INTEGRATED COMMON CORE CURRICULUM: ENVIRONMENTAL EDUCATION THROUGH LANDSCAPE ARCHITECTURE

by

EMILY SWIHART

B.S., Iowa State University, 2007

A THESIS

submitted in partial fulfillment of the requirements for the degree

MASTER OF LANDSCAPE ARCHITECTURE

Department of Landscape Architecture/Regional and Community Planning
College of Architecture

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2014

Approved by:

Major Professor
Mary Catherine (Katie) Kingery-Page

Copyright

Abstract

Recent development and adoption of Common Core State Standards has shifted academic emphasis within public and accredited schools. Consistent, national educational goals have standardized education and have resulted in a challenge to educators to assist all students in achieving maximum test scores. The curricular subjects of math, science, and literacy are the primary emphasis of instruction and achievement. Standardized testing is the dominant means to determine whether students are reaching acceptable achievement.

"Integrated Common Core Curriculum: Environmental Education Through Landscape Architecture" explores the potential of incorporating basic landscape architectural knowledge into a fourth-grade curriculum while striving to achieve learning standards as determined by the Common Core and the Iowa Core Curriculum. Exploring the application of current educational criteria, the researcher developed an educational unit that utilizes the process of park design as a simplified version of a landscape architect's approach in order to emphasize math, literature, science, creative thinking, and teamwork. Implementing environmental education through place-based education theory enhances unit strength by providing enhanced emotional, mental, and physical health benefits to children.

Created during this study, an instructional unit was evaluated by a convenience sample of educators. Through the use of an open-ended questionnaire, preliminary review results indicate a strong potential for the unit to successfully demonstrate the basic process of landscape architecture design through the use of the local place simultaneously achieving academic standards. Review results identify a variety of limitations and challenges the unit would encounter for implementation including a current subject focused instructional philosophy within the school district verse the thematic focus of the unit. Additionally, ever-evolving standards would require regular unit updates, although school districts face perennial budget challenges and educators are limited on time.

As a student of landscape architecture, I recognize that the profession offers a unique opportunity to model place-based, multi-subject practices realized in the practice of landscape architecture. Promoting the profession of landscape architecture through a curricular unit provides an environmental education tool and provides the opportunity for students to explore a career option within the classroom setting.

Table of Contents

List of Figures

List of Tables

Acknowledgements

Enormous thanks to my thesis committee for your time, your patience, and your thoughtful guidance throughout this process. Like all things worth achieving, I could not have done it without the incredible support and assistance of those I admire. I am eternally grateful for the educational opportunities given to me by my very first teachers, Mom and Dad; grateful to my siblings who challenged me every day; grateful to my dearest friends who provide unconditional love and laughter; and finally grateful to my husband, who makes every day a great adventure.

Chapter 1 - Introduction

Inspiration for this study originated from literature that support the theory of place-based education as a process that integrates the local community and landscape into a child's education thereby enhancing ethical, economical, and spiritual connections to child's place (Sobel, 2004, ii) and that appreciation and knowledge should first come from the places closest to us first and expands with child growth and development (Sobel, 2004).

Additionally, a personal interest in early childhood education, and the obligatory regulations and standards imposed on public education inspired the possibility of integrating practices of place-based education into an existing rigorous educational system (Davenport Community Schools, 2013, Academics; United States Department of Education, 2013, Choices). This study aims to suggest and test one method of integrating place-based education into a public school district's educational method.

Perhaps the most well-known text of recent publication, Richard Louv's *Last Child in the Woods* expands dialogue that challenges the current culture of childhood. This dialog questions, analyzes, and discusses the possibility of a healthier way to raise our children. Educators and caregivers are faced with the everyday challenge of how to best prepare students for a successful life during their most formative and impressionable years. The primary challenge lies in determining the best course of action to prepare students for their future and the definition of what successful achievement of this goal resembles.

The world is changing in unpredictable ways. Technologies are expanding rapidly, markets are being created that didn't exist a few years ago and new skill sets are being sought in high demand that were not as highly valued in the past. All of this combined with an increasingly competitive and globalized job market increases pressure to raise contemporary children ready to take on the ever changing world. Achievement of these goals depends upon a myriad of factors, influences, and strategies. As various educational philosophies are implemented, modified, or abandoned to achieve these goals, what cost and what types of lessons are becoming an inherent part of children.

Simultaneously, leaders in the design professions and some educators are embracing scientific research that supports claims that nature and the natural environment offer benefits beyond energy efficiency and aesthetics. This research indicates that interactions with the natural world produce beneficial physical, emotional, and physiological changes in humans (Faber Taylor, Kuo, & Sullivan, 2001; Wells, 2000; Chawla & Cushing, 2007; Hartig, Evans, Jamner, Davis & Garling, 2003; O'Brien, Morris & Stewart, 2012; Pretty, Angus, Bain, Barton, Gladwell, Hine, Pilgrim, Sandercock, & Sellens, 2009; Raanaas, Patil, & Hartig, 2011; Ulrich, 2002; Ulrich, 1984).

As a result, it is proposed that the combination of these two observations warrants a reexamination of our educational system to ensure that students are being as well prepared for the changing economy and job market as possible. Educators continue to be dedicated to readying students to be competent and contributing citizens while evolving technologies, advancing scientific techniques and globalization contribute endless possibilities available to today's youth. The profession of landscape architecture is focused on enhancing landscapes through science-based creative solutions. One approach to bridging the gap between traditional educational systems and a system which utilizes the local landscape in educational efforts is to bring these two professions together; to share resources, knowledge and perspective for the betterment of youth education.

The goal of the study and instructional unit is to explore one way of deepening the appreciation for the natural and cultural connections of life—including student's own communities (Emekauwa, 2004; Larson, Whiting, & Green, 2011; Petty, 2009; Sobel, 2008). It is believed that ultimately through deeper understanding, these future leaders will develop a sense of responsibility toward the place they call home (Sobel, 1996). This study proposes a second look at the criteria being taught to students but through the perspective and experience of a landscape architecture student. The instructional unit proposed attempts to offer a valid alternative to the standard lesson. The developed unit aims to capture some of the benefits of nature exposure by applying the principles of place-based education theory while incorporating educational standards required of the Davenport, Iowa school district.

Chapter 2 - Background and Literature Review

Background

Blooms Taxonomy

Created in 1956, what is commonly known as Bloom's Taxonomy (figure 1) developed as a system to classify the domains of learning into cognitive, affective, and psychomotor (Moore & Stanley, 2010). The three domains of learning are organized as a series of progressions from one level to the next (Moore & Stanley, 2010). This is often illustrated as a pyramid with the more advanced levels of learning ascending toward the top, supported by those previous to them. Cognitive domain classifies knowledge abilities; affective domain defines behavior based attitudes and values; and psychomotor identifies physical skill capabilities (Moore & Stanley, 2010). The nature of this study focuses primarily on the cognitive domain as a resource for establishing learning objectives. Related to the development of 21st Century Skills prioritized by the school district, some learning objectives relate to the affective domain, relating learning objectives to attitudes and behaviors. Learning objectives are generally stated for each daily lesson with a verb referring to the intended level of the cognitive domain and an objective describing the knowledge students are expected to achieve.

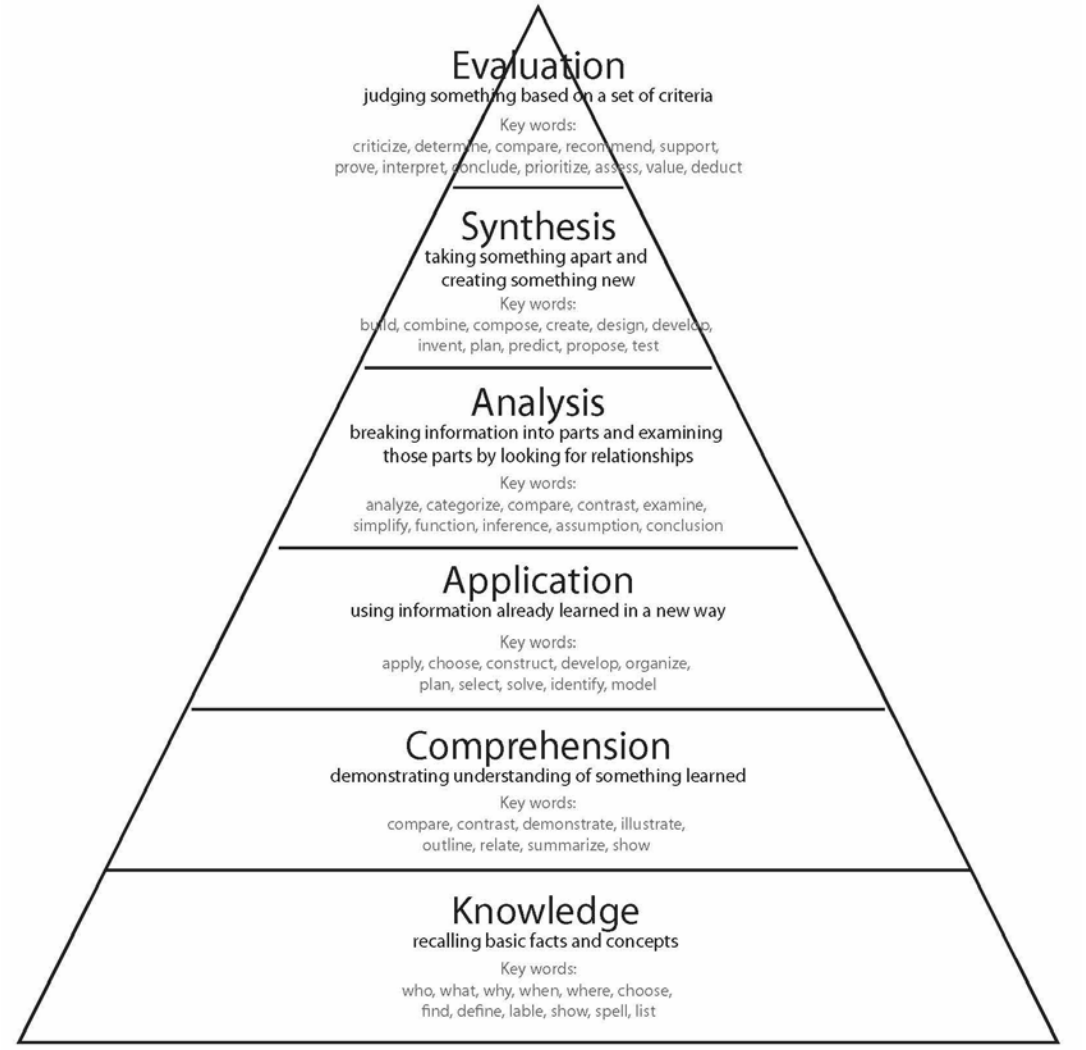


Figure 1 Blooms Taxonomy (created by E. Swihart, adapted from Moore & Stanley, 2010)

This system of learning can be useful in determining an individual's depth of knowledge of a subject from being able to recall information to the highest forms of intellectual evaluation (Moore & Stanley, 2010).

Application of Bloom's taxonomy guided unit development by focusing activities on achieving higher level thinking. As the unit is not meant to be a standalone educational tool, it was not the goal of the unit to achieve each level of cognitive progression, rather used as a tool to challenge and assess students' capabilities.

Age Appropriate Content

Viability and usefulness of the unit relies on a variety of factors not least of which is developmentally appropriate material. Determination of and assessment of the appropriate level of content of fourth-grade curricular material was guided by early childhood researcher and educator Lilian Katz. Katz emphasizes that curricular development requires attention to three questions 1) What should be learned? 2) When should it be learned? and 3) How is it best learned? The answer to each of these questions depends upon the answer to the others (Katz, 1999; Smidt, 2012).

What should be learned: Determining what should be learned relies on the values and preferences of the individual or group of individuals deciding upon the curricular requirements (Smidt, 2010). The values and content subject of the proposed curricular unit was determined after examining schoolyard site potential and realizing an opportunity to utilize the large lot sizes and adjacent open spaces that exists at nearly all of the Davenport Community School District's elementary schools, both urban and rural, as an extension of the classroom.

Described as learning goals, Smidt asserts that no matter the subject of the curriculum, the learning goals will likely fit into one of four categories:

1. Knowledge/understanding
2. Skills
3. Dispositions
4. Feelings

In early childhood education, the ability to apply information accurately within an appropriate context indicates a child understands a subject beyond knowledge (Smidt, 2012; Katz, 1999). For example, a child who has achieved knowledge of numbers may be able to count to ten but has not achieved understanding of the number system until they are able to demonstrate accurately the full implications. Skills refer to behaviors that are easily observed or inferred such as drawing, adding, or friendship-making (Smidt, 2012; Katz, 1999). Disposition is a characteristic of the way a child responds to a situation (Smidt, 2012). For example, a desirable disposition may include curiosity or persistence while an undesirable disposition may include characteristics such as meanness or combative. Dispositions are determined by characteristics repeatedly observed; therefore

disposition relies on the passage of time for establishment (Smidt, 2012; Katz, 1999). Feelings are subjective emotional or influenced states that range in intensity and duration (Smidt, 2012; Katz, 1999). An age appropriate curriculum will implement practices that address and test these four learning goals simultaneously in a way that strengthen the students' ability to advance (Smidt, 2012). A curriculum in which students know information but fail to understand the significance of that information is educationally inappropriate. Similarly, a curriculum in which students achieve understanding of knowledge and skills through a process that invokes feelings of anguish, displeasure or discouragement is equally inappropriate.

When should it be learned: The aforementioned learning goals should occur through the progression of grade levels; determination of the curricular content at a particular level is driven by two dimensions of development: the normative and the dynamic (Smidt, 2012). These address the characteristics and capabilities typical for children of a certain age and weight the progression of an individual child from immature to mature considering the long term impacts of early education (Smidt, 2012). The normative dimension indicates an expected range of what children of a certain age should and should not be expected to achieve. This is balanced by the dynamic dimension which asserts the notion that although a child can do and learn, learning may not promote long term development and knowledge (Katz, 1999).

Cognitive development occurs in three distinct phases that coincide with approximate age ranges. David Sobel identifies the stages of formative years as "early childhood from ages four to seven, the elementary years from eight to eleven, and early adolescence from twelve to fifteen" (Sobel, 1996, p. 11). Pretty describes these three phases as "First Age: 0 to 5 years, Second Age: 6-11 year, and Third Age: 12-18 years" (Pretty et al., 2009, p. 12-13). As the traditional age for fourth-grade students in the Unites States ranges from nine to ten years, both researchers categorize the developmental stage of fourth-graders as being a transitional period of exploration between parentally controlled environments of very young childhood and an age of widespread exploration, discovery and independence of early adulthood (Pretty et al., 2009; Sobel, 1996).

During second age, memories are formed in a continuous sequence whereas memories created during First Age are fragmented (Pretty et al., 2009). Children are also interested in expanding their landscape beyond the range of their backyard into the community, yet usually not so far that it reaches beyond the neighborhood scale (Sobel, 1996). Implications of this development identify this is a critical time during which children develop place attachment and emotional connections to the areas they are exposed. Positive exposure and interactions with natural environments during these formative years can produce adults that are more likely to participate in positive lifestyle activities that involve the natural spaces adjacent to their community; resulting in motivations to understand and protect those natural areas (Larson et al., 2011). Incorporating curricular materials that promote the natural environment is one method of taking advantage of these formative years.

How is it best learned: Studies indicate that children learn most effectively through active involvement as compared to passive observation; as a result Katz reasons that a curriculum supporting interactions will allow students to make better and deeper sense of their environment and experience (Katz, 1999). Additionally, Katz maintains that when formal educational methods are introduced too early, long term implications can be counterproductive (1999).

Applied to curriculum development and implementation, it is reasonably deduced that a system that incorporates a single method of teaching for a diverse group of students will likely fail to successfully instruct (Katz, 1999). This study was developed following Katz' theories, guided by Smidt's four categories of learning goals and striving to incorporate a variety of teaching methods that push students to learn more deeply and naturally.

Common Core State Standards

Created in response to lower than desirable trends in national academic progress, the goals of the Common Core State Standards set clear, nationally sought education achievement expectations (GSCS Video Maker, 2012 October 22). Historically, states independently determined standards for what students should know and are capable of at each grade level (GSCS Video Maker, 2012 October 22; Common Core State Standards

Initiative, 2014). Discrepancies between state expectations made it challenging to compare student educational expectations and achievements nationally (GSCS Video Maker, 2012 October 22; Common Core State Standards Initiative, 2014). The Common Core State Standards was developed in 2009 through a collaborative effort of teachers, school chiefs, administrators, and other educational experts, coordinated by the Council of Chief State School Officers and the National Governors Association Center for Best Practices (Common Core State Standards Initiative, 2014).

The Common Core is designed to set consistent, strong, national standards in English Language Arts and Mathematics (Common Core State Standards Initiative, 2014). These two subject areas are emphasized because they are viewed as the areas in which students build subject skill sets (Common Core State Standards Initiative, 2014). The standards are aligned with international education achievements to produce globally competitive students upon high school graduation (GSCS Video Maker, 2012 October 22).

Implementation decisions are made at the state and local level (Common Core State Standards Initiative, 2014). The Common Core does not mandate the use of specific curriculum or assessment requirements, although there is an effort underway to develop student assessment tools for which states can choose to utilize (Common Core State Standards Initiative, 2014). Adoption of the Common Core at the state level is not mandatory, however currently, "forty-four states, the District of Columbia, four territories, and the Department of Defense Education Activity (DoDEA) have voluntarily adopted and are moving forward with the Common Core" (Common Core State Standards Initiative, 2014). One of the advantages of the Common Core is that it pools resources, adoption of the Common Core results in a reduced financial burden on the state to individually develop standards and assessments. Iowa adopted the Common Core on July 29, 2010 (Common Core State Standards Initiative, 2014). Since adoption, "all school districts and accredited nonpublic schools are required to fully implement the Iowa Core in grades 9-12 by July 1, 2012 and grades K-8 by the 2014-2015 school year" (Iowa Department of Education, 2014). The state of Iowa Department of Education provides school districts with a handbook that provides a process to facilitate planning

Iowa Core Curriculum implementation, including guidance on alignment with Common Core State Standards (Iowa Department of Education, 2014).

Iowa Core Curriculum

The Iowa Core (formerly referred to as the Iowa Core Curriculum and the Model Core Curriculum) was created under the leadership of the Council of Chief State School Officers and the National Governors Association as an instructional tool for districts to use to deliver challenging and meaningful educational content (Iowa Department of Education, Iowa Core, 2013). The Iowa Core is a common set of expectations created to help teachers take "learning to a deeper level by focusing on a well-researched set of standards in literacy and mathematics and essential concepts and skills in science, social studies and 21st century learning" (Iowa Department of Education, 2013, Iowa Core).

The intent of the Iowa Core is three fold. The primary goal is to increase student achievement by ensuring all students engage in rigorous and relevant curriculum (Iowa Department of Education, 2013, Iowa Core). The Iowa Core provides teachers with effective instructional strategies to implement in the classroom as appropriate per the students (Iowa Department of Education, 2013, Iowa Core). Finally, the Iowa Core identifies the essential concepts and skill sets deemed necessary for student success in postsecondary education and an emerging global economy (Iowa Department of Education, 2013, Iowa Core).

The Iowa Core identifies skills and concepts for grades K-12, enabling curriculum to build upon previously mastered knowledge as students' progress through the grade levels (Iowa Department of Education, 2013, Iowa Core). The standards were developed to emphasize required learning achievements, rather than the means of teaching the standards (Iowa Department of Education, 2013, Iowa Core). The Iowa Core identifies characteristics of effective instruction and sets standards on what students need to learn, providing assistance for instruction while leaving the how best to teach students the material to be determined by the districts and educators (Iowa Department of Education, 2013, Iowa Core). Through this approach, school administrators and educators within local school districts are empowered to determine how to achieve grade level standards and provide additional information and resources as appropriate or necessary. The Iowa

Core is in an evolutionary stage as this thesis is being written, with new tools and instructions anticipated in the near future. This is significant for the reason that decisions made on implementing educational theory will be based on a student-centered philosophy addressing learning needs rather than from the perspective of the teacher, resulting in "student-centered classroom focused on students and learning rather than teachers and teaching" (Iowa Department of Education, 2013, Iowa Core).

Implementation of the Iowa Core occurs at the district level. Each school district and accredited non-public school in Iowa is required to create a written plan describing implementation of the Iowa Core (Iowa Department of Education, 2013, Iowa Core). District administrators and educators are responsible for identifying how essential concepts and skills will be taught and developing methods and materials to support students achieving well below or well above the grade-level expectations, including students who are English as a second language learners and students with special needs. The philosophy of the Iowa Department of Education is that all students must have the opportunity to learn and acquire the knowledge and skills necessary to succeed in life post-school (Iowa Department of Education, 2013, Iowa Core).

In compliance with the Iowa Department of Education and the Iowa Core, the school district selected for this study has developed a plan for implementing the Iowa Core. The written plan indicates that the components of the Iowa Core will be communicated to students, educators, families and community members on an ongoing basis, and that the district will support educators and students in achieving the Essential Concepts and Skills identified in the Iowa Core. The district will continue to work to create student-centered classrooms, teaching rigorous and relevant materials assessed via formative and summative assessment methods (Davenport Community Schools, 2013, Academics). Educators will have access to continued professional development and every educational leader will work to create a cohesive system of content, instruction and assessment (Davenport Community Schools, 2013, Academics). The district will also work with families and community members to become actively engaged as partners in implementation of the Iowa Core and student success (Davenport Community Schools, 2013, Academics). All content areas are designed to prepare students to meet college and career readiness expectations.

Educational Subjects

Literacy is identified as integral not only for success in language arts but in all other subject areas (Iowa Core Curriculum, 2013, Literacy). To be literate is to be able to read, write, speak, listen, and think effectively across a variety of content areas (Iowa Core Curriculum, 2013, Literacy). A literate student is able to successfully communicate with others what they know and what they have learned. As an interdisciplinary skill, literacy needs to be developed across the curriculum within mathematics, science, social studies, and 21st century skills (Iowa Core Curriculum, 2013, Literacy).

The Iowa Core Curriculum identifies fundamental concepts that have guided the creation of the literacy curricula (paraphrased, Iowa Core Curriculum).

1. Demonstrate independence: able to comprehend and evaluate complex text across a variety of disciplines
2. Build strong content knowledge: able to establish a base of knowledge across a wide range of subjects.
3. Respond to varying demands of audience, task, purpose, and discipline: able to adapt communication in response to audience, task, purpose, and discipline.
4. Comprehend and critique: Able to engage and remain open-minded readers and listeners, working to understand an author or speaker and engage in thoughtful dialogue.
5. Value evidence: Able to cite specific evidence when offering oral or written interpretation of text.
6. Use technology and digital media strategically and capably: Able to thoughtfully employ technology to enhance reading, writing, speaking, listening and language use.
7. Come to understand other perspectives and cultures: Obtain an appreciation for twenty-first-century classroom and workplace settings often offering diverse cultural backgrounds, experiences, and perspectives.

The Iowa Core Mathematics standards provide school districts with recommendations for curriculum, instruction, and assessment as well as content and mathematical practice standards. These standards are based on "important 'processes and

proficiencies' with longstanding importance in mathematics education" (Iowa Core Curriculum, 2013, Mathematics). Eight mathematical practices identified by the Iowa Core Curriculum describe the variety of expertise instructors should seek to develop in all students (paraphrased, Iowa Core Curriculum).

1. Make sense of problems and persevere in solving them: Able to explain the meaning of a problem and seek methods for generating a solution.
2. Reason abstractly and quantitatively: Able to make sense of quantities and the relationship they have within problem solutions.
3. Construct viable arguments and critique the reasoning of others: Able to comprehend and utilize stated assumptions, definitions, and previously established results while formulating an argument.
4. Model with mathematics: Able to apply mathematical principles to solve problems within everyday life, society and workplace situations.
5. Use appropriate tools strategically: Able to consider available tools when seeking to solve mathematical problems.
6. Attend to precision: Able to communicate precisely with others.
7. Look for and make use of structure: Able to look for and identify patterns or structure in mathematical problems.
8. Look for and express regularity in repeated reasoning: Able to recognize when calculations are repeated and identify general methods and shortcuts.

The Iowa Core Mathematics states that in order to achieve these standards, rich mathematical tasks are necessary for students to fully develop conceptual understanding and skill. For a mathematical task to be rich it must involve 1) problem solving methods including problem-based instructional tasks and 2) practice mathematical skills in a meaningful, purposeful and distributed manner (2013, Mathematics). Problem-based instruction helps students develop a deeper understanding of mathematical concepts by emphasizing connections across math content areas, to other disciplines, and real world experiences. Mathematical study that occurs systematically distributes short periods of practice and reinforcement over long periods of time to enhance concept understanding (Iowa Core Curriculum, 2013, Mathematics).

The Iowa Core Mathematics Standards have been developed to define what students should be learning and be able to perform at the completion of the grade level study of mathematics.

The **Iowa Core for Science** provides a comprehensive model for educators to teach both content knowledge and process skills. Responding to an ever increasing technological world, traditional methods of instructing science courses have been redesigned to clarify and raise expectations (Iowa Core Curriculum, 2013, Science). According to the Iowa Core, students proficient in scientific skills have the ability to (Iowa Core Curriculum, 2013, Science):

1. Know, use, and interpret scientific explanations of the natural world.
2. Generate and evaluate scientific evidence and explanations.
3. Understand the nature and development of scientific knowledge.
4. Participate productively in scientific practices and discourse.

The overall belief is that all students should experience science through rigorous and relevant curriculum that offers a global perspective, opportunities for collaboration and an obvious connection to other areas of study (Iowa Core Curriculum, 2013, Science). Eight categories of standards are identified; the first four are content specific while the remaining four focus on application of knowledge (Iowa Core Curriculum, 2013, Science).

1. Science as Inquiry
2. Physical Science
3. Earth and Space Science
4. Life science
5. Science and Technology
6. Science in Personal Perspectives
7. Science in Social Perspectives
8. History and Nature of Science

The **social studies** portion of the Iowa Core Curriculum is an integrated study of social sciences and humanities to help students develop the capability "to make informed and reasoned decisions for the public good as citizen of a culturally diverse, democratic society in an interdependent world" (Iowa Core Curriculum, 2013, Social Studies).

Through the study of social studies, students gain an understanding of the concepts that provide civic competence allowing them to actively participate in society (Iowa Core Curriculum, 2013, Social Studies). Competencies in the social sciences have been organized around the five content areas of (Iowa Core Curriculum, 2013, Social Studies).

1. Behavioral science
2. Economics
3. Geography
4. History
5. Political science/civil literacy

Through instruction, students inherit the ability to identify, define and apply knowledge and skills associated with political, economic, and social systems in which they live; this includes a historical context that creates the spatial, temporal and cultural perspective within the world (Iowa Core Curriculum, 2013, Social Studies).

The fifth and final section of the Iowa Core Curriculum was created to address the need for students to be competitive in the **21st century global** economy. The world economy evolved from an industrial era to an informational era; it is believed that the future will be known as the creative era, belonging to those who will be able to keep pace in an increasingly complex economic environment. Iowa schools need to help students develop the capacity to apply academic knowledge to real life situations. No matter the field of work, basic essential skills are required to lead satisfying, productive lives (Iowa Core Curriculum, 2013, 21st Century Skills). Minimal skills required as identified by the Iowa Core Curriculum include (Iowa Core Curriculum, 2013, 21st Century Skills).

1. Employability skills
2. Financial literacy
3. Health literacy
4. Technology literacy
5. Civic literacy

Another way of considering skills necessary for survival include the ability to critically think and problem solve, collaborate and lead, adapt, take initiative, communicate, access and analyze information, and demonstrate curiosity and imagination (Iowa Core Curriculum, 2013, 21st Century Skills).

Standards and Benchmarks

The selected school district responded to the Iowa Core Curriculum by developing a series of standards and benchmarks for each grade level and for each content area. A complete list for all grade levels is available on the school district's website. For the purposes of this study, only the standards and benchmarks for the fourth-grade level were considered.

The school district's standards and benchmarks are organized into fourteen content areas, each including a series of Standards proceeded by a Power Benchmark, under which a Grade Level Benchmark exists (Davenport Community Schools, 2013, Academics). Each Grade Level Benchmark has an optional list of vocabulary, and a series of skills. As students' progress through school, quantity of content areas increases, adding areas of study more focused on preparing students to enter a continuing higher education institution or the work force. Content areas for the primary grade levels include: Physical Education, Language Arts and Reading, Information Literacy, Music, Social Studies, Science, Health, Mathematics and Visual Arts (Davenport Community Schools, 2013, Academics).

For each subject area, Standards and Benchmarks have been identified by the school district for curricular reference. The general organization of each subject area's Standards and Benchmarks is a hierarchy system in which the Subject Area encompasses a series of Power Benchmarks. Each Power Benchmark includes a list of Grade Level Benchmarks. Each Grade Level Benchmark has a corresponding list of vocabulary works and skills to be accomplished. The school district organizes the set of these in a matrix—a sample matrix is visible in Table 1.

Fourth-Grade Number & Operations		
Number & Operations – Standard 1: Understands and applies concepts of number and operations		
Power Benchmark 1: Understands numbers, ways of representing numbers, relationships among numbers, and number systems		
Grade Level Benchmark	**Vocabulary**	**Skills**
a: Demonstrates the place-value structure of the base-ten number system and is able to represent and compare whole numbers to hundred thousands and decimals to thousandths ITBS*	☐ Tenth ☐ Hundredth ☐ Thousandth ☐ Decimal ☐ Decimal fraction ☐ Greater than ☐ Less than ☐ Equal to ☐ Digit ☐ Compare ☐ Place value ☐ Place value chart ☐ Decimal point ☐ Negative number	☐ Explores the concept of 1,000 4.2 ☐ Explores the concept of 10,000 4.2 ☐ Reads, writes, and compares whole numbers having up to six digits 4.1,4.3, 4.4, 4.5, 12.1, 12.3(ITBS) ☐ Demonstrates the place-value structure of the base-ten number system to hundred thousands and is able to represent and compare whole numbers 4.1,4.3, 4.5, 10.5,12.2, 12.3, 12.4 (ITBS) ☐ Demonstrates the place-value structure of the base-ten number system to hundred thousands and is able to read and write decimal fractions through the hundredths and thousandths place 10.5, 16.1, 16.2, 16.3, 20.4, 21.1 ☐ Compares and orders decimals 21.3 ☐ Estimates the location of fractions on a number line 10.3, 17.1
b: Recognizes equivalent representation for the same number and generates them by composing and decomposing numbers ITBS*	☐ Factor ☐ Multiple ☐ Square number	☐ Recognizes equivalent representations of the same number and generates them by decomposing and composing numbers 14.2, 14.3, 14.4, 14.5, 18.1, 18.2, 18.3, 18.4, 18.5 (ITBS)

Table 1 Organizational System Example of Iowa Core Curriculum Standards and Benchmarks for Mathematics (Davenport Community Schools, 2 September 2009)

Literature Review

Environmental Education Movement

The contemporary movement focused on helping children connect with nature must be explored prior to explaining methods of connecting children to the outdoors through education and curriculum. Known by various names, the movement focuses on creating resources, networks and supportive research that assist individuals in applying this knowledge at home, in classrooms, and within communities; all in an effort to provide children with the opportunity to physically, mentally, and emotionally explore the natural world. Educational, academic, and social benefits have been demonstrated

through the use of educational methods that take learning beyond the school building walls (Broda, 2007).

One of the leading authors of the movement, Richard Louv, introduces his well-known book *Last Child in the Woods* with a story of his two young boys inquiring why "it was more fun when you were a kid?" hinting at the desire to live the stories they heard of a free roaming childhood through woods, fields, ravines, and swamps (Louv, 2008, p. 1). Louv, as well as numerous other authors, have documented accounts of children with similar longings (Louv, 2008; Moore, 1997; Sobel, 1996; Broda, 2007). In one single generation, it seems that families have evolved from children roaming free through the neighborhoods and fields to an over scheduled, organized sports obsessed, indoor dwelling culture (Moore, 1997; Louv, 2008).

The catalyst for this evolution can be identified in many sources; a reaction to a change in environment, a response to cultural changes of a more competitive society, or dwindling opportunities for access to naturalized areas (Kareiva, 2008; Moore, 1997). The exact cause is uncertain and complex. It is known that society is evolving, childhood is changing and this will results in different outcomes.

Operational Definitions

As this movement continues to gain momentum, a web of various perspectives, approaches, and desired outcomes will continue to emerge; each adding to the whole while maintaining individuality. Entering its third decade, momentum within the movement is picking up and sectors of the movement are becoming clear with more defined focus, clearer goals for how to solve challenge of reduced children-nature interactions, and a growing body of literature. New terminology is being developed or redefined as the movement evolves. The following operational definitions allow an accurate exploration of environmental education.

Nature-Deficit Disorder: Perhaps, currently, the most well know term of the outdoor education movement, coined by Richard Louv in *Last Child in the Woods*, nature deficit disorder "describes the human costs of alienation from nature" (Louv, 2008, p. 36). The losses include a diminished use of the senses, enhanced difficulties focusing, and increased rates of mental, physical, and emotional illness in individuals, families, and communities (Louv, 2008).

Biophilia hypothesis: A term used by E.O. Wilson, a Harvard professor, to describe the belief that people have an innate connection to nature and other living organisms via biological evolution; therefore, as our species evolved we have continued to maintain a dependence on nature that extends beyond physical and material sustenance to include the desire for aesthetic, intellectual, cognitive, and spiritual meaning (Louv, 2008; Louv, 2008). The hypothesis maintains that humans are inherently drawn to the natural world, speculating that this innate affinity comes from a biologically based need integral to our development and survival (Moore, 1997). It has been a relatively short amount of time that humans have existed not as a hunter and gatherer species but a cultivation to which biology has yet to evolve; therefore humans maintain a need for occasional immersion in natural environments (Louv, 2007).

Environmental Education: An organized educational effort to teach children and adults about the environment through investigation techniques; incorporating a variety of subjects to develop an understanding of how the environment works (North American Association for Environmental Education, 2013). The intended outcome enables a person to make intelligent, informed and responsible decisions about how to protect and care for the environment (NAAEE, 2013).

Nature Literacy: Defined as "the ability to learn from and respond to direct experience of nature" and through this literacy, nature appears "as a connected, inclusive whole" (Sobel, 1996, p. vi). As nature literacy is pursued, it is necessary to redefine "community as an interwoven web of nature and culture, a relationship marked by mutual dependence and one enriched and sustained by love" (Sobel, 1996, p. vi).

Ecophobia: A fluid term, meaning the fear of ecological deterioration (Louv, 2008; Sobel, 1996) or the fear of home. Either way, ecophobia addresses a concern that curriculum is failing to teach students to understand and appreciate the landscape of their home. Curricular trends emphasize the global scale of environmental challenges without first developing an understanding of ecosystem complexities within their neighborhood and region (Louv, 2008; Sobel, 1996).

Ecopsychology: A theory describing the effects direct interactions with nature have on the human psyche (Roszak, 2001). The theory asks for the analysis of not only what we do for the earth but also what the earth does for us (Louv, 2008). Applied to the

education of children and the study of the natural world, ecopsychology emphasizes that "worship of secondary experience in childhood came with the risk of depersonalizing human life" (Louv, 2008, p. 66). The foundation of the practice is the belief that there is a "synergistic relation between planetary and personal well-being" (International Community for Ecopsychology, 2004).

Place-based Education: Also known as community-based education, experiential education, or environmental education; Place-based Education is a pedagogy that involves students and educators in community challenges and seeks to inspire students to become engaged in their local cultural identity, traditions, and history (Sobel, 2005; Sobel, 2005). It is asserted that disintegration from the land and local community can be redirected to support fundamental beliefs in creating a sustainable, resilient economy, environment, political and social structure at a local level (Sobel, 2005). Thought of as the reintegration of the individual into their homeland, a reestablishment of the link between a person and the place in which they reside (Sobel, 2005).

Outdoor Education: A general term used to describe the idea that the outdoors is another tool to be used to achieve learning in students (Broda, 2007). A broader scale of the social and education movements focused on relating children to the outdoors through formal and informal education. Using the outdoors as a classroom, encouraging exploration of natural materials, posing questions whose answers connect people to the landscape exemplify methods of implementation of outdoor education; the scale of the outdoors is less defined.

Collectively, these terms help to identify some of the primary challenges that gave rise to this movement and define some of the favored solutions to address the separation of human education and nature. As part of a larger outdoor education movement, the differences in theory and philosophy occur in goals and implementation. Exploration of the differences is necessary to select the most appropriate guidelines for this study. Without identifying the pedagogical parameters, the study risks weakening its validity due to the lack of comparisons by which to measure results.

Nature Literacy

The Place-Based Education Movement focuses on teaching students about environment at the level appropriate to their cognitive capabilities and emotional needs

within the context of the local community. Place-based education encourages students to open their eyes to the systems that form the outdoors and understand nature as an innate part of their being and the community in which they live.

In practice, the study of the environment should begin from a positive approach, teaching students to appreciate and love a place before being confronted with the challenges that face that same environment (Sobel, 1996; Sobel, 2005; Louv, 2008). For example, a unit focused on the study of plants would first look at the plants of the local region rather than jumping directly to the rainforest. These plants are tangible and real to students; the rainforest is likely never going to be experienced by students (Sobel, 2008; Sobel, 2004). Second, the unit would look at the plants in a positive light, perhaps looking at the benefits they provide people, or the home and food they provide wildlife rather than talking about potential threats such as invasive species or deforestation. Teaching students to love the environment and respect it for the benefits it provides through hands-on, local teaching will help students start small in their understanding of the world. As cognitive and emotional development progresses, the introduction of threats facing the environment will have a more solid foundation for discussion and understanding (Sobel, 1996). Starting at a smaller scale, one that is more easily accessible and perceivable (local), then expanding in scale (regional, continental, global) as knowledge expands is a core principle of the Place-Based Education Movement.

The danger in prematurely teaching lessons about environmental threats and challenges is that students can feel helpless to solve the problems of the world due to the scale of the issues, the lack of complete comprehension of the issues, and a lack of direct connection to the issues, physically and emotionally (Sobel, 1996; Louv, 2008). The solution is simple and right out the schoolhouse doors. Everywhere has a 'here and now' in the local environment which is tangible to students, easily accessed before, during and after the school day, and provides an inexpensive learning lab for teachers of all subjects. Once this is recognized and accepted as an invaluable resource to the school, teachers then need to be empowered to take full advantage of this resource.

Once teachers and administrators are 'on board' for teaching in the outdoors, the next step is to support teachers in utilizing the environment. A very real possibility that needs to be considered and resolved is that teachers may agree with the ideology of the

movement, they may be incapable of implementing the principles for a number of reasons: lack of knowledge, lack of supporting materials, or fear of the outdoors (Pretty et al., 2009). The first two can be overcome through the support of administration, partnering with local resources or curricular materials that provide adequate guidance and information. Most educators by training are not naturalists, biologist, or any other type of outdoor expert; they are trained experts at helping students learn and need to be provided with resources and assistance utilizing the natural world. The ideas and methods proposed in the Place-Based Education Movement require an ideology shift and a curriculum shift. To fully implement and achieve the goals of the movement, teachers, administrators, or publishing companies are going to need to find, provide, and/or create appropriate curricular material.

The third challenge to equipping educators to take classroom units outside is likely the most challenging. Overcoming the fear of the outside requires educators so committed to the potentials and ideology of the Place-Based Education Movement that they challenge their personal preconceived ideas and discomforts. Educators can become more comfortable and confident in the natural environment though controlled exposure with more experienced adults.

The degree to which an acceptable level of nature literacy is achieved and measured will in large part be determined by each school district. However, at a minimum, it becomes a conscious effort on the part of the administration and educators to find ways to incorporate experiential educational opportunities, even if the curriculum remains unchanged.

As described by Louv, when schools are challenged to incorporate place-based learning, we "will help students realize that school isn't supposed to be a polite form of incarceration, but a portal to the wider world" (Louv, 2008, p. 226). If schools, educators, administrators and local resources are able to work together to overcome challenges, students will be provided a more rich educational experience allowing them to see their community more inquisitively and with greater appreciation.

Technology in Outdoor Education

As with any educational reform type of movement, the goal is to improve the successes of the educational system. In trying to make progress, it is inevitable and

valuable that methodologies are scrutinized and theories are challenged. As the place-based education movement gains popularity, technology becomes a concern. Technological advances occur and students need to be prepared to utilize technology.

The utilization of the natural world in education is not about a technological reversal; it is about promoting knowledge and skills that allow students to recognize complexities, analyze various forms of data, and develop creative problem solving skills (Louv, 2008). Knowing when and how to utilize the right tool for the job is essential – all levels of technology are at the most basic level tools for use (Louv, 2008). Nurtured properly, these skills will assist students in all forms of professional and personal success (Sobel, 2008). At its most simple, it is essential that the value of the natural environment be instilled in the future generations for survival. Society will continue to depend upon the fruits of the earth for our survival. We need clean drinking water, we need nutritious and diverse foods, we need clean air to breath; all of these things and more require a healthy earth and a healthy relationship with the earth.

Second, technologies have been used in the context of the natural world for as long as human history (Louv, 2008). Teaching students to be keen observers of natural patterns can be enhanced through the proper application of technology. Technology can aid in solving the challenges of cohabitating earth with other creatures, but as with any challenge, it is essential to be able to understand complexities prior to creating a viable solution (Louv, 2008). Students equipped with the ability to apply a variety of disciplines are equipped to consider multiple solutions, to observe and evaluate each potential solution logically, and will be properly prepared for whatever the future holds.

For adults in a global society, it is easy to think of the earth as a whole. Adults can travel nearly everywhere and obtain goods from nearly everywhere. But for children, the world is much smaller, much simpler. A child's world begins in the back yard; as children age, their world expands to include the surrounding neighborhood (Sobel, 1996). As a child grows, their world grows to include the rest of the community, eventually reaching the global scale. Just as children don't age overnight, neither does their capacity to understand the complexities of the world, they obtain this capacity with time. Just as a child's perspective of the world evolves as they grow, so should the advancement of technology that is used to explore the natural world (Sobel, 1996).

Initially, experiences in nature don't require expensive equipment, advanced knowledge of ecosystems, plant biology, animal habitat, or even species identification (Louv, 2008; Sobel, 2004). All of these things and more can be experienced without pre-existing knowledge and technologies, especially through the eyes of children. Curiosity, exploration, inquiry, and guided research help students learn more than technicalities; it helps them acquire an appreciation and admiration for the environment on a local scale (Sobel, 1996). It helps them become better stewards of the land, higher level thinkers, problem solvers, and more curious and aware people (Sobel, 2004).

As technology is used to aid in exploration and knowledge expands so should the level of technology expand. Technologies range from primitive tools such as a compass or plumb-bob apparatus to handheld Global Positioning Systems (GPS) to advanced Geographic Information System (GIS) mapping and analysis tools (Broda, 2007). As understanding is developed and knowledge is advanced, the introduction of greater technologies can aid and enhance the process of understanding natural connections, challenges and solutions. Without the proper preparation and understanding, advanced technologies can detract from the educational goals, even running the risk of becoming a frustration that inhibits learning.

Cultural evolutions and rapidly changing technologies have made it difficult to determine the appropriate type and amount of technology to incorporate into a curriculum. As district demographics have become increasingly suburban, the average child of today experiences fewer opportunities to access the great outdoors than children of decades past.

Over the past forty years, the U.S. Census has recorded a steady increase in the urban population and a decline in rural population (U.S. Census, 1995; U.S. Census 2003). Recreation and relaxation activities have declined in the hierarchy of priorities, especially free play: physically active and mentally refreshing activities (Louv, 2008). The loss of natural spaces for free play, the invention of attractive indoor alternatives predominately related to electronic devices, and general fear of the outdoors has assisted the decline of child interactions with natural places (Louv, 2008; Pretty et al., 2009; Moore, 1997; Kareiva, 2008). Some studies indicate that the amount of time children spend in natural areas has declined to less than 10% of children playing in natural areas, a

dramatic decline from an estimated 40% of children one generation ago (Pretty et al., 2009).

For many, time spent enjoying and exploring nature has become an activity reserved to vacations, a rare anomaly that is not part of everyday life (Louv, 2008). It seems that nature exploration is an activity only available in some far off land, which requires traveling long distances to enjoy; perhaps to a State or National Park and real connections to nature in everyday life are infrequent experiences, assumed to be removed from our own communities (Louv, 2008).

