

Children's contact with nature in low-income neighborhoods: parents' and teachers' perspectives

by

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A REPORT

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Abstract

A growing body of literature reveals children are spending less time in nature in recent years (Clements, 2004; Luís et al., 2020). Both perceived and physical accessibility to greenspaces can contribute to children's positive usage of these spaces, especially for disadvantaged communities including, low-income and/or racially minoritized populations (Bates et al., 2018; Strife & Downey, 2009). This study aims to explore how elementary school teachers' and parents' perceptions and attitudes of children's contact with nature can inform recommendations to improve children's access to and contact with nature. With its history of redlining and current social and spatial inequalities, Kansas City, Missouri serves as a suitable case to assess greenspace equity for children in low-income communities (González-Pérez, 2021). The study was conducted in one elementary school in the Kansas City Public Schools district and uses a mixed methods approach. A socio-demographic analysis was used to select schools in low-income areas with a higher proportion of children aged five to nine years old compared to the rest of the city. Then, spatial analysis of the greenspaces in the participating school's attendance zone identified the types of greenspaces available to these neighborhoods and nearby the school. Parents (n=31) and teachers (n=20) were surveyed using multi-lingual photo-surveys to gather their perceptions of their children's access to and contact with nature. Survey responses were entered in the IBM Statistical Package for the Social Sciences (SPSS) 29 software. Analyses included frequencies, correlations, factor and reliability analysis, and independent sample t-tests to understand the strength of and associations between different factors. Findings from the greenspace availability analysis and social statistical analysis revealed that children's contact with nature was limited, including the types of greenspaces children go to and the exposure of nature during school. However, parents and teachers were aware and had positive attitudes towards the importance of children's contact with nature, and liked all outdoor settings and activities proposed in the survey. Potential factors that may be associated with children's contact with nature included their reliance on parent supervision at greenspaces, curriculum, walkability (i.e., unsafe street crossings and sidewalks) and safety concerns (i.e., gunshots, drugs/alcohol, poor maintenance). These findings informed design strategies including re-envision existing greenspaces, create safe and green routes to school and greenspaces, transform vacant lots, and create policy to support planning for children's contact with nature in

the city. Despite the small sample size, this study contributes to the growing body of literature on greenspace accessibility and contact with nature for children. Additionally, it sheds light on potential future research on what factors may be associated with children's contact with nature using both spatial and social analyses.

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children's contact with nature



children's contact with nature in low-income neighborhoods

parent's and teachers' perspectives



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Abstract

A growing body of literature reveals children are spending less time in nature in recent years (Clements, 2004; Luís et al., 2020). Both perceived and physical accessibility to greenspaces can contribute to children's positive usage of these spaces, especially for disadvantaged communities including, low-income and/or racially minoritized populations (Bates et al., 2018; Strife & Downey, 2009). This study aims to explore how elementary school teachers' and parents' perceptions and attitudes of children's contact with nature can inform recommendations to improve children's access to and contact with nature. With its history of redlining and current social and spatial inequalities, Kansas City, Missouri serves as a suitable case to assess greenspace equity for children in low-income communities (González-Pérez, 2021). The study was conducted in one elementary school in the Kansas City Public Schools district and uses a mixed methods approach. A socio-demographic analysis was used to select schools in low-income areas with a higher proportion of children aged five to nine years old compared to the rest of the city. Then, spatial analysis of the greenspaces in the participating school's attendance zone identified the types of greenspaces available to these neighborhoods and nearby the school. Parents (n=31) and teachers (n=20) were surveyed using multi-lingual photo-surveys to gather their perceptions of their children's access to and contact with nature. Survey responses were entered in the IBM Statistical Package for the Social Sciences (SPSS) 29 software. Analyses included frequencies, correlations, factor and reliability analysis, and independent sample t-tests to understand the strength of and associations between different factors. Findings from the greenspace availability analysis and social statistical analysis revealed that children's contact with nature was limited, including the types of greenspaces children go to and the exposure of nature during school. However, parents and teachers were aware and had positive attitudes towards the importance of children's contact with nature, and liked all outdoor settings and activities proposed in the survey. Potential factors that may be associated with children's contact with nature included their reliance on parent supervision at greenspaces, curriculum, walkability (i.e., unsafe street crossings and sidewalks) and safety concerns (i.e., gunshots, drugs/alcohol, poor maintenance). These findings informed design strategies including re-envision existing greenspaces, create safe and green routes to school and greenspaces, transform vacant lots, and create policy to support planning for children's contact with nature in the city. Despite the small sample size, this study contributes to the growing body of literature on greenspace accessibility and contact with nature for children. Additionally, it sheds light on potential future research on what factors may be associated with children's contact with nature using both spatial and social analyses.

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Thank you,

A handwritten signature in black ink that reads "Emily Moore". The signature is fluid and cursive, with the first name "Emily" and last name "Moore" clearly distinguishable.

Emily Moore

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Figure 1.1 Defining the problem

1.1 | Problem Statement

Interacting with nature is known to provide a multitude of benefits for children including healthy physical and mental development (Clements, 2004; Hanscom & Louv, 2016; Keniger et al., 2013). However, more children are spending less time in nature. Researchers suggest a contributor to this is low accessibility of greenspaces (Clements, 2004; Luís et al., 2020; Soga & Gaston, 2016). This is especially prevalent among communities, including those with high levels of low-income and racially minoritized populations, where their neighborhoods have less overall ‘greenness’ (i.e. tree canopy and vegetation cover) and fewer accessible quality greenspaces (Bates et al., 2018; Strife & Downey, 2009).

Additional barriers for children’s access to greenspace include parental concerns for safety in their neighborhoods, physical barriers such as distance, and their limited knowledge of the benefits of nature (Fernandes et al., 2023; Gaster, 1992; Kytä, 2004; Vidal & Castro Seixas, 2022). Cities must offer safe, accessible places for children to be in contact with nature as more people are living in urban environments. In addition, child physical and mental health problems have been linked to diminished exposure to nature, see Figure 1.1 (Vidal & Castro Seixas, 2022). It is important to evaluate available greenspaces and gather community perceptions to understand how to address the challenges they face and identify opportunities to improve children’s contact with nature.

1.2 | Research Objective and Goal

Building upon the literature on children's access to greenspace and contact with nature, this study focuses on school attendance zones in the historically disinvested areas of Kansas City, MO to explore the answer to the following question:

How can parents' and teachers' perceptions and attitudes of greenspace accessibility inform recommendations to improve children's contact with nature?

To address this question, this study utilizes both quantitative and qualitative approaches through spatial and social data analysis of greenspace accessibility in the areas where children spend most of their time – neighborhoods and schools.

This study seeks to understand not only what greenspaces are available in these neighborhoods and nearby the schools but explores parents' and teachers' perceptions of children's greenspace accessibility to address the challenges they face. Together, findings inform design and planning recommendations for improving children's contact with nature for communities most in need in Kansas City. Although conducted in Kansas City, Missouri, the proposed methods and the translational design process may be applicable in other cities across the nation. Children's disconnection to nature and its health and wellbeing implications are issues experienced globally and must be addressed. See Figure 1.2 for an overview of the study process.

1.3 | Project Overview

Chapter 2

This chapter is a literature review divided into two sections. The first section focuses on evidence that greenspace is beneficial for human health and wellbeing, especially for children. This section also addresses the inequitable access to greenspaces that communities with higher proportion of low-income and/or racially minoritized communities experience and other challenges that children experience. The second section includes how greenspace accessibility has been measured, and the opportunities and barriers for contact with nature in school including in schoolyards and nearby nature.

Chapter 3

This chapter includes the project's methodologies. It describes the initial study area and how spatial analysis of socio-demographic variables was used to select potential school attendance zones. Additionally, it includes a greenspace availability analysis to gather what was available to these neighborhoods and the school. And lastly, it describes the social data collection tool for collecting parent and teacher perceptions of their children's access and contact with nature.

Chapter 4

This chapter covers how the data from the surveys was analyzed through statistical analyses using the IBM Statistical Package for the Social Sciences (SPSS) 29 software. Analyses include frequencies, bivariate correlations, independent sample t-tests, and factor analysis. Then a discussion synthesizes the major findings from analysis including issues of walkability (i.e., unsafe sidewalks, distance, unsafe street crossings), safety (i.e., crime, general safety in area), preferences for outdoor settings and activities, and school-specific barriers.

Chapter 5

This section includes design and planning recommendations for improving children's contact with nature in the study area. It identifies five key goals based on the research findings and suggests four design strategies for meeting these goals.

Chapter 6

The final chapter consists of an overview of the study, key findings from the analysis, limitations of the study, contributions, and future research needs.

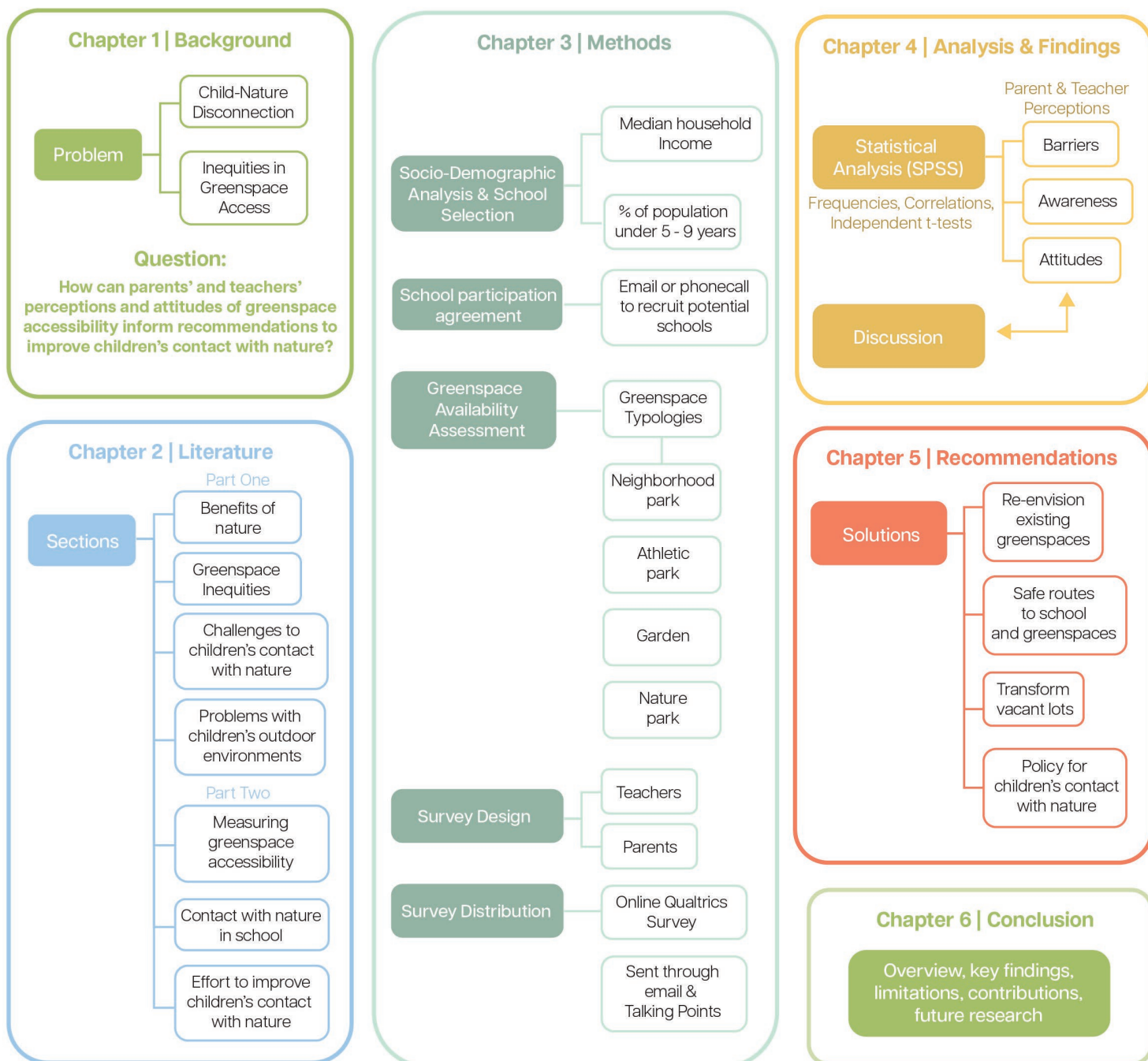


Figure 1.2 Study process

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Part 1

2.1 | Greenspace & Human Health and Wellbeing

There is an inherent human-nature connection that makes access to greenspaces essential to the health and wellbeing of people (Amoly et al., 2014; Ives et al. 2017; Keniger et al., 2013; Shanahan et al., 2015). The term greenspace encompasses landscapes that are both maintained or unmaintained (i.e., urban parks, gardens, nature reserves; Barton & Rogerson, 2017; Keniger et al., 2013). Interacting with greenspaces creates a host of positive human health benefits, including improvements and maintenance of physical health, mental wellbeing, cognitive ability, and social relationships (Barton & Rogerson, 2017; Keniger et al., 2013). However, there is a growing disconnection between people and the natural environment. More people are living in urban environments where there is less greenspace and more time spent indoors; also called an “extinction of experience” in nature (Soga & Gaston, 2016). Diminished exposure to nature is considered a public health concern, where an increasing body of evidence suggests mental and physical health problems may be associated with limited access to greenspace and contact with nature (Barton & Rogerson, 2017; Beery et al., 2023; Keniger et al., 2013; Lin et al., 2015; Marcus & Sachs, 2014; Strife & Downey, 2009; Vanaken & Danckaerts, 2018).

2.2 | Greenspace Inequities and Impacts

Greenspace is known to be beneficial to people’s wellbeing; however, environmental injustices limit and even prevent some communities from reaping the benefits of nature (Boone et al., 2009; Nesbitt & Meitner, 2016; Rigolon, 2016; Rigolon & Flohr, 2014). Studies have found that inequitable distribution of greenspace including distances to greenspaces and overall greenness of an area, relates to lower socio-economic status. Low-income and racially minoritized communities often travel longer distances to greenspaces and are shown to have lower quality greenspaces in their neighborhoods (Dai, 2011; Nesbitt & Meitner, 2016; Rigolon & Flohr, 2014; Wen et al., 2013). Others have found that some low socio-economic and minoritized populations may have nearby parks and other greenspaces, yet the quality, safety, available amenities, and acreage were lacking and was influential on people’s perceptions and limited usage of those spaces (Boone et al., 2009; Fernandes et al., 2023; Rigolon, 2016; Vaughan et al., 2013). In addition, where greenspace is minimal, there is greater risk of environmental hazards due to reduced essential ecosystem services (i.e., reducing pollution or temperatures) that can impact people’s health and wellbeing. Many disadvantaged communities have been found to have lower life expectancies, increased risk for chronic diseases, less physically active, and have a lower quality of life (Abercrombie et al., 2008; Barton & Rogerson, 2017; O’Brien et al., 2022; Wen et al., 2013). In many cities, these issues and inequities faced today are linked to the larger history of racism and redlining that shaped the urban fabric and distribution of greenspaces (Boone et al., 2009; LaVeist, 2011).

Environmental inequities are especially concerning for their impacts on children's health and wellbeing (Arora, 2018). Children's physical environments can have serious, life-long psychological and physical health impacts in their development (Hanscom & Louv, 2016; Strife & Downey, 2009; Sunyer et al., 2015; Vanaken & Danckaerts, 2018). As cities become more dense, children are living in environments with limited greenspaces and diminished contact with nature (Rigolon, 2016; Rigolon & Flohr, 2014; Strife & Downey, 2009).

Children are also diagnosed at younger ages for mental and physical health issues such as depression, anxiety, behavioral problems, attention deficits, obesity, and asthma (CDC, 2022; Overweight & Obesity, 2022; Zhang & Zheng, 2022). Those living below poverty are also more likely to have mental, behavioral, or developmental disorders (1 in 5 children in the U.S.) and are less likely to receive treatment (CDC, 2022). In addition, children of racially minoritized groups are found to have higher percentages of physical health conditions (CDC, 2022; Overweight & Obesity, 2022). It is important to consider the value of equitable and frequent access to greenspaces for children, which has the potential to address many of these issues.

2.3 | Benefits of Children's Contact with Nature

Childhood is the critical time of exploration, learning and growing, and it is thought that being outdoors in nature is ideal for healthy childhood development (Souter-Brown, 2015). Nature provides many opportunities to engage and stimulate the senses, challenge and develop cognitive skills and motor functions (Clements, 2004; Hanscom & Louv, 2016; Moore, 1974; Souter-Brown, 2015). While nature challenges children, it is also a calming, stress-reducing environment (Hanscom & Louv, 2016; Ulrich et al., 1991). In contrast, the built environment has been found to overstimulate and overwhelm children with its busyness and noise (Alvarsson et al., 2010; Hanscom & Louv, 2016; Taylor et al., 2001).

There is evidence of improvements to mental health, cognitive functioning, and physical health in children who are regularly exposed to greenspaces. Taylor et al. (2001) conducted a study that exposed children with attention deficit disorder (ADD) to greenspaces and results indicated that children exposed to greener spaces had less severe ADD symptoms (i.e., inattention). These findings are supportive of Attention Restoration Theory, which theorizes that natural environments are restorative of attention and concentration as they require less, effortful, indirect attention (Allahyar & Kazemi, 2021; Faber Taylor & Kuo, 2009; Huang et al., 2021; Kaplan, 1995). Similarly, research was done on the impact of green and blue spaces (i.e., beaches) on children's behavior and symptoms of attention deficit/hyperactivity disorder. Longer use of green and blue spaces reduced behavioral problems and higher residential greenness correlated to lower attention deficit hyperactivity disorder symptoms (Amoly et al., 2014).

Learning outdoors has also shown to have improvements to children's socio-emotional health, academic performance, and overall wellbeing. Outdoor or nature-based learning can include hands-on experiences such as working in school gardens, field trips to natural spaces, or didactic based teaching of traditional subjects in outdoor classrooms (Mann et al., 2022). Students have been found to be more engaged in learning, improved academically, and have better social skills when taught outdoors in nature (Mann et al., 2022). Some studies have also found greater levels of greenness surrounding schools, and even as little as a window view to greenspace, to improve student academic performance, reduce stress, and increase attention (Aumann et al., n.d.; Dadvand et al., 2017; Li & Sullivan, 2016; Wu et al., 2014). Furthermore, the level of greenness around schools can influence air pollution levels, which is shown to impact brain development and cognitive functions (Dadvand et al., 2017; Markevych et al., 2018; Sunyer et al., 2015).

Time in greenspaces also encourages physical activity and healthy lifestyles. For example, Ward et al (2016) found that time in greenspaces positively supports moderate to vigorous physical activity for children (Ward et al., 2016). Another study showed that higher neighborhood greenspace is associated with higher percentages of children, particularly boys and younger children, choosing to spend more time being physically active over use of electronics (Sanders et al., 2015). As the literature supports, greenspaces can be beneficial to children's health and wellbeing; however, these benefits may not extend to all children. Communities with a high proportion of low-income and/or racially minoritized families face many challenges that can limit contact with nature for children.

2.4 | Challenges to Children's Contact with Nature

Over time, children's ability to freely navigate their outdoor environments and access greenspaces have been restricted (Arora, 2018; Clements, 2004; Gaster, 1992; Kytä, 2004; Vidal & Castro Seixas, 2022). Compared to past generations, children today are growing up indoors, spend time doing sedentary activities (i.e., screen-based activities), and have less free time from increased pressure of education-related activities (Aggio et al., 2015; Clements, 2004; Dadvand et al., 2017; Luís et al., 2020; Souter-Brown, 2015; Vidal & Castro Seixas, 2022). Researchers suggest that children's accessibility and usage of greenspaces is impacted by a multitude of factors such as availability and proximity of greenspaces, parent restrictions, safety, quality and design of greenspaces, environmental hazards, limited education of nature, and awareness of the benefits of being in greenspaces (Clements, 2004; Dai, 2011; Kytä, 2004; Rigolon & Flohr, 2014; Vidal & Castro Seixas, 2022). In addition, children have been historically left out of urban policies, where children's rights and needs have not been considered in urban planning decisions (Vidal & Castro Seixas, 2022). As a solution, Child Green Infrastructure (CGI) is a concept that combines initiatives of urban green infrastructure (UGS), child-friendly cities, and children's infrastructure that puts children's rights at the forefront of planning urban green infrastructure for their equitable access for children and use for connecting and playing in nature. This concept strives to move away from planning only structured children's play infrastructure (i.e., playgrounds) and aims to rewild cities and create natural spaces in areas where children live, learn, and play (Vidal & Castro Seixas, 2022).

It is imperative to address these potential obstacles of greenspace accessibility, especially for communities with low-income and racially minoritized families who are known to experience environmental inequities, to understand how to plan and design urban environments for children to navigate and have a healthy childhood.

2.5 | Problems with Children’s Outdoor Environments

Many greenspaces are not designed for children’s creative, unstructured play and exploration of nature (Hanscom & Louv, 2016; Souter-Brown, 2015; Vidal & Castro Seixas, 2022). For example, many urban greenspaces are designed with an

abundance of furniture and lack natural spaces to engage with (Vidal & Castro Seixas, 2022). Even the common play spaces available for children are often composed of commercial play equipment or sports fields that lend to only structured play (Clements, 2004; Hanscom & Louv, 2016; Skar et al., 2016; Vidal & Castro Seixas, 2022). Additionally, the conventional schoolyard is often characterized by containing paved surfaces, lawn, commercial play equipment, with minimal or no tree or vegetation cover (Clements, 2004; Danks, 2010; Dymont & Bell, 2008; Luís et al., 2020; Schulman & Peters, 2008). Children need a diversity of play environments that support both structured and unstructured play opportunities in natural settings (Rigolon & Flohr, 2014; Skar et al., 2016; Veitch et al., 2006; Vidal & Castro Seixas, 2022).



Figure 2.1 Benefits and barriers to children's contact with nature

Part 2

2.6 | Measuring Greenspace Accessibility

Greenspace accessibility is commonly evaluated objectively through availability measures (number of greenspaces or level of greenness), calculating proximity, or frequency to greenspaces; however, these measures alone do not capture the complexity of greenspace accessibility. People's perceptions of accessibility can also be influential to their use of greenspaces (Beery et al., 2023; Dai, 2011; Jones et al., 2009; Ma et al., 2023; Wright Wendel et al., 2012). Several studies focused on public perceptions of greenspaces and its impacts on physical health; more specifically, gathering their perceptions of distances to greenspaces, greenness of neighborhoods, and perceived safety (Jones et al., 2009; Leslie et al., 2010; Ma et al., 2023). Jones and colleagues (2009) reported that access to greenspace, proximity-wise, was better in deprived neighborhoods, yet residents used them less and were less physically active because they reported access was difficult due to perceptions of poor safety and quality of the greenspaces (Jones et al., 2009). Using both objective and subjective measures of accessibility is important because different groups of people (e.g., by age, gender, or race/ethnicities) may have different perceptions that are limiting their time in nature (Leslie et al., 2010; Ma et al., 2023).

Because young children are increasingly becoming more dependent on parents, researchers suggest parent perceptions are a major factor to children's access to greenspaces (Feng & Astell-Burt, 2017; Veitch et al., 2006). Current research, although limited, consists of parent perceptions of safety and impacts on children's access to greenspaces (Clements, 2004; Feng & Astell-Burt, 2017; Sefcik et al., 2019; Veitch et al., 2006). Studies that have surveyed parents often use five-point Likert scale questions about various barriers to access nearby nature (Skar et al., 2016). These include physical and

social factors such as access (i.e., number of greenspaces near home), concerns for traffic, lack of walkways, role of institutions (i.e., school), role of parents, attitudes, time pressures, and safety (Skar et al., 2016; Veitch et al., 2006). For example, researchers found that a parent's perception of safety of physical park features and quality of the park, determines if their children will have contact with them (Feng & Astell-Burt, 2017; Sefcik et al., 2019; Veitch et al., 2006). Parents have also reported fearing crime and safety in the area as a factor contributed to their children spending less time outdoors (Clements, 2004; Sefcik et al., 2019; Skar et al., 2016; Veitch et al., 2006). Demographic and socio-economic factors such as the child's gender and age, parent income, education, and living situations (i.e., urban vs. rural) are also collected to address additional barriers that complement the physical and social factors (Baró et al., 2021; Passmore et al., 2021; Skar et al., 2016; Veitch et al., 2006). Greenspaces within low-income, and/or racially minoritized communities are reportedly unmaintained and unsafe, so some prefer to travel longer distances to more desirable parks (Sefcik et al., 2019; Veitch et al., 2006). However, some may not have the ability to travel longer distances (Jones et al., 2009; Sefcik et al., 2019). Parents may also require their children be supervised at greenspaces, which can be difficult to find time to do so (Clements, 2004; Skar et al., 2016; Veitch et al., 2006). Another factor to consider, are parents' knowledge of the benefits of nature for children and how their own preferences (i.e., dislike of things associated with nature such as insects) influence their children's contact with nature (Passmore et al., 2021; Sefcik et al., 2019; Skar et al., 2016). In addition, when asked what could encourage more time in nature, parents suggested better availability of greenspaces and facilitation (i.e., signage, paths, nature playgrounds) of nature spaces

for their children (Skar et al., 2016; Veitch et al., 2006). They also believed that institutions including kindergartens, before/after school care, and schools need to play a larger role in facilitating time in nature and organize more activities outdoors (Skar et al., 2016).

2.7 | Contact with Nature in School

Researchers suggest that greening schoolyards can be a solution to provide children access to greenspace because children spend much of their time on school property (Bikomeye et al., 2021; Children & Nature Network, n.d; Schulman & Peters, 2008; Stevenson et al., 2020). Some studies have assessed the impact of greening schoolyards in low-income communities. In comparison of before and after schoolyard greening renovations, schoolyard usage increased greatly outside of school time post-renovations (Bates et al., 2018; Bikomeye et al., 2021; Bohnert et al., 2022). In addition, green schoolyards have shown to increase children's physical activity, created more positive social interactions, improved community perceptions of safety, and created better community relations (Bates et al., 2018; Bikomeye et al., 2021; Bohnert et al., 2022). Green schoolyards may provide safe, accessible greenspace for children's contact with nature; however, there are barriers that make greening schoolyards difficult or not desirable in some communities.

Some studies have reported that teachers find it difficult to incorporate outdoor lessons in the green schoolyard because they do not have the knowledge or training to incorporate using the green schoolyard elements in the curriculum (Bohnert et al.,

2022; Kerlin et al., 2015). Another barrier is that natural play elements are viewed as unsafe because they are thought to be unpredictable, cause obstruction to sightlines, and create higher potential for injury (Dyment & Bell, 2008). However, others have suggested that green schoolyards may lessen injury as it provides softer surfaces over asphalt and concrete that most schoolyards have (Dyment & Bell, 2008; Hanscom & Louv, 2016). It is also recommended for benefits to the community, that green schoolyards be open to public use outside of school time. This idea raises concerns for safety and property damages (Bohnert et al., 2022; Children & Nature Network, n.d.). Additionally, usage outside of school may be reduced for children that rely on a school bus for transportation to the school or from parent permission (Bates et al., 2018; Bohnert et al., 2022). The most apparent restriction that prevents green schoolyards is acquiring funding (Baró et al., 2021; Schulman & Peters, 2008). School funds are often limited, especially in low-income areas, and landscape maintenance is often costly (Giezen & Pellerey, 2021; Schulman & Peters, 2008). Although green schoolyards have been well-researched for their benefits and potential for providing accessible greenspace, fewer studies have investigated potential use of nearby greenspaces during school.

Where schoolyards do not provide nature connections, it is important to provide other opportunities for children to experience nature in schools. Nearby greenspaces can be used by schools for outdoor learning; however, fewer studies have focused on factors contributing to accessibility of greenspaces outside of the school property. Many studies have assessed potential nature exposure for children through measuring the amount of natural qualities in schoolyards and the proximity to natural areas as a "gateway" for connection to nature (Beery

et al., 2023). Although proximity is an important factor that is influential to schools' frequency of use of nearby greenspaces, there are other factors such as teacher preferences and the curriculum, that need to be considered (Beery et al., 2023). Another study gathered information from Danish schools, who incorporated outdoor learning in the curriculum, on what greenspaces teachers use, how they use them, and what their preferences are. They found greenspaces that are familiar and nearby (walking distance) to be their preference (Bentsen et al., 2013). These greenspaces tended to be forests, green schoolyards, and streams and lakes (Bentsen et al., 2013).

Another study associated school green infrastructure to frequency of outdoor education activities in distant, natural environments while controlling for socio-demographic indicators and greenspace availability. In Barcelona, Spain, Baró and colleagues (2021) assessed the amount of urban greenspace within and around primary schools (private and public). In addition to spatial analysis, they surveyed schools to gather information on the frequency of outdoor activities in the curriculum to evaluate if these activities makeup for potential inequities of accessibility of nature within or outside the schools (Baró et al., 2021). They found that children in wealthier areas had greener neighborhoods and their schools provided more opportunities for outdoor activities in natural environments

than children in lower-income areas and greener schools (Baró et al., 2021). Although this study used both objective (spatial analysis of greenspace) and subjective data (surveys), it did not include teacher perceptions toward greenspace accessibility and children's contact with nature. To understand the larger issue of children's limited contact with nature, it is important to focus on the settings that children spend most of their time – schools and neighborhoods – and gather both parents' and teachers' perceptions of children's exposure to nature (Baró et al., 2021; Beery et al., 2023; Bentsen et al., 2013; Clements, 2004; Feng & Astell-Burt, 2017; Sefcik et al., 2019; Veitch et al., 2006).

2.8 | Efforts to improve children's access to greenspace

There are some larger national efforts in place aimed at providing children with equitable access to nature. The Children & Nature Network (C&NN) is an initiative to support municipal leaders and communities to plan, create policies and programs aimed to provide equitable access for children to connect with nature in their cities (Children & Nature Network, n.d.). One policy that came from their efforts is the Children's Outdoor Bill of Rights, that lists outdoor experiences every child deserves, and has been approved by fifteen states and six cities in the U.S. Although there is progress, the C&NN states that efforts generated to date, have not been enough to improve access to nature for low-income and racial or ethnic communities (Children & Nature Network, n.d.). Another initiative, Green Schoolyards America, aims to transform schoolyard design from conventional schoolyards to greenspaces through gathering research on green schoolyards, creating policy change, advocating, and providing support for schools (Our Mission, n.d.). Their goal is to provide children – prioritizing those most in need – with daily exposure to nature through schools to support their learning, wellbeing, and play while providing ecosystem services (i.e., air pollutant removal, storm water management) to communities (Our Mission, n.d.).

2.9 | Summary

Children's contact with nature is complex and there are many factors that influence greenspace accessibility. A growing body of evidence supports that inequitable availability and accessibility of greenspace may be impactful on children's physical and mental health. Many studies have assessed what benefits greenspaces provide for children including attention restoration, promoting physical activity, improving school performance, and creating positive social interactions. In addition, research has examined how green schoolyards can provide children opportunities to be in nature since children spend much of their time in schools. However, less research has considered other avenues for children's contact with nature during school, especially in communities with a high proportion of low-income families where green schoolyards may be difficult to fund. Because parents and schools play significant roles in young children's lives, it is important to explore their perceptions including awareness of the benefits of nature, attitudes towards children's contact with nature, and the barriers that may prevent time in nature, to suggest potential practical solutions for improving children's access to nature within and outside of school. This study focuses on these factors to improve children's access to nature in communities with low-income and racially minoritized families. Refer to Figure 2.2 for a summary of the literature review.

Part 1

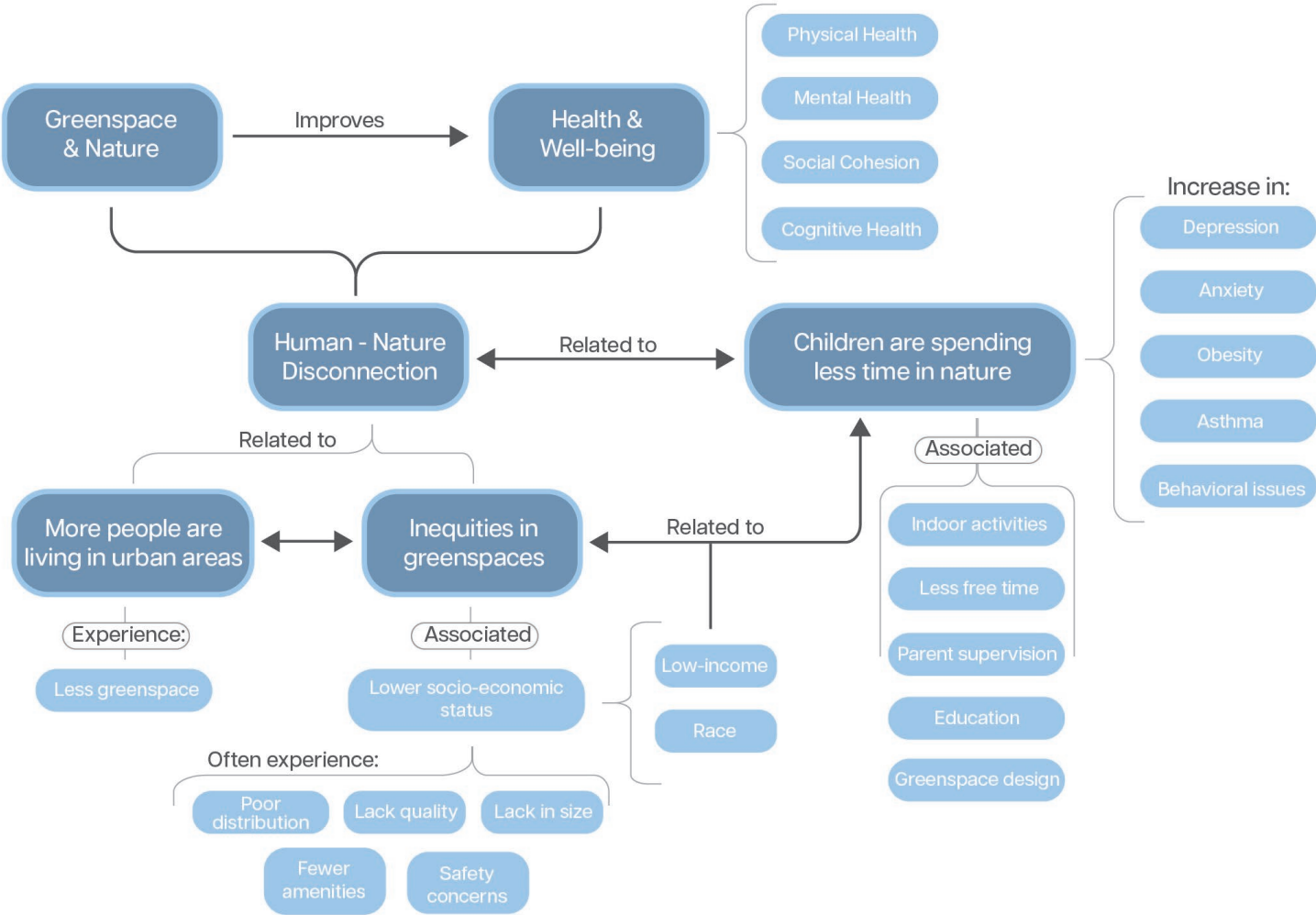
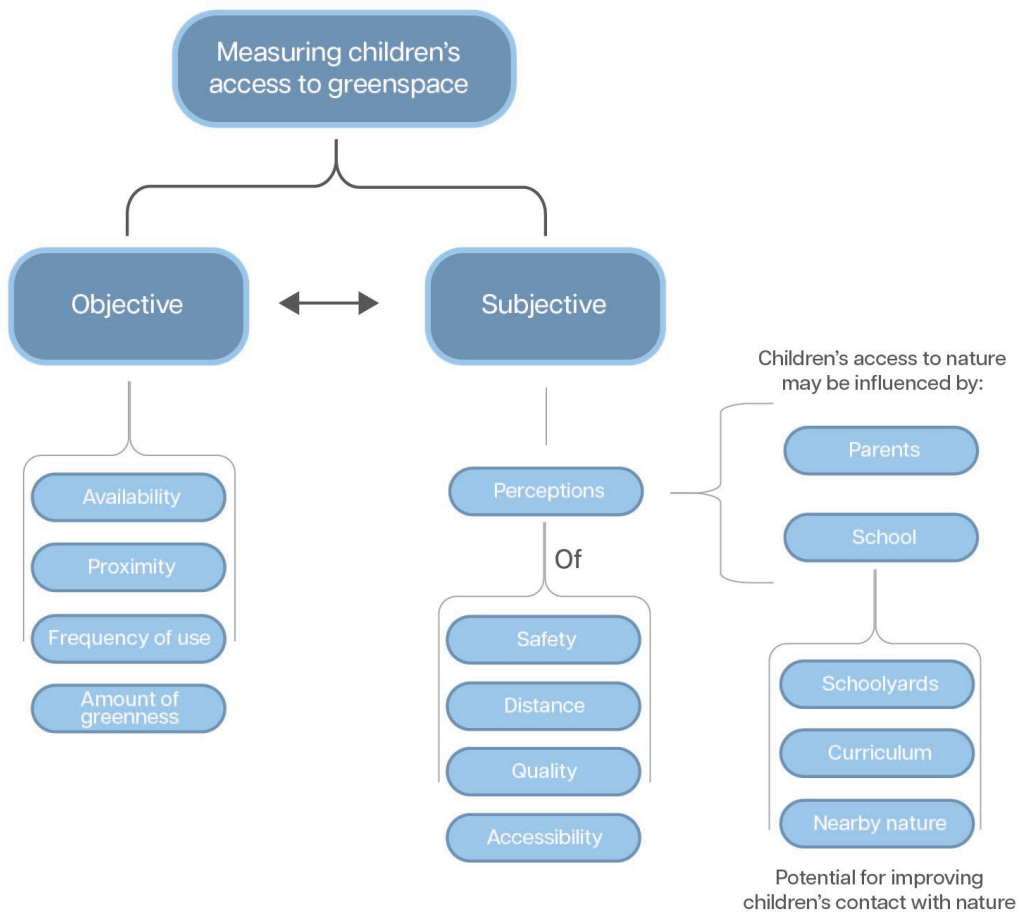


Figure 2.2 Literature review content

Part 2



Chapter 3 | Methods

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3.2 Study Area Kansas City, MO	22
3.3 Spatial Analysis Socio-Demographics	32
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3.1 | Overview

This study includes both spatial and social data collection and analysis. Spatial analysis of socio-demographic data was used to select the school attendance zones. Then, a spatial analysis of greenspace availability gathered the types and sizes of greenspaces that are potentially used by those living within the school attendance zone. In addition, social data was collected through photo surveys from parents and teachers of children in kindergarten through sixth grade. The survey gathers their perceptions of children's access and contact with nature. Then, in Section 4, statistical analysis of survey responses identified challenges and opportunities for children's contact with nature. The survey responses and spatial analysis helped inform recommendations of place-based design strategies for children to be exposed to nature . See Figure 3.1 for an overview of the methods.

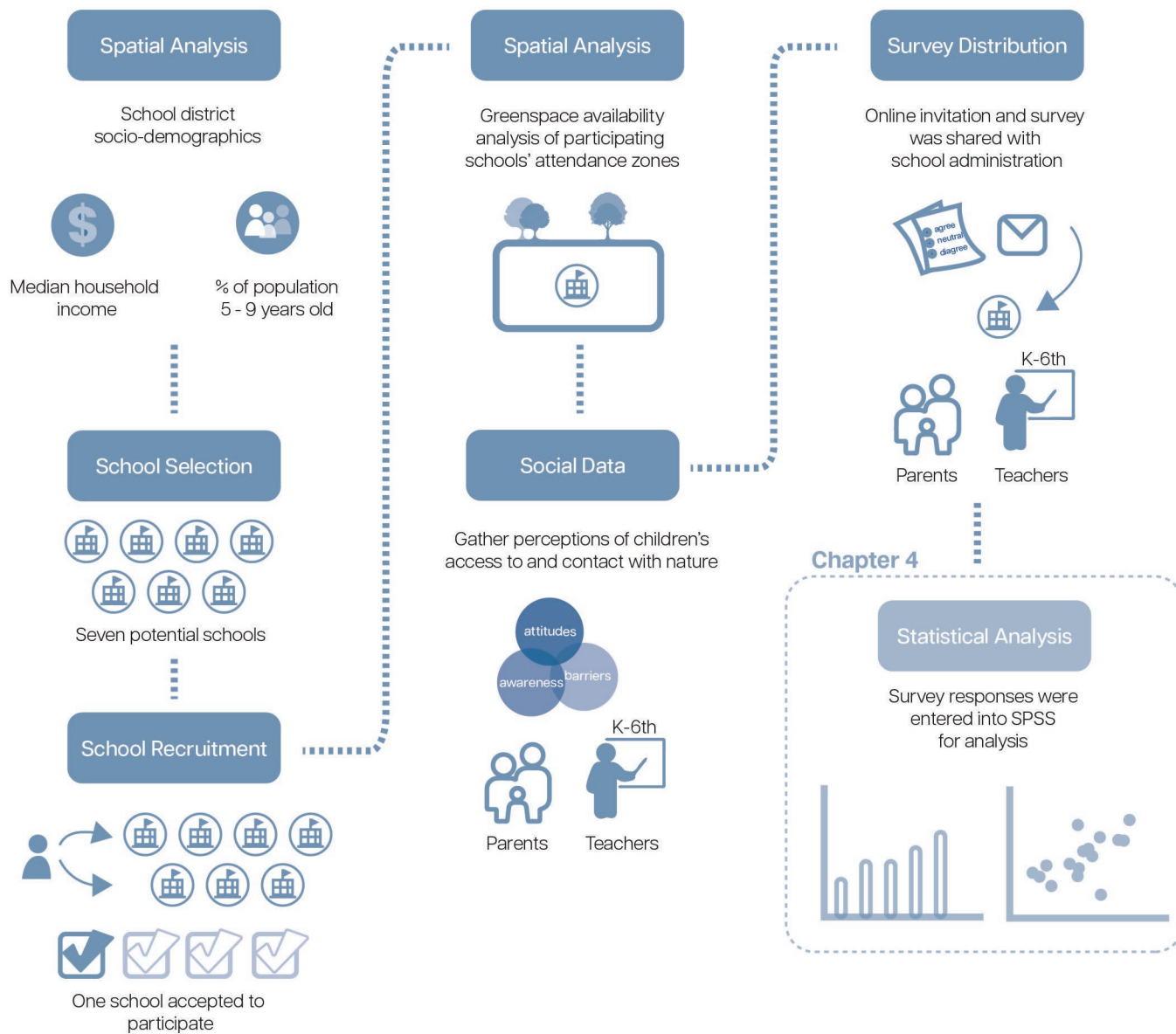


Figure 3.1 Overview of the research methods

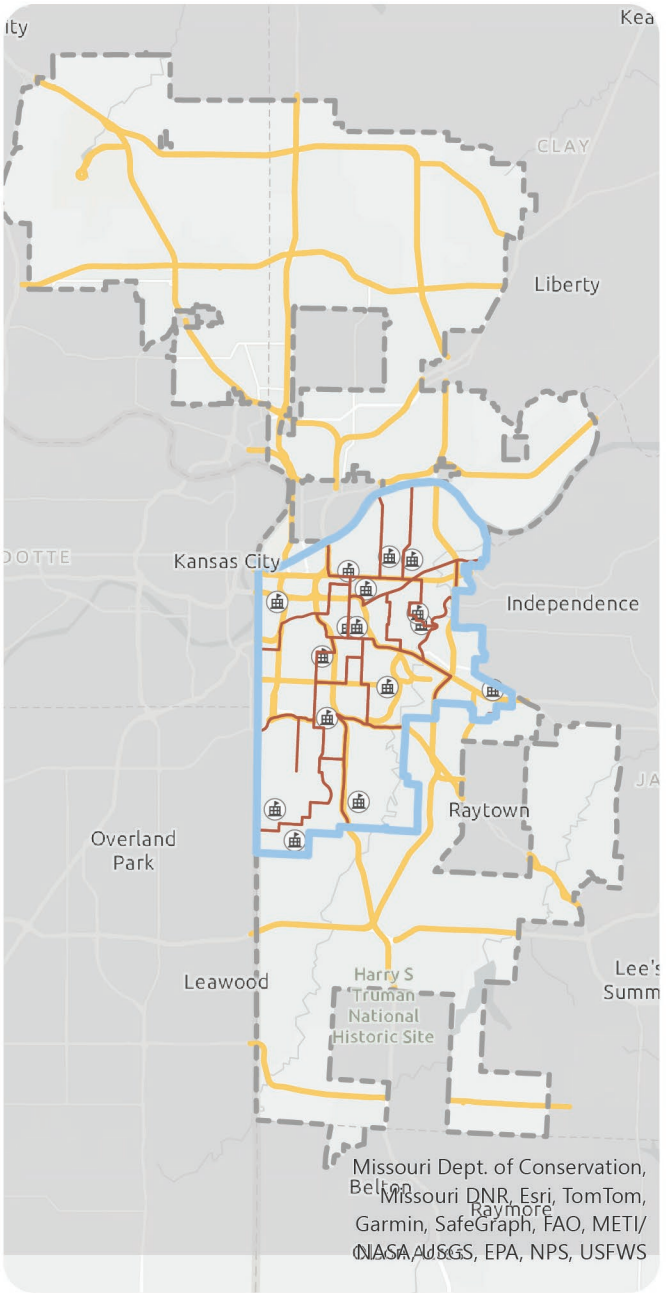
3.2 | Study Area | Kansas City, Missouri

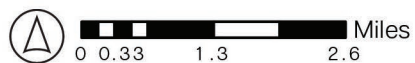
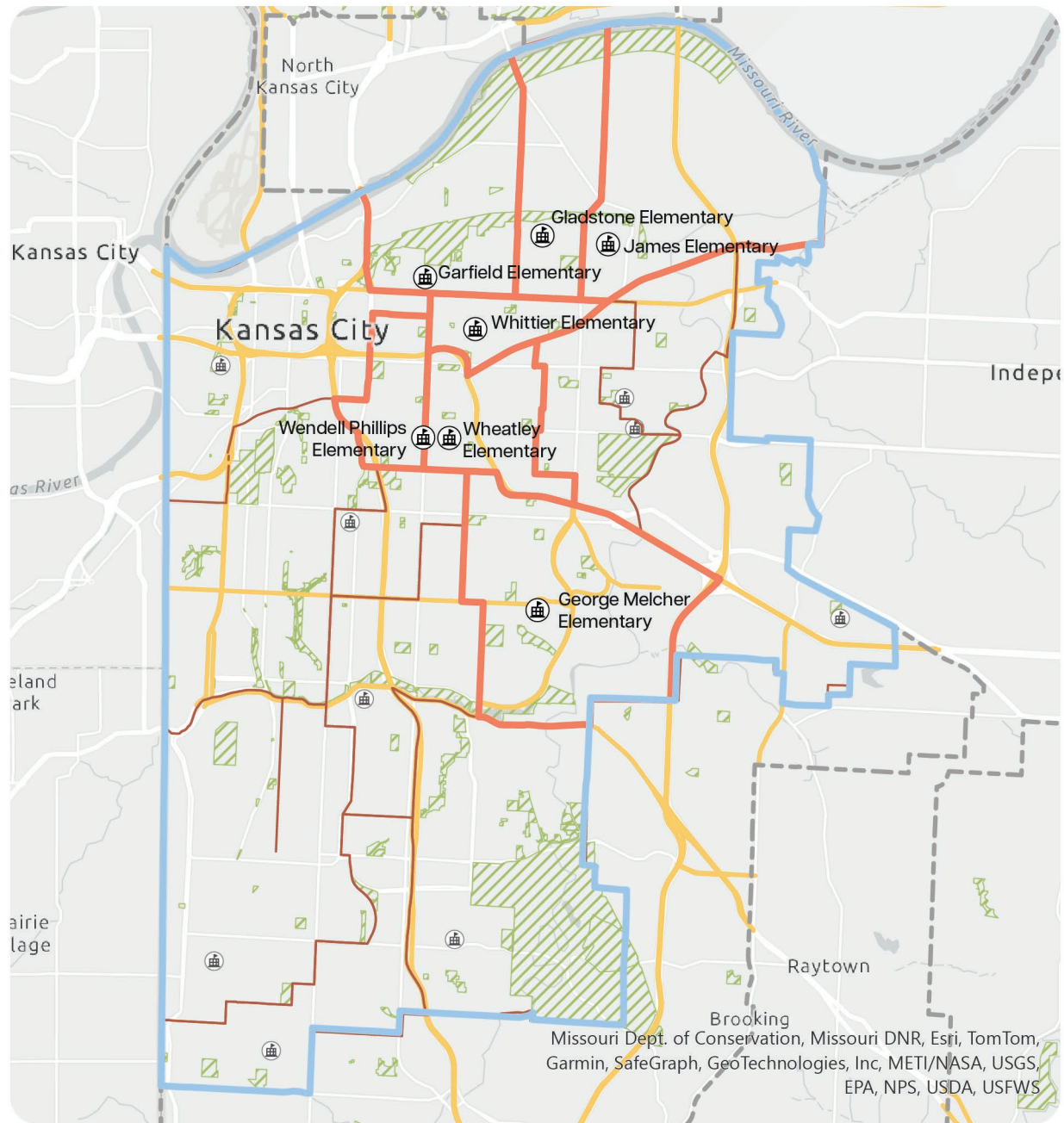
With its historical redlining, which involved school attendance boundaries, Kansas City, Missouri remains one of the most racially segregated cities in the United States (González-Pérez, 2021). Racially minoritized communities still face structural and spatial inequalities that have negatively impacted their quality of life (González-Pérez, 2021). Because of this, Northeast Kansas City serves as a suitable case for exploring children’s access and contact with nature in low-income communities. The study collects data from elementary schools in the Kansas City Public Schools district, see Figures 3.2 and 3.3 for the study area location.

Figure 3.2 Kansas City Public Schools district, Kansas City, Missouri

Figure 3.3 (opposite) Potential study area

-  Study Area Elementary Schools
-  KCPS Elementary Schools
-  Major Roads & Highways
-  Kansas City, MO
-  KCPS District Boundary
-  Study Area (School Attendance Zones)
-  KCPS Attendance Zones
-  Greenspaces





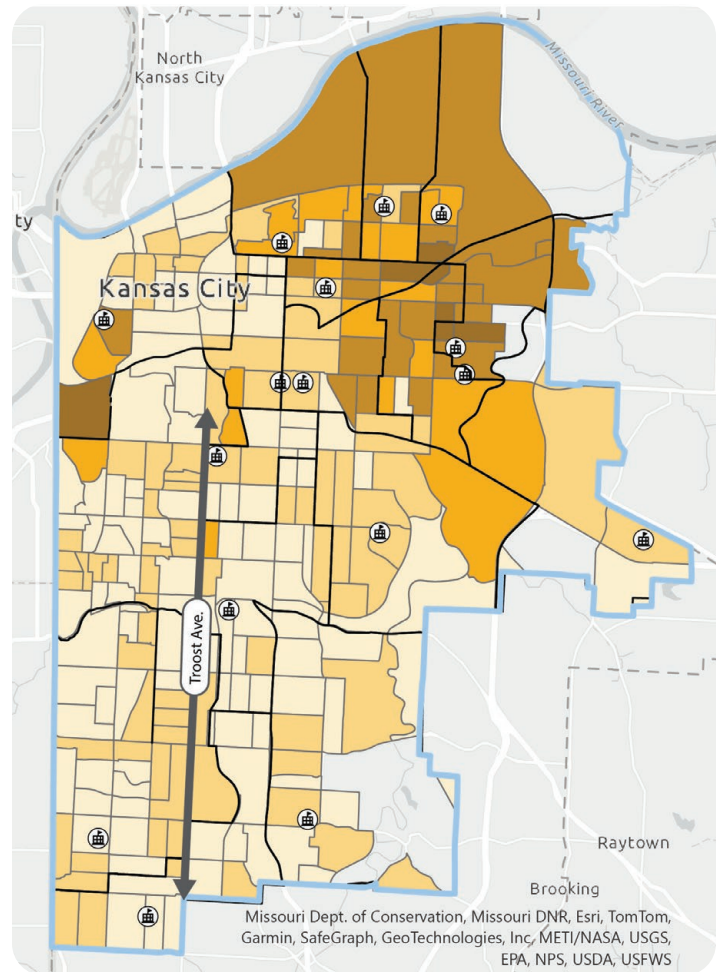
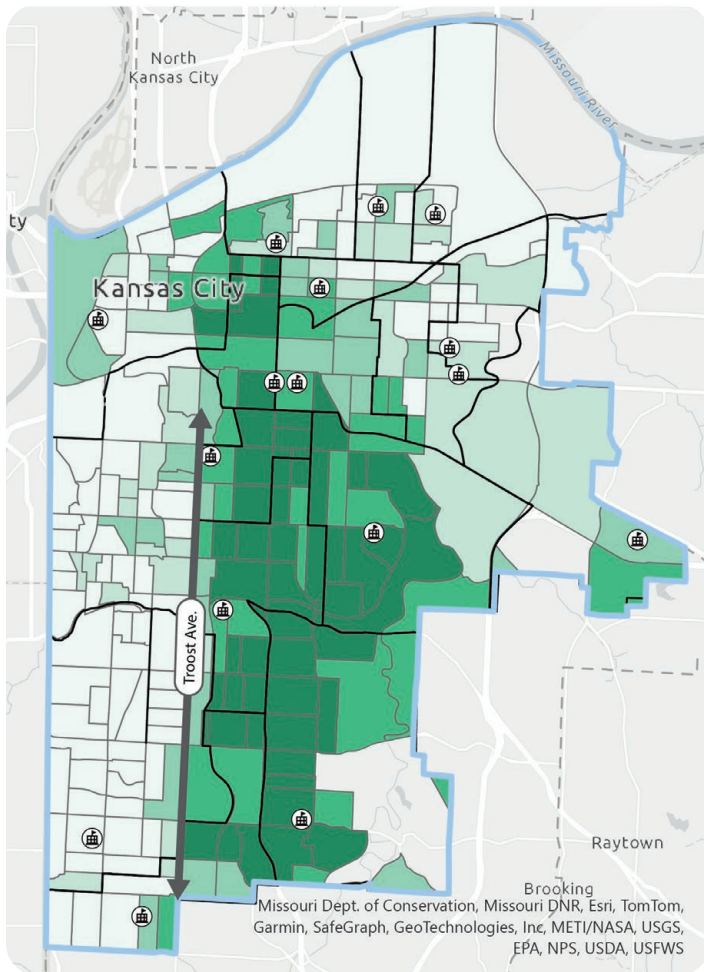
Missouri Dept. of Conservation, Missouri DNR, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, USFWS

Kansas City Public Schools District Context

The following maps, Figures 3.4 and 3.5, show the district-wide demographic distribution. East of the historic racial divide – Troost Avenue – has a high percentage of black or African American and Hispanic populations. There is also a higher percentage of people without a car, lower educational attainment, and more children living with single parents on the east side of Troost. Refer to Figures 3.6 – 3.8.

