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A COMPARISON OF LOW LEVEL READERS' SUCCESS IN TAKING ORAL TESTS VERSUS PRINTED TESTS IN THE LEVEL ONE INTERMEDIATE SCIENCE CURRICULUM STUDY CLASSROOM

by

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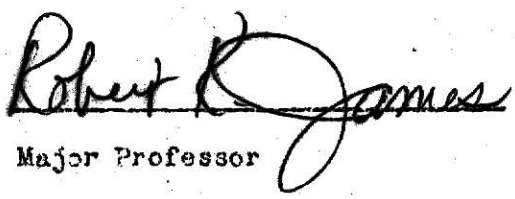

Major Professor

TABLE OF CONTENTS

LIST OF TABLES

Chapter 1

INTRODUCTION TO THE PROBLEM

Many subject oriented classroom teachers evaluate students by using printed or written tests. Traditionally their means of educating children has been by the printed page. It is assumed that all children read at a level allowing them to read and comprehend subject matter. In turn, a printed test to evaluate student progess seems logical. However, low level readers seem to be the group of students who are discriminated against the most by printed tests. A method to reduce bias in printed testing procedures, is to use oral tests in conjunction with low level readers.

The primary purpose of this study is to determine whether low level readers will be more successful in taking an oral test than a traditional printed test. Another purpose is to gain insight into the limitations of printed tests for low level readers.

The study took place in the Level 1 Intermediate Science Curriculum Study (ISCS) classes at Abilene Junior High School in Abilene, Kansas. It should be noted that the problem of the study is not necessarily unique to an ISCS program or to Abilene Junior High School. The primary difference between the ISCS program and a more conventional approach is it allows each student to progress at his own pace, and it permits the scope and sequence of instruction to vary with the students' interests, abilities and background.[1]

In addition to the basic ISCS text, all students follow "excursion" activities. These "excursion" activities not only give the more capable student additional challenging activities, but also give the less able student additional remedial activities. This enables students to work at their own rate within the same classroom. Even though ISCS is a versitile program, it basically relies upon student reading and comprehension of the text and published printed tests for student evaluation.

The Level I ISCS program is centered around specific science processes as well as particular scientific concepts. The basic conceptual theme is "Energy, Its Forms and Characteristics." Likewise the basic process theme is "Measurement and Operational Definitions."[2]

Statement of the Problem and Hypothesis

The problem of this study, stated in the form of a question is:

> Are low level readers in Level I ISCS more successful in taking oral or printed tests. It is hypothesized that low level readers in Level I ISCS will be more successful in taking oral tests rather than printed tests.

Definitions

(1). Low level readers--In this study, low level readers are those students who have a reading level below the seventh grade as determined by the Metropolitan Achievement Tests.

(2). Oral tests--Oral tests are all items of the published ISCS tests on cassette tape. These oral tests are the same as the printed ones except that they will be administered by tape recording.

(3). Printed tests--Printed tests are all items of the published ISCS test.

(4). Student success in taking oral tests--Student success in taking oral tests are the number of correct responses on the test.

(5). Student success in taking printed tests--Student success in taking printed tests are the number of correct responses on the test.

Limitations of the Study

This study may not be representative of all ISCS Level I classroom situations. It was conducted only at Abilene Junior High School. Subjects were entirely Abilene Junior High students. The author recognizes the possibility that Abilene Junior High students are nor representative of students elsewhere.

Another limiting factor is that the researcher was the only ISCS teacher throughout the study.

An additional limiting factor is that not all chapters of the Level I ISCS text were considered in this study. It may be, that the chapters not tested are significally different from the ones tested; thus results from this study may not be applicable to them.

Chapter 2

REVIEW OF THE LITERATURE

It is not the intent of the investigator to analyze the wide spectrum of reading difficulties Junior High students have. However, reading difficulties do exist in varying degrees and stem from a variety of causes.[3]

Townsend, in two separate studies, involving elementary and high school students, was able to show a positive correlation between reading ability and scholastic achievement.[4,5] In a related study, Krathshol showed poor readers did unsatisfactory work in their college courses.[6] Although the two literature citations above involve students with a wide range of ages, it appears that poor readers at any age perform less well in their scholastic pursuits than do good readers.