Health Benefits of Place-based Education

Place-based Education is much more than theory on how best to educate students; it is a theory on how to improve all aspects of a student's educational experience. Preliminary research strongly suggests that real, physical interactions between humans and nature positively affect mental, physical, and spiritual health (Taylor & Kuo, 2001; Ulrich, 1981, Moore, 1997). Taking advantage of educational opportunities to incorporate exposure to nature could be considered a necessity for healthy child development and living, much like proper nutrition and adequate sleep (Moore, 1997). With this approach, the idea of incorporating elements of nature into the daily lives of adults and children becomes a more urgent matter. Professional landscape architects, and parallel professionals, can influence the quality of nature available but it is up to the individual to choose to experience it—at least it is entirely up to adults. Children can still be influenced and encouraged to experience and interact with the environment.

Emotional and Mental

Nature has long been considered to possess qualities that assist in mental and emotional wellbeing. The impact of these benefits have implications reaching from home life to the schoolyard and beyond.

In 2004, researchers published the results of a four year study of use of prescription antidepressants among children and adolescents; the finding demonstrated an overall increase in use of 49 percent from 1998 to 2002 with increases significantly higher among female populations than male (68 percent to 34 percent respectively) (Delate, Gelenberg, Simmons, & Motheral, 2004).

In 1984, Roger Ulrich published research findings that hospital patients recovering from surgery had quicker recovery time, fewer doses of narcotics for pain, slightly fewer complications and an overall better attitude when recovering in rooms with a view of trees versus a brick wall (Ulrich, 1984). In 2003 Cornell University released a study indicating that a room with a view of nature helped protect children against stress, and nature in and around the home can produce significant beneficial results in child psychological well-being (Louv, 2008, 50; Wells & Evan, 2003). The standards for being an accredited hospital or healthcare facility, in-part, require management and relief of pain (Diette et al., 2003). The findings of these studies suggest that access to natural scenes can assist in meeting accreditation standards by improving patient health and outcomes. To explain these outcomes, researchers identify stress reduction as the primary influence; as such views of natural settings can evoke positive emotions and distractions (Raanaas et al., 2011). In addition to study results that indicate positive health benefits of nature exposure to those in the healthcare system, new studies indicate that it can also improve cognitive abilities within children and improve their resistance to negative stresses and depression (Louv, 2008).

The benefits of time and exposure to nature apply to everyone. For those living with ADHD, these life improvements can mean the difference between educational and social success or not. The symptoms of ADHD manifest as unusually high and chronic levels of inattention and impulsivity/hyperactivity (Kou & Taylor, 2004). In 2010, the Centers for Disease Control and Prevention released the results of a survey that indicated an increase of 21.8 percent in parent-reported ADHD diagnosis during 2003 to 2007 among youth aged 4 to 17 years (Visser et al., 2010). Studies suggest that traditional medication regimens may not be the only treatment option available to those living with ADHD; one study indicated a disproportionally higher rate of symptom reduction in children active in green outdoor spaces, converse results indicate a disproportion rate of symptom exaggeration in outdoor environments void of greenery (Taylor & Kuo, 2001; Kuo & Taylor, 2004).

Time in nature can help relieve symptoms of ADHD and reduce stress, boost a child's attention span, improve motor coordination, and increase their ability to concentrate on task; therefore student benefits include enhanced ability concentrate in the

classroom, be less disruptive, increase enthusiasm and engagement, achieve higher critical thinking levels and ultimately achieve higher academic success across multiple disciplines (Sobel, 2004; Pretty et al., 2009; Loucaides, 2004; Louv, 2008; Taylor & Kuo, 2006). Studies results indicate that schools and communities should strive to plan for and develop programming that encourages children to interact, engage, and learn with nature (Pretty et al., 2009). The use and enjoyment of natural settings recognized as a preventative and treatment option for those suffering from mental health ailments and could serve as inspiration for government policies that reflect and support these benefits (O'Brien et al., 2012).

In addition to producing beneficial results for students, the positive impact can carry over to school staff and visitors. Researchers measured physiological and psychological restoration in subjects stressed due to an urban commute to work or completed a series of challenging tests, results indicated that blood pressure data and emotional self-reports recovery was considerably greater in persons looking at a nature setting verse those viewing a built environment without natural elements (Ulrich, 2002). Two studies compared brainwaves of unstressed persons; results indicate that those looking at plants were more relaxed than when looking at manmade objects (Ulrich, 2002). These studies indicate visual exposure to nature lasting only a few minutes can produce significant recovery from stress. When time is especially valuable and it is essential to perform tasks as a high level of efficiency, such as in the medical field or educational system, the ability to reduce stress quickly can result in higher job satisfaction, reduced absenteeism and staff turnover, and enhance job performance (Ulrich, 2002). One study sponsored by the Learning Through Landscapes Trust produced results that suggest that the presence of nature is a primary reason students feel positive about the school environment (Moore, 1997).

Physical

Some of the most significant mental and physical health challenges facing society today can be linked to an increasingly sedentary lifestyle and modern diet; it is argued that many of these issues could be addressed through an increase in physical activity in natural landscapes (Pretty et al., 2009). Children are particularly influenced by physical activity and nature exposure during the formative years. As illustrated in Figure 2: Life

Pathways, this has the ability to impact the child's lifetime health and longevity (Pretty et al., 2009). Statistics estimate that, within the US, these more sedentary lifestyle changes cost an estimated $90 billion per year and an estimated 30,000 deaths could be prevented each year with a more active lifestyle (Pretty et al., 2008).

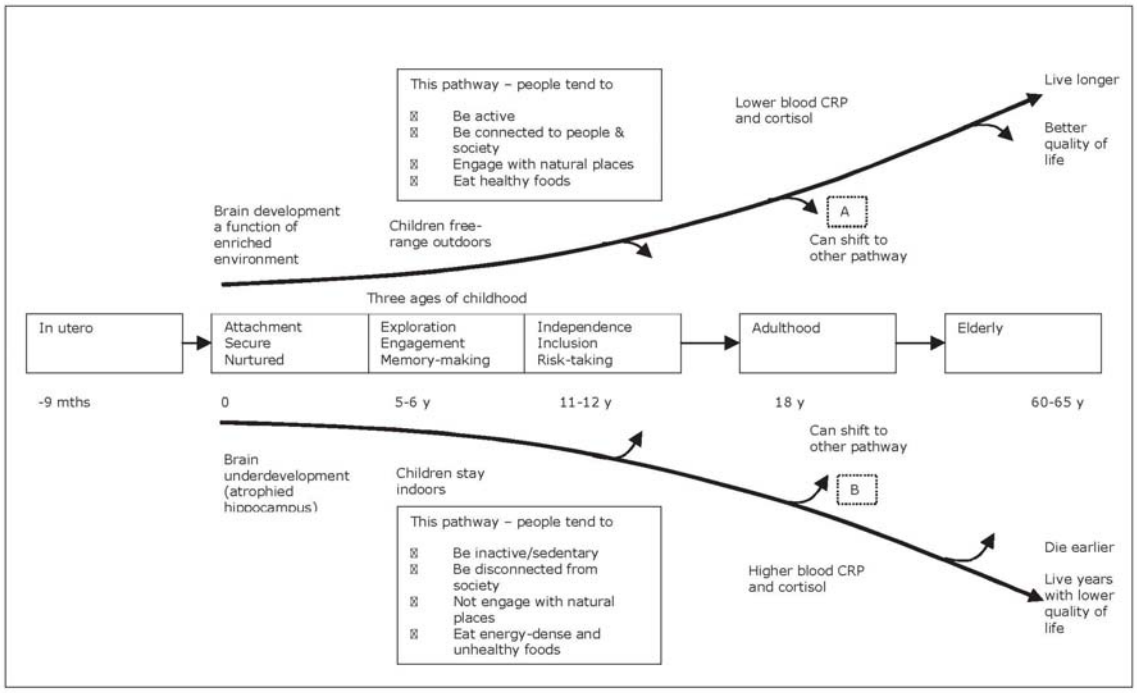


Figure 2 Life Pathways (reproduced with permission from Pretty et al., 2009, p. 6)

Students are being educated in a society that employs nearly twice as many inactive jobs as the previous generation, television viewing time has increased, leisure time has decreased, there are more cars per owner and fewer miles traveled via alternative modes including foot and bike traffic (Pretty el al., 2009; Louv, 2008). The long term ramifications of this include a culture unfamiliar with and unaccustomed to a lifestyle that promotes health.

The idea of 'green exercise' is proposed by Pretty as participating in an activity within the presence of nature (2009, p. 10). The types of outdoor exercise most popular today often take place on a ball field with an organized team but this is neither true outdoor play nor does it seem to be an adequate method for promoting health in youth; as observed, the obesity epidemic coincides with the greatest increase in organized youth

sports in history (Louv, 2008). Green exercise is most valuable when unstructured, allowing for imaginative exploratory play in natural settings (Louv, 2008). One study from Norway and Sweden observed preschool students playing in natural settings, results indicate children who play in natural areas achieved higher levels of motor fitness, especially in balance and agility (Louv, 2008). Another study assessed activity levels of preschoolers in natural settings using methods that analyzed relationships between child's weight, parental weight, percentage of time spend outdoors, and children's activity level (Klesges, Eck, Hanson, Haddock & Klesges, 1990). Study results indicate that "family risk for obesity (number of parents overweight), the physical environment, and child relative weight were significant, independent predictors of children's levels of physical activity" (KEHHK, 1990, p. 444). Continued research is needed to better interpret these studies, it is obvious that there is a connection between 'green exercise' and the overall health of a child.

It is known that physical activity results in a variety of positive physical health impacts in both children and adults (Loucaides, 2004). Physically, health outcomes of increased activity range from decreased blood pressure, decreased cholesterol levels, decreased body mass, reduced risk for cardiovascular disease, reduced risk of Type 2 diabetes, reduced risk of developing osteoporosis and overall improved health (Loucaides, 2004; KEHHK, 1990). Factors that influence the amount of physical activity a child is able to participate in range from time of year, to guardians ability and eagerness to provide transportation, geographical location, and environmental variables (Loucaides, 2004).

The majority of studies that examine the factors influencing the increased percentage of overweight youth have not examined the role environmental conditions play in the epidemic (Joens-Matre, 2008). Of the few, one study compared the impact geographic factors have on the amount of physical activity urban and rural students receive (Loucaides, 2004). Results demonstrate that significant interactions between season and geographic locations relate to activity levels (Loucaides, 2004). Children residing in urban conditions were more active than rural children during winter months but were far surpassed in activity levels during summer months (Loucaides, 2004). These results can be explained by observing that rural children spent significantly more time

outdoors than urban children therefore when temperatures dropped so did physical activity levels (Loucaides, 2004) (Table 2). The condition of the outdoor environment greatly impacts the amount of physical activity experienced by children. Contrary behaviors were observed in urban children whose physical activity remained relatively consistent throughout the changing seasons; it was concluded that these children likely had more access to at home exercise equipment and/or transportation to places where physical activity could be achieved (Loucaides, 2004).

	Urban school children (n = 116)		Rural school children (n = 96)	
	Mean	SD	Mean	SD
Winter	13583	4313	12436	3610
Summer	14531	4901	16450	5134

Table 2 Means and SDs of total daily step counts for urban and rural school children (reproduced with permission from Loucaides, 2004)

Another study examined youth in the Midwestern United States. Similar to Loucaides' study, this research focused on physical activity as it relates to the prevalence of obesity in children in rural versus urban areas but produced results that contradict those of Loucaides (2004; Joens-Matre et al., 2008). The Joens-Matre study suggests that students in rural and small cities are more active than urban children (2008) in spite of the lower average socioeconomic status which has been associated with lower activity levels (JWCRNH, 2008). Children in rural areas were observed to have slightly greater physical activity levels after school while the greatest difference was observed in the comparison of activity levels during the school day lunchtime during which urban children participated in less activity than rural children (JWCRNH, 2008). Study results suggest an increased effort to activate children during the school day can produce measurable health benefits. A reexamination of the environmental conditions may provide additional insight to the result of these studies.

Examination of patterns and hindrances to physical activity in youth, school districts can better understand how to deliver a curriculum that encourages complete development. Incorporating activities that promote physical activity, exploration of natural places, and connections to the community simultaneously promote healthy lifestyle activities.

Social

Physical exposure to natural environments has proven beneficial; the form of interactions within nature can enhance or detract from benefits. The type and quality of benefits achieved through exposure/play in natural landscapes is diverse (Moore, 1997). Structured and unstructured interactions with nature produce short term and lasting benefits to children (Moore, 1997). Structured interactions produce deeper understanding, sustained academic development and appreciation for the landscape; unstructured interactions promote healthy personal development (Moore, 1997). Environments designed to emphasize formal play (gyms, play structures, pools, etc.) greatly influence the play patterns that occurs within the area (Pretty et al., 2009; Moore, 1997). Conversely, natural environments are ever changing which greatly encourages explorative, creative play (Pretty et al., 2009).

When the natural area is viewed as a social space, children who are allowed to participate in informal play expand their sense of freedom, creativity, independence, and inner strength proving useful during times of increased stress (Pretty et al., 2009; Moore, 1997). Children spend more time interacting in cooperative groups, positive social interaction was elevated and more mixing of age, sex and ethnic backgrounds occurred during play sessions in landscapes dominated by natural elements (Moore, 1997). Activity occurring in natural settings enhances facilitation of more social behavior between strangers, providing an opportunity to expand social networks and social circles (O'Brien et al., 2012). This is relevant to the extent that participants in one survey agreed or strongly agreed that visiting with people was most important to their ability to enjoy a visit to a woodland (94%), second was taking part in organized activity (78%) and third, meeting new people (71.5%) (O'Brien et al., 2012).

Children that are allowed and encouraged to play in natural landscapes form memories and emotional attachments to those types of environments (O'Brien et al.,

2012). One study reviled a strong connection between past and present experiences where 80% of participants agreed or strongly agreed that having experienced woodlands as a child was important and influential (O'Brien et al., 2012).

Beyond providing space for people to interact with each other, nature is often sought as a place of refuge and solace (Louv, 2008). In one survey, the most common response concerning the benefits of woodland experiences were related to "peacefulness, calm, restfulness and stimulation of the senses" (O'Brien et al., 2012, p. 4). The contrast to daily life, nature can provide "feelings of freedom and escape…from something such as worries or frustrations, or escaping into a sensory experience" giving users a chance to be alone for a while and recover (O'Brien et al., 2012, p. 32). During times of aloneness, users were able to gain perspective and "reflection on their place in the world" (O'Brien et al., 2012, p. 33). One study of Finnish adolescents indicated they would seek out natural settings after upsetting events to clear their minds (Louv, 2008). The solaces found in natural environments provide interpersonal and intrapersonal benefits.

Environmental

Nature and humans are not separate from each other. People are part of nature and nature is part of people and when thought of as separate (homocentric), both people and nature are at risk (Hung, 2007). Some maintain that the philosophy of human dominion over the natural world is rooted in the Old Testament; with this perspective, the influence of this belief is, in part, the seed for modern theories and educational practices (Hung, 2007). No matter the origin of the cultural separation of man and nature, the implications have great impact on the health and longevity of the natural landscape. Time spent in nature helps repair separation anxiety caused by modern lifestyle, emphasizes awareness to the healing power of nature, and builds affection for the natural environment (O'Brien et al., 2012).

Humans interact with nature every moment of everyday; the body actively receives signals and responds accordingly (Hung, 2007). Considering these evidences, a mutual dependency is established between the success of mankind and the environment.

To this end, the primary goals of the Outdoor Education Movement help students interact and connect with the natural environment for their personal benefit and gain. Beyond educational benefits, motivation for the reconnection of youth with nature serves

to benefit ecology and holds the potential to prepare students to confront environmental challenges in the future. Methods of student interaction and nature connections are diverse, some focus on utilization of the local landscape for study subject (Place-base education) while others encourage the formalized exploration of the interworking's of the environment in order to make responsible decisions related to protection and care (Environmental education).

Better understanding and recognition of the connections that exist between human development and ecology allow for more thoughtful and beneficial decisions to be implemented within educational systems, cultural systems, and legal systems (Hung, 2007). Understanding how children use the natural environment is still very much an unknown due to the lack of economic incentive to fund research (Louv, 2008). The challenge this lack of understanding represents is the lack of funding for support, research and advocacy on behalf of nature. Economic and social correlations of higher test scores and funding are more easily and traditionally measured (Louv, 2008).

Summary

Emerging research suggests that if we, as a society, stop viewing the natural environment as a luxury, stop viewing creative learning as unproductive and immeasurable, and outdoor exploration as unnecessary to our child's development and instead begin applying the practices of place-based education, our children and their future will be enhanced in ways not currently being valued. A proper education doesn't need to be defined only by test scores and fact memorization; despite well intentioned efforts, the current educational system often fails to help children grow and mature in all aspects of development – mental, physical, emotional, social, and spiritual. We cannot afford to continue to deny the innate connections human being have to our environment and we should begin at the local level.

Chapter 3 - Creating an Instructional Unit

No Child Left Inside Act of 2011

Sponsored in 2011, the passage of the No Child Left Inside Act would amend the previously passed No Child Left Behind act of 2001 to include environmental education (No Child Left Inside Coalition, 2014). This bill reflects the progress of the environmental education movement and supports integrated outdoor education in public schools. Bill content incentives and supports states in development and implementation of Environmental Literacy Plans, promotes partnership funding opportunities, encourages educator capacity building through time and resources, and integrates environmental education with core curricular areas (No Child Left Inside Coalition, 2014). As of October 21, 2011, the U.S. Senate Committee on Health, Education, Labor and Pension approved elements of No Child Left Inside Act as a part of the reauthorization of No Child Left Behind legislature demonstrating validation of the idea that a complete education includes the environment (The Bay Net, 2011). The bill has gained nationwide support and sparked a movement for legislative and cultural education reform. The passage of the bill could refocus how curriculum is implemented within the education system.

Goals of the Instructional Unit

An instructional unit is common method of implementing curriculum. A unit is a set of instructional plans that focuses on accomplishing prescribed goals. Units are organized in a variety of ways, from topic based to theme focused to an emphasis on curricular subject. Units also vary in length from single day instructional lessons to multi-day instructional lectures and activities. As a well-established practice in education, it reasons that instructional unit would provide a strong mode through which to explore thesis goals.

The method of accomplishing the prescribed unit goal of integrating place-based education into the elementary classroom unit are numerous and varied. The method most appropriate for unit development depends upon any number of factors. From the view point of the researcher, a landscape architecture student, not an education student, the

decision came down to two choices: start from scratch or start with an existing unit and modify it to fit a different set of goals.

The primary goal of this study is to explore the potential benefits and challenges of creating an educational unit for a fourth-grade classroom that demonstrates the principles of place-based education and fulfills educational requirements of the selected school district. As later described, the Iowa Core requires students be prepared to lead productive lives in the 21st century, which means they have the skills that allow them to work with people of differing cultural backgrounds, creatively solve problems, communicate clearly, apply multi-disciplinary thinking methods, and critically evaluate information (Iowa Department of Education, 2010, 21st Century). The design of this unit models one way of applying knowledge from a variety of subject areas to develop creative solutions. The structure of the unit was developed to emulate the basic design process of landscape architecture from the beginning phases of inventory and analysis through conceptual design and concept presentation. The unit is guided by the Iowa Core Curriculum and the selected school district's standards and benchmarks while incorporating activities that utilize various domains of learning (Gardner, 1993; Gardner, 2011, Cruz & Duplass, 2007; Moore & Stanley, 2010). The unit attempts to integrate multiple subject areas, demonstrating connectivity between literature, science, mathematics, social studies, and 21st Century Skills as identified by the school district.

Place-based Education is a process of using the local community to teach curricular concepts has guided unit development (Sobel, 2004). As applied to elementary schools, focusing on the local environment and community allows the unit to encourage students to make connections, ask questions, and become curious about the place they call home. From a development perspective, place-based education also encourages students to broaden their definition of local as they grow and develop (Sobel, 2004; Sobel, 2004).

Furthermore, the goals of this unit align with those of the No Child Left Inside Movement in that it is not meant to create naturalists or landscape architects out of teachers and students; rather focuses on bringing awareness and appreciation for the natural world (No Child Left Inside, 2013). It is meant to teach students to be nature-literate; encouraging students to learn from direct experiences in a natural setting; and

respond with the recognition that the natural landscape is an inclusive whole by which all things are connected, directly or indirectly (Sobel,1996). As these connections are recognized and explored, students internalize these relationships as part of who they are because, conversely, they are part of the community which they are exploring.

Unit Development from an Existing Curriculum

Review of existing units revealed a variety of organizational systems for units. A short list was developed outlining various methods through which a unit could be developed, categorized as starting with an existing curriculum compared to developing a unit from scratch (see Appendix B).

Existing curricular units vary greatly based on curricular focus, implementation strategy, and scale. Most common existing curricular units focus heavily on mathematics, literature, or science. The arts are not typically emphasized or incorporated into existing units. Additionally, it was observed that existing units are often categorized as thematic or subject based. Thematic units integrate cross-curricular learning with a heavy emphasis on math, literature and science through a common topic of study. Subject based curricular units instruct lessons based on the subject to be taught with little emphasis on correlations between subject areas.

After reviewing a number of existing units as listed in Appendix B, searching for one that could be used as a model unit, it was determined that although it may be easier to modify an existing curricular unit, a unit similar enough to modify could not be found.

Unit Development from Scratch

Developing a unit from scratch involves a process of four primary phases:

Phase 1) Background research

Phase 2) Major focus areas

Phase 3) Product development

Phase 4) Resource development.

Background research focused on familiarization with and analysis of educational curricular units. Comparison of various units created the framework for unit potential and development. Phase two involved decision making regarding unit thematic topics, analysis and preliminary selection of standards and essential questions were formulated

to guide detailed unit development. Phase three determined unit organization including development of primary documents. Detailed decisions regarding unit implementation and student expectations were made, reviewed and revised. The final phase of unit development assessed resources necessary for unit implementation. Student assessment materials were developed and accessory instructional resources identified (Vontz, 2009).

The selection of specific benchmarks was at the discretion of the author and was made based on the perceived relevance to the creation of the unit base on theme. It was not necessary to incorporate every benchmark into this one unit as this educational unit is, in theory, a part of a larger whole. If an entire curriculum was developed, it would be necessary to meet each one of the benchmarks. Benchmark selection began with a broad overview of the benchmarks. Each benchmark was evaluated for its obvious relevance and use with in the profession of landscape architecture and the design process. After the first cut of benchmarks, it was discovered that a large number of the fourth-grade benchmarks had the potential to be incorporated into the unit. Additional reductions were made as the unit was outlined and developed. Attention was paid to incorporating benchmarks from various subject areas to create a unit that was multi-curricular to emulate the context of problem solving in real life. By exploring multidimensional, cross disciplinary challenges, students will experience a complex interaction of emotional, social, and physical conditions and limitations that inform decision making processes beyond the schoolyard (Sobel, 1996; Lieberman & Hoody, 1998; Sobel, 2004; Stone & Barlow, 2005).

Summary

Initiated by the development of the Common Core State Standards, educational implementation has undergone a major shift over the course of the past decade. Developed to raise student achievement expectations, the Common Core identifies national learning expectations for student's grades kindergarten through 12th grade. States and local school districts are tasked with the implementation of these expectations. A common tool utilized by educators for curriculum implantation is an instructional unit. This tool was selected as the method through which to test the potential of implementing

place-based education principles into a fourth grade classroom while fulfilling educational standards of the Iowa Core Curriculum.

Unit design and development was preceded by an analysis of unit development strategies. Two primary methods were investigated including development based on an existing instructional unit or development of a unit from scratch. Each method presented unique opportunities and challenges for implementation.

Chapter 4 - Methodology

Focused on achieving high marks and state set standards, Iowa school districts and educators are challenged to implement highly effective educational methods. The question posed in this research is if the Iowa Core Curriculum Standards and place-based education can successfully merge into a unit that achieves the objectives of connecting students to the local community and standardized educational accomplishments. A focused study of how an educational unit can be created that successfully merges the two philosophies follows. Primary emphasis is placed on unit development; unit evaluation is secondary due to circumstances that created limitations. The practice of unit creation and preliminary evaluation each have a distinct methodology.

Methodology for Instructional Unit Design

Unit Development

The chosen method of exploring the integration of place-based education theory into the curricular standards of a school district was through the creation of an education unit to be used by teachers. Reasoning that although students are not solely educated at school, the majority of learning is related directly or indirectly to curricular guidance. In other words, if students are learning about their local community and environment at school, the subject matter may overflow into informal learning at home; caregivers may begin to view the outdoor environment with an education value and encourage their child to explore it, they may even be inclined to explore with their child. Additionally, the model of integrating real world challenges into a curricular format has been accomplished before and these models were used as inspiration during the development of this unit (Sobel, 2004; Sobel, 2004; Sobel, 1996; Sobel, 2008).

Guiding Principles

Throughout the development of the unit, three essential components were used as the guiding principles:

1) First and foremost, the unit attempted to apply place-based education philosophy while meeting standards and benchmarks outlined by state and district

standards. This was the primary limitation because if the unit failed to meet these standards, the unit would be unviable in the district and therefore not considered for use. State and federal law relies on standards as a way to evaluate and compare competencies achieved by students and schools. Measureable results are used in an attempt to help ensure all students are receiving equal education. This is a necessary fact of the system which this study needs to respect and appreciate.

2) Second, the unit was designed to elevate student learning by introducing students to the methods and profession of Landscape Architecture. As a profession, landscape architecture is a diverse field that requires professionals to have the ability to integrate knowledge from various subject areas. The practice of landscape architecture requires reaching the highest level of Bloom's Taxonomy of intellectual learning-creating. Using landscape architecture as the premise, the unit strives to integrate creative thinking with science, reading, and/or mathematic exploration. Students are challenged to think critically about educational lessons to the point of fully knowing and understanding rather than simply remembering and reciting lessons learned. Simultaneously, the unit exposes students to a professional field they may not have otherwise been exposed to; resulting in promotion of the design professions and enhanced career awareness for the students.

3) Third, this unit was developed using the theme of community parks for two primary reasons. First, the definition of a park is loose, free of scale limitations and of program requirements. The idea of a park on the school grounds requires little stretch of the imagination no matter the scale of the school grounds or the surrounding land uses; it allows for the creative mind to imagine alternative program elements that can be evaluated for appropriateness. For example, an existing school grounds that has a soccer field could be reimagined/designed into a baseball field. The orientation and scale of the baseball fields are ideas that can be tested to determine if a baseball field would fit onto the site and be an appropriate design. This exercise would require students use skills including creative thinking, design, scale, measuring, data analysis, and problem solving. Both ball fields could be considered appropriate activities for a park however the exercise would challenge students to make decisions about programming while applying mathematical functions to test their design concepts.

Second, parks are a familiar concept to students enabling the unit to focus on teaching educational standards, higher thinking skills, and career exploration. It is assumed that students have experienced at least one park and can use it as a reference. Parks are easily found and visited by students and care givers outside of the school day—which can encourage additional learning, exploration, and connectedness to the natural environment throughout the community.

Process for Creating an Instructional Unit

The method of accomplishing the prescribed goal of a unit which integrates the practices of landscape architecture into the elementary classroom unit are numerous and varied.

Initially, the researcher planned to modify a unit rather than creating one from scratch; the objective of the study is not exploration of writing a unit, but rather the application of a theory to an educational system by way of an educational lesson unit. Choice of a method for creating a unit was based partially on analysis of the strengths and challenges of each method. Basis for comparison of each method extended beyond choosing between writing from scratch or modifying a unit; due to the objectives of the study, the resulting unit sought a complex balance of three themes under the application of place-based learning: state educational standards, landscape architecture as a profession, and cross curricular creative exploration of park design. The components addressed during the creation of the unit remain the same, however the method of incorporation and utilization vary depending upon the unit creation methodology. Components of the unit include 1) state and/or district educational standards and benchmarks, 2) a unit theme, 3) unit objectives, 4) instruction and 5) assessment.

The method determined to be most appropriate for unit development involved developing a unit from scratch (see Appendix B for alternative methods of unit development). A review of existing units revealed a variety of organizational systems for units; a complete list of reviewed units can be found in Appendix B. Many of these units served as unit development inspiration.

As a student of landscape architecture, not education, the researcher sought additional guidance from the Kansas State University Department of Education. The

department provided a syllabus for an assignment in instructional unit design; this was used during preliminary unit development and outline. Additional unit development guidance was sought from personal contacts within the education profession (J. Hoffmann, personal communication, 2010-2011; J.Garland, personal communication 2010-2011).

Unit development began with conceptual design. Overall themes were developed, a unit timeline was proposed, and objectives were drafted. Striving for alignment with the Iowa Core standards and school district benchmarks, multi-curricular standards were selected as goals for each day of instruction. A large list was originally drafted, it was reduced to a more realistic and manageable list of standards as the unit was developed.

Detailed unit development occurred, simultaneously, at the scale of the unit and individual days. This was done to ensure overall cohesiveness of the unit from day to day while maintaining high standards along each step of the unit. Consistency in unit development and design was identified as a priority to ease educator implementation. Procedures were written with great attention paid to balancing objectives with creative learning opportunities.

Additionally, each objective required assessment. The Student Workbook and Student Workbook Instructor Unit were developed concurrently with each day of the unit. Developed as means of reinforcing unit lessons and as a method of assessment, student workbook activities incorporate a variety of activity types to accommodate cross-curricular lessons and multiple learning styles. Daily activities and extension activities were drafted and revised as unit details progressed, culminating in a complete unit.

Methodology for Unit Evaluation

Unit Evaluation

Who to Include

Selection of unit review participants is critical as it determines the range of perspectives captured and focuses of the study. For this study, it is important to select and seek out a range of persons involved in education in an effort to collect a comprehensive representation of the target group. The desirable interview participants include teachers or

in-class educators, school administrators and district administrators. This study requires that the educational unit be assessed for its ability to achieve educational standards set by the state and school district and be designed so that educators are able to accurately, easily and confidently implement the unit.

Administrators would be expected to provide perspective on the integration of educational standards and the ability of the unit to achieve measureable and reportable educational outcomes. District administrators are responsible for upholding high educational standards throughout the district. The perspective of administrators is one that will consider the content of the unit and look at the ability of the unit to effectively assist students in achieving the standards and benchmarks as identified by the district.

Teachers or in-class educators would be expected to provide an 'on the ground' perspective to implementation of the unit. It is expected that through the review process, educators would be most opinionated about how the unit will function in a classroom and how prepared they would feel with implementation. Their everyday experience in the classroom would provide perspective on the logistical and organizational details of the unit such as the age appropriateness of the content, time estimates for planning and implementation, accessibility of materials and space.

Ultimately, four educators were involved in the unit review; administrators contacted by the researcher were unable to participate in the assessment process. All respondents were asked to comment on the appropriateness of the unit for the fourth-grade level and its potential to enhance multi-curricular educational opportunities. In addition to questions about the unit specifically, review participants were asked to comment about how educational units are selected.

Development of Questionnaire

The design of the unit review aims to obtain as much information about the assessment of the unit as possible while respecting the time of the review participants. The implemented research format was a semi-structured questionnaire. The semi-structured review process allows for flexibly within questionnaire completion and personal responses from review participants. It provides the opportunity to modify questionnaire language to be structured most appropriately according to the role the review participant hold within the educational system. Creswell (2009) and Wiess (1994)

were used as references to guide the formation of a five question questionnaire focused on addressing the major focus areas this study.

The objective of the questionnaire was to determine if, according to the perspective of the review subjects, the unit would enable teachers to instruct a lesson related to park design while incorporating identified standards of the Iowa Core Curriculum. It was not the intent of the questionnaire to identify the potential of this unit being incorporated into the curriculum of the school district (Creswell, 2009; Weiss, 1994). Despite the appeal of seeking recommendations for enhanced modification, out of respect for the time of the educators, the unit review process does not seek such input from participants.

Questions focus on the three main goals of the unit and determining if through this format they could be achieved. The questions were formulated to focus on one unit goal at a time so that analysis might reveal strengths and weaknesses of the unit. The questionnaire, as provided to the review participants is as follows.

1. After having reviewed the unit, could you speak to the format and content of the unit guide? Do you understand the procedures for each day and what is your comfort level if you were to implement this unit?

2. What are your thoughts on the unit's ability to help students understand the profession of landscape architecture and the process used to solve design problems?

3. Could you speak to the ability of this unit to fit into the existing curriculum? What challenges do you anticipate encountering if this were to be implemented? What commonalities do you see between this unit and the existing curricular material?

4. After having reviewed the unit, what is your opinion of the appropriateness of the difficulty level for a fourth-grade classroom? Are there specific examples of material that is too simple for fourth-graders? Likewise, are there examples that may prove too challenging for fourth-graders?

5. Do you have any additional comments or recommendations as it applies to this unit?

The final question of the unit evaluation provides the opportunity for the participant to disclose any additional thoughts in regards to the unit. Through this

opportunity, the various perspectives of each review participant potentially provide additional unique insight and information not anticipated or offered by other participants.

Research Application

The process of securing evaluation participants though a school district mandates that proper procedures be followed. The process begins with the submission of an Application to Conduct Research to the school district. The application requires identification of specific details related to the study including the "Purpose for Pursuing the Research", identifying the "Problem and Value of the Research", requesting specific participants, identifying "Instruments and Data Collection Activities", and a proposed timeline. For this study, a completed application was submitted with proposed interview questions included to the appropriate authorities within the school district.

Initially, the researcher planned to conduct a series of interviews with teachers in the Davenport Community School district. However, over the course of this study, an application for interviews was submitted twice to the selected school district in Iowa. The first submission was rejected with reasons cited related to a not having enough time with in the year to complete the process. An application was submitted a second time at the beginning of the school year to allow adequate time to complete the process. The application was once more rejected citing existing demands upon the staff's time does not allow for additional commitments.

Convenience Sample

The inability to have access to the ideal group of evaluation participants resulted in the use of a convenience sample (Weiss, 1994). The researcher utilized connections from personal networking to identify alternative interview participants. Initially recruited via a personal phone call, the four participants were asked to voluntarily participate in the review of an educational unit and respond to a series of interview questions. The subjects were not compensated for their participation.

Five contacts were asked to participate, four agreed to participate in the convenience sample. Participant #1 is approximately 55 years of age with 30 years teaching experience within the school district at grade levels kindergarten, first and third-grade. Participant #2 is approximately 50 years of age with 28 years teaching experience

within the school district at grade levels first, second, fourth, sixth, seventh and eighth-grade. Participant #3 is approximately 25 years of age with four years teaching experience within the school district at grade levels first through sixth-grade and one year experience in an adjacent school district within the junior high special education program. Participant #4 is approximately 28 years of age with 2 years teaching experience within the state of Washington and in the Iowa Core Curriculum at the sixth-grade level. Each participant gave informed consent to accept voluntary participation. They approved the use of the information provided through the questionnaire and the identification of their persons, recognizing that the answers they provide will not be disclosed per participant.

Once compiled, the convenience sample was provided with a copy of the Instructor Workbook (Figure 4.1), Student Workbook (Appendix D), and Student Workbook-Instructor Version (Appendix E). The unit materials were in a .pdf format. Participants were also provided with a series of evaluation questions in an electronically fillable word document. These materials were provided electronically via email. Participants were asked to review the unit and complete the questionnaire within a two week period. Respondents provided feedback to the researcher electronically via email. The researcher obtained permission from each research participant to contact them with follow up questions if necessary.

At the conclusion of the ten day time frame, responses from the participants were reviewed by the researcher. Clarifying follow up phone conversations were conducted with each participant and responses were incorporated into initial questionnaire results. The entire evaluation process occurred over a month's time.

Results were compiled through the comparison of participants' responses. Categories were developed based on themes of 1) Teacher Background, 2) Student Background, 3) Teaching Methods, and 4) Unit Evaluation. Responses were grouped together for analysis. Within each theme, sub-themes were sought within participant responses. The limited sample of participants restricted themes to responses of experienced teachers compared to teachers with less than ten years' experience. With participant's answers, sub-themes emerged identifying an abundance of similarities in responses. Drastically contrasting responses were noted and analyzed against all

participant response. Descriptive summarization of responses and enlightening anecdotes from participants is found in Chapter 4, categorized per sub-theme.

Chapter 5 - Findings: Unit Design Outcomes and Evaluation Results

Instructional Unit Design Outcome

The unit consists of three separate documents: Instructor Workbook (Figure 3), Student Workbook (Appendix D) and Student Workbook Instructor Version (Appendix C). The Instructor Workbook is the primary method of assisting educators in unit implementation. The Student Workbook is a set of worksheets, activities, and learning tools to assist in unit implementation. The Student Workbook Instructor Version includes a complete set of blank student worksheets and a set serving as the answer key. Each of these documents was designed to be easy to read, easy to reproduce and easy to implement.

An instructional unit guide was used as a basic introduction to unit development. The guide modeled an educational unit for a single subject; to achieve the new unit goals, guidelines were adapted to incorporate multiple subjects. The initial unit outline identified seven areas of unit development need. Of the initial seven, one was eliminated as a part of the unit for irrelevancy or reaching beyond the scope of this study. The remaining six recommendations were incorporated into the unit design.

Based upon recommendations in the instructional unit design assignment (Vontz, 2009), the Instructor Workbook includes learning standards, a unifying theme, unit objectives, assessment, and resources help communicate unit implementation. The author analyzed unit context as a part of this thesis. The unit is designed to be applicable to a variety of schools regardless of school demographics, physical characteristics, or available resources.

The multi-dimensional nature necessitated additional areas of information be incorporated. A list of materials, a set of preparation steps and a lesson overview was developed for each step of the process to ease planning. Background Information was incorporated into each lesson plan as a way of enhancing educator comfort with the subject matter. It was assumed that the instructor would have little pre-existing knowledge of the subject and would have limited time and resources to do additional research.

Additionally, the unit includes a list of vocabulary words. This is a list of words related to the daily lesson that are unusual to those outside of landscape architecture or are used in a different context than that which would be familiar to an educator. Unit procedure includes a light level of detail to assist clarity of implementation. Lastly, extension activities or homework options accompany the daily lesson. These activities focus on reinforcing the daily lessons or extending learning beyond that which was achieved in the classroom.

The general outline of the model unit was maintained with additions incorporated for a more comprehensive unit. The resulting Instructor Workbook is outlined below.

1. Topic
   Identifies the lesson number, the title of the lesson, and the approximate length of the lesson in minutes.

2. Standards
   Lists the standards to be taught in completion or partially during this lesson, standards are identified by the district content area and numerical system as well as writing the skill to be demonstrated.

3. Objectives
   List of the lesson objectives stating what the lesson intends to teach students, objectives list what students will be expected to know or do at the completion of the lesson.

4. Materials
   List of materials the instructor will need to have acquired and/or prepared prior to teaching the lesson.

5. Preparation
   A recommendation of things to do prior to the daily tasks to save time and better prepare to teach the lesson on the day.

6. Lesson Overview/Instructional Approach
   A set of brief descriptions of the lesson in general steps. This is intended to be used as a reminder of the lesson steps once the instructor feels

comfortable with the Background Information, Vocabulary, Procedures, and Assessment.

7. Background Information

   A narrative providing context for the lesson content; additional information that may enable instructors to teach the lesson with greater understanding and recognize opportunities to expand upon lesson and/or unit information, vocabulary used in the background information that may be new or used in an unfamiliar way is indicated in bold text.

8. Vocabulary

   A list of vocabulary word from Background Information with definitions in context to the unit intended to help teachers understand the terminology that is used by design professionals and has been used throughout the unit.

9. Procedure

   This is a detailed, step by step, set of instructions that outline the procedure of the lesson. The instructor should become familiar with this section of the unit plan prior to teaching the lesson. Within this section, instructors are notified of when to have students use the student workbooks and discussion questions are listed. Instructors are often given options for instruction and/or documentation to allow instructors the ability to best accommodate the needs of students and the classroom setting.

   At the conclusion of each section, homework assignments are identified. The homework assignments have been designed to reinforce the lessons of the day. Most of the homework assignments are optional; instructors should feel free to use as many of the assignments as desired. The intent is to provide instructors with flexibility of scheduling and student skill level.

10. Assessment

    Each assessment criterion evaluates the students' comprehension of the lesson and is derived from the identified lesson objectives.

11. Extension Activities/Homework:

    This section repeats the optional additional activities and/or homework assignments.

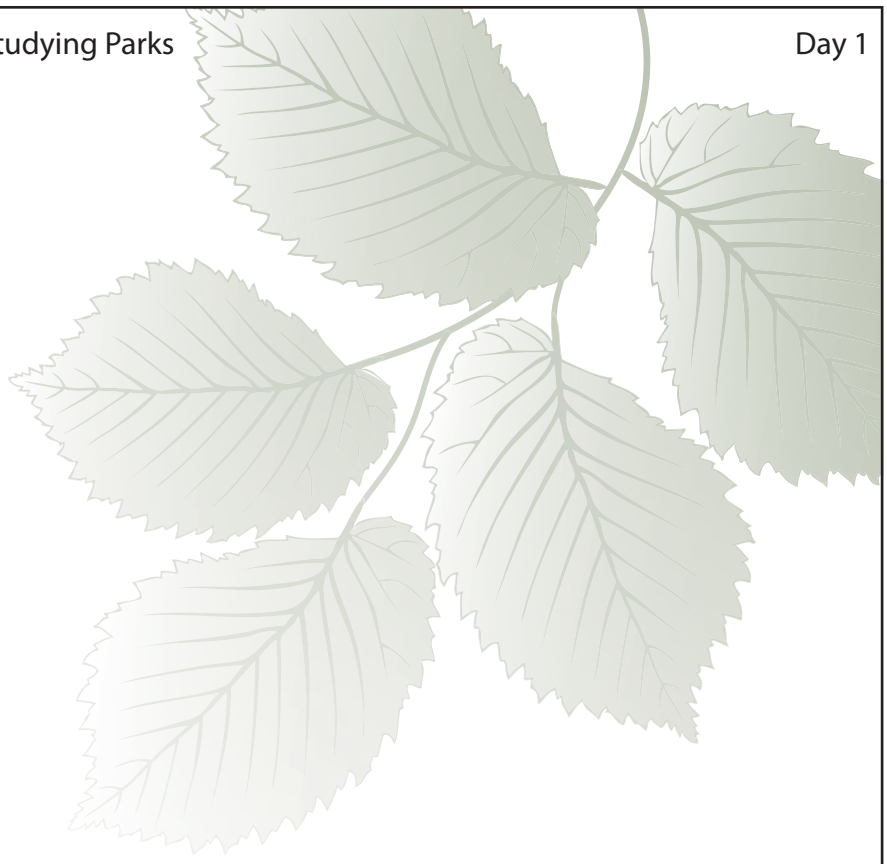
12. Additional Resources

    Additional resources that may be of use to the instructor are listed here. These resources are meant to help the instructor better understand the information to be taught during the lesson but not as necessary information.

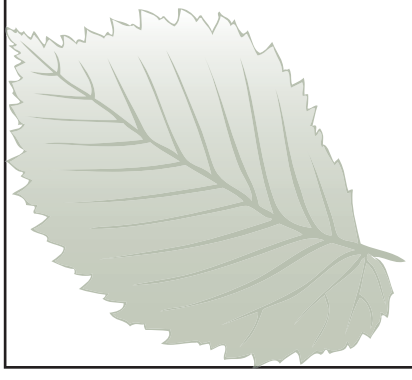
The resulting Instructor Workbook was designed to provide educators with nearly all of the tools necessary to easily implement each day's lesson into the classroom setting. See Figure 3 for the final result.

Figure 3 (multi-page figure). Instructor Workbook (developed by E. Swihart, 2013)

Instructor Workbook
Day 1-9



Instructor Workbook
Day 1



Topic

Lesson 1: Unit Introduction- How are parks made?

Length: 20 minutes

Standards

- Career 2.2a
  - Students will develop career awareness.
- Communication 3.1a
  - Uses speaking skills to communicate effectively.
- Communication 3.1b
  - Uses listening skills to communicate effectively.

Objectives

- Students will demonstrate an understanding of how parks are made and the professions involved in creating parks.
- Students will demonstrate the ability to record individual responses and participate in a group discussion.
- Students will demonstrate the ability to remain focused and on task during group work.
- Students will explain each step of the design process.

Materials

- Computer
- Projector
- Student Worksheet 1.1-Inquiry Questions
- Overhead transparency *Student Worksheet 1.1- Inquiry Questions*
- Overhead marker

Preparation

- Divide students into groups of 4.
- Assemble notebooks.
- Discuss opportunity for an art lesson illustrating the notebook covers with art teacher.

Lesson Overview/Instructional Approach

- The teacher will introduce the unit.
- *Using an overhead or visual presenter, the teacher will introduce Day 1 inquiry questions.*
- Workbooks are distributed to students.
- A teacher-led introduction to the workbook content is given while each student follows along with their individual books.
- Working in groups of 4, students discuss content and record their ideas in preparation for a class discussion. Students record, individually, the discussion responses.
- The teacher leads a class discussion summarizing the group activity. On an overhead projector, the teacher records student responses to each discussion question.