Figure 3.4 (left) Distribution of black or African American populations in Kansas City, MO

Figure 3.5 (right) Distribution of hispanic populations in Kansas City, MO



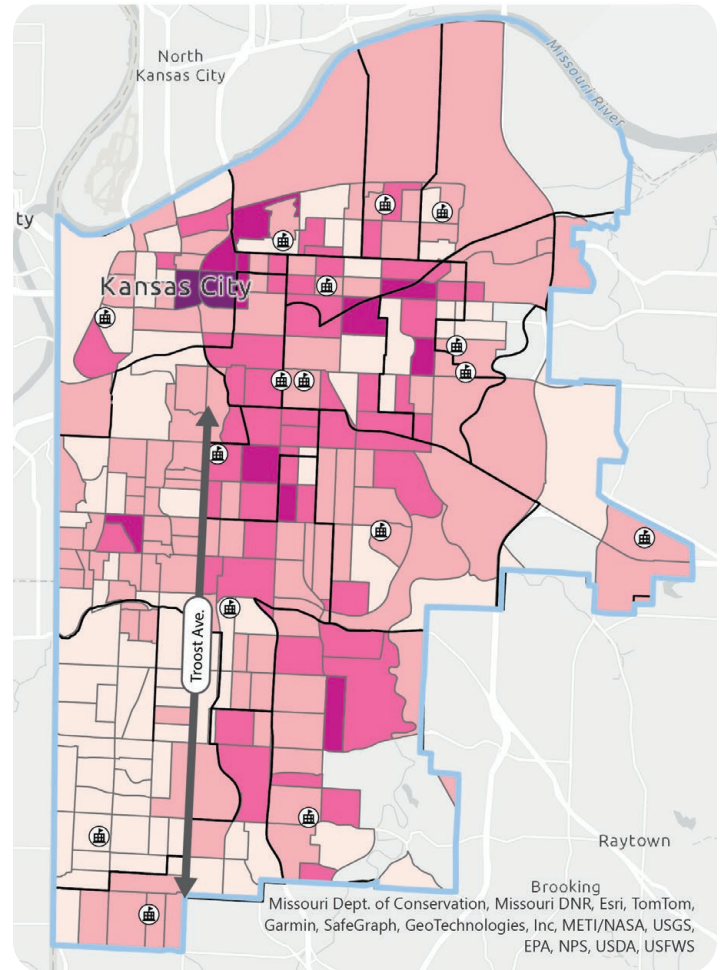
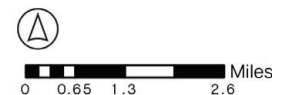
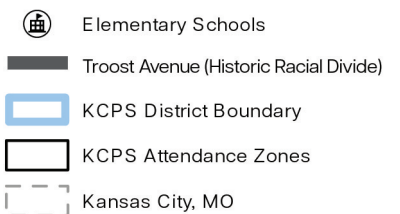
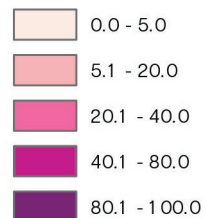


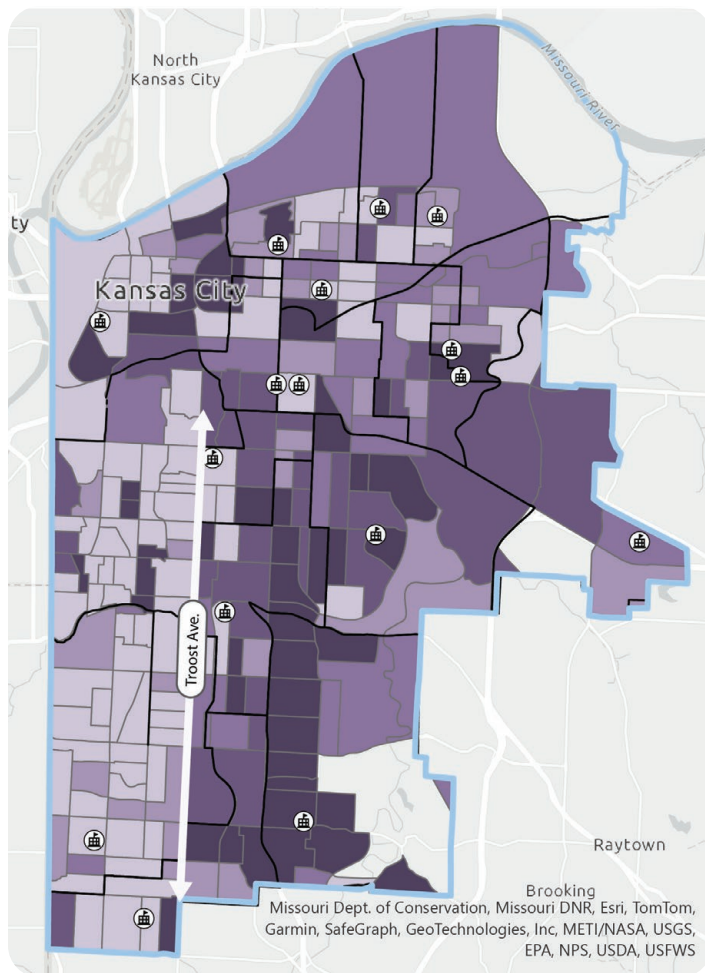
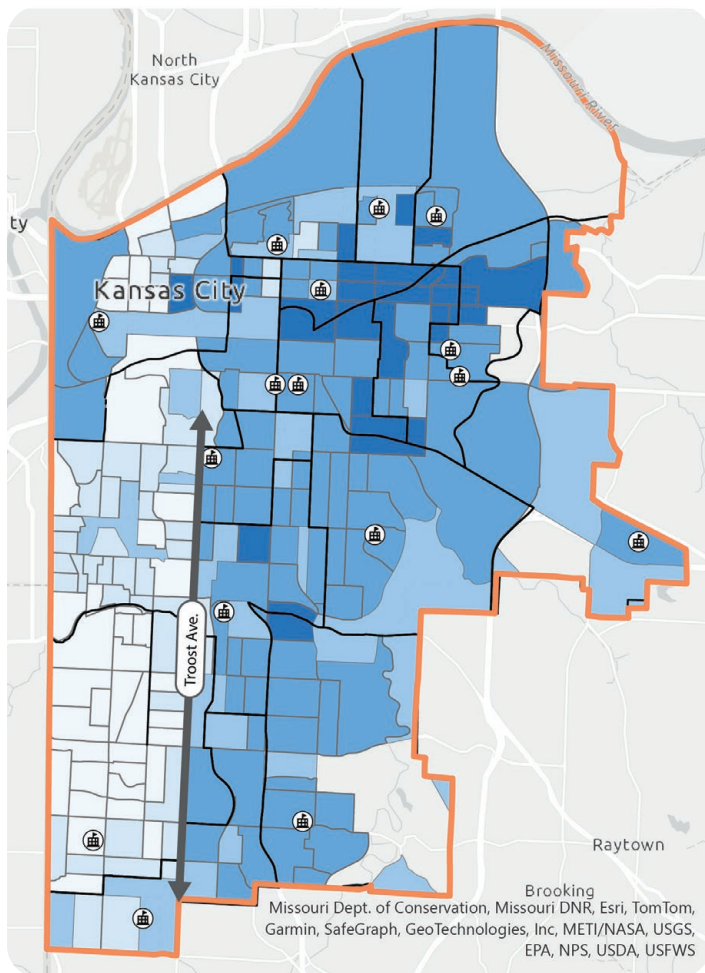
Figure 3.6 (right) Households with no vehicles

Figure 3.7 (opposite, left) Educational attainment

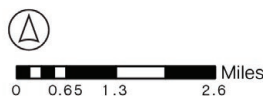
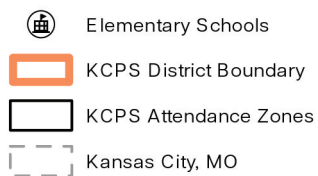
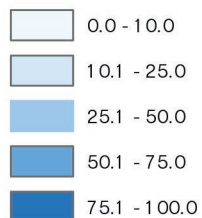
Figure 3.8 (opposite, right) Percent of children in the that live with a single parent

No Vehicles

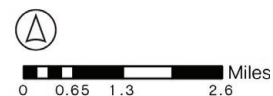
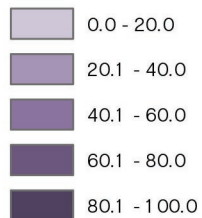




Educational Attainment, Highschool or less (25 Years and Older)



% Children Living with Single Parents



Kansas City, Missouri Parks and Recreation Master Plan Update (2015-2020)

The Kansas City, Missouri Parks and Recreation (KCMOPRD) revised their master plan to address the needs of its residents. Through the help of community members and stakeholders, this master plan identifies priority issues and recommendations to guide the parks and recreation department forward with their mission and vision for Kansas City. Their goal is: "a guide in the delivery of excellent parks, trails, public facilities, activities, programs, and services that will contribute to community prosperity and improve the quality of life for residents and visitors to Kansas City." This document includes their step-by-step process including reviewing related planning documents, a demographic and trends analysis, a stakeholder engagement

and community survey, a parks and facilities assessment, a recreation program assessment, an action plan, and more. KCMOPRD describe the master plan process as gathering where we are, where we want to be, and how to get there (Parks and Recreation Master Plan Update 2015-2020, 2015). For this study, the following is a summary of goals, objectives, recommendations, and strategies that are most relevant to this research.

KCMOPRD Mission Statement

To improve the quality of life, health, and wellness of our community by providing socially equitable, community-driven programming and environmentally sound natural resource management (Strategic Plan, n.d.) – KCMO Parks & Recreation

Community Needs Assessment Summary

This assessment was done through interviews with departmental leaders, focus groups with community representatives, public forums, and online surveys (Parks and Recreation Master Plan Update 2015-2020, 2015). Below are the community needs identified that relate to this research:

Trails and connectivity between parks and the community

Equity in the park system (access and condition)

Priority of underserved areas and populations

Address maintenance issues and perform repairs at existing parks.

Update underutilized parks

Encourage stewardship of parks by the community

Build relationships between the KCMOPRD and the neighborhoods

Engage youth and seniors

Partnerships with school system

More community outreach; increasing access of residents to the programs and facilities of the system.

Safety improvements

Most important benefits provided by KCMOPRD identified by the community:

Enjoyment of open space/nature

Preservation and management of open space/nature

Maintenance of parks

Major reasons that prevent people from using parks, recreation and sports facilities or programs:

Poor maintenance of facilities

Parks are too far from residents

Security

Unfamiliarity of programs offered

KCMOPRD Strategies for Parkland (Selected strategies that relate to this research)

Update existing parks

1 | Update the existing parks classified in ‘poor’ or ‘fair’ as identified in the master plan to support neighborhood revitalization, to generate a higher level of participations, and to enhance community satisfaction with parkland.

New parks & open space in underserved areas

2 | Acquire park and open space property in underserved areas to support the appropriate types of parks that are needed based on the Level of Service and equity goals for neighborhood parks, community parks, regional parks, and greenway-preserves.

Trail connectivity

3 | Strategically plan trail development throughout the city to promote connectivity and public health.

Protect nature

4 | Acquire and cooperatively protect sensitive natural areas within the city to preserve natural communities in perpetuity.

KCPS partnership

5 | Coordinate with Kansas City Public Schools and other school districts within the city limits to support school parks and recreation facilities.

Community gardens

6 | Enhance the community gardens program working with schools, churches, clinics, nonprofits, and other partner organizations (Parks and Recreation Master Plan Update 2015-2020, 2015).

Community vision for parkland

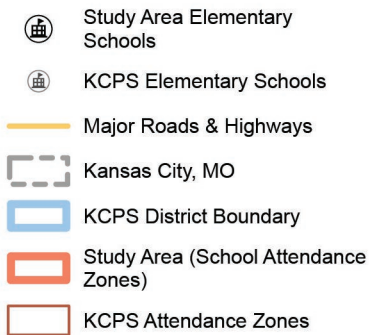
“ENSURE PARKS ARE A SOURCE OF CIVIC PRIDE BY UTILIZING QUALITY DESIGN PRINCIPLES AND MAINTENANCE STANDARDS THAT ALLOW THEM TO BE MANAGED IN THE MOST PRODUCTIVE, EQUITABLE, AND EFFICIENT MANNER.”

- KCMO Parks and Recreation

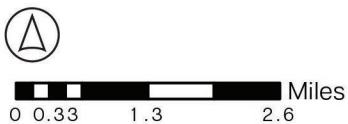
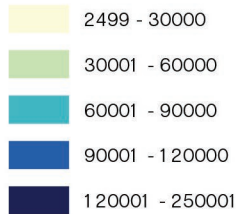
3.3 | Spatial Analysis | Socio-Demographics

To select potential elementary schools, spatial analysis of socio-demographics, at the block group level, was used to initially identify four school attendance zones within the KCPS district boundaries. The two socio-demographic factors used to select potential schools were median household income and percent of population between 5 and 9 years old as seen in Figures 3.9 and 3.10. Later, during school recruitment, in Section 3.4, it was decided to expand the study area. Overlaying the two socio-demographic factors of age and income, identified seven total potential schools: Garfield Elementary School, Whittier Elementary School, Gladstone Elementary School, James Elementary School, Wheatley Elementary, Wendell Phillips Elementary, and George Melcher Elementary.

Median household income was selected as a socio-demographic factor because, as found in the literature, low-income communities experience many inequities that impact their access to greenspace. The selected school’s attendance zones primarily consist of median household incomes of \$2,499 to \$30,000 and \$30,001 to \$60,000.



Median Household Income



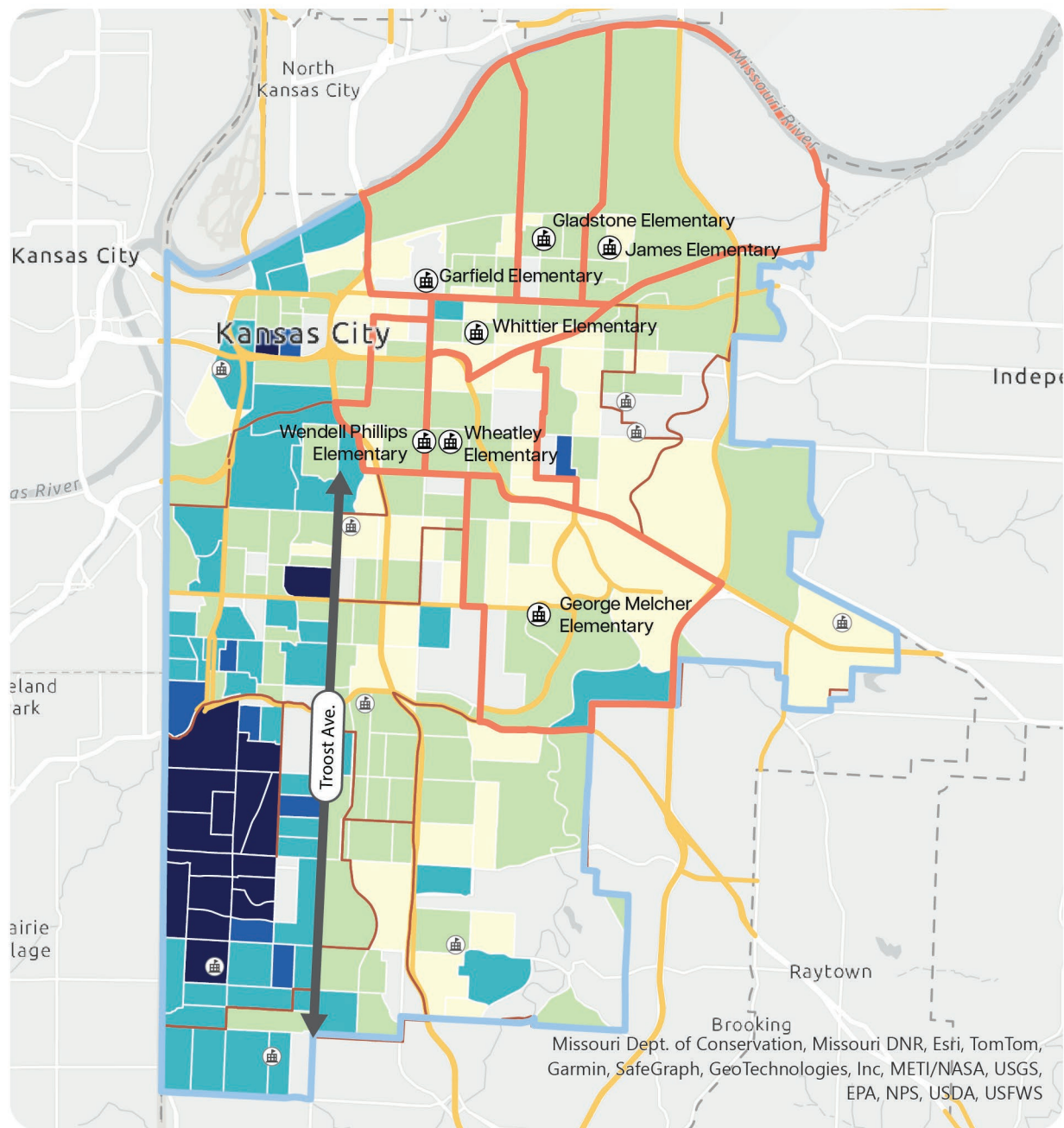
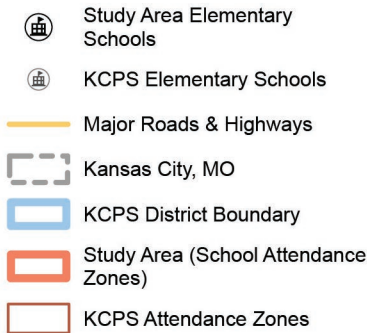
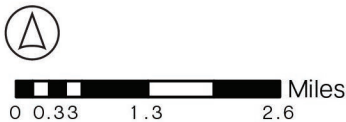
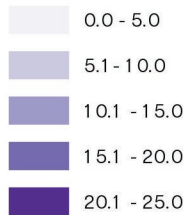


Figure 3.9 Median household income in KCPS district boundaries

The percentage of the population between 5 and 9 years old was selected as a factor to identify areas with the most elementary school age children. The elementary schools in KCPS include grades up to grade 6, which ranges from children ages 11 to 12; however, the data for age ranges were limited to what is provided in the ACS 2021 (5-Year Estimates). It was decided that the 5- to 9-year-old range was sufficient because it captures most of the elementary school-age population.



Age 5 to 9 (%)



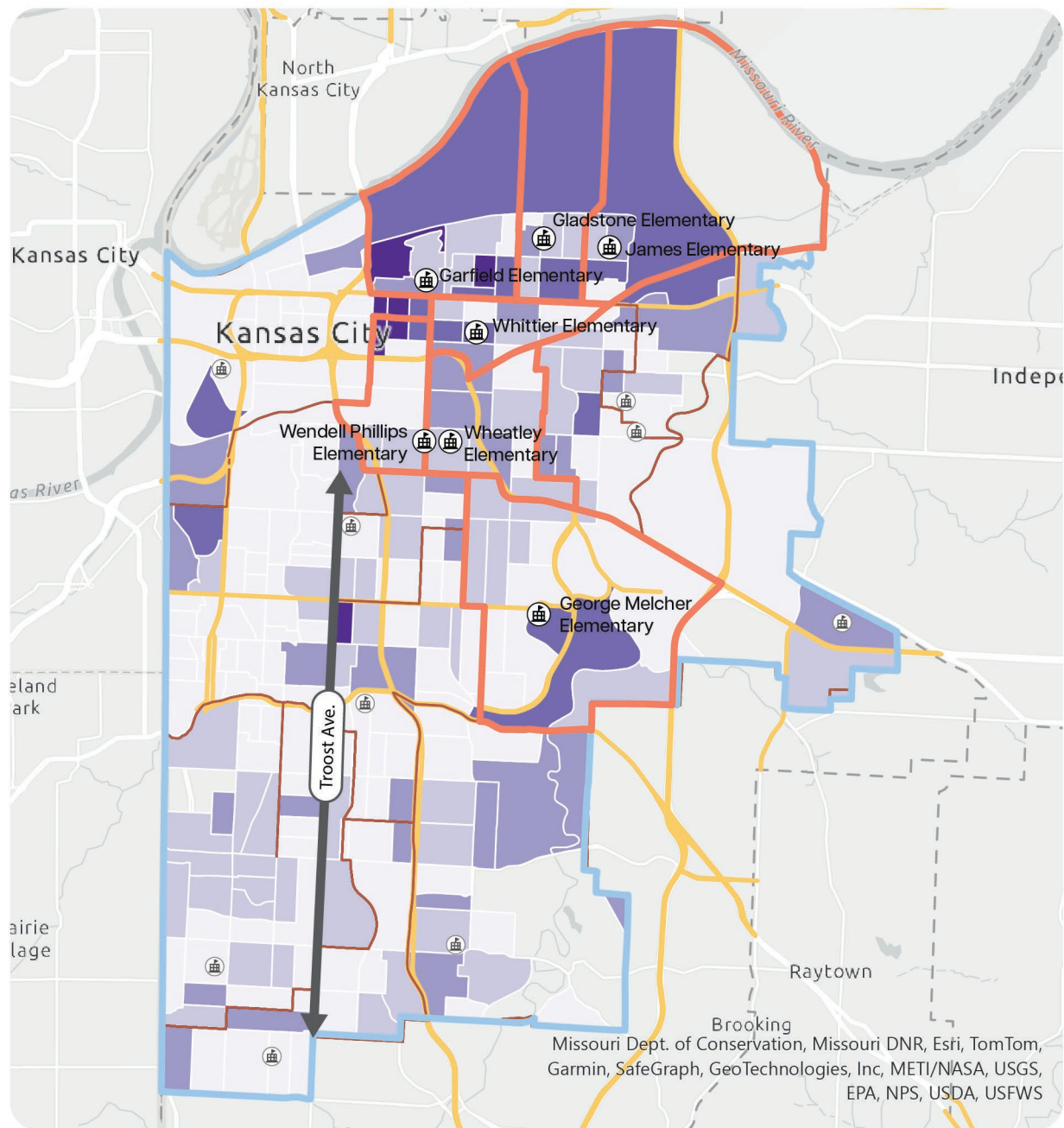


Figure 3.10 Percent of population between 5 and 10 in KCPS district boundaries

3.4 | School Participation

Before conducting spatial analysis of greenspace availability in the school attendance boundaries, the potential schools were contacted via email and phone call to be invited to participate in the study. The principal, vice principal, and the Family and Community Engagement liaisons (FaCE) were contacted and provided with the following information about the study:

Research topic: Children’s contact with nature

Research method: Online survey

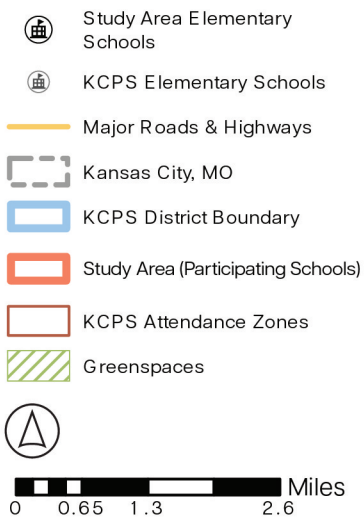
Research participants: Teachers and parents of children/ students in K-6th grade

Goal of research: Identify potential challenges and opportunities for children’s contact with nature.

Outcome of research: Survey responses will be used to inform planning and design recommendations to create more opportunities for children to be in contact with nature.

During this process, it was decided to expand the study area to include three more schools’ attendance zones who displayed similar socio-demographic characteristics. This was done to increase the potential of collecting data from multiple schools. However, only one school decided to participate. Some schools were unable to be reached and the others declined for unknown reasons or stated they needed district guidance.

Gladstone Elementary School was the only school that accepted to participate, reference Figure 3.11 to see Gladstone’s location, and further communications gathered their school’s demographic information (i.e., race/ ethnicities, gender, enrollment numbers, and languages) as shown in Figures 3.12 to 3.15. It was also requested by school administration that the survey be provided in English, Spanish, Swahili, and Burmese, as these were the major languages spoken by the students and their parents. In addition, survey distribution methods were changed from handing out hardcopies to using online surveys because of the school’s need to translate for communications with families, see Section 3.6 for more information on the social data collection tool.



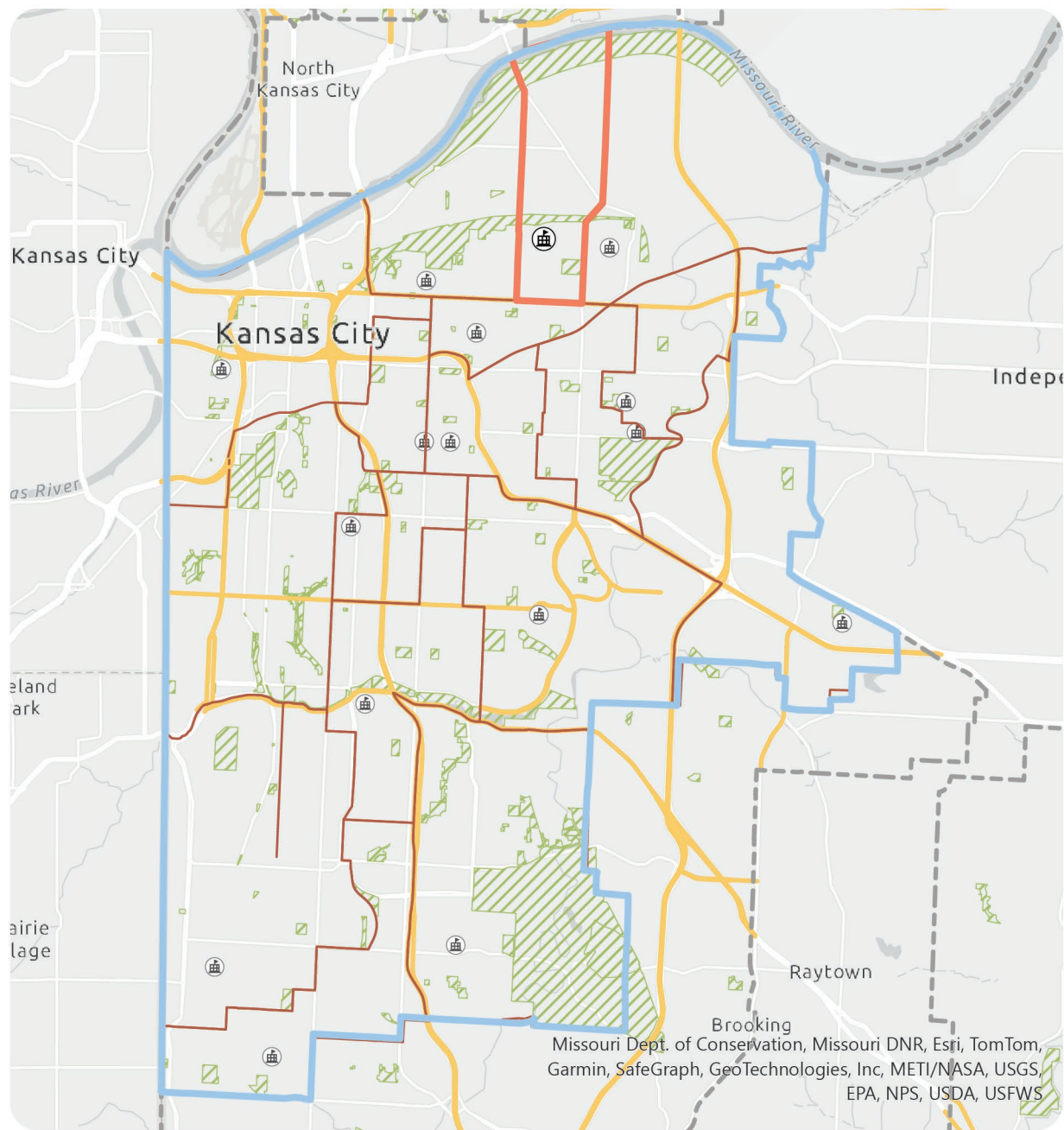


Figure 3.11 Gladstone's attendance zone

Demographic Information | Gladstone Elementary

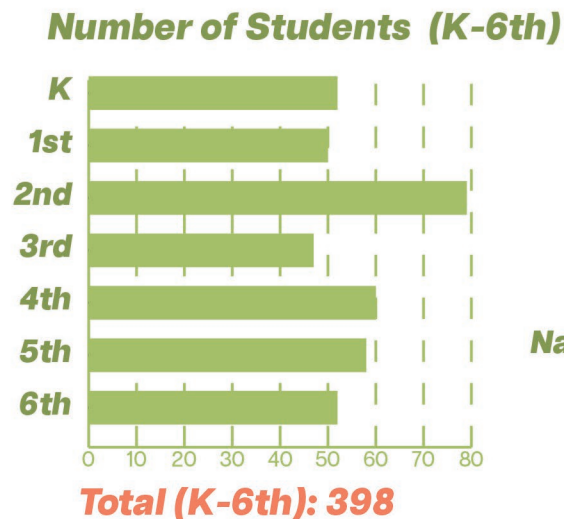


Figure 3.12 Number of students per grade

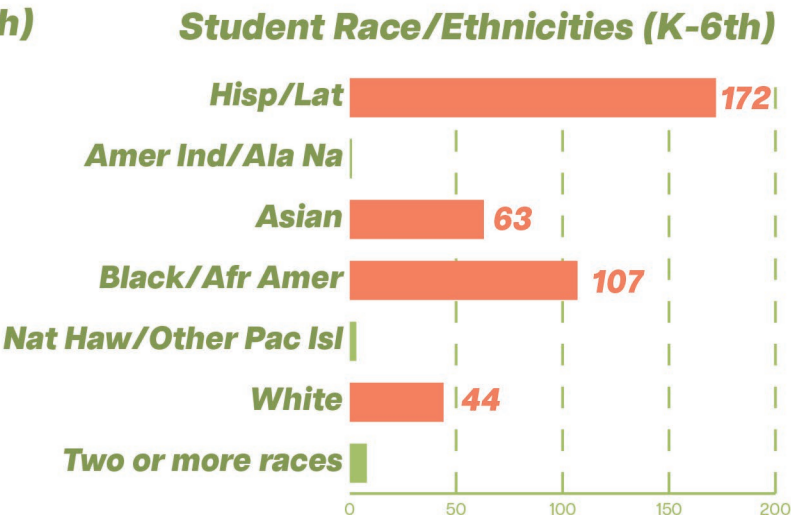


Figure 3.13 Student race/ethnicities

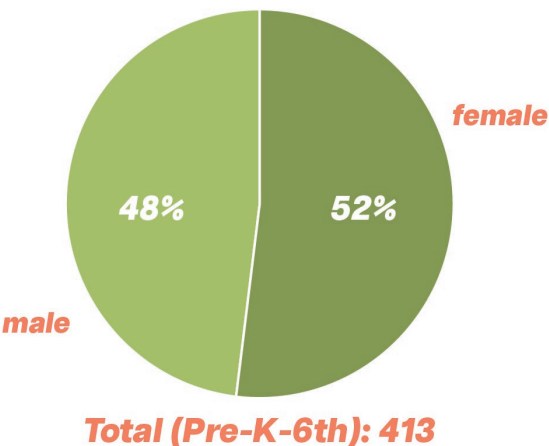


Figure 3.14 Student gender ratio

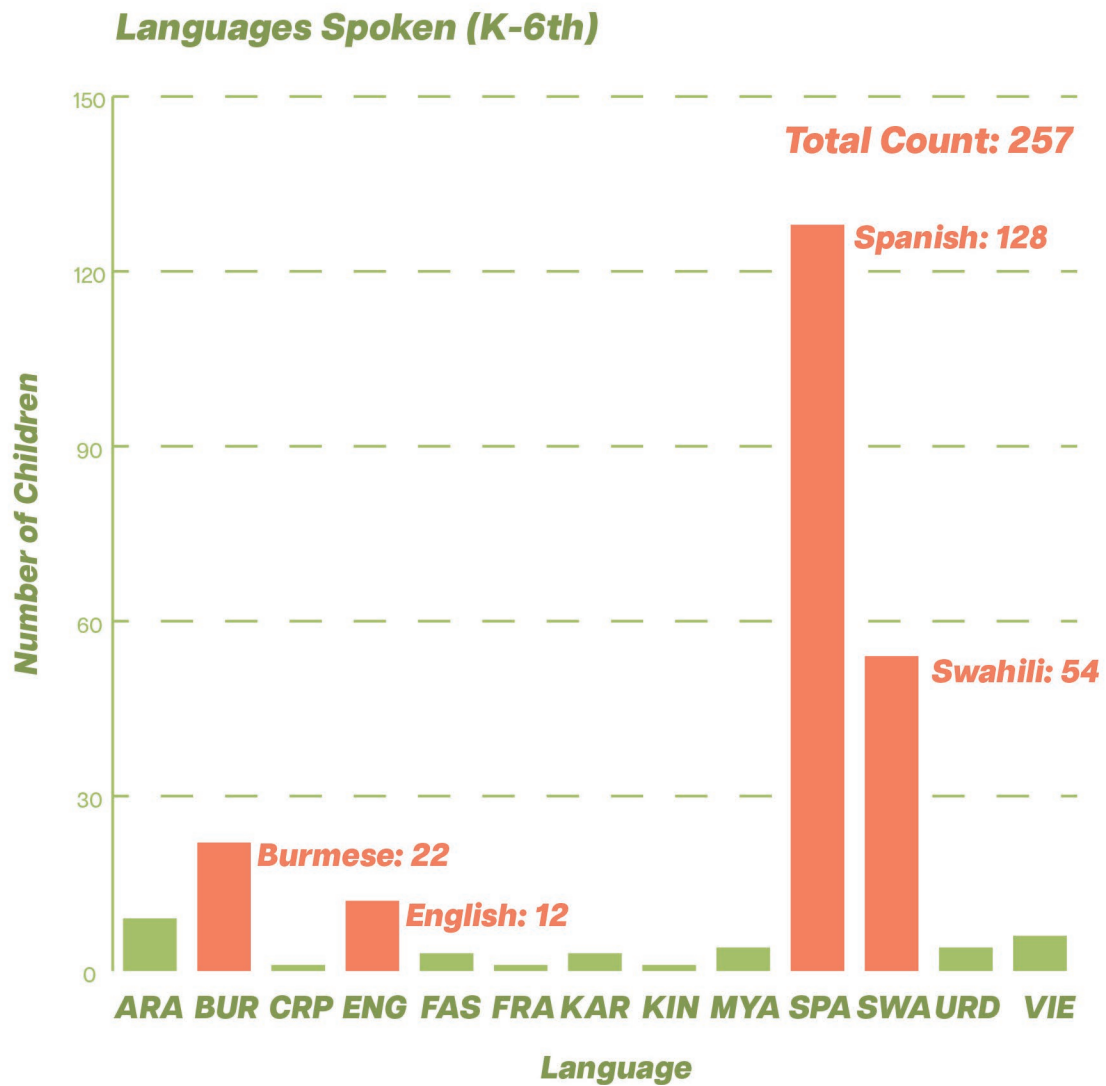


Figure 3.15 Languages spoken by students

3.5 | Spatial Analysis | Greenspace Availability

After confirmation from the school to participate in the study, a spatial analysis of greenspace availability within the school's attendance zone gathered the types of greenspaces that were available to these communities in their neighborhoods and nearby the schools. This required a combination of mapping greenspace locations and sizes (acreage) through ArcGIS, classifying the greenspaces into types by remote site observations of physical features and space functions using Google Street View imagery, and reviewing greenspace information from the Kansas City Parks and Recreation Department.

KCMO Parks and Recreation Park and Facility Assessment

KCMO Parks and Recreation's park and facility assessment in their Master Plan (2015-2020) included assessments of existing conditions, size, park age, strengths, weaknesses, opportunities, and maintenance issues. Each park was rated for its physical condition (i.e., Excellent, Good, Fair, & Poor) and categorized into a park type. These types include mini parks, neighborhood parks, community parks, regional parks, preserves/greenway parks, special use parks, and undeveloped land (Parks and Recreation Master Plan Update 2015-2020, 2015).

In the following greenspace availability analysis, the greenspaces were categorized into types decided by the researcher's observations of their features/amenities, and function. Figure 3.16 shows what the greenspace availability includes. The typologies that were created only account for greenspaces found within or directly on the initially selected school attendance zones which include athletic parks, neighborhood parks, nature parks, and gardens, refer to Figures 3.17 through 3.20 for more information on the greenspace typologies. As seen in Figure 3.21 and 3.22, a quarter mile and half mile radius were drawn around the schools to show what greenspaces were nearby (i.e., 5-10 minute and 10-20 minute walk). In addition, the KCMO Parks and Recreation condition ratings from the 2015-2020 Master Plan was included to provide a sense of the quality/condition of the greenspaces in the study area.

Greenspace Availability Components

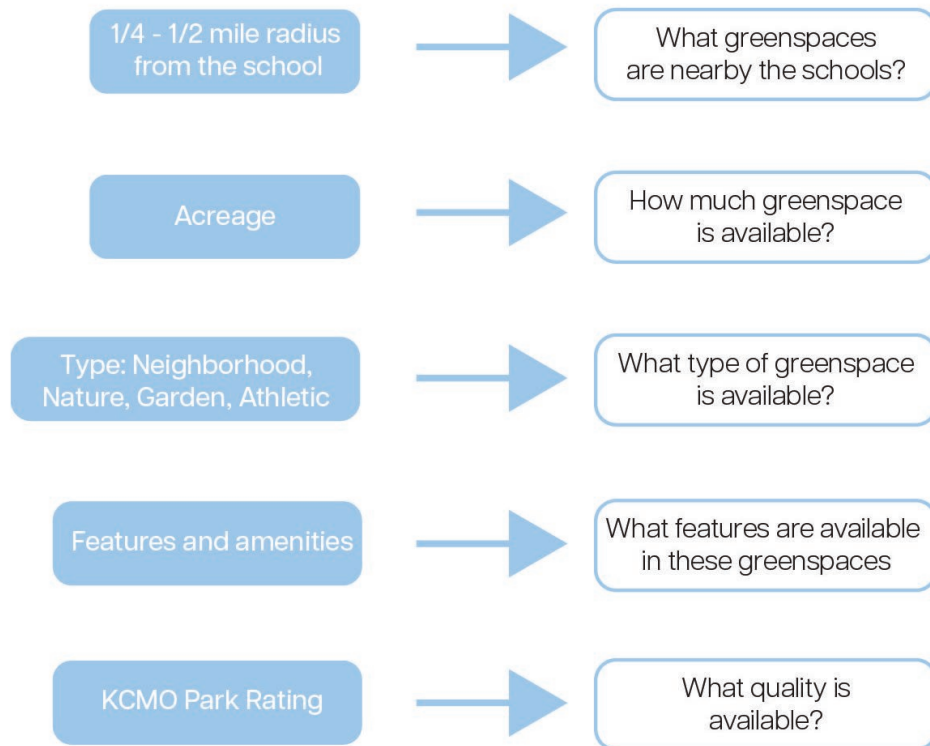


Figure 3.16 Greenspace availability analysis components



Figure 3.17 Neighborhood park type (Google, n.d.)

Neighborhood Park Criteria

The neighborhood park is a greenspace that is designed within residential areas for residents' ease of access to recreational space. It provides spaces for field games, court games, playing, walking, sitting, and picnicking. Vegetation is usually mown lawn and scattered tree cover.

Key Features:

- | | |
|--------------------|---------------------------|
| Playground | Water fountains |
| Athletic courts | Community pool/splash pad |
| Picnic shelters | Scattered tree cover |
| Paved walking path | Maintained landscape |
| Open fields | Benches |
| | Adjacent to neighborhood |



Figure 3.18 Athletic park type (Google, n.d.)

Athletic Park Criteria

Although a neighborhood park may contain athletic courts or fields, athletic parks are primarily dedicated to athletics and have more infrastructure (bleachers, stadium lights, more parking) for games to be hosted there. The landscaping is generally minimal to leave room for athletic needs.

Key Features:

- | | |
|-----------------------|-----------------|
| Turf fields | Athletic courts |
| Sports infrastructure | Track |
| Low tree cover | |
| Maintained landscape | |



Figure 3.19 Nature park type (Google, n.d.)

Nature Park Criteria

The nature park is a greenspace where there is high plant diversity, minimal manicuring to the landscape, and provides recreational activity in nature (nature trails for hiking or biking). They may contain similar features to neighborhood parks (picnic shelters, benches, playgrounds, etc) as well.

Key Features:

*Densely wooded area
Prairie/meadows
Body of water
Nature trails
Minimal landscape
maintenance*



Figure 3.20 Garden type (Google, n.d.)

Garden Criteria

Gardens are greenspaces that are primarily used for producing crops or specialized gardens (i.e., pollinator or rain gardens) and can be maintained by the community.

Key Features:

*Vegetable gardens
Pollinator gardens
Garden beds
Gardening equipment &
storage*

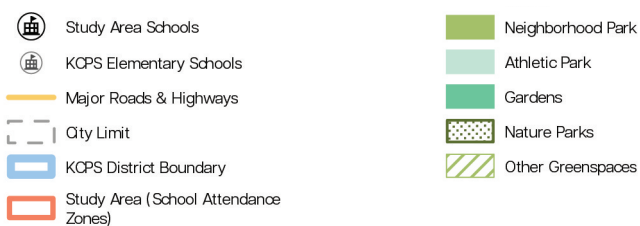
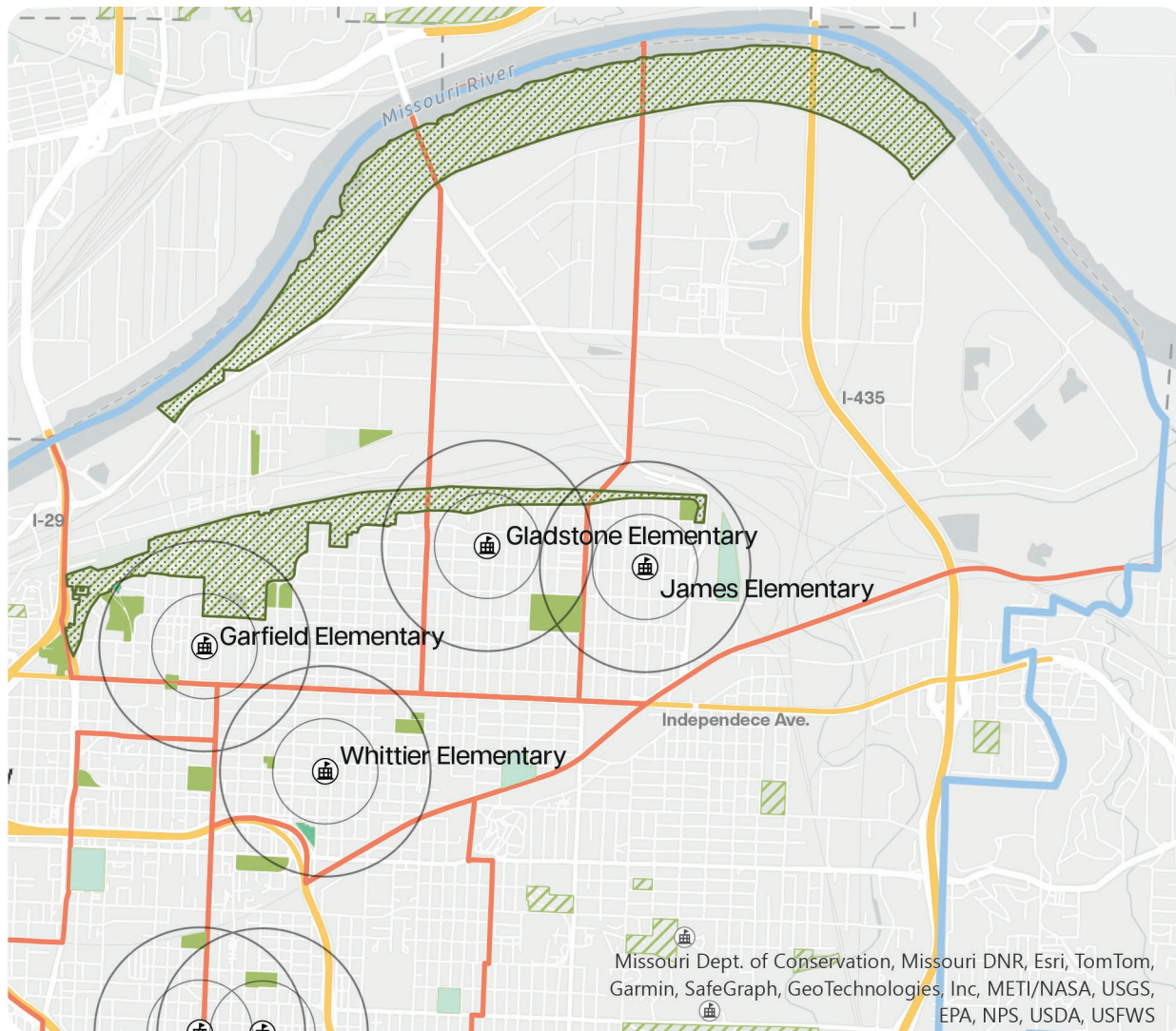


Figure 3.21 Greenspace types in Northeast elementary schools' attendance zones

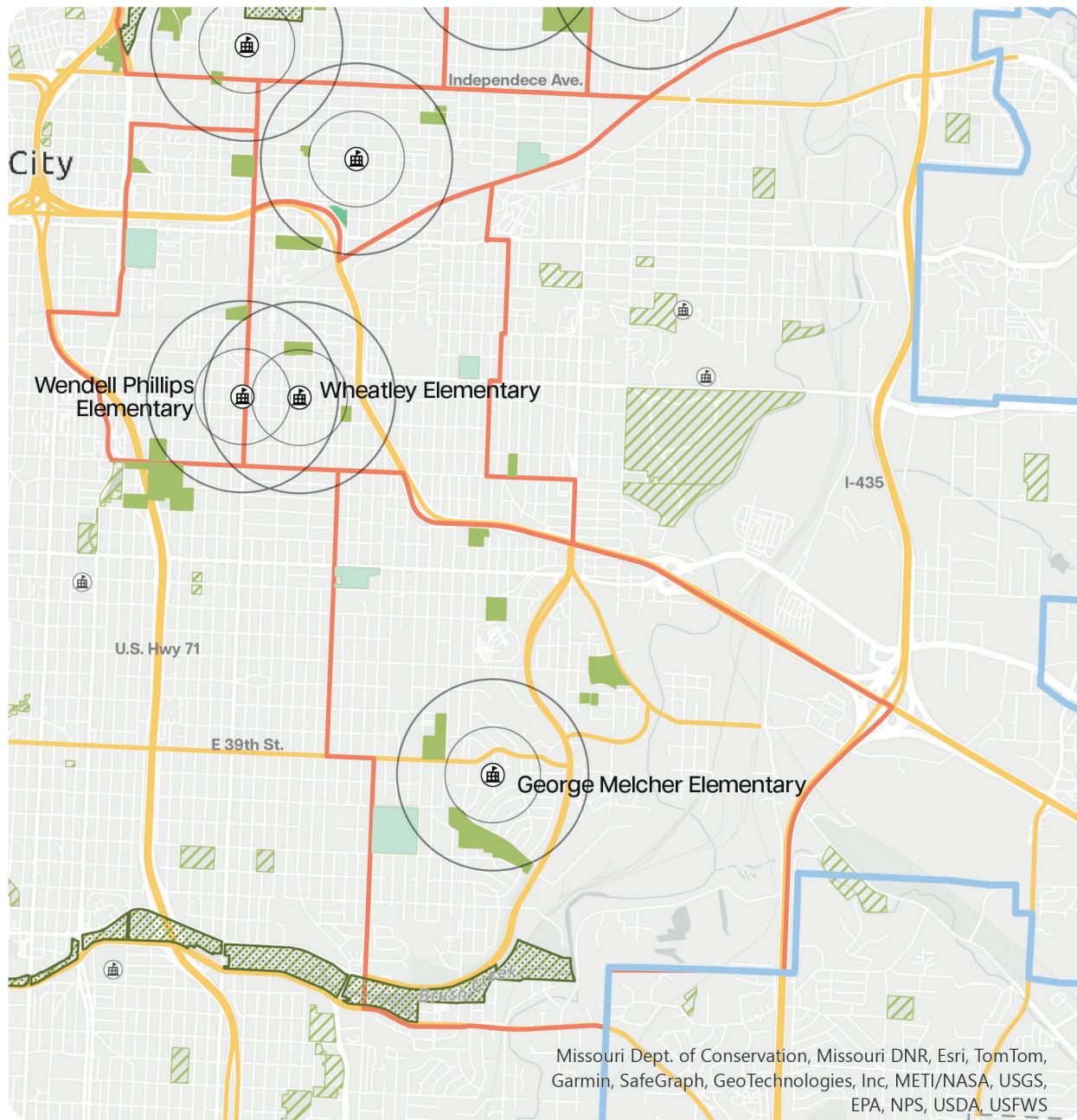


Figure 3.22 Greenspace types in Central elementary schools' attendance zones

Gladstone Elementary School | Greenspace Availability

Gladstone Elementary School and the surrounding neighborhoods have two greenspaces in the area, including a 300-acre nature park (Kessler Park) within a ¼ mile, or 5-10 minute walk, and a 26-acre neighborhood park (Budd Park) around a ½ mile, or 10-20 minute walk. See Figure 3.23. Both parks are rated by KCMOPRD as ‘fair’ in the 2015-2020 Master Plan, meaning, the park is in a state of decline, with less frequent maintenance, and in need of repairs and renovation (Parks and Recreation Master Plan Update 2015-2020, 2015).

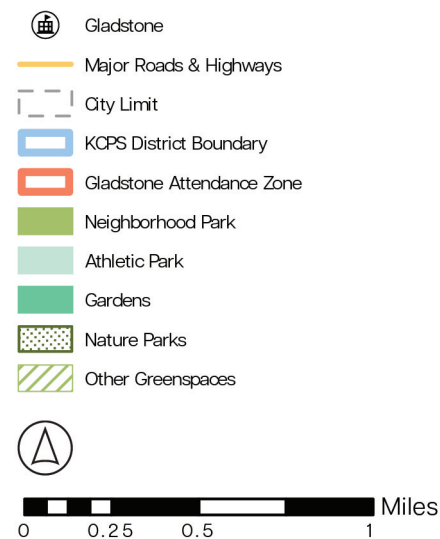




Figure 3.23 Greenspaces nearby Gladstone Elementary School

Gladstone Elementary School | Budd Park Analysis

As seen in Figures 3.24 through 3.31, Budd Park is a large neighborhood park that is surrounded by residential areas and some small businesses. This park provides paved walking paths, a couple playground areas, basketball hoops, a baseball field, soccer field, and tennis courts. There is a large, central pavilion, along with smaller shelters near the playgrounds. This park also includes a community pool and pool house. Vegetation is limited to mown grass and trees. Tree cover is primarily clustered on the perimeter of the park, with some scattered trees throughout.



Figure 3.24 Budd Park playground (Google, n.d.)

1 | Budd Park

Acres: 26.39
Distance from school: 1/4 - 1/2 mile
Type: Neighborhood Park
Overall Park Rating: Fair
(KCMO Parks & Rec)

Key Features:

- P - Playground
- A - Athletic courts/fields
- PS - Picnic shelters
- OF - Open field
- CP - Community Pool
- R - Restrooms

- Neighborhood Park
- Gladstone Attendance Zone
- Scattered Tree Cover
- Paved walking path



Figure 3.25 Budd Park greenspace availability analysis



Figure 3.26 Crossing across St. John Avenue to Budd Park.



Figure 3.27 Mown grass area with large trees



Figure 3.28 Neighborhood context



Figure 3.29 Community pool



Figure 3.30 Walking path and pavilion



Figure 3.31 Tennis courts



0 0.15 0.3 0.6 Miles



Elementary Schools



Major Roads & Highways



Nature Parks



Gladstone Attendance Zone

Figure 3.32 Kessler Park Analysis



Gladstone Elementary School | Kessler Park Analysis

The portion of Kessler Park within the ¼ mile radius of Gladstone Elementary School has a paved walking path along the road, a shared path for cars and pedestrians, and hiking and mountain biking trails (Indian Mound Trail) situated within the dense wooded areas. There are no other amenities available in this area. However, in other parts of the park there are additional trails, a lake, several historic landmarks, and a disc golf course. See Figures 3.32 through 3.38 for the amenities that are available across the park and nearby the school.

2 | Kessler Park

Acres: 303.51

Distance: 1/4 mile

Type: Nature Park

Overall Park Rating: Fair
(KCMO Parks & Rec)

Key Features:

- P - Pedestrian path
- B - Marked bike lane
- M - Mountain bike trail
- D - Shared access drive (bikes, pedestrian & car)
- L - Historic landmark
- W - Body of water
- G - Disc golf course
- O - Scenic overlook



Figure 3.33 Sidewalk path from Gladstone Elementary to Kessler Park



Figure 3.34 Gated entry to Kessler Park



Figure 3.35 Shared pedestrian, bike, and car drive



Figure 3.36 North Terrace Park Lake on west side of park



Figure 3.37 Shared pedestrian, bike, and car drive



Figure 3.38 Paved pedestrian path along the Gladstone Blvd.

3.6 | Social Data

Photo surveys were used to collect data on three factors of perceived access to greenspace and contact with nature including attitudes, awareness, and barriers. Figures 3.39 through 3.41 include the survey content. Attitudes towards children's contact with nature include the importance of contact with nature, time that should be spent in nature, and importance of outdoor learning in schools. Awareness includes knowledge about mental, behavioral, and physical health benefits of contact with nature. Perceived barriers that may negatively influence children's time and quality of experience in greenspace include walkability and safety. The survey also gathered parent and teacher preferences for different greenspace settings to take their children to and outdoor activities they want their children to do. Both parents and teachers were asked about how many of their children/students have neurodiversity/special needs or physical disabilities. In addition, parent demographic information (i.e., race/ethnicity, household income, and car ownership) was collected to address the potential living situations that may contribute to children's access and contact with nature. Surveys for schools gathered more information on teachers' preferences for outdoor or nature-based learning and challenges in the school system. Teachers were also asked to provide their demographic information. Refer to Appendix A for the full version of the surveys.

Target Population

The target population for this study includes the parents and teachers of children/students in kindergarten through sixth grade at Gladstone Elementary School. This population was chosen based on their school attendance area's socio-demographic characteristics (i.e., low household income and high percent of children between ages of 5 and 9) and agreement to participate in the study. Surveying parents and teachers in this school attendance zone helped inform recommendations to address the issues they face within their neighborhood and school as well as their preferences.

Sample Size

A sample size of 31 parents and 20 teachers participated in this study. These numbers were limited due to the time constraints for recruitment and data collection. Although results may not be generalizable due to the small sample size, findings still provide valuable information for informing recommendations to improve children's contact with nature in this area.