The majority of science courses depend on written material to teach science. A basic assumption is made that written materials are suitable for the reading levels of all students. This assumption tends to disagree with research done in this area by other investigators. Several studies outside the area of science have shown textbooks are one reading level too high for the grade use they are designated. In a study reported by Gates, Mallinson investigated the reading level of twelve series of science textbooks designated seventh, eighth and ninth. He used the Flesh formula to determine the reading level of the texts. Mallinson concluded all but the better readers would have difficulty in using the texts.[7]

Several investigators have recognized the dilemma low level readers face--comprehension of written material. Rubon compared the

knowledge gained by students who listened to a phonograph record and students who studied the printed form. The results shoed no significant difference between the two methods of presentation.[8] Postlethwait used audio tape supplemented instruction in botany. No statistical data was taken to support his work; however, he is convinced that audio-programmed lessons are beneficial to the improvement of instruction.[9] A significant study performed by Gates compared an audio tape method of instruction with the traditional text reading method in ISCS Level I classrooms.[10] No significant difference was detected between the two methods of instruction. Gates recommended several other areas of consideration with reference to his work. One being, the problem considered within this paper.

Though limited in quantity the following literature citations attempt to deal with the problem of oral tests. Many science teachers, as well as teachers of other subject matter have doubts about what their printed tests are measuring. These doubts stem from whether the printed test measures subject matter content or ability to read.[11] These doubts have lead to concern and several researchers have attempted to approach testing in different manners.[12,13,14] Such things as oral testing, use of pictures for test questions and responses, and teacher's oral reading of test questions and responses while students follow their test papers have been tried with limited success.

Oral testing is not new and has been used in many classrooms, especially in the foreign languages.[15] Likewise in mathematics and science classrooms, oral testing which has been administered carefully and systematically has been used successfully.[16,17]

Finkelstein and Hammill[18] attempt to compare the results of two tests of science achievement: a traditional printed test and an equivalent reading-free test. Their concern was whether or not the conventional test penalized the poor reader, that is whether the traditional test tested for the students' reading achievement, rather than his science achievement. If so, how adequate and how valid are traditional measures of achievement when used with pupils who are known to be poor readers?

Conclusions from Finkelstein and Hammill's study were that: reading ability did not influence performance in science when achievement was measured by the reading-free test, reading ability and performance on the traditional tests are closely related, and poor readers did much better on the reading-free test than on the traditional printed test.[19]

It is important to remember that this study was performed using fifth grade students. However, the study is significant in that it shows that caution must be used in interpreting test scores that are derived from traditionally printed measures of evaluation.

The literature cited above provides important insights into this study's problem of whether low level readers in Level I ISCS will be more successful in taking oral or printed tests.

Chapter 3

METHODS AND PROCEDURES

Sample

Abilene, Kansas is a small community (approximately 8800 population) which depends upon farming and farm products for most business. Abilene might by typified as being a "middle class" community with "middle class" attitudes and values with few minority groups.

All students in Abilene Junior High School were randomly assigned to the four seventh grade Level I ISCS science classes. In this particular study two sections--class periods two and three--were selected at random by the flipping of a coin to make up the control group. Likewise, two sections--class periods five and six--were selected at random to make up the experimental group. The number of students reading below the seventh grade level is presented in Table I. These students are designated "low level" readers in this study.

Table I

Schedule of Low Level Readers

Level I ISCS

Abilene Junior High

Class Period	Low Level Readers
2	8
3	11
5	12
6	7

The enrollment of each section consisted of approximately thirty-two individuals. Although this study is concerned with only low level readers, all students in each section, whether it be experimental or control, received the same treatment. The reason for this was the experimentor did not want the low level readers to realize they were the only ones tested, thus biasing the data and perhaps embarrassing the students.

Procedure

Not all students in the study were low level readers. In order to avoid experimental bias all students in the experimental group took oral tests and all students in the control group took printed tests. Only the test results for low level readers in both groups were analyzed.