Background Information

*The focus and purpose of this unit is to familiarize students with the individuals involved in the creation of **parks** and the process of designing a park. The intent is to apply the theory of **place-based education** to demonstrate one way of using children's natural curiosity of the outdoors to teach while maintaining achievement of educational standards. Students may benefit from place-based education and interacting with nature by experiencing mental and physical therapeutic effects, increased awareness of the local landscape, and opportunities to teach to different types of learners.*

*Throughout the course of this unit, students will be asked to participate in a variety of activities. Some activities will require students to actively participate with other students on group projects, other activities will require students to work in pairs to investigate questions, and other tasks will ask students to share knowledge with the class and in turn listen and learn from classmates, guest speakers, and the teacher. The primary reason for the range of student involvement methods is to simulate the ways in which **professional designers** interact with each other; secondly it is designed to keep students enthusiastic about the unit and motivated to participate and learn.*

Historically, parks are relatively recent phenomena which arose from the need to provide a place to escape dirty, poverty-stricken industrial towns. Financially capable persons escaped the conditions of town by retreating to the countryside where they sought designs which excluded the geometric patterns which organized cities. For those able to afford to travel to nature, the solution to the less than desirable conditions of the city was avoidance but for those unable to leave the city the solution was to build nature into the city. Urban parks were the physical manifestation of this idea. Urban parks became places where people could easily go to escape the sights and sounds of the city and enjoy the tranquil scenery of nature (Pregill & Volkman, 1999; Wishinsky, 2009).

The first urban park in the United States, planned and constructed for the lower class working people, was Central Park in New York City. In 1858, Frederick Law Olmsted and Calvert Vaux collaborated on the design and won the commission of Central Park. As a result of Olmsted's work on Central Park, the profession of and term Landscape Architect was born (Wishinsky, 2009; Dahl & Molnar, 2003).

*Today, parks have evolved into more than natural retreats amidst city conditions; parks are places of community gatherings, of physically active recreation, and passive recreation. Nearly all recreational activities need a physical facility and parks fulfill that need, providing resources for participation in a variety of activities. The size, type and **project programs** of parks varies based on conditions such as physical size of the park, **user needs**, available funding, and **suitability** of the site for desirable program elements. Parks have also become specialized per activity. Athletic complexes are parks devoted to one or two primary activities (baseball, soccer, tennis, etc). In business districts, empty lots can be converted into 'pocket parks', places for people to gather on lunch breaks, host casual meetings, read, or socialize. A more recent trend in specialized parks are 'skateparks' devoted to providing durable, safe locations for skateboarders and rollerbladers to participate in their sport.*

*The unit structure mimics the typical **design process** that professional landscape architects use to create a **site plan** for a park. The basic design process consists of three parts- **Conceptual Design, Design Development,** and **Construction Documentation**. This unit is focusing on the first phase of the process because the final two phases are heavily focused on production of technical documents. Progressing through the schematic design phase, students will experience the key processes of design without being burdened by the production of technical drawings.*

*During schematic design, Landscape Architects work with their client(s) to develop a **project program**, and work with other professionals to **inventory** and **analyze** site conditions. During the development of a project program, students will play the part of the park user and articulate desirable activities and physical elements for a park, drawing on past experiences as a reference. During the inventory stage and data analysis stage, students will be asked to apply knowledge of mathematics and geography as well as work cooperatively in groups. After a program has been established and the site has been analyzed for its suitability to activities, a conceptual/preliminary design is drafted. This design attempts to translate the information from the inventory/analysis to locate elements of the project program. The products of the schematic phase are conceptual in nature with minimal detail- diagrams and sketches are acceptable to illustrate ideas. In a professional setting, schematic designs are presented to the client for review, resulting in one being selected for further development or asking for a combination of a few concepts into one. The final day of the unit is an optional presentation of the students work to simulate this final step.*

The takeaway message for students studying this unit is that parks are places that have been designed, through a process led by people to accommodate the needs of other people. Parks are as diverse as any individual. Participation in the design of a park, or any outdoor space, provides opportunities for individuals to be creative, to work with nature, to serve a community, and to apply knowledge of and interest in a variety of subjects to a rewarding and ever changing career.

Vocabulary

- Analyze (site)
  - Process by which understanding of the site and its surroundings is gained
  - Includes information about the site between the boundaries and beyond, anything which would influence the site and/or design.
- Collaboration
  - Working with a variety of professionals of various occupational skills to solve a design challenge.
- Conceptual Plan
  - An illustration showing generalized area of site functions drawn approximately to scale, abstract symbols and bubbles are commonly used on this plan.
  - Includes all elements to be included in the final plan without specific details.
- Construction Documentation
  - The process of creating documents to inform the construction process.
  - Graphic and verbal instructions to a contractor for the purpose of bidding and constructing a proposed design.
- Design Development
  - The first step in a design process
  - The process of defining what is being designed
- Design process
  - Systematic procedure of developing a design from conception to installation
  - Series of analytical and creative thinking steps.
  - Provides a logical, organized framework for creating design solutions.
  - Helps insure design solutions will be appropriately suited to the circumstances (site conditions, client desires, budget, etc) of the design.
- Firm
  - a partnership or organization established to operate as a business, a design firm is common term used to describe a business that is hired to produce design related products (concepts, plans, construction documents, construction administration, etc.)
- Inventory (site)
  - The process of identifying and documenting existing conditions of the site.
  - Combined with analysis, this is the research phase of the process.
- Park
  - An area of land, featuring natural elements, for the enjoyment of the public, including facilities for rest and recreation, often owned, set apart, and managed by a city, state, or country
- Place-based education
  - the process of using the local community and environment as a starting point to teach concepts in language arts, mathematics, social studies, science and other subjects across the curriculum
- Professional designers
  - Persons educated in, skilled in and practicing in an occupation that provides critical thinking and creative solutions to design challenges.
- Project Program
  - A list or outline of all elements and requirements the design solution must include and satisfy.
  - Serves as a summary and synthesis of the site inventory and analysis and client interviews.
  - Functions as a check list to compare the proposed design against. (Booth 1983)

- Site plan
  - The refinement of the conceptual plan. Site detail decision are made during the creation of the site plan including materials to be use, patterns of materials, planting schemes, and structural details necessary to convey design intent.
- Site suitability
  - The degree to which a site is suited to a particular function and that will utilize its full potential
  - Ensures that applied programs are integrated to produce a modified landscape that is functionally efficient and visually attractive.
- User needs
  - The required elements a park users requires to create a safe, functional spaces for anticipated and/or intentional user groups

Procedure

- Introduce the unit.
  - Engage the class in a discussion and voting procedure on a class design '**firm**' name. Ask for 5-6 '**firm**' name ideas, list them on the board, instruct students to vote on their favorite.
  - Explain that each workbook will be the location in which to record observations, inquiry questions, discussion results, etc. throughout the unit and that this will be the means of evaluation. Students are not to take the workbooks home with them until the end of the unit to prevent students not having them for the next day's activities. Homework pages or activity statements will be distributed individually.
- Distribute student workbooks and ask each student write his/her name on the cover for identification.
- Ask each student to write the design 'firm' name on the cover of the workbook. Encourage students to draw an illustration of a park on the cover of their notebook. This might be a good activity for the art teacher to do with students.
- Show students the table of content and discuss the organization of the notebook to familiarize students with it.
- Have students turn to page 2 in their notebooks to view the inquiry questions.
- Using an overhead projector or visual presenter, post *Day 1-Inquiry Questions*.
- Engage the class in a discussion of each question. Record and project the responses on each question.

  How are parks made?

  Who designs parks?

  What types of parks are there?

  What parks are students familiar with?

  What parks are in Davenport or near the school/home?
  - Documentation Option 1: At the conclusion of the discussion, summarize each questions response and have students record (in their notebooks) the summary.
  - Documentation Option 2: Make a copy of the transparency for each student to have as a reference throughout the unit.
  - Documentation Option 3: Write a summary of the discussion and distribute the summary to each student. Typing the summary might be the fastest and easiest way to complete this option.
- Conclude the discussion by briefly stating what will be done the next day in class and ask the students to continue thinking about this subject as they play at recess, or walk home after school, or play outside tonight.
- OPTIONAL: Assign homework.

- Instruct students bring a photo of themselves or with family members in a park to post on a bulletin board for the duration of the unit.
- Instruct students to compose a paragraph explaining the photograph. Ask them to specify where the photo was taken, what they are doing in the photo, who was with them at the park, and when the photo was taken.

Assessments

- Informal notes: The discussion is used to gauge the existing knowledge and understanding students have about parks.
- Informal notes on student behavior while participating in class activities.
- Informal notes on students demonstration of understanding how parks are made, and who participates in making parks.
- Informal notes on students demonstration of an understanding of the design process.

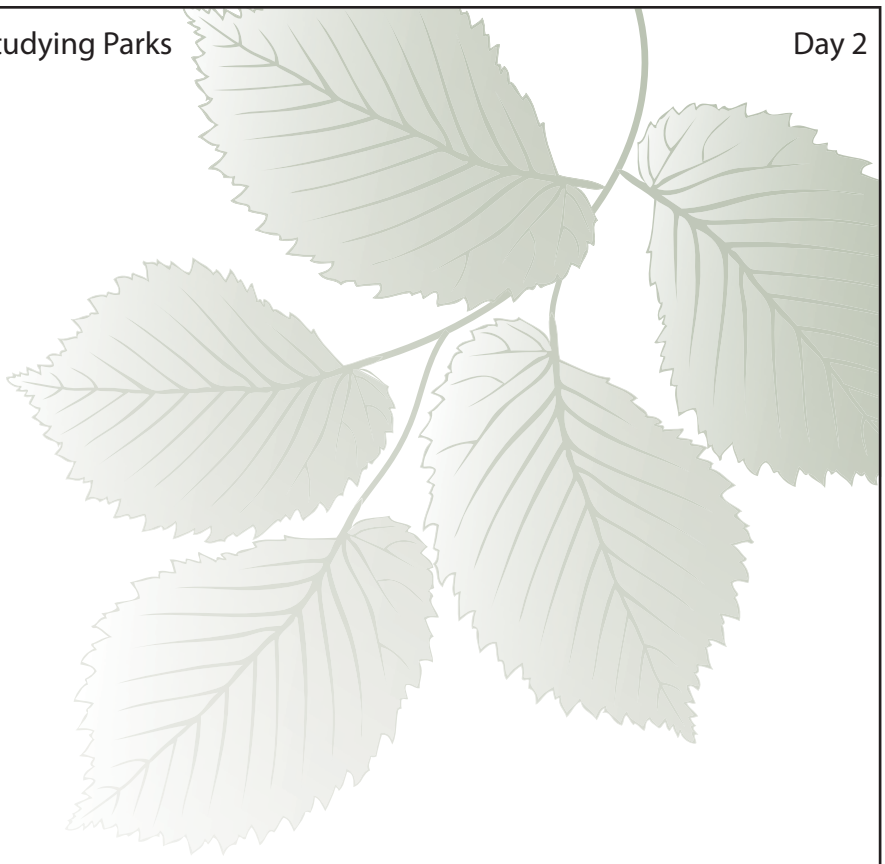
Extension Activities/Homework

- Have students bring a photo of themselves or with family members in a park to post on a bulletin board for the duration of the unit.
- Instruct students to compose a paragraph explaining the photograph. Ask them to specify where the photo was taken, what they are doing in the photo, who was with them at the park, and when the photo was taken.

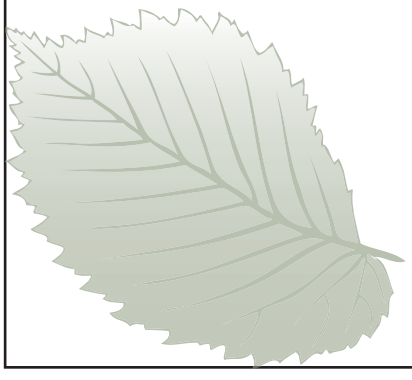
Additional Resources

- Broda, H.W. (2007). *Schoolyard-Enhanced Learning: Using the Outdoors as an Instructional Tool, K-8*. Portland, MA: Stenhouse Publishers.
- Pregill, P. & Volkman, N., (1999). *Landscapes in History: Design and Planning in the Eastern and Western Traditions*. New York, NY John Wiley & Sons.

- For additional web resources see Recommended Resources



Instructor Workbook
Day 2



Topic

Day 2: Project Programming- What does a park need?

Length: 45 minutes

Standards

- Behavioral Science 1.5a
  - Demonstrate and practice the Skills for Life to be able to work independently and cooperatively to accomplish goals
- Behavioral Science 1.5e
  - Explore factors that contribute to one's personal identity such as interest, capabilities and perceptions.
- Behavioral Science 1.5g
  - Understand how the arts express cultural heritage and our humanity: literature, music, drama, dance, role or writers and artists, art and architecture.
- Geography 1.2d
  - Use appropriate resources, data sources and geographic tools, such as atlases, data bases, grid systems, charts, graphs and maps to generate, manipulate and interpret information.
- Communication 3.1b
  - Uses listening skills to communicate effectively.

Objectives

- Students will identify types of professionals and community leaders involved in the process of creating parks.
- Students will identify a variety of park user groups.
- Students will compare a variety of activities that occur in parks and speculate what things are necessary for those activities to occur.
- Students will select popular activity options for the schoolyard.

Materials

- Student Workbooks
- Book- *The Man Who Made Parks: The Story of Parkbuilder Frederick Law Olmsted*
  - Wishinsky, Frieda. (2009). *The Man Who Made Parks: The Story of Park Builder Frederick Law Olmsted*. Toronto: Tundra Books
  - $9.31 New; $6.17 Used: Estimated cost on Amazon.com
- Overhead projector or visual presenter
- Clean transparency sheet
- Transparency markers
- *Student Worksheet 2.1- Inquiry Questions*
- *Student Worksheet 2.2 - Project Program*
- *Student Worksheet 2.3 - Frederick Law Olmsted*
- *Student Worksheet 2.4 - Park Research Guide*
- *Student Worksheet 2.5 - Park List*
- Pencils

Preparation

- Make the principal aware of taking the class outdoors for a lesson (if necessary).
- Obtain a large map of the United States for locating parks and determine a method of marking the location (pins, markers, stickers, etc) and gather necessary materials
- Speak with the librarian about the homework assignment. Ask for assistance with the research; maybe pull some books off the shelves for students to use during research.

Lesson Overview/Instructional Approach

- Introduce project programming as a step in the design process and describe how the class is going to determine a program for the schoolyard park.
- Review with students questions on worksheet *Student Worksheet 2.3 - Frederick Law Olmsted* preparing students listen to a book reading.
- Read to the class The Man Who Made Parks: The Story of Parkbuilder Frederick Law Olmsted
- Small group discussions over the reading, using the corresponding workbook page as an assessment tool
- Lead the class in a discussion and voting procedure to determine desirable elements for a schoolyard park. Record results, make copies of final list (Program) and distribute to each student for use during the design process.

Background Information **(paraphrased from Wishinksky, 2009; Pregill & Volkman, 1999)**

Olmsted was born in Hartford, Connecticut, in 1822. Best know as the "'father" of American landscape architecture, Olmsted was a Renaissance man. Throughout his life, Olmsted studied and practiced a variety of traded including studing engineering, working as a sailor, farming, writing and publishing. He earned fame when he joined with Calvert Vaux to submit a design to New York City's Central Park design competition. Drawing on their combined experience the partners won the competition and assumed the roles of construction adminstrators of New York's Cenral Park. At the end of his term as architect-in-cheif of Central Park, Olmsted signed is resigniation letter as Frederick Law Olmsted, Landscape Architect; it was the first time the title had been used and a profession was born (paraphrased from Wishinsky, 2009).

After serving as administrator and then architect-in-cheif of Central Park's construction, Olmsted served as the administrative head of the US Sanitary Commission and later as manager of the Mariposa gold mining estate in Califorina. After years of exploring the world and a number of professions, in 1872 Olmsted opened his own design firm. His firm worked on projects ranging from residential/urban design to college campuses, to the grounds of the US Capitol. One of the most famous national parks is in existence due to Olmsted's efforts; he served as the first head of the commission in charge of preserving Yosemite Valley. He is also credited as a leader in the establishment of the Niagara Reservation. At the time of his retirement in 1895, Olmsted's firm had carried out over 550 projects.

In the same year of his retirement, Olmsted suffered a mental breakdown and spent the remainder of his life in an Asylum in Waverly, Massachusetts. He died 28 August 1903. It was a few decades after his death when people started to realize the impact Olmsted's work had on society and environmentally consincious design.

*The planning and design of a park is a collaborative effort between a variety of professionals and community members. Everyone who has a vested interest in the ultimate provision of recreational activities needs to be include in the planning process, including children, pre- teenagers, teenagers, and adults. The design team is usually led by a recreational service agency that is responsible for providing support for recreational facilities- in the case of city parks it is usually a **parks department**. The planning process involves setting a course of action to be taken to create a park and anticipating future dilemmas and needs. The planning process begins at the inception of a park design and continues throughout the life of the park. In effort to account for the different types of planning that need to occur, six classifications are considered.*

*1. **Organizational planning**: the grouping of professionals into administrative roles with responsibility for one particular function. An example of organizational planning for a large park might include divisions such as Recreational Program Services, Maintenance, Design and Construction, Ranger Services, Interpretation, and Special Facilities.*

*2. **Financial planning**: concerned with managing the budget of park development, programming and management*

*3. **Physical planning**: concerned with the physical arrangement of recreational areas and facilities*

*4. **Program planning**: involves integrating schedules, services and events to be hosted in the park*

*5. **Functional planning**: responsible for regularly continuing tasks and services*

*6. **General planning**: a simplified combination of all the aforementioned types of planning; "master planning"*

(revised from Park Planning Handbook by Monty Christiansen, 1985)

The type of planning that students will be doing resembles Physical Planning. However, no matter the type of planning process, the people involved are similar. The park planning team is a working group of individuals with a variety of skills, knowledge, vested interest, and opinions. As the process progresses, the team members may change depending on level of expertise needed throughout the process. The constant team member is the team leader. The team leader can be a design professional such as a landscape architect, a business person, a member of the City Parks Department or another type of professional qualified to organize and synthesize the ongoing, ever changing planning process.

Parks are designed for use by people, therefore the wants and needs of the anticipated park users must be considered during the planning. Park users include any person who visits the park or uses the park for recreational activity. These people can range from young children to teenagers to elderly adults. When considering program activities, all age groups should be considered as well as all physical and mental ability levels. Park users don't need to be able-bodied healthy young adults; park users can be young children crawling in the grass, or a visually impaired person who is enjoying the sounds and smells of the park while resting in the warm sunshine, or a mental challenged person walking on a trail as a form of therapy. Park users can be anyone and everyone and the design program should address the needs and wants of all people.

Parks offer a range of activities depending upon 1) the needs of users, 2) the availability of natural resources on site, 3) opportunities to use special interest groups to instruct, program or maintain facilities, or 4) by financial resources. During the development of the program, a set of activities deemed desirable for the new park must be created based on user needs and desires, financial resources, special interest group opportunities and the availability of activity resources exiting near the site.

User needs can be determined in a number of ways including surveys of community members, discussion groups, focus group meetings, etc. Financial resources are those concerned with budgetary requirements of the park and the availability of funds. In some cases, special interest groups will have the means and desires to take on the support or operation of a park/part of a park; in which case they are responsible for those activities occurring on their request. And the final requirement of evaluating available adjacent resources seems obvious but it may not be to students unaware of resources near the school site or in the neighborhood. For example, a swimming pool might be a desirable element to include in the program but it is an expensive item to install and maintain, therefore if there is already a public pool located in the neighborhood it is probably not a viable element to include in the program.

*As the process progresses, this list of desirable activities will need to be re-evaluated during the analysis phase to determine if the physical space requirements and provisions of the site allow for feasibility of the program element. A list of possible activities is in the teacher workbook on the **Inquiry Question Master** page. During this unit students should be encouraged to express any activities they would want to see in a park with the teacher expressing interest in how the activity would work. Challenge students to think more deeply about an activity and what it would take to install an activity area before putting it on the program.*

Vocabulary

- Financial planning
  - concerned with budgetary control of park departments
- Functional planning
  - responsible for regularly continuing tasks and services
- General planning
  - a combination of all the aforementioned types of planning; "master planning"

- Organizational planning
  - the grouping of roles into administrative organization with responsibility for one particular function
- Parks department
  - City agency responsible for the operation, management, and maintenance of public parks and recreation spaces.
- Physical planning
  - concerned with the spatial arrangement of recreational areas and facilities
- Programming
  - Creation of a project program (a list or outline of all the elements and requirements the design solution must include and satisfy).
  - A listing of goals and objectives for the site created though conversations between the client and the landscape architect.
- Program planning
  - involves integrating schedules, services and events
- Schoolyard Program
  - The project program developed throught this unit that is specifically for the school's grounds.

Procedure

- Introduce the concept of programming and encourage students to start thinking about activities they like having available in parks near their home.
- Introduce students to the *Student Worksheet 2.3 - Frederick Law Olmsted* in the workbooks and inform the students that they will be working in pairs to complete the worksheet after the book is read. Encourage them to review the questions prior to reading the story so they can pay particular attention to certain points in the book.
- If possible, take students to a quite, shaded location outside to read the book *The Man Who Made Parks: The Story of Parkbuilder Frederick Law Olmsted*. Ask students to put workbooks away during the reading to minimize the temptation of working on *Student Worksheet 2.3 - Frederick Law Olmsted* during the reading. As you read the book to students stop in places that describe conditions of the environment and ask student to imagine what it would be like to be in a place like the one described.
  - Living in dirty cities with no parks to play in.
  - Walking through wildflower lined paths in the country, watching cattle graze in fields of grass
  - Rocky, swampy, muddy land covered with pigsties and slaughterhouses that was supposed to be a park
  - Construction of the park, building bridges, roads, planting trees
  - A special time they were in a park
- If possible, have students work outside on *Student Worksheet 2.3 - Frederick Law Olmsted*. Pair students up and ask them spend some time completing the worksheet; each student should complete the worksheet in their individual workbook, for future reference, while working together. Be available to answer questions but encourage student collaboration.
- Once the worksheets are completed, take the class back into the classroom for preparation of the schoolyard program.
- To prepare the schoolyard program, engage students in a class discussion inspired by the *Student Worksheet 2.1- Inquiry Questions.*
  - What activities would students like to have available in a park near their home?
  - What equipment or elements are required for those activities?

- In addition to the students, who else might be a user of the park and what activities would those users participate in?

  Activity = Fishing

  Equipment/elements = pond, fishing pole, worms, etc.

  Users = children, parents, grandparents, fish, etc.

- At the conclusion of the discussion, have students raise their hands to vote on their favorite two (2) activities. Record the total number of votes for each activity.
- Have a discussion to identify the most popular activities. Instruct students that they just participated in one method of forming a project program. In the classroom situation, they were the potential users of the park and, through the vote, decided the activities they would like to have in the park- the Project Program.
- Distribute the Project Program to each student.
  - Option 1: At the conclusion of the discussion, ask students to record (on *Student Worksheet 2.2 - Project Program*) the Project Program including the most popular activities as determined by votes; equipment/elements needed for those activities, and potential users.
  - Option 2: Make a copy of the transparency (with vote totals) for each student to have as a reference throughout the unit. Be sure to indicate which elements received the most votes and are now part of the program.
  - Option 3: Write a conclusion of the discussion and distribute the developed program to each student. Typing the summary might be the fastest and easiest way to complete this option.
- OPTIONAL: Assign homework.
  - Research a park (selected from *Student Worksheet 2.4 - Park Research Guide*). Prepare a short introduction to the park including its location, when it was created, activities that occur in the park and site elements. Encourage students to collect images of the park. On a map of the United States, ask each student to mark the location of the chosen park; stickers, push pins, markers, etc can be used to mark the locations.
  - This activity will take a few days to complete; ask the librarian to help the students with their research.

Assessments

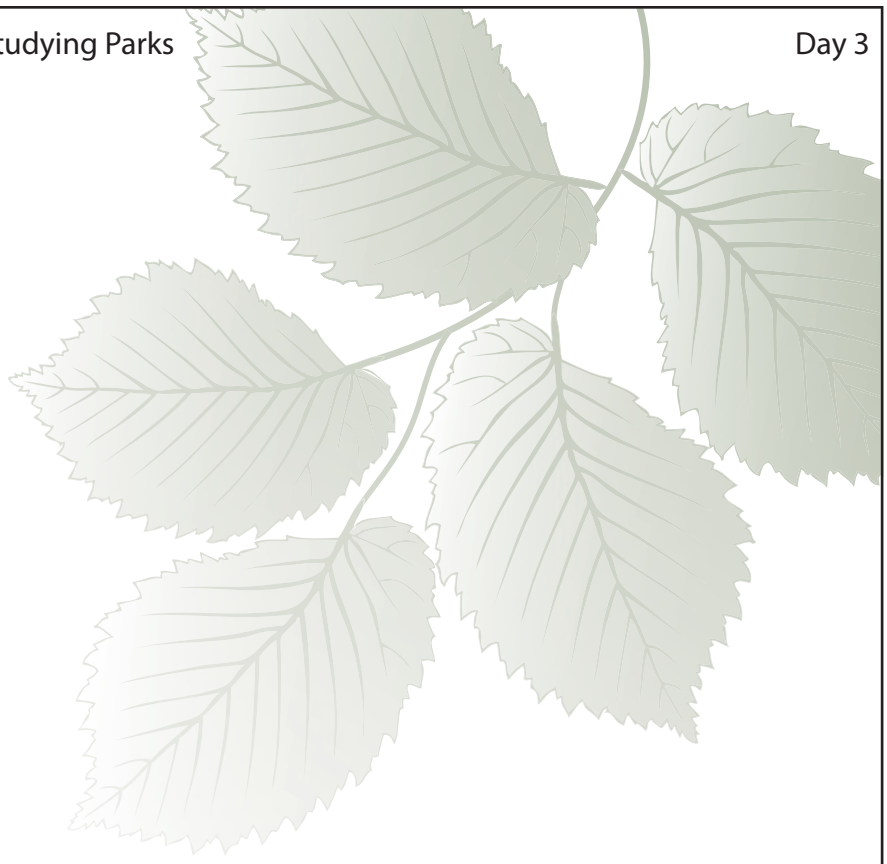
- Students will demonstrate an understanding of the people involved in creating a park.
- Students will demonstrate knowledge of park user groups.
- Students will demonstrate knowledge of a variety of activities that occur in parks and identify physical elements necessary for those activities to occur.
- Worksheets: Evaluate each students completed FLO worksheet for completeness and accuracy.
- OPTIONAL: Check completeness of homework assignment.

Extension Activities/Homework

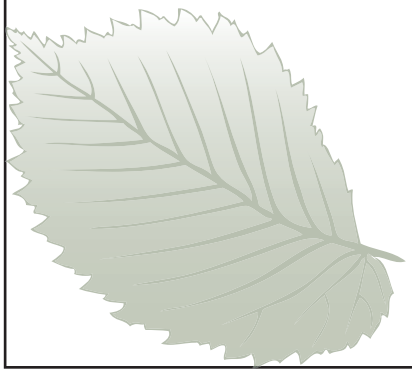
- Research a park (selected from the Parks List). Prepare a short introduction to the park including location, when it was created, activities that occur in the park and site elements. Encourage students to collect images of the park.
  - This activity will take a few days to complete; ask the librarian to help the students with their research.

Additional Resources

- For additional web resources see Recommended Resources



Instructor Workbook
Day 3



Topic

Lesson 3: Unit Introduction- How are parks made?

Length: 20 minutes

Standards

- Data Analysis and Probability 5.1a
  - Design investigations to address a question and consider how data-collection methods affect the data set.
- Data Analysis and Probability 5.1b
  - Collect data using observation, surveys, and experiments
- Geometry 3.2b
  - Make and use coordinate systems to specify locations and to describe paths.
- Geography 1.2d
  - Recognize the five themes of geography: Location, place, human interaction with the environment, movement, and regions.
- Geography 1.2e
  - Describe how people create places that reflect ideas, personality, culture, wants and needs as they design homes, playgrounds, and classrooms.

Objectives

- Students will demonstrate an understanding of what it means to take inventory of a site.
- Students will compare methods of collecting data during an inventory.
- Students will compare methods of recording data collected during an inventory.
- Students will compose a list of items to be inventoried on the schoolyard site.

Materials

- Computer
- Projector
- Student Workbooks
- Overhead projector
- Clean transparency sheet
- Transparency markers

Preparation

- Gather and organize equipment necessary for the Inventory Activity Pack. Refer to the Inventory Activity Pack List for equipment.
- Make enough copies of *Student Worksheet 3.1- Master Inventory List* for each student.

Lesson Overview/Instructional Approach

- Introduce the process of inventory and describe the inventory project the class is going to participate in the following day.

- The teacher will lead the class in a brainstorming session, creating a list of items to be inventoried.
- The teacher will record responses on the Inventory List transparency.
- The teacher will lead a discussion on the methods of collecting data.
- The teacher will lead a whole class discussion on methods of recording data.
- The teacher informs the students of the "fieldtrip" that will be the next day's lesson. Procedures are reviewed.
- In groups of four, students will pack their groups Inventory Activity Pack. The teacher will provide students with a list of the items (Inventory Activity Pack List) that need to be included in the pack.

Background Information

Prior to the development of any design concepts, a thorough understanding of the existing site conditions is necessary. The inventory phase in the design process is the process of researching the site conditions. It is essentially the process of identifying and recording information about the pre-design condition of the site. Information about the site can be obtained through a variety of external sources but it is nearly always essential to verify all data with at least one site visit. By conducting a site visit, designers are able to intimately observe the site and get a sense of the relationships between on and off site elements and become as familiar with the site as possible. This awareness of the site helps designers create concepts that exhibit the best qualities of the site while making plans to improve or disguise less attractive areas of the site.

During a site visit and site inventory some of the questions that should be asked and answered include:

What are the site's good and bad features?

What features or elements should be changed or corrected?

How does the site function?

What are the limitations?

How do you feel about the site? What, on the site, do you react to?

The elements to be inventoried include anything that can be seen, heard, smelled or felt from the site. The inventory process extends beyond the site boundaries to anything that influences the site and the processes that interact with it. On site inventory includes a range of things from natural to man-made elements. It also includes those things that can only be inventoried using a variety of sources and techniques such as soil suitability, locations of ***utilities****, temporal changes, topography, etc.*

During the collection of inventory data, it is important to be organized and methodical throughout the accumulation of data. Using a variety of methods of recording data helps create a more thorough set of data; a few reliable methods of recording data include written notes, recorded film, still photographs, sketches, diagrams and maps.

Once adequate amounts of data have been collected to inform the designer of site conditions, the data must be analyzed to deduct the meaning of the data as it will apply to a design.

Vocabulary

- GPS
  - Global Positiong System. A space-based global navigation system that provides location and time information at anytime and to any place on the earth's surface.
- Hydrology
  - The study of the movement, distribution, and quality of water.
- Inventory Activity Pack
  - Set of materials that will be helpful in completing the site inventory activity.
- Inventory Activity Pack List
  - The minimum list of items to be inclued in the Inventory Activity Pack prior to conducting the site inventory.

- Plan drawing
  - A two dimensional drawing or diagram used to describe a place or communicate building instructions.
- Topography
  - The two dimesional represntation of three dimesional landforms through a series of contour lines, each representing a single elevation.
- Utilities
  - Products and the infrastructure required to provide these products to the public including: electricity, digital/fiber optic cables, cellular towers, natural gas, telephone, water and sewage. Infrastructure systems can be below ground or above ground.

Procedure

- Introduce the concept of inventory.
  - Engage the class in a discussion as to what an inventory is using examples within the classroom;

    Example: An inventory of students during roll call, recording which students are present and which ones are absent.
  - Challenge students to hypothesize about why is it important to know what conditions are like on the site before doing a design? Engage the class in a guided discussion.
  - Explain that the information will be used to evaluate design solutions, evaluate what works where on the site.
- Once the class demonstrates an understanding of the concept of an inventory, the teacher asks student to participate in a brainstorming session of ideas for what they will inventory. Encourage students to think about what they already know is on the site to start the discussion. Ask students to refer to the Project Program developed during the previous day's activity to help identify items that need to be inventoried in order to complete a design.
  - Example: For a basketball court they would need to measure the area of available open space to determine if a basketball court would fit in the space.
- Ask student to complete *Student Worksheet 3.1- Master Inventory List* during the discussion.
- Use the *Master Inventory List* as a guide to the essential inventory items.
- Discuss methods of collecting the desirable data and methods of recording data sets.
- Ask students to practice using a map to identify and record inventory information using *Student Worksheet 3.2- Site Inventory.*
- Conclude the session by introducing next day's activity as a fieldtrip to the schoolyard to apply the Inventory List they just created.
- Ask students to get into their groups of four and prepare to listen to instructions for packing the materials they will need during the fieldtrip/inventory.
- The group of materials necessary for the inventory will be referred to as the *Student Worksheet 3.3 -Activity Pack List*. The teacher leads the classroom in packing the Inventory Activity Pack. Refer to the guide for materials to include in the *Student Worksheet 3.3 -Activity Pack List*.
- Conclude the class with a wrap up discussion summarizing the day's lesson. Instruct students to wear clothing for an outdoor activity appropriate for the next lesson. Collect signed parent letters and remind students without letters to bring them before the activity.
- OPTIONAL: Assign homework.
  - Use the *Student Worksheet 3.4 Bedroom Inventory* to do a practice inventory of student's own bedrooms.

Assessments

- Informal notes on attentiveness and contributions creating a master inventory list.
- Completeness and correctness of *Student Worksheet 3.1- Master Inventory List*
- Informal notes on students demonstration of understanding methods of recording data during an inventory.
- Informal notes on students composition of an inventory list.
- OPTIONAL: Check completeness of homework assignment.

Extension Activities/Homework

- Use the Bedroom Inventory Worksheet to do a practice inventory of student's own bedrooms.

Additional Resources

- Booth, N.K. (1983). *Basic Elements of Landscape Architectural Design*. Long Grove, IL: Waveland Press, Inc.
- For additional web resources see Recommended Resources

Instructor Workbook
Day 4

Topic

Lesson 4: Project Inventory- What is already here?

Time: 45 minutes

Standards

- Geometry 3.2c
  - Find the distance between points along horizontal and vertical lines of a coordinate system.
- Measurement 4.2b
  - Select and apply appropriate standard units and tools to measure length, area, volume, weight, elapsed time, temperature and the size of angles.
- Behavioral Science 1.5a
  - Demonstrate and practice the Skills for Life to be able to work independently and cooperatively to accomplish goals.
- Data Analysis & Probability 5.1a
  - Design investigations to address a question and consider how data-collection methods affect the data set.
- Measurement 4.1d
  - Understand that measurements are approximations and understand how differences in units affect precision.
- Measurement 4.2a
  - Develop strategies for estimating the perimeters, areas, and volumes of irregular shapes.
- Measurement 4.2e
  - Develop strategies to determine the surface areas and volumes of rectangular solids.

Objectives

- Identify elements from the inventory list in real time and space.
- Identify elements of the schoolyard that are man-made.
- Identify elements of the schoolyard that are natural.
- Accurately measure and record inventory data.

Materials

- Activity Packs
  - Pencil
  - Clipboards
  - Paper
  - Base maps
  - Colored pencil set
  - Ruler
  - Tape measure
  - Camera
  - Plum-bob activity equipment
- *Student Worksheet 4.1- Site Inventory*

Preparation

- Recruit a second adult leader- another teacher, volunteer, etc.
- Create two student groups by grouping groups of four into one of two larger groups.
  - Group A  Purple group= four groups of four students each= 16 students
  - Group B  Blue group= four groups of four students each= 16 students
- Copy the *Student Worksheet 4.1- Site Inventory Group A and Group B*. Prepare enough copies for each student to receive one and each adult leader.
  - Each group will be responsible for collecting information on the items listed on their list.
  - Each list should include natural elements and man-made elements.
- Develop a route for the adult leader to follow on the 'field trip'. Organize the route to inventory the entire Inventory Sub-list in the most efficient manner.
- Visit *www.websoilsurvey.com* and collect a map of the schoolyard as it is suitable for development.

Lesson Overview/Instructional Approach

- Using the inventory list generated in the previous lesson, the teacher will lead the class in a review. Important points to review include the items on the list, differences in natural elements compared to man-made elements, methods of collecting data and methods of recording data.
- The teacher and a teacher's aid will lead the class on a 'field trip' to the schoolyard. The purpose of the 'field trip' is to participate in one method of inventory as discussed in the previous lesson.
- Once outside, the adult leader will lead the class on a predetermined route around the schoolyard, taking inventory of the site.
- The adult leader will use *Student Worksheet 4.1- Site Inventory Group A or Group B* to help guide students in the inventory process and provide additional information.
- The adult leader will lead discussions during the 'field trip' and be available for questions from the students.
- The teacher will lead the class in a whole class discussion after the inventory has been completed, focusing on what the students found, how they measured items and how they recorded data.

Background Information

A review from Day 3:

Prior to the development of any design concepts, a thorough understanding of the existing site conditions is necessary. The inventory phase in the design process is the process of researching the site conditions. It is essentially the process of identifying and recording information about the pre-design condition of the site. Information about the site can be obtained through a variety of external sources but it is nearly always essential to verify all data with at least one site visit. By conducting a site visit, designers are able to intimately observe the site and get a sense of the relationships between on and off site elements and become as familiar with the site as possible. This awareness of the site helps designers create concepts that exhibit the best qualities of the site while making plans to improve or disguise less attractive areas of the site.

During a site visit and site inventory some of the questions that should be asked and answered include:

What are the site's good and bad points?

What should be changed or corrected?

How does the site function?

What are the limitations?

How do you feel and react about the site?

The elements to be inventoried include anything that can be seen, heard, smelled or felt from the site. The inventory process extends beyond the site boundaries to anything that influences the site and the processes that interact with the site. On site inventory includes a range of things from natural to man-made elements. It also includes those things that can only be inventoried using a variety of sources and techniques such as soil suitability, locations of utilities, etc.

During the collection of inventory data, it is important to be organized and methodical throughout the accumulation of data. Using a variety of methods of recording data helps create a more thorough set of data; a few reliable methods of recording data include written notes, recorded film, still photographs, sketches, and diagrams.

Once adequate amounts of data have been collected to inform the designer of site conditions, the data must be analyzed to deduct the meaning of the data as it will apply to a design.

Vocabulary

- Site visit
  - A visit to the site that is being designed for the purpose of information collection, inventory, analysis, preparation and/or construction administration.
- Soil suitability
  - The appropriateness of soil to support a specific activity or function. An example would be sandy, well drained soil is not well suited for a pond; clay, slowly draining soil is better suited for a pond.

Procedure

- Remind students of the previous day's discussion and review the inventory list from the day before. Introduce the activity with directions on how the data will be collected.
- Divide the class into groups A and B and distribute *Student Worksheet 4.1- Site Inventory* . Each group should have different lists and each student member of the groups should have the same list.
- Review the procedures for field trips and remind students of appropriate and inappropriate behavior.
- Determine a time to return to the classroom and record time on *Student Worksheet 4.1- Site Inventory* . Identify a signal to use to indicate when it is time to return to the classroom as a secondary method of keeping on schedule.
- Determine a meeting place in the schoolyard. This place should be a quiet, shaded location that the class will use as a base for meeting before and after the inventory.
- Ask students to gather in their groups to review *Student Worksheet 4.1- Site Inventory* with the adult leader (teacher, volunteer, etc). Adult leaders should be familiar with the list and the location of the items on the schoolyard prior to class. A planned route should be predetermined in order to stay on schedule, inventory as much of the list as possible, and to manage students.
- Ask students to quickly and quietly gather activity packs and prepare to go outside.
- Once the class demonstrates readiness, lead the class outside to the predetermined meeting place. Do one final review of the procedures and the ending time.
  - Time spend out doors conducting the inventory will determined by the size of the schoolyard, amount of time available, behivior of students, etc. The teacher should determine the amout of time prior to the lesson. Time may not allow for an intire inventory of the site; be sure to have planned for students to inventory the largest items first (school building, parking lot, site boundary, woodland, hills, valleys, etc.) and be sure to have students inventory at least one natural item and on built item to recognize the difference.
- Conduct the inventory. Encourage students to be thorough but remain aware of the time. Try to inventory as much as possible in the time allotted.
- Once time has run out, ask student to gather in the predetermined gathering place for a discussion on the activity. The teacher will ask the following questions. The discussion should not be limited to these questions, improvise as students discuss the activity.

- What did you discover during the inventory process?
- Where there things that you noticed this time around the schoolyard that you hadn't notice before? What things?
- What methods of data collection were the most efficient? Which ones took longer?
- To what degree do you think the data is accurate and detailed? Given more time and resources, what other information would you like to have?
- Looking at the data recorded now, after the inventory has been completed, what methods worked best and which ones would you change?

- The teacher will conclude the class with a brief summary of the 'field trip' and the inventory process. The teacher will briefly introduce the next step of the design process- analysis.
- Ask students to check for all the items in their *Activity Packs*, then quickly and quietly return to the classroom.

Assessments

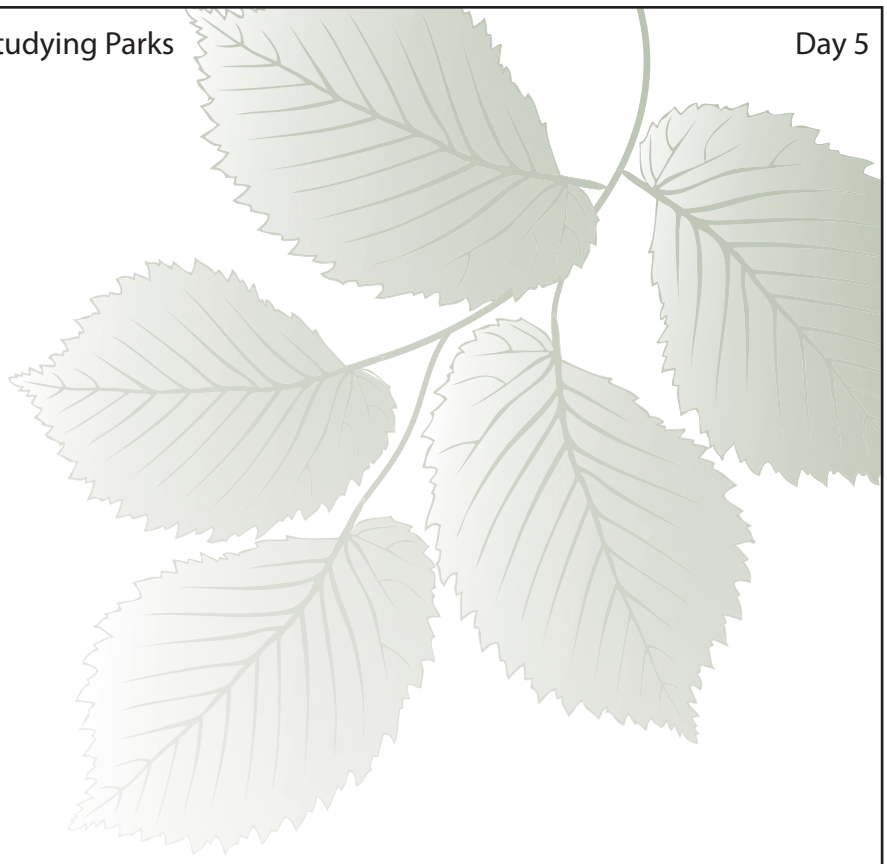
- Students will demonstrate the ability to accurately identify inventory items.
- Students will demonstrate knowledge of man-made items.
- Students will demonstrate knowledge of natural items.
- Students will demonstrate ability to measure and record inventory data accurately.
- OPTIONAL: Check completeness of homework assignment.

Extension Activities/Homework

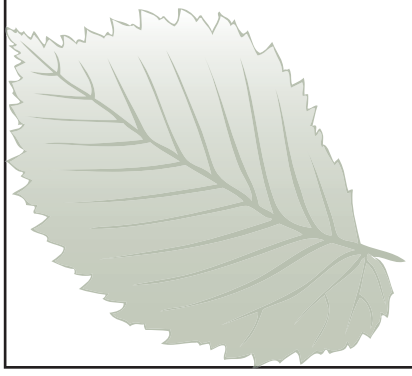
- Ask students to bring an example of a model from home to share with the class in a later discussion. Offer examples of models such as a model car, a doll, a toy house, a toy animal, etc.