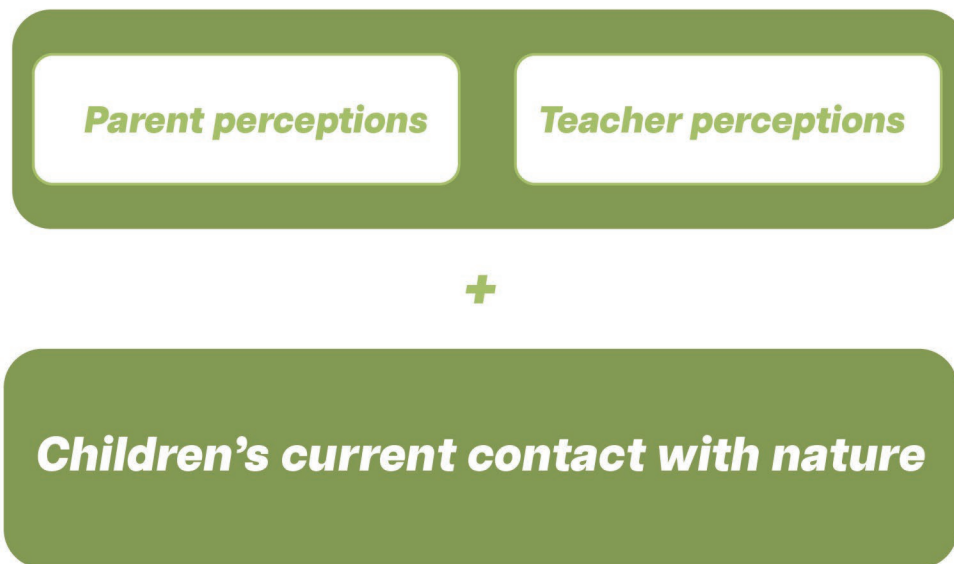


Figure 3.39 Survey content and major goals from data collection.

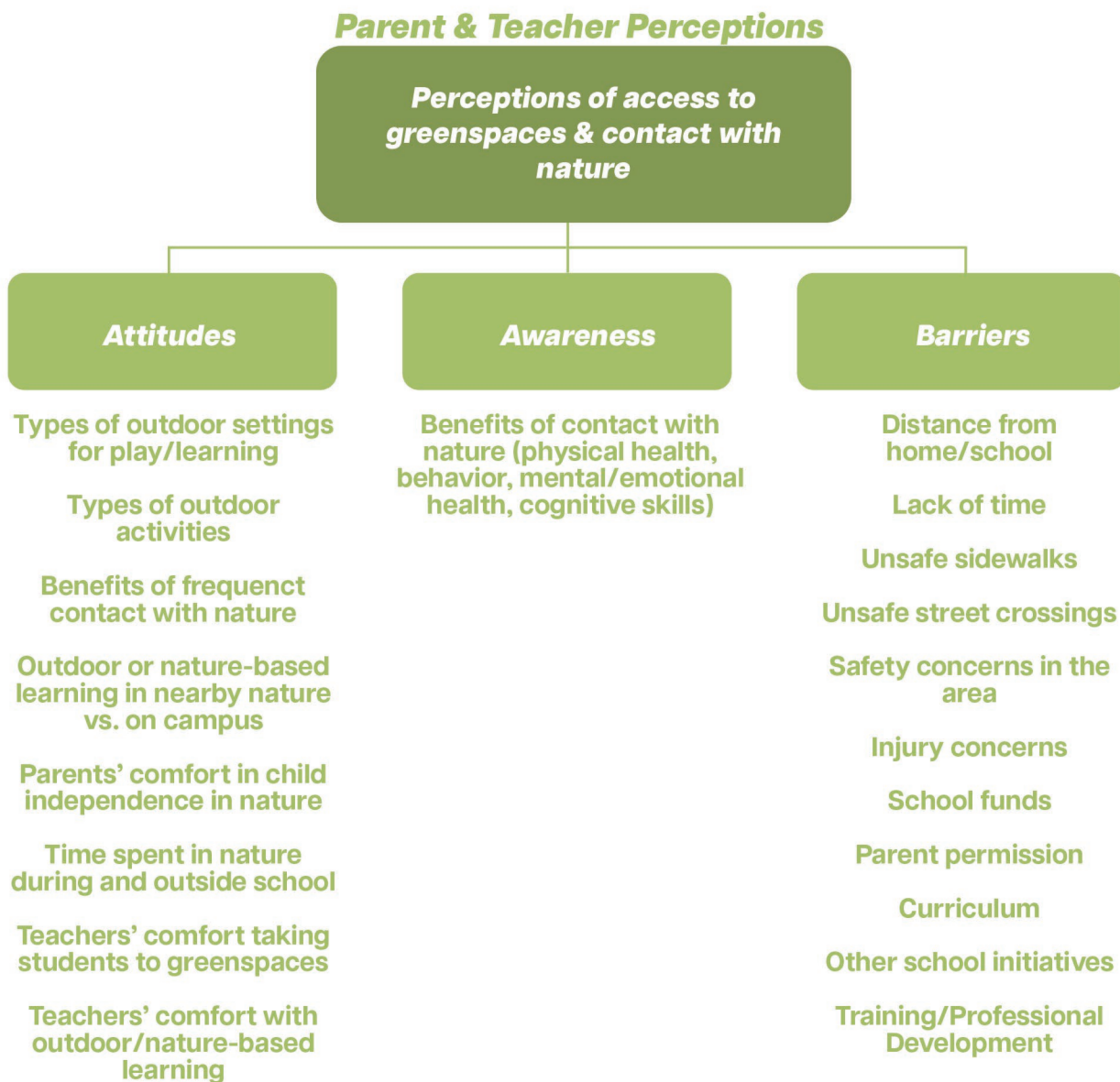


Figure 3.40 Parent and teacher perceptions

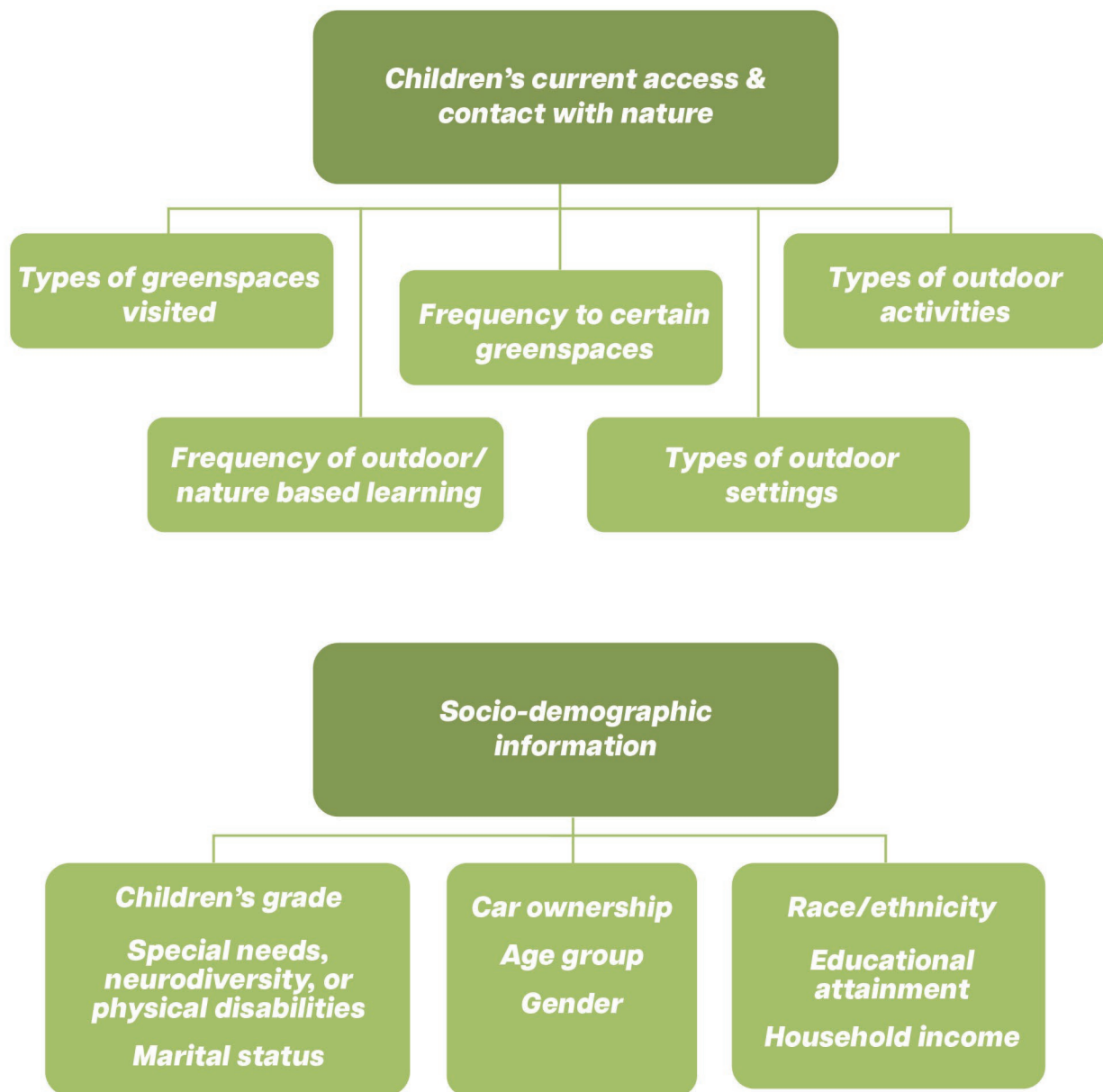


Figure 3.41 Children's current contact with nature and socio demographic variables.

Survey Format & Distribution

The survey was provided online for both parents and teachers through Qualtrics, refer to Figure 3.42. For parents, surveys were translated in English, Spanish, Swahili, and Burmese, as requested by the schools. The online surveys were first translated with the translation function in Qualtrics (it uses Google Translate) and were checked by the school's internal translation service. Multi-language surveys were intended to ensure higher inclusivity in data collection and remove language as a limiting factor.

Further communications with the participating schools discussed their role in the study and methods for distributing surveys to teachers and parents. Parents were recruited through an online flyer, see Appendix A, that was shared by the school administration through the schools' internal communication service called, Talking Points. The flyer includes an introduction to the study, instructions for the survey, and a link to the online survey. Teachers received an email sent out by the school administration with the link to fill out their survey online. Surveys were sent out to Gladstone on January 3rd and teachers and parents were given until January 23rd to fill out the survey, see Appendix D for the project schedule. To increase survey responses, reminder messages were sent out by the school administration and the timeframe for collecting data had been extended.

Qualtrics Survey Design

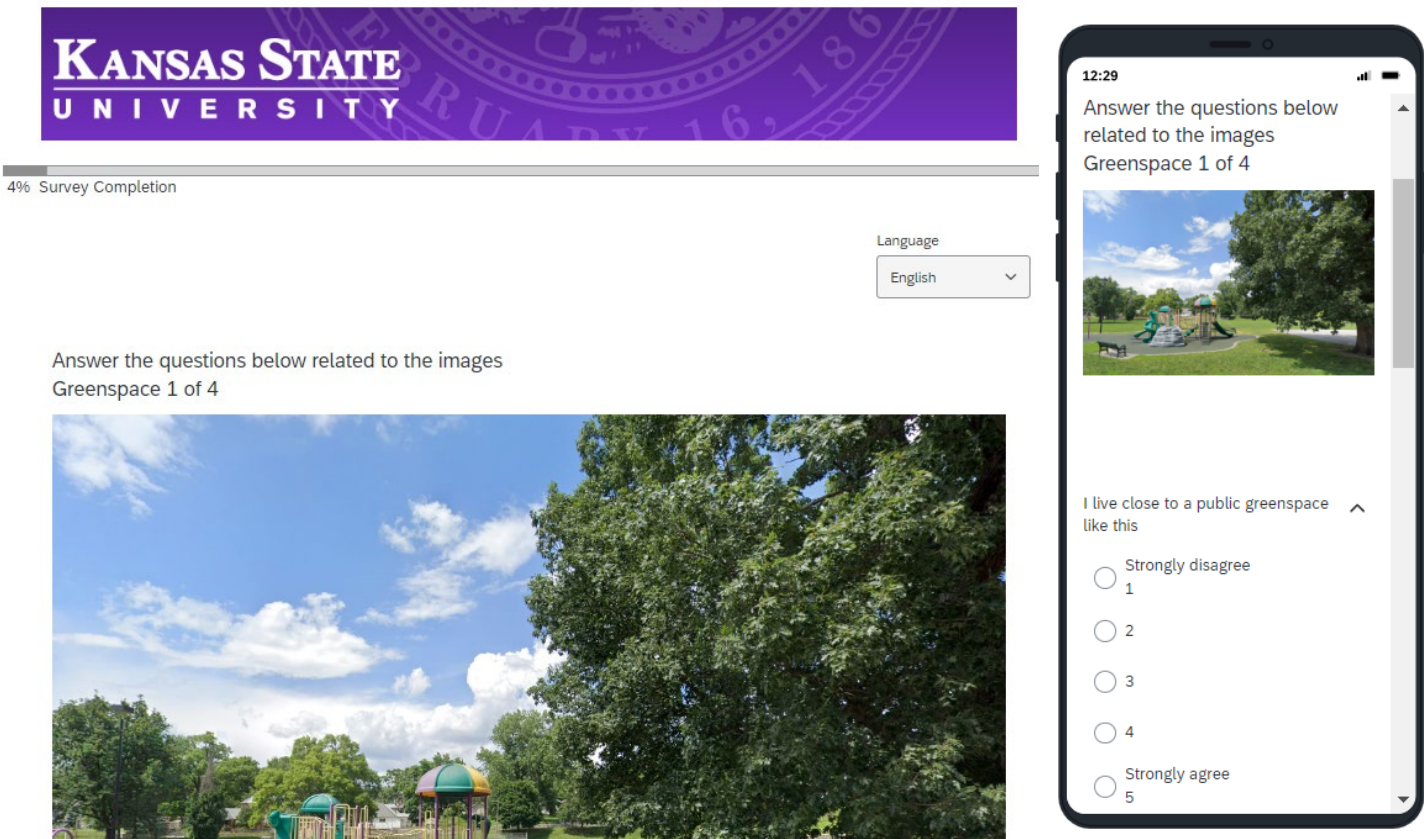


Figure 3.42 Qualtrics survey design

Chapter 4 | Analysis

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4.1 | Social Statistical Analysis Overview

The collected data from the surveys was entered into the IBM Statistical Package for the Social Sciences (SPSS) 29 software for analysis. Data analyses include frequencies, Pearson bivariate correlations, factor analysis and reliability tests, and independent sample t-tests to understand the strength of and associations between different factors that may be related to children's contact with nature, see Figure 4.1. Refer to Appendix B for all data analysis tables. All questions were scored with a 5-point Likert scale. For the purposes of this study, mean values were categorized as low (mean = 1.0 – 2.0), moderately low (mean = 2.1 – 3.0), moderately high (mean = 3.1 – 4.0), and high (mean = 4.1 – 5.0).

Due to the sample size (parents $n = 31$, teachers $n = 20$), the strength of the statistical analysis was limited, however, it still provides a basis for how gathering parent and teacher perceptions of children's access to nature can provide critical information to inform recommendations for planning and designing greenspaces for children's contact with nature.

Variables

There are three overarching variables being measured: attitudes, awareness, and barriers. For the purposes of this study, attitudes were the participants' feelings towards children's contact with nature (i.e., importance of contact with nature, nature-based learning, types of outdoor settings, and activities). Awareness was defined as the participants' knowledge towards the benefits of nature including the physical, mental/emotional, behavioral, and cognitive benefits. Barriers were defined as walkability, safety, and school-specific factors that may limit children's contact with nature.

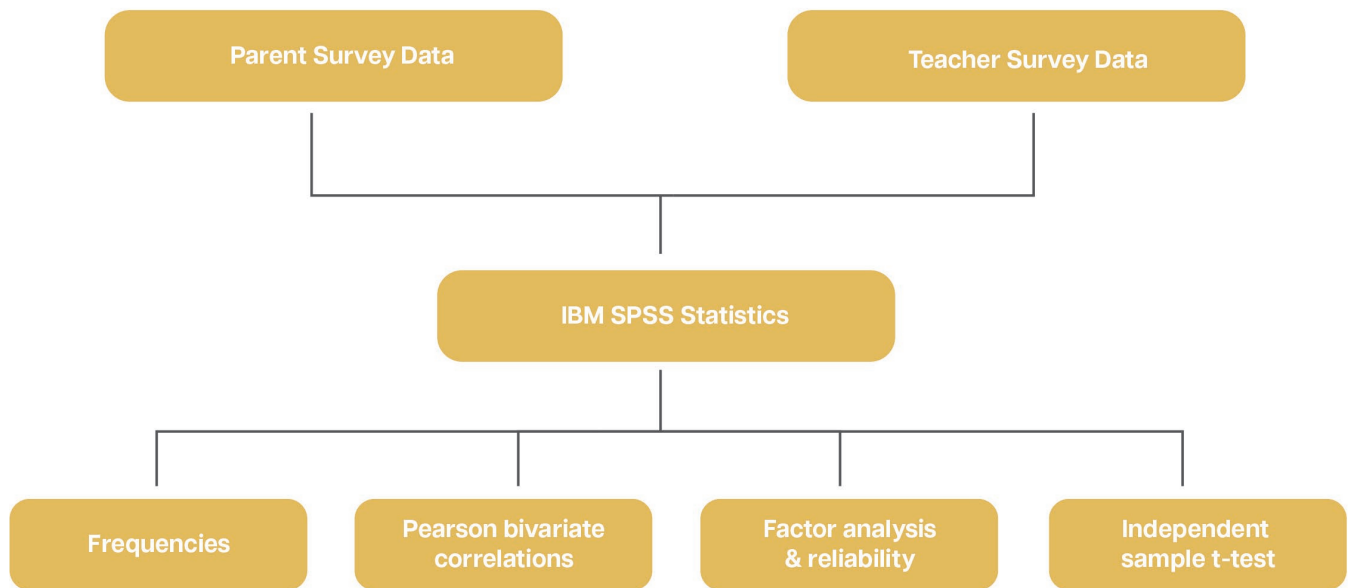


Figure 4.1 Overview of statistical analysis process

Total household income before taxes (% parents)

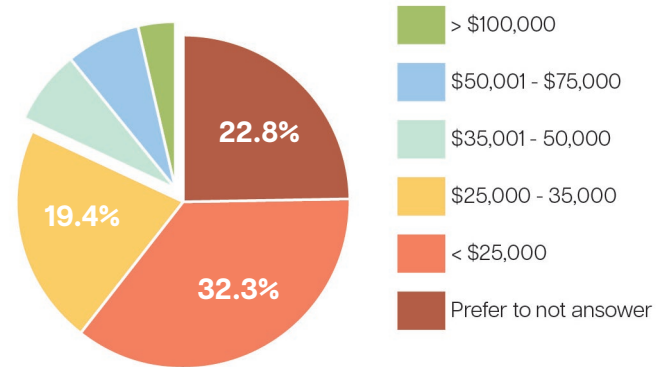


Figure 4.2 Parent, Total household income

Highest degree or level of education (% parents)

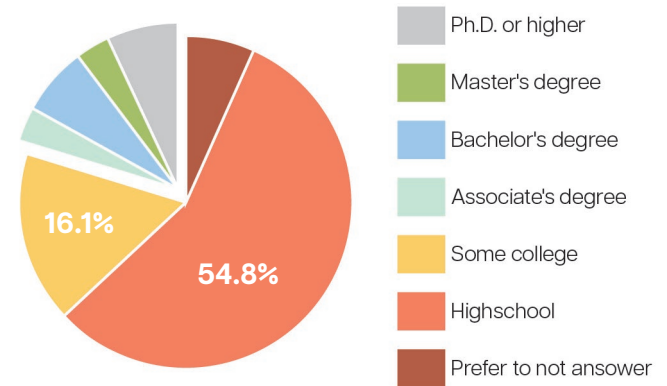


Figure 4.3 Parent, Highest degree of level of education

4.2 | Participant Demographics

Parents

Most participants that completed the parent version of the survey (n=31) were mothers/stepmothers, identified as female, married, between 30-39 years old, Hispanic or white, owned at least one car, with high school or some college being their highest level of education, and had a total household income less than \$25,000 or between \$25,000 and \$35,000. Refer to Figure 4.2 through 4.6 for parent demographics.

Questions that asked about their children showed that 19.4% of parents had one child with special needs or neurodiversity, and 6.5% with one child with a physical disability. In addition, most parents chose to drive their children to school (58.1%) or children walked with adults (19.4%). Travel time to school was primarily less than 5 minutes (32.3%) or between 5 and 10 minutes (41.9%). See Figures 4.7 and 4.8.

71% of parents were mothers or stepmothers

74.2% of parents were female

71% of parents were married

Age Group (% parents)

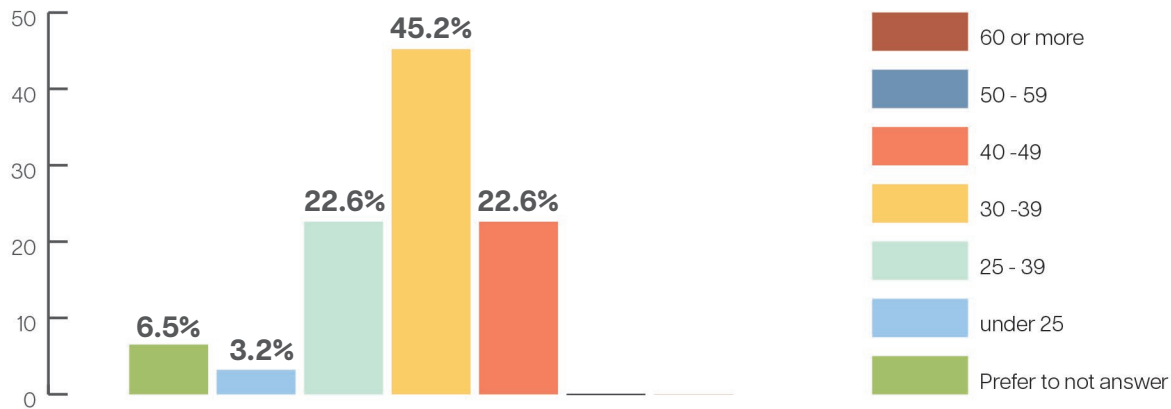


Figure 4.4 Parent, Age group

Race/Ethnicity (% parents)

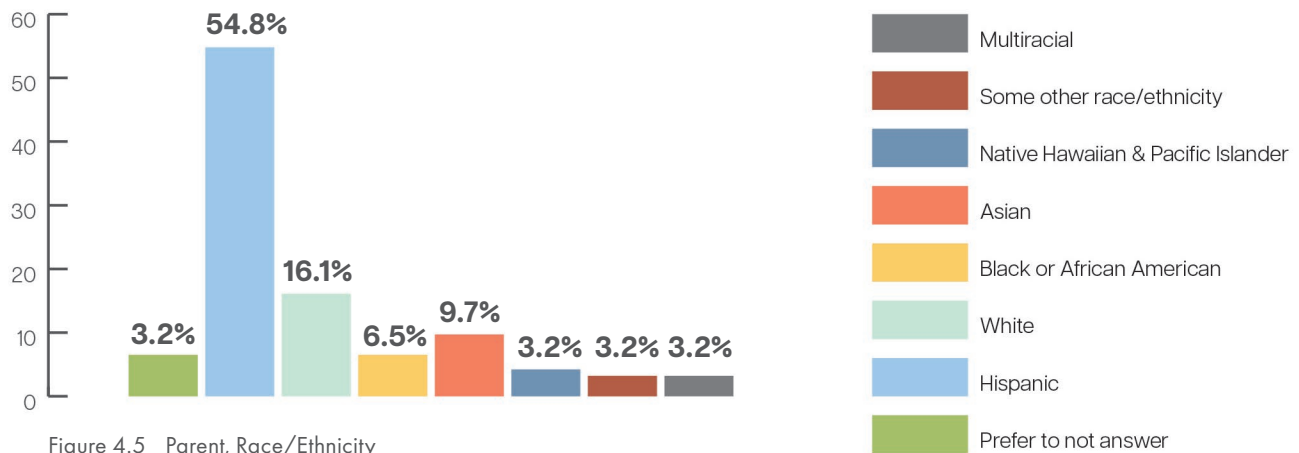


Figure 4.5 Parent, Race/Ethnicity



Figure 4.6 (opposite) Parent, Car ownership

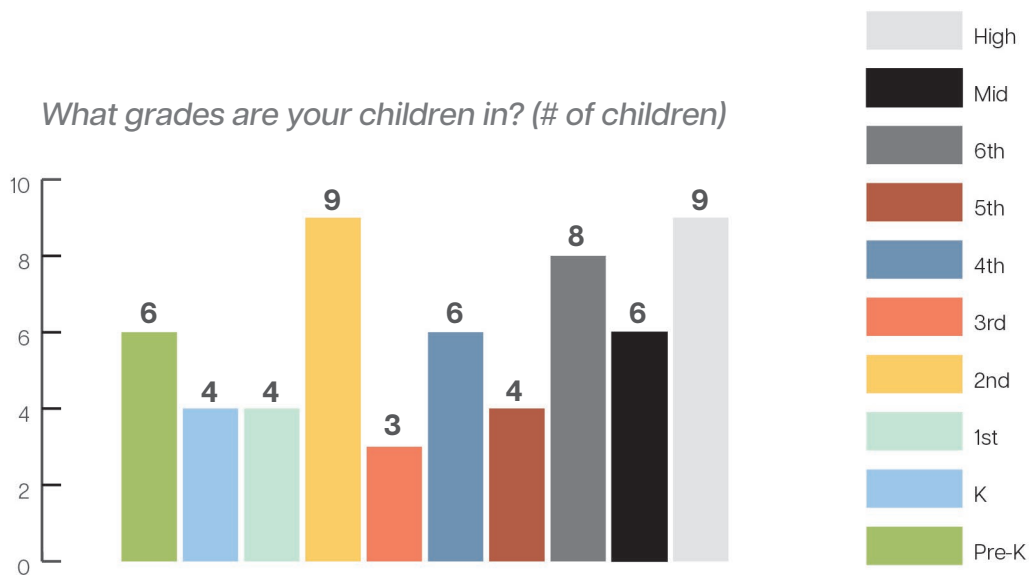
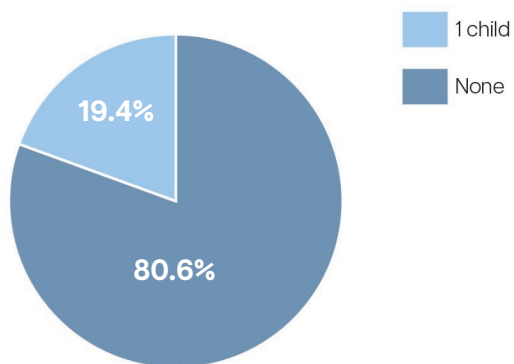


Figure 4.7 Children's grade

Percent of children with neurodiversity or special needs (%)



Percent of children with physical disabilities (%)

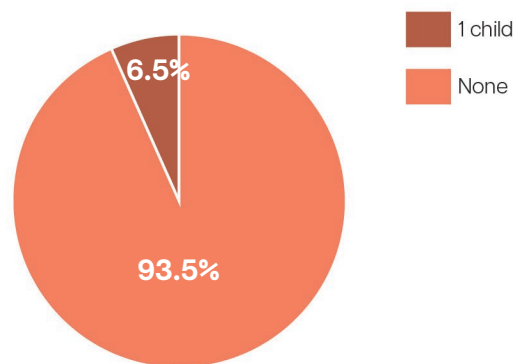
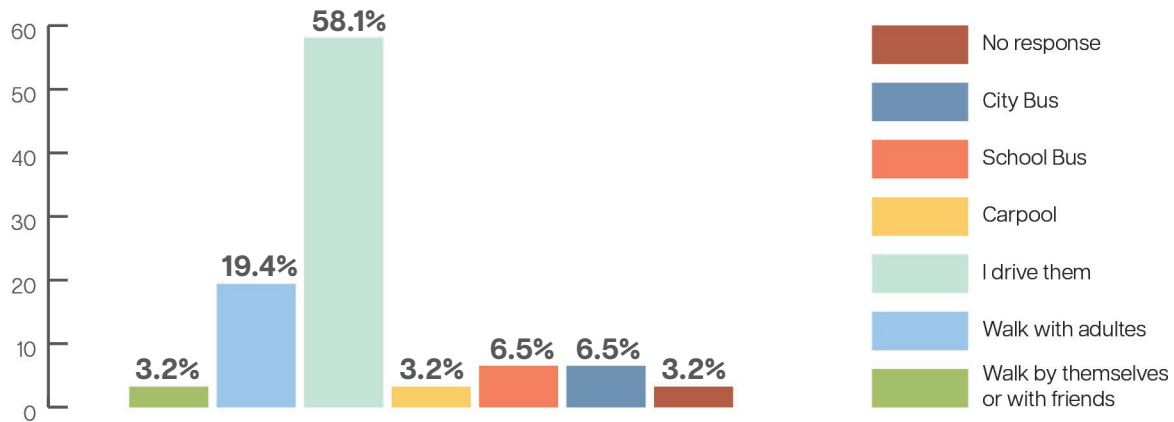


Figure 4.8 Children with neurodiversity, special needs, or physical disabilities

How do your children usually get to and from elementary school? (%)



How long does it usually take your children to get to elementary school? (min)

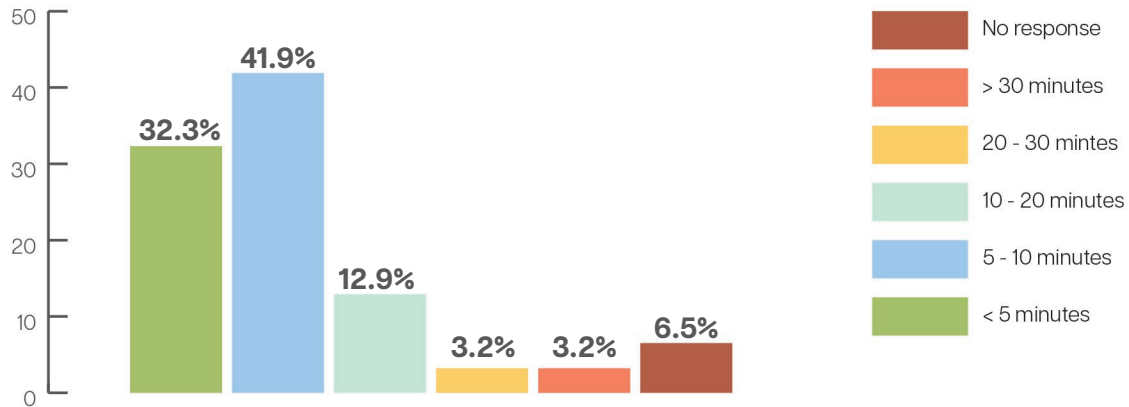


Figure 4.9 Means of transportation to school and time it takes

Total household income before taxes (% teachers)

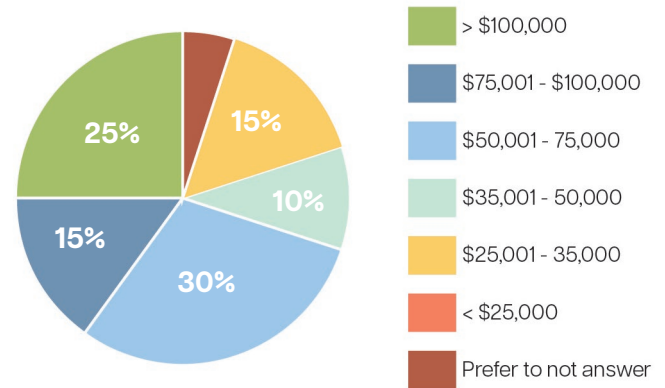


Figure 4.10 Teacher, Total household income

Highest degree or level of education (% teachers)

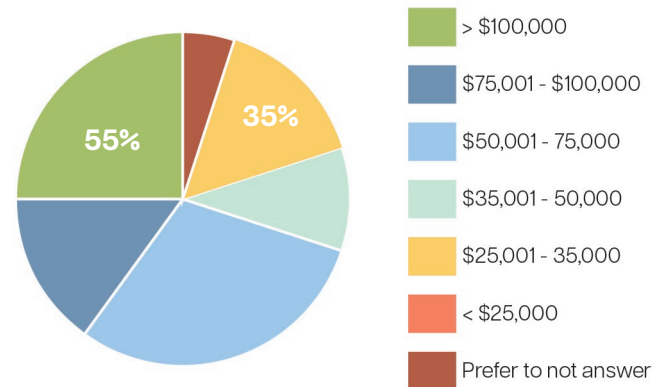


Figure 4.11 Teacher, Highest degree or level of education

Teachers

Most participants that completed the teacher version of the survey (n=20) were female, 30 years old or more, white, highest level of education being a Master's or Bachelor's degree and have a total household income of \$50,001 or more. Refer to Figures 4.10 through 4.13 for teacher demographics. In addition, see Figure 4.14 and 4.15, for what grades teachers teach and the percent of children that have special needs/ neurodiversity or physical disabilities.

85%

of teachers were female

Age Group (% teachers)

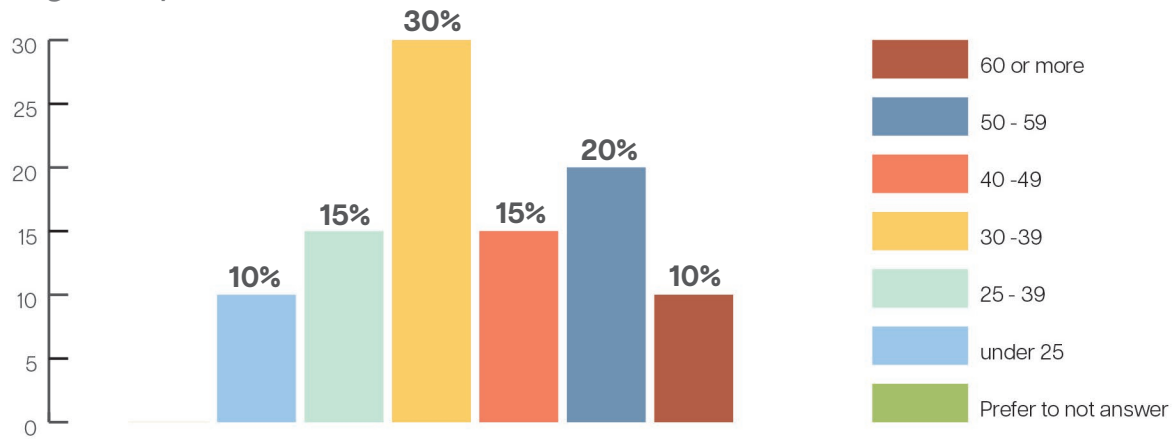


Figure 4.12 Teacher, Age group

Race/Ethnicity (% teachers)

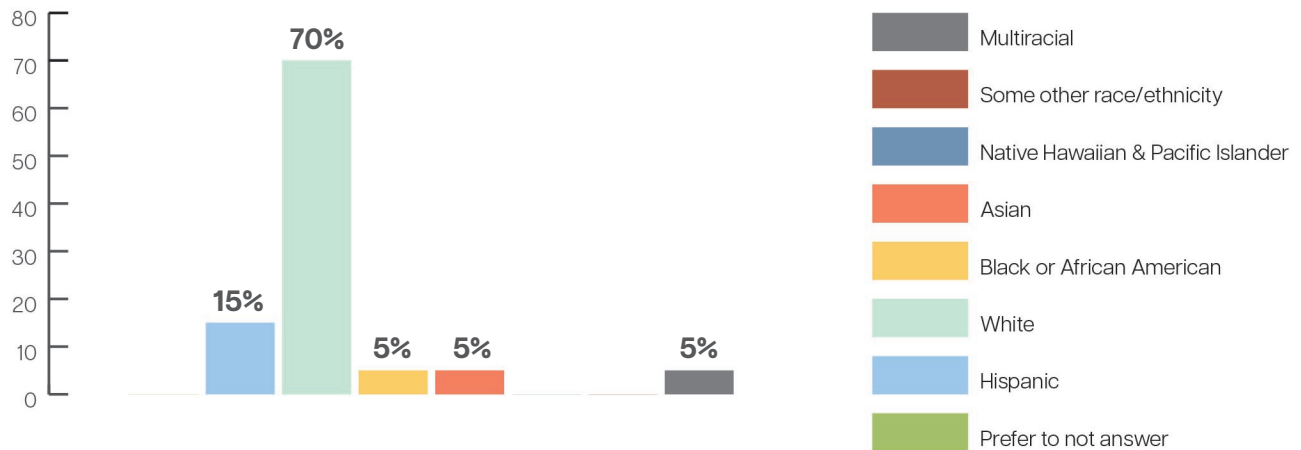


Figure 4.13 Teacher, Race/ethnicity

Grades Teachers Teach (# of teachers)

**Note: Some teachers teach multiple grades*

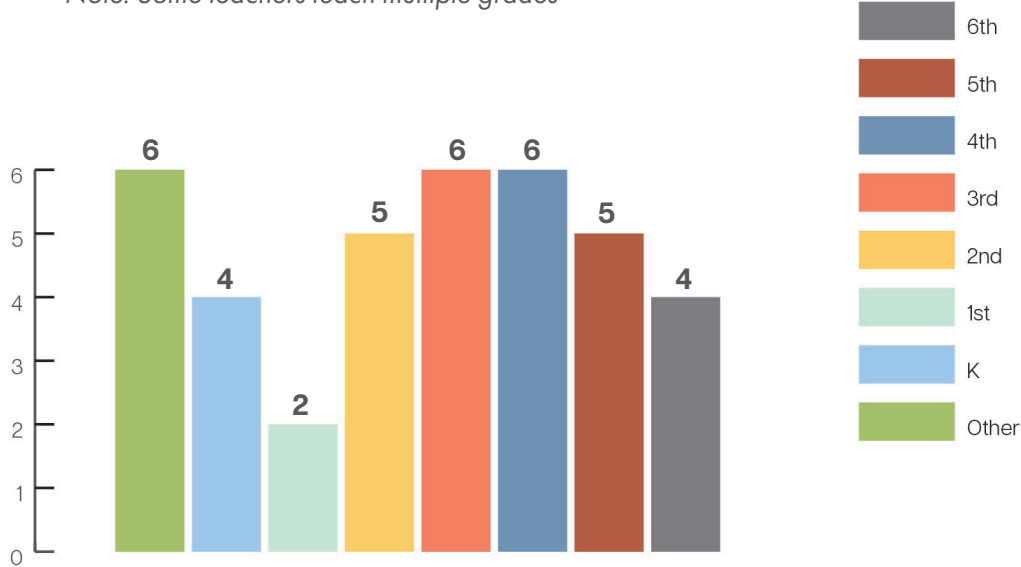
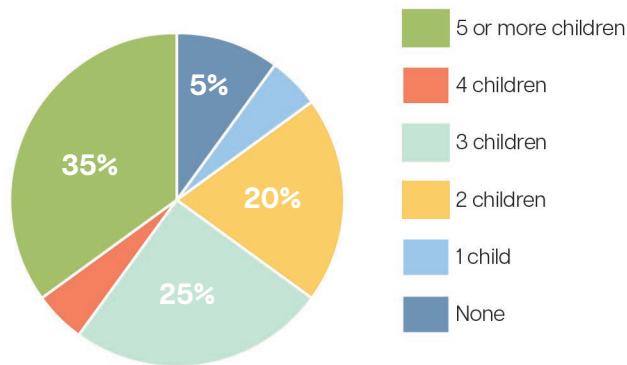


Figure 4.14 Grades teachers teach

How many students teachers report have neurodiversity or special needs (%)



How many students teachers report have physical disabilities (%)

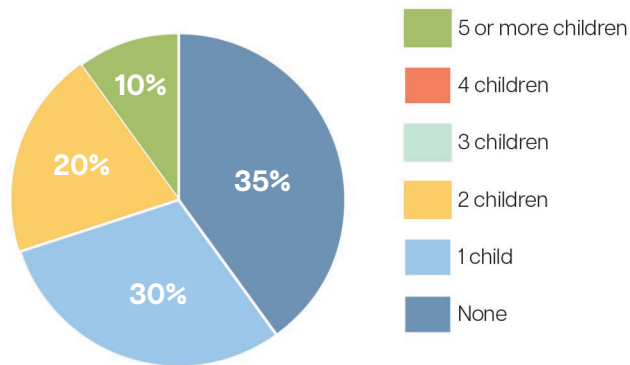


Figure 4.15 Students with neurodiversity, special needs, or physical disabilities

4.3 | Greenspace Types, Frequency & Barriers to Greenspaces

What greenspaces are nearby residences and the school?

Of the greenspace types that parents reported if they strongly disagreed to strongly agreed they live close to, neighborhood parks (mean = 3.48) and athletic parks (mean = 3.32) had a moderately-high mean value, nature parks had a moderately low mean value (mean = 2.81), and gardens had a low mean value (mean = 1.87). Refer to Figure 4.16 to see how parents responded for each greenspaces' location.

Of the greenspace types that teachers reported if they strongly disagreed to strongly agreed their school was located close to, neighborhood parks had a moderate mean value (mean = 3.00), nature parks (mean = 2.65) and gardens (mean = 2.35) had a moderately low mean value, and athletic parks (mean = 1.35) had a low mean value. Refer to Figure 4.17 to see how teachers responded for each greenspaces' location.

These findings were compared with the greenspace availability assessment that identified one nature park and one neighborhood park within $\frac{1}{4}$ and $\frac{1}{2}$ radius of the school. It is also important to note that although parents said they lived close to an athletic park, there were no athletic parks identified by the greenspace availability analysis in the immediate school attendance zone. It was possible the image representing the athletic park was associated with the neighborhood park in the area since they both contain similar features (i.e., athletic fields & courts) or it was an athletic park outside the school attendance zone.

I live close to a public greenspace like this (% parents)

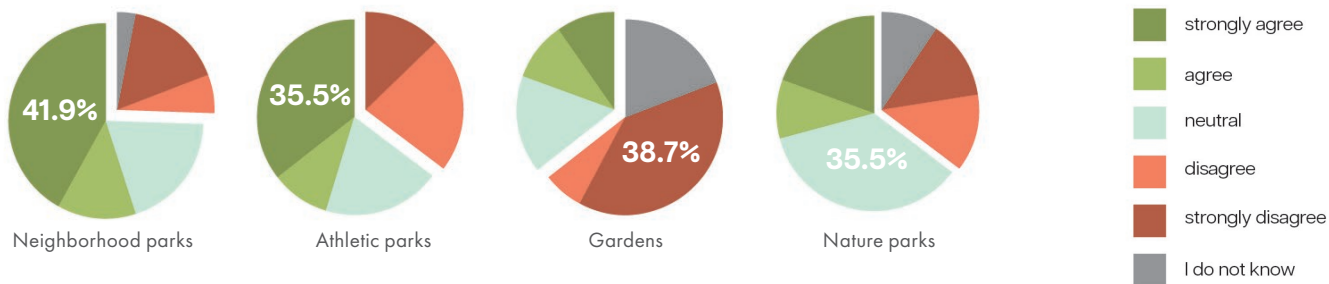


Figure 4.16 Location of greenspaces from from home

Our school is located close to a public greenspace like this (% teachers)

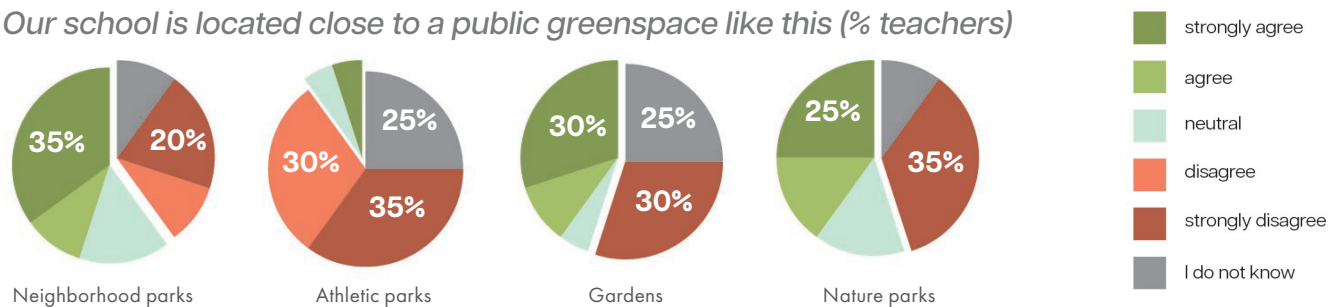


Figure 4.17 (below) Location of greenspaces from school

How frequently do parents and teachers take their children/students to greenspaces and what barriers may influence this?

Parents took their children most often to neighborhood parks (mean = 3.48), sometimes to nature parks (mean = 2.94) and athletic parks (mean = 2.55) and rarely to never to gardens (mean = 1.94). As seen in Figure 4.18, how frequently parents took their children to neighborhood parks was skewed to the right towards ‘very often’, nature parks had no skewness and concentrated at ‘sometimes’, and athletic and gardens were skewed left towards ‘never’ or ‘rarely’.

How frequent parents took their children to greenspaces and potential barriers were explored for correlations to see if specific barriers such as ‘lack of time,’ ‘distance from home,’ ‘unsafe or disconnected sidewalks to get there,’ ‘unsafe street crossings,’ ‘safety concerns in the area,’ or ‘injury concerns’ may play a role in how frequent parents took their children to greenspaces. To do so, Pearson bivariate correlations were run and only a few statistically significant correlations

were found, refer to Table 4.1. For neighborhood parks, how frequently parents took their children there was significantly negatively correlated with ‘unsafe street crossings’ ($r = -.392, p = .032$) and ‘safety concerns in the area’ ($r = -.366, p = .047$). Similarly, how frequently parents took their children to athletic parks was negatively correlated with ‘unsafe street crossings’ ($r = -.381, p = .038$). No statistically significant correlations were found for how frequently parents took their children to gardens or nature parks and any of the barriers. However, across the greenspace types, there were moderately high mean values for ‘safety concerns in the area’ as a barrier. In addition, ‘distance from home,’ was moderately high for gardens. All other mean values for barriers were moderately low. Refer to Appendix B for correlation and frequency tables. Furthermore, parents identified additional barriers they experience in the open-ended questions:

The area they live in is not upkeep and needs more consistent cleaning and upkeep, so they need to drive further away to go to a more decent park.

Bad neighborhood.

Aggressive dogs.

Drug paraphernalia and alcohol containers are found in these areas.

Drive-by shootings/gun shots in area.

How frequently do you take your children to public greenspaces like this? (% parents)

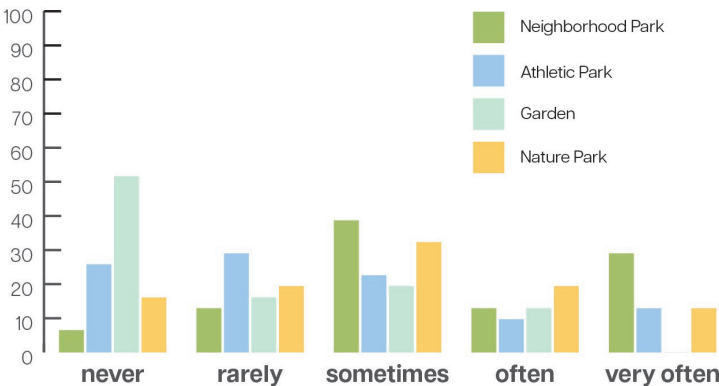


Figure 4.18 How frequent parents take their children to public greenspaces

It was also found that parents responded that their children never or rarely go to any of the greenspace types by themselves or with friends, as all mean values were below 2.0, see Figure 4.19. The mean values for parents' comfort with their children going to greenspaces by themselves or with friends was also below 2.0. Pearson correlation showed that there was a significant positive correlation between these two variables, where parents' comfort was meaningfully associated with children going to greenspaces by themselves or with friends. Parents were also not comfortable with their children playing unsupervised before or after school in public greenspaces near the school (mean = 2.03).

As found in the literature, free play is important for children's development, yet parents feel the need to supervise their children for concerns of safety and injury (Clements, 2004; Kytä, 2004; Veitch et al., 2006; Vidal & Castro Seixas, 2022). Although injury concerns and lack of time were less of

a concern to parents in this study, 'safety concerns in the area' was an overall concern and was further supported by the open-ended responses that mentioned crime, poor maintenance, and living in a bad neighborhood. In addition, it was predicted that their children's grade may be associated with how frequently children go by themselves or with friends to greenspaces and how comfortable parents were with letting their children go by themselves or with friends to greenspaces. However, these correlations were not possible because parents were allowed to select multiple answers for what grades their children were in. A question about if age influences letting children go to greenspaces by themselves or with friends is needed for future research purposes.



Figure 4.19 (opposite) How frequent children go by themselves or with friends and parents' comfort

The mean value for how frequently teachers took their students to any of the greenspace types was below 2.00, which indicated that most teachers never to rarely took their children to these types of greenspaces. Refer to Figure 4.20. However, the mean value for how comfortable teachers were taking their students to neighborhood parks, athletic parks, and gardens (means = 3.1 – 4.0) were moderately high and nature parks was moderately low (mean = 2.85), see Figure 4.21.

Like parents, how frequently teachers took their students to neighborhood parks was significantly negatively correlated with ‘safety concerns in the area’ ($r = -.455, p = .044$). Teachers’ comfort in taking their students to neighborhood parks was also negatively correlated with ‘safety concerns in the area’ ($r = -.472, p = .036$) and ‘injury concerns’ ($r = -.564, p = .010$). There were not statistically significant correlations between how frequently teachers took their students to athletic parks and barriers to do so. However, how comfortable teachers were taking students to athletic parks was negatively correlated with ‘unsafe street crossings’ ($r = -.469, p = .037$) and ‘injury concerns’ ($r = -.710, p < .001$). Barriers that may prevent how frequently teachers took their students to gardens include ‘lack of time’ ($r = -.535, p = .015$), ‘distance from school’ ($r = -.541, p = .014$), ‘unsafe or disconnected sidewalks to get there’ ($r = -.525, p = .018$), ‘unsafe street crossings’ ($r = -.572, p = .010$),

How frequently do you take your students to public greenspaces like this? (% teachers)

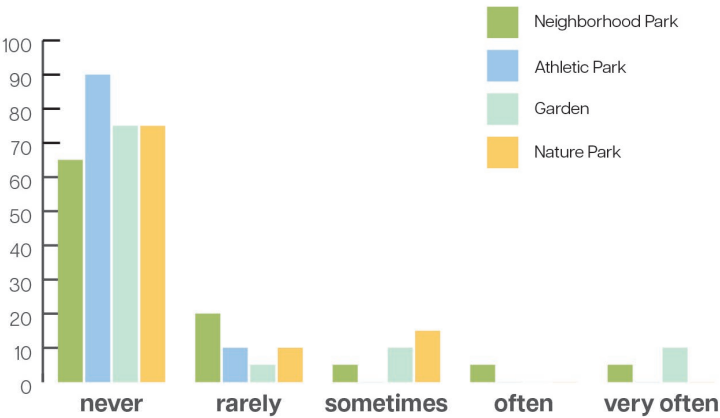


Figure 4.20 How frequent teachers take their students to greenspaces

I feel comfortable taking my students to a public greenspace like this (% teachers)

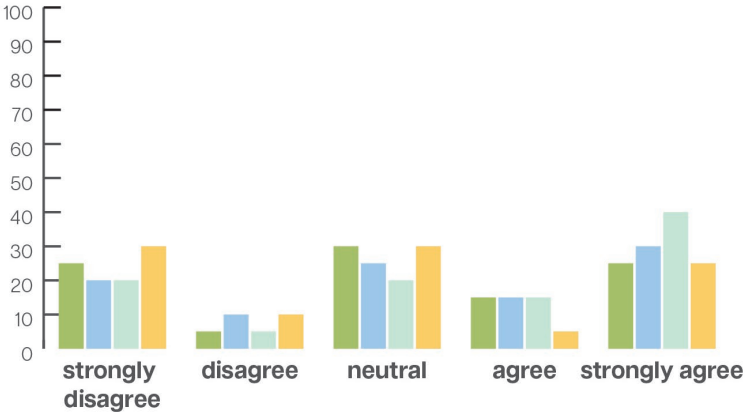


Figure 4.21 How comfortable teachers were taking students to greenspaces

and ‘safety concerns in the area’ ($r = -.466, p = .038$), refer to Table 4.1. There were also significant negative correlations with how comfortable teachers were taking students to gardens and barriers such as ‘unsafe or disconnected sidewalks to get there’ ($r = -.595, p = .006$), ‘unsafe street crossings’ ($r = -.750, p < .001$), ‘safety concerns in the area’ ($r = -.600, p = .005$), and ‘injury concerns’ ($r = -.564, p = .012$). For nature parks, how frequently teachers took their students was only correlated with ‘distance from school’ ($r = -.501, p = .029$). Teachers’ comfort in taking students to nature parks was negatively correlated with ‘unsafe or disconnected sidewalks to get there’ ($r = -.459,$

$p = .042$) and unsafe street crossings ($r = -.509, p = .022$). Other barriers that teachers mentioned in the open-ended questions that may limit how often they took their students to greenspaces include:

- “I have no funding to grow food for my students. Or a way to protect it from not getting vandalized”
- “Lack of supervision and number of students”

Table 4.1 | Statistically Significant Negative Correlations | Frequency to Greenspaces and Barriers

	Lack of Time	Distance	Unsafe or disconnected sidewalks	Unsafe street crossings	Safety concerns in the area	Injury concerns
How frequently parents take their children to public greenspaces				N, A	N	
How frequently teachers take their students to public greenspaces	G	G, Na	G	G	N, G	

Table 4.1 Negative correlations of frequency to greenspaces and barriers

- N | Neighborhood park
- A | Athletic park
- G | Garden
- Na | Nature park

Is there a difference in frequency of use and barriers between parents and teachers?

A series of independent sample t-tests were run to check differences in mean values for how frequently parents versus teachers took their children/students to greenspaces and the barriers to do so.

Frequency of use:

The independent sample t-test showed statistical significance for how frequently parents versus teachers took their children/students to neighborhood parks ($t = 5.247, p < .001$), athletic parks ($t = 5.796, p < .001$), and nature parks ($t = 5.432, p < .001$), refer to Figure 4.22. A high Cohen’s d effect size ($d > 0.7$) showed there were statistically significant differences. Parents took their children to these greenspaces more often, especially to neighborhood parks which had a moderately high mean value; however, the mean value for nature parks and athletic parks was still within the moderately low mean value range. Teachers took their students to these greenspaces rarely to never, indicated by the low mean values. There was no statistical significance for how frequently parents and teachers took their children/students to gardens. Both mean values were below 2.00, meaning most parents and teachers did not take their children/students to gardens.

Figure 4.22 (above) Mean values for how frequent parents versus teachers take their students to greenspaces

Table 4.2 (opposite) No statistically different mean values for barriers

Table 4.3 (opposite) Statistically significant different mean values for barriers

How frequently do you take your children to public greenspaces like this?



Not statistically different

low	1.0 - 1.99
moderately low	2.0 - 2.99
moderately high	3.0 - 4.0
high	4.1 - 5.0

Neighborhood park barriers:

For neighborhood parks, barriers of 'lack of time' ($t = -3.122, p = .003$) and 'distance from school/home' ($t = -2.980, p = .006$) were statistically significant. In addition, they had high Cohen's d effect sizes ($d > .7$), where 'lack of time' and 'distance from school/home' were moderately high barriers for teachers taking their students to neighborhood parks and moderately low barriers for parents. 'Unsafe or disconnected sidewalks,' 'unsafe street crossings,' 'safety concerns in the area,' and 'injury concerns' were not statistically significantly different. Both parents and teachers agreed that 'unsafe street crossings,' and 'safety concerns in the area' were moderately high barriers. 'Unsafe or disconnected sidewalks,' and 'injury concerns,' were moderately low barriers.