It was anticipated that the reading levels of the ISCS text and the ISCS published tests may not have been at the seventh grade reading level. The researcher applied the Fry[20] method for estimating readability, Unit I (Chapter I and II) and Unit II (Chapters III, IV, and V) of the ISCS text were both found to be within the seventh grade reading level. Likewise, the same method was used to determine the reading level of the published ISCS Unit I and Unit II tests. Again the reading level was found to be within the seventh grade reading level.

When students were ready for the test they informed the instructor and it was administered individually. Students in the experimental group received the published ISCS test recorded on a cassette tape for each unit. The student was permitted to stop the tape, listen and relisten to any of the questions and responses they wanted repeated. It should be noted, there was no reading involved on the oral tests. The

control group received the same published ISCS test in printed form. The printed test required subject reading for the test.

All students, whether in the control group of the experiemental group, marked a numbered answer sheet to facilitate statistical analysis of the data.

This type of testing situation was in effect for Unit I and Unit II of Level I ISCS for the 73-74 school year. The control and experimental group remained the same for the entire study except for the illnesses of two students--one participating in control group Unit I and one participating in experimental group Unit I. The experimentor withdrew these two students from the analysis of the Unit I study, but they were reinstated within the analysis of the Unit II study. After all students participating as subjects in the control group and experimental group had completed the units, data from the low level readers was analyzed.

Design

The design used in this study was a modification of the Posttest-only control group design. Subjects were randomly assigned to sections. Because subjects were to remain in their assigned sections, entire sections were randomly assigned to experimental conditions rather than subjects themselves being assigned to experimental conditions. This was the only modification that was necessary to make in the Posttest-only control group design.

In order to analyze the data of this study, the null form of the hypothesis was tested:

> Low level readers in Level I ISCS will be no more successful in taking either the oral or printed test.

The statistic used in analyzing the mean of the control group in comparison to the experimental group was the single tailed t-test for two independent samples. The formula used in calculating the "t" as presented by Rosco is:

$$Sm_1 - m_2 = \sqrt{\frac{SS_1 + SS_2}{n_1 + n_2 - 2}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}$$ [21]

Chapter 4

ANALYSIS OF THE DATA

The data for Unit I is presented in Table II. It is shown to be significant at a .1 level. The investigator, previous to the study had not set a level of significance by which to reject the null hypothesis. It was the decision of the investigator to report the highest level of significance allowable by the data.

Table II

"t" Test for

Unit I ISCS Oral vs. Printed Test

	Experimental (Tape)	Control (Non Tape)
Number of Students	18	18
Mean	18.55	17.28

(single tailed test)

t - 1.39

df - 34

Decision: Reject null hypothesis at @ .1 level of significance. At @ .10 level of significance, low level readers are more successful in taking oral than they are printed tests.

Although the null hypothesis may be rejected at a .1 level of significance the reader should accept the data cautiously.

The data for Unit II is presented in Table III. It is shown to be significant at a .025 level.

Table III

"t" Test for

Unit II ISCS Oral vs. Printed Test

	Experimental (Tape)	Control (Non Tape
Number of Students	19	19
Mean	33.70	29.70

(single tailed test)

t = 2.36

df = 36

Decision: Reject null hypothesis at a .025 level of significance. At a .025 level of significance, low level readers are more successful in taking oral than they are printed tests.

The null hypothesis may be rejected at a .025 level. One should note that the level at which the hypothesis may be rejected is lower for Unit II as compared with Unit I.

An explanation as to why Unit I had a somewhat high level of significance and Unit II had a lower level of significane, is that students of the experimental group seemed to be more confident of themselves in taking the Unit II oral test than they were on the Unit I oral test. This confidence may have stemmed from student familiarization

of the cassette tape recorders and the "new" method of test administration which occured during the oral Unit 1 test. One might surmise that in future investigations involving this paper's problem that students should be allowed to practice before submitting them to actual experimentation.

Chapter 5

CONCLUSIONS

Results of Unit I show the null hypothesis being rejected at a .1 level of significance. One should be cautioned before accepting this data because of the relatively high level of significance at which the null hypothesis was rejected.

Results of Unit II show the null hypothesis being rejected at a .025 level of significance. One should note the null hypothesis for Unit II is at a much lower level of significance than for Unit I.