Additional Resources

- Booth, N.K. (1983). *Basic Elements of Landscape Architectural Design*. Long Grove, IL: Waveland Press, Inc.
- For additional web resources see Recommended Resources



Instructor Workbook
Day 5



Topic

Lesson 5: Analysis- What does it all mean?

Time: 45 minutes

Standards

- Behavioral Science 1.5a
  - Demonstrate and practice the Skills for Life to be able to work independently and cooperatively to accomplish goals.
- Geography 1.2b
  - Construct and use mental maps of communities, regions, and the world that demonstrate understanding of relative location, direction, size, and shape.
- Geography 1.2e
  - Describe how people create places that reflect ideas, personality, culture, wants and needs as they design homes, playgrounds and classrooms.
- Communication 3.1a
  - Uses speaking skills to communicate effectively.
- Communication 3.1b
  - Uses listening skills to communicate effectively.
- Geometry 3.4b
  - Create and describe mental images of objects, patterns, and paths.

Objectives

- Students will analyze information collected during the inventory exercise for patterns and indications of appropriate design decisions.
- Students will compare methods of representing data.
- Students will create a map that records location and size of inventory items.

Materials

- Activity Packs
- Inventory Sub-lists
- *Student Worksheet 5.1- Inventory and Analysis*
- Letter to parents (for Day 6 activity)

Preparation

- Review the provided *Inventory and Analysis Guide*. Make notes about which ones apply to the program and should be brought to the student's attention.
- Cut out sufficient and applicable Inventory Symbols.
- Print a scaled map of the schoolyard. Lamination of this map may be desired so the map can be reused in the future.

Lesson Overview/Instructional Approach

- The teacher will introduce the concept of information analysis.

- Using the information collected during the 'fieldtrip' to the schoolyard, the teacher will lead the class in a discussion compiling the lists into one 'master' list. The product of this activity will be a verbal list describing the data and an illustrated map of the schoolyard with visual indicators of inventory items found.
- In the same groups of four students from earlier in the lesson, students will complete the *Student Worksheet 5.1- Inventory and Analysis*, diagramming relationships between existing site elements while answering questions about the data.

Background Information

The follow up step to the inventory process, analysis aims to makes sense of raw data and determines the importance of the information to the design process. ***Analysis*** *is by far the more challenging step of the two because it requires the designer think about the probable impact existing site conditions would have on the implementation of items in the project program. Accurately predicting the implications of proposing design elements can benefit project budgets and timelines, environmental conditions, and the experience of site users after the design has been installed; conversely inaccurate predictions or ignored conditions can have the reverse effect on the project.*

Methods of analysis range from highly technical computer analysis using programs such as ArcGIS to designer intuition and previous knowledge and experience. Methods of recording analysis include graphic illustration, text charts, relationship diagrams, maps…Examples of each have been included in the Day 5 packet. The approach taken can depend upon an established system within a design firm, individual preferences, amount and variety of data available, client preferences, project scale, and project program details.

Relationship diagrams are an easy way to quickly visualize essential links between program elements and site conditions. Often these diagrams are constructed in a manner that resembles the site so that, graphically, it reads as a map matching the site. Not all elements need to be represented on one map or diagram; categories of inventory items can be determined and mapped on separate sheets for visual clarity. For example, ***slopes*** *of the site can be represented on one map using four colors or patterns such as*

Blue = less than 1 percent ***grade*** where is drainage is a problem

Green = 1 to 3 percent grade that is suitable for all types of construction

Yellow = 4 to 9 percent grade which would need moderate ***earthwork*** for construction

Red = above 10 percent grade requiring major site adjustments for construction

And another map could illustrate where existing transportation functions are located such as trails, sidewalks, roads, and parking areas. Side by side these two maps would give a designer a general idea about the type and amount of access the various slope categories have, options for expansion of the transportation routes, and limitations of the transportation system due to slope.

For this type of information, a graphic representation is a more useful than a written description. It is appropriate and more useful to use written descriptions when describing elements such as character of a place, desirable or undesirable qualities of the site, and regulations or legal matters influencing the site. Together, illustrations and written analysis methods help designers intimately understand the limitations and potentials of the site prior to making design decisions.

Vocabulary

- Analysis
  - Evaluation and synthesis of raw data collected during the inventory process to draw conclusions about the existing condition of the site. Results of the analysis will be used to inform the designer of possibilities both positive and conerning during the design development.
- Earthwork
  - The moving of and shaping of the earth into desirable landforms such as banks, ditches, mounds, basins, etc.
- Grade
  - The degree or inclination of a slope

- Slope
  - A method of measuring elevation and grade change. It is the mathematical equivilent of elevation rise divided by the distance horizontally in which that rise occurs (rise/run). It is often expressed as a ratio.

Procedure

- Introduce the concept of analysis. Encourage students to discuss the analysis process and outcomes, allow this to become less of a presentation talking at the students but a conversation between the teacher and the students.
- Introduce the day's activities.
  - First, a re-assemble the inventory list into a master list with the addition of the data collected during the site visit.
  - Second, completion of the site analysis worksheet.
- Before proceeding to the group discussion of the inventory, students should demonstrate an understanding of the concept of analysis. Encourage students to think about the meaning of the inventory items; ask for examples from students.
- Once a sufficient understanding has been reached, lead the class in a discussion re-assembling the inventory master list with the addition of data. Two methods of student involvement have been described below.
  - Option One: Ask each student to select one item from the list to tell the class about. Then proceed around the room, asking each student for his/her response. Continue with student answers until all inventory items have been recorded. As students are speaking, the teacher will be recording responses and responding to students as needed. Encourage students to speak clearly and loud enough for everyone to hear. Use this as an opportunity to practice public speaking skills.
  - Option Two: Ask each group of four to cover two to three of the major categories (Topography, Soils, Water Action, Vegetation, Animal Evidence, Land Use, Boundaries, Transportation, Structures, Views). Allow groups time to prepare a discussion summarizing the inventory data. Groups could elect one person to speak to the class but it is more desirable if multiple students from the group practice speaking in front of a group.

    As the verbal list is being compiled, use the *Inventory Symbols Set* and written text to record the inventory data on a map of the schoolyard. Students should participate in this process by assembling the map as they describe the data.
- Once completed, use *Student Worksheet 5.1- Inventory and Analysis* with data to discuss relationships between program elements and site information. For this exercise, it is not important to identify every relationship. The teacher should help students focus on identifying relationships that apply to the specific site program and the information the students identified through the site visit.
- For example, if the students expressed interest in having a baseball field on the site then important things to look for in the inventory data would include the

  area of grass lawn,

  slope percentage between one and three percent,

  available parking and access for vehicles,

  access for pedestrians (trails, sidewalks, etc),

  adjacency of buildings (flying balls could break windows)
- If these things are unsuitable, then the site might not be well suited to have a baseball field and alternative recreation activities could be discussed by the class. If the relationships between these elements are sufficiently met then the designer could reasonably propose a baseball field on the site.
- Optional, group students in pairs to work on *Student Worksheet 5.1- Inventory and Analysis*.
- Optional, ask students to complete the worksheet as homework that evening and return the next day.

- The teacher leads a short discussion reviewing the day's lesson and introduces the model building activity.
- Ask students to 'show and tell' about the models they brought from home. Use each model to discuss scale- demonstrating what an appropriate scale is for the schoolyard models.
- The teacher assigns the homework of bringing items from home to use to construct a model and gives examples. Scale of the items needs to be stressed. Provide time for students to brainstorm what things they could use in their models to represent the inventory items previously discussed.
- The teacher assigns the homework of delivering the Parent Letter to their guardian for signature. To be returned the following day.

Assessments

- Students will demonstrate knowledge of analysis through the assessment of inventory data.
- Students will demonstrate knowledge of data representational methods.
- Students will demonstrate an understanding of verbal and graphic representations of data.

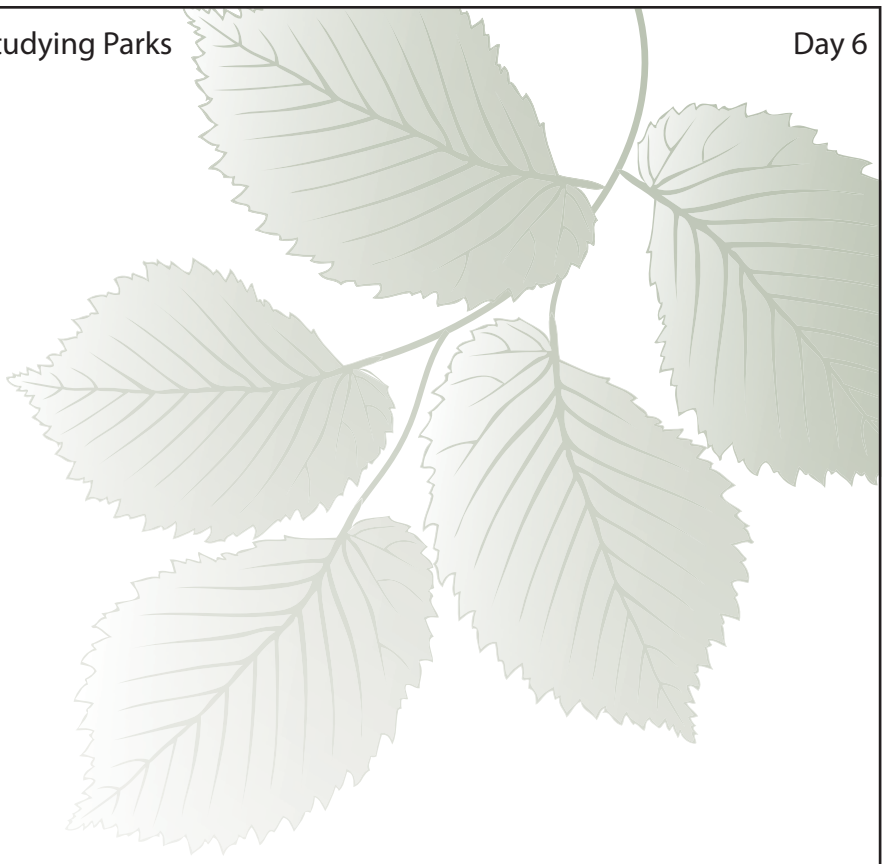
Extension Activities/Homework

- Completion of *Student Worksheet 5.1- Inventory and Analysis*.
- Bring items that resemble elements of the inventory to use in building a model. Ex. Blocks for buildings and pavement, blue yarn for water, twigs for trees, etc.
- Student guardians sign and date the Parent letter, to be returned the following day

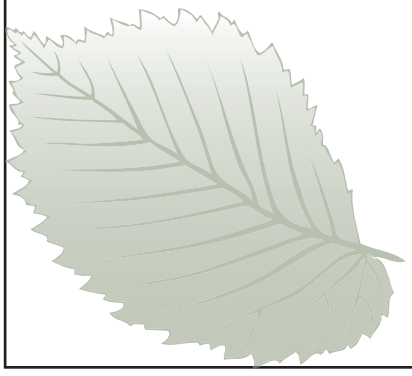
Additional Resources

- Booth, N.K. (1983). *Basic Elements of Landscape Architectural Design*. Long Grove, IL: Waveland Press, Inc.
- Simonds, J.O. (1998). *Landscape Architecture: A Manual of Site Planning and Design.* New York, NY: McGraw-Hill.

- For additional web resources see Recommended Resources



Instructor Workbook
Day 6



Topic

Lesson 6: Project Inventory- A Model Representation

Length: 45-60 minutes

Standards

- Data Analysis and Probability 5.1c
  - Represent data using concrete objects, pictures and graphs.
- Geometry 3.4a
  - Build and draw geometric objects.
- Geometry 3.4c
  - Identify and build a three-dimensional representation of a three-dimensional object.
- Measurement 4.1a
  - Understand such attributes as length, area, weight, volume, and size of angle and select the appropriate unit of measure.
- Behavioral Science 1.5a
  - Demonstrate and practice the Skills for Life to be able to work independently and cooperatively to accomplish goals.
- Geography 1.2c
  - Recognize the five themes of geography: location, place, human interaction with the environment, movement and regions.

Objectives

- Students will construct a model of the schoolyard using information obtained during the inventory.
- Students will compare the similarities and differences between maps and models.

Materials

- Example models (cars, atoms, cells, etc)
- FOSS Schoolyard Models Kit (if available)
  - Plastic Tray (one per group)
  - Ruler (one per group)
  - Wood angles (two per group)
  - Craft sticks (four per group)
  - Gram pieces (25 per group)
  - Plastic cups (two per group)
  - 2 bags of Powdered Clay
  - 8 bags of Sand
- Water
- Duct Tape
- Newspaper
- Paper towels
- Notebook paper

- Dustpan and broom
- Inventory list
- Model building materials brought by students (as homework)
- Model clay (if FOSS kit is unavailable)
- Trays, cake size (if FOSS kit is unavailable)
- Ruler (one per group)
- Letter to parents returned, signed by parents

Preparation

- Send letter home to parents describing the activities goals, suggestions of at home activities, and ask for volunteers to help during the lesson.
- Gather material and prepare group kits.
- Set materials in stations in different locations around the room for students to retrieve in preparation for the model construction

Lesson Overview/Instructional Approach

- Introduce model building as a means of representing data and visualizing site conditions.
- The teacher will help students begin building a model.
- Students will work in groups of four to construct a model that represents the schoolyard.

Background Information

Models are tools that allow people to study objects, environments, or processes that are too large, too small, or too complicated to study at real scale. Through the use of models people are provided the opportunity to manipulate objects or environments not easily controlled in the real world. Perhaps the most popular version of models is miniature versions of real objects. Models can prove to be very valuable methods of representing data due to three dimensional and lifelike qualities. Models can visually represent data in lifelike or symbolic modes. The selected method of visual representation is determined by the model builder and is often derived from the intended purpose, type of data, audience, and model builder preferences.

Landscape architects often use models to help study the conditions of a site. Due to the scale and complexity of some projects, models serve as valuable tools of data representation and analysis. Much of the essential information required for the design process can be represented in model form, such as boundaries, existing site features, proposed site features, etc. Models can take on a variety of different forms depending upon the type and amount of data represented and the purpose of the model. Technological advances have provided Landscape architects with computerized tools for creating models and analyzing data. Programs such as ArcGIS have tools that allow Landscape architects to compare data, assess design options and predict trends. These tools can be used on sites ranging in scale from square feet to hundreds of acres. The level of complexity within each model is determined by the Landscape Architect and is nearly limitless.

Vocabulary

- Model
  - An object, built to scale, that represents in detail an object often too large or too small to manage at the orginal size
- Symbolic
  - Abstract representations of real objects. When used a graphic key or verbal labeling is often needed to distinguish symbolic meaning.

- Terrain
  - Surface features of an area of land

Procedure

- The teacher will introduce model building as a means of representing data and visualizing site conditions. During the presentation, the teacher should show students examples of models.
- The teacher will introduce the model building project and ask student to retrieve the things they brought from home to be used in their models.
- The teacher will ask students to gather in their groups of four, one group per table.
- Once arranged in groups, the teacher will ask for volunteers from each group to retrieve the model building materials from each station around the room.
- Once all students are in their groups and have all the materials collected, the teacher will instruct students on how to start building the terrain.
- As students progress through the model building, the teacher and (if available) a second adult helper should be observing and helping students. Encourage students to refer to the map created in the previous lesson for help.
- Once the models have been completed, ask students to clean their desk areas and wash their hands.
- The teacher will ask student groups to spend a few minutes recording differences and similarities between the model and the map. Discussion to follow.
- The teacher will lead a class discussion about the models emphasizing the differences and similarities to the map.

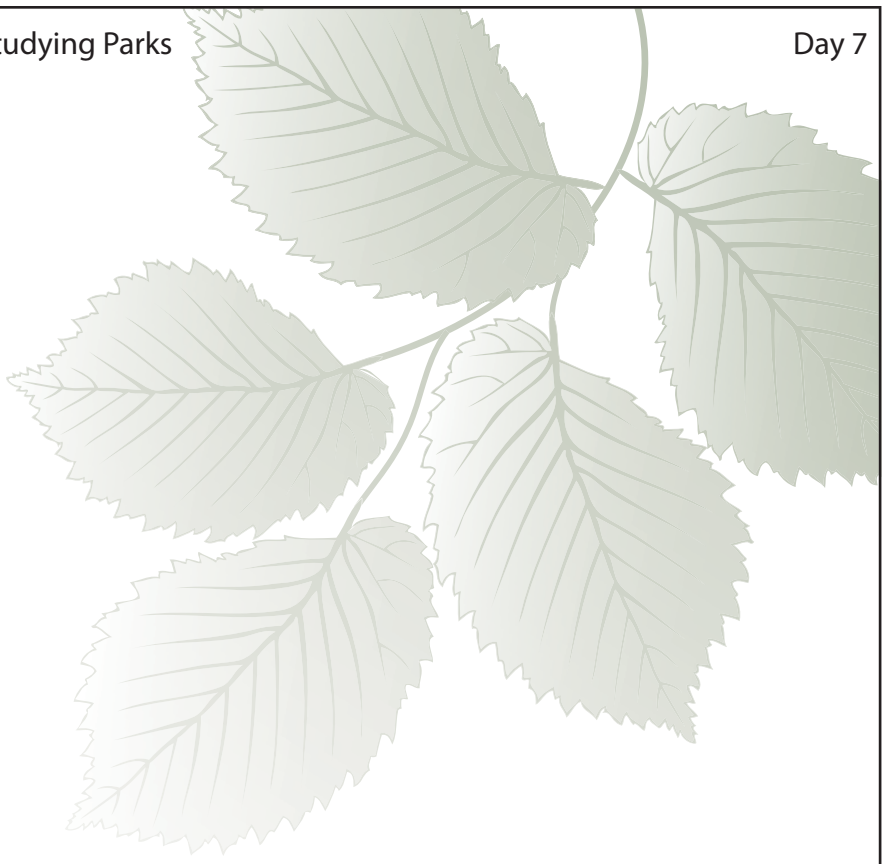
Assessments

- Students will demonstrate knowledge of differences between the representation of data in a map and model.
- Students will demonstrate knowledge of similarities between the representation of data in a map and model.
- Students will demonstrate an understanding of scale and methods of representing data.
- Students will receive credit for bringing items from home to be used to construct models.
- Check completeness of homework assignment.

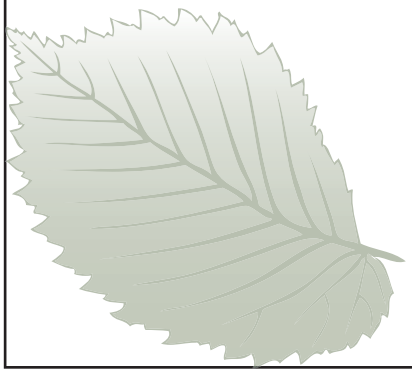
Extension Activities/Homework

Additional Resources

- FOSS Lesson Unit- Teaching Children About Landforms
- Christiansen, M. L. (1985). *Park Planning Handbook*. New York, NY: Macmillan Publishing Company
- For additional web resources see Recommended Resources



Instructor Workbook
Day 7



Topic

Lesson 7: Analysis- How do they relate?

Time: 30 minutes

Standards

- Geography 1.2e
  - Describe how people create places that reflect ideas, personality, culture, wants and needs as they design homes, playgrounds and classrooms.
- Communication 3.1b
  - Uses listening skills to communicate effectively.
- Geometry 3.2a
  - Find the distance between points along horizontal and vertical lines of a coordinate system.
- Behavioral Science 1.5e
  - Explore factors that contribute to one's personal identify such as interest, capabilities and perceptions.
- Behavioral Science 1.5g
  - Understand how the arts express cultural heritage and our humanity: literature, music, drama, dance, role or writers and artists, art and architecture.

Objectives

- Students will analyze information collected during the inventory exercise for relationships that exist between elements.
- Students will analyze information collected during the inventory exercise for patterns and indications of site activities.
- Students will analyze information collected during the inventory exercise for patterns and indications of site users.
- Students will argue the best location of a chosen element based on their evaluation of the inventory.

Materials

- Computer
- Projector
- Student Worksheet 7.1- Ideal Relationships
- Student Worksheet 7.2- Proposal

Preparation

- Review the inventory list, mentally prepare answers to each of the discussion questions
- If desired, prepare a location to record student answers during discussion- poster paper, whiteboard, smart board, computer, etc.

Lesson Overview/Instructional Approach

- The teacher will introduce the concept of making diagrams.
- The teacher will ask student to participate in a discussion of topic questions on diagrams.

- Teacher introduces homework and offers an example.
- Teacher assigns *Student Worksheet 7.2- Proposal* as homework

Background Information

Site inventory is an essential part of the design process but the information collected during the process is virtually useless if not for the analysis process. During site analysis, site data is processed to reveal relationships or clues that can influence the design. During analysis, information collected via inventory processes, client interviews, site visits, etc is assessed equally. The result of the analysis process is a determination of the importance of information and data as it applies to the design program and it is the formation of informed hypothesis as to the best arrangement of the design. An inventory and analysis process that is through and accurate can make the design process easier and outcomes stronger.

Making the leap from raw inventory data to synthesized predictions is a challenge and a skill that designers develop and improve with experience. This step requires that all of the information derived from the inventory process be applied to the program and potential design solutions be explored. Some landscape architects find it helpful to diagram during this step. ***Diagrams*** *are useful tools to use when abstract or exploratory thoughts need to be expressed. Diagrams can be used during nearly every stage of the design process.*

Diagrams are often less concerned with representing specific details and exact shapes and sizes of program elements as the representation of ideas and relationships between elements of the site.

Vocabulary

- Adjacencies
  - Being close to, next to, or adjoining to an object
- Diagrams
  - A plan, sketch, or drawing created to demonstrate how something works or clarifies relationships between parts of a whole

Procedure

- The teacher will introduce the concept of identifying relationships between site features. Examples based on the inventory are encouraged to help students better understand the lesson.
- Ask students to complete *Student Worksheet 7.1- Ideal Relationships* as a warm up for the discussion.
- Once students have completed *Student Worksheet 7.1- Ideal Relationships*, review the worksheet as a class, having students check their own work. Use this activity as a lead into the discussion.
- Initiate a class discussion, ask students to answer the following questions using information from and observations of the inventory list, map and model;
  - How do the site feature relate to each other? Adjacencies? Separate locations? What is happening inside the building?
  - What do the existing features tell us about the site activities?
  - What do the existing site features tell us about the site users?
- Use a systematic method of addressing each question during the discussion.
  - Option 1: Proceed through the Inventory List, using the map and the model as visual reminders of the approximate locations and size of elements. Address all three questions for each inventory item before proceeding to the next item.
  - Option 2: Proceed through the Inventory List, using the map and the model as visual reminders of the approximate locations and size of elements. Proceed through the list three times, focusing on one question at a time.
- Once students understand the existing conditions, ask student to review the program elements they listed as desirable at the beginning of the unit.
- Assign homework *Student Worksheet 7.2- Proposal*

- Ask student to identify one element from the program that is especially desirable to that student and briefly explain why they selected the element.
- Ask the student to use the information they and their classmates gathered during the inventory to write a short description of where they propose the element be incorporated on the site.
- The student needs to offer supportive evidence as to why the selected location is most appropriate to the element.
- Provide student with the example.

Students will be asked to read their assignment to the class during the following lesson.

Assessments

- Students demonstrate knowledge of relationships between inventory elements.
- Students demonstrate knowledge of patterns and indications of site activities.
- Students demonstrate knowledge of patterns and indications of site users.
- Students reasonably defend arguments.

Extension Activities/Homework

- *Student Worksheet 7.2- Proposal*

Additional Resources

- Reid, G.W. (2002). *Landscape Graphics: Plan, Section, and Perspective Drawing of Landscape Spaces*. New York, NY: Watson-Guptill Publications.
- For additional web resources see Recommended Resources

Instructor Workbook
Day 8

Topic

Lesson 8: Project Design- What now?

Time: 45 minutes

Standards

- Geometry 3.4d
  - Identify and draw a two-dimensional representation of a three dimensional object.
- Behavioral Science 1.5a
  - Demonstrate and practice the Skills for Life to be able to work independently and cooperatively to accomplish goals.
- Geography 1.2e
  - Describe how people create places that reflect ideas, personality, culture, wants and needs as they design homes, playgrounds and classrooms.
- Communication 3.1a
  - Uses speaking skills to communicate effectively.
- Communication 3.1b
  - Uses listening skills to communicate effectively.
- Behavioral Science 1.5e
  - Explore factors that contribute to one's personal identity such as interests, capabilities, and perceptions.

Objectives

- Identify elements of a conceptual design.
- Define and create plan drawings.
- Develop recommendations for a schoolyard design.

Materials

- Overhead projector or visual presenter
- Computer
- Note paper
- Scissors (one per student)
- Rulers (two per group)
- Printer paper
- *Student Worksheet 8.1- Design Reasoning*
- Clean map of schoolyard

Preparation

- Prepare clean map of schoolyard for recording note
  - Maps have been provided on 2' x 3' printable PDF files for each school. Files are named by school.
- Become familiar with Bing Maps to show students where maps were generated from.
  - Go to Bing.com Maps and locate the school grounds

- Enable the Bird's Eye view by clicking on the drop down menu near the upper right hand corner of the image (it will read Road or Automatic or Bird's Eye).
- Select Birds Eye and unselect the option to 'Enable tilt' to veiw the site as a map. Students may be interested in the tilt view during the demonstration and it can be used to better understand the map view.
- Make note of the scale icon in the bottom right hand corner of the image and zoom into 1" = 50" (the symbols in the workbook are at that same scale).

Lesson Overview/Instructional Approach

- Students will present their homework assignment to the class.
- A class discussion will analyze the results of the homework assignment.
- The teacher will introduce conceptual design and plan drawings.
- Students will work collaboratively to create a conceptual design using all of the knowledge and information obtained during the project programming, inventory and analysis stages of this unit.
- Students will present design concepts to classmates.
- Students will work collaboratively on *Student Worksheet 8.1- Design Reasoning*

Background Information

Conceptual design *is the phase in which the information collected during the inventory phase and the conclusions made during the analysis phase are combined with the project program to create a design or multiple design options. Conceptual design is the idea generation phase of the design process.*

As the name suggests, conceptual design is often abstract, lacking detail. During this phase, any number of design solutions can be exlpored, modified and combined, eventually creating one or a few ideal conceptual designs. Design solutions are often explored first in plan view on site ***base maps****. These maps are illustrations, aerial images, or a combination of the two. Versions of base maps can be created depending upon the information that needs to be represented in the drawing. The base maps to be used during this exercise will be aerial images. Once base maps are obtained or created, designers explore a variety of design solutions. Because a base map is being used, the illustrations being produced are aerial* ***plan drawings****.*

The graphic representation of these designs is most often in the form of graphic symbols that represent proposed elements. The symbols can be as vague or as detailed as well as the notations that accompany the symbols. Notations are often used to verbally communicate what the symbol represents. For example, bubble shapes are often used to define areas of activity, landscape elements, hardscape elements, individual plants or plant masses. To help convey they design intent, notations are helpful in diseminating what exactly the bubble shape represents.

Vocabulary

- Base map
  - An illustration of the site as it exist prior to design and construction to be used as the base of the design process (inventory, analysis, design, construction documents)
- Conceptual Design
  - An illustration indicating conceptual areas of the design with bubble like shapes; generalized descriptions are assigned to these bubbles such as "low deciduous shrubs" or "low point"
- Plan drawing
  - Two-dimensional illustrations that describe a place or an object or construction information. The level of detail included in plan drawing varies depending on the information intented to be communicated and the audience to be viewing the illustration. The level of detail can range from simple, diagramatic illustrations to detailed, technical drawings.

Procedure

- Using the developed Project Program, the teacher will lead the class in a review of the desired elements.
- The teacher will ask students to share their homework assignment conclusions with the class. Each student will have a few minutes to read their proposal.
- As students are reading their proposals, the teacher should record general notes about the location and reasons each student gives for the proposed location of selected elements on a clean map of the schoolyard.
- Once student presentations have been completed, the teacher will ask students to engage in a brief class discussion about the results of the assignment.
  - What similarities were there between student proposals?
  - What differences were there between student proposals?
  - Which element(s) received more proposals? What could you infer from this? (that those elements are the most desirable among students)
  - What suggestions/thoughts do students have about the proposals? Changes?
- The teacher will conclude the discussion with a summary and suggestions for design modification (where might be a better location for elements, what reasons were strong, and which reasons needed to be re-thought)
- The teacher will introduce the concept of a conceptual design and plan drawings (show BING.com).
- Optional: The teacher will do a demonstration of Bing.com and how the base maps were created.
- Students are asked to gather in groups of four.
- In these groups, students will collaborate to develop a conceptual design for the school yard site. Ask one student from each group to retrieve a base map of the site.
- Ask a second student to retrieve the Design Symbols Set.
- Optional: Ask students to color the symbols with appropriate colors. Greens and browns for trees, pinks, reds, purples, yellows for ornamental shrubs, yellow-green for grasses, bright green for turf grass, etc.
- Ask students to use a ruler to measure the symbols in unit inches and record the measurement. Once student have measured all symbols, instruct students on making the conversion to unit feet according to a given scale. Use a variety of scales to demonstrate how the representative size of the object changes as the scale changes while the actually size of the object stays the same.
- Ask students to work together to cut out the symbols. Suggest to students to keep symbols in separate piles.
- Once symbols have been cut out, ask students to use the knowledge they acquired during the previous lessons to create a design for the schoolyard site. Students can propose any changes to the site except relocation of the building. Students should refer to the inventory, analysis and discussion information as they make design decisions. If students wish to include items that are not included in the design symbol set, have students draw their own symbol for the design.
- Once students have created a conceptual design, ask student to complete *Student Worksheet 8.1- Design Reasoning*
- The teacher should observe students while completing the worksheet. Once all student groups have prepared a short presentation, ask students to present their groups plan. The teacher should make comments about each plan, helping students to understand the strengths and weaknesses of the design. The teacher should site reasons from the inventory, analysis and program in the comments.
- Once student presentation have been completed, ask students to return to groups to complete the final part of *Student Worksheet 8.1- Design Reasoning.*
- Optional: Assign final part of the worksheet as homework.

Assessments

- Students will demonstrate knowledge of the elements of a conceptual design.
- Students will demonstrate the ability to define and create plan drawings.
- Students will demonstrate the ability to make schoolyard design recommendations.

Extension Activities/Homework

- Using Bing.com, locate the park from the writing assignment in Lesson 1 or Lesson 2. Save a picture of the park.
- Completion of *Student Worksheet 8.1- Design Reasoning*

Additional Resources

- Bing.com
- For additional web resources see Recommended Resources

Instructor Workbook
Day 9

Topic

Lesson 9: Project Design- Presentation

Length: 45 minutes

Standards

- Behavioral Science 1.5a
  - Demonstrate and practice the Skills for Life to be able to work independently and cooperatively to accomplish goals.
- Geography 1.2c
  - Recognize the five themes of geography: location, place, human interaction with the environment, movement and regions.
- Geography 1.2e
  - Describe how people create places that reflect ideas, personality, culture, wants and needs as they design homes, playgrounds and classrooms.
- Communication 3.1a
  - Uses speaking skills to communicate effectively.
- Communication 3.1b
  - Uses listening skills to communicate effectively.
- Geometry 3.2a
  - Describe location and movement using common language and geometric vocabulary.
- Behavioral Science 1.5g
  - Understand how the arts express cultural heritage and our humanity: literature, music, drama, dance, role or writers and artists, art and architecture.

Objectives

- Students will evaluate methods of presentation.
- Students will design and create a presentation.

Materials

- Sketch paper
- Construction paper
- Markers
- Pencils
- Colored pencils
- Scissors
- Tape
- Poster board
- Magazines: gardening, sport, art, nature, etc (to cut apart)
- Newspaper

Preparation

- Set up a time to display the students' presentations to the intended audience. Good times to do this would be at an open house.

Lesson Overview/Instructional Approach

- The teacher will introduce presentation reasons and methods.
- The teacher will help students formulate and execute presentation concepts.
- Students will work in groups of four to create a presentation of their design concept.

Background Information

Once designers have created preliminary conceptual designs, the client must be given the opportunity to provide feedback before the designer finalizes the design. Client feedback can be acheived through a number of methods, including presentation of the conceptual design. Throught the process of presentation, designers are allowed to customize a presentaion to the client and the project. Presentaions can be made using a variety of media including but not limited to projected slide presentations, poster presentations, booklets, and oral presentations, or any combination of these. Due to the illustrative nature of design, visuals are necessary when presenting one or more design concepts. However, due to the creative nature of design, presentations are often allowed to be created, allowing for more variety and options in presention style and media.

Presentations allow time for the client to ask questions of the designer, allowing for a conversation about the design concepts to occur. Often, designers will have questions that they wish to have the client answer also. During this exchange, a single, most desiralbe concept is identified. This chosen concept can be one of the presented concepts or combination of elements from all of the presented concepts. The designer has the goal of identifying what the client wants most while ensuring that the design is feasible and safe for the users and public. The beauty of the presentation is that it offers designers the opportunity to educate their clients about the design needs and the client gets to confirm that the designer understood their wants. It is an opportunity to make sure everyone will be happy with the final design.

*After the design presentaion, the designer begins the design development phase in which the conceptual design becomes a **detailed design**. Objects are assigned specific form and size, specific objects are selected such as plant material, site furniture, etc.*

Vocabulary

- Detailed design:
  - Working with a single, client approved concept, technical design deatils and graphics are developed. The graphic style is more refined being hand drafted or produced using compter drafting programs. Details assigned during this phase include things such as construction materials (brick, stone, wood, etc), plant material species, 3-dimensional information (height of buildings, tree canopy height, etc), and preliminary earthwork plans are developed. Detailed design is followed by construction documentation process.

Procedure

- The teacher will introduce presentations as a method of communicating information with an audience.
- The teacher will entertain students' questions about presentations.
- The teacher will introduce students to the lesson's activity.
  - In groups of four, students will prepare a presentation of their design proposal. Students should be allowed freedom to develop their own means of presentation. The teacher will offer support and resources as available to assist students complete their presentations. Students will be required to do a six minute verbal presentation of their project to the class utilizing any materials developed for the presentation. Encourage students to use images, plans, photos, etc collected and developed during the unit including inventory and analysis information.
- The teacher will ask students to gather into their groups of four to begin working on developing a presentation of their groups work.
- At the appropriate time, students will be asked to clean their areas.
- Optional: the teacher can choose to meet with each group to discuss their plan for the presentation and practice speaking about the project prior to giving the presentation.

- Optional: the teacher can choose to have students practice giving their presentations using the students in the class as an audience.
- Students will be asked to present their projects to the audience at the designated time.
- Each group member needs to be involved in the presentation.

Assessments

- Students will demonstrate knowledge of various presentation methods and create a presentation utilizing an appropriate method.
- Students will demonstrate understanding of presentation content.

Extension Activities/Homework

- Collaboration with the art teacher and/or library teacher to help students work on the presentation during other classes. This would allow more time for students to complete the presentation while demonstrating cross curricular partnerships.

Additional Resources

- For additional web resources see Recommended Resources

The instructional (Instructor Workbook shown on p. 51-95; figure 3) unit utilizes the infused approach for integrating additional resources and educational material into the lesson. The infused approach encourages and assists teachers in infusing resources into a lesson plan. Internet resources can be infused into an instructional unit in four ways as identified by Cruz and Duplass in The Elementary Teacher's Guide to the Best Internet Resources (2007, p. 8-10):

1. Content: This would take the form of background information for the teacher, content to integrate into the lesson, or content to use with the children.
2. A task or activity: There are usually stand-alone experiences (as opposed to a comprehensive Internet lesson plan) that become part of the lesson. They may be downloadable paper-based tasks or interactive activity requiring student to complete the task at their desk or in groups at tables or to work at computer stations, or it is a teacher-centered activity using a large-screen monitor, as an example.
3. Teaching materials: From images that might be turned into transparencies to rubrics for projects, teachers can find free materials of high quality online.
4. An extension: This is when teachers move from one discipline to another or they integrate disciplines that often have a central theme (thematic teaching).

Unit Evaluation Results

The extent to which an education lesson is qualified as a lesson plan can be measured against varying guides. This unit was developed to meet the six criteria of a lesson unit as outlined below (Cruz & Duplass, 2007, p. 26):

1. Standards: Is the plan tied to national or state standards?
2. Instructional Sequence: Is there a clear and detailed explanation of the sequence of the instruction?
3. Rigor: Does the plan challenge students with tasks and activities that require critical thinking and self-discipline?
4. Creativity: Does the plan creatively engage the students with
   a) Opportunities to develop skills and crucial thinking,
   b) Variety of strategies, and

c) Meaningful, grade-appropriate content?

5. Resources: Are there resources, such as well-crafted handouts or links to other high-quality websites?
6. Evaluation: Does the plan have an evaluation component?

Evaluation of the developed instructional unit is necessary to accurately assess its potential as a unit and to critically analyze the challenges to its successful implementation or educational potential. Careful analysis and selection of an appropriate evaluation method enhances the ability to collect data that evaluates the successful or non-successful achievement of study goals. For the purposes of this study, it was determined early in the process that a qualitative questionnaire based study would most likely yield valuable and insightful assessment. Open-ended questionnaires as a method of data collection allows researchers to learn about settings, perceptions, challenges, or opinions often limited in other forms of data collection. The evaluation goal for this study is to determine if the developed instructional unit is viable for use in the classroom, meets implementation standards of the educational benchmarks identified, and equips educators to teach about the subject of landscape architecture.

A questionnaire was developed seeking feedback focused on evaluation goals. The open-ended questionnaire is designed to collect qualitative information from a convenience sample of participants about similar evaluation goals while providing flexibility for participants to respond with answers that are more complete with details than fixed answer questions.

The open-ended questionnaire methodology provided advantages that are not available through an interview process. Research participants provided direct responses through their own words and were able to complete the questionnaire according to their conveniences. The expanded, flexible timeline for completion allowed participants the opportunity to answer questions with greater depth and personalization. Through this process, analysis of responses has the potential to reveal unpredictable perspectives that might otherwise not have been captured. Analysis is reported in terms of interpretation and summary rather than statistical categories.

Although limited, a sample group was sought to represent a range of educators involved with curriculum implementation. A range of career length and elementary education instruction experience was sought to broaden sample group perspective and result depth.

Questionnaire Results

A group of educators participated in the review and evaluation of the unit for its practicality and applicability to the current educational system in the district. Each subject was asked to answer basic questions about their tenure as an educator, their familiarity with the profession of landscape architecture prior to the study of the unit, and their familiarity with the community adjacent to the school. Participants were also asked to consider the average student's opportunities for career exploration beyond those of their caregivers and evaluate the amount and quality of educational support students receive outside of the classroom.

Teacher: familiarity with landscape architecture

Background Findings

- Educators had a limited range of knowledge about landscape architecture

Participants had a limited range of perceived knowledge and understanding of what the profession of landscape architecture entails. Nearly all participants indicated that their level of familiarity was basic prior to exploring this unit. None of the participants have ever interacted with or personally hired a professional landscape architect for use of their services.

Representative response:

> *I understand that there are a variety of career paths one can pursue within the profession of Landscape Architecture and believe that persons in this profession work to better communities through the use of the land and plants.*

Teacher: length of career

Participant Characteristic

- Half of participants have careers in education less than 10 years; half have careers greater than 20 years

Participants indicated a wide range of career lengths as educators. One of the participants has been involved in classroom instruction for less than one year as a student teacher finishing a master's degree. Two have been with the school district for more than 28 years and have held a variety of teaching positions cumulatively including each elementary grade level from kindergarten through sixth-grade. This range of experiences provided a broader range of perspective in how the unit being evaluated might fit within the greater curriculum and grade level abilities.

Representative responses:

This is my 9th year teaching 5th grade at Walcott Elementary. I have also taught 1st, 2nd, 4th and 6th grades in the elementary schools and I have taught 7th through 9th grade math.

After being away for a number of years, I returned to the area last year and took a position teaching fifth-grade. During the years I was away, I worked as a fourth-grade teacher in the state of Washington.

Teacher: connections to school/community

Key Findings

- Range of schools are represented in the study
- Large land area is available adjacent to each school
- All participants reside ten miles or more away from where they teach

Half of the participants teach in schools located in a rural community, half teach in urban schools. A range of school population socio-economic averages has been represented in this study. Each participant of the study resides outside of the district in

which they are employed and have a minimum of 10 mile commute to the school in which they teach. This creates disconnect from the community in which the students live and participate.

Representative responses:

> *The school is in a very rural area, with fields around it. The district is growing rapidly, primarily from the urban areas out, however there are still a number of traditional farm families represented in the school. Some of the nearer neighborhoods contain newer homes.*
>
> *My school sits on the outskirts of Davenport and its immediate radius is populated by people of low to middle SES. I am familiar with working with students and parents of this SES as well as middle to upper middle class.*

Student: career exploration opportunities

Key Findings

- Socio-economic status of families may contribute to level of career exploration opportunities found outside school
- Community composition may influence exposure to career opportunities
- Most career exposure occurs at higher education levels

Exposure to potential career opportunities comes from a variety of avenues. The curriculum delivered by three of the participants offer career exploration opportunities as a part of the course work. In rural schools, students are particularly dependent up on school programs for exposure to career opportunities beyond those represented within the community.

Representative responses:

Students are exposed to occupational opportunities from an early age as many of the families are affluent and many parents have social groups with people in a range of occupations.

I would consider my students somewhat sheltered to different occupations. The interest to learn more is there, but the exposure is not. This year the fifth-graders did attend BizTown through Junior Achievement, Students had the chance to see how a town works and the different jobs needed to be a successful town.

I do not believe that my students are familiar with many occupations besides those which their caregivers do. Our curriculum does offer exposure to a number of careers beyond what the parents/caregivers of this community do.

During elementary schools, students are primarily exposed to occupations through the language arts curriculum. As far as the opportunities offered to high school students, I really don't know.

Student: At home involvement

Key Findings

- Socio-economic status of families may contribute to level of attention received at home
- Grade level of student affect the amount of attention received from caregivers

Questionnaire results indicate that there may be a correlation between the grade level of the student and the level of attention received from caregivers; as students' progress through their education direct support received from adults beyond formal instructors' decreases. Within the elementary schools, parent volunteers are welcomed additions to the classroom and serve as a support for the instructor, often expected to work with all

students not only their child. During elementary school grades, para-educators and student peer mentoring is the available as a resource.

Representative responses:

> *In my classroom, we have partnered with the fourth-grade classes to provide peer mentoring to the first-graders. During our shared time, one fourth-grader is partnered with a first-grader as a mentor helping with reading, math, or other homework assignments. This partnership provides the opportunity for first-graders to receive one-on-one assistance and the fourth-graders reach higher levels of critical thinking thought their role as a para-instructor.*
>
> *Many of the students receive a great amount of support from their parents. The student's parents are often able to be home with the children after school and the parents are often involved with the student's extracurricular activities. Parents are very willing to volunteer in the classrooms, and often struggle to maintain appropriate boundaries. They can become overbearing at times and detrimental to their student's education. Overall, the parents are very helpful and generous with their time in the classroom.*
>
> *Most of the caregivers of my students work during school hours, so it is difficult for them to volunteer in the classroom or even help out on the occasional field trip. Similarly, they are supportive of school, however, that does not mean that they make sure that homework is done when it is assigned.*

Existing Curriculum

Evaluation participants were asked to give some background on the current curriculum being used in the district. Each participant teaches at a different school and educational level so the results reflect some differences in methodology and impression. Preliminary conclusion can be drawn about the potential for comfort and interest level of the newly proposed curricular unit based on knowing the current state of education per each reviewer.

Organization

Existing Curriculum Findings

- Curricular organization is primarily by subject matter
- Integration is desirable yet difficult with current structure

Participants indicated a subject based curricular focus in the school district; math, science, and literacy are heavily emphasized and assessed. Educators are provided with educational materials that focus teaching efforts toward each subject matter. Relating subjects to the others is not emphasized as a current priority within the curriculum although it has been in the past. Participants indicated that past curricular trends emphasized the thematic unit structure during which all subjects were taught through the lens of a unit theme such as plants, the solar system, states, weather, water, etc. Teaching each subject individually is driven by the emphasis on the Iowa Assessments test. Students are tested on these subjects and the school is judged for competency based on the student's test scores.

Representative responses:

Our curriculum is organized into subjects: language arts, math, social studies, and science are taught in my classroom. Students also have special areas classes of art, music and physical education. Our curriculum is designed to meet the standards of the Common Core.

Each subject is taught during its own period. The curriculum is based on the State Standards. Rarely is a topic's material taught in one class also covered in another class.

81% of the school day is spent on teaching the curriculum of math, language arts, science and social studies. 26% of the day is spent on math, 43% of the day is spent on language arts (including reading) and 11% of the day is spend on social studies or science.