Athletic park barriers:

For athletic parks, 'lack of time' ($t = -3.624, p < .001$), 'distance from school/home' ($t = -5.450, p < .001$), and 'unsafe or disconnected sidewalks to get there' ($t = -2.467, p = .017$) were statistically significantly different. Cohen's d effect sizes were high ($d > 0.7$), with moderately high to high mean values for teachers and moderately low mean values for parents. 'Unsafe street crossings,' 'safety concerns in the area,' and 'injury concerns' were not statistically significantly different. 'Unsafe street crossings' and 'safety concerns in the area' were both moderately high barriers while 'injury concerns,' was moderately low.

Garden barriers:

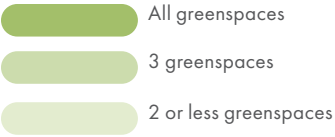
Besides 'lack of time,' being a higher barrier for teachers, there were no statistically significant differences for barriers for parents and teachers taking their children/students to gardens, meaning, they answered similarly. 'Distance from home/school,' was a moderately high barrier while 'unsafe or disconnected sidewalks,' 'unsafe street crossings,' 'safety concerns in the area,' and 'injury concerns' were moderately low.

Nature park barriers:

For nature parks, 'lack of time' ($t = -2.961, p = .005$) and 'unsafe or disconnected sidewalks to get there' ($t = -2.529, p = .015$) were statistically significantly different. Cohen's d effect sizes were high ($d > 0.7$), where 'lack of time' and 'unsafe or disconnected sidewalks to get there' were moderately high barriers for teachers and moderately low barriers for parents. 'Unsafe street crossings,' 'distance from school/home,' 'safety concerns in the area,' and 'injury concerns' were not statistically significantly different. 'Distance from home/school,' 'unsafe street crossings,' and 'safety concerns in the area' were moderately high barriers and 'injury concerns' was a moderately low barrier for both groups. Refer to Tables 4.2 and 4.3 to see the differences in mean values for barriers.

No statistical significant difference in mean values (parents & teachers)						
	Lack of Time	Distance	Unsafe or disconnected sidewalks	Unsafe street crossings	Safety concerns in the area	Injury concerns
Neighborhood Park						
Athletic Park						
Garden						
Nature Park						

Statistical significant difference in mean values (parents & teachers)						
	Lack of Time		Distance		Unsafe or disconnected sidewalks	
Neighborhood Park	Teacher	Parent	Teacher	Parent		
Athletic Park	Teacher	Parent	Teacher	Parent	Teacher	Parent
Garden	Teacher	Parent				
Nature Park	Teacher	Parent			Teacher	Parent



Parent | Statistically Significant Positive Correlations between Barriers

	Lack of Time	Distance	Unsafe or disconnected sidewalks	Unsafe street crossings	Safety concerns in the area	Injury concerns
Lack of Time		G, Na				
Distance			N, A, G, Na	N, A, Na	A, G	A, Na
Unsafe or disconnected sidewalks				N, A, G, Na	N, A, G, Na	A, G, Na
Unsafe street crossings					N, A, G, Na	N, A, G, Na
Safety concerns in the area						N, A, G, Na
Injury concerns						

Table 4.4 Barrier correlations for parents

Teacher | Statistically Significant Positive Correlations between Barriers

	Lack of Time	Distance	Unsafe or disconnected sidewalks	Unsafe street crossings	Safety concerns in the area	Injury concerns
Lack of Time		A, G				
Distance			G	N, G	G	
Unsafe or disconnected sidewalks				N, A, G, Na	N, A, G	N, A, G
Unsafe street crossings					N, A, G	A, G
Safety concerns in the area						N, A, G
Injury concerns						

Table 4.5 Barrier correlations for teachers

What greenspace accessibility barriers are related?

Across the greenspace types, many barriers for parents and teachers taking their children/students to greenspaces were significantly positively correlated with each other. These correlations show that these barriers may be associated and contribute to the overall system of walkability and safety issues. For example, as distance becomes more of a barrier, barriers such as unsafe sidewalks become more of an issue. It is important to address these issues as a collective to reduce negative perceptions of accessibility to greenspaces. Refer to Table 4.4 and 4.5 for correlations between walkability and safety barriers.

4.4 | Awareness & Attitudes

Were parents and teachers aware of the benefits of nature for children?

It was thought that parents' and teachers' awareness and attitudes towards children's contact with nature including, knowledge and feelings towards the benefits for children, may be associated with how frequently children went to certain greenspaces or do outdoor activities. However, having knowledge and positive attitudes towards children's frequent contact with nature for its benefits did not seem to be associated with how often parents and teachers took their children to greenspaces.

Both parents ($n = 31$) and teachers ($n = 20$) had high mean values for having knowledge of the various benefits of nature for children (i.e., physical health, mental and emotional health, behavioral health, and cognitive skills). To see if there were significant differences between how parents and teachers responded, an independent sample t-test was done and there was no statistical significance in the p-values. Factor analysis was then used for dimension reduction to create an overarching latent variable called 'knowledge of the benefits of nature.' To do so, the four variables were correlated, and all were above 0.5, so reliability was checked, and Cronbach's alpha appeared to be strong ($\alpha = 0.929$). Then, the compute variables function was used to create the latent variable of 'knowledge of the benefits of nature.' Combined, parents and teachers had a moderately high mean value for 'knowledge of the benefits of nature' for children (mean = 3.77). Refer to Figure 4.23.

How did parents and teachers feel about frequent contact with nature for its benefits?

Both parents' ($n = 31$) and teachers' ($n = 20$) attitudes towards the various benefits of nature for children had high mean values for physical health, mental and emotional health, behavioral health, and cognitive skills. An independent sample t-test showed that there was no statistical significance in the p-values. Factor analysis was used for dimension reduction to create an overarching latent variable of 'attitudes towards the benefits of nature.' To do so, the four variables were correlated, and all were above 0.5, so reliability was checked, and Cronbach's alpha appeared to be strong ($\alpha = 0.950$). Then, the compute variables function was used to create a latent variable of 'attitudes towards the benefits of nature.' Combined, parents and teachers felt frequent contact with nature was important for its benefits for children with a high mean value (mean = 4.17). With these latent variables, correlations were checked and knowledge of the benefits of nature and attitudes of the benefits of nature were significantly positively correlated ($r = 0.493, p < .001$).

80% of teachers also agreed to strongly agreed that frequent contact in nature in school was important. This had a significant positive correlation between their knowledge of the benefits of nature for children ($r = .628, p = .003$) and their attitudes towards the benefits of nature for children ($r = .525, p = .017$).

80% of teachers agreed frequent contact with nature during school time was important



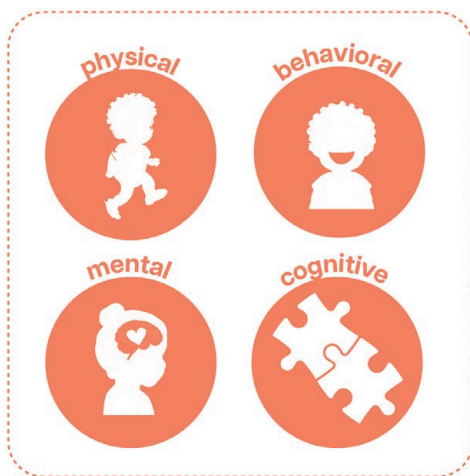
parents



teachers

I consider myself knowledgeable about how frequent contact with nature affects children's...

I feel my children should have frequent contact with nature to improve the following...



Health & well-being

All moderately high
to high mean values



Latent Variables

Knowledge of the
benefits of nature

Attitudes of the
benefits of nature

Significantly positively correlated
($r = .493^{**}$, $p < .001$ (2-tailed))

Figure 4.23 Parents' and teachers' knowledge & attitudes of the benefits of nature for children

Did parents and teachers feel their children have enough contact with nature during and outside school?

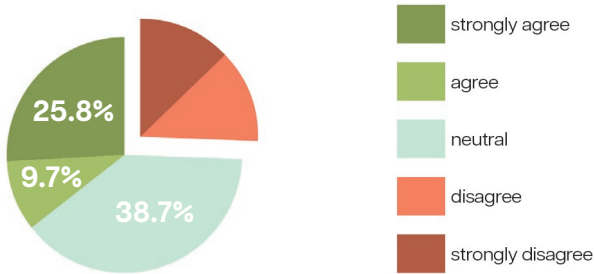
The mean values for parents feeling children did not spend enough time in nature outside of school time (mean = 3.23) and during school time (mean = 3.19) were moderately high. As seen in Figure 4.24, 74.2% of parents responded neutral to strongly agree (38.7% 'neutral,' 9.7% 'agree,' and 25.8% 'strongly agree') that their children did not spend enough time in nature outside of school. Similarly, 74.2% of parents responded neutral to strongly agree (38.7% 'neutral,' 16.1% 'agree,' and 19.4% 'strongly agree') that their children did not spend enough time in nature during school time.

60% of teachers disagreed to strongly disagreed that their school organized enough outdoor or nature-based learning in the curriculum (mean = 1.8). How frequently teachers incorporated outdoor (mean = 1.85) or nature-based learning (mean = 2.05) was also low, see Figure 4.25. Attitudes towards their school organizing enough outdoor or nature-based learning in the curriculum and how frequently they incorporated outdoor learning in their lessons were correlated and there was a significant and positive correlation ($r = .564$, $p = .008$). As seen in Figure 4.26, 85% of teachers also responded they felt neutral to strongly agreeing they were comfortable incorporating outdoor or nature-based learning in their lessons. In addition, how knowledgeable teachers were of the benefits of nature for children was significantly correlated with how comfortable they were incorporating outdoor or nature-based learning in their lessons ($r = .602$, $p = .005$).

Attitudes towards the importance of frequent contact with nature in school, attitudes and awareness of the benefits of frequent contact with nature for children, and how comfortable teachers were incorporating outdoor or nature-based learning in their lessons were each not significantly correlated with how often teachers incorporated outdoor or nature-based learning in their lessons. Although teachers may supported and thought outdoor or nature-based learning was important, they were

not incorporating them in their lessons. Because of this, it was important to understand school-specific barriers that may have influenced how often teachers incorporated outdoor or nature-based learning in their lessons.

I think my children do not spend enough time in nature outside of school time (% parents)



I think my children do not spend enough time in nature during school time (% parents)

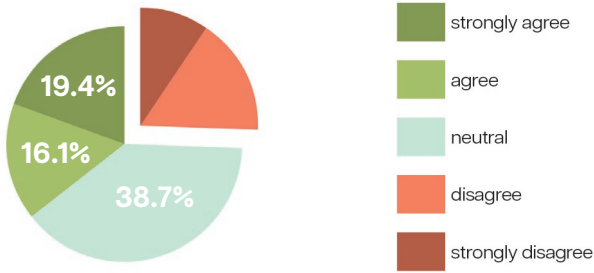


Figure 4.24 Parent's attitude of their children's time in nature.

60% of teachers disagree to strongly disagree their school organizes enough outdoor or nature-based learning in the curriculum

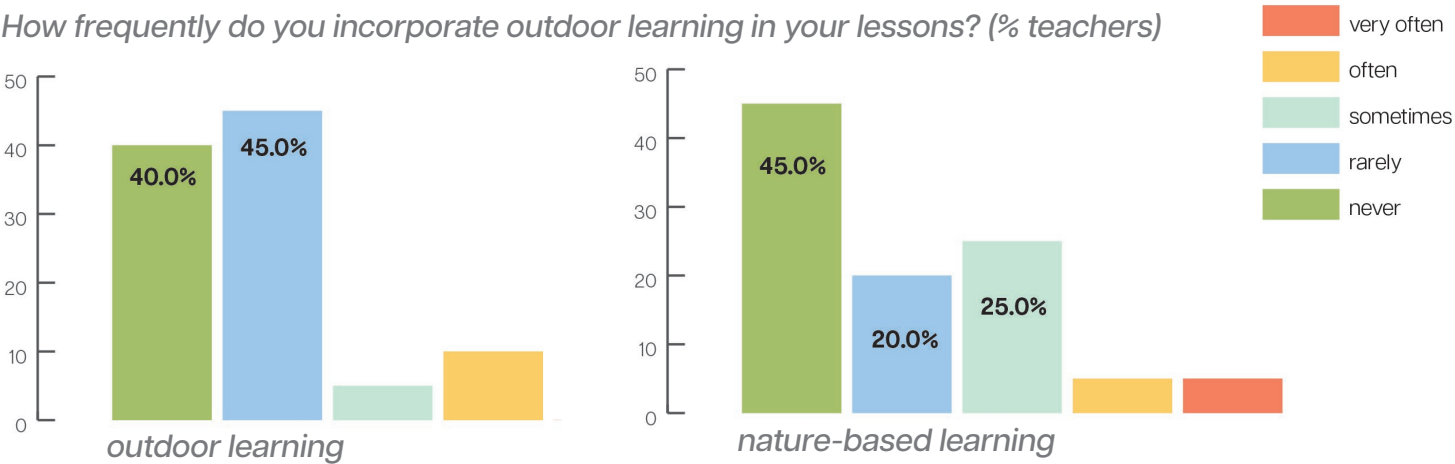


Figure 4.25 Outdoor or nature-based learning in lessons

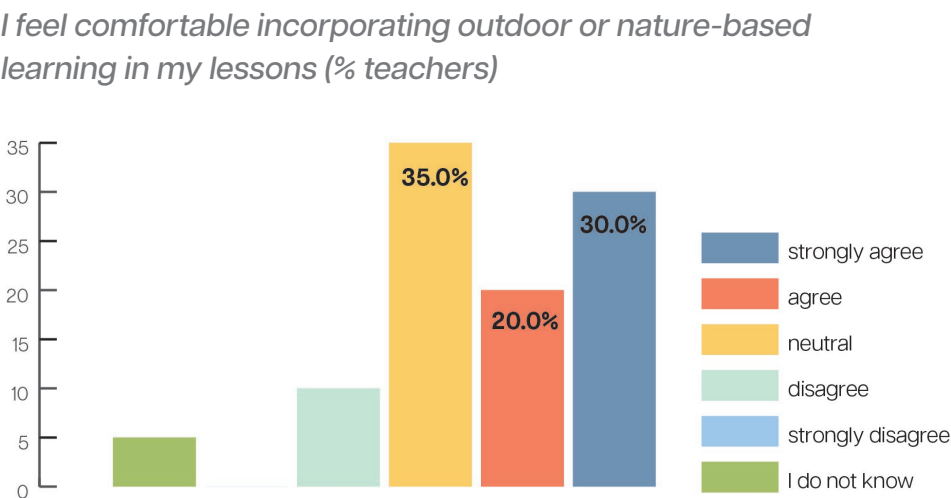


Figure 4.26 (below) Teachers' comfort with outdoor or nature-based learning

4.5 | School-Specific Barriers

According to the mean values, the school-specific barriers that limited their school from providing outdoor or nature-based learning to their students include other curricular time commitments (mean = 3.9), funding (mean = 3.7), and district initiatives (mean = 3.55), school initiatives (mean = 3.45) and lack of training and professional development (mean = 3.10). Refer to Figure 4.27. From the open-ended questions that asked teachers what other reasons negatively influenced how often they incorporated outdoor or nature-based learning in their lessons, teachers said:

“Perhaps due to the very low academic levels of the majority of the students, the school is tied heavily on certain curriculum. There's no time to venture out in nature.”

“It's not on MAP testing”

“I teach math, so sometimes at the end of the year I take them outside to do some work, but we don't really do much other outdoor learning/exploring aside from field trips and recess”

Between school-specific barriers, there were many significant correlations. ‘School initiatives’ were significantly positively correlated with ‘district initiatives’ ($r = .637, p = .003$), ‘other curricular time commitments’ ($r = .640, p = .002$), and ‘lack of training and professional development’ ($r = .619, p = .004$). ‘Other curricular time commitments’ were also associated with ‘district initiatives’ ($r = .640, p = .002$). In addition, ‘other curricular time commitments’ and ‘lack of training and professional development’ were correlated ($r = .536, p = .015$). Teachers reported that getting parent permission to take students to greenspaces was less of an issue (mean = 2.15). It was also found that how frequently teachers took their students to athletic parks, gardens, and nature parks, was significantly negatively correlated with other ‘curricular time commitments.’ However, no significant correlations were found between how frequently teachers incorporated outdoor or nature-based learning in their lessons and any of the school-specific barriers.

The following reasons negatively influence how often I incorporate outdoor or nature-based learning in my lessons:

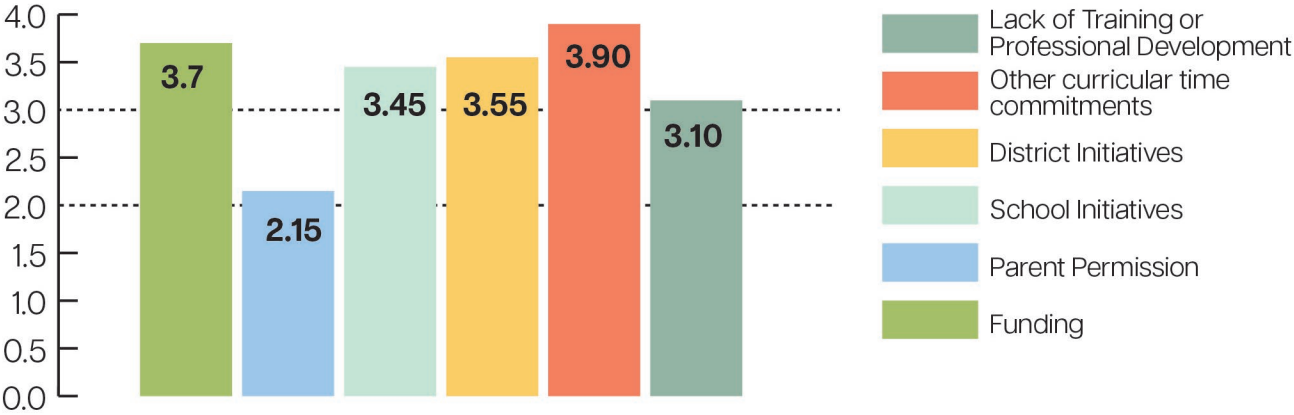


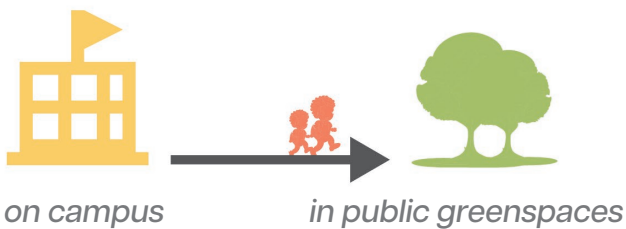
Figure 4.27 School-specific barriers

4.6 | Location, Setting and Activity Preferences

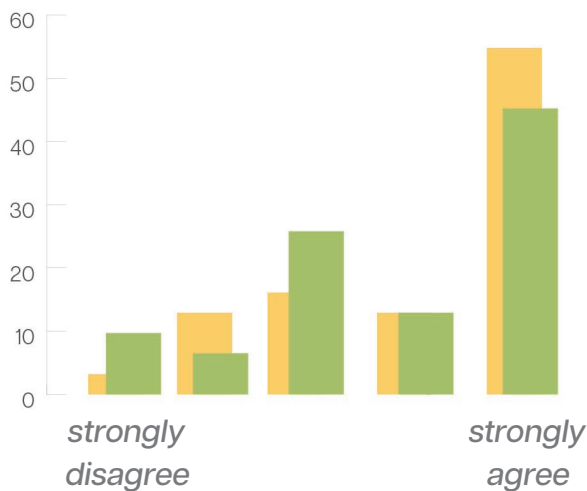
Where do parents and teachers prefer outdoor or nature-based learning to take place?

When asked if parents or teachers preferred outdoor or nature-based learning to be on-campus or off-campus in nearby public greenspaces, as seen in Figure 4.28, both had moderately high to high mean values. To see if there were differences in the mean values between parents and teachers, an independent sample t-test was run. The independent t-test showed there was no statistical significance, which suggested that parents and teachers supported outdoor or nature-based learning whether it be on- or off- campus.

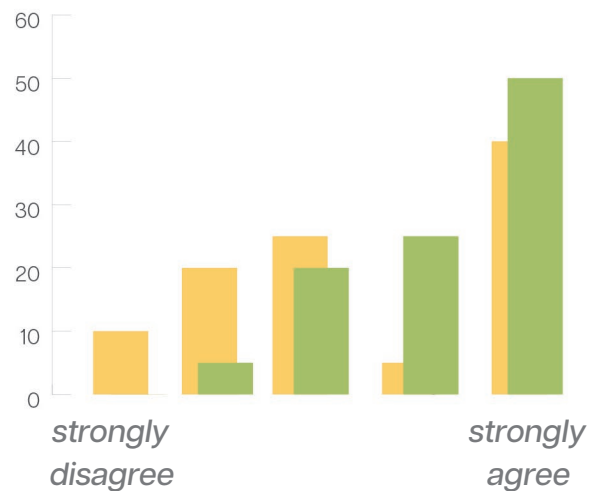
I would support outdoor or nature-based learning...



% of parents (n=31)



% of teachers (n=20)



What outdoor settings and activities do parents and teachers prefer for their children/students?

Both parents and teachers liked all outdoor settings (i.e., nature trail, playground, athletic fields, outdoor classroom, and more) shown in the photo questions (means > 4), see Figure 4.29. In addition, the independent t-test showed there were no statistically significant differences between groups.

Parents were also asked what outdoor activities their children did the most and what activities parents preferred their children to do outside of school time, see Figure 4.30. Mean values showed that their children played on playgrounds (mean = 3.77), did imaginative/pretend play outside (mean = 3.42) and nature learning/exploration (mean = 3.16) the most, while sports and learning in an outdoor classroom had moderately low mean values. However, most parents liked all outdoor activities (means > 3.8). How frequently children did sports ($r = .567, p < .001$), and imaginative/pretend play outside ($r = .465, p = .008$) were significantly positively correlated with parent preferences for those activities.

Teachers were also asked what outdoor activities their students did the most and what activities they would like their students to do during school time. Their students most frequently did sports (mean = 4.40), played on playground (mean = 4.55), and imaginative/pretend play (mean = 3.70), while nature-based learning/exploring nature (mean = 2.65) was moderately low and 'learning in an outdoor classroom' was low (mean = 2.00). There were no correlations between teachers' preferences and what activities students did, however, teachers liked to strongly liked all outdoor activities (means > 4.40).

Figure 4.28 Preferences for location of outdoor or nature-based learning in school

> 4.0

most parents and teachers like to strongly like any of the outdoor settings for their children to play or learn in

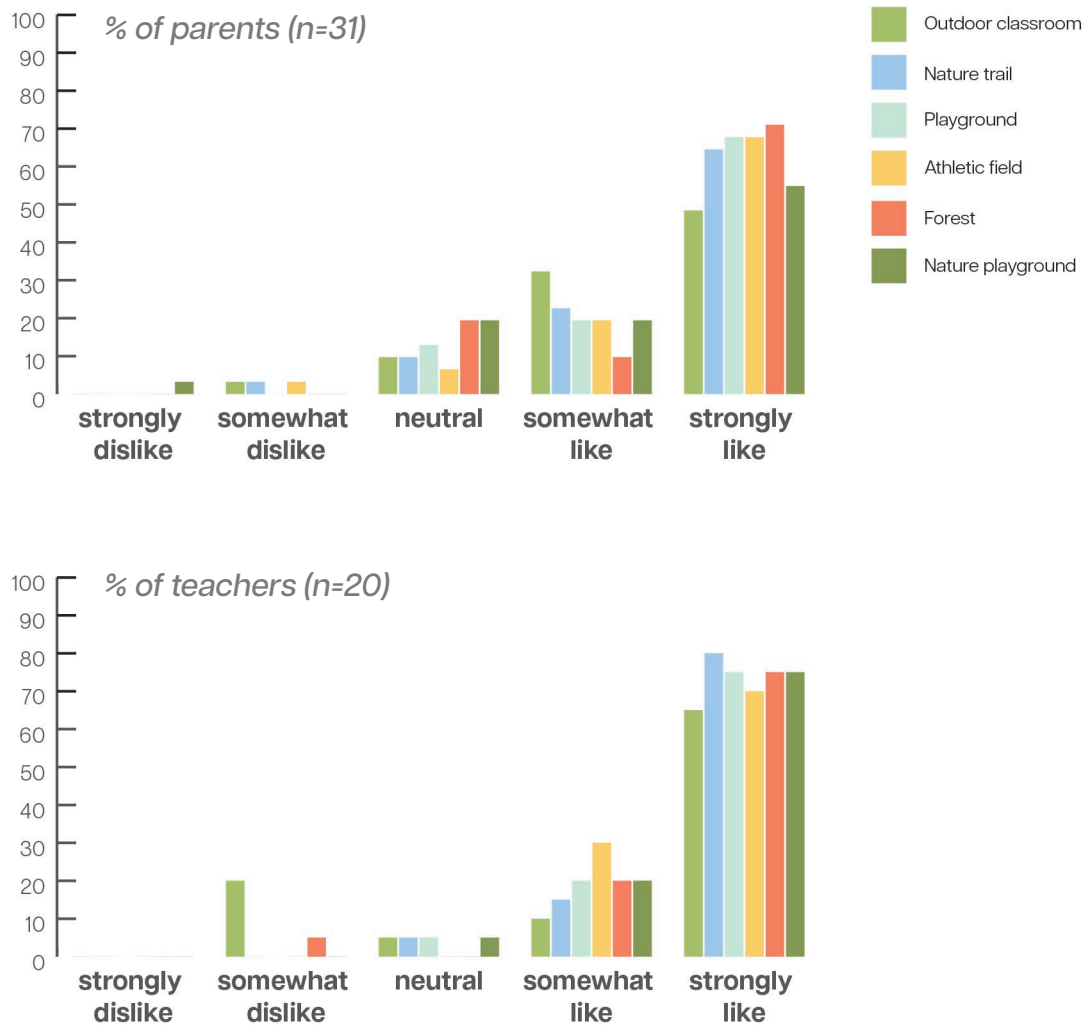


Figure 4.29 Outdoor setting preferences

> **3.84**

most parents and teachers like to strongly like any of the outdoor activities for their children to do during or outside school



sports



play on
playground



imaginative
play outside

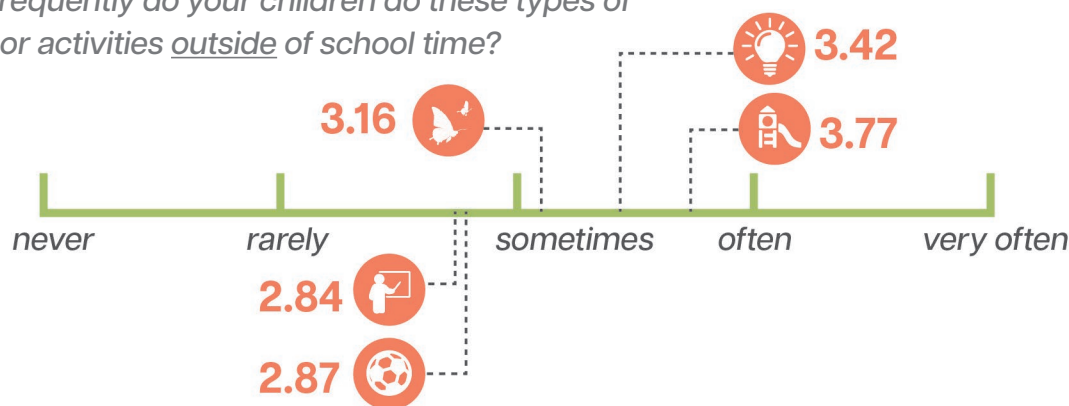


nature learning/
exploration



learning in
outdoor class

How frequently do your children do these types of outdoor activities outside of school time?



How frequently do your students do these types of outdoor activities during school time?

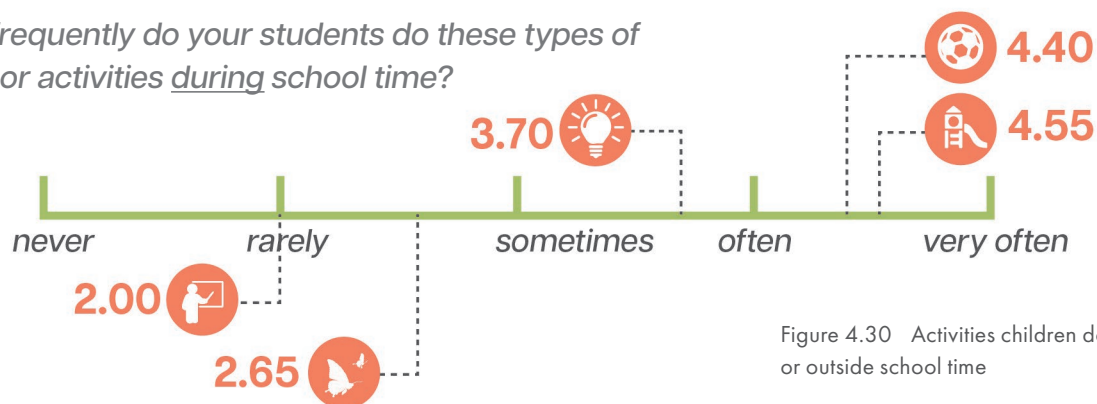


Figure 4.30 Activities children do during or outside school time

4.9 | Discussion

Statistical analyses revealed what perceived barriers and situations that may be associated with how often children/students went to greenspaces or received outdoor or nature-based learning in school. In addition, there were associations between the social data and the observations from the greenspace availability spatial analysis in the school attendance zone neighborhoods. Together, these analyses helped identify the needs in the study area. Refer to Appendix B for statistical analyses tables.

It was found that children were getting most of their exposure to greenspaces outside of school and through supervision of their parents and not during school. However, how often children went to greenspaces was still limited. Findings showed that parents took their children most often to neighborhood parks, only sometimes to nature parks, and rarely to never to athletic parks and gardens. We also learned that most children rarely had independence to go to any public greenspaces by themselves or with friends and that this was associated with their parents' comfort in them doing so. Additionally, at school, teachers rarely to never took their students to any of the greenspace types. Despite a nature park within a quarter mile away from the school, almost half of the teachers strongly disagreed or did not know there was a nature park close to the school.

These findings were supported by most parents and teachers feeling that their children did not spend enough time in nature during or outside school. To understand what may be limiting time in nature for children/students, a series of questions were asked to gather parents' and teachers' perceptions of barriers (i.e., sidewalk condition, safety concerns, distance), their knowledge of the benefits of contact with nature for children, attitudes towards outdoor settings of varying levels

of naturalness, various outdoor activities, and what school-specific barriers were experienced in the school system.

While attitudes and awareness towards children's contact with nature was thought to play a significant role in how frequently children went to greenspaces and the experiences they have (i.e., types of greenspaces and activities), they were not significantly correlated. Findings showed that both parents and teachers thought that frequent contact with nature was beneficial to their children's health and wellbeing, and liked all greenspace settings and outdoor activities that were presented, whether it was playing on a conventional playground or doing nature-based activities in more natural settings. According to parents, their children less frequently did sports, learned in an outdoor classroom, or did nature learning and exploration. In school, nature learning and exploration and learning in an outdoor classroom were also the least common activities. This was supported by most teachers who reported that they rarely to never incorporated outdoor or nature-based learning in their lessons. Parents and teachers also supported outdoor or nature-based learning whether it was on-campus or off-campus in nearby public greenspaces.

'Safety concerns in the area' and 'unsafe street crossings' were consistently moderately high barriers for both parents and teachers for taking their children/students to most greenspaces. This was supported by additional safety concerns parents identified (i.e., crime, drugs/alcohol, maintenance, bad neighborhood). Both parents and teachers agreed that distance to gardens was a moderately high barrier, as there were no gardens in the area. For teachers, 'lack of time' was a moderately high barrier for all greenspaces, 'distance from school' was moderately high and high for neighborhood

parks and athletic parks, and 'unsafe or disconnected sidewalks' was moderately high for athletic parks and nature parks. An additional barrier teachers said they experience was not having enough adult supervision to take students to nearby greenspaces. It was also thought that parents and teachers may have perceived more natural greenspaces as unsafe for their children to be in, however 'injury concerns' was consistently a moderately low barrier for all greenspace types. From this, there were only a few correlations between how frequently parents took their children to greenspaces and barriers. For teachers, there were more correlations between how frequently or comfortably they were taking their students to greenspaces, especially for gardens, and walkability and safety barriers.

While walkability and safety factors are critical for ensuring accessibility to greenspaces, teachers experience school-specific barriers that may not allow visits to greenspaces or having outdoor or nature-based learning in lessons. Based on students' low-academic levels, having a specific curriculum, the MAP testing requirements, and other school-specific barriers (i.e., district initiatives, school initiatives, lack of funding, training or professional development), it does not seem the school includes time for outdoor or nature-based learning. Funding and training or professional development may also be focused on the specific curriculum needs, and not nature-based learning. Most teachers disagreed that the school incorporates enough outdoor or nature-based learning and believed that frequent contact with nature in schools was important. One teacher said at the end of the year they have one day where they do work outside, otherwise it was limited to recess and field trips.

There is a need to increase the opportunities for children to be in contact with nature during and outside of school time in these areas. It is known that teachers and parents believed frequent contact with nature was beneficial for children, yet they were not spending enough time in nature. To do so, we must address the barriers that may prevent children from accessing greenspaces and address the systematic barriers within the schools to design and plan a child-friendly environment where nature-based learning and play is at the core. Chapter 5 outlines how five key goals identified from these findings can be addressed with four design and planning strategies. Goals include (1) providing more diverse nearby outdoor experiences for children in their neighborhoods, (2) providing nature-based learning spaces in outdoor settings for school use, (3) improving walkability in neighborhoods, (4) improving perceptions of safety, and (5) support children's contact with nature in education. Design and planning strategies that respond to these goals include (1) re-envision existing greenspaces, (2) creating safe and green routes to schools and greenspaces, (3) transform vacant lots, and (4) make policies to support city-efforts for children's contact with nature.

**improving children's access and
contact with nature**

design recommendations



Chapter 5 | Planning & Design Recommendations

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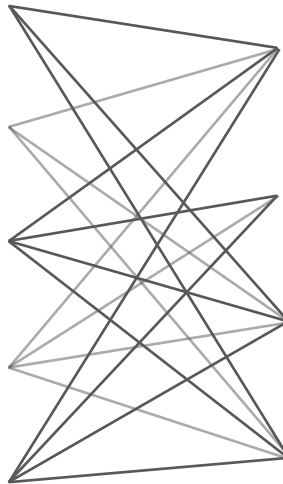
5.1 | Introduction

The following recommendations were based on landscape architecture and planning perspectives for addressing the findings from the literature review, social data analysis, and greenspace availability assessment. However, the issue of improving children's equitable access to and contact with nature is an interdisciplinary issue that requires collaboration between educators, community members, planners, landscape architects, local governments, parks and recreation, to non-profit organizations. This research was only conducted in Gladstone Elementary, so there is a need to expand this research across the district and city to understand what greenspaces are available to each school and the surrounding neighborhoods, the natural features they provide, what may prevent children from accessing those greenspaces, and what opportunities there are for increasing children's contact with nature.

Responding to the spatial and social analyses findings, a set of goals were created to improve children's contact with nature in the study area: (1) provide more diverse nearby outdoor experiences for children in their neighborhoods, (2) provide nature-based learning spaces in outdoor settings for school use, (3) improve walkability in neighborhoods, (4) improve perceptions of safety, and (5) support children's contact with nature in education. Responding to these goals, various design strategies were suggested such as re-envisioning existing greenspaces, creating safe and green routes to school and greenspaces, transforming vacant lots, and create policy to support planning for children's contact with nature in the city, see Figure 5.1. The following sections are a phasing plan to implement these strategies in the study area. In addition, potential partnerships, resources, and funding opportunities were provided to support these efforts, see Section 5.6.

Goals

- 1** Provide more diverse nearby outdoor experiences for children in their neighborhoods.
- 2** Provide nature-based learning spaces in outdoor settings for school use
- 3** Improve walkability in neighborhoods
- 4** Improve perceptions of safety
- 5** Support children's contact with nature in education



Strategies

RE-ENVISION EXISTING GREENSPACES

CREATE SAFE ROUTES TO SCHOOL AND GREENSPACES

TRANSFORM VACANT OR UNDERUTILIZED LAND

POLICY CHANGE

Figure 5.1 Goals and strategies for improving children's access and contact with nature.

1

RE-ENVISION EXISTING GREENSPACES

5.2 | Phase 1 – Re-Envision Existing Greenspaces

Goals: Providing diverse outdoor experiences in neighborhoods, providing nature-based learning spaces in outdoor settings for school use, improving perceptions of safety, and supporting children's contact with nature in education.

Why Re-Envision Existing Greenspaces?

Existing greenspaces in communities, such as neighborhood parks, can provide more opportunities for children to interact with nature. While many parks provide recreational opportunities (i.e., athletic courts/fields, walking paths, playgrounds), they often lack natural elements and spaces for children to engage with. To provide children with rich outdoor experiences requires a diversity of environments for them to explore, be creative, and challenge themselves. To do so, parks and public spaces can incorporate natural elements such as gardens, nature playgrounds, nature trails, and more. In addition, these spaces may already be places that children go to and will benefit from adding nature play and learning spaces, or they may be places children do not use as much, so adding nature play and learning spaces can create new opportunities.

Recommendations for Gladstone Elementary's School Attendance Zone:

There are two greenspaces, Kessler Park and Budd Park, in the school attendance zone that are within a $\frac{1}{4}$ and $\frac{1}{2}$ mile radius of Gladstone Elementary School and have potential to provide valuable nature learning and play opportunities. Refer to Figure 5.2.

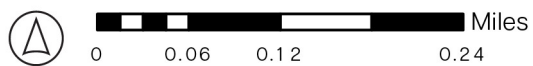
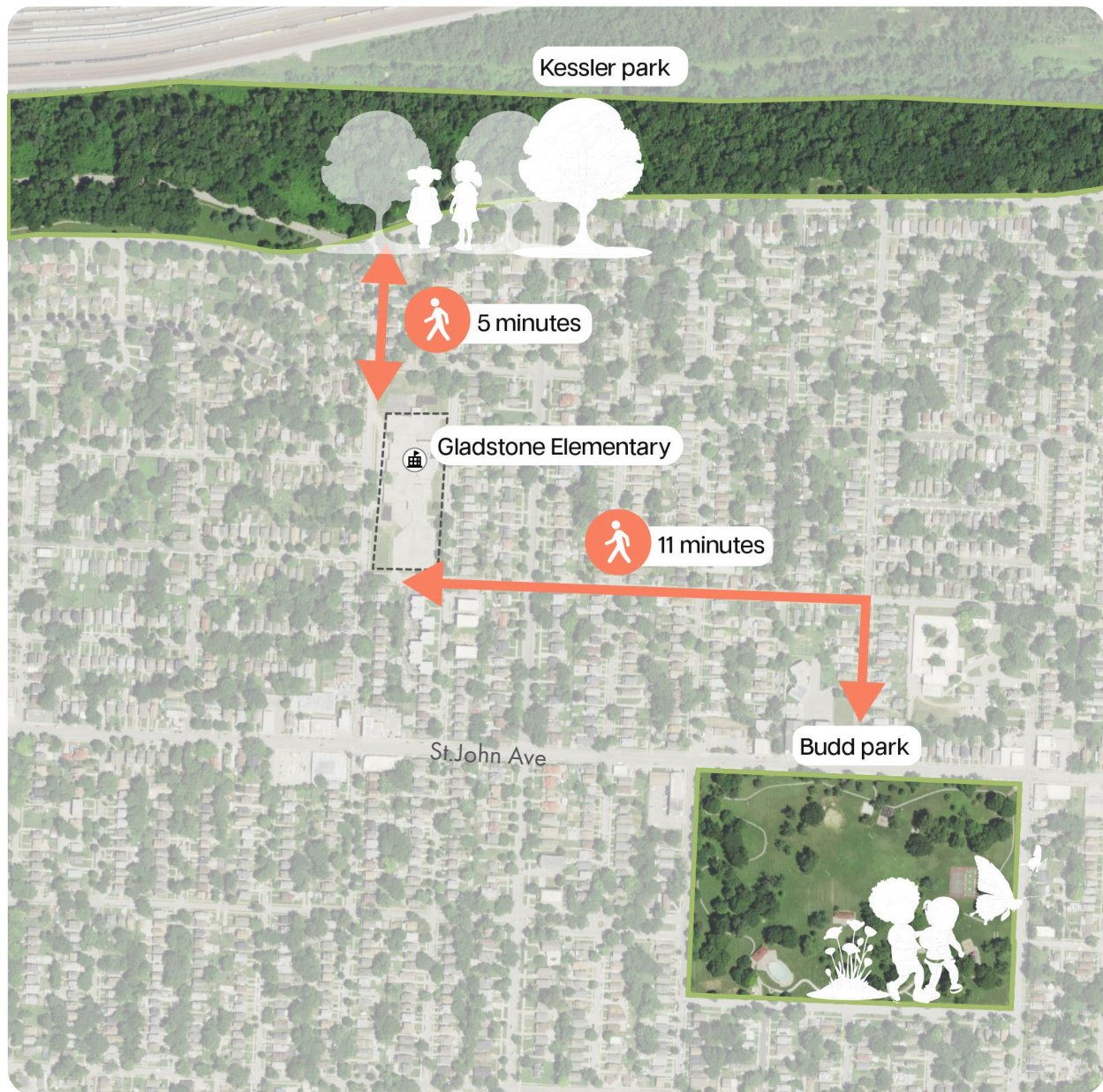


Figure 5.2 Greenspaces with potential to provide children with more contact with nature.

Existing Conditions



Design Suggestions





Kessler Park | Nature Park

In the immediate area of Gladstone Elementary School's attendance zone, there is a densely wooded area with mountain biking trails, shared-use lanes, and paved walking paths. Refer to Figure 5.3. Based on the greenspace availability assessment, there were not many opportunities for children to use this space besides the paths/trails. In addition, despite parents and teachers liking nature settings for their children to play and learn in, they frequented nature parks less. Additionally, many teachers were unaware of a nature park nearby the school despite it being within a 5-minute walk of the school. To encourage more families and schools to use Kessler Park as a resource and opportunity to engage their children/students in nature, various design concepts were provided:

Figure 5.3 Kessler Park conceptual plan

Re-Envisioning Kessler Park:

Plan child-friendly nature trail loops for children, families, and schools to use.

Providing several options of trail lengths that create loops can improve accessibility and may encourage children and families to use nature trails. In addition, wider paths, wayfinding and signage can promote use of the trails by families for their children's contact with nature. Child-friendly nature trails may also be a resource for schools to take their students to experience and study forests. Nature trails should have rest areas with picnic tables or benches for families or school groups to stop at. Trails can also be playful and include play spaces that serve as destinations for families to use the trails. Refer to Figure 5.4.

Enhance the paved walking path with vegetation and nature play or learning nodes

Along the existing paved walking path, as seen in Figure 5.5, there can be pockets of nature play opportunities to stop at. These pockets can occur where the path bends away from the road and there is open lawn space. These spaces can be nature playgrounds, pollinator gardens, restored meadows or rain gardens. Where nature play and learning pockets occur, interactive educational signage can provide information about the natural system,

plants, or wildlife. Additionally, maps along the path can inform where nature spaces/trails are located for families to use. In areas where the walking path is closer to the road, a vegetated buffer such as native plantings or rain gardens can provide a sense of safety from the road and add a sensory experience. To learn more about designing pathways or trails for children and families, refer to PlayCore's and Natural Learning Initiative's guide called Pathways for Play in Section 5.6.

Nature education center

While not in the immediate attendance zone (1 mile away), there are large, open, mown-lawn areas in Kessler Park that can be restored to ecosystems and become a resource for schools to learn about ecosystems and wildlife. In addition to the existing forested areas, these areas can have restored meadows, prairies, wetlands, or demonstration gardens, see Figure 5.6. Designated areas for learning such as an outdoor classroom pavilion or study stations along trails can allow classes to stop, gather, and do workshops or activities. In addition, families and schools can be involved in the process of restoring and maintaining these ecosystems through the help of local partners.

Child-friendly nature trail



Figure 5.4 Kessler Park, child-friendly nature trail

Enhanced paved walking path

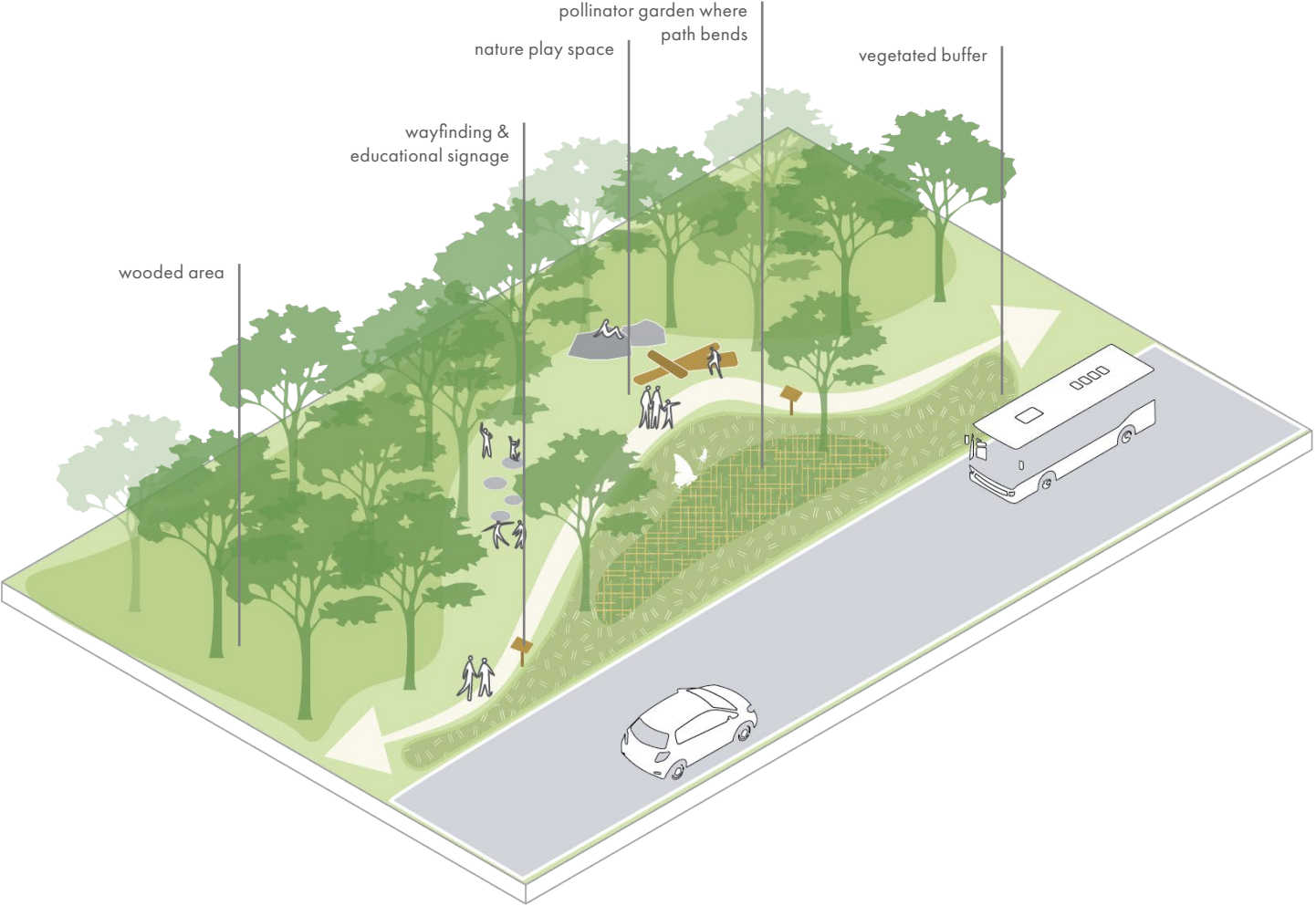


Figure 5.5 Kessler Park, enhanced paved walking path

Nature education center

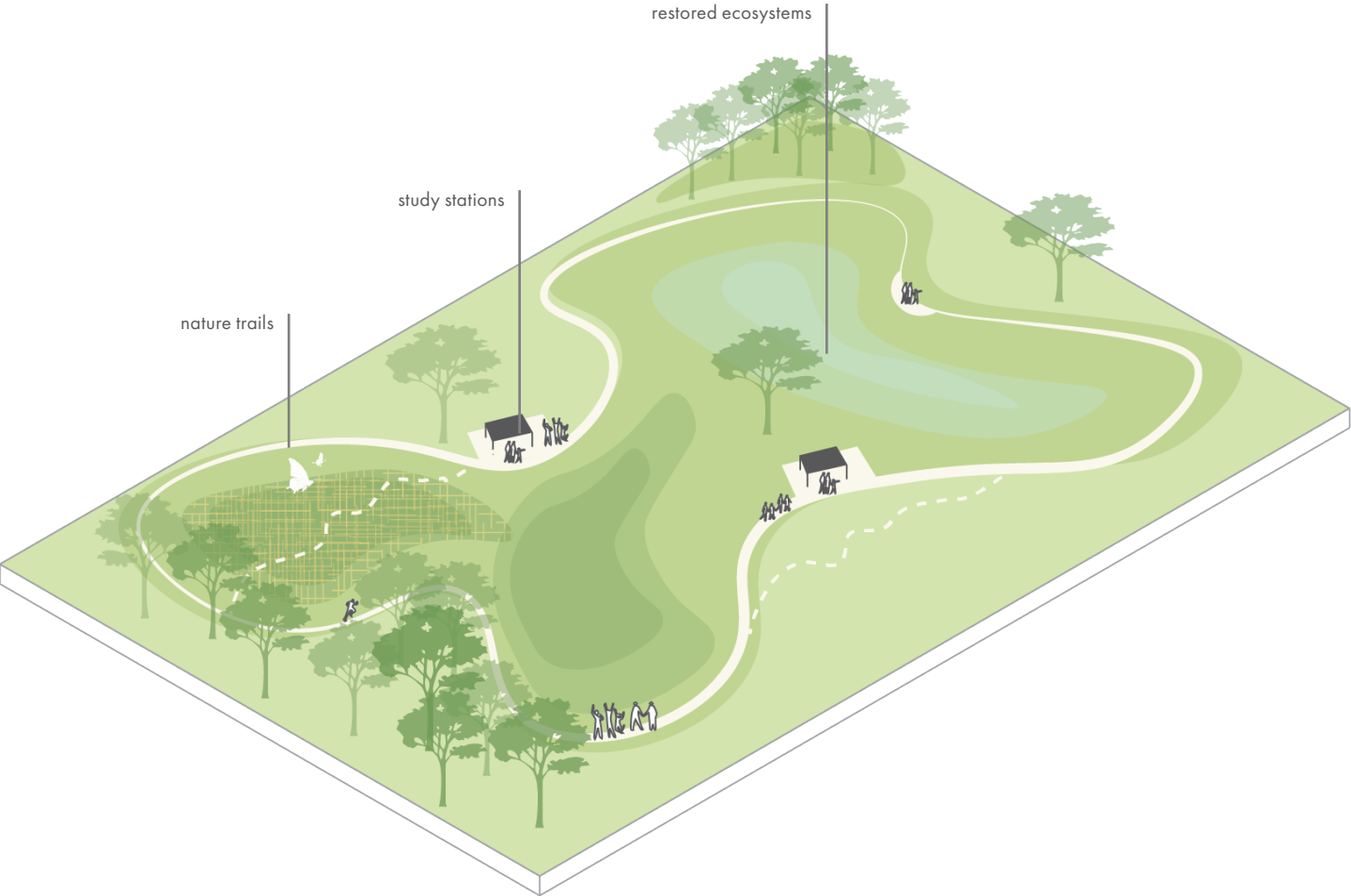


Figure 5.6 Kessler Park, nature education center

Budd Park | Neighborhood Park

Budd Park provides a variety of outdoor recreation features including playgrounds, athletic fields, courts, walking paths, a community pool, and picnic shelters. While there are many recreational opportunities, this park does not have nature play or learning opportunities. The Kansas City, Missouri Parks and Recreation also rated this park as 'fair,' meaning it is in a state of decline and is not maintained as often, so it is a priority for improvement. Since the neighborhood park was identified as the closest and most frequented greenspace that parents took their children to, introducing nature play elements can provide children with additional spaces to engage in nature activities while retaining the existing park features, see Figure 5.7.

Re-Envisioning Budd Park:

Nature playground

Nature playgrounds should be made of natural materials and interactive elements such as steppingstones, climbing boulders, balancing logs, building and digging areas, gardens, or playhouses. These types of spaces can allow children to play in an unstructured environment, interact with materials, engage their senses, and use their creativity or imagination. In addition, they can provide children with risk-taking opportunities, improve coordination, and challenge them physically through uneven surfaces, trails, climbing or balancing objects, or jumping from object to object. Nature playgrounds can be located under the tree canopy, to protect from the sun and heat and allow children to interact with fallen leaves, sticks, or nuts/fruits, see Figure 5.8. For more information on designing nature playgrounds, refer to Natural Learning Initiative's Green Desk or Design Resources, or Green Schoolyards America in Section 5.6.

Sensory or healing gardens

While playgrounds are important to challenge children physically, sensory gardens can create a passive space. Sensory gardens can provide various textures, sounds, and smells through a diversity of plants and hardscape materials to stimulate children's senses and provide a calming space, see Figure 5.8. These spaces can also include art, water features, or sound makers. Refer to the Natural Learning Initiative's resources on sensory gardens in Section 5.6 for more information.

Enhance paved walking paths with vegetation & gathering areas

As suggested for Kessler Park, incorporating more vegetated areas, small gathering or rest areas, or play opportunities can provide children and families with more engaging walking experiences and places to stop along the way. Refer to Figure 5.8

Demonstration gardens

Demonstration gardens may include rain gardens where children can learn about water-loving plants and capturing and infiltrating water, pollinator gardens to learn about native plant species and insects, or vegetable gardens to learn about growing food. With each garden, educational signage can provide information about their purpose. Schools can also be involved in creating and maintaining the gardens to use for their lessons. To provide a gathering place for workshops or events, demonstration gardens can be located near the existing picnic pavilion, refer to Figure 5.9. Refer to KC Healthy Kids and Master Gardener's in Section 5.6 for more information on creating community gardens.