A basic assumption throughout this study was that low level readers have difficulty in taking printed tests. Results of this study are consistant with results of other studies, such as that of Finkelstein and Hammill, signifying this assumption to be true. It would appear when low level readers can hear the test questions they are able to achieve higher test scores than they are on printed tests.

It seems valid that science teachers should strive to measure achievement rather than reading ability. Too often teachers assume that students' reading abilities are sufficient to deal with printed material in course work. For this reason educators should help promote success for low level readers rather than promote failure for low level readers by improper testing.

Areas for Further Investigation

It is this investigator's opinion that the ISCS classroom is a unique and dynamic situation for young science students. In order for the ISCS program to continue to improve, research and experimentation

should continue. Areas for further investigation as recommended by this investigator are:

(1). Comparison of knowledge gained by low level readers using oral tapes of text material and film strips of text material to supplement text material and those which do not use supplemental materials, in the ISCS classroom.

(2). Comparisons of knowledge gained by students between ISCS classrooms that facilitate the use of partnerships for accomplishing the work and classrooms that require individual work only.

(3). Comparisons of knowledge gained by students that are placed in a classroom with adult assisstants in addition to the ISCS teacher as to those who are placed in a ISCS teacher only classroom.

(4). Comparison of the knowledge gained by non-low level readers by the oral testing approach versus the printed testing approach in ISCS classrooms.

LIST OF FOOTNOTES

1. Intermediate Science Curriculum Study, Probing the Natural World II, The Florida State University, 1970, pp. ix-xi.

2. Richard Wade Gates, "An Analysis of Student Outcomes Using Audio-Tapes to Supplement Reading In The Level One Course Of The Intermediate Science Curriculum Study," (unpublished Doctor's dissertation, University of Iowa, 1970), p. 5.

3. Marion Monroe and Bertie Backus, Remedial Reading: A Monograph in Character Education (Cambridge, Massachusetts: Houghton-Mifflin Co., 1947), pp. 1-34.

4. Agatha Townsend, "Reading and Achievement Test Scores in the Elementary Grades," from "1946 Achievement Testing Progress in Independent Schools and Supplementary Studies," Educational Records Bulletin, (New York: Educational Records Bureau, number 45, June 1946), pp. 54-58.

5. Agatha Townsend, "A Summary of Correlations Based on the Use of Certain Fall Tests," from "1945 Fall Testing Progress in Independent Schools and Supplementary Studies," Educational Records Bulletin, (New York: Educational Records Bureau, number 44, 1946), pp. 58-63.

6. William C. Krathwhol, "The Importance of Acquiring Reading Skills," The National Elementary Principal, (number 25, February 1946), pp. 30-33.

7. Richard Wade Gates, "An Analysis of Student Outcomes Using Audio-Tapes to Supplement Reading In The Level One Course of The Intermediate Science Curriculum Study," (unpublished Doctor's dissertation, University of Iowa, 1970), p. 3.

8. Phillip J. Rubon, et. al., "A Comparison of Phonographic Recordings with Printed Material in Terms of Knowledge Gained Through Their Use Alone," The Harvard Educational Review, Volumn 13, number 1, January 1943, pp. 63-76.

9. S. N. Postlethwait, et. al., The Audio-Tutorial Approach to Learning, Second Edition, Burgess Publishing Co., Minneapolis, 1969, pp. 1-33.

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11. Leonard B. Finkelstein and Donald B. Hammill, "A Reading-Free Science Test," The Elementary School Journal, (number 70, October 1969), pp. 34-37.

12. H. D. Carter, "How Reliable Are Good Oral Examinations," California Journal of Educational Research,(number 13, September 1962), pp. 147-153.

13. Eleanor M. Ladd, "More Than Scores from Tests," Reading Teacher, (number 24, January 1971), pp. 305-311.

14. H. Wolf, "Oral Testing," Mathematics Teacher, (number 52, May 1959), pp. 384-387.

15. T. R. Kalivoda, "Oral Testing in Secondary Schools," Modern Language Journal, (number 54, May 1970), pp. 328-330.

16. H. D. Carter, "How Reliable Are Good Oral Examinations," California Journal of Educational Research, (number 13, September 1962), pp. 147-153.