Each period is 30 minutes at the elementary school, however reading lasts two hours. Students have art twice during a five day rotation.

Teaching Methods

Key Findings

- Heavy emphasis on district mandated curriculum and uniformity
- Emphasis on math, literature and science
- Repetition of information is necessary for learning

Participants indicated a heavy emphasis on the curricular subjects of math, and literacy, with a slightly lower yet present emphasis on science. The arts, including visual arts, music and physical education courses are offered to most students on a less frequent basis as the core subjects; either a couple times a week or as time allows. Hands-on learning is not emphasized by the current curriculum and if it is going to be done, teachers are responsible for developing the activities. Standardize testing that is meant to track student progress and gauge educational success is simultaneously de-emphasizing the in class learning activities.

Throughout the week and school year, teachers find it necessary to review information with students for better understanding and learning. The curriculum is designed to repeat concepts throughout the year.

Representative responses:

The elementary school curriculum uses a lot of hands on activities and reviewing. The students have time to work in groups and individually.

Unfortunately, my students do not do a whole lot of activities. Science is where most activities take place, since it is primarily "hands on". I would like to have my students do more research-based activities. For example, students would research a topic and present their information to the class by having the students play a board game they created, or share a poster that conveys their knowledge

gained. I am not able to teach this way anymore because of the district mandated curriculum and all of the testing that goes with it.

The K-5 curriculum is cyclical, teaching key concepts repeatedly each year, adding additional skills as students get older, so, much repetition is needed for students to master the standards.

(The amount of repetition) depends on the subject. With math especially, review is needed from day to day. We spend the first 10 minutes of math reviewing- especially because it builds upon itself.

Opportunities

Key Findings

- Able to insert additional materials to the curriculum
- Guest speakers are a great addition, sometimes hard to organize
- Field trips are extremely valuable but difficult to take

Participants indicated an ability to insert materials into the existing curriculum as they desire. However, depending on classroom dynamics and achievement, this is often difficult to implement due to strenuous curricular standards and limited flexible time. Similarly, field trips and guest speakers are valued by the participating educators but create more of an organizational and time challenge for the teachers. Financial burdens also fall on the teacher in most cases because districts rarely have access money for field trips.

Representative responses:

As teachers, we are trying to integrate more subjects with each other. I don't think any particular curriculum does a great job at this. In some lessons, social studies are integrated with math. In most cases, literacy is integrated into all subjects.

There is very little time in the day or in the year to insert additional materials. We are allowed to enrich the curriculum, but time rarely allows for that luxury.

When we have a field trip planned, we need to schedule the bus and school lunches if we are going to be gone over lunch. We send home a permission slip to parents/guardian informing them of the field trip. Students must have the permission slip signed and returned in order to participate on the field trip. Most field trips are arranged by the grade level teacher, some are arranged by the district. I do not know the cost of field trips, but I do know that the bus company charges by the mile and it is very costly (perhaps no so costly on a business budget, but very costly on a school budget). I believe that our limit for distance is how far we can go during the school day. Also, if district busses are used, they need to be back in time to run their routes for other schools whose dismissal time is earlier than ours. We are limited to the field trips set up by the district unless we can do some creative fundraising to pay for the trip. We cannot ask students to pay for any portion of the field trip; however, we can ask for donations. Teachers can apply for funding but there are certain "strings" attached to that money. So, unless it is a district mandated trip, I usually do not take field trips.

Field trips get approved through the principle. Parents get a note home so they are aware of the fieldtrip. I believe the PTA provides $7.00 per child on fieldtrips. I'm not sure if there is a limit, but most grades go on two fieldtrips. We like to leave by 8:30am and be back by 2:30pm.

New Unit Evaluation

Developed through the perspective of a landscape architecture student with no experience in formal public education beyond being product of the system, it is necessary to evaluate the unit with professionals. If the unit is to be determined as viable and a credible option for education it must meet the standards of the state. The state sets benchmarks to which each student is expected to achieve during each grade level; this unit needs to comply with the state standards to be considered viable at the most basic

level. In addition to meeting state standards, the goal of this unit is to provide a method of community exploration, career investigation and creative problem solving.

Curriculum standards

Key Findings

- Unit does not meet current curricular standards
- Some of the content might be above the fourth-grade level

Participants indicated a difference in opinion about the appropriateness of the math included in this unit. Some are concerned that the math is beyond that of the fourth-grade level while others made no mention of it or commented that it was appropriately challenging. Integration of the subjects into one unit appealed to all participants. With the current curricular philosophy adopted by the district, this unit would not be an appropriate fit. However, in prior curricular philosophies, a unit based structure was used, during which the unit would have been an appropriate fit.

Representative responses:

This unit does not fit my current curriculum standards for science or social studies.

Setting high expectations is a part of the Iowa Core Curriculum with a strong emphasis on vocabulary, this unit accomplishes those goals.

I think that this unit is very well done. It integrates these subjects nicely and if at all possible, I would try to use it in my classroom.

I believe that the content of this unit would work for both fourth-grade and fifth grade.

The math seems a little advanced for the fourth-grade level, but the other subject areas seem like they could be implemented and adjusted for ability levels at fourth-grade. The design seems logical.

Landscape architecture component

Key Findings

- The unit is successful in communicating what type of work a landscape architect might do
- Demonstrates real life application of curriculum to the community

Overall, the participants agreed that the unit would successfully expose students to the work that landscape architects participate in and help students understand the idea of a designed community. Through a unit that uses local resources and environments familiar to students, the educators believe that the patterns within the community would be made more evident to students. One participant indicated that the link between community parks and the school playground could be stronger but overall agrees that the patterns and systems are clear and concise.

Representative responses:

I think it gives students a chance to see what a landscape architect does and it makes students more aware of the community around them.

I think this unit does a great job connecting the subject matter to real world jobs.

This unit does a great job of helping students get acquainted with the concept of a designed community (and I learned a lot while reading the unit too).

Changes or challenges

Key Findings

- Overall a clearly understood unit design
- Including options for use indoors would be more accommodating
- Incorporate documents more familiar to teachers for easier use

- Making all materials available would ease teacher burden and be more user friendly

Participants were asked to comment on the unit itself and how it might be improved for improved usability or applicability. Overall, participants were complementary of the unit. Additions and modifications suggested would not necessitate major renovations of the unit. Some of the modifications could be done on an individual teacher basis. The suggestion of the indoor activity does speak to the climate of Iowa and the potential need to modify this unit for use during winter months. Implementing emerging technologies was offered as a method of making the unit more user friendly. The unit is obviously designed for outdoor use but changing weather and timing within the school year give value to some options of indoor use practice.

Representative responses:

> *Maybe you could make a pacing guide to go along with the teacher workbook. This would make it easy for teachers to glance at the unit and know how to pace their teaching. It would just be a chart with an overview of each day. Then they could go back to the teacher workbook for more detailed lessons.*
>
> *Expand the unit by having the students design a large scale park, like the classroom is a park and desks can be trees/plants, they need to arrange a trail, etc.*
>
> *Adding a writing component option- creative writing, free writing, reflective writing, etc. would make the unit more applicable to some of the current classroom work.*
>
> *I think that the unit is already user friendly. The one thing that would make it even more user-friendly would be to have all materials included (such as any books that are referenced or used); although I realize that this may not be economically feasible.*

I don't see any changes necessary to make it more applicable to the classroom. I really like the step by step directions and how it is laid out for each day.

Expectations and impressions

Key Findings

- Participants didn't know what to expect
- Unit would be effective in teaching cross curricular subjects
- Students of all learning styles would enjoy and learn from the unit

Participants offered an overall positive view on the unit's ability to reach and engage students of all learning styles. Hands-on activities are highly appreciated by the teachers and those offered in this unit were reviewed as being effective in incorporating the core subjects of math, language arts, reading, and science. The real world application of curricular lessons helps to solidify the applicability of the subjects to students and provide them with a better since of professional application.

Representative responses:

I immediately thought the math in the unit is real world. Students love real world application and this unit provided that.

I didn't know what to expect. The unit is something that you have thought through. It uses multiple intelligences to reach all learners. I think students would be engaged, especially when they get to be hands on. I appreciate the background knowledge that you have provided because I don't know that much about landscape or design.

I like the idea of the lesson, and teaching math, reading and social studies through different curriculum. By making the curriculum one that can be hands on and visual, students who learn in a variety of ways can be engaged. High levels of engagement and interaction can keep student's attention and interest. Showing

students that math is used for things more than adding and subtracting, or trying to figure out how fast the train was going. It provides students with a different outlook for the subjects they are learning.

Chapter 6 - Conclusions

Challenges the District Faces Beyond Educational Units

Within Iowa, school districts and educators are continually challenged to meet a series of standards of quality; from district accreditation standards, to programming, to teacher qualifications, all ultimately focused on meeting student performance requirements. In addition, many districts, including the Davenport Community School District, perennially facing budget reductions ultimately necessitating that districts do more with less (Becker, 2013; Luna, 2012).

Related to a reduced district budget is the increase in average class size (Iowa Department of Education, 2011, p. 1). The stae of Iowa is making a concerted effort to keep class sizes down to a goal of seventeen students per classroom however a study of the publicly available information of student enrollment and teachers within the elementary schools in the Davenport Community School District revealed that not one school within the district averaged seventeen students per classroom (see Table 3) (Iowa Department of Education, 2011, p. 1-2; Davenport Community Schools, 2013, School Directory). Student to teacher ratios were calculated based on publicly available information on each school's website. Seventeen schools were analyzed. Out of the seventeen analyzed, one came close to the goal with an average of nineteen students per classroom and one topped out at an average of twenty five students per one teacher. This overabundance of students to teachers presents a challenge simply for logistics. With more students per teacher, one on one time is reduced, resources required for a lesson would increase, and the amount of time required to complete separate tasks would increase. With limited time and resources, the balance the state is striving for is not currently being achieved making it difficult to go above and beyond educational standards.

Elementary School	Total Number of Students - 2012	Total Number of Teachers - 2012	Average Student:Teacher Ratio
Adams	552	22	25
Blue Grass	367	18	20
Buchanan	349	16	22
Buffalo	228	12	19
Eisenhower	451	19	24
Filmore	379	18	21
Garfield	495	22	23
Harrison	581	26	22
Hayes	354	16	22
Jackson	349	16	22
Madison	415	18	23
McKinley	373	17	22
Monroe	455	21	22
Truman	397	18	22
Walcott	215	11	20
Washington	320	16	20
Jefferson	387	19	20

Table 3 Student: Teacher Ratio 2012 Grades K-5 (created by E. Swihart; Iowa Department of Education, 2011, 1-2; Davenport Community Schools, 2013, School Directory)

The education system within the United State is increasingly complex and faces ever evolving challenges to deliver highly competent and educationally competitive students. The No Child Left Behind Act of 2001 was a primary catalyst for a standards based reform to the national education system (Cruz & Duplass, 2007, p. 27). This has resulted in increased pressure on schools to develop, implement and achieve higher standards (US Department of Education, 2013, Choices). As observed through the course of this study and supported by the reason cited for rejecting the application for research, school districts are focused on achieving the highest performance possible. New research is continually offering methods of instruction that offer achievement. This challenges states, districts, and educators to stay current and capable of achieving increasingly high standards. Furthermore, the training and implementation of these methods needs to be completed within the district school year. This limited time frame coupled with the need to continue to advance students forces districts to use methods that can be easily integrated.

Educational trends affect the methods being used in schools and currently, there is a trend that supports test-centric educational reform. Recent political acts have emphasized the standardization of education and formalized teaching methods that have created factory like schools where everything has a procedure and everything can be quantitatively measured (Meier, 2002). Students as young as four are being taught in methods and styles that allow for formalized testing and formal literacy practices are being pushed onto students earlier and earlier in an effort to improve test scores (Meier, 2002). As a result, trust is being lost between parents and school districts, the authority and judgment of educators is being lost- handed over to politicians far removed from the realities of the classroom (Meier, 2002). The responsibility of how students are educated needs to continually be questioned, improved, and responsibilities need to be divided amongst those who know the students the best- parents, teachers and local administrators (Meier, 2002).

Additionally, it must be recognized that there are cultural challenges that are perhaps the most difficult to overcome and cannot be addressed through standard educational practices. Among the cultural challenges that educators face, include a wide range of support from the student's caregivers. By law, the school year is 180 days with a minimum 5 hours of required instructional time during a school day (School Administrators of Iowa, 2013). At minimum, students spend 900 hours per year in educational courses totaling approximately than ten percent of the total year (School Administrators of Iowa, 2013). With this limited amount of time spent in school, the education received outside of the school day can make a huge impact on the success of the student.

Challenges the Instructional Unit May Face

The first challenge the unit faced was during development. It is difficult to develop a curriculum from scratch and with no reference to other curricular materials. This unit, as with all units, is a part of a greater curricular whole. It is an example of a nine day unit that would occur during the course of a one hundred eighty day school year; it is a small part of the fourth-grade learning experience. Development of the unit was guided by an exercise in curriculum planning from the Department of Education at

Kansas State University; as the study was conducted in Iowa, this was not an ideal situation however it was the only one available.

Additionally, the complexity and continual development of the Iowa Core and the state standards and benchmarks provided unique challenges to developing a unit based on a set of standards. The ever evolving philosophy and implementation of state requirements is a consistent challenge faced by districts. This unit was developed on a set of standards that were available at the beginning of the study. Since the beginning of the study, the standards, the language used to discuss the standards, and the means of implementation have continued to evolve. As such, the unit was evaluated based on previous standards because the process of keeping the unit up to date would have proved immensely challenging and would not have been necessary to test the potential of the unit.

During unit development and review, it became obvious that there are some challenges that would be difficult to address from a unit perspective; it is necessary for each educator to customize the unit which would mean additional preparation time. As mentioned previously, this is a challenge due to limited time and resources available to educators. Customization is necessary due to the differences in site features from school to school. The educator would need to become familiar with the site and, although limited, have customized unit materials such as maps of the school yard.

This unit made a concerted effort to make use of sites close to most schools, such as the school yard itself, in an effort to minimize the challenge of a field trip. Although valuable, field trips often require vehicular transportation that costs districts financial and personnel resources and for these reasons may be minimized or discouraged. The place-based education theory encourages interaction with the local community and environment to enhance learning. Being limited to what is within walking distance limits the range of hands-on educational opportunities.

The most significant challenge this unit would face is the standardization of evaluation. The emphasis of the unit is on creative problem solving, where each student or group of students is presented with a challenge and is asked to use higher thinking skills to develop a solution. Developing a standardized test to measure creative problem solving is a challenge that is unlikely to be overcome; therefore as long as the school

districts and the state emphasize standardized testing as the means to measure student progress, this unit would be an unlikely candidate for implementation.

Strengths Achieved by the Unit

In spite of strong challenges facing the unit's viability within the current curricular environment, this unit was able to demonstrate strengths not currently exemplified in the school system.

One of the unit goals was to demonstrate how a real world professions and the challenges are addressed by those professionals can be met using a multitude of traditional curricular skills. This unit was able to concisely present a site design challenge typical to that of what a professional landscape architect might face and offer a series of individual lessons that culminated in a creative design solution from each student or team of students.

Each step of the unit incorporated a variety of curricular subjects, as a part of a yearlong curriculum, would serve to meet the standards and benchmarks outlined by the state. Integration of multiple subjects demonstrates how each, in the professional world, is not separate from the others but rather often times dependent upon others. This method was once the standard practice in the school district and was indicated as a preferable method of education by multiple reviewers. This style of unit provides flexibility and customization which better allows educators to tailor learning to suit the individual needs of the students and classroom activities.

Professional review of the unit identified that the unit was organized in a way that allowed those with no familiarity of the design professions could implement this unit. The organization was praised by educators as successful and incredibly valuable considering limited preparation time and resources. As a complicated, multi-step process, presenting the design process in a way that is understood and can be taught to a group of students demonstrates that it is possible to have a curriculum based on real world processes.

This unit successfully communicates the design process, background of the profession and desirable outcomes to professional not specialized in landscape design, outdoor education, conservation or park programming. Through organized and thoughtful

development, the unit equips educators to utilize the space available to them without over burden or an expectation that they become design professionals. The strength of this unit lies in its ability to create a level of comfort within educators to step outside of the classroom, challenge students accordingly, all within a curriculum that achieves state determined educational standards. Beyond measurable scoring, encouraging students to be creative problem solvers enhances learning and prepares students for challenges that will be faced outside of the classroom environment.

Potential of the Unit to Promote Landscape Architecture

Developed as a method of exploring place-based education within the educational structure of the Common Core, this unit utilizes the basic properties of landscape architecture throughout the unit. Though this theme, the unit provides an opportunity to promote the profession of landscape architecture to students. Exposure to the profession at an early age introduces students to a potential career choice.

Additionally, through implementation, this unit exposes educators, administrators and student guardians to the profession. Through implementation of the unit, professional landscape architects may be sought to provide educators with assistance. This profession promotion activity would expose the type of work landscape architects are involved with while building understanding and appreciation for the impact professionals can have on communities.

Limitations of Study

This study was limited by factors beyond the control of the researcher including the availability of educators to participate in a more thorough review. Had additional educators and administrators been able to participate in the evaluation of the unit, the strengths of the unit would have been more easily identified and the limitations more specifically acknowledged. Consensus among four participants does not hold the same weight as that of a broader study group.

Additionally, the body of academic research into the subject matter of nature's impact on education is relatively limited. A newly identified field of study, research is slow to emerge and slow to be peer tested. Funding availability further limits the advancements of research; educational systems and nature interest groups are continually

limited for funding. Studies are being done and evidence continues to emerge but at a rate slower than desired. Complicating the issue of emerging research, each state has unique core curriculum requirements and, in Iowa, each school district is responsible for developing standards and benchmarks that fulfill the state requirements. This lack of standardization with state school districts presents a challenge in curriculum development, testing, and evaluation.

Ever evolving and changing Iowa Core Curriculum requirements and school district standards and benchmarks challenged the creation of this unit throughout the study. As the primary goal of the study was to create a unit that successfully met school district curricular standards and benchmarks, the continual revision created an ever persistent challenge.

Directions for Future Research

Continued unit evaluation is needed to fully assess the limitations and potential of the developed unit. Broadening the participant group to include additional educators and administration would provide a deeper understanding of the viability of the unit as it was created in this research study and potential for implementation. Upon further evaluation, revisions to the unit, derived from assessment results, would be appropriate.

Created in the spirit of collaborative educational experience, continued research on successful partnerships between formal educators and school districts and working professionals would be appropriate. The expertise and professional experience of instructors would provide critical perspective to educational unit development. Similarly, preparing students for a future professional career would be enhanced though collaboration with working professionals. A partnering of educators and professionals could lead to more thoughtful and valuable skill development. Development of this unit was based on the perspective of a professional in the field of landscape architecture; collaboration with educators would have enhanced development of a nature based and place-based curricular unit.

Beyond the study, deeper investigative research into the state run process of determining the core curricular standards could provide insight into the motivations, intension and priorities of the developers. Additionally, investigating how school districts

respond to the Iowa Core Curriculum and how curricular material is selected for implementation could provide insight to challenges and opportunities a place-based educational unit could provide the district.

Unit Distribution and Potential

The curricular unit has the potential to be of value to educators and instructors beyond the scope of this thesis. It is the intention of the author to make the unit available as a resource and promote unit utilization through various avenues. By allowing the unit to be publicly accessed and used, the profession of landscape architecture will be introduced to students, multi-curricular learning opportunities made available and place-based education introduced to educators as a method of enhancing learning.

It is the intention of the author to work with Kansas State University to develop a website though which the unit would easily accessible. Unit promotion will occur in partnership with professional organizations that are interested in unit goals. Professional organizations that will be approached about unit promotion include but not limited to landscape architectural organizations, curriculum development professionals, science organizations, and environmental organizations.

Additionally, it is in the interest of the profession to involve professionals in the awareness of and implementation of this unit. Through professional networks, landscape architects the unit will be encouraged to utilize the unit as a way to become involved in the local education system. Full or partial involvement in unit implementation would aid in educator comfort and enhance relationship building opportunities. A potential partnership between professional landscape architects and elementary educators in the form of training seminars will be explored. An alternative method of promoting the instructional unit and enhancing instructor comfort to be explored is an instructional workshop hosted by landscape architecture professionals for educators.

Due to limited evaluation opportunities available during this study, additional feedback and input is desired from educators implementing full or partial unit curriculum. The most desirable feedback would be generated from in class implementation of the unit with involving students. Continued evaluation will be on a voluntary basis. If it is

determined that unit modifications are necessary or desirable, it is possible that updates will be made available through the same Kansas State University resource.

Discussion

Children of today are much more 'connected' to the world beyond their neighborhood; however, for most youth, this connection has been formed via electronic devices such as the computer, television, movies, or games. These are second hand connections formed not by physically visiting a space, not by making personal observations or emotional connections; these experiences of the world beyond are fed to children through the interpretation of an author, a director, a computer programmer. The experience is another person's interpretation of a place as captured and conveyed though a screen, experienced through limited senses.

By limiting children's first hand experiences of nature, we diminish the value of the natural world and we deprive our children of a learning experience that encourages the use of all the senses, of the ability to develop and use all levels of learning. The complete physical detachment from a space, environment, or topic of study limits the emotional involvement and investment a student can make; when it comes to environmental subjects this can be a drastic outcome. Without this emotional investment, the natural world is reduced to a set of data to learned and then regenerated at the appropriate time to achieve the acceptable testing scores. Through this process, the sense of wonder, of exploration, and discovery is lost; it suppresses all that learning is meant to be.

Based in real world challenges and seeking real world solutions, landscape architecture offers one avenue that would apply desirable curricular outcomes as defined by state standards and district benchmarks to relatable real world challenges. This unit offers one method of utilizing the profession of landscape architecture to demonstrate a meeting of both academe and professional careers. Other models exist and methods could be implemented if certain hurdles could be overcome. Utilizing professionals in the classroom is another option, yet requires additional time and effort on the part of the teacher to coordinate such a visit. As discussed in the review of the curricular unit, educators don't have an abundance of time to coordinate or host extra-curricular activities during the school day. Current educational system philosophies dictates that time spent

on extra activities takes away from the valuable time needed to prepare students for the variety of tests required. If this valuable in class time is going to be given to professionals, it is the primarily the responsibility of the landscape architect to coordinate with the teacher to make the most valuable use of the time with students. Topics of discussion, activities, project examples, etc. should be chosen and implemented to coordinate with and support the curricular topics of the classroom. Working with teachers to support their efforts will result in a more desirable outcome for everyone.

The question remains, how can we implement an educational system that is structured enough to be measureable? One in which students who are not meeting state standards can be identified and assisted while providing educational opportunities that support healthy mental, physical, emotional and cultural growth? The answer to this compound question is not simple nor has it been found as of yet. Students are being measured through incessant amounts of testing, teachers are feeling the pressure to make sure every student is achieving their potential as determined by the state standards, yet cultural awareness, socially responsible citizenship, and mental disorders are not being properly addressed through the heavy emphasis on math, science, and language arts. It is possible that this is not a question to be solved within the school district; perhaps it is a challenge our society needs to address. The development of our society has facilitated the decline in physical activity, suppressed natural exploration tendencies of childhood, and increase pressures to achieve successes measured by test scores, advanced educational degrees, and future earning potential.

Education is not the sole responsibility of the formalize system; students do not stop being students once outside of the classroom walls. The proper education of a child is the responsibly of all contributing members of society—guardians, educators, community professionals—all who come in contact with students should add to the experience of childhood and help prepare them for a productive future. The students of today are the professionals of tomorrow; will these professionals be able to take tests really well or will they be prepared to tackle complex issues with creative problem solving skills? It is the best interest of the professional practice of landscape architecture that students are equipped with the skills to perform multidimensional, complex tasks as professionals.

References

American Society of Landscape Architects. (2008). *The Roof is Growing*. Retrieved from http://www.asla.org/greenroofeducation/index.html

Becker, T. (2013 March 25) Davenport school board hones in on $3.2 million in budget cuts. *Quad City Times*. Retrieved from http://qctimes.com/news/local/education/davenport-school-board-hones-in-on-million-in-budget-cuts/article_0aa507c2-95d0-11e2-ae56-001a4bcf887a.html

Centers for Disease Control and Prevention. (2010). Increasing Prevalence of Parent-Reported Attention-Deficit/Hyperactivity Disorder Among Children. Retrieved from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5944a3.htm?s_cid=mm5944a3_w

Chawla, L. & Cushing, D.F. (2007, April). Benefits of Nature for Children's Health. *University of Colorado at Denver and Health Sciences Center*. Retrieved from http://www.ucdenver.edu/academics/colleges/ArchitecturePlanning/discover/centers/CYE/Publications/Documents/Benefits_nature_fact_2011.pdf

Chawla, L. & Escalante, M. (2010, December). Student Gains From Place-Based Education. *University of Colorado at Denver and Health Sciences Center*. Retrieved from http://www.ucdenver.edu/academics/colleges/ArchitecturePlanning/discover/centers/CYE/Publications/Documents/CYE_FactSheet2_Place-Based%20Education_December%202010.pdf

Common Core State Standards Initiative. (2014). *About the Standards*. Retrieved from http://www.corestandards.org/about-the-standards/

Common Core State Standards Initiative. (2014). *Frequently Asked Questions*. Retrieved from http://www.corestandards.org/about-the-standards/frequently-asked-questions/#faq-2313

Creswell, J.W. (2009). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Thousand Oaks, CA: SAGE Publications, Inc.

Cruz, B.C. & Duplass, J.A. (2007). *The Elementary Teacher's Guide to the Best Internet Resources.* Upper Saddle River, NJ: Person.

Cuppens, V., Rosenow, N., & Wike, J. (2008). Learning with Nature Idea Book: Creating Nurturing Outdoor Spaces for Children. Lincoln, NE: The Arbor Day Foundation.

Davenport Community Schools, (2005, February). Power Standards and Benchmarks: Fourth/Fifth Grade: Physical Education Standard. Retrieved from

http://www.davenportschools.org/wp-content/uploads/2012/08/PE-Grade-4-and-5-Benchmarks.pdf

Davenport Community Schools, (2007, April). Power Standards and Benchmarks: Grade 4: Language Arts and Reading. Retrieved from http://www.davenportschools.org/wp-content/uploads/2012/08/Grade-41.pdf

Davenport Community Schools, (2009, February). Information Literacy Standards and Benchmarks: Grade 4. Retrieved from http://www.davenportschools.org/wp-content/uploads/2012/08/Grade-4.pdf

Davenport Community Schools, (2009, April). Power Standards and Benchmarks: Grade 4: Music Standards. Retrieved from http://www.davenportschools.org/wp-content/uploads/2012/08/General-Music-Grade-4.pdf

Davenport Community Schools, (2010, August). Iowa Core-Davenport Schools Priority Essential Concepts and Skills for 4th Grade Social Studies. Retrieved from http://www.davenportschools.org/wp-content/uploads/2012/08/Elementary-Fourth-Grade.pdf

Davenport Community Schools, (2012, August). Iowa Core-Davenport Schools Priority Essential Concepts and Skills for Grade 4 Science. Retrieved from http://www.davenportschools.org/wp-content/uploads/2012/08/Iowa-Core-Grade-4-Standards1.pdf

Davenport Community Schools. Health Benchmarks K-5. Retrieved from http://www.davenportschools.org/wp-content/uploads/2012/08/Health-Benchmarks-K-5.pdf

Davenport Community Schools. (2 September 2009) Mathematics: Grade 4. Retrieved from http://www.davenportschools.org/wp-content/uploads/2012/08/Grade-4-Math-CC-Standards.pdf

Davenport Community Schools. K-5 Standards and Benchmarks: Visual Art. Retrieved from http://www.davenportschools.org/wp-content/uploads/2012/08/K-5-Visual-Arts-Standards.pdf

Davenport Community Schools. (2013). Academics. Retrieved from http://www.davenportschools.org/academics/.

Davenport Community Schools. (2013). School Directory & School Profiles. Retrieved from http://www.davenportschools.org/our-schools/directory-of-our-schools/

Delate, T., Gelenberg, A.J., Simmons, V.A., & Motheral, B.R. (2004, April). Trends in the Use of Antidepressants in a National Sample of Commercially Insured Pediatric Patients, 1998 to 2002. *Psychiatric Services*, 55(4),387-391. doi: 10.1176/appi.ps.55.4.387

Diette G B, Lechzin N, Haponik E, Devrotes A, & Rubin H R. 2003. Distraction therapy with nature sights and sounds reduces pain during flexible bronchoscopy. A complementary approach to routine analgesia. *Chest Journal,* 123, 941-48

Emekauwa, E. (2004, January). The Star with My Name: The Alaska Rural Systemic Initiative and the Impact of Place-Based Education on Native Student Achievement. *Rural School and Community Trust*. Retrieved from http://www.ruraledu.org/user_uploads/file/Star_with_my_Name.pdf

Full Option Science System (2011). *Landforms.* Retrieved from https://www.fossweb.com/studenthome.

Gardner, H. (1993). *Multiple Intelligences: The Theory in Practice*. New York, NY: Basic Books.

Gardner, H. (2011). *Frames of Mind: The Theory of Multiple Intelligences*. New York: NY: Basic Books.

GSCS Video Maker (2012 October 22). *Three-Minute Video Explaining the Common Core State Standards* [Video file]. Retrieved from http://vimeo.com/51933492

Hartig, T., Evans, G., Jamner, L.D., Davis, D.S., and Garling, T. 2003. Tracking restoration in natural and urban field settings. *Journal of Environmental Psychology*, 23, 109-123

Hung, R., (2007, October). Educating For and Through Nature: A Merleau-Pontian Approach. *Studies in Philosophy and Education*. 27, 355-367 DOI 10.1007/s11217-007-9059-x

International Community for Ecopsychology. 2004. Retrieved from http://www.ecopsychology.org/.

Iowa Department of Education. (2009, September 30). Iowa Core Curriculum: K-12 Science. Retrieved from http://educateiowa.gov/index.php?option=com_content&view=article&id=2462&Itemid=4559

Iowa Department of Education. (2010, August 1). Iowa Core Curriculum: K-12 21st Century Skills.

Iowa Department of Education. (2010, August 1). Iowa Core: K-12 Social Studies. Retrieved from http://educateiowa.gov/index.php?option=com_content&view=article&id=2331&Itemid=4343

Iowa Department of Education. (2010, November 17). Iowa Core: Mathematics. Retrieved from

http://educateiowa.gov/index.php?option=com_content&view=article&id=2268&Itemid=4369

Iowa Department of Education. (2010, November 17). Iowa Core: K-12 Social Studies. Retrieved from http://educateiowa.gov/index.php?option=com_content&view=article&id=2474&Itemid=4568

Iowa Department of Education. (2011, January). Iowa Early Intervention Block Grant Program (Class Size) 2010-2011.

Iowa Department of Education. (2011, September 7). Iowa Core: English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects. Retrieved from http://educateiowa.gov/index.php?option=com_content&view=article&id=2360&Itemid=4465

Iowa Department of Education. (2013). Iowa Core. Retrieved from http://educateiowa.gov/index.php?option=com_content&view=article&id=2485&Itemid=4602

Iowa Department of Education. (2014). Iowa Core. Retrieved from https://www.educateiowa.gov/iowacore#Iowa_Core_Resources

Iowa Department of Natural Resources. (2010). *Trees for Teens: Project Tree House!* Retrieved from www.iowadnr.gov/forestry/treesforkids

Joens-Matre, R.R., Welk, G.J., Calabro, M.A., Russell, D. W., Nicklay, E., and Hensley, L.D., (2008), Rural-urban difference in physical activity, physical fitness, and overweight prevalence of children. *The Journal of Rural Health*, 24:49-54.

Kareiva, P., (2008), Ominous trends in nature recreation. *Proceedings of the National Academy of Sciences*, 105 (8), 2757-2758

Katz, Lilian. (1999, July). *Another look at what young children should be learning*. Clearninghouse on Elementary and Early Childhood Education. EDO-PS-99-5

Klesges, R.C., Eck, L.H., Hanson, C.L., Haddock, C.K., Klesges, L.M. (1990). Effects of Obesity, Social Interactions, and Physical Environment on Physical Activity in Preschoolers. *Health Psychology,* 9(4), 435-449.

Kuo, F.E., & Faber Taylor, A. (2004). A potential natural treatment for Attention Deficit/Hyperactivity Disorder: Evidence from a national study. *American Journal of Public Health*, 94(9), 1580-1586.

Larson, L. R., Whiting, J.W, & Green, G.T. 2011. "Exploring the influence of outdoor recreation participation on pro-environmental behavior in a demographically

diverse population" Local Environment: The International Journal of Justice and Sustainability Volume 16, Issue 1:67-86 DOI:10.1080/13549839.2010.548373

Laumann K, Garling, T, and Storkmark K. M., (2003). Selective attention and heart rate responses to natural and urban environments. *Journal of Environmental Psychology* 23, 125-34.

Leslie, C.W., Tallmadge, J., & Wessels, T. (1996). *Into the Field: A Guide to Locally Focused Teaching*. Great Barrington, MA: The Orion Society.

Lieberman, G.A. & Hoody, L.L., (1998). Closing the Achievement Gap: Using the Environment as an Integrating Context for Learning. Retrieved from http://www.seer.org/pages/research/execsum.htm

Louv, R. (2007, March/April) Leave No Child Inside. *Orion Magazine*. Retrieved from http://www.orionmagazine.org/index.php/articles/article/240

Louv, R. (2008). *Last Child in the Woods: Saving Our Children From Nature-Deficit Disorder*. Chapel Hill, NC: *Algonquin* Books of Chapel Hill

Louv, R. (2011). *The Nature Principle*. Chapel Hill, NC: Algonquin Books of Chapel Hill.

Loucaides, C.A., Chedzoy, S.M., & Bennett, N. (2004). Differences in physical activity levels between urban and rural school children in Cyprus. *Health Education Research*, 19(2), 138-147.

Luna, K. (2012 January 10). Davenport schools brace for budget cuts. *Quad City Times.* Retrieved from http://qctimes.com/news/local/davenport-schools-brace-for-budget-cuts/article_152ce6ea-3b4c-11e1-b0ac-001871e3ce6c.html

Marzano, R.J. & Kendall, J.S. (2008). Designing & Assessing Educational Objectives: Applying the New Taxonomy. Thousand Oak, CA: Corwin Press

Meier, D. (2002). *In Schools We Trust: Creating Communities of Learning in an Era of Testing and Standardization*. Boston, MA: Beacon Press

Michigan State University W.K. Kellogg Biological Station. (2009). *Forest…of…Fortune!*. Retrieved from http://www.kbs.msu.edu/community-outreach/k-12-partnership/lesson-plans.

Moore, B. & Stanley, T. (2010). *Critical Thinking and Formative Assessments: Increasing the Rigor in Your Classroom*. Larchmont, NY: Eye on Education.

Moore, R. C. & Wong, H. H. (1997). *The Life History of an Environmental Schoolyard: Natural Learning: Creating Environments for Rediscovering Nature's Way of Teaching*. Berkeley, CA: MIG Communications.

Moore, R.C. (1997). The Need for Nature: A Childhood Right. *Social Justice*, 24(3), 203-220. Stable URL: http://www.jstor.org/stable/29767032

Moore, R.C. (1996). Outdoor Settings for Playing and Learning: Designing School Grounds to Meet the Needs of the Whole Child and Whole Curriculum. *The NAMTA Journal*, 21(3) 97-121.

Nabhan, G.P., & Trimbel, S. (1994). The Geography of Childhood: Why Children Need Wild Places. Boston, Massachusetts: Beacon Press.

National Energy Foundation. (2002). *Landscaping and Urban Forestry*. Retrieved from http://www.nef1.org/ea/koolkids/lesson4-s.html

National Energy Foundation. (2002). *The Urban Heat Island Effect*. Retrieved from http://www.nef1.org/ea/koolkids/lesson2-s.html

No Child Left Inside Coalition, (2014, February). About the No Child Left Inside Act. Retrieved from http://www.cbf.org/ncli-federal-microsite/pages/ncli---solution---about-act

No Child Left Inside. (2013). About the No Child Left Inside Act. Retrieved from http://www.cbf.org/ncli-federal-microsite/pages/ncli---solution---about-act

No Child Left Inside. (2013). What Has NCLB Done to Environmental Education. Retrieved from http://www.cbf.org/ncli/problem/nclb-has-done

No Child Left Inside. (2013). Childhood Obesity. Retrieved from http://www.cbf.org/ncli/problem-obesity

North American Association for Environmental Education. (2013). What is Environmental Education. Retrieved from http://www.naaee.net/what-is-ee

O'Brien, L., Morris, J., & Stewart, A., (2012). Exploring relationships between peri-urban woodlands and people's health and well-being. *Forest Research*.

Pretty J, Angus C, Bain M, Barton J, Gladwell V, Hine R, Pilgrim S, Sandercock S and Sellens M. (2009). *Nature, Childhood, Health and Life Pathways.* Interdisciplinary Centre for Environment and Society Occasional Paper, 2009-02. University of Essex, UK.

Raanaas, R.K., Patil, G.G., & Hartig, T. (2011). Health benefits of a view of nature through the window: a quasi-experimental study of patients in a residential rehabilitation center. *Clinical Rehabilitation* 26(1) 21-32. DOI: 10.1177/0269215511412800

Roszak, T., (2001). *The Voice of the Earth*. Grand Rapids, MI: Phanes Press, Inc.

School Administrators of Iowa. (2013). School Administrators of Iowa Important Dates and Numbers Guide. Retrieved from http://www.sai-iowa.org/criticaldates/

Sobel, D. (1996). *Beyond Ecophobia: Reclaiming the Heart in Nature Education*. Great Barrington, MA: The Orion Society.

Sobel, D. (2004). *Place-Based Education: Connecting Classrooms and Communities*. Great Barrington, MA: The Orion Society.

Sobel, D. (2008). Childhood and Nature. Portland, Maine: Stenhouse Publishers.

Smidt, S. (2010). Key Issues in Early Years Education. New York, NY: Routledge.

Speicher, S. (2009, February). *IDEO's Ten Tips For Creating a 21st- Century Classroom Experience*. Retrieved from http://www.metropolismag.com/February-2009/IDEO-rsquos-Ten-Tips-For-Creating-a-21st-ndashCentury-Classroom-Experience/Stone, M.K. & Barlow, Z. (2005). *Ecological Literacy: Educating Our Children for a Sustainable World*. San Francisco, CA: Sierra Club Books.

Tarrant, M.A. & Green, G.T., (1999). Outdoor recreation and the predictive validity of environmental attitudes. *Leisure Sciences,* 21(1), 17-30.

Taylor, A. & Kuo, F.E., (2006). Is contact with nature important for healthy child development? State of evidence. In C. Spencer & M. Blades, (Eds.). Children and Their Environments (pp. 124-140). Cambridge, UK: Cambridge University Press.

Taylor, A., Kuo, F.E., & Sullivan, W.C. (2001) Coping with ADD: The surprising connection to green play settings. *Environment and Behavior*, 33(1), 54-77.

The Bay Net. (October 21, 2011). No Child Left Inside Legislation Approved by Senate Committee. *The Bay Net.* Retrieved from http://www.thebaynet.com/news/index.cfm/fa/viewstory/story_ID/24681

Twery, M.J., Hildreth, S.J., & Evans, C.A. (2007). *Brining the Northern Forest to Your Classroom*. Newtown Square, PA: USDA Forest Service.

Ulrich, R. (2002). *Health Benefits of Garden is Hospitals*. Paper presented at the Plants for People International Exhibition Floriade, Haarlemmermeer, Netherlands

Ulrich R S. (1984, April). View through a window may influence recovery from surgery. *Science* 224(4647) 420-421.

United States Department of Education. (2013). Choices for Parents. Retrieved from http://www2.ed.gov/nclb/choice/index.html

U.S. Census Bureau. (1995). Urban and rural populations: 1990 to 1990. Retrieved from http://www.census.gov/population/censusdata/urpop0090.txt

U.S. Census Bureau. (2003). 2000 Census of Population and Housing, *Population and Housing Unit Counts* PHC-3-17, Iowa Washington, DC.

U.S. Energy Information Administration. (2003). *Elementary Article: What Can You Do With a Field of Corn?.* Retrieved from http://www.eia.doe.gov/kids/

U.S. Energy Information Administration. (2006). *Energy Activity: Energy Picture*. Retrieved from http://www.eia.doe.gov/kids/

U.S. Energy Information Administration. (2007). *Energy Play: Harry Spotter and the Chamber of Windy Myths.* Retrieved from http://www.eia.doe.gov/kids/

U.S. Energy Information Administration. (2009). *Energy Activities with Energy Ant*. Retrieved from http://www.eia.doe.gov/kids/

Visser, S.N., Bitsko, R.H., Danielson, M.L., Perou, R., & Blumberg, S.J. (2010, November 12). Increasing Prevalence of Parent-Reported Attention-Deficit/Hyperactivity Disorder Among Children---United States, 2003 and 2007. *Centers for Disease Control and Prevention: Morbidity and Mortality Weekly Report*, 59(44); 1439-1443. Retrieved from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5944a3.htm?s_cid=mm5944a3_w.

Weiss, R.S. (1994). *Learning from Strangers: The Art and Method of Qualitative Interview Studies*. New York, NY: The Free Press.

Wells, N.M. (2000). At Home With Nature: Effects of "Greenness" on Children's Cognitive Functioning. *Environment and Behavior*, 32(6), 775-795.

Wells, N.M., & Evan, G.W. (2003). Nearby Nature: A Buffer of Life Stress among Rural Children. *Environment and Behavior*, 35(3), 311-330. DOI: 10.1177/0013916503035003001

Wilhoit, G. (1998). *How to Develop A Standards-Based Unit of Study*. Frankfort, KY: The Kentucky Department of Education.

Wilke, B. (2013). *Land Conservation Debate*. Michigan State University. Retrieved from http://kbsgk12project.kbs.msu.edu/blog/2013/08/15/land-conservation-debate/

Wishinsky, F. (2009). *The Man Who Made Parks: The Story of Parkbuilder Frederick Law Olmsted*. Plattsburgh, NY: Tundra Books of Northern New York.

Vontz, T. (2009). *Designing an Instructional Unit: A Thematic Approach to Social Studies, Communication Arts, and Children's Literature*. Kansas State University. Obtained from Dr. Lotta Larson

Appendix A - Site Selection Statistics

School Selection

For this study, a school district was selected to use as a source of information while developing the unit and as an evaluation source. The school district selected to be the guide was selected for a number of reasons. The initial interest in the school district was due to a personal connection and familiarity. The primary reason for selection is the overall abundance of land surrounding the elementary schools in the district and urban setting of nearly every elementary school within the district. The relatively large acreage associated with each of the schools will provide more flexibility and creative learning as educators and students navigate the unit. It is possible to utilize the unit without a large schoolyard. Adjacent parks or local landscapes could easily be substituted. A large parcel of land provides students the opportunity to design a park with large elements (athletic fields, ponds, planting masses). The urban nature of the school district is relevant due to the demographic composition of the community it serves. A secondary reason for selection includes the impending implementation of the Iowa Core Curriculum in the 2014-2015 school year for kindergarten through eighth-grade (www.corecurriculum.iowa.gov).

School District Demographics

A cross section of the student population within the district reveals a diverse student population. The district includes eighteen elementary schools, three of which are located in adjacent rural communities, fifteen of which are located with the urban context of the city. Within the district, fifteen of the eighteen elementary schools serve the majority of the student population meals through a free and reduced price program. Ethnic diversity of students varies from school to school. Twelve of the eighteen schools indicate a majority of Caucasian students, however this can be a misleading as three of these twelve schools have a majority by less than ten percent. Much of the remaining student population is identified as “Black or African American” or “Hispanic/Latino of any race” or “Multi-racial”. The district has a relatively small population of “American

Indian or Alaskan Native" and "Asian," together totally less than ten percent of the population in each elementary school.

Grade Selection

The focus of this study explores the development of an educational unit at the fourth-grade level. The selection of the grade level was less critical to the development of the unit for two reasons. First, no matter what grade level was selected for the case study, the pre-existing curricular standards were to be used, therefore, the content of the lesson focuses on teaching skills at a given grade level. Second, the unit developed during this study is not meant to be a standalone educational unit. Rather, it is an exploration of an example that demonstrates the potential of place-based educational units and if acceptable to a school district, would be further developed to be fully or partially integrated to each grade level. However, in order to develop a specific lesson unit, a focus grade level had to be selected. The fourth-grade level was selected after a concentrated review of the standards and benchmarks for elementary school grades. The specified, fourth-grade standards seemed to provided enough flexibility to develop a new unit based on place-based goals of the unit.