Existing Conditions



Design Suggestions

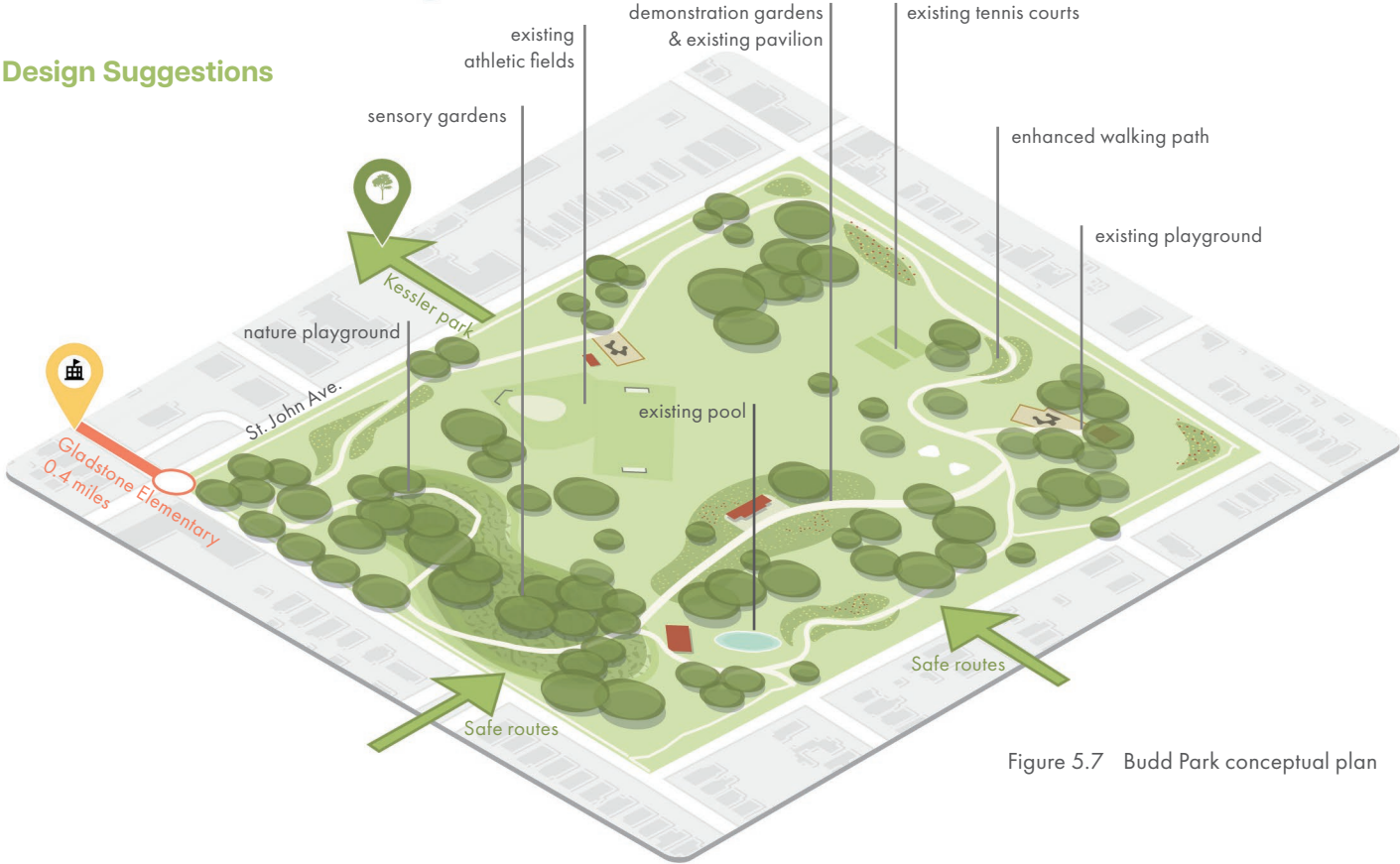


Figure 5.7 Budd Park conceptual plan

Nature playground, sensory garden, enhanced walking paths

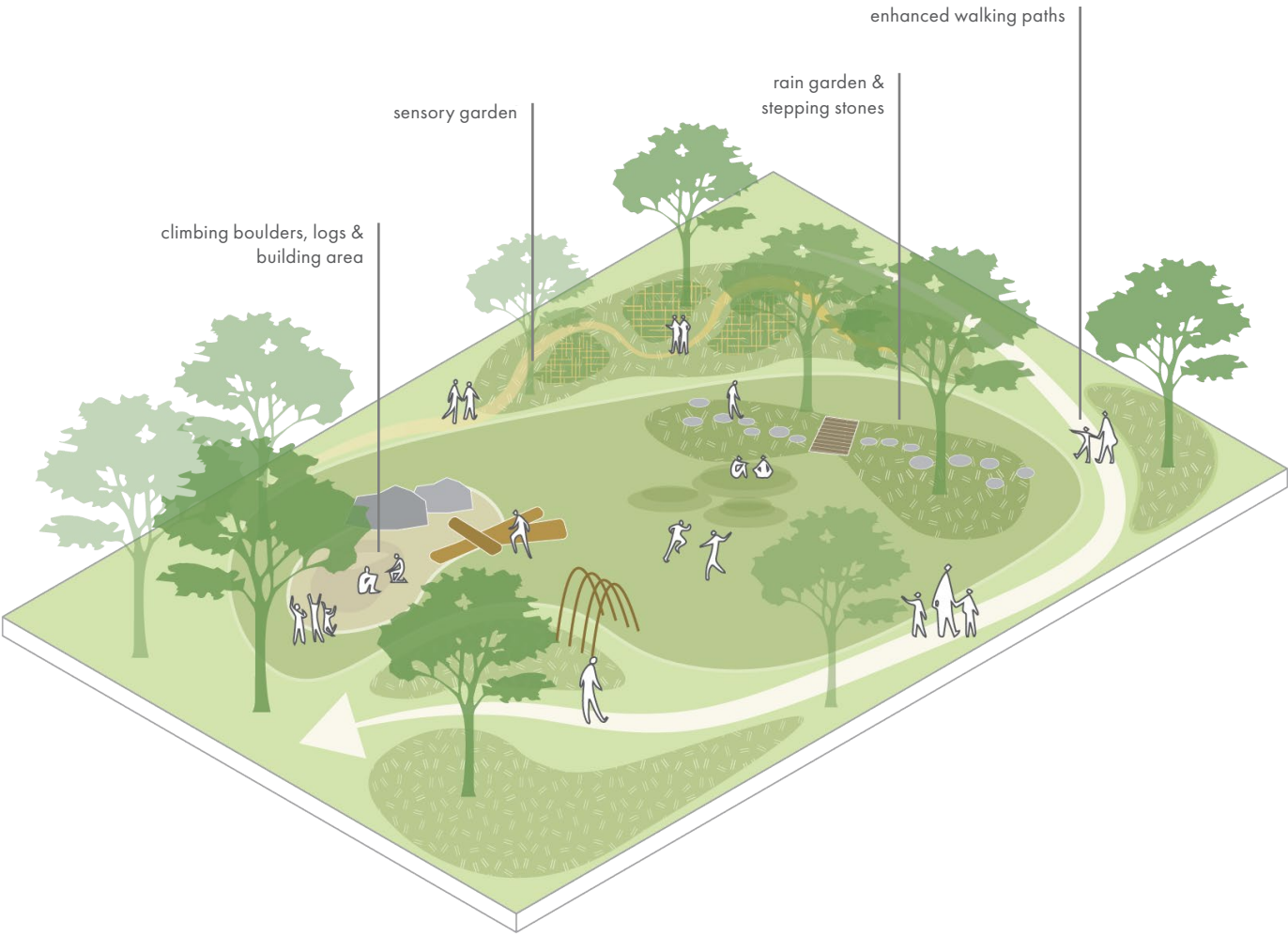


Figure 5.8 Budd park, nature playground

Demonstration gardens at
existing pavilion



Figure 5.9 Budd park, demonstration gardens

Next Steps for Re-Envisioning Existing Greenspaces

While these design concepts were informed from the survey findings and spatial analysis, there are additional suggestions to implement these projects within the study area and across the city, see Figure 5.10. The Children & Nature Network, National League of Cities, and Cities Connecting Children to Nature have created a guide based on what cities are doing to add nature play and learning into existing parks and public spaces, see Section 5.6. This includes inventory of existing city parks and playgrounds, surveying families and community members to identify barriers, considering ways to enhance spaces for young children, addressing city policies to promote naturalized spaces, develop nature play design guidelines, engage the community to co-create nature play spaces, and raise awareness of nature play spaces and increase access (Adding Nature Play Into Public Spaces: A Pathway, 2021). The following are suggestions for the next steps for re-envisioning greenspaces in the Gladstone Elementary School attendance zone.



Figure 5.10 CCCN strategies for adding nature spaces to public spaces

Engage with the community

The design suggestions for Kessler Park and Budd Park were initial ideas based on the findings in this research, however, there is a need to receive input and feedback from community members. Re-envisioning greenspaces in the Gladstone Elementary School's attendance zone should not only include children and families in engagement events, but also schools to support teachers' needs for outdoor and nature-based lessons.

Raise awareness of natural spaces

As identified in the KCMO parks and recreation plan, there was a need to raise awareness of parks and recreational facilities. It is important to inform the public of nature spaces near them and especially promote their use by children. In addition to raising awareness through community engagement, online resources should provide information about nature play spaces in the city and how to access them for families and schools to use (Adding Nature Play Into Public Spaces: A Pathway, 2021). Additionally, incorporating wayfinding and signage in neighborhoods can improve awareness and accessibility of these nature spaces. With Gladstone, signage and marketing should be translated into common languages that are present in the communities.

Potential Partnerships

Potential partners for re-envisioning greenspaces may include KCMO Parks and Recreation, the University of Missouri Extension Master Gardener volunteer program, Heartland Conservation Alliance, local landscape architecture firms, and the Children & Nature Network. These groups can be involved in community engagement (i.e., with children, families, and schools), education, redesigning greenspaces, restoring landscapes, creating city-wide design guidelines for nature spaces, and creating gardens. See Section 5.6 for more information on partnerships and resources.

2 SAFE ROUTES TO SCHOOL AND GREENSPACES

5.3 | Phase 2 – Safe Routes to School and Greenspaces

Goals to Meet: Improve walkability and perceptions of safety in neighborhoods, and support children’s contact with nature in education.

Why Create Safe and Green Routes?

The next step is to plan safe routes to school and greenspaces in the neighborhoods. Given that parents and teachers identified walkability and safety barriers for some greenspaces in the area, it is important that we address those issues to increase children’s safe access to these greenspaces. In addition, greening streets can increase children’s contact with nature in areas that do not have nearby greenspaces, see Figure 5.11.

Creating Safe Routes to School & Safe Routes to Parks

The Safe Routes Partnership is a national nonprofit that aims to improve walkability to school and in daily life. They suggest that safe routes be prioritized in low-income and communities of color who experience the impacts of historical disinvestments, where crime and violence is high, and physical activity is low (Safe Routes to Parks Action Framework, n.d.). In addition to Safe Routes to Schools, it is suggested this effort can incorporate safe routes to parks. The Safe Routes to Parks action framework guides local governments to create safe and equitable access to parks for disadvantaged communities, see Section 5.6. This framework is centered around engaging community members and creating partnerships with local organizations. The four steps to create safe routes to parks include assess, plan, implement, and sustain (Safe Routes to Parks Action Framework, n.d.)

Assess:

Identify parks or neighborhoods of focus, analyze the study area to gather assets and barriers of accessibility and conduct a walkability and accessibility assessment (Safe Routes to Parks Action Framework, n.d.).

Plan:

Create goals and actions based on community feedback, identify policy changes, and incorporate Safe Routes to Parks into other community improvement plans (Safe Routes to Parks Action Framework, n.d.).

Implement

Improve parks: park design, street design, park amenities, ADA compliance, signage and wayfinding, and maintenance.

Improve routes to the parks: maintenance, street design, signage and wayfinding, and connectivity (i.e., connect neighborhood and other destinations to parks).

Create programs to encourage walking and biking, improve personal safety, use crime prevention through environmental design (Safe Routes to Parks Action Framework, n.d.).

Sustain

Establish a sustainable financial model, incorporate Safe Routes into park and recreation planning and policy, and evaluate the impact after implementation (Safe Routes to Parks Action Framework, n.d.).

Planning Safe Routes and Green Streets

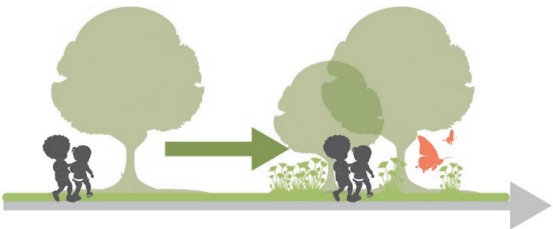


Figure 5.11 Green streets



Figure 5.12 Planning safe routes and green streets in the study area

Recommendations Gladstone Elementary School's Attendance Zone:

This study identified unsafe street crossings and safety concerns in the area as higher barriers for both parents and teachers for some of the greenspaces. To address these, curb extensions, clearly marked street crossings, and speed control elements (i.e., speed tables) should be prioritized throughout these neighborhoods and at major intersections where greenspaces are located. In addition, prioritizing repairing and redesigning routes from school to greenspaces may encourage schools to use nearby nature in lessons without need for bus transportation or travelling further to other natural spaces with educational spaces. However, a walkability and accessibility assessment and further community engagement is needed to identify specific areas of concern.

In addition to implementing traffic calming methods and repairing/connecting sidewalks, greening streets should be prioritized in neighborhoods not within a 5–10-minute walk of a greenspace. Refer to Figure 5.12 to see what neighborhoods to prioritize for green streets in the study area and what key connections are needed. Creating vegetative buffers, such as

stormwater curb extensions, can widen the space between the sidewalk and road, create a visual buffer from the road, and can improve pedestrian safety, see Figure 5.13. Improving the safety of neighborhood streets and implementing green infrastructure can provide children with more nature play and physical activity opportunities in their neighborhoods. Additionally, while some neighborhoods may be located further from greenspaces, improvements to the streets can create a more pleasant pedestrian experience to these greenspaces.

Potential Partnerships

KCMO Parks and Recreation, Mid America Regional Council, KC Healthy Kids, Safe Routes Partnership, and Northeast Kansas City Chamber of Commerce are all organizations with missions to improve pedestrian safety and active transportation. These groups can engage with community members, including families and schools, to identify walkability and accessibility concerns and plan/design routes to greenspaces and schools. See Section 5.6 for more information on partnerships, resources, and funding.

Planning Safe Routes and
Green Streets

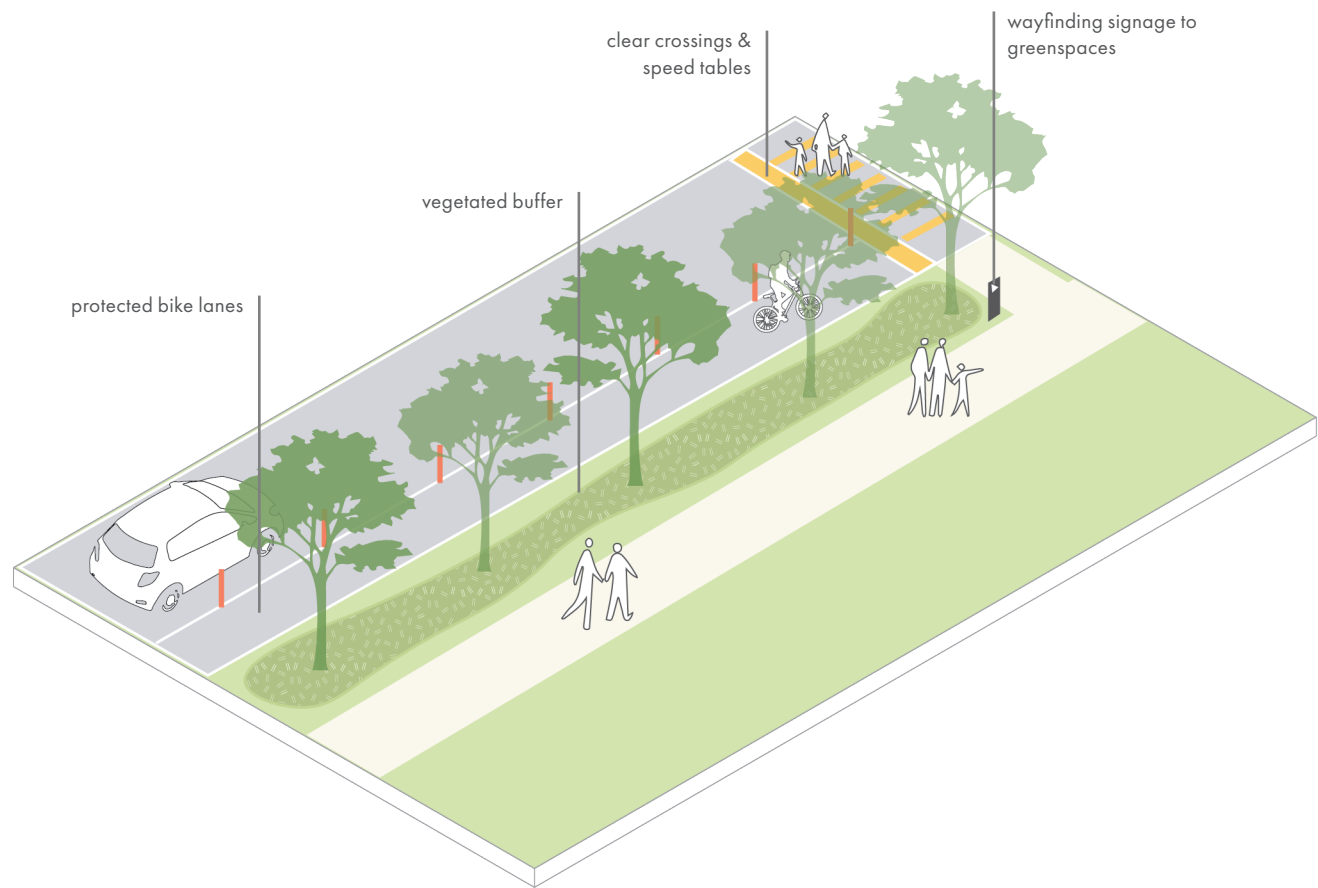


Figure 5.13 Creating safe routes to
parks & schools

3 TRANSFORMING VACANT LOTS

5.4 | Phase 3 – Transforming Vacant Lots

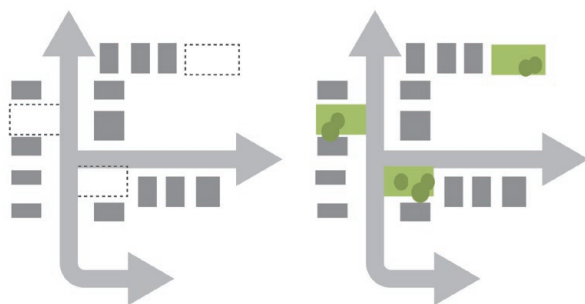
Goals to Meet: Providing diverse outdoor experiences in neighborhoods, providing nature-based learning spaces in outdoor settings for school use, improving walkability and perceptions of safety, and supporting children’s contact with nature in education.

Why Transform Vacant or Underutilized Land?

To increase the number of greenspaces in neighborhoods where space may be limited, small-scale urban greening (SSUG) strategies can be used (Loder, 2020). Refer to Figure 5.14. With historical disinvestments in eastside Kansas City, MO, there is an abundance of underutilized and vacant land within the neighborhoods that can negatively impact communities including creating concerns for safety and feelings of neighborhood destabilization. Refer to Figure 5.15 to see vacant land across Kansas City. Many cities such as Chicago and Philadelphia have established vacant lot policies and programs that aim to improve equitable distribution and access to quality greenspaces in disadvantaged communities (Loder, 2020). Common goals for transforming vacant land include providing ecological services (i.e., stormwater management), urban greening, neighborhood stabilization, crime reduction, economic revitalization, community empowerment, and improving health (Loder, 2020).

Transforming underutilized and vacant land has the potential to create a network of different types of greenspaces for children to be engaged in playing outdoors and in nature within their neighborhoods. It can address many of the issues and preferences identified from the data analysis including improving equitable distribution and access to nearby quality greenspaces for children in their neighborhoods, improvements to health and wellbeing, and reducing walkability and safety concerns.

As with the previous strategies, to begin a vacant lot transformation includes gathering local organizations that can support the project, acquiring funding, picking lots, developing a design through community engagement, and collecting materials to implement the project (Heartland Conservation Alliance, n.d.). Refer to Figure 5.17 to see the process of vacant lot transformations.



- Study Area Elementary Schools
- KCPS Elementary Schools
- Major Roads & Highways
- Kansas City, MO
- KCPS District Boundary
- Gladstone Attendance Zone
- KCPS Attendance Zones
- Greenspaces
- LandBank & Homestead Lots
- Greenspace 1/4 mi Buffer

Figure 5.14 Transforming vacant lots strategy

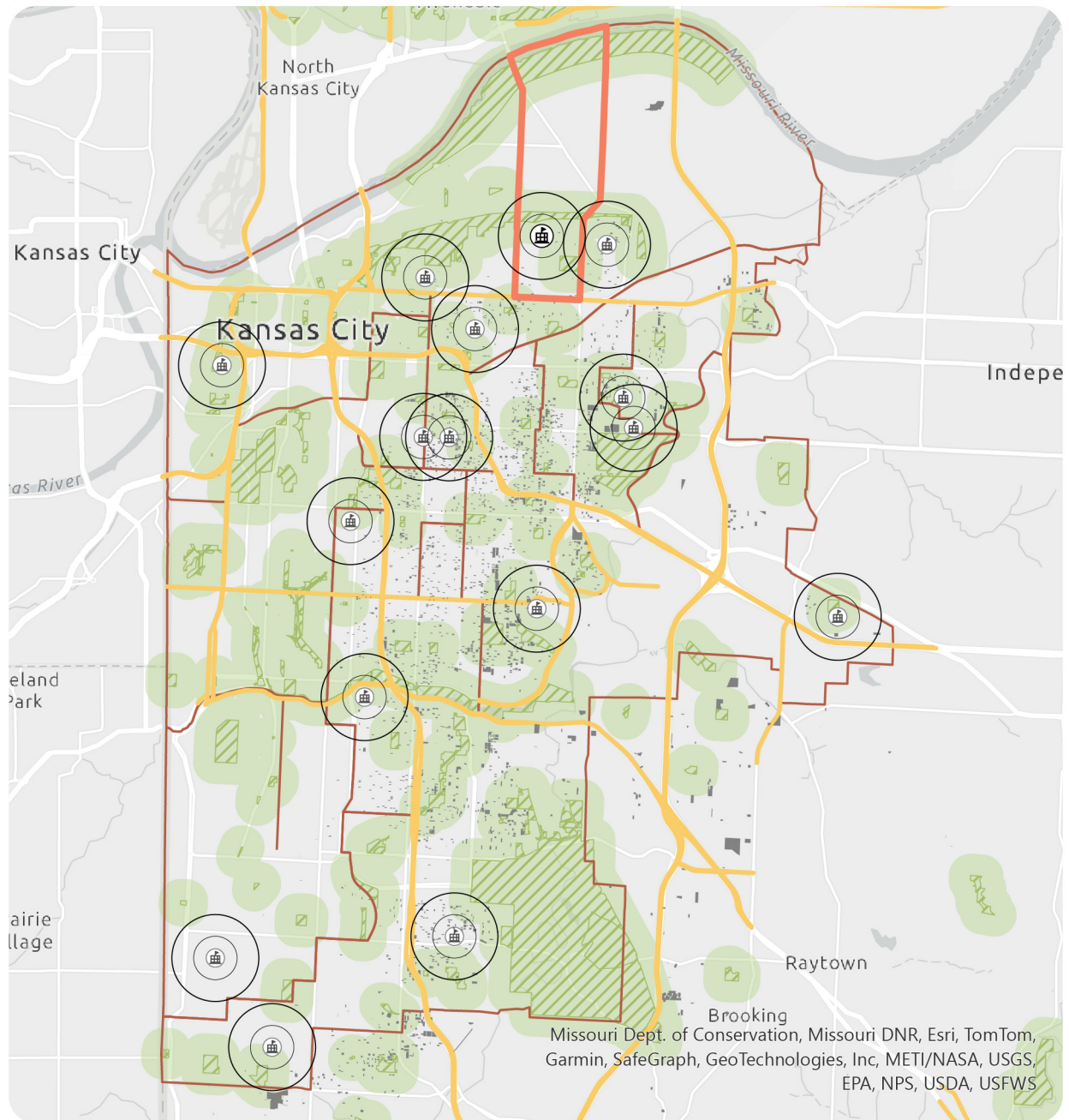


Figure 5.15 Vacancy in Kansas City, Missouri

Areas in Need of Vacant Lot Transformations

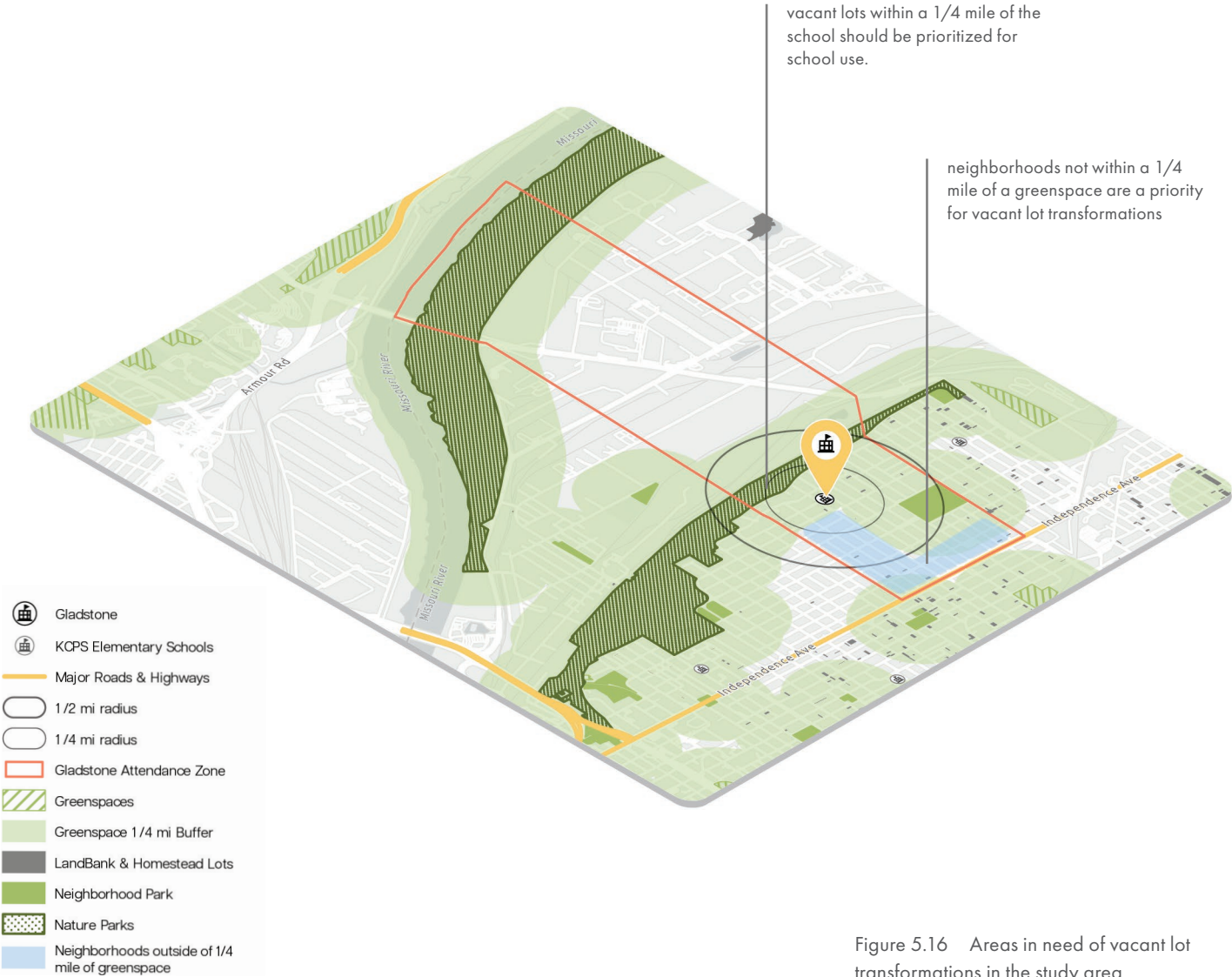


Figure 5.16 Areas in need of vacant lot transformations in the study area

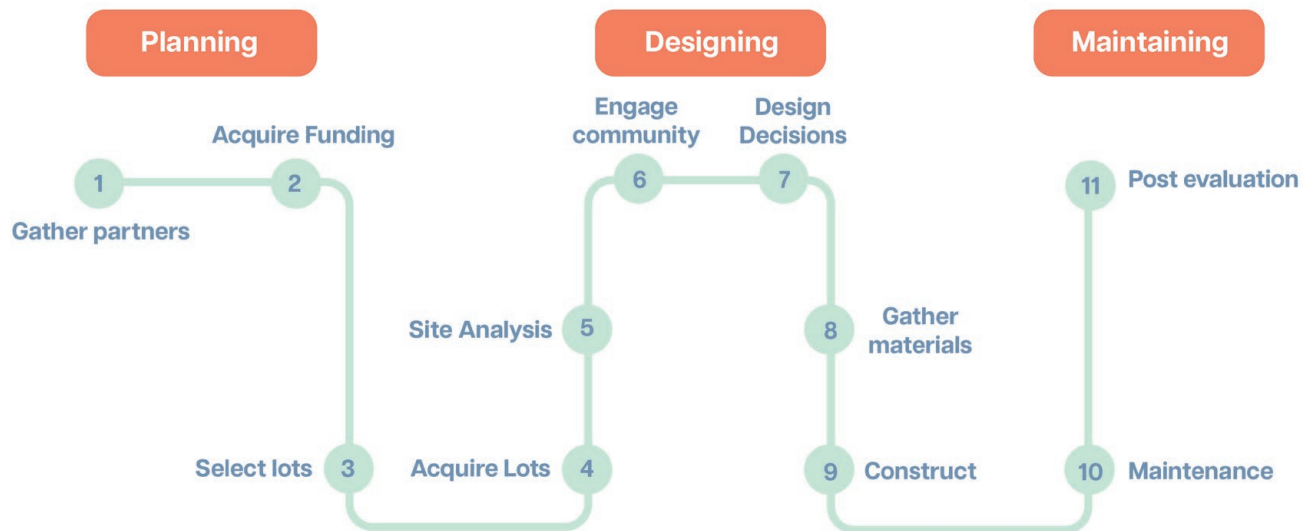
Figure 5.17 (opposite) Steps for transforming vacant lots

Potential Partnerships

The Heartland Conservation Alliance and Urban Neighborhood Initiative (UNI) are organizations in the Kansas City Area that partners with neighborhoods in eastside Kansas City to transform vacant lots in their neighborhoods. The UNI has also created a guide called Vacant to Vibrant to help communities transform vacant lots. KCMO Parks and Recreation can also be a key partner in vacant lot transformations. Within the parks and recreation master plan, there is a need to provide more equity in the system, with plans to acquire park and open space in communities most in need. Vacant lots can be acquired and incorporated into KCMO Parks and Recreation system to increase usable greenspaces in neighborhoods. In addition, children, families, and schools should be involved in the process to meet their needs and identify which vacant lots to transform and for what purpose. See Section 5.6 for more information on partnerships, resources, and funding.

Acquiring Vacant Lots | Homesteading Authority and Land Bank

To start a vacant lot transformation project requires acquiring the lots. Many cities have organizations that obtain and manage vacant lots to sell them at affordable prices to community members or other organizations. The City of Kansas City, MO has nonprofit corporations including the Kansas City Homesteading Authority and Land Bank that obtains vacant properties, manages, and sells them to homeowners and investors that want to improve the community. Interested parties in acquiring vacant land to repurpose can include nonprofit organizations, governmental entities, academic institutions, individuals who own residential property, and more (Policies and Procedures for the Acquisition and Disposal of Properties, 2013). Buying vacant lots owned by these two corporations should be prioritized as they are owned by the city and not private owners.



Recommendations for Gladstone Elementary School Attendance Zone:

There are five Land Bank vacant lots in neighborhoods that are not within a ¼ mile radius of a greenspace. These lots should be prioritized to provide the children in the immediate area a place to engage in nature. For school purposes, vacant lots that are situated within the ¼ mile, or 5-minute walk, radius should be prioritized for frequent use for school purposes. There are three Land Bank vacant lots within a ¼ mile or 5-minute walk radius of the school. Refer to Figure 5.16, for potential vacant lots to transform. Vacant lots for school purposes should be corner lots to increase visibility, accessibility, and reduce disturbance to residences when being used by schools. Selecting a lot for school use should also consider its size and how many students will use it at once. In addition, with concerns for keeping students together and reducing vandalism, a fenced lot may reduce these concerns.

While there are not many vacant lots in Gladstone Elementary School's attendance zone, there are other school attendance zones in the KCPS district that have an abundance of vacant lots with potential to be transformed to support children's contact with nature.

Potential Vacant Lot Designs for Children's Contact with Nature

The following are potential design ideas for children's contact with nature, however community engagement and site analysis is needed to identify what residents and schools want in specific vacant lots and what is possible according to lot types.

Community gardens

There were no gardens found in these neighborhoods and both parents and teachers rarely to never take their children to gardens, so vacant lots can be suitable for introducing gardens in their community.

Pocket park

In areas that are not close to a park, vacant lots can be used as small parks embedded into the neighborhood. Gathering areas and nature playgrounds can activate the space for adjacent households to use.

Pollinator or rain garden

If vacant lots are too narrow or residents do not want an active space next to their property such as community gardens or pocket parks, a passive space such as a pollinator or rain garden can introduce nature in the neighborhood and improve perceptions of safety. Refer to Figure 5.18 for vacant lot designs.

Additional suggestions for vacant lot designs, implementation, and maintenance can be found in the Vacant to Vibrant guide or Heartland Conservation Alliance guide in Section 5.6. The Natural Learning Initiative's Green Desk also provides information on various natural elements to incorporate in nature play spaces.

Vacant Lot Design Concepts



Figure 5.18 Vacant lot design concepts

5.5 | Policy Change

Goals to Meet: Providing diverse outdoor experiences in neighborhoods, providing nature-based learning spaces in outdoor settings for school use, improving walkability and perceptions of safety, and supporting children's contact with nature in education.

Policy that Prioritizes Children's Contact with Nature

To address inequities for children's access to greenspace and contact with nature, cities must create systematic change through writing policy that prioritizes connecting children to nature, see 5.19. Not only should all children have access to parks, but also nature-based play and learning opportunities for a healthy childhood development. The previous strategies in this document: (1) re-envision existing greenspaces, (2) create safe and green routes to school and greenspaces, (3) and transforming vacant lots, have potential to improve children's access and contact with nature. In addition, nature should be incorporated into the school system since children spend much of their time in school and contact with nature has been shown to improve academic achievement. It was found that school-specific barriers such as curriculum, district initiatives, school initiatives, funding, and training and professional development limited teachers from incorporating nature-based learning in their lessons. There is a need to guide teachers and schools for including nature in school. Support, on a larger scale, can create a city-wide effort for addressing equity in children's access and contact with nature.

Cities across the nation are joining Children and Nature Network and National League of Cities in the Cities Connecting Children to Nature network. These networks help city officials with assistance in developing these strategies for children's nature connection to incorporate in city planning, programming, and policymaking. Refer to the CCCN Municipal Action Guide in Section 5.6. Many cities have developed strategies for connecting children to nature through incorporating nature-play and learning in parks, schools, libraries, and childcare centers. While these efforts connect children to nature in cities, they also address other city goals such as improving the environment, supporting health and wellbeing, creating educational opportunities, and supporting the economy (Cities Connecting Children to Nature, n.d.). Kansas City should become a part of the Children and Nature Network to help support efforts for increasing children's contact with nature. To begin, it is suggested to use the CCCN Systems Change Measurement Toolkit which is a city-wide assessment of the policies, practices, distribution of resources, partnerships, and more that contribute to children's equitable access to nature (Systems Change Measurement Toolkit, n.d.). Additionally, as other cities have done, Kansas City can pass the Children's Outdoor Bill of Rights (COBOR) which addresses the rights of children's outdoor experiences, provides an outline for city goals, tools for raising awareness, and a framework for implementing children's connection to nature programs. This bill would create a city-wide effort and collaboration between schools, the health department, the city, to non-profits (Children's Outdoor Bill of Rights (COBOR), n.d.).



**policy for children's
contact with nature**



**Improve equitable access and
contact with nature for children**

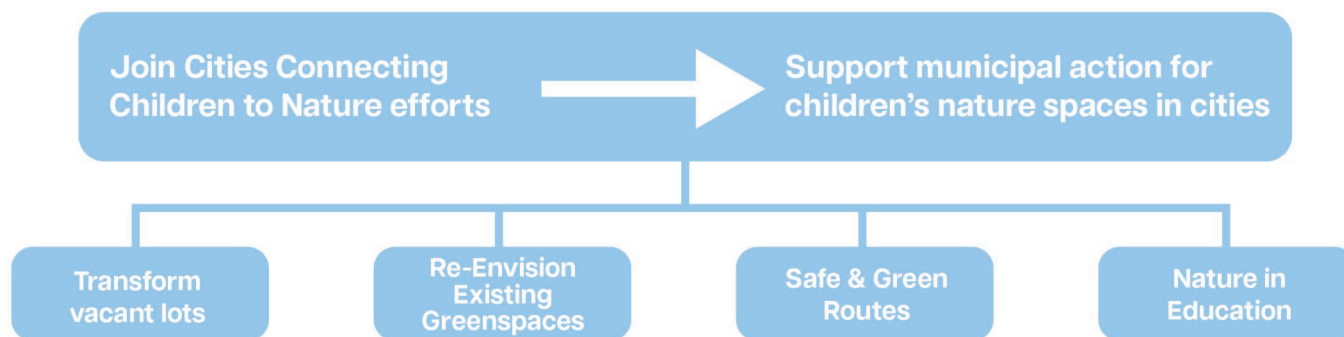


Figure 5.19 Policy for children's access and contact with nature

5.6 | Partnerships and Funding

Below are potential local and national organizations that can help support Kansas City with creating more opportunities for children to be in contact with nature:

Table 5.6 Resources master list

Partners & Resources			
Partner Name	Description/Role	Resources	Links
KCMO Parks and Rec	Can play a key role in these efforts as there are city plans to create a partnership with the KCPS district, enhance the community gardens programs, acquire new space for parks, plan trails to connect greenspaces, and protect natural areas.	Website	https://kcparks.org/
Kansas City Public Schools	Engage with local and national partners in projects that support children's contact with nature in the community and incorporate nature in education.	--	--
Heartland Conservation Alliance - a 501(c)3 organization	Protect and restore natural resources.	Website	https://www.heartlandconservationalliance.org/
	Transform vacant lots.	Restoring Vacant Lots	https://www.heartlandconservationalliance.org/restoring-vacant-lots/
	Engage and educate the public about restoration and protecting natural resources.	A guide for transforming vacant lots with additional resources.	
	Connect people to nature.	Green Guard Stewardship Training Program A free training program that educates the community about the environment and engages in classes and programs. Participants can include community members, officials, schools, teachers, children, and more.	https://www.heartlandconservationalliance.org/green-guard-stewardship-training-program/

Urban Neighborhood Initiative - a Community Development Corporation (CDC)	Community engagement, community development, and youth programs.	Vacant to Vibrant Guide	https://vacanttovibrantkc.org/
		<i>A guide with steps for selecting, designing, and implementing vacant lot transformations.</i> Website	https://uni-kc.org/
Northeast Kansas City Chamber of Commerce	Advocates for plans and projects for economic and social growth in Northeast Kansas City businesses, institutions, and neighborhoods.	About	https://nekcchamber.com/about-us/
Mid America Regional Council (MARC)	Nonprofit that organizes partners and creates plans that addresses issues such as early learning, community development, and more. Key goals include having successful people, engaged people, healthy people, vibrant places, connected places, and green places. MARC can play a key role in engaging communities, supporting teachers with training, and creating a plan for improving children's contact with nature.	Website	https://www.marc.org/
Homesteading Authority and Land Bank	For vacant lot acquisition.	Homesteading	https://www.kcmo.gov/city-hall/housing/homesteading
		Land Bank	https://www.kcmo.gov/city-hall/housing/landbank
KC Healthy Kids	Helps Kansas City communities to improve children's health and well-being through community education, local and regional advocacy, and more. There are programs that support community garden projects, engaging children in community changes, planning safe routes for physical activity, and supporting children's mental health.	Website	https://www.kchealthykids.org/
University of Missouri Master Gardener Volunteer Program	Can educate communities on gardening and environmental education. There are many hands-on and educational events, workshops, and programs available.	Website	http://www.mggkc.org/
		Community Projects	http://www.mggkc.org/our-projects/community-projects/
		Children's Programs	http://www.mggkc.org/our-projects/childrens-programs/
		Educational Opportunities	http://www.mggkc.org/public-education/advanced-education/

Children & Nature Network	An organization that supports global action for improving children's healthy development through connection with nature. They support leaders, educators, activists, practitioners, and parks in improving children's access and contact with nature.	Website	https://www.childrenandnature.org/
		Cities Connecting Children to Nature <i>To see what cities are involved, their strategies, partnerships, research, and more.</i> - Resources for CCCN cities - Municipal Action Guide - Creating Systems Level Change in Cities: A Toolkit - Citywide Planning for Equitable Access to Nature - Equity Mapping: Young Children & Nature - Children's Outdoor Bill of Rights - Greening School Grounds & Outdoor Learning	https://www.childrenandnature.org/cities/cities-connecting-children-to-nature/ https://www.childrenandnature.org/resources/category/cities/ https://www.childrenandnature.org/wp-content/uploads/2017/10/CCCN-Municipal-Action-Guide-webready.pdf https://www.childrenandnature.org/resources/creating-systems-level-change-in-cities-a-toolkit/ https://eadn-wc04-796033.nxedge.io/wp-content/uploads/CCCNSystemsMap.pdf https://www.childrenandnature.org/resources/equity-mapping-resource-guide-for-young-childrens-access-to-nature/ https://eadn-wc04-796033.nxedge.io/wp-content/uploads/CCCN_COBOR_whatIs_21-1-20_final.pdf https://www.childrenandnature.org/greening-school-grounds-outdoor-learning-global-action-agenda/

Children & Nature Network continued		Apply to Nature Everywhere	https://www.childrenandnature.org/resources/nature-everywhere-rfa/
		A two-year commitment where communities implement Nature Everywhere visions and plans of creating equitable access to nature. Technical assistance, resources, grants and opportunities are available. Institutional partners (school districts, municipal/county/regional government representative) and essential community partners can apply.	
		Nature Everywhere Conference	https://www.childrenandnature.org/conference/about/
		Brings leaders of different disciplines together that are committed to health and well-being of children and communities to share strategies for how to improve equitable access to nature.	
National League of Cities	NLC is partnered with Children & Nature Network and Cities Connecting Children to Nature. They advocate and protect cities through influence on policy, strengthening local leadership, and providing solutions.	Learning Outside Resources	https://www.childrenandnature.org/schools/learning-outside/
		Adding Nature Play into Public Spaces Guide	https://www.childrenandnature.org/wp-content/uploads/Nature-Play_ECNC.pdf
		About	https://www.nlc.org/about/
Natural Learning Initiative	For nature play space design assistance, professional development and training, research, resources, and programs. Online courses are available to learn about nature play and learning spaces.	Website	https://naturalearning.org/
		Pathways for Play Designing pathways or trails for children and families.	https://www.playcore.com/programs/pathways-for-play
		Green Desk Nature play/learning space elements	https://naturalearning.org/greendesk/
		Design Assistance for nature spaces	https://naturalearning.org/design-assistance/
		Professional Development & Training	https://naturalearning.org/professional-development/
		Sensory Gardens	https://naturalearning.org/sensory-gardens/#:~:text=Sensory%20gardens%20provide%20intimate%20spaces,%2C%20flags%2C%20and%20children's%20art.

Green Schoolyards America	Supports school districts for creating green schoolyards through public presentations, professional development, programs, resources.	Website	https://www.greenschoolyards.org/
		National Outdoor Learning Library <i>Resources for schools and districts including teaching and learning outdoors advice, creating play spaces, policies and funding for school grounds, and case studies.</i>	https://www.greenschoolyards.org/library
		Green Schoolyard Activity Guide	https://www.greenschoolyards.org/guides
National Wildlife Federation	Works with teachers, youth organizations, parents, caregivers, and influences policy makers to help incorporate regular time in nature in children's lives. For teachers, they provide nature programming to schools, childcare centers, park agencies, and other institutions. In addition they have educational resources for lesson plans and curriculum for connecting children to nature.	Website - Connecting Kids to Nature	https://www.nwf.org/en/Kids-and-Family/Connecting-Kids-and-Nature
		Policies that Connect Kids and Nature	https://www.nwf.org/Home/Kids-and-Family/Connecting-Kids-and-Nature/Kids-and-Nature-Policy#:~:text=Reconnecting%20children%20to%20nature%20will,families%20with%20the%20great%20outdoors.
Safe Routes to School National Partnership	National non-profit that aims to improve walking and biking to schools and the health and well-being of all people.	Website	https://www.saferoutespartnership.org/
		Safe Routes to Park Resources	https://www.saferoutespartnership.org/healthy-communities/saferoutestoparks
		Safe Routes to Parks Action Framework	https://www.saferoutespartnership.org/sites/default/files/resource_files/safe-routes-action-framework.pdf
National Association of City Transportation Officials (NACTO)	An association with a mission to make cities places for people that have safe and accessible transportation to support quality of life.	Programs and Initiatives <i>Designing better streets, building capacity, shaping transportation policy, strengthening peer networks, and more</i>	https://nacto.org/programs/#all-programs
		Urban Street Design Guide - Neighborhood street	https://nacto.org/publication/urban-street-design-guide/streets/neighborhood-street/
National Recreation and Park Association (NRPA)	Non-profit organization that aims to build strong, vibrant, and resilient communities through parks and recreation. Their work focuses on equity, climate resiliency, and health and well-being.	Safe Routes to Parks	https://www.nrpa.org/our-work/partnerships/initiatives/safe-routes-to-parks/
		About	https://www.nrpa.org/about-national-recreation-and-park-association/

Funding for Children's Contact with Nature

Many of the partnerships have grant and funding opportunities listed on their websites that can support efforts for children's nature play and learning. However, below are some potential funding opportunities:

Table 5.7 Funding

Funding		
Name	Description	Links
Federal funding (C&NN)	Resources identified by the Children & Nature Network	https://www.childrenandnature.org/resources/federal-funding-opportunities-for-connecting-children-to-nature/#safe-streets-and-roads-for-all-ss4a
KABOOM! Grants	Supports children's play spaces	https://kaboom.org/grants
Missouri Department of Conservation Community Conservation Funding	- Outdoor Recreation Infrastructure Program - Conservation Land Acquisition Program - Conservation Easement Assistance Program - Land Conservation Innovations Program	https://mdc.mo.gov/community-conservation/community-conservation-funding-opportunities
ReBuild KC Neighborhood Grants	The neighborhood services departments provides over \$4.4 million in grants to build better and stronger neighborhoods. Categories for neighborhood improvement projects include Affordable Housing Projects, Non-Profit Assistance Projects, Violence Prevention Projects, Healthy Childhood Environment Projects, Housing Assistance Projects, Job Training Projects, Strong, Healthy Community Projects. Each project can receive up to \$1,000,000 in funds.	https://www.kcmo.gov/programs-initiatives/rebuildkc#:~:text=ReBuild%20KC%20allocated%20%244.4%20million%20in%20neighborhood%20grants,Job%20Training%20Projects%207%20Strong%2C%20Healthy%20Community%20Projects
Go KC	Funding allocated for maintenance and upgrade needs in the city. Funding will go to improvements at park facilities for community centers, public pools, repairing historic fountains, and upgrades to parks across the city. GO KC also has a Sidewalk Project program for repairing streets, bridges and sidewalks.	https://www.kcmo.gov/programs-initiatives/go-kc
REI Environmental Grants	For connecting people outside, creating space, and centering health outside.	https://www.reifund.org/
MARC Funding and RFPS	Funding available for transportation purposes.	https://www.marc.org/about-marc/funding-and-rfps

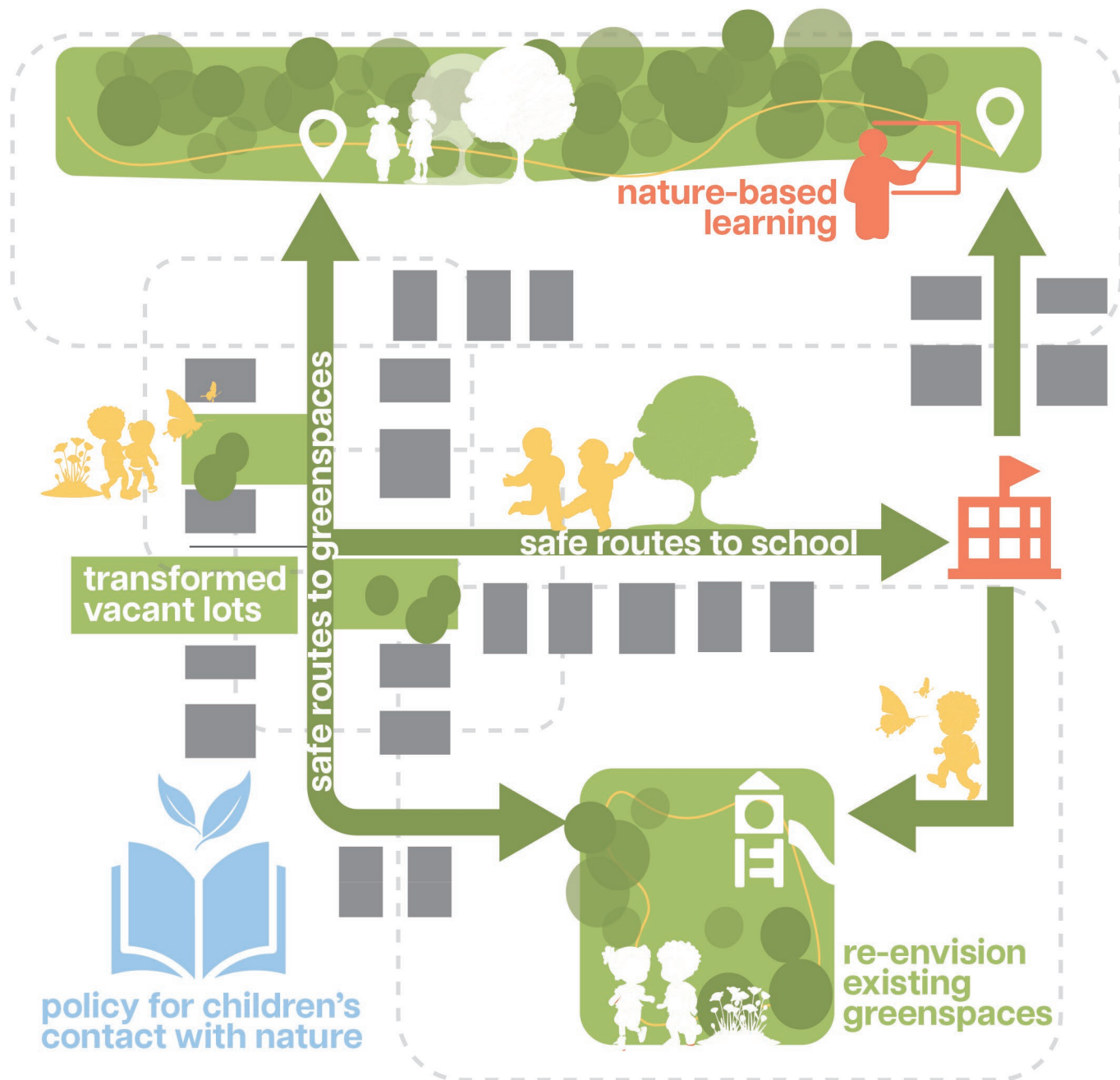


Figure 5.20 Strategies for improving children's access and contact with nature

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6.1 | Conclusion

Overview

This study gathered parents' and teachers' perceptions of children's access and contact with nature in Gladstone Elementary School's school attendance zone within the Kansas City Public Schools district in Kansas City, Missouri. A review of the literature revealed that there is a need to understand the barriers that prevent children from spending more time in nature during and outside school. Many studies that have researched access to greenspaces have not considered both parent and teacher perspectives to assess the extent of where (types of greenspaces), when (during or after school), how (types of outdoor activities) children are exposed to nature, and the barriers that may limit them. This study used mixed methods including a spatial analysis of available types of greenspaces in the school attendance zones and social data analysis through multi-lingual photo surveys. Findings from statistical analysis informed practical place-based design and planning recommendations for improving children's access and contact with nature in the Gladstone Elementary School attendance zone.

Key Findings

Findings from the greenspace availability analysis and social statistical analysis revealed that children's contact with nature was limited, especially for the types of greenspaces children go to and the exposure of nature during school. However, parents' and teachers' attitudes (i.e., benefits of nature, preference for outdoor settings and activities, comfort with outdoor teaching) and awareness of the importance of children's contact with nature did not seem to be associated with their children's limited contact with nature. Potential factors that may limit children's contact with nature include the number and type

of greenspaces in their neighborhoods, the need for parent supervision at greenspaces, school curriculum, other school/district initiatives, walkability (i.e., unsafe street crossings and sidewalks) and safety concerns (i.e., gunshots, drugs/alcohol, poor maintenance).

These findings informed recommendations for improving children's access to greenspace and contact with nature including provide more diverse nearby outdoor experiences for children in their neighborhoods, provide nature-based learning spaces in outdoor settings for school use, improve walkability in neighborhoods, improve perceptions of safety, and support children's contact with nature in education. Responding to these goals, various place-based design strategies were suggested such as re-envision existing greenspaces, create safe and green routes to school and greenspaces, transform vacant lots, and create policy to support planning for children's access and contact with nature in the city.

Limitations

Limitations of this study include the difficulties with recruiting participants and the timeframe for collecting survey responses. Four schools had initially agreed to participate; however, two schools decided to not participate in the study, and one did not distribute the survey. For the school that did participate, collecting data only occurred over two weeks. In addition, sending reminders was dependent on school administration, so how frequent reminders were sent could not be controlled. All communications were also sent via email or through the school's primary online communication platform, so the survey may not have reached as many people. In addition, the school

that participated also had a diverse range of languages spoken, and the survey was only provided in four languages. As a result, the sample size was small ($n = 51$), so findings were not generalizable. Additionally, the survey was kept short to reduce the time it takes to fill out, so it does not include other potential factors that can influence children's access to nature.

Contribution and Future Research

Despite the limitations, this study contributed to the existing literature of children's access and contact with nature by having gathered data from both parents and teachers on children's access and contact with nature, which has not been done to our knowledge. Additionally, it sheds light on potential future research on what factors may be associated with children's contact with nature using both spatial and social analyses. However, additional research is needed to confirm the results of this study and to support the suggested planning and design strategies. Additionally, with each planning and design strategy, there is a need to engage families, children, and schools to identify specific areas of concern, further gather opinions of specific greenspaces, identify opportunities, and co-design nature play and learning spaces. Greenspace availability assessments and collecting social data from parents and teachers should be done district-wide and across the city to further understand and plan for children's access and contact with nature in the city.

References

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Abercrombie, L. C., Sallis, J. F., Conway, T. L., Frank, L. D., Saelens, B. E., & Chapman, J. E. (2008). Income and Racial Disparities in Access to Public Parks and Private Recreation Facilities. *American Journal of Preventive Medicine*, 34(1), 9–15. <https://doi.org/10.1016/j.amepre.2007.09.030>

Adding Nature Play Into Public Spaces: A Pathway. (2021). Children and Nature Network. https://www.childrenandnature.org/wp-content/uploads/Nature-Play_ECNC.pdf

Aggio, D., Smith, L., Fisher, A., & Hamer, M. (2015). Mothers' perceived proximity to green space is associated with TV viewing time in children: The Growing Up in Scotland study. *Preventive Medicine*, 70, 46–49. <https://doi.org/10.1016/j.ypmed.2014.11.018>

Allahyar, M., & Kazemi, F. (2021). Effect of landscape design elements on promoting neuropsychological health of children. *Urban Forestry & Urban Greening*, 65, 127333. <https://doi.org/10.1016/j.ufug.2021.127333>

Alvarsson, J. J., Wiens, S., & Nilsson, M. E. (2010). Stress recovery during exposure to nature sound and environmental noise. *International Journal of Environmental Research and Public Health*, 7(3), 1036–1046. <https://doi.org/10.3390/ijerph7031036>

Amoly, E., Dadvand, P., Forns, J., López-Vicente, M., Basagaña, X., Julvez, J., Alvarez-Pedrerol, M., Nieuwenhuijsen, M. J., & Sunyer, J. (2014). Green and blue spaces and behavioral development in Barcelona schoolchildren: The BREATHE project. *Environmental Health Perspectives*, 122(12), 1351–1358. <https://doi.org/10.1289/ehp.1408215>

Arora, A. (2018, November 26). Advantage or Paradox: The challenge for children and young people of growing up urban. UNICEF DATA. <https://data.unicef.org/resources/urban-paradox-report/>

Aumann, D., Heschong, L., Group, H. M., Wright, R., & Peet, R. (n.d.). Windows and Classrooms: Student Performance and the Indoor Environment.