17. H. Wolf, "Oral Testing," Mathematics Teacher, (number 52, May 1959), pp. 384-387.

18. Leonard B. Finkelstein and Donald B. Hammill, "A Reading-Free Science Test," The Elementary School Journal, (number 70, October 1969), pp. 34-37.

19. Leonard B. Finkelstein and Donald B. Hammill, "A Reading-Free Science Test," The Elementary School Journal, (number 70, October 1969), pp. 34-37.

20. Edward Fry, "A Reading Formula That Saves Time," Journal of Reading, (April 1968), pp. 514-577.

21. John T. Rosco, Fundamental Research Statistics For The Behavoral Science, Holt, Rinehart, and Winston, Inc., 1969, pp. 166-167.

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Townsend, Agatha, "Reading and Achievement Test Scores in the Elementary Grades," from "1946 Achievement Testing Progress in Independent Schools and Supplementary Studies," Educational Records Bulletin, Educational Records Bureau, New York, number 45: 58-64, June 1946.

Wolf, H., "Oral Testing," Mathmetics Teacher, 52: 384-387, May 1959.

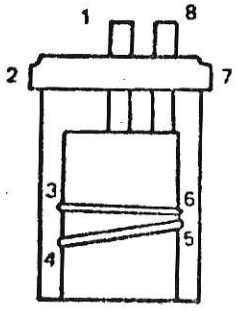
APPENDIX

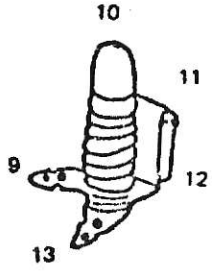
THIS BOOK CONTAINS NUMEROUS PAGES WITH THE ORIGINAL PRINTING BEING SKEWED DIFFERANTLY FROM THE TOP OF THE PAGE TO THE BOTTOM.

THIS IS AS RECEIVED FROM THE CUSTOMER.

Get two test leads, a bulb and socket, and an ISCS battery from your teacher. Charge the battery for one minute. Get your teacher to watch you. Now connect the bulb to the battery so that the bulb lights. 01-Core-

Study the diagram to see how you should connect test leads to make the bulb light. Then, write the two numbers for each test lead that show where the ends of each lead should be connected. 01-Core-





Something that changes in an activity or experiment and affects the results of it is called 01-Core-

a. an example.
b. a solution.
c. a problem.
d. a variable.

In box 01-Core-4A you will find a circuit all set up. Use the good spare parts in the box to find out why the bulb doesn't light. Which part is bad? 01-Core-4

Get batteries A, C, and D from box 01-Core-5. Use any other materials you think you need. Which of the batteries has influence? 01-Core-5

A hammer is used to transfer influence to a nail. Why must you swing a hammer before it can drive a nail into wood? 01-Core-6

Match the following terms by first listing the numbers (1, 2, and 3) on your paper and then writing after each number the letter (a, b, c, or d) of the correct matching definition. 01-Core-7

Terms	Definitions
1. Component	a. A group of objects that directly interact with each other within a system
2. Subsystem	b. A group of objects that interact with each other
3. System	c. An object that does not interact with other objects
	d. An object that is part of a system

01-Core-8A On your paper, write the letter of each diagram which identifies a system. Also explain why the diagram or diagrams you chose represent systems.