Appendix B - Unit Development Strategies

The following list of unit development strategies was developed by the researcher throughout the process of instructional unit research and exploration. It was developed to help categorize the potential of each existing unit. Additional resources were utilized during unit analysis as a guide (Speicher, 2009; Wilhoit, 1998). Once it was determined that an instructional unit would be developed from scratch, strategies were analyzed and utilized to guide unit development and methodology.

Starting with an Existing Curriculum

- Modify the existing school curriculum.
- Identify benchmarks and seek out a unit which fulfills the desired benchmarks.

  Benchmarks = unit = modifications = assessment

- Identify targeted curricular subjects and theme of the unit; seek out a unit which partially fulfills desired goals and modify accordingly.

  Curricular subjects + Theme = unit = modifications = assessment

- Identify targeted benchmarks and theme of the unit; seek out a unit which partially fulfills desired goals and modify accordingly

  Benchmarks + Theme = unit = modifications = assessment

- Identify an existing unit and desirable objectives and modify accordingly.

  Unit + Objectives = modifications = assessment

- Use an existing unit.

Starting from Scratch

- Develop a unit driven by selected benchmarks.
- Develop a unit driven by selected subject matter.
- Develop a unit driven by a selected theme.

- Develop a unit driven by any combination of the aforementioned criteria.

    Benchmarks + Subjects

    Benchmarks + Theme

    Subjects + Theme

    Benchmarks + Subjects + Theme

Analyzed Existing Units

Brining the Northern Forest to Your Classroom (Twery, Hildreth, & Evans, 2007)

Elementary Article: What Can You Do With a Field of Corn? (U.S. Energy Information Administration, 2003)

Energy Activities with Energy Ant (U.S. Energy Information Administration, 2009)

Energy Activity: Energy Picture (U.S. Energy Information Administration, 2006)

Energy Play: Harry Spotter and the Chamber of Windy Myths (U.S. Energy Information Administration, 2007)

Forest…of…Fortune! (Michigan State University W.K. Kellogg Biological Station, 2009)

Land Conservation Debate (Wilke, 2013)

Landscaping and Urban Forestry (National Energy Foundation, 2002)

The Roof is Growing (American Society of Landscape Architects, 2008)

The Urban Heat Island Effect (National Energy Foundation, 2002)

Trees for Teens: Project Tree House! (Iowa Department of Natural Resources, 2010)

Full Option Science System Lesson Unit- Landforms (FOSS, 2011)

Appendix C - Recommended Resources

Day 1 Introduction

http://www.asla.org/sustainablelandscapes/Vid_Parks.html

A short video clip titled *Revitalizing Communities with Parks*. An introduction to parks, benefits of parks, and a demonstration of park design; includes text with interesting key facts about community green spaces.

http://www.asla.org/careerdiscovery.aspx

Landscape architecture professional website for career discovery; a downloadable PowerPoint presentation *Career Discovery Powerpoint* introduces the profession; the free coloring book *What Does a Landscape Architect Do?* is available as a resource on this webpage.

http://tclf.org/content/public-park

A short description of public parks; featured examples are available on the website.

http://www.asla.org/ContentDetail.aspx?id=12200&PageTitle=Education&RMenuId=54

Landscape Architecture professional webpage providing an overview of what a career in landscape architecture entails.

http://www.youtube.com/watch?v=CRh54PhIN40

A short 5:42 minute video featuring a variety of landscape architecture professionals describing the profession of landscape architecture.

Day 2 Programming

http://tclf.org/pioneer/frederick-law-olmsted-sr

A short biography on Frederick Law Olmsted Sr; links to additional resources included on the website.

http://www.youtube.com/watch?v=NzhQIjv-UI4

Short video titled *Urban Parks: Good for the City and the Environment.* Uses New York City's Central Park to facilitate a brief discussion on park benefits and why they are important to our communities.

Day 3 Inventory

http://www.nybg.org/gardens/home-gardening/tips/site-analysis.php

A basic overview of how to do a site inventory and analysis in a residential landscape.

http://www.youtube.com/watch?v=xdEtgiLe3ps

A video clip of a presentation titled *Site Inventory as a component of Landscape Design.* Minute 6:57 through 11:06 addresses elements of a site inventory. Minute 22:53 through 28:46 gives an overview of site analysis tools. Minute 48:25 through 51:53 discusses procedures and data to collect while on site.

Day 5 Analysis

http://www.youtube.com/watch?v=xdEtgiLe3ps

A video clip of a presentation titled *Site Inventory as a component of Landscape Design*. Minute 12:28 through 14:30 briefly introduces site programming.

Day 6 Analysis model building

http://www.sketchup.com/case-study/apartment-design-elementary-school

Case study example of how students use Google SketchUp to model an apartment. Similar application could be applied to a landscape model using components.

http://www.sketchup.com/learn/videos?playlist=58&playlist=58

Tutorials to introduce using Google SketchUp.

Day 7 Diagrams

http://www.youtube.com/watch?v=7Ilahr-P_mk

Brief 4:30 minute video clip demonstrating an overview of SWOT site analysis technique to analyze a given site, creating in information that will later be used to inform the design.

Google Image Search: "Diagram Graphics for the landscape designer"

A basic search of "Diagram Graphics for the landscape designer" using Google results in a number of images that demonstrate a variety of diagrammatic representations of landscape layout and the beginning phases of design.

Day 8 Design

Google Image Search: “Park design”

A basic search of “Park Design” using Google results in a number of images that demonstrate park designs in plan view.

http://www.youtube.com/watch?v=SkxxmaSOEms

Brief 2:53 minute video demonstrating how to draw trees in plan view.

http://www.youtube.com/watch?v=VJv-Qy1ZOqw

Brief 2:53 minute video demonstrating how to draw rocks and boulders in plan view.

http://friendsoficp.wordpress.com/cdr/

Project example: a final design concept for International Children’s Park. Illustrations demonstrate conceptual design graphics.

Day 9 Presenting a Plan

http://www.youtube.com/watch?v=gdavzLSDxFg

Short 2:48 minute video clip with three tips for students to make a good presentation.

Appendix D - Student Workbook

Student Workbook

Firm Name: _____

Designer: _____

Date: _____

Student Workbook
Day 1

Student Worksheet 1.1- Inquiry Questions

Name: _____

Instructions:

1. How are parks made?

2. What is a park?

3. What types of parks are there?

4. What parks are you familiar with?

5. What parks are in Davenport or near the school/home?

Student Workbook
Day 2

Student Worksheet 2.1- Inquiry Questions

Name:_____

Instructions:

Answer the following questions as best as you can before completing day 2 of the unit.

1. Whose job is it to build and care for parks?

2. Who uses parks?

3. What activities occur in parks?

4. What activities would students like to have available in a park near their home?

5. What equipment or elements are required for those activities?

6. What activities, equipment, or events would students like to have in the "schoolyard park"?

Student Worksheet 2.2 - Project Program

Name:_____

Instructions:

In the first column, list activities you would like to have included in a park near your home. In the second column, list equipment or elements that would be needed to participate in that activity. In the third column, list potential users other than yourself who would benefit from this element.

Activity	Equipment/Elements	Users
Example: Basketball court	Basketballs	Adults/parents
		Teenagers

Student Worksheet 2.3 - Frederick Law Olmsted

Name: _____

Instructions:

After reading the book The Man Who Made Parks: the story of parkbuilder Frederick Law Olmsted, answer the following questions. Answer the questions for you personally and then for Frederick as described in the book.

1. What do you like to do on summer days?

   You: _____

   Frederick: _____

2. What careers do you want to do? And which ones did Frederick Law Olmsted do?

   You: _____

   Frederick: _____

3. What was special about Birkenhead?

   _____

4. In 1857, in what city did Frederick Law Olmsted design an 840 acres park and what is the park called?

   _____

5. What characteristics should a new park have? Circle one.
   a. Swampy-muddy and dirty
   b. Paved with concrete and no plants
   c. Imaginative- original and charming

6. How was the park design for Central Park selected?
   a. Drawing out of a hat
   b. Design competition
   c. Flip a coin

7. What elements were constructed in the park?

   _____ _____

   _____ _____

   _____ _____

8. What other parks did Frederick Law Olmsted design?

   _____ _____

   _____ _____

   _____ _____

Student Worksheet 2.4 - Park Research Guide

Name: _____

Instructions:

Answer the following questions about your chosen park. Use these questions to help drive the research but additional information is desirable. Look for fun facts about the park that would be of interest to the class.

1. What is the name of your park?

   _____

2. Where is your park located?

   _____

3. When was the park established?

   _____

4. What activities occur in the park?

   _____ _____

   _____ _____

   _____ _____

5. What features are in the park?

   _____ _____

   _____ _____

   _____ _____

6. Who uses the park?

   _____ _____

   _____ _____

   _____ _____

7. Additional information/fun facts.

   _____

   _____

   _____

   _____

Student Workbook
Day 3

Student Worksheet 3.1- Master Inventory List

NAME: _____

Instructions:

Complete this worksheet during the classroom discussion. Record suggested inventory suggestions and ideas in the appropriate categories.

Natural Features

Topography:

_____ _____

_____ _____

_____ _____

_____ _____

Soils:

_____ _____

_____ _____

_____ _____

_____ _____

Hydrology/Water:

_____ _____

_____ _____

_____ _____

_____ _____

Vegetation:

_____ _____

_____ _____

_____ _____

_____ _____

Animals:

_____ _____

_____ _____

_____ _____

_____ _____

Man-made Features

Adjacent Land Use:

Boundaries:

Transportation/circulation routes:

Structures:

Views:

Student Worksheet 3.2- Site Inventory

Name: _____

Instructions:

Using the Schoolyard Plan, answer the following questions.

1. Using the given scale, determine the approximate area of the playground as indicated on the map.

2. Using the given scale, determine the approximate area of the school building as indicated on the map.

3. The west edge of the site is covered in forest. Using a green colored pencil, color the forest.

4. Circle the animals that use the forest for food and shelter.

5. Predict what would happen to these creatures if the forest was removed.

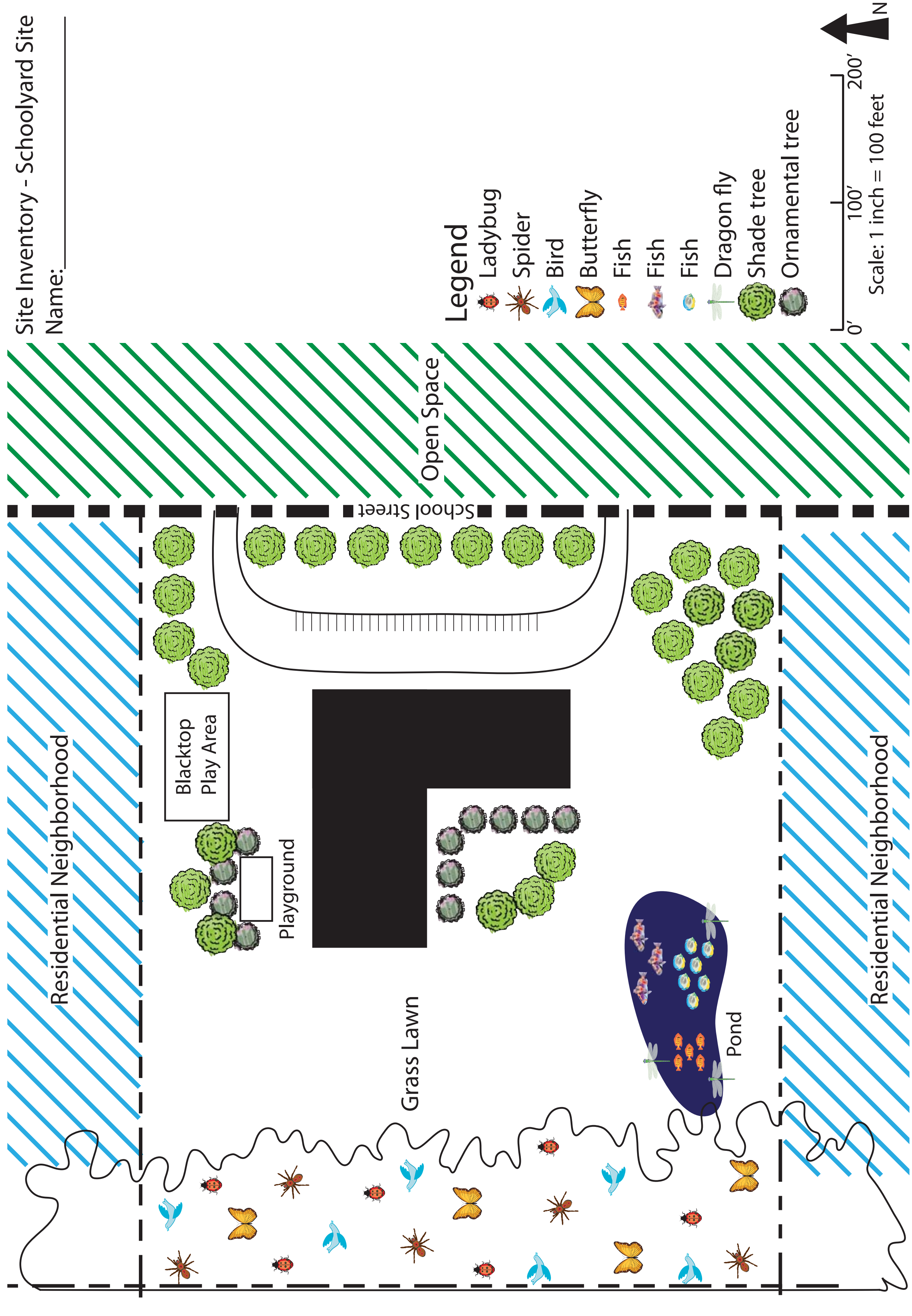
6. Circle the animals that use the pond for food and shelter.

7. Predict what would happen to these creatures if the pond was polluted.

8. Basketball hoops need to be spaced 50 feet apart around the perimeter of the blacktop paved surface. How many basketball hoops could be installed around the blacktop play area? Mark the location of the proposed basketball hoops with an X.

9. The fourth grade students want to plant a prairie on the schoolyard site. They want the prairie to be seen from the parking lot and the playground. Draw the best place for the prairie in yellow.

10. If the fourth grade class wanted to go outside for a discussion, where would they go? Circle the best location to have a quiet gathering in the shade, near the building but protected from traffic and playground noise.


Site Inventory - Schoolyard Site
Name:
Legend
Ladybug
Spider
Bird
Butterfly
Fish
Fish
Fish
Dragon fly
Shade tree
Ornamental tree
0'
100'
200'
Scale: 1 inch = 100 feet
N
Open Space
School Street
Residential Neighborhood
Blacktop Play Area
Playground
Grass Lawn
Pond
Residential Neighborhood

Student Worksheet 3.3 -Activity Pack List

NAME:_____

Instructions:

Use this list to create a pack of materials to be used during the inventory activity. Check each item off as you aquire them to keep track.

- ❑ Pencil (one per student)
- ❑ Clipboard/hard surface (one per student)
- ❑ Paper (per student)
- ❑ Base Map- 8.5x11" (one per student)
- ❑ Colored Pencils Set (one set per 2-3 student)
  - ❍ Red
  - ❍ Orange-red
  - ❍ Yellow
  - ❍ Dark Green
  - ❍ Green
  - ❍ Light Green
  - ❍ Light Purple
  - ❍ Blue
- ❑ Ruler (one per 2-3 students)
- ❑ Tape Measure (one per 2-3 students)
- ❑ Camera (one or two per large group)
- ❑ Base Map- 11x17" or 24x36" (one per large group)
- ❑ Plum-bob activity equipment (two set per large group)
  - ❍ String
  - ❍ Wooden poles (2)
  - ❍ String with washer weight tied to one end
  - ❍ String Level (one to hang on the string)

Student Worksheet 3.4 Bedroom Inventory

NAME: _____

Instructions:

Complete the following worksheet to help inventory the items in your bedroom.

What is the area of your bedroom? Use graph paper to draw the boundary of your bedroom. Use the scale to draw it accurately. Dimensions Area

Inventory each of the following items included in your bedroom. If you do not have one or more of these items, leave the blank spaces empty. Use the additional list spaces to inventory additional pieces of furniture in your bedroom.

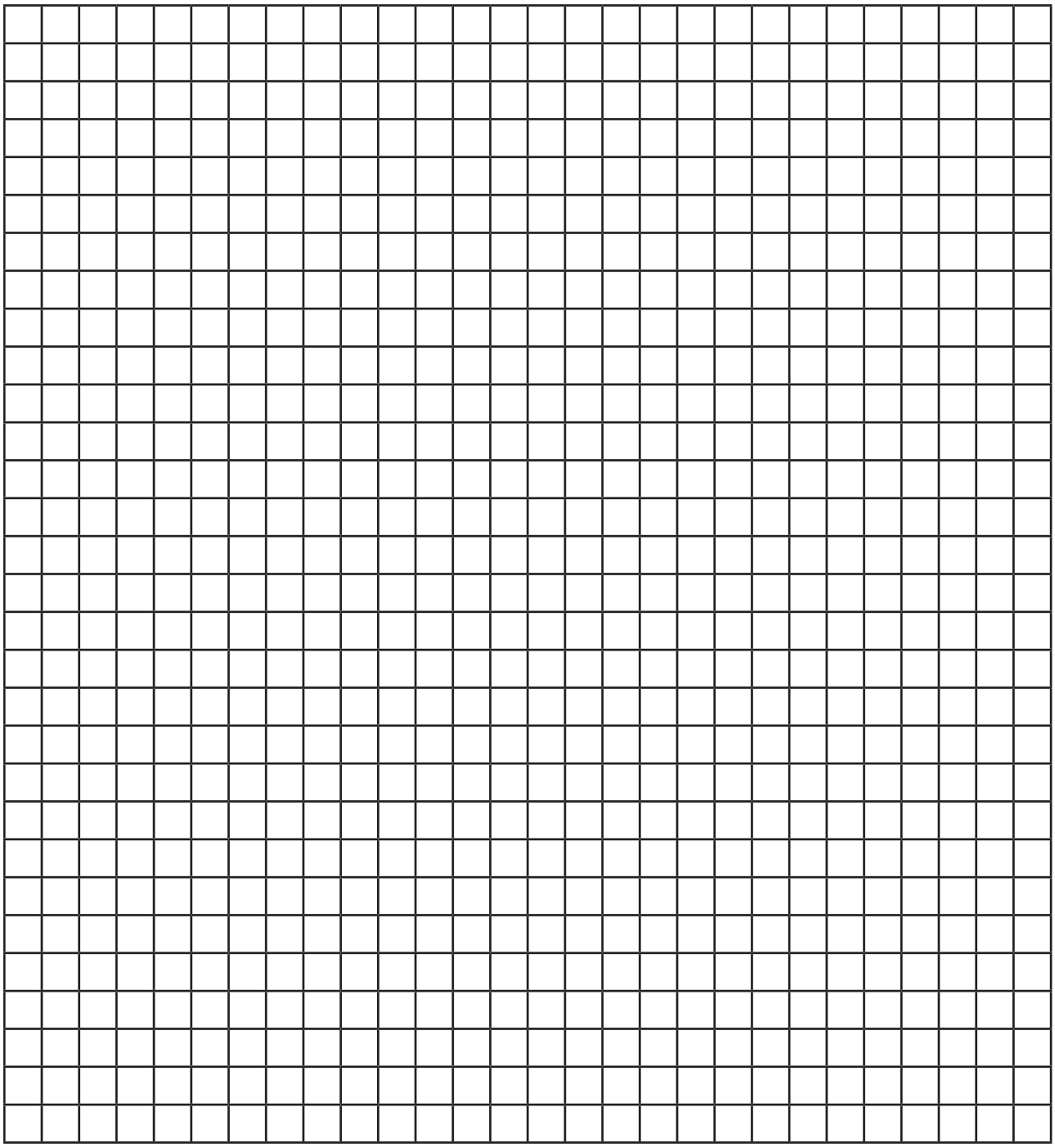
- Bed Dimensions_____ Area_____ Quantity_____
- Dresser Dimensions_____ Area_____ Quantity_____
- Closet Dimensions_____ Area_____ Quantity_____
- Desk Dimensions_____ Area_____ Quantity_____
- Bookshelf Dimensions_____ Area_____ Quantity_____
- Toy chest Dimensions_____ Area_____ Quantity_____
- _____ Dimensions_____ Area_____ Quantity_____
- _____ Dimensions_____ Area_____ Quantity_____
- _____ Dimensions_____ Area_____ Quantity_____

Once all items have been inventoried, draw the item (to scale) on the graph paper. Include a North arrow and a key.

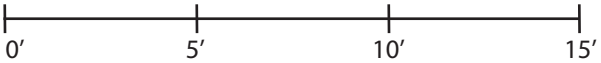
Congratulations! You have drawn a plan map of your bedroom.

Student Worksheet 3.4 Bedroom Inventory

NAME: _____



Key:



Scale 1"=5'

Student Worksheet 4.1- Site Inventory

NAME: _____

GROUP A **Return Time:**

_____

Instructions:

Prior to going on site, review all of the following questions. Once outside, travel around the site making observations as instruction in the check list. Be sure to record all information related to the site accurately for future use. Once an item has been inventoried and recorded, keep track of progress by placing a check mark next to the item on the list.

- ❑ Site Topography
  - ❍ On a map, mark where the site **high point** is. Label this location with the abbreviation **HP**.
  - ❍ On the same map, mark the direction of **slope**. Use arrows to indicate the downhill direction.
  - ❍ With the help of the adult supervisor, estimate the slope. Follow instructions from the **Plum-bob activity** to measure slope.

- ❑ What is the soil like on the site? (an in class activity)
  - ❍ Using the **Web Soil Survey website**, summarize information about the site soil's **suitability for development**.
  - ❍ Use a red pencil to indicate areas where the soil is unsuitable for development, in areas where development should not occur.

- ❑ What does water do on the site?
  - ❍ Using a blue pencil, draw the approximate size and shape of areas where water ponds.

- ❑ What types of vegetation are on the site?
  - ❍ Using a green pencil, identify areas of forest on a map. Label this area with the word **forest**.
  - ❍ Using the same green pencil, identify **specimen trees**. Label individual trees with the letter T followed by a numerical number counting the trees. Example T1, T2, T3, etc.

- ❑ What animals are on the site or use the site throughout the year?
  - ❍ Using identification books and prior knowledge, record **animals, insects, birds, and reptiles** observed on the site.

- ❑ What are existing land uses on and around the site?
  - ❍ Use a light purple colored pencil to color the **civic buildings** on and around the site (including the school building).
  - ❍ Use an orange-red colored pencil to color the **commercial buildings** on and around the site.

- ❑ What boundaries exist on and around the site?
  - ❍ Using a heavy dashed line, indicate the **property boundary**. This can be located using city maps or estimated from on site indicators such as telephone poles (they are usually near the edge of the **Right of Way**), plantings, sidewalks, etc.
  - ❍ Outline edges of streets with a pencil leaving the road white. Label the road with the name of the street.

- ❑ What transportation/ circulation routes exist on and around the site?
  - ❍ Using a pencil, indicate the shape and location of driveways and sidewalks. Use descriptive labels to make notes about the materials, approximate amount of use, and current condition.

- ❑ What structures exist on the site?
  - ❍ Using a pencil. Indicate the shape and location of onsite buildings.
  - ❍ Using a pencil. Indicate the shape and location of onsite maintenance sheds.
  - ❍ Using a pencil. Indicate the shape and location of onsite utility boxes.

- ❑ Where are desirable views from the site located?
  - ❍ As students walk around the site, record notes on the map of locations and directions of desirable views to the site. Make verbal notes and draw arrows pointing in the direction of the view from the standing location.
- ❑ Example: Standing on the sidewalk looking at the front entry of the building.
  - ❍ As students walk around the site, record notes on the map of locations and directions of undesirable views to the site. Make verbal notes and draw arrows pointing in the direction of the view from the standing location.
- ❑ Example: Views of garbage dumpsters from play areas and sitting areas.
  - ❍ As students walk around the site, record notes on the map of locations and directions of desirable views from the site. Make verbal notes and draw arrows pointing in the direction of the view from the standing location.
- ❑ Example: Looking at an offsite forest from a shaded bench.
  - ❍ As students walk around the site, record notes on the map of locations and directions of undesirable views from the site. Make verbal notes and draw arrows pointing in the direction of the view from the standing location.
- ❑ Example: Looking at an offsite parking lot from the play ground.

- ❍ Use a dark green colored pencil to color the open spaces on and around the site.

❑ What boundaries exist on and around the site?

- ❍ Using a blue colored pencil, draw a heavy dashed line to indicate the stream and rivers.
- ❍ Draw a light line with 'x' on it to indicate the location of fences.
- ❍ Draw a bubble around the areas of woodland that serve as edges.

❑ What transportation/ circulation routes exist on and around the site?

❍ Outline edges of streets, on and off the site, with a pencil leaving the road white. Label the road with the name of the street.

- ❍ Outline edges of trails, on and off the site, with a pencil leaving the trail white. Label the trail.

❑ What structures exist on the site?

- ❍ Using a pencil. Indicate the shape and location of onsite parking lots.
- ❍ Using a pencil. Indicate the shape and location of onsite basketball courts.
- ❍ Using a pencil. Indicate the shape and location of onsite playgrounds.

❑ Where are desirable views from the site located?

❍ As students walk around the site, record notes on the map of locations and directions of desirable views to the site. Make verbal notes and draw arrows pointing in the direction of the view from the standing location.

- ■ Example: Standing on the sidewalk looking at the front entry of the building.

❍ As students walk around the site, record notes on the map of locations and directions of undesirable views to the site. Make verbal notes and draw arrows pointing in the direction of the view from the standing location.

- ■ Example: Views of garbage dumpsters from play areas and sitting areas.

❍ As students walk around the site, record notes on the map of locations and directions of desirable views from the site. Make verbal notes and draw arrows pointing in the direction of the view from the standing location.

- ■ Example: Looking at an offsite forest from a shaded bench.

❍ As students walk around the site, record notes on the map of locations and directions of undesirable views from the site. Make verbal notes and draw arrows pointing in the direction of the view from the standing location.

- ■ Example: Looking at an offsite parking lot from the play ground.

Student Worksheet 4.1- Site Inventory

NAME: _____

GROUP B **Return Time:**

_____

Instructions:

Prior to going on site, review all of the following questions. Once outside, travel around the site making observations as instruction in the check list. Be sure to record all information related to the site accurately for future use. Once an item has been inventoried and recorded, keep track of progress by placing a check mark next to the item on the list.

- ❑ Site Topography
  - ❍ On a map, mark where the site low point is. Label this location with the abbreviation LP.
  - ❍ On the same map, mark the direction of hills. Draw a circular shape to indicate the approximate size of the hill. Use arrows to indicate the downhill direction.
  - ❍ With the help of the adult supervisor, estimate the slope of the hill. Follow instructions from the Plum-bob activity to measure slope.
  - ❍ On the same map, indicate the location of valleys. Draw a dashed line and use verbal notations to record the centerline of the valley.
  - ❍ On the same map, indicate the location of swales. Draw a dashed line and use verbal notations to record the centerline of the swale.

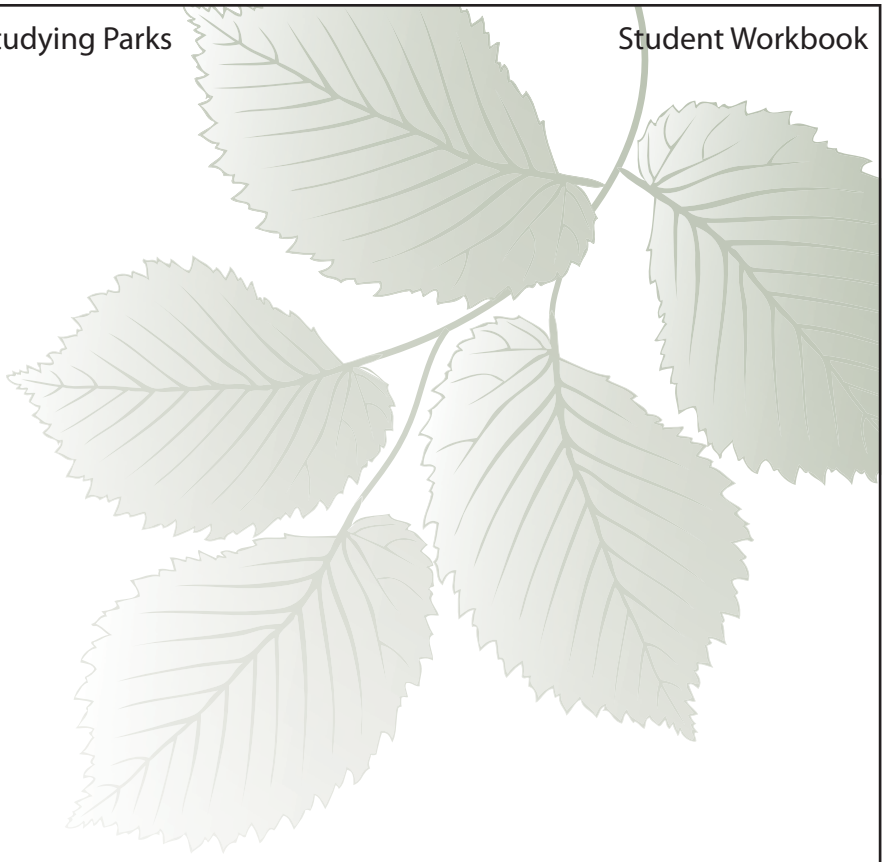
- ❑ What is the soil like on the site? (an in class activity)
  - ❍ Using the Web Soil Survey website, summarize information about the site soil's suitability for development.
  - ❍ Use a red pencil to indicate areas where the soil is unsuitable for development, in areas where development should not occur.

- ❑ What does water do on the site?
  - ❍ Using a blue pencil, use the information from the slope observations to draw the approximate direction of water run-off leaving the site.
  - ❍ Using a blue pencil, use the information from the slope observations to draw the approximate direction of water run-off entering the site.

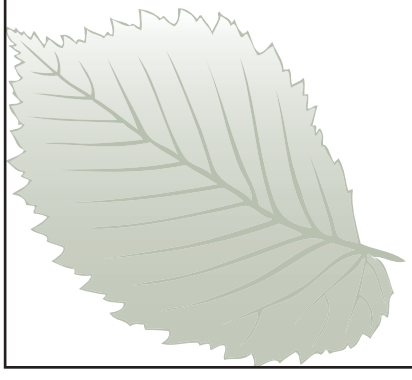
- ❑ What types of vegetation are on the site?
  - ❍ Using a green pencil, identify areas of wooded ravines on a map. Label this area with the words wooded ravine.
  - ❍ Using a light green pencil, identify grassy lawn areas. Shade the area with a series of angled lines and the area 'grassy lawn'. Label individual trees with the letter T followed by a numerical number counting the trees. Example T1, T2, T3, etc.

- ❑ What animals are on the site or use the site throughout the year?
  - ❍ Using identification books and prior knowledge, record animals, insects, birds, and reptiles observed on the site.

- ❑ What are existing land uses on and around the site?
  - ❍ Use a yellow colored pencil to color the residential areas around the site.



Student Workbook - Instructor Version
Day 5



Student Worksheet 5.1- Inventory and Analysis

NAME: _____

Instructions:

Complete the worksheet by recording information collected during the inventory under the Inventory column. Then synthesize the information and record the conclusion in the Analysis column.

Topography	Inventory	Analysis
High Point		
Low Point		
Slope directions		
Slope percentages		
Hills		
Valleys		
Swales		
Depressions		

Soils	Inventory	Analysis
Clay		
Silt		
Loam		

Hydrology	Inventory	Analysis
Run-off		
Infiltration		
Pond		

Vegetation	Inventory	Analysis
Forest		
Wooded ravine		
Prairie		
Grass lawn		
Individual trees		
Shrubs		
Garden		

Animals	Inventory	Analysis
Insects		
Birds		
Mammals		
Reptiles		

Adjacent Land Use	Inventory	Analysis
Residential		
Commercial		
Civic (school, library, chruch, etc)		
Open space		

Boundaries	Inventory	Analysis
Property lines		
Road		
Fences		
Streams/Rivers		
Woodlands		

Transportation/Circulation Routes	Inventory	Analysis
Roads		
Sidewalks		
Driveways		
Trails		

Structures	Inventory	Analysis
Buildings		
Utility box		
Playground		
Maintenance shed		
Parking lots		
Basketball courts/play surfaces		

Views	Inventory	Analysis
Desirable from the site		
Un-desirable from the site		
Desireable to the site		
Un-desirable to the site		

Inventory and Analysis Guide

(modified from Booth, 1983)

Note: Not all conditions will exist or apply to each site or program. Determine which ones do and leave the rest alone.

A. Site Location and Context

1. Identify conditions and land uses surrounding the site
   - Type and condition of adjoining land uses
   - Adjoining street or road(s): how heavily traveled? When?
   - How much noise is generated from the street?
2. Identify character of the site
   - Style, age and condition of architecture; height
   - Maturity of vegetation
   - Feeling and character of the neighborhood
3. Identify location of significant functions
   - School entrance
   - Fire exits
4. Identify pattern of vehicular circulation
   - Hierarchy of road types, intensity and type of use (residential, commercial, etc)
   - Daily and seasonal fluctuations in the intensity of traffic
   - Identify primary means for arriving at the site; is there more than one? Which one is most frequently used? When?
   - Identify location and schedule of nearby bus routes

B. Topography

1. Identify degree of slope at various locations throughout the site
   - Identify restrictions for building on the various slope conditions
   - Identify land uses most appropriate for the different slop e conditions present on the site
2. Identify major landform types and significance of each
   - Convex
   - Concave
   - Valley
   - Ridge
3. Identify areas of erosion (too steep) and areas of wet ground (too level)
4. Identify grade change between inside and outside of existing building
5. Check comfort of walking on different areas of the site
6. Identify elevation changes between top and bottom of all existing steps and retaining walls

C. Hydrology and Drainage

1. Identify watersheds and divides between each

- Check to see if water drains away from existing buildings at all points
- Identify where water flows from building down spouts

2. Identify major bodies of water
3. Identify seasonal fluctuation of streams and lakes
   - Flooding and elevation of high water
   - Check for areas of erosion
4. Identify wet spots or areas of standing water
5. Identify drainage onto and away from the site
   - Does any water run onto the site from surroundings? How much? When?
   - Where does the water go when it leaves the site?

D. Soil

1. Identify soil type
2. Identify general rate of percolation
3. Identify limitations for building

E. Vegetation

1. Identify and locate existing plant material
2. Identify zones of plant material types
3. Identify plant species
   - size (height, spread, and canopy height for trees)
   - form; color (foliage and flower)
   - texture
   - unique characteristics
4. Identify condition, value and client's opinion of existing plant material

F. Existing Buildings

1. Over all massing and height
2. Identify materials of façade
3. Identify locations of doors and windows
4. Identify uses inside the buildings
   - Room use; frequency and when
   - Views outside of rooms

G. Other Existing Structures

1. Location, condition and materials of walks, terraces, steps, walls, fences, swimming pools, etc.
2. Height of elements

H. Utilities

1. Location, height above ground or depth beneath ground
   - Water line
   - Gas line

- Electric line
- Telephone line
- Storm sewer
- Septic tank

I. Views

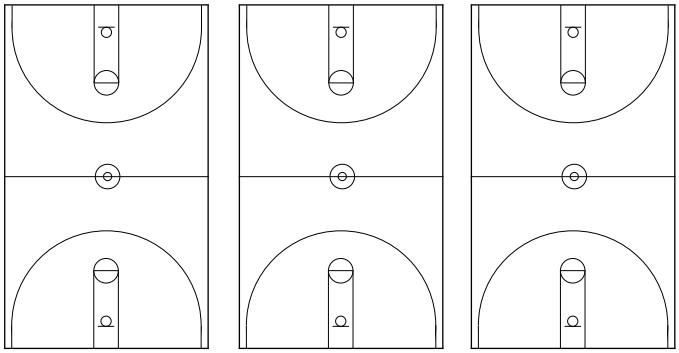
1. Observe and identify what is seen from all sides of the site
   - Good; should it be taken advantage of?
   - Bad; should it be screened?
   - indifferent
2. Observe and identify views from inside the building looking out
3. Observe and identify views from off the site looking on
   - Views from different sides of the site
   - Views from street
   - Where are the best views of the site?
   - Where are the worst views of the site?

J. Site Functions

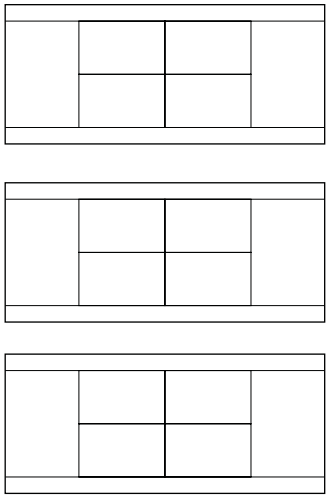
1. Identify how the site is currently used (what, where, when, and how?)
2. Identify location, time, and frequency for such things as
   - Employee arrival and departure
   - School hours
   - Work/maintenance
   - Parking of cars
   - Garbage collection
   - Service people
3. Identify and locate maintenance problems
4. Identify and locate special areas of wear and tear
   - Worn grass edges along sidewalks or drives
   - Worn lawn due to children's play
5. Identify how one arrives at the site
   - How do you feel?
   - What do you see?
6. Identify location for dumping snow in the winter

Design Symbols Set

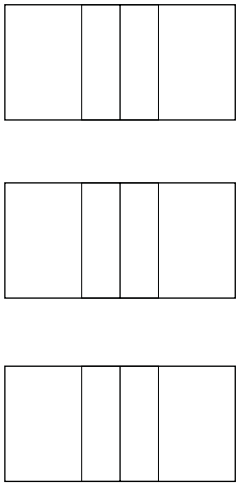
Scale: 1″ = 50′



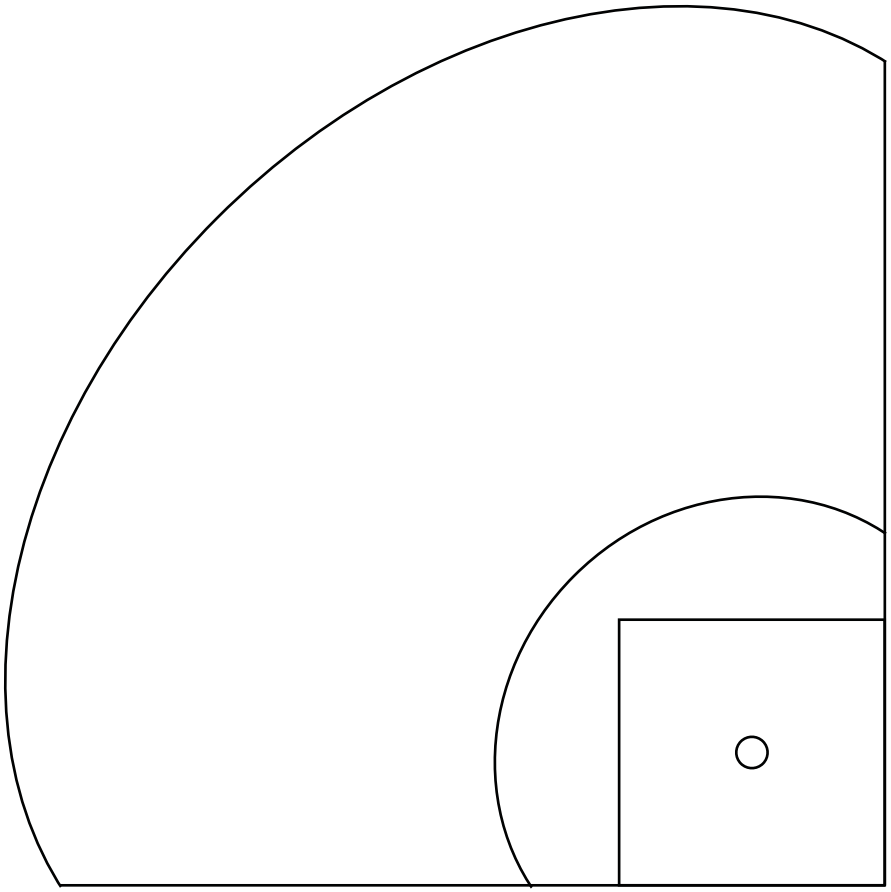
Basketball



Tennis



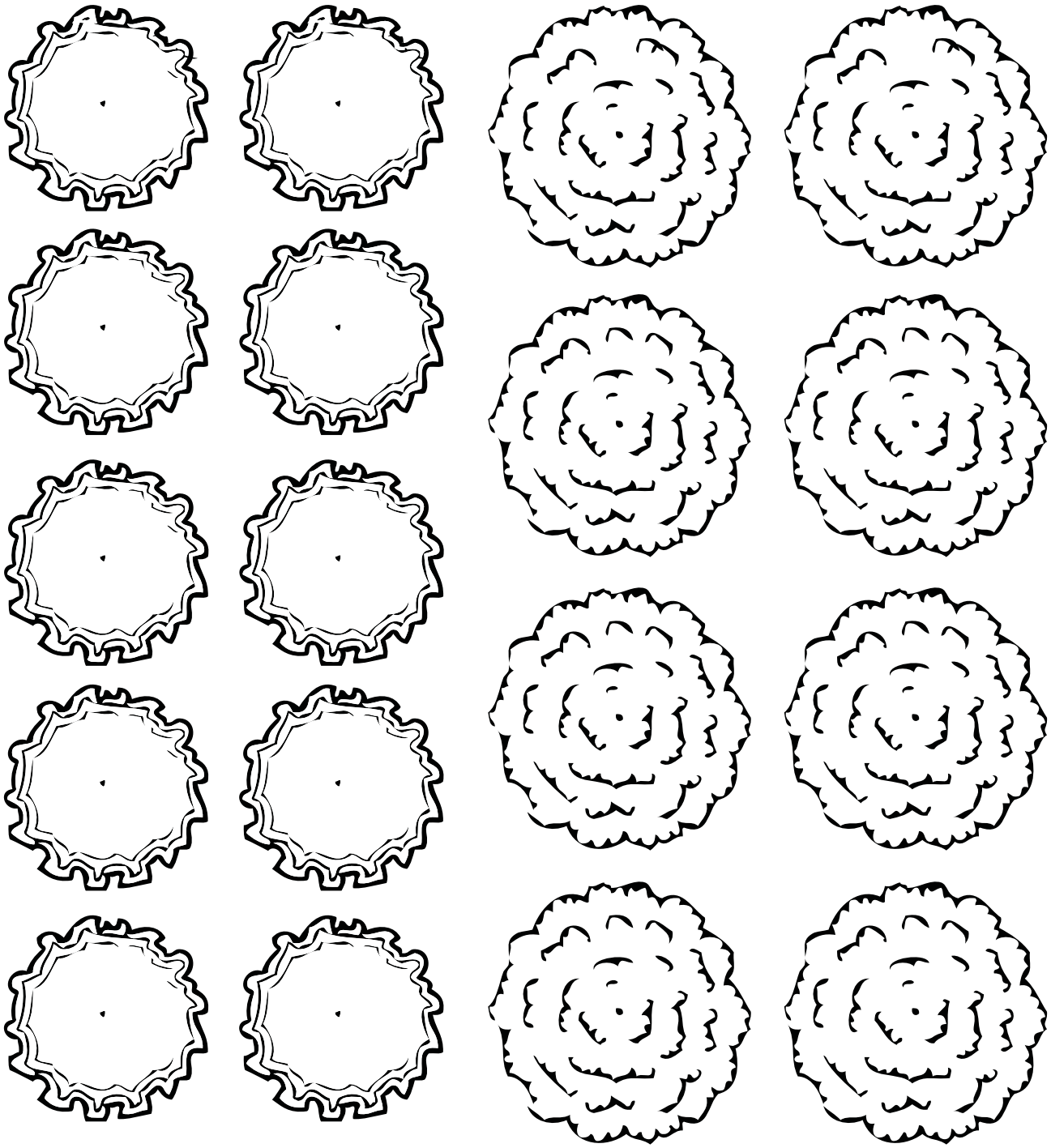
Volleyball



Baseball

Inventory Symbols Set

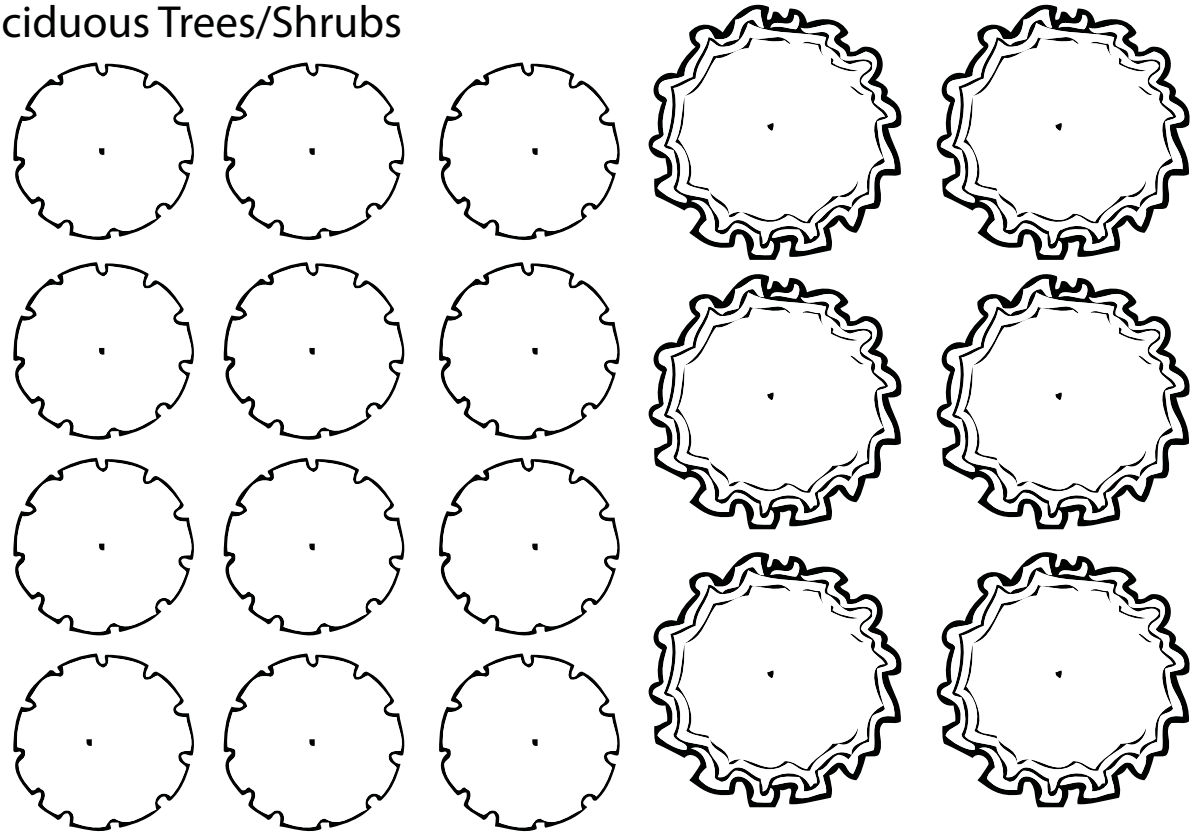
Scale: 1″ = 50′



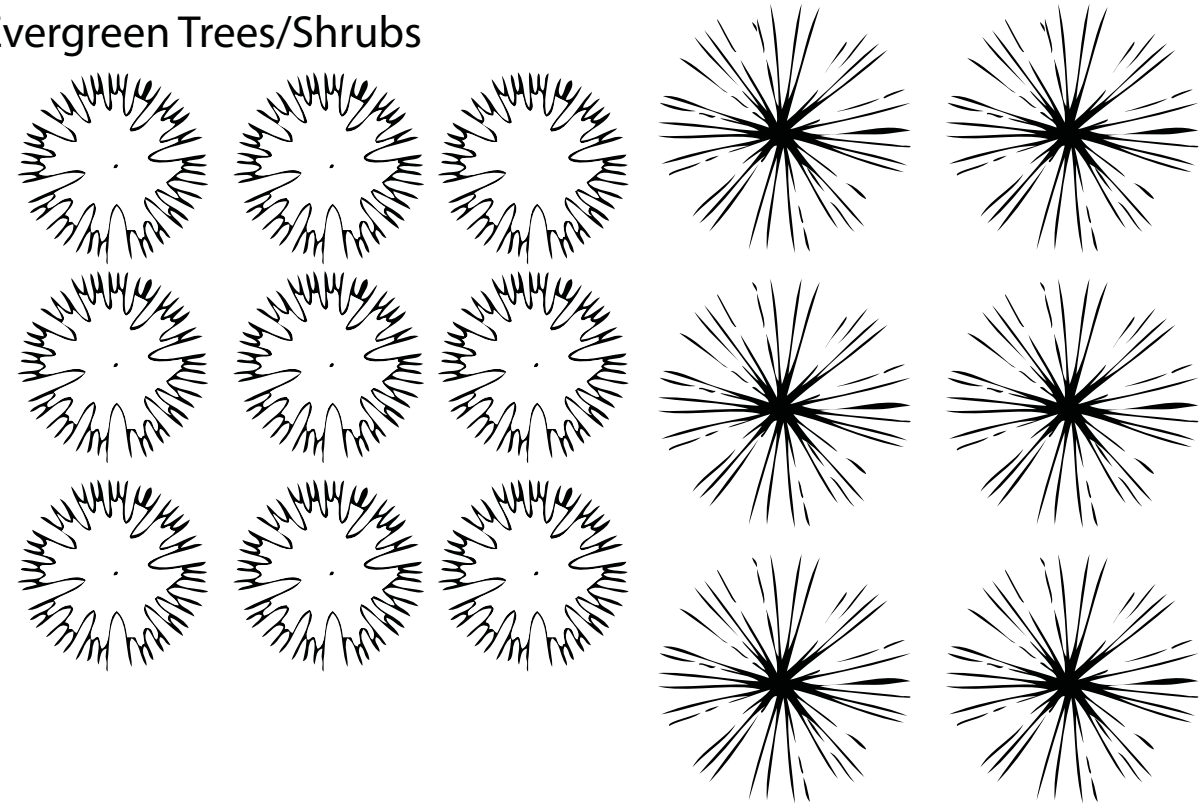
Inventory Symbols Set

Scale: 1″ = 50′

Deciduous Trees/Shrubs



Evergreen Trees/Shrubs



Student Workbook
Day 7

Student Worksheet 7.1- Ideal Relationships

NAME: _____

Instructions:

Match the Program Element to the most appropriate Site Element. Each Program Element has one Site Element that would be most appropriately match to it.