Baró, F., Camacho, D. A., Pérez Del Pulgar, C., Triguero-Mas, M., & Anguelovski, I. (2021). School greening: Right or privilege? Examining urban nature within and around primary schools through an equity lens. *Landscape and Urban Planning*, 208, 104019. <https://doi.org/10.1016/j.landurbplan.2020.104019>

Barton, J., & Rogerson, M. (2017). The importance of greenspace for mental health. *BJPsych International*, 14(4), 79–81. <https://doi.org/10.1192/S2056474000002051>

Bates, C. R., Bohnert, A. M., & Gerstein, D. E. (2018). Green Schoolyards in Low-Income Urban Neighborhoods: Natural Spaces for Positive Youth Development Outcomes. *Frontiers in Psychology*, 9. <https://www.frontiersin.org/articles/10.3389/fpsyg.2018.00805>

Beery, T., Djerf, H., Wünsche, T. U., & Fridberg, M. (2023). Broadening the foundation for the study of childhood connectedness to nature. *Frontiers in Environmental Science*, 11. <https://www.frontiersin.org/articles/10.3389/fenvs.2023.1225044>

Bentsen, P., Schipperijn, J., & Jensen, F. S. (2013). Green Space as Classroom: Outdoor School Teachers' Use, Preferences and Ecostrategies. *Landscape Research*, 38(5), 561–575. <https://doi.org/10.1080/01426397.2012.690860>

Bikomeye, J. C., Balza, J., & Beyer, K. M. (2021). The Impact of Schoolyard Greening on Children's Physical Activity and Socioemotional Health: A Systematic Review of Experimental Studies. *International Journal of Environmental Research and Public Health*, 18(2), Article 2. <https://doi.org/10.3390/ijerph18020535>

- Bohnert, A. M., Nicholson, L. M., Mertz, L., Bates, C. R., & Gerstein, D. E. (2022). Green schoolyard renovations in low-income urban neighborhoods: Benefits to students, schools, and the surrounding community. *American Journal of Community Psychology*, 69(3–4), 463–473. <https://doi.org/10.1002/ajcp.12559>
- Boone, C. G., Buckley, G. L., Grove, J. M., & Sister, C. (2009). Parks and People: An Environmental Justice Inquiry in Baltimore, Maryland. *Annals of the Association of American Geographers*, 99(4), 767–787. <https://doi.org/10.1080/00045600903102949>
- CDC. (2022). Data and Statistics on Children’s Mental Health | CDC. Centers for Disease Control and Prevention. <https://www.cdc.gov/childrensmentalhealth/data.html>
- Children & Nature Network. (n.d.). Municipal Action Guide. Children and Nature Network. https://eadn-wc04-796033.nxedge.io/wp-content/uploads/CCCN-Municipal-Action-Guide_webready.pdf
- Children’s Outdoor Bill of Rights (COBOR). (n.d.). Children and Nature Network. https://eadn-wc04-796033.nxedge.io/wp-content/uploads/CCCN_COBOR_what_is_21-1-20_final.pdf
- Cities Connecting Children to Nature. (n.d.). Children & Nature Network. Retrieved March 12, 2024, from <https://www.childrenandnature.org/cities/cities-connecting-children-to-nature/>
- Clements, R. (2004). An Investigation of the Status of Outdoor Play. *Contemporary Issues in Early Childhood*, 5(1), 68–80. <https://doi.org/10.2304/ciec.2004.5.1.10>
- Dadvand, P., Tischer, C., Estarlich, M., Llop, S., Dalmau, -Bueno Albert, L., López-V. M., Valent, Ín A., de, K. C., Fernández-S. A., Lertxundi, N., Rodríguez, -Dehli Cristina, Gascon, M., Guxens, M., Zugna, D., Basaga, ña X., Nieuwenhuijsen, M. J., Ibarluzea, J., Ballester, F., & Sunyer, J. (2017). Lifelong Residential Exposure to Green Space and Attention: A Population-based Prospective Study. *Environmental Health Perspectives*, 125(9), 097016. <https://doi.org/10.1289/EHP694>
- Dai, D. (2011). Racial/ethnic and socioeconomic disparities in urban green space accessibility: Where to intervene? *Landscape and Urban Planning*, 102(4), 234–244. <https://doi.org/10.1016/j.landurbplan.2011.05.002>
- Danks, S. G. (2010). *Asphalt to Ecosystems: Design Ideas for Schoolyard Transformation*. New Village Press.
- Dyment, J. E., & Bell, A. C. (2008). Grounds for movement: Green school grounds as sites for promoting physical activity. *Health Education Research*, 23(6), 952–962. <https://doi.org/10.1093/her/cym059>
- Faber Taylor, A., & Kuo, F. E. (2009). Children With Attention Deficits Concentrate Better After Walk in the Park. *Journal of Attention Disorders*, 12(5), 402–409. <https://doi.org/10.1177/1087054708323000>
- Feng, X., & Astell-Burt, T. (2017). Residential Green Space Quantity and Quality and Child Well-being: A Longitudinal Study. *American Journal of Preventive Medicine*, 53(5), 616–624. <https://doi.org/10.1016/j.amepre.2017.06.035>
- Fernandes, A., Krog, N. H., McEachan, R., Nieuwenhuijsen, M., Julvez, J., Márquez, S., de Castro, M., Urquiza, J., Heude, B., Vafeiadi, M., Gražulevičienė, R., Slama, R., Dedele, A., Aasvang, G. M., Evandt, J., Andrusaityte, S., Kampouri, M., & Vrijheid, M. (2023). Availability, accessibility, and use of green spaces and cognitive development in primary school children. *Environmental Pollution*, 334, 122143. <https://doi.org/10.1016/j.envpol.2023.122143>

- Gaster, S. (1992). Historical Changes in Children's Access to U.S. Cities: A Critical Review. *Children's Environments*, 9(2), 23–36.
- Giezen, M., & Pellerey, V. (2021). Renaturing the city: Factors contributing to upscaling green schoolyards in Amsterdam and The Hague. *Urban Forestry & Urban Greening*, 63, 127190. <https://doi.org/10.1016/j.ufug.2021.127190>
- Hanscom, A. J., & Louv, R. (2016). *Balanced and barefoot: How unrestricted outdoor play makes for strong, confident, and capable children*. New Harbinger Publications, Inc.
- Huang, S., Qi, J., Li, W., Dong, J., & van den Bosch, C. K. (2021). The Contribution to Stress Recovery and Attention Restoration Potential of Exposure to Urban Green Spaces in Low-Density Residential Areas. *International Journal of Environmental Research and Public Health*, 18(16), 8713. <https://doi.org/10.3390/ijerph18168713>
- Jones, A., Hillsdon, M., & Coombes, E. (2009). Greenspace access, use, and physical activity: Understanding the effects of area deprivation. *Preventive Medicine*, 49(6), 500–505. <https://doi.org/10.1016/j.ypmed.2009.10.012>
- Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology*, 15(3), 169–182. [https://doi.org/10.1016/0272-4944\(95\)90001-2](https://doi.org/10.1016/0272-4944(95)90001-2)
- Keniger, L. E., Gaston, K. J., Irvine, K. N., & Fuller, R. A. (2013). What are the Benefits of Interacting with Nature? *International Journal of Environmental Research and Public Health*, 10(3), 913–935. <https://doi.org/10.3390/ijerph10030913>
- Kerlin, S., Santos, R., & Bennett, B. (2015). Green Schools as Learning Laboratories? Teachers' Perceptions of Their First Year in a New Green Middle School.
- Kyttä, M. (2004). The extent of children's independent mobility and the number of actualized affordances as criteria for child-friendly environments. *Journal of Environmental Psychology*, 24(2), 179–198. [https://doi.org/10.1016/S0272-4944\(03\)00073-2](https://doi.org/10.1016/S0272-4944(03)00073-2)
- LaVeist, T. A. (2011). *Minority Populations and Health: An Introduction to Health Disparities in the United States*. John Wiley & Sons.
- Leslie, E., Sugiyama, T., Ierodionou, D., & Kremer, P. (2010). Perceived and objectively measured greenness of neighbourhoods: Are they measuring the same thing? *Landscape and Urban Planning*, 95(1), 28–33. <https://doi.org/10.1016/j.landurbplan.2009.11.002>
- Li, D., & Sullivan, W. C. (2016). Impact of views to school landscapes on recovery from stress and mental fatigue. *Landscape and Urban Planning*, 148, 149–158. <https://doi.org/10.1016/j.landurbplan.2015.12.015>
- Lin, B., Meyers, J., & Barnett, G. (2015). Understanding the potential loss and inequities of green space distribution with urban densification. *Urban Forestry & Urban Greening*, 14(4), 952–958. <https://doi.org/10.1016/j.ufug.2015.09.003>
- Loder, A. (2020). *Small-Scale Urban Greening: Creating places of health, creativity, and ecological sustainability*. Routledge.
- Luís, S., Dias, R., & Lima, M. L. (2020). Greener Schoolyards, Greener Futures? Greener Schoolyards Buffer Decreased Contact With Nature and Are Linked to Connectedness to Nature. *Frontiers in Psychology*, 11. <https://www.frontiersin.org/articles/10.3389/fpsyg.2020.567882>
- Ma, L., Shi, W., & Wu, L. (2023). Mediating roles of perceptions and visiting behavior in the relationship between urban greenspace accessibility and personal health: Evidence from Lanzhou, China. *Applied Geography*, 159, 103085. <https://doi.org/10.1016/j.apgeog.2023.103085>

- Mann, J., Gray, T., Truong, S., Brymer, E., Passy, R., Ho, S., Sahlberg, P., Ward, K., Bentsen, P., Curry, C., & Cowper, R. (2022). Getting Out of the Classroom and Into Nature: A Systematic Review of Nature-Specific Outdoor Learning on School Children's Learning and Development. *Frontiers in Public Health*, 10, 877058. <https://doi.org/10.3389/fpubh.2022.877058>
- Marcus, C. Cooper., & Sachs, N. (2014). *Therapeutic landscapes: An evidence-based approach to designing healing gardens and restorative outdoor spaces* (1st ed.). John Wiley & Sons.
- Markevych, I., Tesch, F., Datzmann, T., Romanos, M., Schmitt, J., & Heinrich, J. (2018). Outdoor air pollution, greenspace, and incidence of ADHD: A semi-individual study. *Science of The Total Environment*, 642, 1362–1368. <https://doi.org/10.1016/j.scitotenv.2018.06.167>
- Moore, R. C. (1974). Anarchy Zone: Kids' Needs and School Yards. *The School Review*, 82(4), 621–645. <https://doi.org/10.1086/443157>
- Nesbitt, L., & Meitner, M. J. (2016). Exploring Relationships between Socioeconomic Background and Urban Greenery in Portland, OR. *Forests*, 7(8), Article 8. <https://doi.org/10.3390/f7080162>
- O'Brien, L. E., Urbanek, R. E., & Gregory, J. D. (2022). Ecological functions and human benefits of urban forests. *Urban Forestry & Urban Greening*, 75, 127707. <https://doi.org/10.1016/j.ufug.2022.127707>
- Our Mission. (n.d.). Green Schoolyards America. Retrieved October 8, 2023, from <https://www.greenschoolyards.org/mission>
- Overweight & Obesity. (2022, July 27). CDC. <https://www.cdc.gov/obesity/data/childhood.html>
- Parks and Recreation Master Plan Update 2015-2020. (2015). Kansas City Parks and Recreation Department. <https://kcparks.org/wp-content/uploads/2013/04/KC-Parks-Master-Plan.pdf>
- Passmore, H.-A., Martin, L., Richardson, M., White, M., Hunt, A., & Pahl, S. (2021). Parental/Guardians' Connection to Nature Better Predicts Children's Nature Connectedness than Visits or Area-Level Characteristics. *Ecopsychology*, 13(2), 103–113. <https://doi.org/10.1089/eco.2020.0033>
- Policies and Procedures for the Acquisition and Disposal of Properties. (2013). Land Bank of Kansas City, Missouri. <https://www.kcmo.gov/home/showpublisheddocument/10656/638205234414170000>
- Rigolon, A. (2016). A complex landscape of inequity in access to urban parks: A literature review. *Landscape and Urban Planning*, 153, 160–169. <https://doi.org/10.1016/j.landurbplan.2016.05.017>
- Rigolon, A., & Flohr, T. L. (2014). Access to Parks for Youth as an Environmental Justice Issue: Access Inequalities and Possible Solutions. *Buildings*, 4(2), Article 2. <https://doi.org/10.3390/buildings4020069>
- Safe Routes to Parks Action Framework. (n.d.). National Recreation and Park Association. <https://www.nrpa.org/contentassets/64ee196b5bf241c6ac3462b8d42d1e66/safe-routes-action-framework.pdf>
- Sanders, T., Feng, X., Fahey, P. P., Lonsdale, C., & Astell-Burt, T. (2015). The influence of neighbourhood green space on children's physical activity and screen time: Findings from the longitudinal study of Australian children. *International Journal*

of Behavioral Nutrition and Physical Activity, 12(1), 126. <https://doi.org/10.1186/s12966-015-0288-z>

Schulman, A., & Peters, C. A. (2008). GIS analysis of urban schoolyard landcover in three U.S. cities. *Urban Ecosystems*, 11(1), 65–80. <https://doi.org/10.1007/s11252-007-0037-4>

Sefcik, J. S., Kondo, M. C., Klusaritz, H., Sarantschin, E., Solomon, S., Roepke, A., South, E. C., & Jacoby, S. F. (2019). Perceptions of Nature and Access to Green Space in Four Urban Neighborhoods. *International Journal of Environmental Research and Public Health*, 16(13), Article 13. <https://doi.org/10.3390/ijerph16132313>

Shanahan, D. F., Fuller, R. A., Bush, R., Lin, B. B., & Gaston, K. J. (2015). The Health Benefits of Urban Nature: How Much Do We Need? *BioScience*, 65(5), 476–485. <https://doi.org/10.1093/biosci/biv032>

Skar, M., Wold, L. C., Gundersen, V., & O'Brien, L. (2016). Why do children not play in nearby nature? Results from a Norwegian survey. *Journal of Adventure Education and Outdoor Learning*, 16(3), 239–255. <https://doi.org/10.1080/14729679.2016.1140587>

Soga, M., & Gaston, K. J. (2016). Extinction of experience: The loss of human–nature interactions. *Frontiers in Ecology and the Environment*, 14(2), 94–101. <https://doi.org/10.1002/fee.1225>

Souter-Brown, Gayle. (2015). *Landscape and urban design for health and well-being using healing, sensory and therapeutic gardens*. Routledge.

Stevenson, K. T., Moore, R., Cosco, N., Floyd, M. F., Sullivan, W., Brink, L., Gerstein, D., Jordan, C., & Zaplatosch, J. (2020). A national research agenda supporting green schoolyard development and equitable access to nature. *Elementa: Science of the Anthropocene*, 8(1), 406. <https://doi.org/10.1525/elementa.406>

Strategic Plan. (n.d.). Kansas City, Missouri Parks and Recreation. <https://kcparks.org/strategic-plan/>

Strife, S., & Downey, L. (2009). Childhood Development and Access to Nature: A New Direction for Environmental Inequality Research. *Organization & Environment*, 22(1), 99–122. <https://doi.org/10.1177/1086026609333340>

Sunyer, J., Esnaola, M., Alvarez-Pedrerol, M., Forns, J., Rivas, I., López-Vicente, M., Suades-González, E., Foraster, M., Garcia-Esteban, R., Basagaña, X., Viana, M., Cirach, M., Moreno, T., Alastuey, A., Sebastian-Galles, N., Nieuwenhuijsen, M., & Querol, X. (2015). Association between Traffic-Related Air Pollution in Schools and Cognitive Development in Primary School Children: A Prospective Cohort Study. *PLOS Medicine*, 12(3), e1001792. <https://doi.org/10.1371/journal.pmed.1001792>

Systems Change Measurement Toolkit. (n.d.). Children and Nature Network. <https://eadn-wc04-796033.nxedge.io/wp-content/uploads/CCCN-Toolkit-110620.pdf>

Taylor, A. F., Kuo, F. E., & Sullivan, W. C. (2001). Coping with add: The Surprising Connection to Green Play Settings. *Environment and Behavior*, 33(1), 54–77. <https://doi.org/10.1177/00139160121972864>

Ulrich, R. S., Simons, R. F., Losito, B. D., Fiorito, E., Miles, M. A., & Zelson, M. (1991). Stress recovery during exposure to natural and urban environments. *Journal of Environmental Psychology*, 11(3), 201–230. [https://doi.org/10.1016/S0272-4944\(05\)80184-7](https://doi.org/10.1016/S0272-4944(05)80184-7)

Vanaken, G.-J., & Danckaerts, M. (2018). Impact of Green Space Exposure on Children's and Adolescents' Mental Health: A Systematic Review. *International Journal of Environmental Research and Public Health*, 15(12), 2668. <https://doi.org/10.3390/ijerph15122668>

- Vaughan, K. B., Kaczynski, A. T., Wilhelm Stanis, S. A., Besenyi, G. M., Bergstrom, R., & Heinrich, K. M. (2013). Exploring the distribution of park availability, features, and quality across Kansas City, Missouri by income and race/ethnicity: An environmental justice investigation. *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine*, 45 Suppl 1, S28-38. <https://doi.org/10.1007/s12160-012-9425-y>
- Veitch, J., Bagley, S., Ball, K., & Salmon, J. (2006). Where do children usually play? A qualitative study of parents' perceptions of influences on children's active free-play. *Health & Place*, 12(4), 383–393. <https://doi.org/10.1016/j.healthplace.2005.02.009>
- Vidal, D. G., & Castro Seixas, E. (2022). Children's Green Infrastructure: Children and Their Rights to Nature and the City. *Frontiers in Sociology*, 7, 804535–804535. <https://doi.org/10.3389/fsoc.2022.804535>
- Ward, J. S., Duncan, J. S., Jarden, A., & Stewart, T. (2016). The impact of children's exposure to greenspace on physical activity, cognitive development, emotional wellbeing, and ability to appraise risk. *Health & Place*, 40, 44–50. <https://doi.org/10.1016/j.healthplace.2016.04.015>
- Wen, M., Zhang, X., Harris, C. D., Holt, J. B., & Croft, J. B. (2013). Spatial Disparities in the Distribution of Parks and Green Spaces in the USA. *Annals of Behavioral Medicine*, 45(1), 18–27. <https://doi.org/10.1007/s12160-012-9426-x>
- Wright Wendel, H. E., Zarger, R. K., & Mihelcic, J. R. (2012). Accessibility and usability: Green space preferences, perceptions, and barriers in a rapidly urbanizing city in Latin America. *Landscape and Urban Planning*, 107(3), 272–282. <https://doi.org/10.1016/j.landurbplan.2012.06.003>
- Wu, C.-D., McNeely, E., Cedeño-Laurent, J. G., Pan, W.-C., Adamkiewicz, G., Dominici, F., Lung, S.-C. C., Su, H.-J., & Spengler, J. D. (2014). Linking Student Performance in Massachusetts Elementary Schools with the "Greenness" of School Surroundings Using Remote Sensing. *PLOS ONE*, 9(10), e108548. <https://doi.org/10.1371/journal.pone.0108548>
- Zhang, D., & Zheng, J. (2022). The Burden of Childhood Asthma by Age Group, 1990–2019: A Systematic Analysis of Global Burden of Disease 2019 Data. *Frontiers in Pediatrics*, 10, 823399. <https://doi.org/10.3389/fped.2022.823399>

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DataKC (2019). School Districts. [shapefile]. City of Kansas City, MO. Retrieved October, 2023 from https://data.kcmo.org/d/mt7e-6h45?category=dataset&view_name=School-Districts

Esri. (2023). Light Gray Canvas Base. [vector tile layer]. ArcGIS Living Atlas of the World. Retrieved September 21, 2023. https://basemaps.arcgis.com/arcgis/rest/services/World_Basemap_v2/VectorTileServer

Google. (2023). KCPS School Boundaries. [kml]. Google. Retrieved October 5, 2023 from https://www.google.com/maps/d/viewer?mid=1HZDnzNqOnTSuaRV0ka7NqndzIIM&hl=en_US&ll=39.066304847362495%2C-94.47065953817054&z=13
Missouri Spatial Data Information Service. (2023). MO Public Schools. [shapefile]. Missouri Spatial data Information Service. Retrieved October, 2023 from [MO Public Schools | Missouri Spatial Data Information Service Open Data Site \(arcgis.com\)](https://data.kcmo.org/d/mt7e-6h45?category=dataset&view_name=School-Districts)

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Bender, K. (2020). Kansas City Missouri Parks and Boulevards Map [shapefile]. City of Kansas City, Missouri. Retrieved September 21, 2023 from https://data.kcmo.org/d/h5fe-gwsc?category=dataset&view_name=Kansas-City-Missouri-Parks-and-Boulevards-Map

DataKC (2019). School Districts. [shapefile]. City of Kansas City, MO. Retrieved October, 2023 from https://data.kcmo.org/d/mt7e-6h45?category=dataset&view_name=School-Districts

Esri. (2023). Light Gray Canvas Base. [vector tile layer]. ArcGIS Living Atlas of the World. Retrieved September 21, 2023. https://basemaps.arcgis.com/arcgis/rest/services/World_Basemap_v2/VectorTileServer

Google. (2023). KCPS School Boundaries. [kml]. Google. Retrieved October 5, 2023 from https://www.google.com/maps/d/viewer?mid=1HZDnzNqOnTSuaRV0ka7NqndzIIM&hl=en_US&ll=39.066304847362495%2C-94.47065953817054&z=13

Missouri Spatial Data Information Service. (2023). MO Public Schools. [shapefile]. Missouri Spatial data Information Service. Retrieved October, 2023 from [MO Public Schools | Missouri Spatial Data Information Service Open Data Site \(arcgis.com\)](https://data.kcmo.org/d/mt7e-6h45?category=dataset&view_name=School-Districts)

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DataKC (2019). School Districts. [shapefile]. City of Kansas City, MO. Retrieved October, 2023 from https://data.kcmo.org/d/mt7e-6h45?category=dataset&view_name=School-Districts

Esri. (2023). Light Gray Canvas Base. [vector tile layer]. ArcGIS Living Atlas of the World. Retrieved September 21, 2023. https://basemaps.arcgis.com/arcgis/rest/services/World_Basemap_v2/VectorTileServer

Google. (2023). KCPS School Boundaries. [kml]. Google. Retrieved October 5, 2023 from https://www.google.com/maps/d/viewer?mid=1HZDnzNqOnTSuaRV0ka7NqndzIIM&hl=en_US&ll=39.066304847362495%2C-94.47065953817054&z=13

Missouri Spatial Data Information Service. (2023). MO Public Schools. [shapefile]. Missouri Spatial data Information Service. Retrieved October, 2023 from [MO Public Schools | Missouri Spatial Data Information Service Open Data Site \(arcgis.com\)](https://data.kcmo.org/d/mt7e-6h45?category=dataset&view_name=School-Districts)

U.S. Census Bureau. (2021). ACS 2021 (5-Year Estimates) SE: A03001. Race [Block Group Data (CSV)]. Social Explorer. Retrieved January 4, 2024 from https://www.socialexplorer.com/tables/ACS2021_5yr/R13607891

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DataKC (2019). School Districts. [shapefile]. City of Kansas City, MO. Retrieved October, 2023 from https://data.kcmo.org/d/mt7e-6h45?category=dataset&view_name=School-Districts

Esri. (2023). Light Gray Canvas Base. [vector tile layer]. ArcGIS Living Atlas of the World. Retrieved September 21, 2023. https://basemaps.arcgis.com/arcgis/rest/services/World_Basemap_v2/VectorTileServer

Google. (2023). KCPS School Boundaries. [kml]. Google. Retrieved October 5, 2023 from https://www.google.com/maps/d/viewer?mid=1HZDnzNqOnTSuaRV0ka7NqndzIIM&hl=en_US&ll=39.066304847362495%2C-94.47065953817054&z=13

Missouri Spatial Data Information Service. (2023). MO Public Schools. [shapefile]. Missouri Spatial data Information Service. Retrieved October, 2023 from [MO Public Schools | Missouri Spatial Data Information Service Open Data Site \(arcgis.com\)](https://data.kcmo.org/d/mt7e-6h45?category=dataset&view_name=School-Districts)

U.S. Census Bureau. (2021). ACS 2021 (5-Year Estimates) SE: A04001. Hispanic or Latino by Race [Block Group Data (CSV)]. Social Explorer. Retrieved January 4, 2024 from https://www.socialexplorer.com/tables/ACS2021_5yr/R13607892

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DataKC (2019). School Districts. [shapefile]. City of Kansas City, MO. Retrieved October, 2023 from https://data.kcmo.org/d/mt7e-6h45?category=dataset&view_name=School-Districts

Esri. (2023). Light Gray Canvas Base. [vector tile layer]. ArcGIS Living Atlas of the World. Retrieved September 21, 2023. https://basemaps.arcgis.com/arcgis/rest/services/World_Basemap_v2/VectorTileServer

Google. (2023). KCPS School Boundaries. [kml]. Google. Retrieved October 5, 2023 from https://www.google.com/maps/d/viewer?mid=1HZDnzNqOnTSuaRV0ka7NqndzIIM&hl=en_US&ll=39.066304847362495%2C-94.47065953817054&z=13

Missouri Spatial Data Information Service. (2023). MO Public Schools. [shapefile]. Missouri Spatial data Information Service. Retrieved October, 2023 from [MO Public Schools | Missouri Spatial Data Information Service Open Data Site \(arcgis.com\)](https://arcgis.com/open-data/metadata/metadata.html?dataset=MO+Public+Schools+Shapefile)

U.S. Census Bureau. (2021). ACS 2021 (5-Year Estimates) SE: A10054B. Vehicles Available (Renter-Occupied Housing Units) [Block Group Data (CSV)]. Social Explorer. Retrieved January 4, 2024 from https://www.socialexplorer.com/tables/ACS2021_5yr/R13607887

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DataKC (2019). School Districts. [shapefile]. City of Kansas City, MO. Retrieved October, 2023 from https://data.kcmo.org/d/mt7e-6h45?category=dataset&view_name=School-Districts

Esri. (2023). Light Gray Canvas Base. [vector tile layer]. ArcGIS Living Atlas of the World. Retrieved September 21, 2023. https://basemaps.arcgis.com/arcgis/rest/services/World_Basemap_v2/VectorTileServer

Google. (2023). KCPS School Boundaries. [kml]. Google. Retrieved October 5, 2023 from https://www.google.com/maps/d/viewer?mid=1HZDnzNqOnTSuaRV0ka7NqndzIIM&hl=en_US&ll=39.066304847362495%2C-94.47065953817054&z=13

Missouri Spatial Data Information Service. (2023). MO Public Schools. [shapefile]. Missouri Spatial data Information Service. Retrieved October, 2023 from [MO Public Schools | Missouri Spatial Data Information Service Open Data Site \(arcgis.com\)](https://arcgis.com/open-data/metadata/metadata.html?dataset=MO+Public+Schools+Shapefile)

U.S. Census Bureau. (2021). ACS 2021 (5-Year Estimates) SE: A12002. Highest Educational Attainment for Population 25 Years and Over [Block Group Data (CSV)]. Social Explorer. Retrieved January 4, 2024 from https://www.socialexplorer.com/tables/ACS2021_5yr/R13607884

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DataKC (2019). School Districts. [shapefile]. City of Kansas City, MO. Retrieved October, 2023 from https://data.kcmo.org/d/mt7e-6h45?category=dataset&view_name=School-Districts

Esri. (2023). Light Gray Canvas Base. [vector tile layer]. ArcGIS Living Atlas of the World. Retrieved September 21, 2023. https://basemaps.arcgis.com/arcgis/rest/services/World_Basemap_v2/VectorTileServer

Google. (2023). KCPS School Boundaries. [kml]. Google. Retrieved October 5, 2023 from https://www.google.com/maps/d/viewer?mid=1HZDnzNqOnTSuaRV0ka7NqndzIIM&hl=en_US&ll=39.066304847362495%2C-94.47065953817054&z=13

Missouri Spatial Data Information Service. (2023). MO Public Schools. [shapefile]. Missouri Spatial data Information Service. Retrieved October, 2023 from [MO Public Schools | Missouri Spatial Data Information Service Open Data Site \(arcgis.com\)](#)

U.S. Census Bureau. (2021). ACS 2021 (5-Year Estimates) SE: A10065. Children Living with Single Parents [Block Group Data (CSV)]. Social Explorer. Retrieved January 4, 2024 from https://www.socialexplorer.com/tables/ACS2021_5yr/R13607880

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DataKC (2019). School Districts. [shapefile]. City of Kansas City, MO. Retrieved October, 2023 from https://data.kcmo.org/d/mt7e-6h45?category=dataset&view_name=School-Districts

Esri. (2023). Light Gray Canvas Base. [vector tile layer]. ArcGIS Living Atlas of the World. Retrieved September 21, 2023. https://basemaps.arcgis.com/arcgis/rest/services/World_Basemap_v2/VectorTileServer

Google. (2023). KCPS School Boundaries. [kml]. Google. Retrieved October 5, 2023 from https://www.google.com/maps/d/viewer?mid=1HZDnzNqOnTSuaRV0ka7NqndzIIM&hl=en_US&ll=39.066304847362495%2C-94.47065953817054&z=13

Missouri Spatial Data Information Service. (2023). MO Public Schools. [shapefile]. Missouri Spatial data Information Service. Retrieved October, 2023 from [MO Public Schools | Missouri Spatial Data Information Service Open Data Site \(arcgis.com\)](#)

U.S. Census Bureau. (2021). ACS 2021 (5-Year Estimates) SE: A14006. Median Household Income (In 2021 Inflation Adjusted Dollars) [Block Group Data (CSV)]. Social Explorer. Retrieved January 4, 2024 from https://www.socialexplorer.com/tables/ACS2021_5yr/R13607880

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DataKC (2019). School Districts. [shapefile]. City of Kansas City, MO. Retrieved October, 2023 from https://data.kcmo.org/d/mt7e-6h45?category=dataset&view_name=School-Districts

Esri. (2023). Light Gray Canvas Base. [vector tile layer]. ArcGIS Living Atlas of the World. Retrieved September 21, 2023. https://basemaps.arcgis.com/arcgis/rest/services/World_Basemap_v2/VectorTileServer

Google. (2023). KCPS School Boundaries. [kml]. Google. Retrieved October 5, 2023 from https://www.google.com/maps/d/viewer?mid=1HZDnzNqOnTSuaRV0ka7NqndzIIM&hl=en_US&ll=39.066304847362495%2C-94.47065953817054&z=13

Missouri Spatial Data Information Service. (2023). MO Public Schools. [shapefile]. Missouri Spatial data Information Service. Retrieved October, 2023 from [MO Public Schools | Missouri Spatial Data Information Service Open Data Site \(arcgis.com\)](#)

U.S. Census Bureau. (2021). ACS 2021 (5-Year Estimates) SE: A01001. Age [Block Group Data (CSV)]. Social Explorer. Retrieved January 4, 2024 from https://www.socialexplorer.com/tables/ACS2021_5yr/R13607847

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DataKC (2019). School Districts. [shapefile]. City of Kansas City, MO. Retrieved October, 2023 from https://data.kcmo.org/d/mt7e-6h45?category=dataset&view_name=School-Districts

Esri. (2023). Light Gray Canvas Base. [vector tile layer]. ArcGIS Living Atlas of the World. Retrieved September 21, 2023. https://basemaps.arcgis.com/arcgis/rest/services/World_Basemap_v2/VectorTileServer

Google. (2023). KCPS School Boundaries. [kml]. Google. Retrieved October 5, 2023 from https://www.google.com/maps/d/viewer?mid=1HZDnzNqOnTSuaRV0ka7NqndzIIM&hl=en_US&ll=39.066304847362495%2C-94.47065953817054&z=13

Missouri Spatial Data Information Service. (2023). MO Public Schools. [shapefile]. Missouri Spatial data Information Service. Retrieved October, 2023 from [MO Public Schools | Missouri Spatial Data Information Service Open Data Site \(arcgis.com\)](https://arcgis.com)

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DataKC (2019). School Districts. [shapefile]. City of Kansas City, MO. Retrieved October, 2023 from https://data.kcmo.org/d/mt7e-6h45?category=dataset&view_name=School-Districts

Esri. (2023). Light Gray Canvas Base. [vector tile layer]. ArcGIS Living Atlas of the World. Retrieved September 21, 2023. https://basemaps.arcgis.com/arcgis/rest/services/World_Basemap_v2/VectorTileServer

Google. (2023). KCPS School Boundaries. [kml]. Google. Retrieved October 5, 2023 from https://www.google.com/maps/d/viewer?mid=1HZDnzNqOnTSuaRV0ka7NqndzIIM&hl=en_US&ll=39.066304847362495%2C-94.47065953817054&z=13

Missouri Spatial Data Information Service. (2023). MO Public Schools. [shapefile]. Missouri Spatial data Information Service. Retrieved October, 2023 from [MO Public Schools | Missouri Spatial Data Information Service Open Data Site \(arcgis.com\)](https://data.missouri.gov/dataset/mo-public-schools)

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DataKC (2019). School Districts. [shapefile]. City of Kansas City, MO. Retrieved October, 2023 from https://data.kcmo.org/d/mt7e-6h45?category=dataset&view_name=School-Districts

Esri. (2023). Light Gray Canvas Base. [vector tile layer]. ArcGIS Living Atlas of the World. Retrieved September 21, 2023. https://basemaps.arcgis.com/arcgis/rest/services/World_Basemap_v2/VectorTileServer

Google. (2023). KCPS School Boundaries. [kml]. Google. Retrieved October 5, 2023 from https://www.google.com/maps/d/viewer?mid=1HZDnzNqOnTSuaRV0ka7NqndzIIM&hl=en_US&ll=39.066304847362495%2C-94.47065953817054&z=13

Missouri Spatial Data Information Service. (2023). MO Public Schools. [shapefile]. Missouri Spatial data Information Service. Retrieved October, 2023 from [MO Public Schools | Missouri Spatial Data Information Service Open Data Site \(arcgis.com\)](https://data.missouri.gov/dataset/mo-public-schools)

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DataKC (2019). School Districts. [shapefile]. City of Kansas City, MO. Retrieved October, 2023 from https://data.kcmo.org/d/mt7e-6h45?category=dataset&view_name=School-Districts

Esri. (2023). Light Gray Canvas Base. [vector tile layer]. ArcGIS Living Atlas of the World. Retrieved September 21, 2023. https://basemaps.arcgis.com/arcgis/rest/services/World_Basemap_v2/VectorTileServer

Google. (2023). KCPS School Boundaries. [kml]. Google. Retrieved October 5, 2023 from https://www.google.com/maps/d/viewer?mid=1HZDnzNqOnTSuaRV0ka7NqndzIIM&hl=en_US&ll=39.066304847362495%2C-94.47065953817054&z=13

Missouri Spatial Data Information Service. (2023). MO Public Schools. [shapefile]. Missouri Spatial data Information Service. Retrieved October, 2023 from [MO Public Schools | Missouri Spatial Data Information Service Open Data Site \(arcgis.com\)](https://arcgis.com)

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Google. (2023). KCPS School Boundaries. [kml]. Google. Retrieved October 5, 2023 from https://www.google.com/maps/d/viewer?mid=1HZDnzNqOnTSuaRV0ka7NqndzIIM&hl=en_US&ll=39.066304847362495%2C-94.47065953817054&z=13

MARC. (2023). KC Regional Trails and Bikeways Map. [feature layer]. Retrieved January 2024 from <https://www.arcgis.com/home/item.html?id=c0328d965cf44a10bfb710f3014619ac>

Missouri Spatial Data Information Service. (2023). MO Public Schools. [shapefile]. Missouri Spatial data Information Service. Retrieved October, 2023 from [MO Public Schools | Missouri Spatial Data Information Service Open Data Site \(arcgis.com\)](https://www.missouri.gov/mo-public-schools-missouri-spatial-data-information-service-open-data-site)

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Bender, K. (2020). Kansas City Missouri Parks and Boulevards Map [shapefile]. City of Kansas City, Missouri. Retrieved September 21, 2023 from https://data.kcmo.org/d/h5fe-gwsc?category=dataset&view_name=Kansas-City-Missouri-Parks-and-Boulevards-Map

Esri. (2023). Light Gray Canvas Base. [vector tile layer]. ArcGIS Living Atlas of the World. Retrieved September 21, 2023. https://basemaps.arcgis.com/arcgis/rest/services/World_Basemap_v2/VectorTileServer

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Bender, K. (2020). Kansas City Missouri Parks and Boulevards Map [shapefile]. City of Kansas City, Missouri. Retrieved September 21, 2023 from https://data.kcmo.org/d/h5fe-gwsc?category=dataset&view_name=Kansas-City-Missouri-Parks-and-Boulevards-Map

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Bender, K. (2020). Kansas City Missouri Parks and Boulevards Map [shapefile]. City of Kansas City, Missouri. Retrieved September 21, 2023 from https://data.kcmo.org/d/h5fe-gwsc?category=dataset&view_name=Kansas-City-Missouri-Parks-and-Boulevards-Map

Esri. (2023). Light Gray Canvas Base. [vector tile layer]. ArcGIS Living Atlas of the World. Retrieved September 21, 2023. https://basemaps.arcgis.com/arcgis/rest/services/World_Basemap_v2/VectorTileServer

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Bender, K. (2020). Kansas City Missouri Parks and Boulevards Map [shapefile]. City of Kansas City, Missouri. Retrieved September 21, 2023 from https://data.kcmo.org/d/h5fe-gwsc?category=dataset&view_name=Kansas-City-Missouri-Parks-and-Boulevards-Map

City of Kansas City Neighborhoods and Housing Services. (2023). Land Bank and Kansas City Missouri Homesteading Authority Data. [dataset]. City of Kansas City, Missouri. Retrieved September 28, 2023 from <https://data.kcmo.org/Neighborhoods/Land-Bank-and-Kansas-City-Missouri-Homesteading-Au/2ebw-sp7f>

DataKC (2019). School Districts. [shapefile]. City of Kansas City, MO. Retrieved October, 2023 from https://data.kcmo.org/d/mt7e-6h45?category=dataset&view_name=School-Districts

Esri. (2023). Light Gray Canvas Base. [vector tile layer]. ArcGIS Living Atlas of the World. Retrieved September 21, 2023. https://basemaps.arcgis.com/arcgis/rest/services/World_Basemap_v2/VectorTileServer

Google. (2023). KCPS School Boundaries. [kml]. Google. Retrieved October 5, 2023 from https://www.google.com/maps/d/viewer?mid=1HZDnzNqOnTSuaRV0ka7NqndzIIM&hl=en_US&ll=39.066304847362495%2C-94.47065953817054&z=13

Missouri Spatial Data Information Service. (2023). MO Public Schools. [shapefile]. Missouri Spatial data Information Service. Retrieved October, 2023 from [MO Public Schools | Missouri Spatial Data Information Service Open Data Site \(arcgis.com\)](https://data.kcmo.org/d/mt7e-6h45?category=dataset&view_name=School-Districts)

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Bender, K. (2020). Kansas City Missouri Parks and Boulevards Map [shapefile]. City of Kansas City, Missouri. Retrieved September 21, 2023 from https://data.kcmo.org/d/h5fe-gwsc?category=dataset&view_name=Kansas-City-Missouri-Parks-and-Boulevards-Map

City of Kansas City Neighborhoods and Housing Services. (2023). Land Bank and Kansas City Missouri Homesteading Authority Data. [dataset]. City of Kansas City, Missouri. Retrieved September 28, 2023 from <https://data.kcmo.org/Neighborhoods/Land-Bank-and-Kansas-City-Missouri-Homesteading-Au/2ebw-sp7f>

Esri. (2023). Light Gray Canvas Base. [vector tile layer]. ArcGIS Living Atlas of the World. Retrieved September 21, 2023. https://basemaps.arcgis.com/arcgis/rest/services/World_Basemap_v2/VectorTileServer

Google. (2023). KCPS School Boundaries. [kml]. Google. Retrieved October 5, 2023 from https://www.google.com/maps/d/viewer?mid=1HZDnzNqOnTSuaRV0ka7NqndzIIM&hl=en_US&ll=39.066304847362495%2C-94.47065953817054&z=13

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2023-2024 Survey
CHILDREN'S CONTACT WITH NATURE

Appendix A | Parent Survey

Dear parents,

My name is Emily Moore, and I am a graduate student in the landscape architecture program at Kansas State University. I am doing research on elementary school children's contact with nature. I believe your perspective matters and I would appreciate your participation in this study.

This study focuses on elementary schools in the Kansas City Public Schools district and children in kindergarten through 6th grade. It aims to collect parent and teacher perspectives of children's access and contact with nature through surveys. Your responses on children's contact with nature are very important and will provide valuable information for informing recommendations to provide more opportunities for your children's contact with nature. The findings of this study will be shared with the schools and parents that participated in May 2024..

Your participation in this survey is voluntary and completely anonymous, with no identity information tied to the survey. The anonymous data will not be used or distributed to others for future research. You may withdraw from participation anytime and skip any question you prefer not to respond to. It should take around 10-12 minutes to complete.

If you have questions about the study, please contact:

Emily Moore

Graduate Student at Kansas State University

ekmoore01@ksu.edu

Dr. Sara Hadavi

Professor of Landscape Architecture at Kansas State University

sarahadavi@ksu.edu

Dr. Lisa Rubin

IRB Chair at Kansas State University

comply@ksu.edu

If possible, please complete the survey by the end of next week (January 19th).
Please only fill out one survey.

Scan the QR code with your phone camera or visit the link below

Online Survey Link: https://kstate.qualtrics.com/jfe/form/SV_8oBqFD3cj3tK8yW

Thank you for your participation!

Sincerely,



Emily Moore

Master of Landscape Architecture

Department of Landscape Architecture and Regional & Community Planning

Kansas State University



What elementary school do your children in Kindergarten through 6th grade attend?

- ☐ Gladstone Elementary ☐ Garfield Elementary
☐ Whittier Elementary ☐ George Melcher Elementary

Answer the questions below related to the images



To what extent do you agree or disagree with these statements?

	<i>strongly disagree</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>strongly agree</i>	<i>5</i>	<i>I do not know</i>
I live close to a public greenspace like this	☐	☐	☐	☐	☐	☐	☐	☐
I feel comfortable letting my children go to a public greenspace like this by themselves or with friends	☐	☐	☐	☐	☐	☐	☐	☐
How frequently do you take your children to public greenspaces like this?	<i>never</i> ☐	<i>1</i> ☐	<i>2</i> ☐	<i>3</i> ☐	<i>4</i> ☐	<i>5</i> ☐	<i>often</i> ☐	☐
How frequently do your children go to public greenspaces like this by themselves or with friends?	☐	☐	☐	☐	☐	☐	☐	☐

The following reasons negatively influence how often I take my children to a public greenspace like this:

	<i>not at all</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>very much</i>
Lack of time	☐	☐	☐	☐	☐	☐	☐
Distance from home	☐	☐	☐	☐	☐	☐	☐
Unsafe or disconnected sidewalks to get there	☐	☐	☐	☐	☐	☐	☐
Unsafe street crossings	☐	☐	☐	☐	☐	☐	☐
Safety concerns in the area	☐	☐	☐	☐	☐	☐	☐
Injury concerns	☐	☐	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐	☐	☐

Answer the questions below related to the images



To what extent do you agree or disagree with these statements?

	<i>strongly disagree</i>				<i>strongly agree</i>	<i>I do not know</i>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
I live close to a public greenspace like this	☐	☐	☐	☐	☐	☐
I feel comfortable letting my children go to a public greenspace like this by themselves or with friends	☐	☐	☐	☐	☐	
How frequently do you take your children to public greenspaces like this?	<i>never</i> <i>1</i> ☐	<i>2</i> ☐	<i>3</i> ☐	<i>4</i> ☐	<i>often</i> <i>5</i> ☐	
How frequently do your children go to public greenspaces like this by themselves or with friends?	☐	☐	☐	☐	☐	

The following reasons negatively influence how often I take my children to a public greenspace like this:

	<i>not at all</i>				<i>very much</i>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Lack of time	☐	☐	☐	☐	☐
Distance from home	☐	☐	☐	☐	☐
Unsafe or disconnected sidewalks to get there	☐	☐	☐	☐	☐
Unsafe street crossings	☐	☐	☐	☐	☐
Safety concerns in the area	☐	☐	☐	☐	☐
Injury concerns	☐	☐	☐	☐	☐
Other_____	☐	☐	☐	☐	☐

Answer the questions below related to the images



To what extent do you agree or disagree with these statements?

	<i>strongly disagree</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>strongly agree</i>	<i>5</i>	<i>I do not know</i>
I live close to a public greenspace like this	☐	☐	☐	☐	☐	☐	☐	☐

I feel comfortable letting my children go to a public greenspace like this by themselves or with friends	☐	☐	☐	☐	☐	☐	☐	☐
--	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

	<i>never</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>often</i>	<i>5</i>
How frequently do you take your children to public greenspaces like this?	☐	☐	☐	☐	☐	☐	☐

How frequently do your children go to public greenspaces like this by themselves or with friends?	☐	☐	☐	☐	☐	☐	☐
---	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

The following reasons negatively influence how often I take my children to a public greenspace like this:

	<i>not at all</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>very much</i>	<i>5</i>
Lack of time	☐	☐	☐	☐	☐	☐	☐
Distance from home	☐	☐	☐	☐	☐	☐	☐
Unsafe or disconnected sidewalks to get there	☐	☐	☐	☐	☐	☐	☐
Unsafe street crossings	☐	☐	☐	☐	☐	☐	☐
Safety concerns in the area	☐	☐	☐	☐	☐	☐	☐
Injury concerns	☐	☐	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐	☐	☐

Answer the questions below related to the images



To what extent do you agree or disagree with these statements?

	<i>strongly disagree</i>				<i>strongly agree</i>	<i>I do not know</i>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
I live close to a public greenspace like this	☐	☐	☐	☐	☐	☐
I feel comfortable letting my children go to a public greenspace like this by themselves or with friends	☐	☐	☐	☐	☐	
How frequently do you take your children to public greenspaces like this?	<i>never</i> <i>1</i> ☐	<i>2</i> ☐	<i>3</i> ☐	<i>4</i> ☐	<i>often</i> <i>5</i> ☐	
How frequently do your children go to public greenspaces like this by themselves or with friends?	☐	☐	☐	☐	☐	

The following reasons negatively influence how often I take my children to a public greenspace like this:

	<i>not at all</i>				<i>very much</i>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Lack of time	☐	☐	☐	☐	☐
Distance from home	☐	☐	☐	☐	☐
Unsafe or disconnected sidewalks to get there	☐	☐	☐	☐	☐
Unsafe street crossings	☐	☐	☐	☐	☐
Safety concerns in the area	☐	☐	☐	☐	☐
Injury concerns	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐

To what extent do you agree or disagree with these statements?

For the purpose of this survey, **outdoor learning** is considered to mean: “learning traditional subjects in an outdoor classroom.”

Nature-based learning is considered to mean: “learning that occurs in natural settings where students interact with natural elements and learn about the environment”

	strongly disagree				strongly agree	
	1	2	3	4	5	I do not know
I think my children do not spend enough time in nature outside of school time	☐	☐	☐	☐	☐	☐
I think my children do not spend enough time in nature during school time	☐	☐	☐	☐	☐	☐
I would support outdoor or nature-based learning but only on the school campus	☐	☐	☐	☐	☐	☐
I would support supervised outdoor or nature-based learning in public greenspaces outside the school campus	☐	☐	☐	☐	☐	☐
I feel comfortable with my children playing unsupervised before/after school in public greenspaces nearby the school	☐	☐	☐	☐	☐	☐

How frequently do your children do these types of **outdoor activities** outside of school time?

	never				often
	1	2	3	4	5
Sports (soccer, basketball, track)	☐	☐	☐	☐	☐
Play on playground (slide, seesaw, swings, tag, hopscotch)	☐	☐	☐	☐	☐
Imaginative or pretend play outside (children make up the rules)	☐	☐	☐	☐	☐
Nature-based learning/exploring nature	☐	☐	☐	☐	☐
Learning in outdoor classroom	☐	☐	☐	☐	☐

To what extent **do you like** these kinds of **outdoor activities** for your children to do outside of school time?

	<i>strongly dislike</i> 1	2	3	4	<i>strongly like</i> 5
Sports (soccer, basketball, track)	☐	☐	☐	☐	☐
Play on playground (slide, seesaw, swings, tag, hopscotch)	☐	☐	☐	☐	☐
Imaginative or pretend play outside (children make up the rules)	☐	☐	☐	☐	☐
Nature-based learning/exploring nature	☐	☐	☐	☐	☐
Learning in outdoor classroom	☐	☐	☐	☐	☐

I consider myself **knowledgeable** about how frequent contact with nature affects children's...

	<i>strongly disagree</i> 1	2	3	4	<i>strongly agree</i> 5	<i>I do not know</i>
Physical health (healthy weight, mobility)	☐	☐	☐	☐	☐	☐
Behavior (impulse control, temper, being respectful)	☐	☐	☐	☐	☐	☐
Mental/emotional health (positive relationships, rational thinking, decision making, & mood management)	☐	☐	☐	☐	☐	☐
Cognitive skills (think, learn, remember, attention)	☐	☐	☐	☐	☐	☐

To what extent **do you like** these kinds of **settings** for your child to play/learn in?

strongly dislike 1 2 3 4 5 strongly like



strongly dislike 1 2 3 4 5 strongly like



strongly dislike 1 2 3 4 5 strongly like



strongly dislike 1 2 3 4 5 strongly like



strongly dislike 1 2 3 4 5 strongly like



strongly dislike 1 2 3 4 5 strongly like



I feel my children should have frequent contact with nature to improve the following:

	<i>strongly disagree</i>				<i>strongly agree</i>	<i>I do not know</i>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
Physical health (healthy weight, mobility)	☐	☐	☐	☐	☐	☐
Behavior (impulse control, temper, being respectful)	☐	☐	☐	☐	☐	☐
Mental/Emotional health (positive relationships, rational thinking, decision making, and mood management)	☐	☐	☐	☐	☐	☐
Cognitive Skills (think, learn, remember, attention)	☐	☐	☐	☐	☐	☐

How many children do you have?	☐ <i>1</i>	☐ <i>2</i>	☐ <i>3</i>	☐ <i>4</i>	☐ <i>5 or more</i>	
What grades are your children in? Select all that apply.	☐ <i>Pre-K</i>	☐ <i>1st grade</i>	☐ <i>3rd grade</i>	☐ <i>5th grade</i>		
	☐ <i>Kindergarten</i>	☐ <i>2nd grade</i>	☐ <i>4th grade</i>	☐ <i>6th grade</i>		
			☐ <i>Middle school</i>	☐ <i>Highschool or higher</i>		
How many of your children have special needs or neurodiversity?	☐ <i>0</i>	☐ <i>1</i>	☐ <i>2</i>	☐ <i>3</i>	☐ <i>4</i>	☐ <i>5 or more</i>
How many of your children have physical disabilities?	☐ <i>0</i>	☐ <i>1</i>	☐ <i>2</i>	☐ <i>3</i>	☐ <i>4</i>	☐ <i>5 or more</i>
How does your child usually get to and from school?	☐ <i>walk by themselves or with friends</i>	☐ <i>walk with adults</i>	☐ <i>I drive them</i>	☐ <i>school bus</i>		
	☐ <i>bike by themselves or with friends</i>	☐ <i>bike with adults</i>	☐ <i>carpool</i>	☐ <i>city bus</i>		
How long does it usually take your child to get to school?	☐ <i>less than 5 minutes</i>	☐ <i>5-10 minutes</i>	☐ <i>10-20 minutes</i>	☐ <i>20-30 minutes</i>	☐ <i>more than 30 minutes</i>	

Are you a single parent? ☐ *yes* ☐ *no*

What is your relationship to your children? ☐ *Mother*
Step-Mother ☐ *Father*
Step-Father ☐ *Grandparent* ☐ *Grandparent*

Do you have at least one car? ☐ *yes* ☐ *no*

Indicate your age group ☐ *under 25* ☐ *25 - 29* ☐ *30 - 39* ☐ *Prefer to not answer*
☐ *40 - 49* ☐ *50 - 59* ☐ *60 or more*

How do you identify? ☐ *Female* ☐ *Male* ☐ *Non-binary* ☐ *Gender not listed*
☐ *Prefer to not answer*

Which of the following best describes your race/ethnicity? ☐ *Hispanic* ☐ *Black or African American* ☐ *Asian*
☐ *White* ☐ *American Indian or Alaska Native* ☐ *Native Hawaiian and Other Pacific Islander*
☐ *Prefer to not answer* ☐ *Some other race/ethnicity* ☐ *Multiracial*

What is your highest degree or level of school you have completed? ☐ *Highschool* ☐ *Associates degree* ☐ *Master's degree* ☐ *Prefer to not answer*
☐ *Some college* ☐ *Bachelor's degree* ☐ *Ph.D. or higher*

Which of the following best describes your total household income last year before taxes? ☐ *less than \$25,000* ☐ *\$35,001-\$50,000* ☐ *\$75,001-\$100,000*
☐ *\$25,000-\$35,000* ☐ *\$50,001-\$75,000* ☐ *more than \$100,000*
☐ *Prefer to not answer*

We thank you for your time spent taking this survey.
Your response has been recorded.

The findings from this study will be shared with the schools that participate in May 2024.

Emily Moore

2023-2024 Survey
CHILDREN'S CONTACT WITH NATURE

Teacher Survey

Dear teachers,

My name is Emily Moore, and I am a graduate student in the landscape architecture program at Kansas State University. I am doing research on elementary school children's contact with nature. I believe your perspective matters and I would appreciate your participation in this study.

This study focuses on elementary schools in the Kansas City Public Schools district and children in kindergarten through 6th grade. It aims to collect parent and teacher perspectives of children's access and contact with nature through surveys. Your responses on children's contact with nature are very important and will provide valuable information for informing recommendations to provide more opportunities for your children's contact with nature. The findings of this study will be shared with the schools and parents that participated in May 2024.

Your participation in this survey is voluntary and completely anonymous, with no identity information tied to the survey. The anonymous data will not be used or distributed to others for future research. You may withdraw from participation anytime and skip any question you prefer not to respond to. It should take around 10-12 minutes to complete.