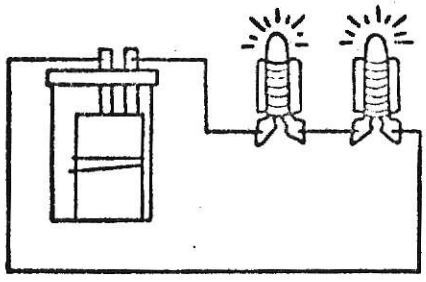


Diagram a

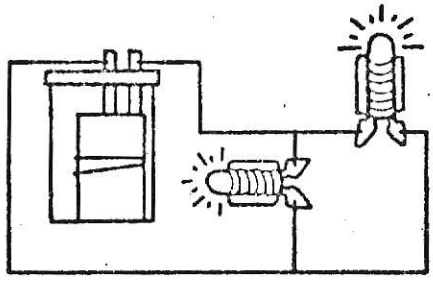


Diagram b

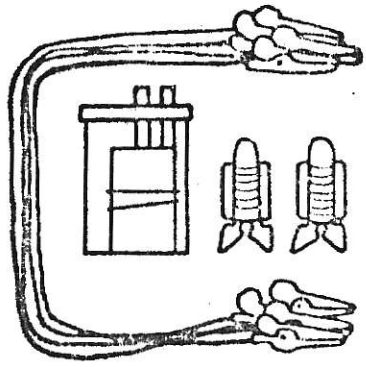
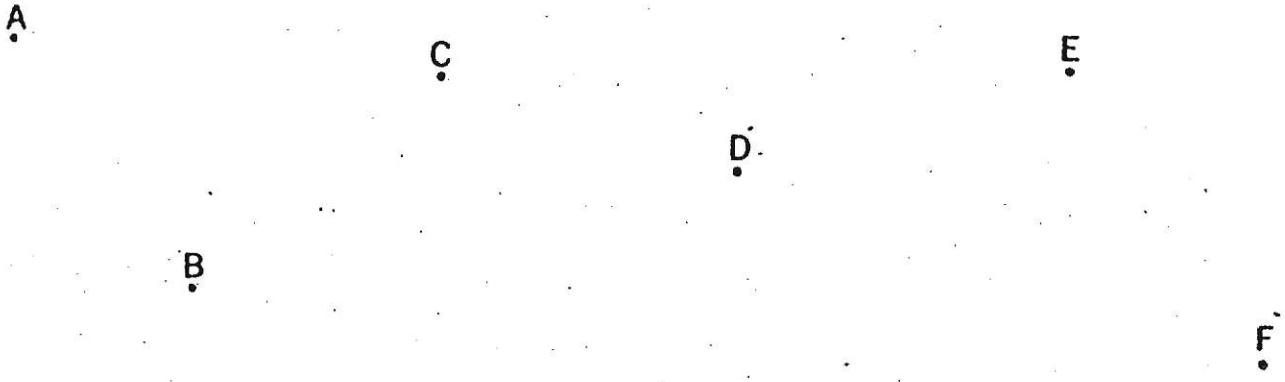


Diagram c

01-Core-9A



On the diagram above, measure the distance between the following points to the nearest 0.1 cm.

1. What is the distance from point A to point B?
2. What is the distance from point C to point F?
3. What is the distance from point D to point E?

01-Core-10A Ask your teacher or his assistant to begin tapping on the desk for you. Tell him when to begin. Use your ISCS timer to find out how long he taps the desk.

01-Core-11A On your paper write the letters of all good reasons for using data tables.

a. Data tables store data in an organized way.
b. Data tables tend to reduce errors by organizing data.
c. Data tables make it easier to find relationships.
d. Data tables help make sure you collect the data you need.
e. All of these.

01-Core-12A

Name of Group Member	No. of Sinkers Dragged	No. of Times Dragged	Distance from Hook to Pulley (cm)	Total Distance Dragged (cm)	Total Time for Dragging (sec)
Sue	1	70	90	6300	130
Betty	2	60	85	5100	110
Sam	3	50	80	4000	105

Study the table. Use it to answer all the questions below.

1. What was the distance in centimeters from hook to pulley when two sinkers were dragged?
2. What was the total distance in centimeters that one sinker was dragged?
3. How many times were the three sinkers dragged?

What is the letter of the phrase below which correctly completes the sentence? An operational definition includes a description of ___ the thing being defined. 01-Core-13A

a. the way to classify
b. the texture and color of
c. the shape or odor of
d. the way to measure

On your paper, divide 12.34 by 2.1. Round off your answer to one number after the decimal point. 01-Core-14A

On your paper, multiply 7.32 X 2.4. 01-Core-15A

Add these three numbers on your paper. 4.35, 3.4, 5,31 01-Core-16A

Subtract 4.57 from 8.7 on your paper. 01-Core-17A

Your teacher will observe you for this check when he can. 01-Core-18A

Your teacher will observe you for this check when he can. 01-Core-19A

Your teacher will observe you for this check when he can. 01-Core-20A

Your teacher will observe you for this check when he can. 01-Core-21A

Your teacher will observe you for this check when he can. 01-Core-22A

01-Exc 01-1A

Which of the following tells the main advantage of the metric system which makes it useful in measurement problems?

a. It was developed in France, and most of the early scientists were French.
b. The meter has a more logical historical basis than the yard.
c. The units of the metric system are related by factors of the number ten, and therefore changing from one unit to another is easier.
d. All systems of measurement are of equal value, but scientists needed a common system of units. They happened to choose the metric system.