Program Element	Site Element
_____ Quite reading area	A. On a hill
_____ Baseball field	B. In a depression
_____ Vegetable garden	C. On a track/path
_____ Fishing pond	D. Amphitheater
_____ Sledding	E. Under a shade tree
_____ Bird watching	F. Open space
_____ Basketball court	G. A stand of trees
_____ Soccer field	H. On a concrete pad
_____ Running area	I. Near bleachers
_____ Musical concert area	J. Near the school cafeteria

Student Worksheet 7.2- Proposal

NAME: _____

Instructions:

Identify one element from the Project Program that is especially desirable to you. Briefly explain why you have selected that element. Then use the information you and your classmates gathered during the inventory and write a short description of where you believe is the most appropriate location for the element. Support your claim with reasons.

1. What element have you selected?

_____

2. Why did you select that element?

_____

_____

_____

_____

3. Where do you propose the element be incorporated on the site?

_____

_____

_____

_____

4. What reasons can you offer to support your proposal? Why is the location you propose the best location for the selected element?

_____

_____

_____

_____

Student Workbook
Day 8

Student Worksheet 8.1- Design Reasoning

NAME: _____

A. Describe how the group members made decisions about the design.

B. Describe a selected elements of your design

1. What element have you selected to describe?
2. Why did you choose to propose this element in the design?
3. Describe the features of the element.
4. What reasons did you use to select the size and location of the element?
5. Who will benefit fro this element? Who are the users?

C. Describe a second selected elements of your design

1. What element have you selected to describe?
2. Why did you choose to propose this element in the design?
3. Describe the features of the element.
4. What reasons did you use to select the size and location of the element?
5. Who will benefit from this element? Who are the users?

D. Prepare a brief presentation to be given to the class. In the presentation, talk about the design elements, but focus on one in more detail. Use this space to make notes.

E. After listening to the class presentations, revisit your design and describe changes you would like to make (but don't move the pieces on the plan).

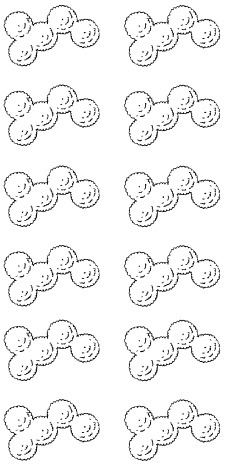
Design Symbols Set

Instructions

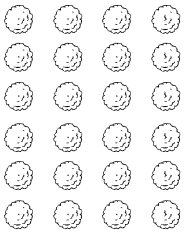
Using sissors, carefully cut around the plant and landscape elements.

Using the information from the inventory, analysis and homework assignements, create a design proposal for the schoolyard site. On the scaled school yard aerial image, students will arrange symbols to indicate their design intent. Students are free to use as many or as few symbols as possible in their design. Once students have created their design, a presentation should be prepared outlining the elements included in the design and reasons for the proposed design.

Deciduous Shrubs



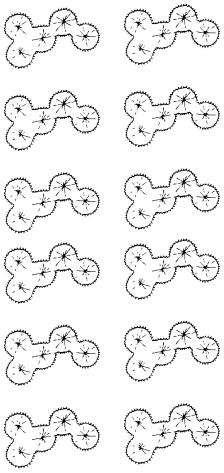
8' shrubs, group



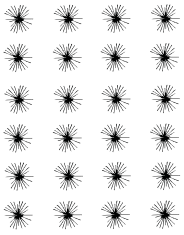
8' shrubs, individual

5' shrubs, individual

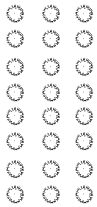
Evergreen Shrubs



8' shrubs, group

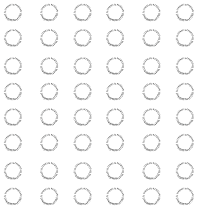


8' shrubs, individual



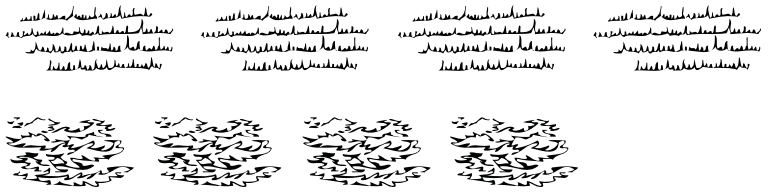
5' shrubs, individual

Ornamental Grass



5' grass, individual

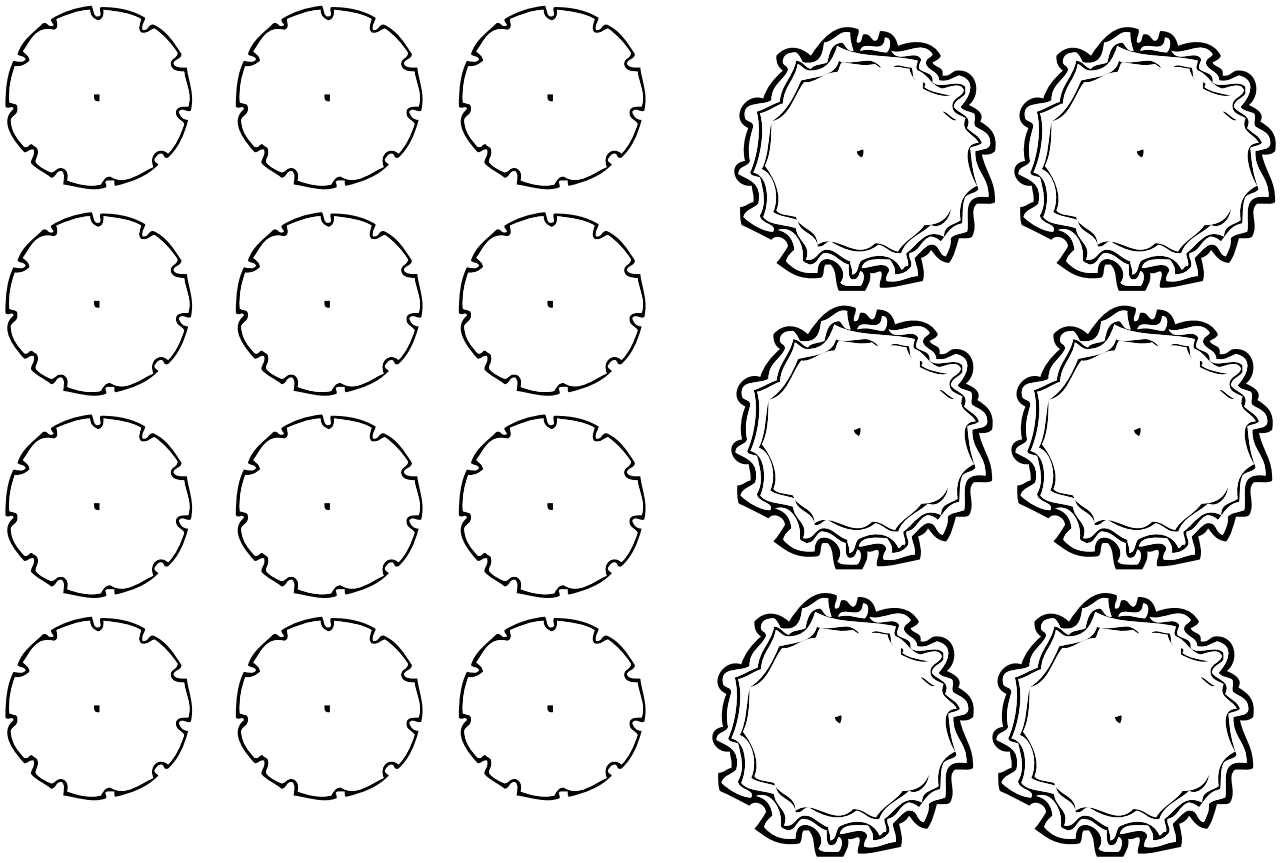
Groundcovers



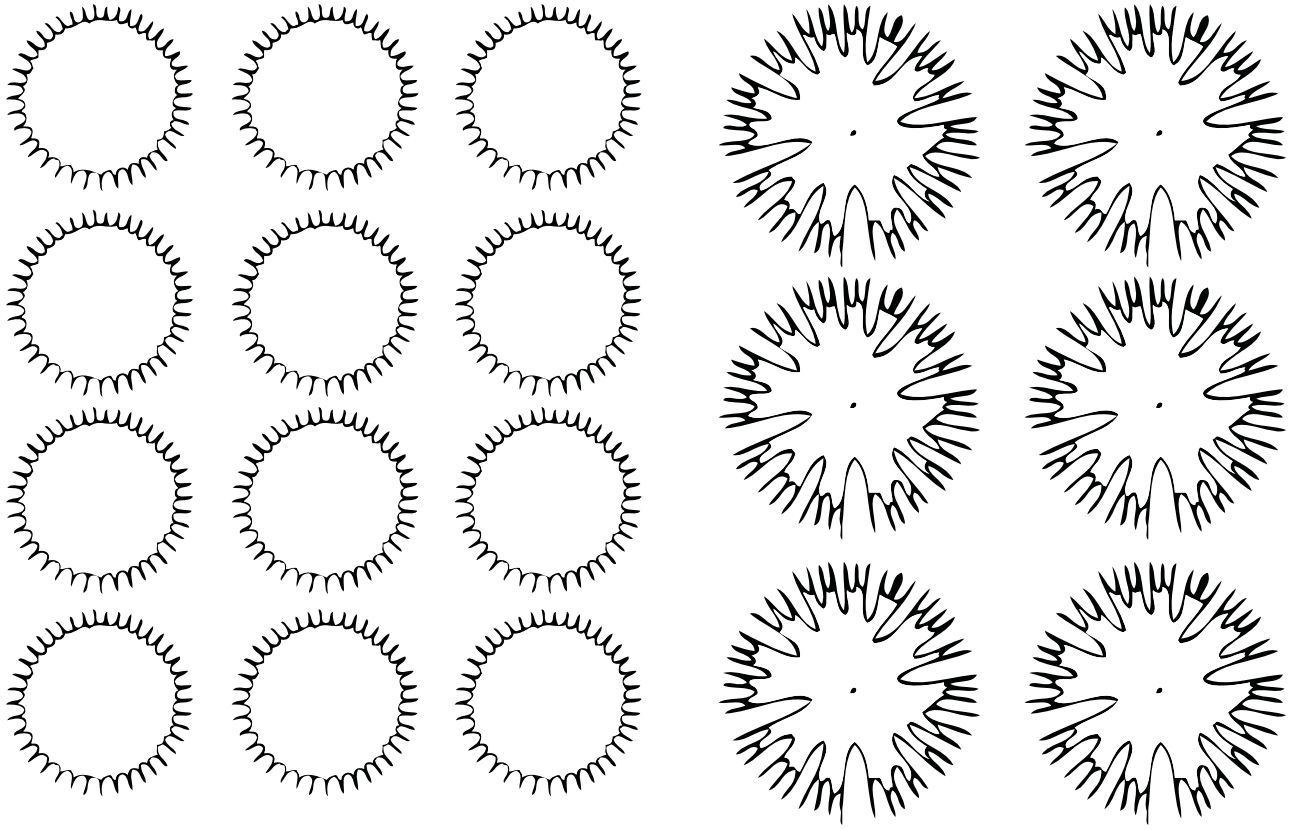
50′ 70′

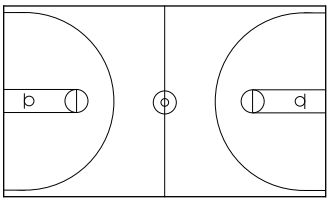
Deciduous Trees/Shrubs

Scale: 1″ = 50′

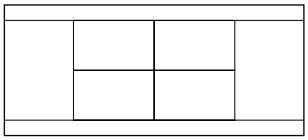


Evergreen Trees/Shrubs

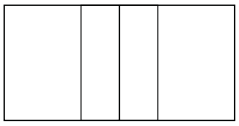




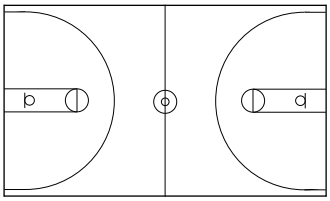
Basketball



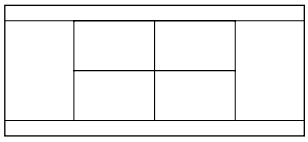
Tennis



Volleyball

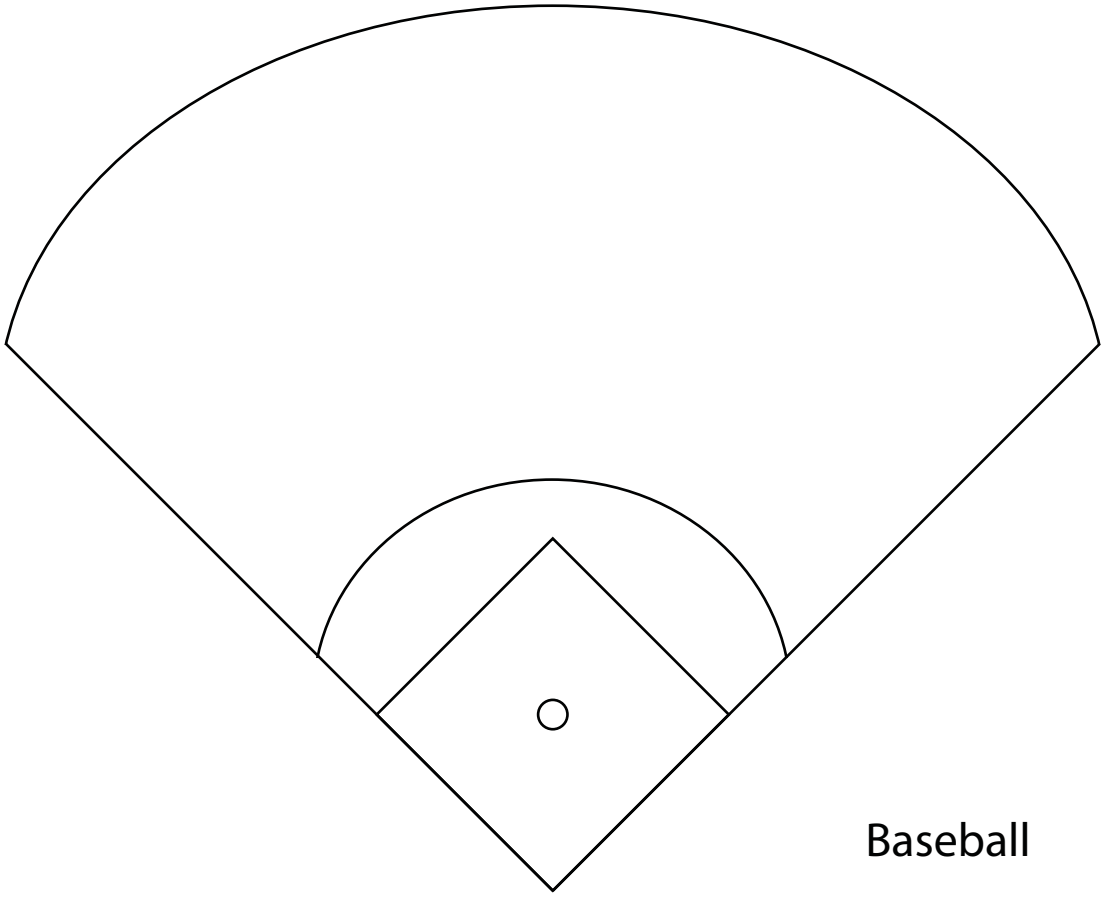


Basketball



Tennis

Volleyball



Baseball

Appendix E - Student Workbook Instructor Version

Student Workbook - Instructor Version

Firm Name: _____

Designer: _____

Date: _____

Student Workbook - Instructor Version
Day 1

Student Worksheet 1.1- Inquiry Questions

Name: _____

Instructions:

1. How are parks made?

2. What is a park?

3. What types of parks are there?

4. What parks are you familiar with?

5. What parks are in Davenport or near the school/home?

Student Worksheet 1.1- Inquiry Questions

Name: KEY

Instructions:

1. How are parks made?

2. What is a park?

3. What types of parks are there?

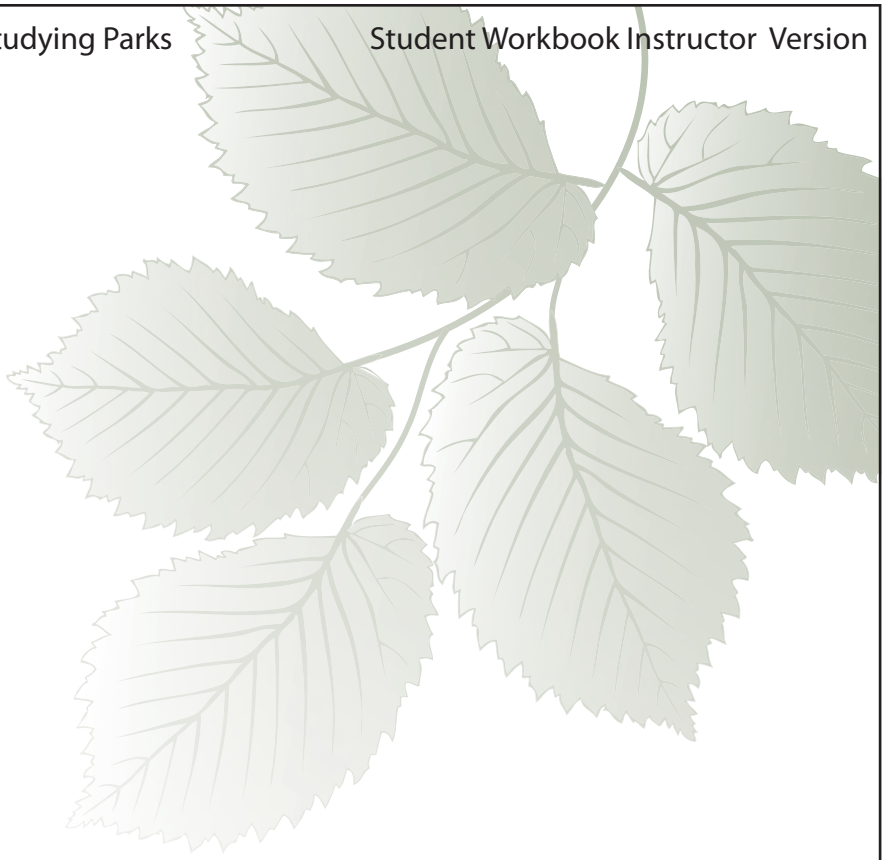
Pocket Parks	Country Parks	Skate Parks	Dog Parks
Community Parks	National Parks	City Parks	Athletic Parks

4. What parks are you familiar with?

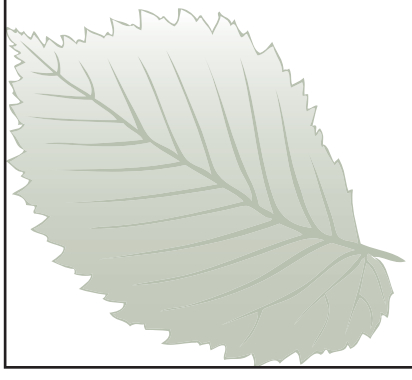
A list of any park is appropriate. Encourage students to include any park they are aware of, from an amusement park to a city park. There are few wrong answers to this question, encourage students to think beyond the limits of the city.

5. What parks are in Davenport or near the school/home?

Whalen Park	Ridgeview Park	Prairie Heights Park	Northwest Park
Marquette Park	Junge Park	VanderVeer Park	Emeis Park
Fejervary Park	Cork Hill Park	LeClaire Heights Park	Lindsay Park
Garfield Park	Eastern Avenue Park	Duck Creek Park	



Student Workbook - Instructor Version
Day 2



Student Worksheet 2.1- Inquiry Questions

Name:_____

Instructions:

Answer the following questions as best as you can before completing day 2 of the unit.

1. Whose job is it to build and care for parks?

2. Who uses parks?

3. What activities occur in parks?

4. What activities would students like to have available in a park near their home?

5. What equipment or elements are required for those activities?

6. What activities, equipment, or events would students like to have in the "schoolyard park"?

Student Worksheet 2.1 - Inquiry Questions

Name: KEY

Instructions:

Answer the following questions as best as you can before completing day 2 of the unit.

1. Whose job is it to build and care for parks?

Many individuals can and should be involved in the process of park planning. Public parks are most often city property and therefore managed by the city parks department however park planning is a process lead by a design professional but that should involve everyone who has a vested interest in the recreational experience.

2. Who uses parks?

Kids	Adults	Parents	Grandparents
Dogs	Cats	Squirrels	Rabbits
Snakes	Mice	Spiders	Students

3. What activities occur in parks?

Walking	Hiking	Running	Sports/athletics
Soccer	Football	Fishing	Concessions/food stands
Golf	Picnic	Gardening	Off-road driving
Skateboarding	Car shows	Tennis	Playing/play ground
Basketball	Dodge ball	Camping	Frisbee golf
Frisbee	Kite flying	Baseball	Riding horses
Farmer's market	Bicycling	Craft shows	Swimming
Sledding	Ice skating	Kick ball	Enjoyment of nature
Roller-skating	Skateboarding	Boating	Volleyball

4. What activities would students like to have available in a park near their home?

Ask students to choose activities from the list above that they would like to have in a park near their home or school. There is no correct answer and there will be a variety of responses.

5. What equipment or elements are required for those activities?

Answers will vary depending on the list generated from the previous question. Students should be encouraged to think about everything that would be required for an activity. For example, if students wanted to play baseball the answers to this question should include dugout benches, backstop fence, ball gloves, bats, balls, etc.

6. What activities, equipment, or events would students like to have in the "schoolyard park"?

Any of the above answers are appropriate responses to this inquiry, but in by no means limited to this list. Encourage the children to be creative and honest about what they would like to be able to do on the schoolyard.

Student Worksheet 2.2 - Project Program

Name:_____

Instructions:

In the first column, list activities you would like to have included in a park near your home. In the second column, list equipment or elements that would be needed to participate in that activity. In the third column, list potential users other than yourself who would benefit from this element.

Activity	Equipment/Elements	Users
Example: Basketball court	Basketballs	Adults/parents
		Teenagers

Student Worksheet 2.3 - Frederick Law Olmsted

Name: _____

Instructions:

After reading the book The Man Who Made Parks: the story of parkbuilder Frederick Law Olmsted, answer the following questions. Answer the questions for you personally and then for Frederick as described in the book.

1. What do you like to do on summer days?

   You: _____

   Frederick: _____

2. What careers do you want to do? And which ones did Frederick Law Olmsted do?

   You: _____

   Frederick: _____

3. What was special about Birkenhead?

   _____

4. In 1857, in what city did Frederick Law Olmsted design an 840 acres park and what is the park called?

   _____

5. What characteristics should a new park have? Circle one.

   a. Swampy-muddy and dirty

   b. Paved with concrete and no plants

   c. Imaginative- original and charming

6. How was the park design for Central Park selected?

   a. Drawing out of a hat

   b. Design competition

   c. Flip a coin

7. What elements were constructed in the park?

   _____ _____

   _____ _____

   _____ _____

8. What other parks did Frederick Law Olmsted design?

   _____ _____

   _____ _____

   _____ _____

Student Worksheet 2.3 - Frederick Law Olmsted

Name: _____

Instructions:
After reading the book The Man Who Made Parks: the story of parkbuilder Frederick Law Olmsted, answer the following questions. Answer the questions for you personally and then for Frederick as described in the book.

1. What do you like to do on summer days?

   You: Student answers

   Frederick: Wandering over rolling hills; meandering down quire country paths; watching cattle graze in fields; listening to the rustle of trees and songs of birds; reading books; learning about parks and gardens in England

2. What careers do you want to do? And which ones did Frederick Law Olmsted do?

   You: Student answers

   Frederick: Surveyor-mapping and measuring land; Import businessman-adding numbers; sailor; farmer; author/newspaper reporter; magazine publisher; park superintendent; landscape architect

3. What was special about Birkenhead?

   It was known as "the people's park" because it was open to all residents

4. In 1857, in what city did Frederick Law Olmsted design an 840 acres park and what is the park called?

   New York City, New York; Central Park

5. What characteristics should a new park have? Circle one.

   c. Imaginative- original and charming

6. How was the park design for Central Park selected?

   b. Design competition

7. What elements were constructed in the park?

Walkways for people	Paths for horses/riders	Bridges
Roads	Rolling pastures	Rugged, preserved land
Lake		

8. What other parks did Frederick Law Olmsted design?

Prospect Park, Brooklyn, New York	Emerald Necklace, Boston, Massachusetts
Unites States Capitol Building grounds	Mount Royal, Montreal, Quebec
Niagara Falls	Yosemite National Park

Student Worksheet 2.4 - Park Research Guide

Name: _____

Instructions:

Answer the following questions about your chosen park. Use these questions to help drive the research but additional information is desirable. Look for fun facts about the park that would be of interest to the class.

1. What is the name of your park?

   _____

2. Where is your park located?

   _____

3. When was the park established?

   _____

4. What activities occur in the park?

   _____ _____

   _____ _____

   _____ _____

5. What features are in the park?

   _____ _____

   _____ _____

   _____ _____

6. Who uses the park?

   _____ _____

   _____ _____

   _____ _____

7. Additional information/fun facts.

   _____

   _____

   _____

   _____

Student Workbook - Instructor Version
Day 3

Student Worksheet 3.1- Master Inventory List

NAME: _____

Instructions:

Complete this worksheet during the classroom discussion. Record suggested inventory suggestions and ideas in the appropriate categories.

Natural Features

Topography:

_____ _____
_____ _____
_____ _____
_____ _____

Soils:

_____ _____
_____ _____
_____ _____
_____ _____

Hydrology/Water:

_____ _____
_____ _____
_____ _____
_____ _____

Vegetation:

_____ _____
_____ _____
_____ _____
_____ _____

Animals:

_____ _____
_____ _____
_____ _____
_____ _____

Man-made Features

Adjacent Land Use:

Boundaries:

Transportation/circulation routes:

Structures:

Views:

Student Worksheet 3.1- Master Inventory List

NAME: KEY

Instructions:

Complete this worksheet during the classroom discussion. Record suggested inventory suggestions and ideas in the appropriate categories.

Natural Features

Topography:

- High points
- Low Points
- Slope directions
- Slope percentages
- Hills
- Valleys
- Swales
- Depressions

Soils:

- Clay
- Silt
- Loam

Hydrology/Water:

- Drain off
- Pond
- Infiltration

Vegetation:

- Forest
- Wooded Ravine
- Prairie
- Grass Lawn
- Individual trees
- Shrubs
- Garden

Animals:

- Insects
- Birds
- Mammals
- Reptiles

Man-made Features

Adjacent Land Use:

- Residential
- Civic (school, library, Church, etc)
- Commercial
- Open space

Boundaries:

- Property Lines
- Roads
- Fences
- Steams/Rivers
- Woodlands

Transportation/circulation routes:

- Roads
- Driveways
- Sidewalks
- Trails

Structures:

- Buildings
- Maintenance Shed
- Utility box
- Parking Lots
- Playground
- Basketball court

Views:

- Desirable from the site
- Un-desirable from the site
- Desirable to the site
- Un-desirable to the site

Student Worksheet 3.2- Site Inventory

Name: _____

Instructions:

Using the Schoolyard Plan, answer the following questions.

1. Using the given scale, determine the approximate area of the playground as indicated on the map.

2. Using the given scale, determine the approximate area of the school building as indicated on the map.

3. The west edge of the site is covered in forest. Using a green colored pencil, color the forest.

4. Circle the animals that use the forest for food and shelter.

5. Predict what would happen to these creatures if the forest was removed.

6. Circle the animals that use the pond for food and shelter.

7. Predict what would happen to these creatures if the pond was polluted.

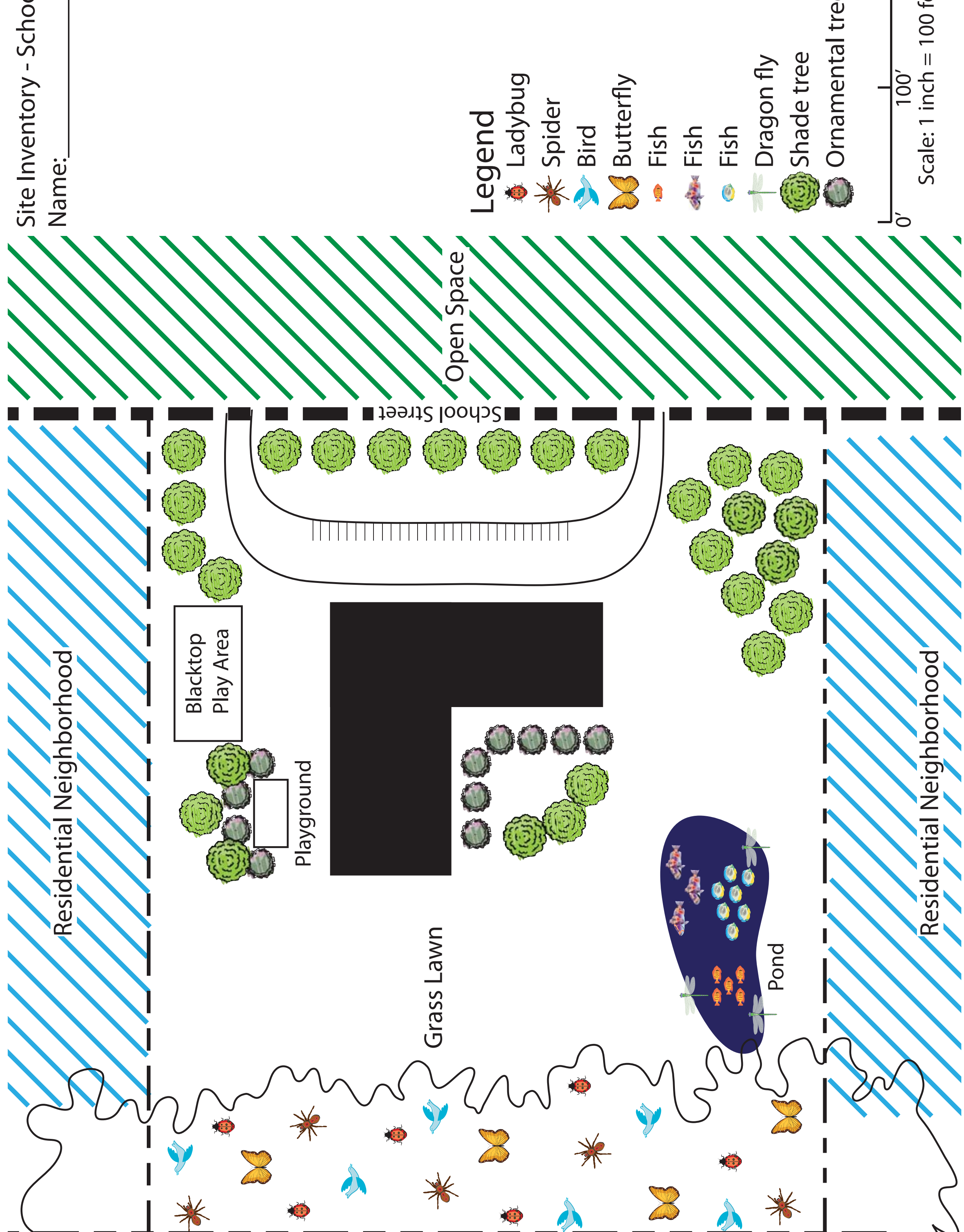
8. Basketball hoops need to be spaced 50 feet apart around the perimeter of the blacktop paved surface. How many basketball hoops could be installed around the blacktop play area? Mark the location of the proposed basketball hoops with an X.

9. The fourth grade students want to plant a prairie on the schoolyard site. They want the prairie to be seen from the parking lot and the playground. Draw the best place for the prairie in yellow.

10. If the fourth grade class wanted to go outside for a discussion, where would they go? Circle the best location to have a quiet gathering in the shade, near the building but protected from traffic and playground noise.

Site Inventory - Schoolyard Site

Name:____________



Student Worksheet 3.3 -Activity Pack List

NAME:_____

Instructions:

Use this list to create a pack of materials to be used during the inventory activity. Check each item off as you aquire them to keep track.

- ❑ Pencil (one per student)
- ❑ Clipboard/hard surface (one per student)
- ❑ Paper (per student)
- ❑ Base Map- 8.5x11" (one per student)
- ❑ Colored Pencils Set (one set per 2-3 student)
  - ❍ Red
  - ❍ Orange-red
  - ❍ Yellow
  - ❍ Dark Green
  - ❍ Green
  - ❍ Light Green
  - ❍ Light Purple
  - ❍ Blue
- ❑ Ruler (one per 2-3 students)
- ❑ Tape Measure (one per 2-3 students)
- ❑ Camera (one or two per large group)
- ❑ Base Map- 11x17" or 24x36" (one per large group)
- ❑ Plum-bob activity equipment (two set per large group)
  - ❍ String
  - ❍ Wooden poles (2)
  - ❍ String with washer weight tied to one end
  - ❍ String Level (one to hang on the string)

Student Worksheet 3.4 Bedroom Inventory

NAME: _____

Instructions:

Complete the following worksheet to help inventory the items in your bedroom.

What is the area of your bedroom? Use graph paper to draw the boundary of your bedroom. Use the scale to draw it accurately. Dimensions Area

Inventory each of the following items included in your bedroom. If you do not have one or more of these items, leave the blank spaces empty. Use the additional list spaces to inventory additional pieces of furniture in your bedroom.

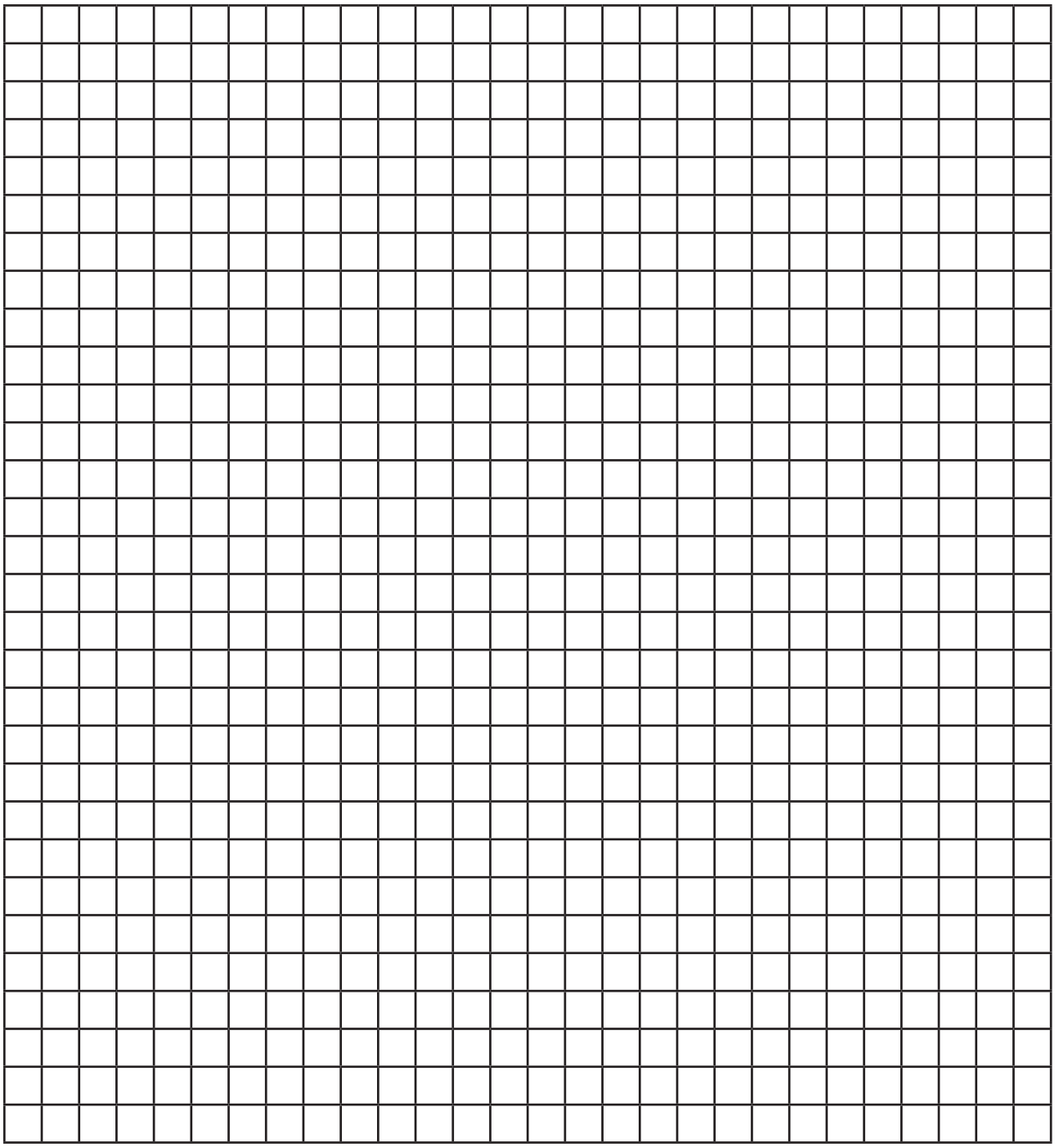
- Bed Dimensions_____ Area_____ Quantity_____
- Dresser Dimensions_____ Area_____ Quantity_____
- Closet Dimensions_____ Area_____ Quantity_____
- Desk Dimensions_____ Area_____ Quantity_____
- Bookshelf Dimensions_____ Area_____ Quantity_____
- Toy chest Dimensions_____ Area_____ Quantity_____
- _____ Dimensions_____ Area_____ Quantity_____
- _____ Dimensions_____ Area_____ Quantity_____
- _____ Dimensions_____ Area_____ Quantity_____

Once all items have been inventoried, draw the item (to scale) on the graph paper. Include a North arrow and a key.

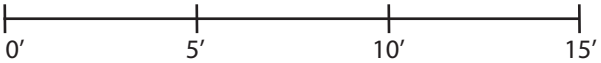
Congratulations! You have drawn a plan map of your bedroom.

Student Worksheet 3.4 Bedroom Inventory

NAME: _____



Key:



Scale 1"=5'

Student Worksheet 4.1- Site Inventory

NAME: _____

GROUP A **Return Time:**

_____

Instructions:

Prior to going on site, review all of the following questions. Once outside, travel around the site making observations as instruction in the check list. Be sure to record all information related to the site accurately for future use. Once an item has been inventoried and recorded, keep track of progress by placing a check mark next to the item on the list.

- ❑ Site Topography
  - ❍ On a map, mark where the site **high point** is. Label this location with the abbreviation **HP**.
  - ❍ On the same map, mark the direction of **slope**. Use arrows to indicate the downhill direction.
  - ❍ With the help of the adult supervisor, estimate the slope. Follow instructions from the **Plum-bob activity** to measure slope.