If you have questions about the study, please contact:

Emily Moore
Graduate Student at Kansas State University
ekmoore01@ksu.edu

Dr. Sara Hadavi
Professor of Landscape Architecture at Kansas State University
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Dr. Lisa Rubin
IRB Chair at Kansas State University
comply@ksu.edu

If possible, please complete the survey by the end of next week (January 19th).

Scan the QR code with your phone camera or visit the link below or in your email.

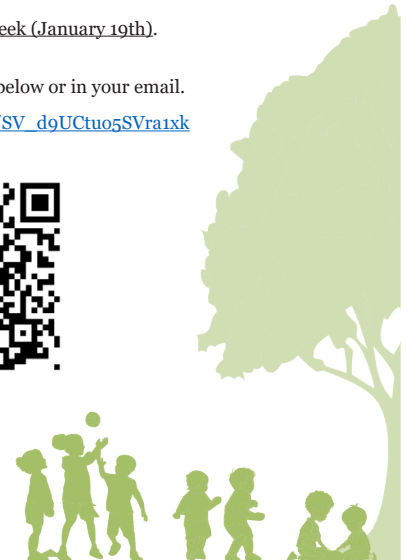
Online Survey Link: https://kstate.qualtrics.com/jfe/form/SV_d9UCtuo5SVra1xk

Thank you for your participation!

Sincerely,



Emily Moore
Master of Landscape Architecture
Department of Landscape Architecture and Regional & Community Planning
Kansas State University



Answer the questions below related to the images



To what extent do you agree or disagree with these statements?

Our school is located close to a public greenspace like this	<i>strongly disagree</i> 1 ○	2 ○	3 ○	4 ○	<i>strongly agree</i> 5 ○	<i>I do not know</i> ○
I feel comfortable taking my students to a public greenspace like this	<i>strongly disagree</i> 1 ○	2 ○	3 ○	4 ○	<i>strongly agree</i> 5 ○	
How frequently do you take your students to public greenspaces like this?	<i>never</i> 1 ○	2 ○	3 ○	4 ○	<i>often</i> 5 ○	

The following reasons negatively influence how often I take my students to a public greenspace like this:

	<i>not at all</i> 1	2	3	4	<i>very much</i> 5
Lack of time	○	○	○	○	○
Distance from school	○	○	○	○	○
Unsafe or disconnected sidewalks to get there	○	○	○	○	○
Unsafe street crossings	○	○	○	○	○
Safety concerns in the area	○	○	○	○	○
Injury concerns	○	○	○	○	○
Other _____	○	○	○	○	○

Answer the questions below related to the images



To what extent do you agree or disagree with these statements?

	<i>strongly disagree</i>				<i>strongly agree</i>	<i>I do not know</i>
	1	2	3	4	5	
Our school is located close to a public greenspace like this	☐	☐	☐	☐	☐	☐
	<i>strongly disagree</i>				<i>strongly agree</i>	
	1	2	3	4	5	
I feel comfortable taking my students to a public greenspace like this	☐	☐	☐	☐	☐	
	<i>never</i>				<i>often</i>	
	1	2	3	4	5	
How frequently do you take your students to public greenspaces like this?	☐	☐	☐	☐	☐	

The following reasons negatively influence how often I take my students to a public greenspace like this:

	<i>not at all</i>				<i>very much</i>
	1	2	3	4	5
Lack of time	☐	☐	☐	☐	☐
Distance from school	☐	☐	☐	☐	☐
Unsafe or disconnected sidewalks to get there	☐	☐	☐	☐	☐
Unsafe street crossings	☐	☐	☐	☐	☐
Safety concerns in the area	☐	☐	☐	☐	☐
Injury concerns	☐	☐	☐	☐	☐
Other_____	☐	☐	☐	☐	☐

Answer the questions below related to the images



To what extent do you agree or disagree with these statements?

	<i>strongly disagree</i>				<i>strongly agree</i>	
	1	2	3	4	5	<i>I do not know</i>
Our school is located close to a public greenspace like this	☐	☐	☐	☐	☐	☐
	<i>strongly disagree</i>				<i>strongly agree</i>	
	1	2	3	4	5	
I feel comfortable taking my students to a public greenspace like this	☐	☐	☐	☐	☐	
	<i>never</i>				<i>often</i>	
	1	2	3	4	5	
How frequently do you take your students to public greenspaces like this?	☐	☐	☐	☐	☐	

The following reasons negatively influence how often I take my students to a public greenspace like this:

	<i>not at all</i>				<i>very much</i>
	1	2	3	4	5
Lack of time	☐	☐	☐	☐	☐
Distance from school	☐	☐	☐	☐	☐
Unsafe or disconnected sidewalks to get there	☐	☐	☐	☐	☐
Unsafe street crossings	☐	☐	☐	☐	☐
Safety concerns in the area	☐	☐	☐	☐	☐
Injury concerns	☐	☐	☐	☐	☐
Other_____	☐	☐	☐	☐	☐

Answer the questions below related to the images



To what extent do you agree or disagree with these statements?

	<i>strongly disagree</i>				<i>strongly agree</i>	
	1	2	3	4	5	<i>I do not know</i>
Our school is located close to a public greenspace like this	☐	☐	☐	☐	☐	☐
	<i>strongly disagree</i>					<i>strongly agree</i>
	1	2	3	4	5	
I feel comfortable taking my students to a public greenspace like this	☐	☐	☐	☐	☐	☐
	<i>never</i>					<i>often</i>
	1	2	3	4	5	
How frequently do you take your students to public greenspaces like this?	☐	☐	☐	☐	☐	☐

The following reasons negatively influence how often I take my students to a public greenspace like this:

	<i>not at all</i>				<i>very much</i>
	1	2	3	4	5
Lack of time	☐	☐	☐	☐	☐
Distance from school	☐	☐	☐	☐	☐
Unsafe or disconnected sidewalks to get there	☐	☐	☐	☐	☐
Unsafe street crossings	☐	☐	☐	☐	☐
Safety concerns in the area	☐	☐	☐	☐	☐
Injury concerns	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐

For the purpose of this survey, **outdoor learning** is considered to mean: “learning traditional subjects in an outdoor classroom.”

	<i>never</i> 1	2	3	4	<i>often</i> 5
How frequently do you incorporate outdoor learning in your lessons?	☐	☐	☐	☐	☐

Nature-based learning is considered to mean: “learning that occurs in natural settings where students interact with natural elements and learn about the environment”

	<i>never</i> 1	2	3	4	<i>often</i> 5
How frequently do you incorporate nature-based learning in your lessons?	☐	☐	☐	☐	☐

To what extent do you agree or disagree with these statements?

	<i>strongly disagree</i> 1	2	3	4	<i>strongly agree</i> 5	<i>I do not know</i>
I think frequent contact with nature during school time is important	☐	☐	☐	☐	☐	☐
I feel comfortable incorporating outdoor or nature-based learning in my lessons	☐	☐	☐	☐	☐	☐
Our school organizes enough outdoor or nature-based learning in the curriculum	☐	☐	☐	☐	☐	☐
I would support outdoor or nature-based learning but only on the school campus	☐	☐	☐	☐	☐	☐
I would support outdoor or nature-based learning in greenspaces outside the school campus	☐	☐	☐	☐	☐	☐

To what extent do you agree or disagree with these statements?

	<i>strongly disagree</i> 1	2	3	4	<i>strongly agree</i> 5	<i>I do not know</i>
Funding issues limit our school from providing outdoor or nature-based learning to our students	☐	☐	☐	☐	☐	☐
Parent permission makes it difficult to take our students to public greenspaces frequently	☐	☐	☐	☐	☐	☐

How frequently do your students do these types of **outdoor activities** during school time?

	<i>never</i> 1	2	3	4	<i>often</i> 5
Sports (soccer, basketball, track)	☐	☐	☐	☐	☐
Play on playground (slide, seesaw, swings, tag, hopscotch)	☐	☐	☐	☐	☐
Imaginative or pretend play outside (children make up the rules)	☐	☐	☐	☐	☐
Nature-based learning/exploring nature	☐	☐	☐	☐	☐
Learning in outdoor classroom	☐	☐	☐	☐	☐

To what extent do you like these kinds of **outdoor activities** for your students to do during school time?

	<i>strongly dislike</i> 1	2	3	4	<i>strongly like</i> 5
Sports (soccer, basketball, track)	☐	☐	☐	☐	☐
Play on playground (slide, seesaw, swings, tag, hopscotch)	☐	☐	☐	☐	☐
Imaginative or pretend play outside (children make up the rules)	☐	☐	☐	☐	☐
Nature-based learning/exploring nature	☐	☐	☐	☐	☐
Learning in outdoor classroom	☐	☐	☐	☐	☐

I consider myself **knowledgeable** about how frequent contact with nature affects students'...

	<i>strongly disagree</i> 1	2	3	4	<i>strongly agree</i> 5	<i>I do not know</i>
Physical health (healthy weight, mobility)	☐	☐	☐	☐	☐	☐
Behavior (impulse control, temper, being respectful)	☐	☐	☐	☐	☐	☐
Mental/emotional health (positive relationships, rational thinking, decision making, & mood management)	☐	☐	☐	☐	☐	☐
Cognitive skills (think, learn, remember, attention)	☐	☐	☐	☐	☐	☐

To what extent **do you like** these kinds of **settings** for your students to play/learn in?

strongly dislike 1 2 3 4 5 strongly like

☐ ☐ ☐ ☐ ☐



strongly dislike 1 2 3 4 5 strongly like

☐ ☐ ☐ ☐ ☐



strongly dislike 1 2 3 4 5 strongly like

☐ ☐ ☐ ☐ ☐



strongly dislike 1 2 3 4 5 strongly like

☐ ☐ ☐ ☐ ☐



strongly dislike 1 2 3 4 5 strongly like

☐ ☐ ☐ ☐ ☐



strongly dislike 1 2 3 4 5 strongly like

☐ ☐ ☐ ☐ ☐



I feel my students should have frequent contact with nature to improve the following:

	<i>strongly disagree</i>				<i>strongly agree</i>	<i>I do not know</i>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
Physical health (healthy weight, mobility)	☐	☐	☐	☐	☐	☐
Behavior (impulse control, temper, being respectful)	☐	☐	☐	☐	☐	☐
Mental/emotional health (positive relationships, rational thinking, decision making, & mood management)	☐	☐	☐	☐	☐	☐
Cognitive skills (think, learn, remember, attention)	☐	☐	☐	☐	☐	☐

The following reasons negatively influence how often I can incorporate outdoor or nature-based learning in lessons:

	<i>strongly disagree</i>				<i>strongly agree</i>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Other school initiatives	☐	☐	☐	☐	☐
District initiatives	☐	☐	☐	☐	☐
Other curricular time commitments	☐	☐	☐	☐	☐
Lack of training and professional development	☐	☐	☐	☐	☐
Other_____	☐	☐	☐	☐	☐

How many of your students have special needs or neurodiversity? ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 or more

How many of your students have physical disabilities? ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 or more

What grade do you teach? ☐ Kindergarten ☐ 2nd grade ☐ 4th grade ☐ 6th grade
☐ 1st grade ☐ 3rd grade ☐ 5th grade ☐ Other_____

Indicate your age group

- ☐ *under 25* ☐ *25 - 29* ☐ *30 - 39* ☐ *Prefer to not answer*
☐ *40 - 49* ☐ *50 - 59* ☐ *60 or more*

How do you identify?

- ☐ *Female* ☐ *Male* ☐ *Non-binary* ☐ *Gender not listed*
☐ *Prefer to not answer*

Which of the following best describes your race/ethnicity?

- ☐ *Hispanic* ☐ *Black or African American* ☐ *Asian*
☐ *White* ☐ *American Indian or Alaska Native* ☐ *Native Hawaiian and Other Pacific Islander*
☐ *Prefer to not answer* ☐ *Some other race/ethnicity* ☐ *Multiracial*

What is your highest degree or level of school you have completed?

- ☐ *Highschool* ☐ *Associates degree* ☐ *Master's degree* ☐ *Prefer to not answer*
☐ *Some college* ☐ *Bachelor's degree* ☐ *Ph.D. or higher*

Which of the following best describes your income last year before taxes?

- ☐ *less than \$25,000* ☐ *\$35,001-\$50,000* ☐ *\$75,001-\$100,000*
☐ *\$25,000-\$35,000* ☐ *\$50,001-\$75,000* ☐ *more than \$100,000*
☐ *Prefer to not answer*

We thank you for your time spent taking this survey.
Your response has been recorded.

The findings from this study will be shared with the
schools that participate in May 2024.

Emily Moore

Appendix References

FatCamera. (2015). Children Chasing Soccer Ball During a Match [Photograph]. iStock.

<https://www.istockphoto.com/photo/children-chasing-soccer-ball-during-a-match-gm486401400-72972625>

Fly View Productions. (2023). Schoolchildren playing outside at recess [Photograph]. iStock.

<https://www.istockphoto.com/photo/schoolchildren-playing-outside-at-recess-gm1554384047-526667211>

Google Earth. (n.d.). [Google street view of Budd Park]. Retrieved November 9, 2023.

Google Earth. (n.d.). [Google street view of community gardens in Kansas City]. Retrieved November 9, 2023.

Google Earth. (n.d.). [Google street view of Northeast Athletic Fields]. Retrieved November 9, 2023.

Google Earth. (n.d.). [Google street view of North Terrace Park Lake]. Retrieved November 9, 2023.

JackF. (2021). Group of kids having open air lesson [Photograph]. iStock.

<https://www.istockphoto.com/photo/group-of-kids-having-open-air-lesson-gm1298904665-391684036>

Lacey, C. (n.d.) Family exploring the cycle trail at Calke Abbey, Derbyshire. [Photograph]. National Trust Images.

<https://www.nationaltrustimages.org.uk/image/1364332>

omgimages. (2015). Group Looking For Minibeasts At Activity Centre. [Photograph]. iStock.

<https://www.istockphoto.com/photo/group-looking-for-minibeasts-at-activity-centre-gm484592828-71299809>

woolzian. (2015). Boys climbing through woodland [Photograph]. iStock. <https://www.istockphoto.com/photo/boys-climbing-through-woodland-gm481287978-69375321>

Appendix B | Statistical Analysis

Statistical Analysis Codes

Format:

(Participant Type code) _ (Greenspace Type code) _ (Variable code)

(B/P/S) _ (N/A/G/Na) _ (Variable code)

Participant Type code:

B – Both parents and teachers answered the same question

P – Only parents responded to this question

S – Only teachers responded to this question

Greenspace Type code:

N – Neighborhood park

A – Athletic park

G – Garden

Na – Nature park

Codes

Greenspace Type Frequency & Location	
Codes	Variable
B_(N, A, G, Na)_Locationclose	Parent - I live close to a public greenspace like this Teacher - Our school is located close to a public greenspace like this
B_(N, A, G, Na)_FrqTkChd	How frequently do you take your children/ students to a public greenspace like this?
P_(N, A, G, Na)_FrqChdAlone	How frequently do your children go to public greenspaces like this by themselves or with friends?
P_(N, A, G, Na)_CmfChdGo	I feel comfortable letting my children go to a public greenspace like this by themselves or with friends

Greenspace Type Barrier	
Codes	Variable
The following reasons negatively influence how often I take my children/students to a public greenspace like this:	
B_(N, A, G, Na)_BarrierTime	Lack of time
B_(N, A, G, Na)_BarrierDist	Distance from home/school
B_(N, A, G, Na)_BarrierSdwlk	Unsafe or disconnected sidewalks to get there
B_(N/A/G/Na)_BarrierSt	Unsafe street crossings
B_(N/A/G/Na)_BarrierSafety	Safety concerns in the area
B_(N/A/G/Na)_BarrierInj	Injury concerns

Time in Nature During and Outside School	
Codes	Variable
P_ChdDNEngTimeOutSch	I think my children do not spend enough time in nature outside of school time
P_ChdDNEngTimeInSch	I think my children do not spend enough time in nature during school time
B_OtderNtreLrnOnSchCmps	I would support supervised outdoor or nature-based learning but only on the school campus
B_OtdrNtreLrnOutSchCmps	I would support supervised outdoor or nature-based learning in public greenspaces outside the school campus
P_CmftBefAftSchNearby	I feel comfortable with my children playing unsupervised before/after school in public greenspaces nearby the school
S_FreqOutLearn	How frequently do you incorporate outdoor learning in your lessons?
S_FreqNatBaseLearn	How frequently do you incorporate nature-based learning in your lessons?
S_FreqNatInSchImp	I think frequent contact with nature during school time is important
S_ComfOutNatBaseLess	I feel comfortable incorporating outdoor or nature-based learning in my lessons
S_SchEnghOutNatBaseCurr	Our school organizes enough outdoor or nature-based learning in the curriculum

Outdoor Activities	
Codes	Variable
How frequently do your children do these types of outdoor activities outside of school time?	
How frequently do your students do these types of outdoor activities during school time?	
P/S_FreqActOutSchSports	Sports (soccer, basketball, tennis, track)
P/S_FreqActOutSchPlygrd	Play on playground (slide, seesaw, swings, tag, hopscotch)
P/S_FreqActOutSchImgPrtdplayOut	Imaginative or pretend play outside (children make up the rules)
P/S_FreqActOutSchNtreLearnExp	Nature-based learning/exploring nature
P/S_FreqOutSchLearnOutClass	Learning in outdoor classroom
To what extent do you like these kinds of outdoor activities for your children to do outside of school time?	
To what extent do you like these kinds of outdoor activities for your students to do during school time?	
P/S_LikeOutSchSports	Sports (soccer, basketball, tennis, track)
P/S_LikeOutSchPlygrd	Play on playground (slide, seesaw, swings, tag, hopscotch)
P/S_LikeOutSchImgPrtdplayOut	Imaginative or pretend play outside (children make up the rules)
P/S_LikeOutSchNtreLearnExp	Nature-based learning/exploring nature
P/S_LikeOutSchLearnOutClass	Learning in outdoor classroom

Outdoor Settings	
Codes	Variable
To what extent do you like these kinds of settings for your children to play or learn in?	
B_LikeSettingOutClass	[image of kids in an outdoor classroom]
B_LikeSettingNatureTrail	[image of kids on nature trail]
B_LikeSettingPlygrd	[image of kids playing on a playground]
B_LikeSettingAthFld	[image of kids playing soccer]
B_LikeSettingNature	[image of kids learning in nature]
B_LikeSettingNatureplay	[image of kids playing on a nature playground]

Knowledge and Attitudes of the Benefits of Nature	
Codes	Variable
I consider myself knowledgeable about how frequent contact with nature affects children's...	
B_KnowFreqContNtrePhys	Physical health (healthy weight, mobility)
B_KnowFreqContNtreBeh	Behavior (impulse or temper control, being respectful)
B_KnowFreqContNtreMenEmo	Mental/Emotional health (positive relationships, rational thinking, decision making, & mood management)
B_KnowFreqContNtreCogn	Cognitive Skills (think, learn, remember, attention)
I feel my children should have frequent contact with nature to improve the following:	
B_FeelFreqContNatPhys	Physical health (healthy weight, mobility)
B_FeelFreqContNatBeh	Behavior (impulse or temper control, being respectful)
B_FeelFreqContNatMenEmo	Mental/Emotional health (positive relationships, rational thinking, decision making, & mood management)
B_FeelFreqContNatCogn	Cognitive Skills (think, learn, remember, attention)

School Specific Barriers	
Codes	Variable
The following reasons negatively influence how often I incorporate outdoor or nature-based learning in my lessons	
S_SchBarrierFund	Funding issues limit our school from providing outdoor or nature-based learning to our students
S_SchBarrierPerm	Parent permission makes it difficult to take our students to greenspaces frequently
S_BarrierToOutNtreLearn_SchIn	Other school initiatives
S_BarrierToOutNtreLearn_DistIn	District initiatives
S_BarrierToOutNtreLearn_Curric	Other curricular time commitments
S_BarrierToOutNtreLearn_Train	Lack of training and professional development
S_BarrierToOutNtreLearn_Other	Other

Frequencies | Teacher | Greenspace Type

		Statistics								
		B_N_Locationc lose	B_N_FrqTkCh d	S_N_CmfTkSt u	B_N_BarrierTi me	B_N_BarrierDi st	B_N_BarrierSd wk	B_N_BarrierSt	B_N_BarrierSa fety	B_N_BarrierInj
N	Valid	20	20	20	20	20	20	20	20	20
	Missing	0	0	0	0	0	0	0	0	0
Mean		3.00	1.65	3.10	3.80	3.55	3.20	3.15	3.85	2.65
Std. Deviation		1.864	1.137	1.518	1.322	1.504	1.281	1.424	1.226	1.309
Skewness		-.271	1.976	-.186	-.960	-.571	-.414	-.292	-1.209	.418
Std. Error of Skewness		.512	.512	.512	.512	.512	.512	.512	.512	.512
Percentiles	25	1.00	1.00	1.25	3.00	2.25	2.25	2.00	3.00	2.00
	50	3.00	1.00	3.00	4.00	4.00	3.00	3.00	4.00	2.00
	75	5.00	2.00	4.75	5.00	5.00	4.00	4.00	5.00	4.00

		Statistics								
		B_A_Locationc lose	B_A_FrqTkChd	S_A_CmfTkStu	B_A_BarrierTi me	B_A_BarrierDi st	B_A_BarrierSd wk	B_A_BarrierSt	B_A_BarrierSaf ety	B_A_BarrierInj
N	Valid	20	20	20	20	20	20	20	20	20
	Missing	0	0	0	0	0	0	0	0	0
Mean		1.35	1.10	3.25	3.90	4.60	3.80	3.65	3.80	2.75
Std. Deviation		1.226	.308	1.517	1.410	.821	1.105	1.348	1.322	1.552
Skewness		1.339	2.888	-.270	-.930	-2.259	-.863	-.712	-.960	.276
Std. Error of Skewness		.512	.512	.512	.512	.512	.512	.512	.512	.512
Percentiles	25	.25	1.00	2.00	3.00	4.25	3.00	3.00	3.00	1.00
	50	1.00	1.00	3.00	5.00	5.00	4.00	4.00	4.00	2.50
	75	2.00	1.00	5.00	5.00	5.00	5.00	5.00	5.00	4.00

		Statistics								
		B_G_Locationc lose	B_G_FrqTkCh d	S_G_CmfTkSt u	B_G_BarrierTi me	B_G_BarrierDi st	B_G_BarrierSd wk	B_G_BarrierSt	B_G_BarrierSa fety	B_G_BarrierInj
N	Valid	20	20	20	20	20	20	19	20	19
	Missing	0	0	0	0	0	0	1	0	1
Mean		2.35	1.65	3.50	3.45	3.50	3.00	3.00	2.80	2.00
Std. Deviation		2.134	1.309	1.573	1.791	1.821	1.686	1.599	1.673	1.528
Skewness		.248	1.983	-.586	-.520	-.552	-.073	-.091	.126	1.254
Std. Error of Skewness		.512	.512	.512	.512	.512	.512	.524	.512	.524
Percentiles	25	.25	1.00	2.25	1.00	1.00	1.00	1.00	1.00	1.00
	50	1.00	1.00	4.00	4.50	5.00	3.00	3.00	3.00	1.00
	75	5.00	1.75	5.00	5.00	5.00	5.00	5.00	4.75	3.00

		Statistics								
		B_Na_Locatio nclose	B_Na_FrqTkC hd	S_Na_CmfTkS tu	B_Na_BarrierT ime	B_Na_BarrierD ist	B_Na_BarrierS dwk	B_Na_BarrierS t	B_Na_BarrierS afety	B_Na_BarrierI nj
N	Valid	20	20	20	20	19	20	20	19	19
	Missing	0	0	0	0	1	0	0	1	1
Mean		2.65	1.40	2.85	3.80	3.21	3.40	3.30	3.47	2.95
Std. Deviation		1.872	.754	1.565	1.399	1.398	1.231	1.261	1.307	1.393
Skewness		.033	1.605	.183	-.886	-.009	-.496	-.284	-.353	.241
Std. Error of Skewness		.512	.512	.512	.512	.524	.512	.512	.524	.524
Percentiles	25	1.00	1.00	1.00	3.00	2.00	3.00	2.25	3.00	2.00
	50	3.00	1.00	3.00	4.00	3.00	3.50	3.00	3.00	3.00
	75	4.75	1.75	4.75	5.00	5.00	4.00	4.00	5.00	4.00

Frequencies / Parent / Greenspace Type

		Statistics									
		B_N_Location lose	B_N_FrqTkCh d	P_N_FrqChdAl one	P_N_CmfChd Go	B_N_BarrierTi me	B_N_BarrierDi st	B_N_BarrierSd wtk	B_N_BarrierSt	B_N_BarrierSa fety	B_N_BarrierInj
N	Valid	31	31	31	31	30	30	30	30	30	30
	Missing	0	0	0	0	1	1	1	1	1	1
Mean		3.48	3.45	1.84	1.58	2.70	2.40	2.77	3.07	3.67	2.57
Std. Deviation		1.630	1.234	1.267	1.025	1.149	1.037	1.431	1.437	1.348	1.382
Skewness		-.660	-.166	1.373	1.949	-.237	.286	-.013	-.274	-.517	.608
Std. Error of Skewness		.421	.421	.421	.421	.427	.427	.427	.427	.427	.427
Percentiles	25	2.00	3.00	1.00	1.00	1.75	1.75	1.00	1.75	2.75	1.00
	50	4.00	3.00	1.00	1.00	3.00	2.50	3.00	3.00	4.00	2.00
	75	5.00	5.00	3.00	2.00	3.25	3.00	4.00	4.00	5.00	3.00

		Statistics									
		B_A_Location lose	B_A_FrqTkCh d	P_A_FrqChdAl one	P_A_CmfChd Go	B_A_BarrierTi me	B_A_BarrierDi st	B_A_BarrierSd wtk	B_A_BarrierSt	B_A_BarrierSa fety	B_A_BarrierInj
N	Valid	31	31	31	30	31	30	30	30	31	30
	Missing	0	0	0	1	0	1	1	1	0	1
Mean		3.32	2.55	1.58	1.53	2.61	2.87	2.93	2.93	3.35	2.53
Std. Deviation		1.492	1.338	1.025	1.106	1.116	1.252	1.285	1.530	1.496	1.570
Skewness		-.147	.559	1.552	2.041	-.072	-.070	-.077	.058	-.339	.507
Std. Error of Skewness		.421	.421	.421	.427	.421	.427	.427	.427	.421	.427
Percentiles	25	2.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	2.00	1.00
	50	3.00	2.00	1.00	1.00	3.00	3.00	3.00	3.00	4.00	2.00
	75	5.00	3.00	2.00	1.25	3.00	4.00	4.00	4.25	5.00	4.00

		Statistics									
		B_G_Location lose	B_G_FrqTkCh d	P_G_FrqChdAl one	P_G_CmfChd Go	B_G_BarrierTi me	B_G_BarrierDi st	B_G_BarrierSd wtk	B_G_BarrierSt	B_G_BarrierSa fety	B_G_BarrierInj
N	Valid	31	31	30	31	31	29	28	28	29	28
	Missing	0	0	1	0	0	2	3	3	2	3
Mean		1.87	1.94	1.47	1.74	2.61	3.38	2.71	2.68	3.10	2.29
Std. Deviation		1.628	1.124	1.008	1.182	1.256	1.498	1.410	1.492	1.423	1.487
Skewness		.668	.737	1.937	1.315	.158	-.503	.294	.311	-.195	.778
Std. Error of Skewness		.421	.421	.427	.421	.421	.434	.441	.441	.434	.441
Percentiles	25	1.00	1.00	1.00	1.00	1.00	2.50	1.00	1.00	2.00	1.00
	50	1.00	1.00	1.00	1.00	3.00	4.00	3.00	3.00	3.00	2.00
	75	3.00	3.00	1.00	3.00	4.00	5.00	3.00	4.00	4.00	3.00

		Statistics									
		B_Na_Locatio nclose	B_Na_FrqTkC hd	P_Na_FrqChd Alone	P_Na_CmfChd Go	B_Na_BarrierT ime	B_Na_BarrierD ist	B_Na_BarrierS dwk	B_Na_BarrierS t	B_Na_BarrierS afety	B_Na_BarrierI nj
N	Valid	31	31	31	30	30	30	30	29	30	28
	Missing	0	0	0	1	1	1	1	2	1	3
Mean		2.81	2.94	1.45	1.83	2.70	2.80	2.43	2.55	3.13	2.46
Std. Deviation		1.558	1.263	1.028	1.416	1.208	1.349	1.382	1.478	1.655	1.598
Skewness		-.221	.023	2.306	1.408	-.003	.119	.652	.497	-.031	.627
Std. Error of Skewness		.421	.421	.421	.427	.427	.427	.427	.434	.427	.441
Percentiles	25	2.00	2.00	1.00	1.00	1.75	1.75	1.00	1.00	1.75	1.00
	50	3.00	3.00	1.00	1.00	3.00	3.00	2.00	2.00	3.00	2.00
	75	4.00	4.00	1.00	3.00	3.25	4.00	3.00	3.50	5.00	3.75

Frequencies | Parent | Time in Nature, Activities, Setting, Benefits of Nature

		Statistics				
		P_ChDNEng hTimeOutSch	P_ChDNEng hTimeInSch	B_OtdrNtreLn OnSchCmps	B_OtdrNtreLn OutSchCmps	P_CmtfBefAftS chNearby
N	Valid	31	31	31	31	31
	Missing	0	0	0	0	0
Mean		3.23	3.19	4.03	3.77	2.03
Std. Deviation		1.334	1.223	1.251	1.359	1.426
Skewness		-.083	-.044	-.938	-.754	1.047
Std. Error of Skewness		.421	.421	.421	.421	.421
Percentiles	25	2.00	2.00	3.00	3.00	1.00
	50	3.00	3.00	5.00	4.00	1.00
	75	5.00	4.00	5.00	5.00	3.00

		Statistics									
		P_FreqActOutS chSports	P_FreqActOutS chPlygrd	P_FreqActOutS chImgPrtdplay Out	P_FreqActOutS chNtreLearnEx p	P_FreqActOutS chLearnOutCla ss	P_LikeOutSch Sports	P_LikeOutSch Plygrd	P_LikeOutSchI mgPrtdplayOut	P_LikeOutSch NtreLearnExp	P_LikeOutSch LearnOutClass
N	Valid	31	31	31	31	31	31	31	31	31	31
	Missing	0	0	0	0	0	0	0	0	0	0
Mean		2.87	3.77	3.42	3.16	2.84	3.84	4.35	4.19	4.35	4.26
Std. Deviation		1.335	1.309	1.259	1.214	1.594	1.293	1.050	1.167	.950	.965
Skewness		.161	-.696	-.234	-.329	.176	-1.063	-1.341	-1.075	-1.296	-1.037
Std. Error of Skewness		.421	.421	.421	.421	.421	.421	.421	.421	.421	.421
Percentiles	25	2.00	3.00	2.00	2.00	1.00	3.00	4.00	3.00	4.00	4.00
	50	3.00	4.00	3.00	3.00	2.00	4.00	5.00	5.00	5.00	5.00
	75	4.00	5.00	5.00	4.00	4.00	5.00	5.00	5.00	5.00	5.00

		Statistics					
		B_LikeSetting OutClass	B_LikeSetting NatureTrail	B_LikeSettingP lygrd	B_LikeSettingA thFld	B_LikeSetting Nature	B_LikeSetting Natureplay
N	Valid	29	31	31	30	31	30
	Missing	2	0	0	1	0	1
Mean		4.34	4.48	4.55	4.57	4.52	4.27
Std. Deviation		.814	.811	.723	.774	.811	1.015
Skewness		-1.165	-1.547	-1.311	-1.912	-1.257	-1.430
Std. Error of Skewness		.434	.421	.421	.427	.421	.427
Percentiles	25	4.00	4.00	4.00	4.00	4.00	3.75
	50	5.00	5.00	5.00	5.00	5.00	5.00
	75	5.00	5.00	5.00	5.00	5.00	5.00

		Statistics							
		B_KnowFreqC ontNtrePhys	B_KnowFreqC ontNtreBeh	B_KnowFreqC ontNtreMenEm o	B_KnowFreqC ontNtreCogn	B_FeelFreqCo ntNatPhys	B_FeelFreqCo ntNatBeh	B_FeelFreqCo ntNatMenEmo	B_FeelFreqCo ntNatCogn
N	Valid	31	31	31	31	30	31	30	31
	Missing	0	0	0	0	1	0	1	0
Mean		3.84	3.68	3.71	3.84	4.00	4.00	4.00	3.84
Std. Deviation		1.675	1.720	1.553	1.530	1.259	1.390	1.287	1.508
Skewness		-1.138	-1.015	-1.019	-1.144	-1.110	-1.193	-1.041	-1.080
Std. Error of Skewness		.421	.421	.421	.421	.427	.421	.427	.421
Percentiles	25	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
	50	5.00	5.00	4.00	5.00	4.50	5.00	5.00	5.00
	75	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00

Frequencies | Teacher | Time in Nature, Activities, Setting, Benefits of Nature

		Statistics						
		S_FreqOutLearn	S_FreqNatBaseLearn	S_FreqNatinSchhImp	S_CompOutNatBaseLess	S_SchEnghOutNatBaseCurr	B_OtdrNtreLrnOnSchCmps	B_OtdrNtreLrnOutSchCmps
N	Valid	20	20	20	20	20	20	20
	Missing	0	0	0	0	0	0	0
Mean		1.85	2.05	4.50	3.55	1.80	3.45	4.20
Std. Deviation		.933	1.191	.827	1.317	1.240	1.468	.951
Skewness		1.188	.933	-1.240	-.888	.788	-.224	-.847
Std. Error of Skewness		.512	.512	.512	.512	.512	.512	.512
Percentiles	25	1.00	1.00	4.00	3.00	1.00	2.00	3.25
	50	2.00	2.00	5.00	3.50	1.50	3.00	4.50
	75	2.00	3.00	5.00	5.00	3.00	5.00	5.00

		Statistics									
		S_LikeActDurSchSports	S_LikeActDurSchPlygrd	S_LikeActDurSchImgPrtdplayOut	S_LikeActDurSchNatreLearnExp	S_LikeActDurSchOutClass	S_FreqActDurSchSports	S_FreqActDurSchPlygrd	S_FreqActDurSchImgPrtdplayOut	S_FreqActDurSchNatreLearnExp	S_FreqActDurSchOutClass
N	Valid	20	20	20	20	20	20	20	20	20	20
	Missing	0	0	0	0	0	0	0	0	0	0
Mean		4.55	4.65	4.70	4.45	4.40	4.40	4.55	3.70	2.65	2.00
Std. Deviation		.686	.587	.657	.826	.883	.883	.686	1.218	1.226	1.076
Skewness		-1.283	-1.521	-2.079	-1.071	-.939	-1.449	-1.283	-.326	.376	1.408
Std. Error of Skewness		.512	.512	.512	.512	.512	.512	.512	.512	.512	.512
Percentiles	25	4.00	4.00	5.00	4.00	3.25	4.00	4.00	2.25	2.00	1.00
	50	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.00	3.00	2.00
	75	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	3.00	2.00

		Statistics					
		B_LikeSettingOutClass	B_LikeSettingNatureTrail	B_LikeSettingPlygrd	B_LikeSettingAthFld	B_LikeSettingNature	B_LikeSettingNatureplay
N	Valid	20	20	20	20	20	20
	Missing	0	0	0	0	0	0
Mean		4.20	4.75	4.70	4.70	4.65	4.70
Std. Deviation		1.240	.550	.571	.470	.745	.571
Skewness		-1.157	-2.239	-1.845	-.945	-2.695	-1.845
Std. Error of Skewness		.512	.512	.512	.512	.512	.512
Percentiles	25	3.25	5.00	4.25	4.00	4.25	4.25
	50	5.00	5.00	5.00	5.00	5.00	5.00
	75	5.00	5.00	5.00	5.00	5.00	5.00

		Statistics							
		B_KnowFreqContNtrePhys	B_KnowFreqContNtreBeh	B_KnowFreqContNtreMenEmo	B_KnowFreqContNtreCogn	B_FeelFreqContNatPhys	B_FeelFreqContNatBeh	B_FeelFreqContNatMenEmo	B_FeelFreqContNatCogn
N	Valid	20	20	20	20	20	20	20	20
	Missing	0	0	0	0	0	0	0	0
Mean		3.80	3.70	3.85	3.75	4.55	4.50	4.60	4.50
Std. Deviation		1.399	1.625	1.348	1.618	1.191	1.192	1.142	1.192
Skewness		-1.142	-1.175	-1.273	-1.289	-3.351	-3.210	-3.802	-3.210
Std. Error of Skewness		.512	.512	.512	.512	.512	.512	.512	.512
Percentiles	25	3.00	3.00	3.00	3.00	5.00	4.25	5.00	4.25
	50	4.00	4.50	4.00	4.50	5.00	5.00	5.00	5.00
	75	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00

Frequencies | Parent | Demographics

P_ParRelChild

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Mother/Step-Mother	22	71.0	78.6	78.6
	Father/Step-Father	5	16.1	17.9	96.4
	Other family member	1	3.2	3.6	100.0
	Total	28	90.3	100.0	
Missing	System	3	9.7		
Total		31	100.0		

B_AgeGroup

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Prefer to not answer	2	6.5	6.5	6.5
	under 25	1	3.2	3.2	9.7
	25 - 29	7	22.6	22.6	32.3
	30 - 39	14	45.2	45.2	77.4
	40 - 49	7	22.6	22.6	100.0
	Total	31	100.0	100.0	

P_SinglePar

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	22	71.0	71.0	71.0
	Yes	9	29.0	29.0	100.0
	Total	31	100.0	100.0	

P_OneCar

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	4	12.9	12.9	12.9
	Yes	27	87.1	87.1	100.0
	Total	31	100.0	100.0	

B_Identify

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	23	74.2	74.2	74.2
	Male	8	25.8	25.8	100.0
	Total	31	100.0	100.0	

B_HsehidIncome

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Prefer to not answer	7	22.6	25.0	25.0
	Less than \$25,000	10	32.3	35.7	60.7
	\$25,000 - \$35,000	6	19.4	21.4	82.1
	\$35,001 - \$50,000	2	6.5	7.1	89.3
	\$50,001 - \$75,000	2	6.5	7.1	96.4
	More than \$100,000	1	3.2	3.6	100.0
	Total	28	90.3	100.0	
Missing	System	3	9.7		
Total		31	100.0		

B_EdAttain

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Prefer to not answer	2	6.5	6.7	6.7
	Highschool	17	54.8	56.7	63.3
	Some college	5	16.1	16.7	80.0
	Associate's Degree	1	3.2	3.3	83.3
	Bachelor's Degree	2	6.5	6.7	90.0
	Master's Degree	1	3.2	3.3	93.3
	Ph.D. or higher	2	6.5	6.7	100.0
	Total	30	96.8	100.0	
Missing	System	1	3.2		
Total		31	100.0		

B_RaceEth

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Prefer to not answer	1	3.2	3.2	3.2
	Hispanic	17	54.8	54.8	58.1
	White	5	16.1	16.1	74.2
	Black or African American	2	6.5	6.5	80.6
	Asian	3	9.7	9.7	90.3
	Native Hawaiian and Pacific Islander	1	3.2	3.2	93.5
	Some other race/ethnicity	1	3.2	3.2	96.8
	Multiracial	1	3.2	3.2	100.0
	Total	31	100.0	100.0	

B_NumChildSpecNeuro

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	25	80.6	80.6	80.6
	1 child	6	19.4	19.4	100.0
	Total	31	100.0	100.0	

B_NumChildPhysDis

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	29	93.5	93.5	93.5
	1 child	2	6.5	6.5	100.0
	Total	31	100.0	100.0	

Frequencies | Parent | Children

P_TranspSch

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Walk by themselves or with friends	1	3.2	3.3	3.3
	Walk with adults	6	19.4	20.0	23.3
	I drive them	18	58.1	60.0	83.3
	Carpool	1	3.2	3.3	86.7
	School bus	2	6.5	6.7	93.3
	City bus	2	6.5	6.7	100.0
	Total	30	96.8	100.0	
Missing	System	1	3.2		
Total		31	100.0		

P_TimeToSch

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 5 minutes	10	32.3	34.5	34.5
	5 - 10 minutes	13	41.9	44.8	79.3
	10 - 20 minutes	4	12.9	13.8	93.1
	20 - 30 minutes	1	3.2	3.4	96.6
	More than 30 minutes	1	3.2	3.4	100.0
	Total	29	93.5	100.0	
Missing	System	2	6.5		
Total		31	100.0		

P_GradePreK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	25	80.6	80.6	80.6
	Yes	6	19.4	19.4	100.0
	Total	31	100.0	100.0	

P_GradeK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	27	87.1	87.1	87.1
	Yes	4	12.9	12.9	100.0
	Total	31	100.0	100.0	

P_Grade1st

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	27	87.1	87.1	87.1
	Yes	4	12.9	12.9	100.0
	Total	31	100.0	100.0	

P_Grade2nd

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	22	71.0	71.0	71.0
	Yes	9	29.0	29.0	100.0
	Total	31	100.0	100.0	

P_Grade3rd

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	28	90.3	90.3	90.3
	Yes	3	9.7	9.7	100.0
	Total	31	100.0	100.0	

P_Grade4th

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	25	80.6	80.6	80.6
	Yes	6	19.4	19.4	100.0
	Total	31	100.0	100.0	

P_Grade5th

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	27	87.1	87.1	87.1
	Yes	4	12.9	12.9	100.0
	Total	31	100.0	100.0	

P_Grade6th

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	23	74.2	74.2	74.2
	Yes	8	25.8	25.8	100.0
	Total	31	100.0	100.0	

P_GradeMid

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	25	80.6	80.6	80.6
	Yes	6	19.4	19.4	100.0
	Total	31	100.0	100.0	

P_GradeHigh

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	22	71.0	71.0	71.0
	Yes	9	29.0	29.0	100.0
	Total	31	100.0	100.0	

Frequencies | Teachers | Demographics & Student Information

B_AgeGroup

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	under 25	2	10.0	10.0	10.0
	25 - 29	3	15.0	15.0	25.0
	30 - 39	6	30.0	30.0	55.0
	40 - 49	3	15.0	15.0	70.0
	50 - 59	4	20.0	20.0	90.0
	60 or more	2	10.0	10.0	100.0
	Total	20	100.0	100.0	

B_Identify

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	17	85.0	85.0	85.0
	Male	2	10.0	10.0	95.0
	Gender not listed	1	5.0	5.0	100.0
	Total	20	100.0	100.0	

B_HsehidIncome

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Prefer to not answer	1	5.0	5.0	5.0
	\$25,000 - \$35,000	3	15.0	15.0	20.0
	\$35,001 - \$50,000	2	10.0	10.0	30.0
	\$50,001 - \$75,000	6	30.0	30.0	60.0
	\$75,001 - \$100,000	3	15.0	15.0	75.0
	More than \$100,000	5	25.0	25.0	100.0
	Total	20	100.0	100.0	

B_EdAttain

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Highschool	2	10.0	10.0	10.0
	Bachelor's Degree	7	35.0	35.0	45.0
	Master's Degree	11	55.0	55.0	100.0
	Total	20	100.0	100.0	

B_RaceEth

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hispanic	3	15.0	15.0	15.0
	White	14	70.0	70.0	85.0
	Black or African American	1	5.0	5.0	90.0
	Asian	1	5.0	5.0	95.0
	Multiracial	1	5.0	5.0	100.0
	Total	20	100.0	100.0	

B_NumChildSpecNeuro

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	1	5.0	5.3	5.3
	1 child	1	5.0	5.3	10.5
	2 children	4	20.0	21.1	31.6
	3 children	5	25.0	26.3	57.9
	4 children	1	5.0	5.3	63.2
	5 or more children	7	35.0	36.8	100.0
	Total	19	95.0	100.0	
	Missing System	1	5.0		
Total		20	100.0		

B_NumChildPhysDis

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	7	35.0	36.8	36.8
	1 child	6	30.0	31.6	68.4
	2 children	4	20.0	21.1	89.5
	5 or more children	2	10.0	10.5	100.0
	Total	19	95.0	100.0	
Missing System		1	5.0		
Total		20	100.0		

S_GradeTeachK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	16	80.0	80.0	80.0
	Yes	4	20.0	20.0	100.0
	Total	20	100.0	100.0	

S_GradeTeach1st

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	18	90.0	90.0	90.0
	Yes	2	10.0	10.0	100.0
	Total	20	100.0	100.0	

S_GradeTeach2nd

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	15	75.0	75.0	75.0
	Yes	5	25.0	25.0	100.0
	Total	20	100.0	100.0	

S_GradeTeach3rd

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	14	70.0	70.0	70.0
	Yes	6	30.0	30.0	100.0
	Total	20	100.0	100.0	

S_GradeTeach6th

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	16	80.0	80.0	80.0
	Yes	4	20.0	20.0	100.0
	Total	20	100.0	100.0	

S_GradeTeach4th

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	14	70.0	70.0	70.0
	Yes	6	30.0	30.0	100.0
	Total	20	100.0	100.0	

S_GradeTeachOther

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	14	70.0	70.0	70.0
	Yes	6	30.0	30.0	100.0
	Total	20	100.0	100.0	

S_GradeTeach5th

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	15	75.0	75.0	75.0
	Yes	5	25.0	25.0	100.0
	Total	20	100.0	100.0	

Frequencies / Teachers / School-Specific Barriers

Statistics

		S_SchBarrierFund	S_SchBarrierPerm	S_BarrierToOuthNtreLearn_Schoolin	S_BarrierToOuthNtreLearn_Dislin	S_BarrierToOuthNtreLearn_Curric	S_BarrierToOuthNtreLearn_Trafficin	S_BarrierToOuthNtreLearn_Other
N	Valid	20	20	20	20	20	20	4
	Missing	0	0	0	0	0	0	16
Mean		3.70	2.15	3.45	3.55	3.90	3.10	4.00
Std. Deviation		1.780	1.565	1.432	1.504	1.373	1.373	2.000
Skewness		-1.423	.732	-.546	-.778	-1.159	-.062	-2.000
Std. Error of Skewness		.512	.512	.512	.512	.512	.512	1.014
Percentiles	25	3.25	1.00	2.25	3.00	3.25	2.00	2.00
	50	4.00	2.00	4.00	4.00	4.00	3.00	5.00
	75	5.00	3.00	5.00	5.00	5.00	4.00	5.00

Correlations | Parents | Greenspace Type & Barriers

		Correlations									
		B_N_Locationclose	B_N_FrqTkChd	P_N_FrqChdAlone	P_N_CmfChdGo	B_N_BarrierTime	B_N_BarrierDist	B_N_BarrierSdwk	B_N_BarrierSt	B_N_BarrierSafety	B_N_BarrierInj
B_N_Locationclose	Pearson Correlation	1	.103	.362*	.305	-.057	-.208	-.265	-.160	-.292	.147
	Sig. (2-tailed)		.581	.046	.095	.765	.271	.157	.399	.117	.438
	N	31	31	31	31	30	30	30	30	30	30
B_N_FrqTkChd	Pearson Correlation	.103	1	.283	.260	-.057	-.154	-.336	-.392*	-.366*	-.173
	Sig. (2-tailed)	.581		.124	.158	.766	.417	.069	.032	.047	.362
	N	31	31	31	31	30	30	30	30	30	30
P_N_FrqChdAlone	Pearson Correlation	.362*	.283	1	.844**	.268	.077	-.041	-.050	-.013	.113
	Sig. (2-tailed)	.046	.124		<.001	.153	.684	.832	.794	.945	.552
	N	31	31	31	31	30	30	30	30	30	30
P_N_CmfChdGo	Pearson Correlation	.305	.260	.844**	1	.098	-.006	-.042	.111	-.025	.115
	Sig. (2-tailed)	.095	.158	<.001		.605	.973	.826	.559	.897	.543
	N	31	31	31	31	30	30	30	30	30	30
B_N_BarrierTime	Pearson Correlation	-.057	-.057	.268	.098	1	.133	.187	.013	.022	.067
	Sig. (2-tailed)	.765	.766	.153	.605		.483	.323	.948	.907	.724
	N	30	30	30	30	30	30	30	30	30	30
B_N_BarrierDist	Pearson Correlation	-.208	-.154	.077	-.006	.133	1	.623**	.444*	.271	.101
	Sig. (2-tailed)	.271	.417	.684	.973	.483		<.001	.014	.147	.595
	N	30	30	30	30	30	30	30	30	30	30
B_N_BarrierSdwk	Pearson Correlation	-.265	-.336	-.041	-.042	.187	.623**	1	.679**	.387*	.174
	Sig. (2-tailed)	.157	.069	.832	.826	.323	<.001		<.001	.034	.358
	N	30	30	30	30	30	30	30	30	30	30
B_N_BarrierSt	Pearson Correlation	-.160	-.392*	-.050	.111	.013	.444*	.679**	1	.511**	.536**
	Sig. (2-tailed)	.399	.032	.794	.559	.948	.014	<.001		.004	.002
	N	30	30	30	30	30	30	30	30	30	30
B_N_BarrierSafety	Pearson Correlation	-.292	-.366*	-.013	-.025	.022	.271	.387*	.511**	1	.549**
	Sig. (2-tailed)	.117	.047	.945	.897	.907	.147	.034	.004		.002
	N	30	30	30	30	30	30	30	30	30	30
B_N_BarrierInj	Pearson Correlation	.147	-.173	.113	.115	.067	.101	.174	.536**	.549**	1
	Sig. (2-tailed)	.438	.362	.552	.543	.724	.595	.358	.002	.002	
	N	30	30	30	30	30	30	30	30	30	30

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Neighborhood Park

Correlations											
		B_A_Locationclose	B_A_FrqTkChd	P_A_FrqChdAlone	P_A_CmfChdGo	B_A_BarrierTime	B_A_BarrierDist	B_A_BarrierSdwlk	B_A_BarrierSt	B_A_BarrierSafety	B_A_BarrierInj
B_A_Locationclose	Pearson Correlation	1	.092	.200	.315	.098	-.102	.052	.028	-.128	-.051
	Sig. (2-tailed)		.622	.280	.090	.602	.592	.786	.884	.494	.787
	N	31	31	31	30	31	30	30	30	31	30
B_A_FrqTkChd	Pearson Correlation	.092	1	.441*	.103	.393*	-.137	-.196	-.381*	-.317	-.138
	Sig. (2-tailed)	.622		.013	.590	.029	.471	.298	.038	.082	.467
	N	31	31	31	30	31	30	30	30	31	30
P_A_FrqChdAlone	Pearson Correlation	.200	.441*	1	.509**	.582**	.090	.083	-.126	.013	.199
	Sig. (2-tailed)	.280	.013		.004	<.001	.635	.664	.507	.943	.292
	N	31	31	31	30	31	30	30	30	31	30
P_A_CmfChdGo	Pearson Correlation	.315	.103	.509**	1	.259	.003	.025	-.169	-.079	.134
	Sig. (2-tailed)	.090	.590	.004		.167	.989	.896	.382	.677	.487
	N	30	30	30	30	30	29	29	29	30	29
B_A_BarrierTime	Pearson Correlation	.098	.393*	.582**	.259	1	.233	.033	-.014	.005	.127
	Sig. (2-tailed)	.602	.029	<.001	.167		.216	.864	.943	.978	.503
	N	31	31	31	30	31	30	30	30	31	30
B_A_BarrierDist	Pearson Correlation	-.102	-.137	.090	.003	.233	1	.579**	.551**	.544**	.470*
	Sig. (2-tailed)	.592	.471	.635	.989	.216		<.001	.002	.002	.010
	N	30	30	30	29	30	30	29	29	30	29
B_A_BarrierSdwlk	Pearson Correlation	.052	-.196	.083	.025	.033	.579**	1	.805**	.750**	.651**
	Sig. (2-tailed)	.786	.298	.664	.896	.864	<.001		<.001	<.001	<.001
	N	30	30	30	29	30	29	30	30	30	30
B_A_BarrierSt	Pearson Correlation	.028	-.381*	-.126	-.169	-.014	.551**	.805**	1	.872**	.590**
	Sig. (2-tailed)	.884	.038	.507	.382	.943	.002	<.001		<.001	<.001
	N	30	30	30	29	30	29	30	30	30	30
B_A_BarrierSafety	Pearson Correlation	-.128	-.317	.013	-.079	.005	.544**	.750**	.872**	1	.637**
	Sig. (2-tailed)	.494	.082	.943	.677	.978	.002	<.001	<.001		<.001
	N	31	31	31	30	31	30	30	30	31	30
B_A_BarrierInj	Pearson Correlation	-.051	-.138	.199	.134	.127	.470*	.651**	.590**	.637**	1
	Sig. (2-tailed)	.787	.467	.292	.487	.503	.010	<.001	<.001	<.001	
	N	30	30	30	29	30	29	30	30	30	30

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Athletic Park

Correlations | Parents | Greenspace Type & Barriers

		Correlations									
		B_G_Locationclose	B_G_FrqTkChd	P_G_FrqChdAlone	P_G_CmfChdGo	B_G_BarrierTime	B_G_BarrierDist	B_G_BarrierSdwk	B_G_BarrierSt	B_G_BarrierSafety	B_G_BarrierInj
B_G_Locationclose	Pearson Correlation	1	.597**	.424*	.121	.219	-.074	.026	.057	-.141	.070
	Sig. (2-tailed)		<.001	.020	.518	.236	.702	.895	.773	.466	.725
	N	31	31	30	31	31	29	28	28	29	28
B_G_FrqTkChd	Pearson Correlation	.597**	1	.681**	.414*	.289	.084	.099	.160	.000	.213
	Sig. (2-tailed)	<.001		<.001	.021	.115	.664	.617	.417	1.000	.277
	N	31	31	30	31	31	29	28	28	29	28
P_G_FrqChdAlone	Pearson Correlation	.424*	.681**	1	.495**	.353	.084	.082	.016	.013	.131
	Sig. (2-tailed)	.020	<.001		.005	.056	.671	.686	.939	.948	.516
	N	30	30	30	30	30	28	27	27	28	27
P_G_CmfChdGo	Pearson Correlation	.121	.414*	.495**	1	.402*	.224	.060	-.044	.145	.084
	Sig. (2-tailed)	.518	.021	.005		.025	.244	.760	.822	.453	.670
	N	31	31	30	31	31	29	28	28	29	28
B_G_BarrierTime	Pearson Correlation	.219	.289	.353	.402*	1	.452*	.105	.015	.121	.153
	Sig. (2-tailed)	.236	.115	.056	.025		.014	.594	.939	.532	.438
	N	31	31	30	31	31	29	28	28	29	28
B_G_BarrierDist	Pearson Correlation	-.074	.084	.084	.224	.452*	1	.432*	.298	.450*	.224
	Sig. (2-tailed)	.702	.664	.671	.244	.014		.022	.124	.014	.252
	N	29	29	28	29	29	29	28	28	29	28
B_G_BarrierSdwk	Pearson Correlation	.026	.099	.082	.060	.105	.432*	1	.888**	.587**	.711**
	Sig. (2-tailed)	.895	.617	.686	.760	.594	.022		<.001	.001	<.001
	N	28	28	27	28	28	28	28	28	28	28
B_G_BarrierSt	Pearson Correlation	.057	.160	.016	-.044	.015	.298	.888**	1	.555**	.694**
	Sig. (2-tailed)	.773	.417	.939	.822	.939	.124	<.001		.002	<.001
	N	28	28	27	28	28	28	28	28	28	28
B_G_BarrierSafety	Pearson Correlation	-.141	.000	.013	.145	.121	.450*	.587**	.555**	1	.457*
	Sig. (2-tailed)	.466	1.000	.948	.453	.532	.014	.001	.002		.014
	N	29	29	28	29	29	29	28	28	29	28
B_G_BarrierInj	Pearson Correlation	.070	.213	.131	.084	.153	.224	.711**	.694**	.457*	1
	Sig. (2-tailed)	.725	.277	.516	.670	.438	.252	<.001	<.001	.014	
	N	28	28	27	28	28	28	28	28	28	28