- ❑ What is the soil like on the site? (an in class activity)
  - ❍ Using the **Web Soil Survey website**, summarize information about the site soil's **suitability for development**.
  - ❍ Use a red pencil to indicate areas where the soil is unsuitable for development, in areas where development should not occur.

- ❑ What does water do on the site?
  - ❍ Using a blue pencil, draw the approximate size and shape of areas where water ponds.

- ❑ What types of vegetation are on the site?
  - ❍ Using a green pencil, identify areas of forest on a map. Label this area with the word **forest**.
  - ❍ Using the same green pencil, identify **specimen trees**. Label individual trees with the letter T followed by a numerical number counting the trees. Example T1, T2, T3, etc.

- ❑ What animals are on the site or use the site throughout the year?
  - ❍ Using identification books and prior knowledge, record **animals, insects, birds, and reptiles** observed on the site.

- ❑ What are existing land uses on and around the site?
  - ❍ Use a light purple colored pencil to color the **civic buildings** on and around the site (including the school building).
  - ❍ Use an orange-red colored pencil to color the **commercial buildings** on and around the site.

- ❑ What boundaries exist on and around the site?
  - ❍ Using a heavy dashed line, indicate the **property boundary**. This can be located using city maps or estimated from on site indicators such as telephone poles (they are usually near the edge of the **Right of Way**), plantings, sidewalks, etc.
  - ❍ Outline edges of streets with a pencil leaving the road white. Label the road with the name of the street.

- ❑ What transportation/ circulation routes exist on and around the site?
  - ❍ Using a pencil, indicate the shape and location of driveways and sidewalks. Use descriptive labels to make notes about the materials, approximate amount of use, and current condition.

- ❑ What structures exist on the site?
  - ❍ Using a pencil. Indicate the shape and location of onsite buildings.
  - ❍ Using a pencil. Indicate the shape and location of onsite maintenance sheds.
  - ❍ Using a pencil. Indicate the shape and location of onsite utility boxes.

- ❑ Where are desirable views from the site located?
  - ❍ As students walk around the site, record notes on the map of locations and directions of desirable views to the site. Make verbal notes and draw arrows pointing in the direction of the view from the standing location.
- ❑ Example: Standing on the sidewalk looking at the front entry of the building.
  - ❍ As students walk around the site, record notes on the map of locations and directions of undesirable views to the site. Make verbal notes and draw arrows pointing in the direction of the view from the standing location.
- ❑ Example: Views of garbage dumpsters from play areas and sitting areas.
  - ❍ As students walk around the site, record notes on the map of locations and directions of desirable views from the site. Make verbal notes and draw arrows pointing in the direction of the view from the standing location.
- ❑ Example: Looking at an offsite forest from a shaded bench.
  - ❍ As students walk around the site, record notes on the map of locations and directions of undesirable views from the site. Make verbal notes and draw arrows pointing in the direction of the view from the standing location.
- ❑ Example: Looking at an offsite parking lot from the play ground.

- ❍ Use a dark green colored pencil to color the open spaces on and around the site.

❑ What boundaries exist on and around the site?

- ❍ Using a blue colored pencil, draw a heavy dashed line to indicate the stream and rivers.
- ❍ Draw a light line with 'x' on it to indicate the location of fences.
- ❍ Draw a bubble around the areas of woodland that serve as edges.

❑ What transportation/ circulation routes exist on and around the site?

- ❍ Outline edges of streets, on and off the site, with a pencil leaving the road white. Label the road with the name of the street.
- ❍ Outline edges of trails, on and off the site, with a pencil leaving the trail white. Label the trail.

❑ What structures exist on the site?

- ❍ Using a pencil. Indicate the shape and location of onsite parking lots.
- ❍ Using a pencil. Indicate the shape and location of onsite basketball courts.
- ❍ Using a pencil. Indicate the shape and location of onsite playgrounds.

❑ Where are desirable views from the site located?

- ❍ As students walk around the site, record notes on the map of locations and directions of desirable views to the site. Make verbal notes and draw arrows pointing in the direction of the view from the standing location.
  - ■ Example: Standing on the sidewalk looking at the front entry of the building.
- ❍ As students walk around the site, record notes on the map of locations and directions of undesirable views to the site. Make verbal notes and draw arrows pointing in the direction of the view from the standing location.
  - ■ Example: Views of garbage dumpsters from play areas and sitting areas.
- ❍ As students walk around the site, record notes on the map of locations and directions of desirable views from the site. Make verbal notes and draw arrows pointing in the direction of the view from the standing location.
  - ■ Example: Looking at an offsite forest from a shaded bench.
- ❍ As students walk around the site, record notes on the map of locations and directions of undesirable views from the site. Make verbal notes and draw arrows pointing in the direction of the view from the standing location.
  - ■ Example: Looking at an offsite parking lot from the play ground.

Student Worksheet 4.1- Site Inventory

NAME: _____

GROUP B **Return Time:**

_____

Instructions:

Prior to going on site, review all of the following questions. Once outside, travel around the site making observations as instruction in the check list. Be sure to record all information related to the site accurately for future use. Once an item has been inventoried and recorded, keep track of progress by placing a check mark next to the item on the list.

- ❑ Site Topography
  - ❍ On a map, mark where the site low point is. Label this location with the abbreviation LP.
  - ❍ On the same map, mark the direction of hills. Draw a circular shape to indicate the approximate size of the hill. Use arrows to indicate the downhill direction.
  - ❍ With the help of the adult supervisor, estimate the slope of the hill. Follow instructions from the Plum-bob activity to measure slope.
  - ❍ On the same map, indicate the location of valleys. Draw a dashed line and use verbal notations to record the centerline of the valley.
  - ❍ On the same map, indicate the location of swales. Draw a dashed line and use verbal notations to record the centerline of the swale.

- ❑ What is the soil like on the site? (an in class activity)
  - ❍ Using the Web Soil Survey website, summarize information about the site soil's suitability for development.
  - ❍ Use a red pencil to indicate areas where the soil is unsuitable for development, in areas where development should not occur.

- ❑ What does water do on the site?
  - ❍ Using a blue pencil, use the information from the slope observations to draw the approximate direction of water run-off leaving the site.
  - ❍ Using a blue pencil, use the information from the slope observations to draw the approximate direction of water run-off entering the site.

- ❑ What types of vegetation are on the site?
  - ❍ Using a green pencil, identify areas of wooded ravines on a map. Label this area with the words wooded ravine.
  - ❍ Using a light green pencil, identify grassy lawn areas. Shade the area with a series of angled lines and the area 'grassy lawn'. Label individual trees with the letter T followed by a numerical number counting the trees. Example T1, T2, T3, etc.

- ❑ What animals are on the site or use the site throughout the year?
  - ❍ Using identification books and prior knowledge, record animals, insects, birds, and reptiles observed on the site.

- ❑ What are existing land uses on and around the site?
  - ❍ Use a yellow colored pencil to color the residential areas around the site.

Student Workbook - Instructor Version
Day 5

Student Worksheet 5.1- Inventory and Analysis

NAME: _____

Instructions:

Complete the worksheet by recording information collected during the inventory under the Inventory column. Then synthesize the information and record the conclusion in the Analysis column.

Topography	Inventory	Analysis
High Point		
Low Point		
Slope directions		
Slope percentages		
Hills		
Valleys		
Swales		
Depressions		

Soils	Inventory	Analysis
Clay		
Silt		
Loam		

Hydrology	Inventory	Analysis
Run-off		
Infiltration		
Pond		

Vegetation	Inventory	Analysis
Forest		
Wooded ravine		
Prairie		
Grass lawn		
Individual trees		
Shrubs		
Garden		

Animals	Inventory	Analysis
Insects		
Birds		
Mammals		
Reptiles		

Adjacent Land Use	Inventory	Analysis
Residential		
Commercial		
Civic (school, library, chruch, etc)		
Open space		

Boundaries	Inventory	Analysis
Property lines		
Road		
Fences		
Streams/Rivers		
Woodlands		

Transportation/Circulation Routes	Inventory	Analysis
Roads		
Sidewalks		
Driveways		
Trails		

Structures	Inventory	Analysis
Buildings		
Utility box		
Playground		
Maintenance shed		
Parking lots		
Basketball courts/play surfaces		

Views	Inventory	Analysis
Desirable from the site		
Un-desirable from the site		
Desireable to the site		
Un-desirable to the site		

Inventory and Analysis Guide

(modified from Booth, 1983)

Note: Not all conditions will exist or apply to each site or program. Determine which ones do and leave the rest alone.

A. Site Location and Context

1. Identify conditions and land uses surrounding the site
   - Type and condition of adjoining land uses
   - Adjoining street or road(s): how heavily traveled? When?
   - How much noise is generated from the street?
2. Identify character of the site
   - Style, age and condition of architecture; height
   - Maturity of vegetation
   - Feeling and character of the neighborhood
3. Identify location of significant functions
   - School entrance
   - Fire exits
4. Identify pattern of vehicular circulation
   - Hierarchy of road types, intensity and type of use (residential, commercial, etc)
   - Daily and seasonal fluctuations in the intensity of traffic
   - Identify primary means for arriving at the site; is there more than one? Which one is most frequently used? When?
   - Identify location and schedule of nearby bus routes

B. Topography

1. Identify degree of slope at various locations throughout the site
   - Identify restrictions for building on the various slope conditions
   - Identify land uses most appropriate for the different slop e conditions present on the site
2. Identify major landform types and significance of each
   - Convex
   - Concave
   - Valley
   - Ridge
3. Identify areas of erosion (too steep) and areas of wet ground (too level)
4. Identify grade change between inside and outside of existing building
5. Check comfort of walking on different areas of the site
6. Identify elevation changes between top and bottom of all existing steps and retaining walls

C. Hydrology and Drainage

1. Identify watersheds and divides between each

- Check to see if water drains away from existing buildings at all points
- Identify where water flows from building down spouts

2. Identify major bodies of water
3. Identify seasonal fluctuation of streams and lakes
   - Flooding and elevation of high water
   - Check for areas of erosion
4. Identify wet spots or areas of standing water
5. Identify drainage onto and away from the site
   - Does any water run onto the site from surroundings? How much? When?
   - Where does the water go when it leaves the site?

D. Soil

1. Identify soil type
2. Identify general rate of percolation
3. Identify limitations for building

E. Vegetation

1. Identify and locate existing plant material
2. Identify zones of plant material types
3. Identify plant species
   - size (height, spread, and canopy height for trees)
   - form; color (foliage and flower)
   - texture
   - unique characteristics
4. Identify condition, value and client's opinion of existing plant material

F. Existing Buildings

1. Over all massing and height
2. Identify materials of façade
3. Identify locations of doors and windows
4. Identify uses inside the buildings
   - Room use; frequency and when
   - Views outside of rooms

G. Other Existing Structures

1. Location, condition and materials of walks, terraces, steps, walls, fences, swimming pools, etc.
2. Height of elements

H. Utilities

1. Location, height above ground or depth beneath ground
   - Water line
   - Gas line

- Electric line
- Telephone line
- Storm sewer
- Septic tank

I. Views

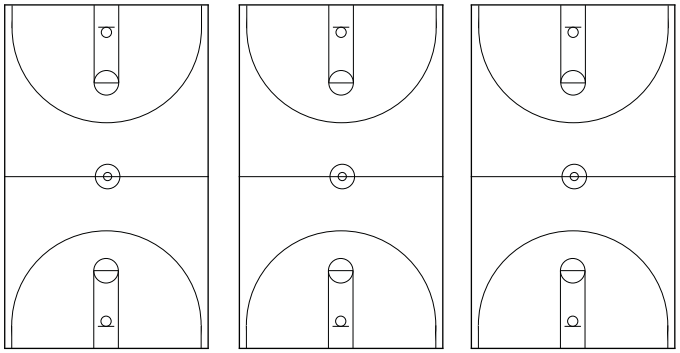
1. Observe and identify what is seen from all sides of the site
   - Good; should it be taken advantage of?
   - Bad; should it be screened?
   - indifferent
2. Observe and identify views from inside the building looking out
3. Observe and identify views from off the site looking on
   - Views from different sides of the site
   - Views from street
   - Where are the best views of the site?
   - Where are the worst views of the site?

J. Site Functions

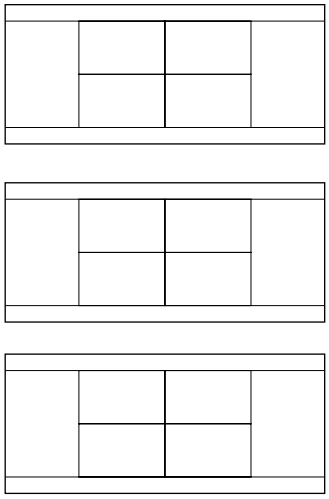
1. Identify how the site is currently used (what, where, when, and how?)
2. Identify location, time, and frequency for such things as
   - Employee arrival and departure
   - School hours
   - Work/maintenance
   - Parking of cars
   - Garbage collection
   - Service people
3. Identify and locate maintenance problems
4. Identify and locate special areas of wear and tear
   - Worn grass edges along sidewalks or drives
   - Worn lawn due to children's play
5. Identify how one arrives at the site
   - How do you feel?
   - What do you see?
6. Identify location for dumping snow in the winter

Design Symbols Set

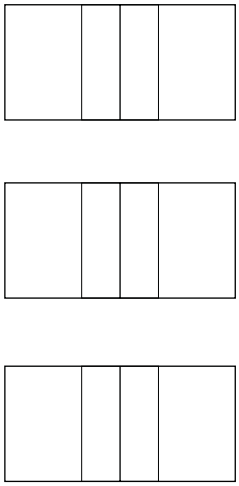
Scale: 1″ = 50′



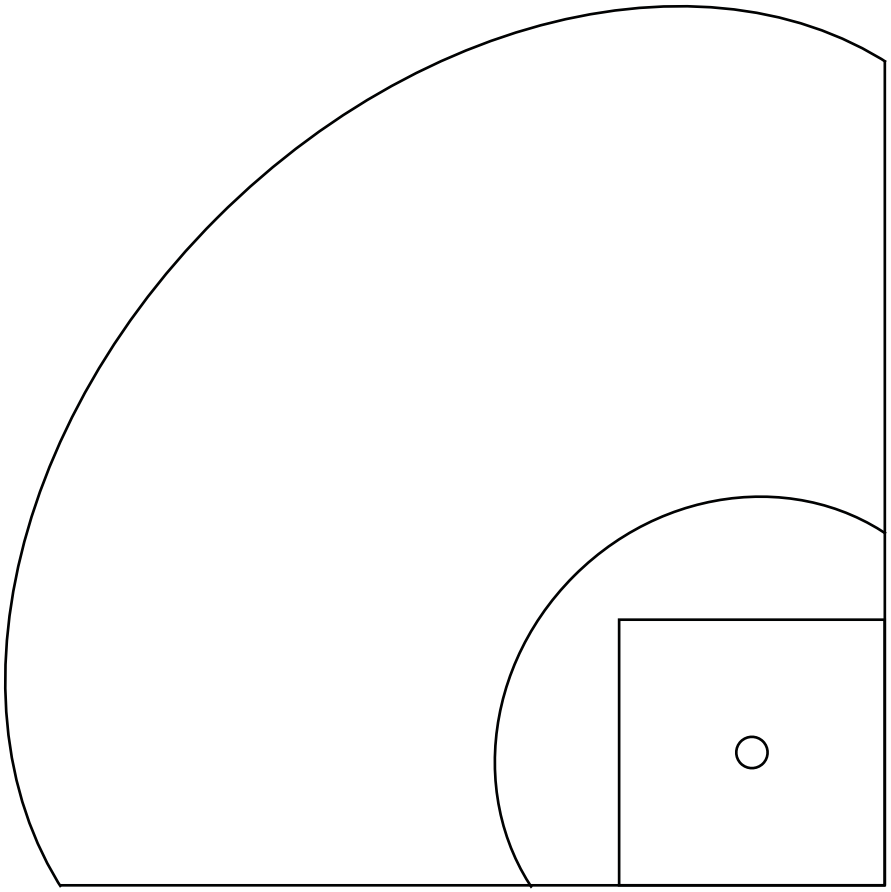
Basketball



Tennis



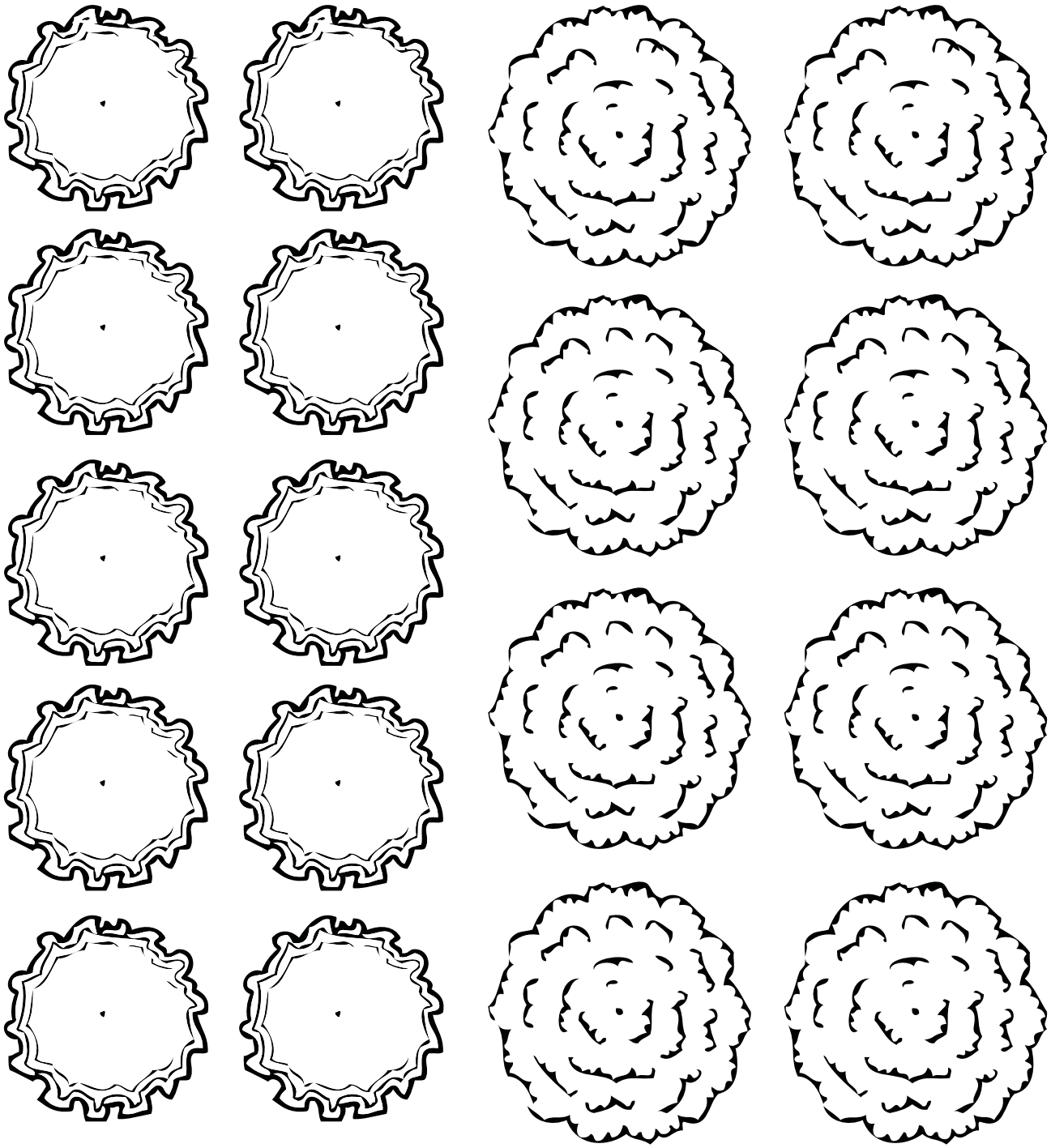
Volleyball



Baseball

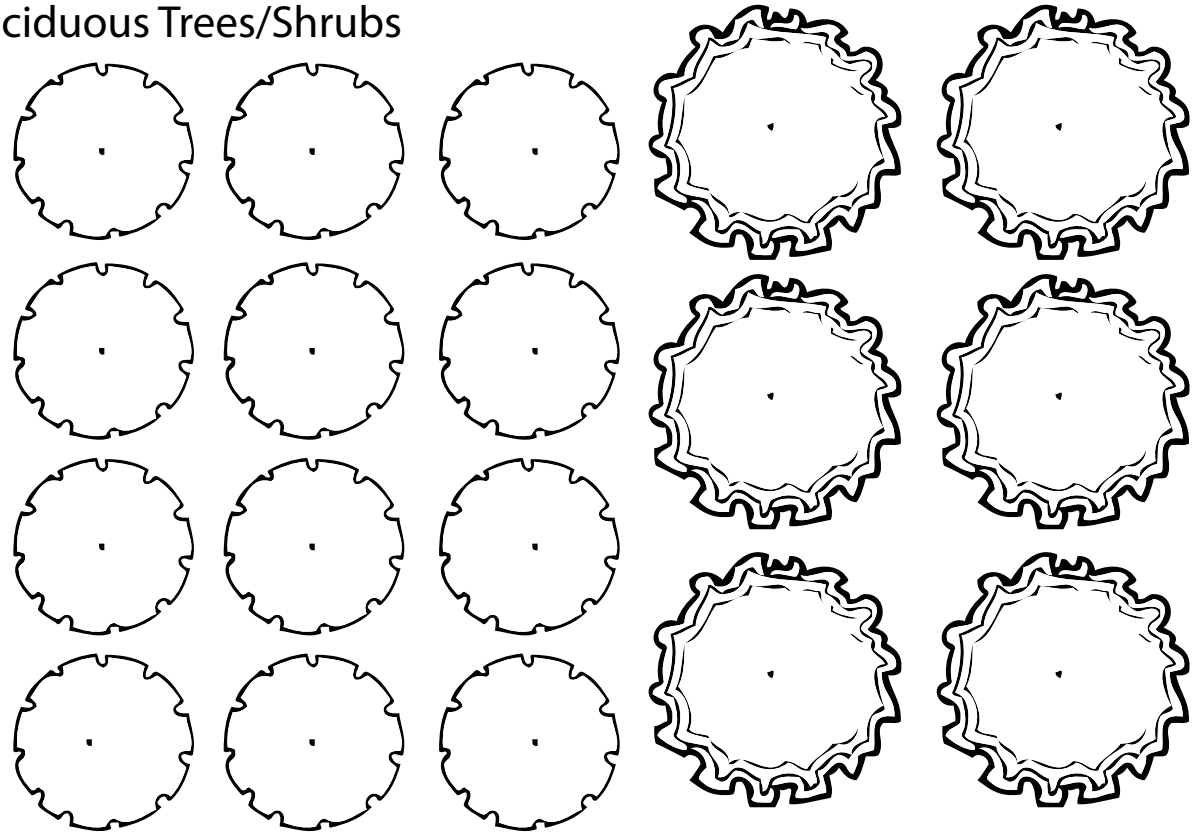
Inventory Symbols Set

Scale: 1″ = 50′

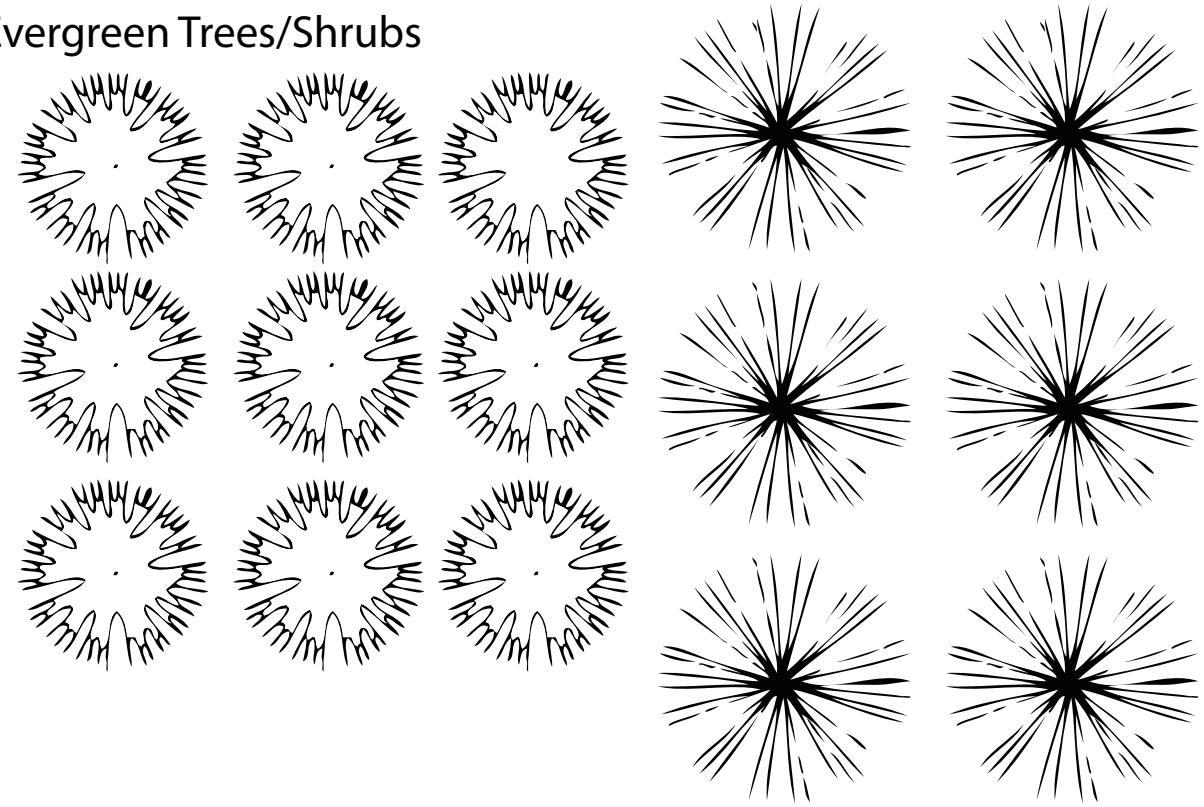


Inventory Symbols Set Scale: 1″ = 50′

Deciduous Trees/Shrubs



Evergreen Trees/Shrubs



Student Workbook - Instructor Version
Day 7

Student Worksheet 7.1- Ideal Relationships

NAME: _____

Instructions:

Match the Program Element to the most appropriate Site Element. Each Program Element has one Site Element that would be most appropriately match to it.

Program Element	Site Element
_____ Quite reading area	A. On a hill
_____ Baseball field	B. In a depression
_____ Vegetable garden	C. On a track/path
_____ Fishing pond	D. Amphitheater
_____ Sledding	E. Under a shade tree
_____ Bird watching	F. Open space
_____ Basketball court	G. A stand of trees
_____ Soccer field	H. On a concrete pad
_____ Running area	I. Near bleachers
_____ Musical concert area	J. Near the school cafeteria

Student Worksheet 7.1- Ideal Relationships

NAME: KEY

Instructions:

Match the Program Element to the most appropriate Site Element. Each Program Element has one Site Element that would be most appropriately match to it.

Program Element	Site Element
__E__ Quite reading area	A. On a hill
__I__ Baseball field	B. In a depression
__J__ Vegetable garden	C. On a track/path
__B__ Fishing pond	D. Amphitheater
__A__ Sledding	E. Under a shade tree
__G__ Bird watching	F. Open space
__H__ Basketball court	G. A stand of trees
__F__ Soccer field	H. On a concrete pad
__C__ Running area	I. Near bleachers
__D__ Musical concert area	J. Near the school cafeteria

Student Worksheet 7.2- Proposal

NAME: _____

Instructions:

Identify one element from the Project Program that is especially desirable to you. Briefly explain why you have selected that element. Then use the information you and your classmates gathered during the inventory and write a short description of where you believe is the most appropriate location for the element. Support your claim with reasons.

1. What element have you selected?

_____

2. Why did you select that element?

_____

_____

_____

_____

3. Where do you propose the element be incorporated on the site?

_____

_____

_____

_____

4. What reasons can you offer to support your proposal? Why is the location you propose the best location for the selected element?

_____

_____

_____

_____

Student Worksheet 7.2- Proposal

NAME: Key

Instructions:

Identify one element from the Project Program that is especially desirable to you. Briefly explain why you have selected that element. Then use the information you and your classmates gathered during the inventory and write a short description of where you believe is the most appropriate location for the element. Support your claim with reasons.

EXAMPLE 1

1. What element have you selected?

Native Prairie Grass stand

2. Why did you select that element?

Because I like tall, wild grasses and flowers that used to cover Iowa. I want to study it in science class too.

3. Where do you propose the element be incorporated on the site?

I propose a stand of native prairie be located at the far end of the playground. It is sunny there so the grass will grow and we can watch it grow everyday during recess.

4. What reasons can you offer to support your proposal? Why is the location you propose the best location for the selected element?

The prairie would be a good addition to the schoolyard because it would provide a place for students to study native plants, insects, and a different ecosystem. It would also help with water infiltration. The far end of the playground is the best location for the prairie because it is in full sun and has a slope of approximately four percent which means it will drain well.

EXAMPLE 2

1. What element have you selected?

I have selected the fishing pond to be the element I most want to have on the schoolyard site.

2. Why did you select that element?

My dad and I like to go fishing on our vacations but I would like to go more often. If a fishing pond were at the school my dad and I could go fishing even when we are not on vacation.

3. Where do you propose the element be incorporated on the site?

I propose a fishing pond be dug in the northwest corner of the site near the woods and the hiking trail.

4. What reasons can you offer to support your proposal? Why is the location you propose the best location for the selected element?

This is the most suitable site for the pond because there is a depression there already that holds water after it rains. It is the lowest part of the site so water from the rest of the schoolyard would drain toward the pond and fill it up. I also think it is a good spot because it is in a quiet location, away from the playground and parking lot.

Student Workbook - Instructor Version
Day 8

Student Worksheet 8.1- Design Reasoning

NAME: _____

A. Describe how the group members made decisions about the design.

B. Describe a selected elements of your design

1. What element have you selected to describe?
2. Why did you choose to propose this element in the design?
3. Describe the features of the element.
4. What reasons did you use to select the size and location of the element?
5. Who will benefit fro this element? Who are the users?

C. Describe a second selected elements of your design

1. What element have you selected to describe?
2. Why did you choose to propose this element in the design?
3. Describe the features of the element.
4. What reasons did you use to select the size and location of the element?
5. Who will benefit from this element? Who are the users?

D. Prepare a brief presentation to be given to the class. In the presentation, talk about the design elements, but focus on one in more detail. Use this space to make notes.

E. After listening to the class presentations, revisit your design and describe changes you would like to make (but don't move the pieces on the plan).

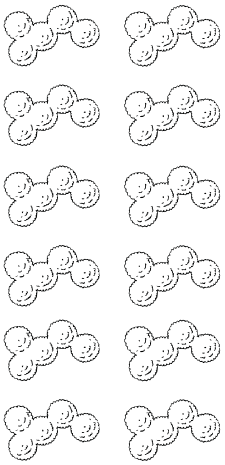
Design Symbols Set

Instructions

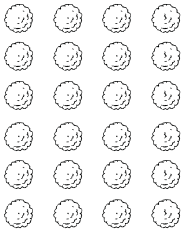
Using sissors, carefully cut around the plant and landscape elements.

Using the information from the inventory, analysis and homework assignements, create a design proposal for the schoolyard site. On the scaled school yard aerial image, students will arrange symbols to indicate their design intent. Students are free to use as many or as few symbols as possible in their design. Once students have created their design, a presentation should be prepared outlining the elements included in the design and reasons for the proposed design.

Deciduous Shrubs



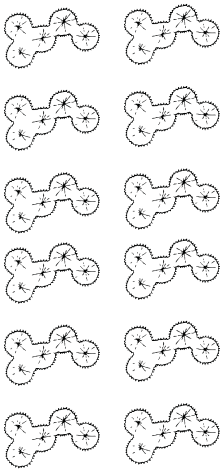
8' shrubs, group



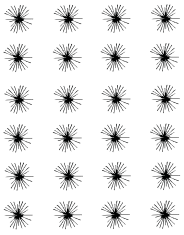
8' shrubs, individual

5' shrubs, individual

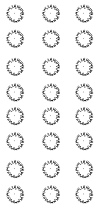
Evergreen Shrubs



8' shrubs, group

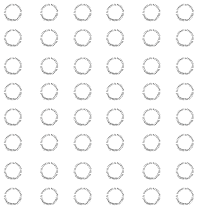


8' shrubs, individual



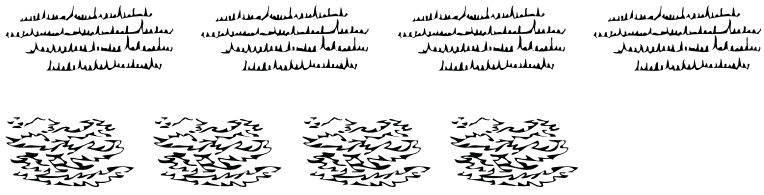
5' shrubs, individual

Ornamental Grass



5' grass, individual

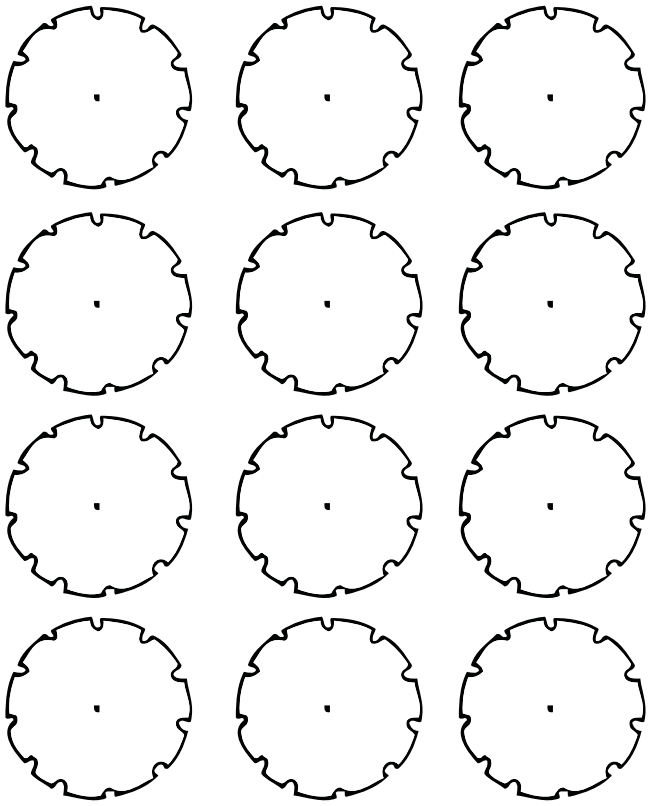
Groundcovers

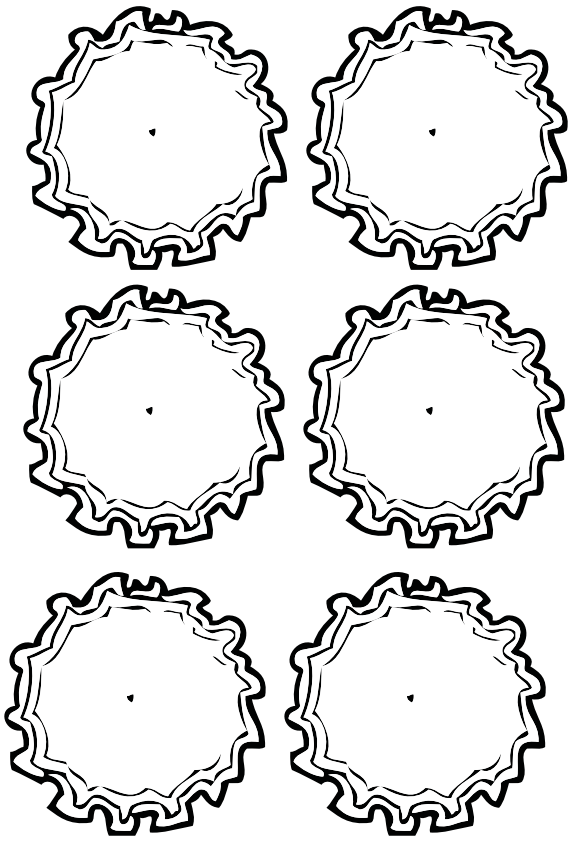


50′ 70′

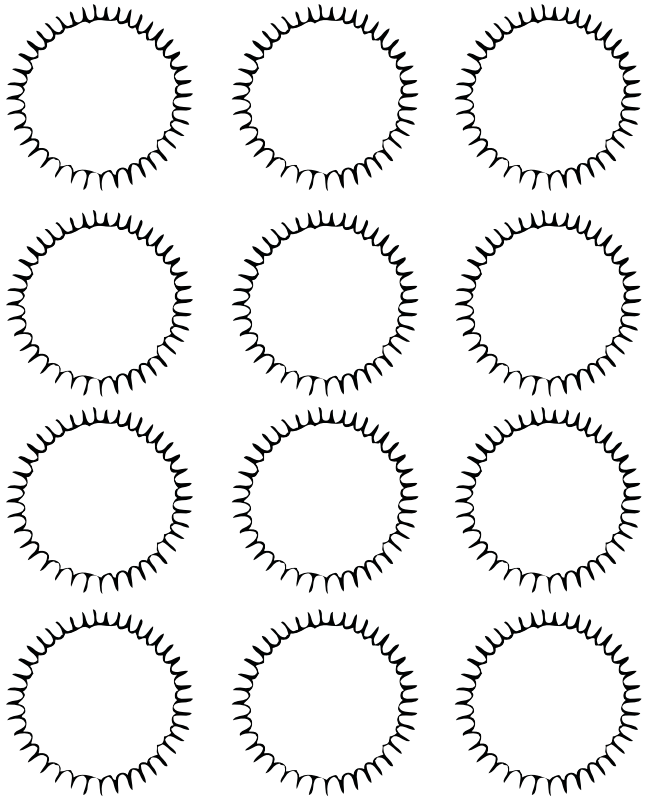
Deciduous Trees/Shrubs

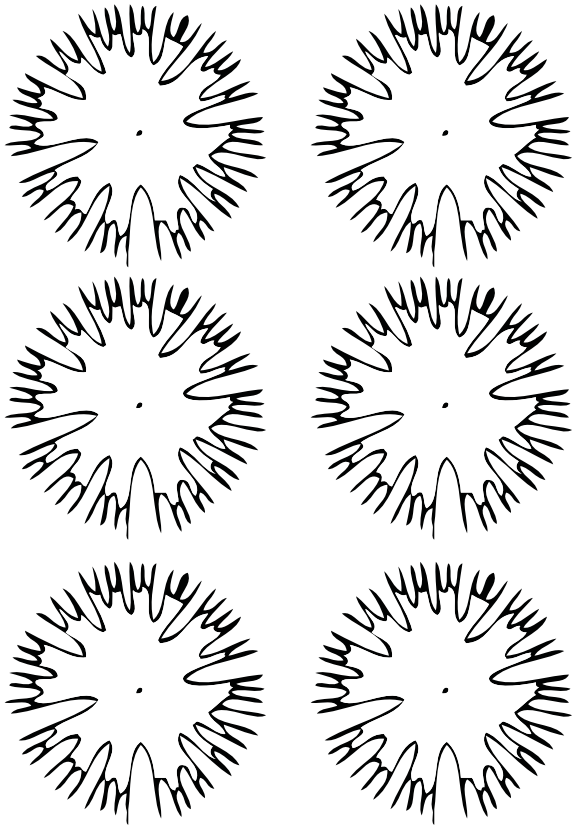
Scale: 1″ = 50′

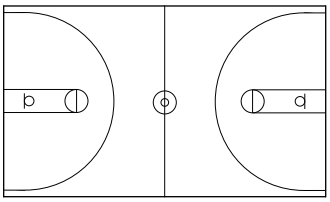




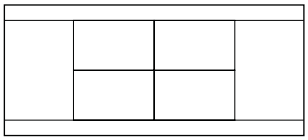
Evergreen Trees/Shrubs



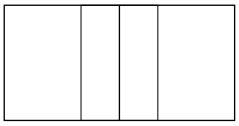




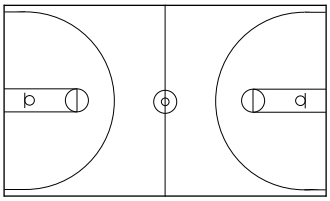
Basketball



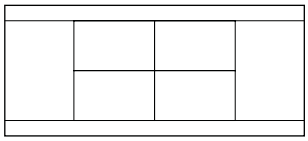
Tennis



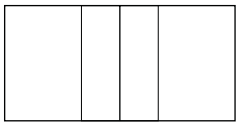
Volleyball



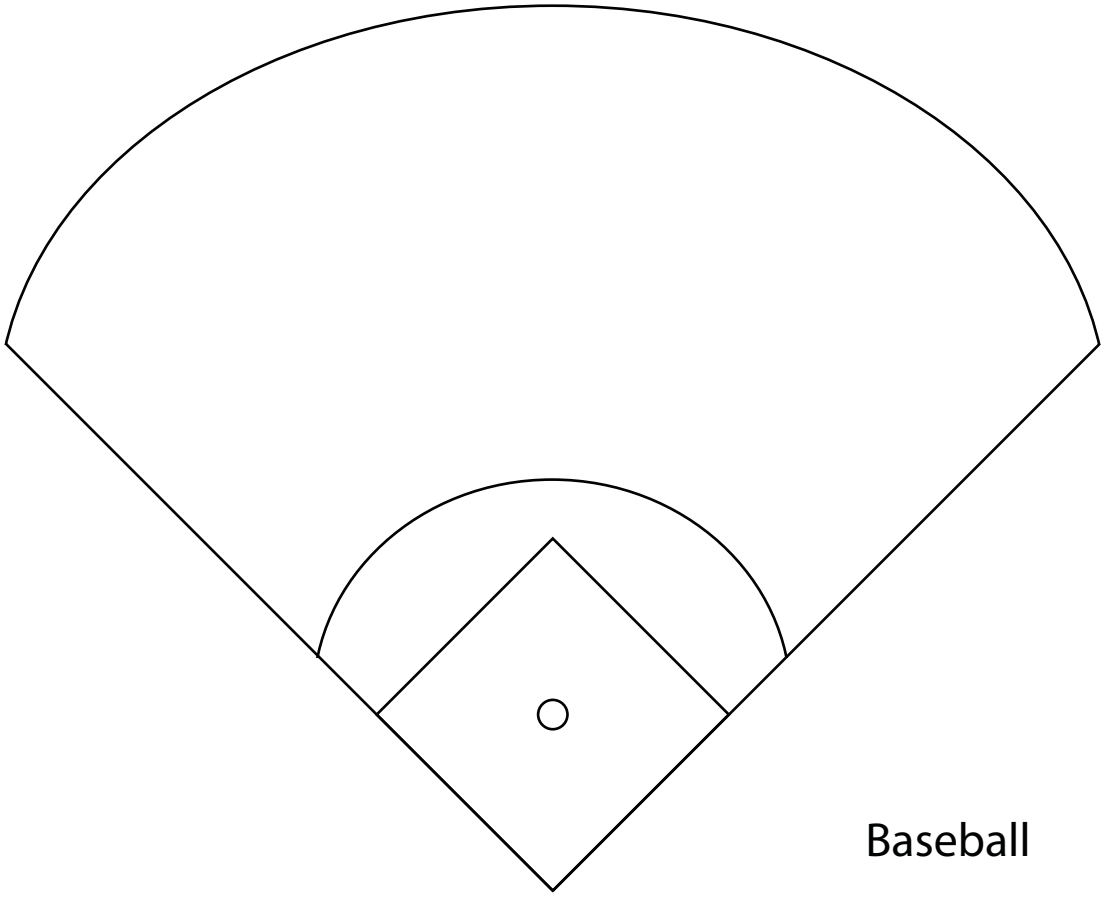
Basketball



Tennis



Volleyball



Baseball

Appendix F - Unit Evaluation Participants

Participant # 1 is a first-grade teacher with 30 years' experience teaching elementary grade levels. Participant # 1 has experience teaching kindergarten for three years, first-grade for twenty years, and third-grade for five years.

Participant # 2 is a fifth-grade teacher with 28 year experience teaching elementary grade levels. Participant #2 has experience teaching first, second, fourth, and sixth-grade as well as seventh through ninth-grade math courses.

Participant #3 is a special education teacher with five years' experience teaching first through sixth-grade in special education. This participant has experience working with students with behavior disabilities and/or academic disabilities.

Participant #4 is a second year teacher who has recently moved to the area from Washington State and is teaching fifth-grade in a neighboring district.