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Garden

Correlations

		B_Na_Locationclose	B_Na_FrqTkChd	P_Na_FrqChdAlone	P_Na_CmfChdGo	B_Na_BarrierTime	B_Na_BarrierDist	B_Na_BarrierSdwk	B_Na_BarrierSt	B_Na_BarrierSafety	B_Na_BarrierInj
B_Na_Locationclose	Pearson Correlation	1	.112	-.068	-.323	.256	-.213	-.069	.011	.168	.085
	Sig. (2-tailed)		.549	.714	.082	.172	.259	.716	.953	.374	.668
	N	31	31	31	30	30	30	30	29	30	28
B_Na_FrqTkChd	Pearson Correlation	.112	1	.434*	.373*	.053	-.048	-.041	-.156	-.206	.117
	Sig. (2-tailed)	.549		.015	.043	.780	.802	.828	.419	.274	.552
	N	31	31	31	30	30	30	30	29	30	28
P_Na_FrqChdAlone	Pearson Correlation	-.068	.434*	1	.569**	.115	.167	.262	-.039	.043	.249
	Sig. (2-tailed)	.714	.015		.001	.545	.378	.162	.839	.823	.202
	N	31	31	31	30	30	30	30	29	30	28
P_Na_CmfChdGo	Pearson Correlation	-.323	.373*	.569**	1	-.292	-.235	.073	-.081	.039	.232
	Sig. (2-tailed)	.082	.043	.001		.117	.212	.700	.677	.837	.235
	N	30	30	30	30	30	30	30	29	30	28
B_Na_BarrierTime	Pearson Correlation	.256	.053	.115	-.292	1	.660**	.287	.251	.090	.293
	Sig. (2-tailed)	.172	.780	.545	.117		<.001	.124	.188	.637	.130
	N	30	30	30	30	30	30	30	29	30	28
B_Na_BarrierDist	Pearson Correlation	-.213	-.048	.167	-.235	.660**	1	.640**	.587**	.244	.422*
	Sig. (2-tailed)	.259	.802	.378	.212	<.001		<.001	<.001	.194	.025
	N	30	30	30	30	30	30	30	29	30	28
B_Na_BarrierSdwk	Pearson Correlation	-.069	-.041	.262	.073	.287	.640**	1	.811**	.607**	.771**
	Sig. (2-tailed)	.716	.828	.162	.700	.124	<.001		<.001	<.001	<.001
	N	30	30	30	30	30	30	30	29	30	28
B_Na_BarrierSt	Pearson Correlation	.011	-.156	-.039	-.081	.251	.587**	.811**	1	.727**	.740**
	Sig. (2-tailed)	.953	.419	.839	.677	.188	<.001	<.001		<.001	<.001
	N	29	29	29	29	29	29	29	29	29	27
B_Na_BarrierSafety	Pearson Correlation	.168	-.206	.043	.039	.090	.244	.607**	.727**	1	.629**
	Sig. (2-tailed)	.374	.274	.823	.837	.637	.194	<.001	<.001		<.001
	N	30	30	30	30	30	30	30	29	30	28
B_Na_BarrierInj	Pearson Correlation	.085	.117	.249	.232	.293	.422*	.771**	.740**	.629**	1
	Sig. (2-tailed)	.668	.552	.202	.235	.130	.025	<.001	<.001	<.001	
	N	28	28	28	28	28	28	28	27	28	28

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Nature Park

Correlations | Teachers | Greenspace Type & Barriers

Correlations										
		B_N_Locationclose	B_N_FrqTkChd	S_N_CmfTkStu	B_N_BarrierTime	B_N_BarrierDist	B_N_BarrierSdwk	B_N_BarrierSt	B_N_BarrierSafety	B_N_BarrierInj
B_N_Locationclose	Pearson Correlation	1	.298	.167	-.214	-.451*	-.397	-.535*	-.530*	-.259
	Sig. (2-tailed)		.202	.481	.366	.046	.083	.015	.016	.270
	N	20	20	20	20	20	20	20	20	20
B_N_FrqTkChd	Pearson Correlation	.298	1	.540*	-.119	-.436	-.347	-.323	-.455*	-.299
	Sig. (2-tailed)	.202		.014	.617	.055	.134	.164	.044	.200
	N	20	20	20	20	20	20	20	20	20
S_N_CmfTkStu	Pearson Correlation	.167	.540*	1	.063	-.302	-.308	-.372	-.472*	-.564**
	Sig. (2-tailed)	.481	.014		.792	.196	.186	.106	.036	.010
	N	20	20	20	20	20	20	20	20	20
B_N_BarrierTime	Pearson Correlation	-.214	-.119	.063	1	.111	-.193	-.067	-.019	-.164
	Sig. (2-tailed)	.366	.617	.792		.641	.416	.779	.935	.489
	N	20	20	20	20	20	20	20	20	20
B_N_BarrierDist	Pearson Correlation	-.451*	-.436	-.302	.111	1	.404	.500*	.276	.103
	Sig. (2-tailed)	.046	.055	.196	.641		.077	.025	.240	.666
	N	20	20	20	20	20	20	20	20	20
B_N_BarrierSdwk	Pearson Correlation	-.397	-.347	-.308	-.193	.404	1	.848**	.623**	.483*
	Sig. (2-tailed)	.083	.134	.186	.416	.077		<.001	.003	.031
	N	20	20	20	20	20	20	20	20	20
B_N_BarrierSt	Pearson Correlation	-.535*	-.323	-.372	-.067	.500*	.848**	1	.496*	.284
	Sig. (2-tailed)	.015	.164	.106	.779	.025	<.001		.026	.225
	N	20	20	20	20	20	20	20	20	20
B_N_BarrierSafety	Pearson Correlation	-.530*	-.455*	-.472*	-.019	.276	.623**	.496*	1	.654**
	Sig. (2-tailed)	.016	.044	.036	.935	.240	.003	.026		.002
	N	20	20	20	20	20	20	20	20	20
B_N_BarrierInj	Pearson Correlation	-.259	-.299	-.564**	-.164	.103	.483*	.284	.654**	1
	Sig. (2-tailed)	.270	.200	.010	.489	.666	.031	.225	.002	
	N	20	20	20	20	20	20	20	20	20

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Neighborhood Park

Correlations										
		B_A_Locationclose	B_A_FrqTkChd	S_A_CmfTkStu	B_A_BarrierTime	B_A_BarrierDist	B_A_BarrierSdwk	B_A_BarrierSt	B_A_BarrierSafety	B_A_BarrierInj
B_A_Locationclose	Pearson Correlation	1	.181	.205	-.374	-.063	.288	.078	.078	.021
	Sig. (2-tailed)		.444	.386	.104	.793	.219	.744	.744	.931
	N	20	20	20	20	20	20	20	20	20
B_A_FrqTkChd	Pearson Correlation	.181	1	-.169	-.218	-.250	.062	.089	.052	.055
	Sig. (2-tailed)	.444		.476	.355	.288	.795	.710	.828	.818
	N	20	20	20	20	20	20	20	20	20
S_A_CmfTkStu	Pearson Correlation	.205	-.169	1	.012	-.169	-.439	-.469*	-.341	-.710**
	Sig. (2-tailed)	.386	.476		.959	.476	.053	.037	.141	<.001
	N	20	20	20	20	20	20	20	20	20
B_A_BarrierTime	Pearson Correlation	-.374	-.218	.012	1	.509*	-.149	-.075	-.152	-.204
	Sig. (2-tailed)	.104	.355	.959		.022	.532	.754	.521	.387
	N	20	20	20	20	20	20	20	20	20
B_A_BarrierDist	Pearson Correlation	-.063	-.250	-.169	.509*	1	.371	.390	.310	.248
	Sig. (2-tailed)	.793	.288	.476	.022		.107	.089	.183	.292
	N	20	20	20	20	20	20	20	20	20
B_A_BarrierSdwk	Pearson Correlation	.288	.062	-.439	-.149	.371	1	.834**	.800**	.614**
	Sig. (2-tailed)	.219	.795	.053	.532	.107		<.001	<.001	.004
	N	20	20	20	20	20	20	20	20	20
B_A_BarrierSt	Pearson Correlation	.078	.089	-.469*	-.075	.390	.834**	1	.756**	.635**
	Sig. (2-tailed)	.744	.710	.037	.754	.089	<.001		<.001	.003
	N	20	20	20	20	20	20	20	20	20
B_A_BarrierSafety	Pearson Correlation	.078	.052	-.341	-.152	.310	.800**	.756**	1	.616**
	Sig. (2-tailed)	.744	.828	.141	.521	.183	<.001	<.001		.004
	N	20	20	20	20	20	20	20	20	20
B_A_BarrierInj	Pearson Correlation	.021	.055	-.710**	-.204	.248	.614**	.635**	.616**	1
	Sig. (2-tailed)	.931	.818	<.001	.387	.292	.004	.003	.004	
	N	20	20	20	20	20	20	20	20	20

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Athletic Park

Correlations | Teachers | Greenspace Type & Barriers

		Correlations								
		B_G_Locationclose	B_G_FrqTkChd	S_G_CmfTkStu	B_G_BarrierTime	B_G_BarrierDist	B_G_BarrierSdwk	B_G_BarrierSt	B_G_BarrierSafety	B_G_BarrierInj
B_G_Locationclose	Pearson Correlation	1	.461*	.180	-.773**	-.752**	-.585**	-.514*	-.510*	-.416
	Sig. (2-tailed)		.041	.447	<.001	<.001	.007	.024	.022	.077
	N	20	20	20	20	20	20	19	20	19
B_G_FrqTkChd	Pearson Correlation	.461*	1	.396	-.535*	-.541*	-.525*	-.572*	-.466*	-.195
	Sig. (2-tailed)	.041		.084	.015	.014	.018	.010	.038	.423
	N	20	20	20	20	20	20	19	20	19
S_G_CmfTkStu	Pearson Correlation	.180	.396	1	.009	-.386	-.595**	-.750**	-.600**	-.564*
	Sig. (2-tailed)	.447	.084		.969	.093	.006	<.001	.005	.012
	N	20	20	20	20	20	20	19	20	19
B_G_BarrierTime	Pearson Correlation	-.773**	-.535*	.009	1	.637**	.453*	.399	.383	.230
	Sig. (2-tailed)	<.001	.015	.969		.003	.045	.091	.096	.344
	N	20	20	20	20	20	20	19	20	19
B_G_BarrierDist	Pearson Correlation	-.752**	-.541*	-.386	.637**	1	.823**	.785**	.725**	.452
	Sig. (2-tailed)	<.001	.014	.093	.003		<.001	<.001	<.001	.052
	N	20	20	20	20	20	20	19	20	19
B_G_BarrierSdwk	Pearson Correlation	-.585**	-.525*	-.595**	.453*	.823**	1	.982**	.933**	.634**
	Sig. (2-tailed)	.007	.018	.006	.045	<.001		<.001	<.001	.004
	N	20	20	20	20	20	20	19	20	19
B_G_BarrierSt	Pearson Correlation	-.514*	-.572*	-.750**	.399	.785**	.982**	1	.940**	.602**
	Sig. (2-tailed)	.024	.010	<.001	.091	<.001	<.001		<.001	.008
	N	19	19	19	19	19	19	19	19	18
B_G_BarrierSafety	Pearson Correlation	-.510*	-.466*	-.600**	.383	.725**	.933**	.940**	1	.612**
	Sig. (2-tailed)	.022	.038	.005	.096	<.001	<.001	<.001		.005
	N	20	20	20	20	20	20	19	20	19
B_G_BarrierInj	Pearson Correlation	-.416	-.195	-.564*	.230	.452	.634**	.602**	.612**	1
	Sig. (2-tailed)	.077	.423	.012	.344	.052	.004	.008	.005	
	N	19	19	19	19	19	19	18	19	19

*. Correlation is significant at the 0.05 level (2-tailed).

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Garden

Correlations

		B_Na_Locationclose	B_Na_FrqTkChd	S_Na_CmfTkStu	B_Na_BarrierTime	B_Na_BarrierDist	B_Na_BarrierSdwik	B_Na_BarrierSt	B_Na_BarrierSafety	B_Na_BarrierInj
B_Na_Locationclose	Pearson Correlation	1	.440	-.270	-.149	-.781**	-.119	-.154	-.218	.079
	Sig. (2-tailed)		.052	.249	.531	<.001	.618	.517	.371	.747
	N	20	20	20	20	19	20	20	19	19
B_Na_FrqTkChd	Pearson Correlation	.440	1	-.036	-.319	-.501*	-.238	-.244	-.099	.177
	Sig. (2-tailed)	.052		.881	.170	.029	.312	.301	.687	.467
	N	20	20	20	20	19	20	20	19	19
S_Na_CmfTkStu	Pearson Correlation	-.270	-.036	1	.394	.001	-.459*	-.509*	-.030	-.131
	Sig. (2-tailed)	.249	.881		.086	.996	.042	.022	.904	.592
	N	20	20	20	20	19	20	20	19	19
B_Na_BarrierTime	Pearson Correlation	-.149	-.319	.394	1	-.083	-.226	-.143	.204	.133
	Sig. (2-tailed)	.531	.170	.086		.735	.338	.547	.402	.588
	N	20	20	20	20	19	20	20	19	19
B_Na_BarrierDist	Pearson Correlation	-.781**	-.501*	.001	-.083	1	.206	.215	.082	-.029
	Sig. (2-tailed)	<.001	.029	.996	.735		.396	.377	.745	.908
	N	19	19	19	19	19	19	19	18	18
B_Na_BarrierSdwik	Pearson Correlation	-.119	-.238	-.459*	-.226	.206	1	.970**	.429	.107
	Sig. (2-tailed)	.618	.312	.042	.338	.396		<.001	.067	.663
	N	20	20	20	20	19	20	20	19	19
B_Na_BarrierSt	Pearson Correlation	-.154	-.244	-.509*	-.143	.215	.970**	1	.451	.132
	Sig. (2-tailed)	.517	.301	.022	.547	.377	<.001		.052	.589
	N	20	20	20	20	19	20	20	19	19
B_Na_BarrierSafety	Pearson Correlation	-.218	-.099	-.030	.204	.082	.429	.451	1	.442
	Sig. (2-tailed)	.371	.687	.904	.402	.745	.067	.052		.058
	N	19	19	19	19	18	19	19	19	19
B_Na_BarrierInj	Pearson Correlation	.079	.177	-.131	.133	-.029	.107	.132	.442	1
	Sig. (2-tailed)	.747	.467	.592	.588	.908	.663	.589	.058	
	N	19	19	19	19	18	19	19	19	19

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Nature Park

Correlations | Teachers | Frequency of Outdoor/Nature-based Learning & School-Specific Barriers

		Correlations								
		S_SchEnghOut NatBaseCurr	S_FreqOutLearn	S_FreqNatBaseLearn	S_SchBarrierFund	S_SchBarrierPerm	S_BarrierToOutNtreLearn_SchIn	S_BarrierToOutNtreLearn_DistIn	S_BarrierToOutNtreLearn_Curric	S_BarrierToOutNtreLearn_Train
S_SchEnghOutNatBaseCurr	Pearson Correlation	1	.564**	.399	.138	.450*	.291	.034	.080	.353
	Sig. (2-tailed)		.010	.081	.561	.046	.214	.887	.736	.127
	N	20	20	20	20	20	20	20	20	20
S_FreqOutLearn	Pearson Correlation	.564**	1	.575**	-.029	.052	-.104	-.238	-.341	-.111
	Sig. (2-tailed)	.010		.008	.905	.827	.661	.312	.141	.642
	N	20	20	20	20	20	20	20	20	20
S_FreqNatBaseLearn	Pearson Correlation	.399	.575**	1	.355	.024	-.045	-.016	-.383	-.035
	Sig. (2-tailed)	.081	.008		.125	.920	.851	.946	.095	.882
	N	20	20	20	20	20	20	20	20	20
S_SchBarrierFund	Pearson Correlation	.138	-.029	.355	1	.470*	.097	.576**	.052	-.095
	Sig. (2-tailed)	.561	.905	.125		.036	.684	.008	.829	.691
	N	20	20	20	20	20	20	20	20	20
S_SchBarrierPerm	Pearson Correlation	.450*	.052	.024	.470*	1	.156	.343	.277	.262
	Sig. (2-tailed)	.046	.827	.920	.036		.511	.138	.237	.264
	N	20	20	20	20	20	20	20	20	20
S_BarrierToOutNtreLearn_SchIn	Pearson Correlation	.291	-.104	-.045	.097	.156	1	.637**	.640**	.619**
	Sig. (2-tailed)	.214	.661	.851	.684	.511		.003	.002	.004
	N	20	20	20	20	20	20	20	20	20
S_BarrierToOutNtreLearn_DistIn	Pearson Correlation	.034	-.238	-.016	.576**	.343	.637**	1	.640**	.303
	Sig. (2-tailed)	.887	.312	.946	.008	.138	.003		.002	.193
	N	20	20	20	20	20	20	20	20	20
S_BarrierToOutNtreLearn_Curric	Pearson Correlation	.080	-.341	-.383	.052	.277	.640**	.640**	1	.536*
	Sig. (2-tailed)	.736	.141	.095	.829	.237	.002	.002		.015
	N	20	20	20	20	20	20	20	20	20
S_BarrierToOutNtreLearn_Train	Pearson Correlation	.353	-.111	-.035	-.095	.262	.619**	.303	.536*	1
	Sig. (2-tailed)	.127	.642	.882	.691	.264	.004	.193	.015	
	N	20	20	20	20	20	20	20	20	20

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Correlations | Parents | Activity

Correlations											
		P_FreqActOutSchSports	P_FreqActOutSchPlygrd	P_FreqActOutSchImgPrtdplayOut	P_FreqActOutSchNtreLearnExp	P_FreqActOutSchLearnOutClass	P_LikeOutSchSports	P_LikeOutSchPlygrd	P_LikeOutSchImgPrtdplayOut	P_LikeOutSchNtreLearnExp	P_LikeOutSchLearnOutClass
P_FreqActOutSchSports	Pearson Correlation	1	.517**	.470**	.404*	.366*	.567**	.224	.145	.195	.130
	Sig. (2-tailed)		.003	.008	.024	.043	<.001	.226	.437	.293	.485
	N	31	31	31	31	31	31	31	31	31	31
P_FreqActOutSchPlygrd	Pearson Correlation	.517**	1	.707**	.611**	.621**	.116	-.085	.030	.093	.021
	Sig. (2-tailed)	.003		<.001	<.001	<.001	.536	.648	.875	.617	.910
	N	31	31	31	31	31	31	31	31	31	31
P_FreqActOutSchImgPrtdplayOut	Pearson Correlation	.470**	.707**	1	.761**	.616**	.432*	.413*	.465**	.457**	.320
	Sig. (2-tailed)	.008	<.001		<.001	<.001	.015	.021	.008	.010	.080
	N	31	31	31	31	31	31	31	31	31	31
P_FreqActOutSchNtreLearnExp	Pearson Correlation	.404*	.611**	.761**	1	.583**	.251	.137	.189	.267	.077
	Sig. (2-tailed)	.024	<.001	<.001		<.001	.174	.464	.308	.147	.680
	N	31	31	31	31	31	31	31	31	31	31
P_FreqActOutSchLearnOutClass	Pearson Correlation	.366*	.621**	.616**	.583**	1	.116	-.004	-.036	.149	.223
	Sig. (2-tailed)	.043	<.001	<.001	<.001		.533	.981	.846	.423	.228
	N	31	31	31	31	31	31	31	31	31	31
P_LikeOutSchSports	Pearson Correlation	.567**	.116	.432*	.251	.116	1	.632**	.441*	.455*	.435*
	Sig. (2-tailed)	<.001	.536	.015	.174	.533		<.001	.013	.010	.014
	N	31	31	31	31	31	31	31	31	31	31
P_LikeOutSchPlygrd	Pearson Correlation	.224	-.085	.413*	.137	-.004	.632**	1	.812**	.771**	.663**
	Sig. (2-tailed)	.226	.648	.021	.464	.981	<.001		<.001	<.001	<.001
	N	31	31	31	31	31	31	31	31	31	31
P_LikeOutSchImgPrtdplayOut	Pearson Correlation	.145	.030	.465**	.189	-.036	.441*	.812**	1	.898**	.694**
	Sig. (2-tailed)	.437	.875	.008	.308	.846	.013	<.001		<.001	<.001
	N	31	31	31	31	31	31	31	31	31	31
P_LikeOutSchNtreLearnExp	Pearson Correlation	.195	.093	.457**	.267	.149	.455*	.771**	.898**	1	.842**
	Sig. (2-tailed)	.293	.617	.010	.147	.423	.010	<.001	<.001		<.001
	N	31	31	31	31	31	31	31	31	31	31
P_LikeOutSchLearnOutClass	Pearson Correlation	.130	.021	.320	.077	.223	.435*	.663**	.694**	.842**	1
	Sig. (2-tailed)	.485	.910	.080	.680	.228	.014	<.001	<.001	<.001	
	N	31	31	31	31	31	31	31	31	31	31

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Correlations | Teachers | Activity

Correlations											
		S_FreqActDurSchSports	S_FreqActDurSchPlygrd	S_FreqActDurSchImgPrtPlayOut	S_FreqActDurSchNtreLearnExp	S_FreqActDurSchOutClass	S_LikeActDurSchSports	S_LikeActDurSchPlygrd	S_LikeActDurSchImgPrtPlayOut	S_LikeActDurSchNtreLearnExp	S_LikeActDurSchOutClass
S_FreqActDurSchSports	Pearson Correlation	1	.487*	.264	.428	.222	-.035	.284	.127	.029	-.014
	Sig. (2-tailed)		.030	.260	.060	.348	.884	.224	.593	.904	.955
	N	20	20	20	20	20	20	20	20	20	20
S_FreqActDurSchPlygrd	Pearson Correlation	.487*	1	.460*	.116	-.143	.106	.372	.268	.376	.313
	Sig. (2-tailed)	.030		.042	.627	.549	.656	.106	.252	.102	.179
	N	20	20	20	20	20	20	20	20	20	20
S_FreqActDurSchImgPrtPlayOut	Pearson Correlation	.264	.460*	1	.490*	.241	-.170	.213	.210	.194	.117
	Sig. (2-tailed)	.260	.042		.028	.306	.474	.366	.373	.413	.622
	N	20	20	20	20	20	20	20	20	20	20
S_FreqActDurSchNtreLearnExp	Pearson Correlation	.428	.116	.490*	1	.678**	-.009	.186	.190	.164	.136
	Sig. (2-tailed)	.060	.627	.028		.001	.969	.431	.424	.490	.567
	N	20	20	20	20	20	20	20	20	20	20
S_FreqActDurSchOutClass	Pearson Correlation	.222	-.143	.241	.678**	1	.143	.250	.149	.178	.222
	Sig. (2-tailed)	.348	.549	.306	.001		.549	.288	.531	.453	.348
	N	20	20	20	20	20	20	20	20	20	20
S_LikeActDurSchSports	Pearson Correlation	-.035	.106	-.170	-.009	.143	1	.633**	.619**	.748**	.747**
	Sig. (2-tailed)	.884	.656	.474	.969	.549		.003	.004	<.001	<.001
	N	20	20	20	20	20	20	20	20	20	20
S_LikeActDurSchPlygrd	Pearson Correlation	.284	.372	.213	.186	.250	.633**	1	.805**	.559*	.589**
	Sig. (2-tailed)	.224	.106	.366	.431	.288	.003		<.001	.010	.006
	N	20	20	20	20	20	20	20	20	20	20
S_LikeActDurSchImgPrtPlayOut	Pearson Correlation	.127	.268	.210	.190	.149	.619**	.805**	1	.650**	.672**
	Sig. (2-tailed)	.593	.252	.373	.424	.531	.004	<.001		.002	.001
	N	20	20	20	20	20	20	20	20	20	20
S_LikeActDurSchNtreLearnExp	Pearson Correlation	.029	.376	.194	.164	.178	.748**	.559*	.650**	1	.968**
	Sig. (2-tailed)	.904	.102	.413	.490	.453	<.001	.010	.002		<.001
	N	20	20	20	20	20	20	20	20	20	20
S_LikeActDurSchOutClass	Pearson Correlation	-.014	.313	.117	.136	.222	.747**	.589**	.672**	.968**	1
	Sig. (2-tailed)	.955	.179	.622	.567	.348	<.001	.006	.001	<.001	
	N	20	20	20	20	20	20	20	20	20	20

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations | Teachers | Nature in School, Knowledge & Attitudes of Benefits of Nature, and Outdoor/Nature-based learning

Descriptive Statistics

	Mean	Std. Deviation	N
S_FreqOutLearn	1.85	.933	20
S_FreqNatBaseLearn	2.05	1.191	20
S_FreqNatInSchImp	4.50	.827	20
S_ComfOutNatBaseLess	3.55	1.317	20
S_SchEnghOutNatBaseCurr	1.80	1.240	20
KnowofNatBen	3.7750	1.39289	20
AttNatBen	4.5375	1.13635	20

Correlations

		S_FreqOutLearn	S_FreqNatBaseLearn	S_FreqNatInSchImp	S_ComfOutNatBaseLess	S_SchEnghOutNatBaseCurr	KnowofNatBen	AttNatBen
S_FreqOutLearn	Pearson Correlation	1	.575**	-.102	.370	.564**	.185	-.143
	Sig. (2-tailed)		.008	.668	.108	.010	.434	.547
	N	20	20	20	20	20	20	20
S_FreqNatBaseLearn	Pearson Correlation	.575**	1	.027	.216	.399	.134	-.147
	Sig. (2-tailed)	.008		.911	.359	.081	.573	.535
	N	20	20	20	20	20	20	20
S_FreqNatInSchImp	Pearson Correlation	-.102	.027	1	.314	-.308	.628**	.525*
	Sig. (2-tailed)	.668	.911		.177	.187	.003	.017
	N	20	20	20	20	20	20	20
S_ComfOutNatBaseLess	Pearson Correlation	.370	.216	.314	1	.232	.602**	.232
	Sig. (2-tailed)	.108	.359	.177		.325	.005	.326
	N	20	20	20	20	20	20	20
S_SchEnghOutNatBaseCurr	Pearson Correlation	.564**	.399	-.308	.232	1	-.020	-.069
	Sig. (2-tailed)	.010	.081	.187	.325		.934	.772
	N	20	20	20	20	20	20	20
KnowofNatBen	Pearson Correlation	.185	.134	.628**	.602**	-.020	1	.652**
	Sig. (2-tailed)	.434	.573	.003	.005	.934		.002
	N	20	20	20	20	20	20	20
AttNatBen	Pearson Correlation	-.143	-.147	.525*	.232	-.069	.652**	1
	Sig. (2-tailed)	.547	.535	.017	.326	.772	.002	
	N	20	20	20	20	20	20	20

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Independent Samples Test											
Levene's Test for Equality of Variances				t-test for Equality of Means							
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
B_N_Locationclose	Equal variances assumed	.680	.413	.978	49	.166	.333	.484	.495	-.510	1.478
	Equal variances not assumed			.950	36.722	.174	.348	.484	.509	-.548	1.516
B_A_Locationclose	Equal variances assumed	3.960	.052	4.931	49	<.001	<.001	1.973	.400	1.169	2.776
	Equal variances not assumed			5.146	46.038	<.001	<.001	1.973	.383	1.201	2.744
B_G_Locationclose	Equal variances assumed	7.703	.008	-.907	49	.184	.369	-.479	.528	-1.540	.582
	Equal variances not assumed			-.856	32.992	.199	.398	-.479	.560	-1.618	.660
B_Na_Locationclose	Equal variances assumed	3.552	.065	.323	49	.374	.748	.156	.484	-.816	1.129
	Equal variances not assumed			.311	35.320	.379	.758	.156	.503	-.865	1.178

Group Statistics					
	B_ParticipantType	N	Mean	Std. Deviation	Std. Error Mean
B_N_Locationclose	Parent	31	3.48	1.630	.293
	Teacher	20	3.00	1.864	.417
B_A_Locationclose	Parent	31	3.32	1.492	.268
	Teacher	20	1.35	1.226	.274
B_G_Locationclose	Parent	31	1.87	1.628	.292
	Teacher	20	2.35	2.134	.477
B_Na_Locationclose	Parent	31	2.81	1.558	.280
	Teacher	20	2.65	1.872	.418

Independent Samples Effect Sizes					
		Standardizer ^a	Point Estimate	95% Confidence Interval	
				Lower	Upper
B_N_Locationclose	Cohen's d	1.725	.281	-.286	.844
	Hedges' correction	1.752	.276	-.281	.831
	Glass's delta	1.864	.260	-.312	.824
B_A_Locationclose	Cohen's d	1.395	1.414	.781	2.036
	Hedges' correction	1.417	1.392	.769	2.005
	Glass's delta	1.226	1.609	.840	2.355
B_G_Locationclose	Cohen's d	1.841	-.260	-.823	.306
	Hedges' correction	1.870	-.256	-.811	.301
	Glass's delta	2.134	-.224	-.788	.345
B_Na_Locationclose	Cohen's d	1.687	.093	-.470	.655
	Hedges' correction	1.713	.091	-.463	.645
	Glass's delta	1.872	.084	-.480	.645

a. The denominator used in estimating the effect sizes.
Cohen's d uses the pooled standard deviation.
Hedges' correction uses the pooled standard deviation, plus a correction factor.
Glass's delta uses the sample standard deviation of the control (i.e., the second) group.

t-test / Parents & Teachers / How frequently they take their children/ students to greenspaces

Independent Samples Test											
		Levene's Test for Equality of Variances				t-test for Equality of Means				95% Confidence Interval of the Difference	
		F	Sig.	t	df	Significance One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
B_N_FrqTkChd	Equal variances assumed	1.018	.318	5.247	49	<.001	<.001	1.802	.343	1.112	2.492
	Equal variances not assumed			5.342	43.096	<.001	<.001	1.802	.337	1.122	2.482
B_A_FrqTkChd	Equal variances assumed	32.504	<.001	4.746	49	<.001	<.001	1.448	.305	.835	2.062
	Equal variances not assumed			5.796	34.757	<.001	<.001	1.448	.250	.941	1.956
B_G_FrqTkChd	Equal variances assumed	.002	.962	.830	49	.205	.410	.285	.344	-.405	.976
	Equal variances not assumed			.803	36.180	.214	.427	.285	.355	-.435	1.006
B_Na_FrqTkChd	Equal variances assumed	4.176	.046	4.893	49	<.001	<.001	1.535	.314	.905	2.166
	Equal variances not assumed			5.432	48.789	<.001	<.001	1.535	.283	.967	2.104

Independent Samples Effect Sizes					
		Standardizer ^a	Point Estimate	95% Confidence Interval	
				Lower	Upper
B_N_FrqTkChd	Cohen's d	1.197	1.505	.863	2.135
	Hedges' correction	1.216	1.482	.850	2.102
	Glass's delta	1.137	1.585	.821	2.326
B_A_FrqTkChd	Cohen's d	1.064	1.361	.732	1.979
	Hedges' correction	1.081	1.340	.721	1.948
	Glass's delta	.308	4.706	3.111	6.284
B_G_FrqTkChd	Cohen's d	1.199	.238	-.327	.801
	Hedges' correction	1.218	.234	-.322	.789
	Glass's delta	1.309	.218	-.351	.782
B_Na_FrqTkChd	Cohen's d	1.094	1.403	.771	2.024
	Hedges' correction	1.111	1.382	.759	1.993
	Glass's delta	.754	2.037	1.171	2.879

Group Statistics					
	B_ParticipantType	N	Mean	Std. Deviation	Std. Error Mean
B_N_FrqTkChd	Parent	31	3.45	1.234	.222
	Teacher	20	1.65	1.137	.254
B_A_FrqTkChd	Parent	31	2.55	1.338	.240
	Teacher	20	1.10	.308	.069
B_G_FrqTkChd	Parent	31	1.94	1.124	.202
	Teacher	20	1.65	1.309	.293
B_Na_FrqTkChd	Parent	31	2.94	1.263	.227
	Teacher	20	1.40	.754	.169

a. The denominator used in estimating the effect sizes.
Cohen's d uses the pooled standard deviation.
Hedges' correction uses the pooled standard deviation, plus a correction factor.
Glass's delta uses the sample standard deviation of the control (i.e., the second) group.

t-test / Parents & Teachers / Outdoor Setting

Independent Samples Test											
		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
B_LikeSettingOutClass	Equal variances assumed	5.704	.021	.494	47	.312	.623	.145	.293	-.445	.734
	Equal variances not assumed			.459	30.168	.325	.650	.145	.316	-.500	.789
B_LikeSettingNatureTrail	Equal variances assumed	4.933	.031	-1.286	49	.102	.204	-.266	.207	-.682	.150
	Equal variances not assumed			-1.396	48.834	.085	.169	-.266	.191	-.649	.117
B_LikeSettingPlygrd	Equal variances assumed	2.508	.120	-.791	49	.216	.433	-.152	.192	-.537	.234
	Equal variances not assumed			-.832	46.862	.205	.409	-.152	.182	-.518	.215
B_LikeSettingAthFld	Equal variances assumed	2.868	.097	-.689	48	.247	.494	-.133	.193	-.522	.256
	Equal variances not assumed			-.757	47.689	.226	.453	-.133	.176	-.487	.221
B_LikeSettingNature	Equal variances assumed	1.535	.221	-.594	49	.278	.555	-.134	.226	-.587	.319
	Equal variances not assumed			-.605	43.176	.274	.548	-.134	.221	-.580	.312
B_LikeSettingNatureplay	Equal variances assumed	7.407	.009	-1.732	48	.045	.090	-.433	.250	-.936	.070
	Equal variances not assumed			-1.926	46.935	.030	.060	-.433	.225	-.886	.019

Independent Samples Effect Sizes					
		Standardizer ^a	Point Estimate	95% Confidence Interval	
				Lower	Upper
B_LikeSettingOutClass	Cohen's d	1.008	.144	-.427	.713
	Hedges' correction	1.024	.141	-.421	.702
	Glass's delta	1.240	.117	-.456	.686
B_LikeSettingNatureTrail	Cohen's d	.721	-.369	-.934	.200
	Hedges' correction	.733	-.363	-.920	.197
	Glass's delta	.550	-.484	-1.060	.105
B_LikeSettingPlygrd	Cohen's d	.668	-.227	-.790	.338
	Hedges' correction	.679	-.223	-.778	.333
	Glass's delta	.571	-.265	-.830	.306
B_LikeSettingAthFld	Cohen's d	.670	-.199	-.765	.369
	Hedges' correction	.681	-.196	-.753	.363
	Glass's delta	.470	-.284	-.853	.293
B_LikeSettingNature	Cohen's d	.786	-.170	-.733	.394
	Hedges' correction	.799	-.168	-.721	.388
	Glass's delta	.745	-.180	-.742	.388
B_LikeSettingNatureplay	Cohen's d	.867	-.500	-1.072	.077
	Hedges' correction	.881	-.492	-1.055	.076
	Glass's delta	.571	-.759	-1.365	-.136

a. The denominator used in estimating the effect sizes.
Cohen's d uses the pooled standard deviation.
Hedges' correction uses the pooled standard deviation, plus a correction factor.
Glass's delta uses the sample standard deviation of the control (i.e., the second) group.

Group Statistics					
	B_ParticipantType	N	Mean	Std. Deviation	Std. Error Mean
B_LikeSettingOutClass	Parent	29	4.34	.814	.151
	Teacher	20	4.20	1.240	.277
B_LikeSettingNatureTrail	Parent	31	4.48	.811	.146
	Teacher	20	4.75	.550	.123
B_LikeSettingPlygrd	Parent	31	4.55	.723	.130
	Teacher	20	4.70	.571	.128
B_LikeSettingAthFld	Parent	30	4.57	.774	.141
	Teacher	20	4.70	.470	.105
B_LikeSettingNature	Parent	31	4.52	.811	.146
	Teacher	20	4.65	.745	.167
B_LikeSettingNatureplay	Parent	30	4.27	1.015	.185
	Teacher	20	4.70	.571	.128

t-test | Parents & Teachers | Outdoor/Nature-based Learning On or Off Campus in nearby greenspaces

Group Statistics					
	B_ParticipantType	N	Mean	Std. Deviation	Std. Error Mean
B_OtdrNtreLrnOnSchCmps	Parent	31	4.03	1.251	.225
	Teacher	20	3.45	1.468	.328
B_OtdrNtreLrnOutSchCmps	Parent	31	3.77	1.359	.244
	Teacher	20	4.20	.951	.213

Independent Samples Test										
Levene's Test for Equality of Variances					t-test for Equality of Means					
		F	Sig.	t	df	Significance One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower Upper
B_OtdrNtreLrnOnSchCmps	Equal variances assumed	1.671	.202	1.516	49	.068	.136	.582	.384	-.190 1.354
	Equal variances not assumed			1.464	35.977	.076	.152	.582	.398	-.225 1.389
B_OtdrNtreLrnOutSchCmps	Equal variances assumed	4.492	.039	-1.220	49	.114	.228	-.426	.349	-1.127 .276
	Equal variances not assumed			-1.315	48.605	.097	.195	-.426	.324	-1.077 .225

Independent Samples Effect Sizes				
	Standardizer ^a	Point Estimate	95% Confidence Interval Lower Upper	
B_OtdrNtreLrnOnSchCmps	Cohen's d	1.339	.435	-.136 1.001
	Hedges' correction	1.360	.428	-.134 .986
	Glass's delta	1.468	.397	-.184 .968
B_OtdrNtreLrnOutSchCmps	Cohen's d	1.217	-.350	-.914 .218
	Hedges' correction	1.236	-.344	-.900 .215
	Glass's delta	.951	-.448	-1.022 .138

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control (i.e., the second) group.

t-test / Parents & Teachers / Knowledge & Attitudes of the Benefits of Nature

Group Statistics					
	B_ParticipantType	N	Mean	Std. Deviation	Std. Error Mean
B_KnowFreqContNtrePhys	Parent	31	3.84	1.675	.301
	Teacher	20	3.80	1.399	.313
B_KnowFreqContNtreBeh	Parent	31	3.68	1.720	.309
	Teacher	20	3.70	1.625	.363
B_KnowFreqContNtreMenEmo	Parent	31	3.71	1.553	.279
	Teacher	20	3.85	1.348	.302
B_KnowFreqContNtreCogn	Parent	31	3.84	1.530	.275
	Teacher	20	3.75	1.618	.362
B_FeelFreqContNatPhys	Parent	30	4.00	1.259	.230
	Teacher	20	4.55	1.191	.266
B_FeelFreqContNatBeh	Parent	31	4.00	1.390	.250
	Teacher	20	4.50	1.192	.267
B_FeelFreqContNatMenEmo	Parent	30	4.00	1.287	.235
	Teacher	20	4.60	1.142	.255
B_FeelFreqContNatCogn	Parent	31	3.84	1.508	.271
	Teacher	20	4.50	1.192	.267

Independent Samples Test											
		Levene's Test for Equality of Variances				t-test for Equality of Means					
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
B_KnowFreqContNtrePhys	Equal variances assumed	1.051	.310	.086	49	.466	.932	.039	.451	-.868	.946
	Equal variances not assumed			.089	45.660	.465	.929	.039	.434	-.835	.913
B_KnowFreqContNtreBeh	Equal variances assumed	.217	.643	-.047	49	.481	.963	-.023	.483	-.993	.948
	Equal variances not assumed			-.047	42.368	.481	.962	-.023	.477	-.985	.940
B_KnowFreqContNtreMenEmo	Equal variances assumed	.707	.405	-.331	49	.371	.742	-.140	.424	-.992	.711
	Equal variances not assumed			-.342	44.705	.367	.734	-.140	.411	-.968	.687
B_KnowFreqContNtreCogn	Equal variances assumed	.038	.846	.198	49	.422	.844	.089	.449	-.813	.990
	Equal variances not assumed			.195	39.011	.423	.846	.089	.454	-.830	1.008
B_FeelFreqContNatPhys	Equal variances assumed	1.386	.245	-1.545	48	.064	.129	-.550	.356	-1.266	.166
	Equal variances not assumed			-1.563	42.437	.063	.125	-.550	.352	-1.260	.160
B_FeelFreqContNatBeh	Equal variances assumed	1.965	.167	-1.324	49	.096	.192	-.500	.378	-1.259	.259
	Equal variances not assumed			-1.369	45.024	.089	.178	-.500	.365	-1.236	.236
B_FeelFreqContNatMenEmo	Equal variances assumed	3.441	.070	-1.688	48	.049	.098	-.600	.356	-1.315	.115
	Equal variances not assumed			-1.729	44.069	.045	.091	-.600	.347	-1.299	.099
B_FeelFreqContNatCogn	Equal variances assumed	4.215	.045	-1.654	49	.052	.104	-.661	.400	-1.465	.142
	Equal variances not assumed			-1.740	46.850	.044	.088	-.661	.380	-1.426	.103

Independent Samples Effect Sizes

		Standardizer ^a	Point Estimate	95% Confidence Interval	
				Lower	Upper
B_KnowFreqContNtrePhys	Cohen's d	1.574	.025	-.538	.587
	Hedges' correction	1.599	.024	-.529	.578
	Glass's delta	1.399	.028	-.535	.590
B_KnowFreqContNtreBeh	Cohen's d	1.684	-.013	-.575	.549
	Hedges' correction	1.710	-.013	-.567	.540
	Glass's delta	1.625	-.014	-.576	.548
B_KnowFreqContNtreMenEmo	Cohen's d	1.477	-.095	-.657	.468
	Hedges' correction	1.500	-.094	-.647	.461
	Glass's delta	1.348	-.104	-.666	.460
B_KnowFreqContNtreCogn	Cohen's d	1.565	.057	-.506	.619
	Hedges' correction	1.589	.056	-.498	.609
	Glass's delta	1.618	.055	-.508	.617
B_FeelFreqContNatPhys	Cohen's d	1.233	-.446	-1.017	.129
	Hedges' correction	1.252	-.439	-1.001	.127
	Glass's delta	1.191	-.462	-1.040	.128
B_FeelFreqContNatBeh	Cohen's d	1.317	-.380	-.945	.189
	Hedges' correction	1.338	-.374	-.930	.186
	Glass's delta	1.192	-.419	-.992	.163
B_FeelFreqContNatMenEmo	Cohen's d	1.232	-.487	-1.059	.089
	Hedges' correction	1.251	-.480	-1.042	.088
	Glass's delta	1.142	-.525	-1.108	.071
B_FeelFreqContNatCogn	Cohen's d	1.394	-.474	-1.042	.098
	Hedges' correction	1.416	-.467	-1.026	.096
	Glass's delta	1.192	-.555	-1.137	.041

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control (i.e., the second) group.

Factor Analysis | Parents & Teachers | Knowledge & Attitudes
of the Benefits of Nature

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
B_KnowFreqContNtrePhys	3.82	1.558	51
B_KnowFreqContNtreBeh	3.69	1.667	51
B_KnowFreqContNtreMen Emo	3.76	1.464	51
B_KnowFreqContNtreCogn	3.80	1.549	51

Covariance Matrix

	B_KnowFreqC ontNtrePhys	B_KnowFreqC ontNtreBeh	B_KnowFreqC ontNtreMenEm o	B_KnowFreqC ontNtreCogn
B_KnowFreqContNtrePhys	2.428	1.664	1.798	2.025
B_KnowFreqContNtreBeh	1.664	2.780	1.885	2.057
B_KnowFreqContNtreMen Emo	1.798	1.885	2.144	1.793
B_KnowFreqContNtreCogn	2.025	2.057	1.793	2.401

Correlation Matrix

		B_KnowFreqC ontNtrePhys	B_KnowFreqC ontNtreBeh	B_KnowFreqC ontNtreMenEm o	B_KnowFreqC ontNtreCogn
Correlation	B_KnowFreqContNtrePhys	1.000	.640	.788	.839
	B_KnowFreqContNtreBeh	.640	1.000	.772	.796
	B_KnowFreqContNtreMen Emo	.788	.772	1.000	.790
	B_KnowFreqContNtreCogn	.839	.796	.790	1.000
Sig. (1-tailed)	B_KnowFreqContNtrePhys		<.001	<.001	<.001
	B_KnowFreqContNtreBeh	.000		.000	.000
	B_KnowFreqContNtreMen Emo	.000	.000		.000
	B_KnowFreqContNtreCogn	.000	.000	.000	

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.762
Bartlett's Test of Sphericity	Approx. Chi-Square	171.535
	df	6
	Sig.	<.001

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
B_FeelFreqContNatPhys	4.20	1.258	49
B_FeelFreqContNatBeh	4.18	1.349	49
B_FeelFreqContNatMenEmo	4.24	1.267	49
B_FeelFreqContNatCogn	4.08	1.441	49

Covariance Matrix

	B_FeelFreqContNatPhys	B_FeelFreqContNatBeh	B_FeelFreqContNatMenEmo	B_FeelFreqContNatCogn
B_FeelFreqContNatPhys	1.582	1.503	1.491	1.420
B_FeelFreqContNatBeh	1.503	1.820	1.600	1.318
B_FeelFreqContNatMenEmo	1.491	1.600	1.605	1.459
B_FeelFreqContNatCogn	1.420	1.318	1.459	2.077

Correlation Matrix

		B_FeelFreqContNatPhys	B_FeelFreqContNatBeh	B_FeelFreqContNatMenEmo	B_FeelFreqContNatCogn
Correlation	B_FeelFreqContNatPhys	1.000	.886	.935	.784
	B_FeelFreqContNatBeh	.886	1.000	.936	.678
	B_FeelFreqContNatMenEmo	.935	.936	1.000	.799
	B_FeelFreqContNatCogn	.784	.678	.799	1.000
Sig. (1-tailed)	B_FeelFreqContNatPhys		<.001	<.001	<.001
	B_FeelFreqContNatBeh	.000		.000	.000
	B_FeelFreqContNatMenEmo	.000	.000		.000
	B_FeelFreqContNatCogn	.000	.000	.000	

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.793
Bartlett's Test of Sphericity	Approx. Chi-Square
	245.227
	df
	6
	Sig.
	<.001

Reliability | Parents & Teachers | Knowledge & Attitudes
of the Benefits of Nature

Case Processing Summary

		N	%
Cases	Valid	51	98.1
	Excluded ^a	1	1.9
	Total	52	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.929	.931	4

Item Statistics

	Mean	Std. Deviation	N
B_KnowFreqContNtrePhys	3.82	1.558	51
B_KnowFreqContNtreBeh	3.69	1.667	51
B_KnowFreqContNtreMen Emo	3.76	1.464	51
B_KnowFreqContNtreCogn	3.80	1.549	51

Inter-Item Correlation Matrix

	B_KnowFreqC ontNtrePhys	B_KnowFreqC ontNtreBeh	B_KnowFreqC ontNtreMenEm o	B_KnowFreqC ontNtreCogn
B_KnowFreqContNtrePhys	1.000	.640	.788	.839
B_KnowFreqContNtreBeh	.640	1.000	.772	.796
B_KnowFreqContNtreMen Emo	.788	.772	1.000	.790
B_KnowFreqContNtreCogn	.839	.796	.790	1.000

ANOVA with Friedman's Test and Tukey's Test for Nonadditivity

		Sum of Squares	df	Mean Square	Friedman's Chi-Square	Sig
Between People		402.422	50	8.048		
Within People	Between Items	.564	3	.188	.331	.803
	Residual Nonadditivity	.091 ^a	1	.091	.159	.691
	Balance	85.096	149	.571		
	Total	85.186	150	.568		
	Total	85.750	153	.560		
Total		488.172	203	2.405		

Grand Mean = 3.77

a. Tukey's estimate of power to which observations must be raised to achieve additivity = 2.076.

Case Processing Summary			
		N	%
Cases	Valid	49	94.2
	Excluded ^a	3	5.8
	Total	52	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.950	.953	4

Correlations | Parents & Teachers | Knowledge & Attitudes

Descriptive Statistics			
	Mean	Std. Deviation	N
KnowofNatBen	3.7696	1.41849	51
AttNatBen	4.1786	1.24164	49

Correlations			
		KnowofNatBen	AttNatBen
KnowofNatBen	Pearson Correlation	1	.493**
	Sig. (2-tailed)		<.001
	N	51	49
AttNatBen	Pearson Correlation	.493**	1
	Sig. (2-tailed)	<.001	
	N	49	49

** . Correlation is significant at the 0.01 level (2-tailed).

Item Statistics			
	Mean	Std. Deviation	N
B_FeelFreqContNatPhys	4.20	1.258	49
B_FeelFreqContNatBeh	4.18	1.349	49
B_FeelFreqContNatMenEmo	4.24	1.267	49
B_FeelFreqContNatCogn	4.08	1.441	49

Inter-Item Correlation Matrix				
	B_FeelFreqContNatPhys	B_FeelFreqContNatBeh	B_FeelFreqContNatMenEmo	B_FeelFreqContNatCogn
B_FeelFreqContNatPhys	1.000	.886	.935	.784
B_FeelFreqContNatBeh	.886	1.000	.936	.678
B_FeelFreqContNatMenEmo	.935	.936	1.000	.799
B_FeelFreqContNatCogn	.784	.678	.799	1.000

ANOVA with Friedman's Test and Tukey's Test for Nonadditivity						
		Sum of Squares	df	Mean Square	Friedman's Chi-Square	Sig.
Between People		296.000	48	6.167		
Within People	Between Items	.709 ^a	3	.236	2.330	.507
	Residual	.031 ^b	1	.031	.100	.752
	Balance	44.010	143	.308		
	Total	44.041	144	.306		
	Total	44.750	147	.304		
Total		340.750	195	1.747		

Grand Mean = 4.18

a. Kendall's coefficient of concordance $W = .002$.

b. Tukey's estimate of power to which observations must be raised to achieve additivity = 1.708.

TO: Sara Hadavi
Landscape Archt & Comm Plan

Proposal Number: IRB-11957

FROM: Lisa Rubin, Chair
Committee on Research Involving Human Subjects

DATE: 12/07/2023

RE: Proposal Entitled, “Children’s contact with nature: Perceptions of accessibility to greenspace and children’s contact with nature during and outside school in low-income, urban neighborhoods.”

The Committee on Research Involving Human Subjects / Institutional Review Board (IRB) for Kansas State University has reviewed the proposal identified above and has determined that it is EXEMPT from further IRB review. This exemption applies only to the proposal - as written – and currently on file with the IRB. Any change potentially affecting human subjects must be approved by the IRB prior to implementation and may disqualify the proposal from exemption.

Based upon information provided to the IRB, this activity is exempt under the criteria set forth in the Federal Policy for the Protection of Human Subjects, **45 CFR §104(d), category:Exempt Category 2 Subsection ii.**

Certain research is exempt from the requirements of HHS/OHRP regulations. A determination that research is exempt does not imply that investigators have no ethical responsibilities to subjects in such research; it means only that the regulatory requirements related to IRB review, informed consent, and assurance of compliance do not apply to the research.

Any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Committee on Research Involving Human Subjects, the University Research Compliance Office, and if the subjects are KSU students, to the Director of the Student Health Center.

Electronically signed by Lisa Rubin on 12/07/2023 11:57 AM ET

Appendix D | Workplan

Task	October				Task	November			
	Week of the 9th	Week of the 16th	Week of the 23rd	Week of the 30th		Week of the 6th	Week of the 13th	Week of the 20th	Week of the 27th
Breaks				Family in town (10/28-30)	Breaks			Thanksgiving Break	
Other Important To Dos					Other Important To Dos			Work on portfolio	
Committee Members	Meet with Bronwyn (10/11)		Meet with leslie		Committee Members	Meet with Bronwyn			
IRB	Start (10/11) Review (10/13)		Work on IRB		IRB	Review IRB - Send to Sara		Submit IRB	
Spatial Analysis (NDVI & Greenspace Typologies)					Spatial Analysis (Greenspace Typologies)				
Survey Design	Start survey design				Survey Design	Work on survey	Pilot & Edit	Upload to IRB	
School Communications			Draft email & send to schools	Follow up with schools	School Communications	Recruitment	Recruitment	Recruitment	Recruitment
Survey Distribution					Survey Distribution			Thanksgiving Break	
Statistical Analysis					Statistical Analysis				Begin thinking about SPSS
Guidelines					Guidelines				
Draft Proposal	Draft due (10/9)			Edit Proposal	Draft Proposal	Final proposal draft to Major Prof (11/6)	Final draft to full committee (11/17)	Thanksgiving Break	
Final Proposal Defense					Final Proposal Defense	Make presentation	Prep for defense	Thanksgiving Break	Final proposal defense Prelim Master's report reviews
ETDR/Book				Begin Format	ETDR/Book				Outline & Graphic Standards
Defense					Defense				

Task	December				Task	January				
	Week of the 4th	Week of the 11th	Week of the 18th	Week of the 25th		Week of the 1st	Week of the 8th	Week of the 15th	Week of the 22nd	Week of the 29th
Breaks				Winter Break (12/23-12/26 & 1/1)	Breaks	Winter Break (12/23-12/26 & 1/1)				
Other Important To Dos					Other Important To Dos					
Committee Members					Committee Members					
IRB					IRB					
Spatial Analysis (Greenspace Typologies)		Begin			Spatial Analysis (Greenspace Typologies)					
Survey Design					Survey Design					
School Communications	Communications	Confirm distribution date			School Communications					
Survey Distribution					Survey Distribution	Surveys to schools	Surveys to schools	End survey data collection		
Statistical Analysis					Statistical Analysis	Set up SPSS		Input data & Analyze	Analyze	Analyze
Guidelines					Guidelines					
Draft Proposal					Draft Proposal					
Final Proposal Defense					Final Proposal Defense					
ETDR/Book					ETDR/Book	Put greenspace graphics in				ETDR Outline & Design (1/29)
Defense					Defense					

Task	February				March			
	Week of the 5th	Week of the 12th	Week of the 19th	Week of the 26th	Week of the 4th	Week of the 11th	Week of the 18th	Week of the 25th
Breaks						Spring Break (3/9-3/17)	CELA Conference (3/20-3/23)	
Other Important To Dos								
Committee Members								
IRB								
Spatial Analysis (Greenspace Typologies)								
Survey Design								
School Communications								
Survey Distribution								
Statistical Analysis	Finish analysis							
Guidelines	Begin writing						Complete	
Draft Proposal								
Final Proposal Defense								
ETDR/Book		Substantial completion draft to committee	Substantial completion reviews	Make edits			Final Draft to Mr Prof 03/18	
Defense								Prep for defense

Task	April					May
	Week of the 1st	Week of the 8th	Week of the 15th	Week of the 22nd	Week of the 29th	Week of the 6th
Breaks						
Other Important To Dos						
Committee Members						
IRB						
Spatial Analysis (Greenspace Typologies)						
Survey Design						
School Communications						
Survey Distribution						
Statistical Analysis						
Guidelines						
Draft Proposal						
Final Proposal Defense						
ETDR/Book		Final Revisions Submit ETDR	Print book			Submit all assignments to canvas and LARCP office
Defense	DEFENSE Final exam ballots (4/12)					



KANSAS STATE UNIVERSITY