01-Exc 01-2A

The measurement system used in ISCS science is the

a. Hebrew system.
b. English system.
c. Russian system.
d. Metric system.

01-Exc 03-1A

In Excursion 3, you studied two forces – lift and drag – acting on two sinkers. One force was greater than the other. You found this by making the two forces act directly on each other. Read the two examples below. Which one directly compares the two variables?

a. Mary ran around the school track. John ran around the block. Who can run faster?
b. John and Mary raced each other around the school track. Who can run faster?

Which of the following is an operational definition? 02-Core-1A

a. A ruler is a device for measuring length.
b. Light is the form of energy which causes the needle of a light meter to move. The amount of needle movement measures the intensity of the light.
c. Mass is the amount of matter in an object and does not vary from place to place.

Suppose that throughout the course everyone in your class used his own force measurer scale marked in washer units. 02-Core-2A

1. Would this cause a problem?
2. Explain your answer.

Suppose you wanted to use your force measurer to find the weight of a small feather. List the letters of all of the following things that you would need for your force measurer. 02-Core-3A

a. A blade thinner than the thin blade you already have
b. A blade thicker than the thin blade, but thinner than the thick blade
c. A scale calibrated in units from 0 N to 0.1 N
d. A longer scale card

Get an ISCS force measurer, 2 blades, paper clips, and a newton scale card from the supply area. From your teacher, get a spinigig disk and a skate wheel. Report to your teacher how much the spinigig disk weighs and how much the skate wheel weighs. 02-Core-4A

Get two objects from box 02-Core-5A. Use an ISCS force measurer, an aluminum cup, paper clips, and a newton scale card to weigh each of the two objects. Write the difference in newtons between the weights. 02-Core-5A

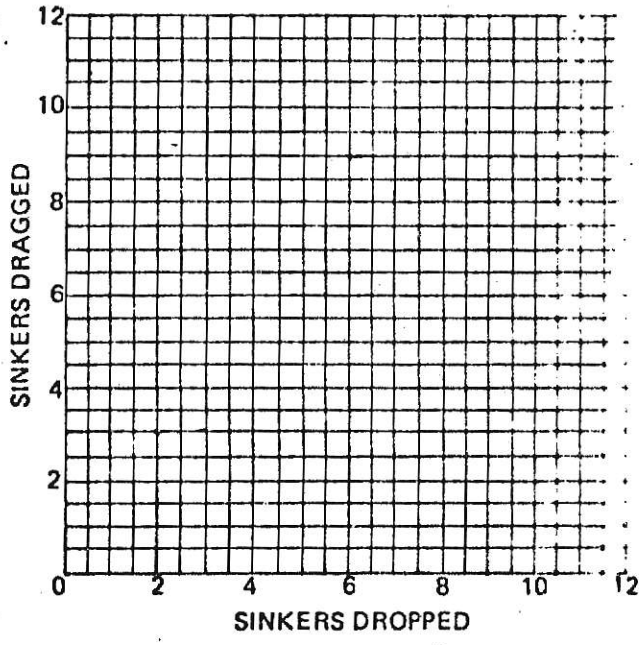
John brought his own washers from home to weigh on his force measurer. He added one washer at a time to a hook on the end of the force measurer blade. He made the data table shown below. 02-Core-6A

Number of Washers on Hook	Weight of Washers (in newtons)
1	0.8
2	1.4
3	2.4
4	2.6
5	2.8
6	3.4

What do you conclude about the weights of the washers John brought from home?

02-Core-7A Larry did Excursion 3, which compares weight and drag. On a separate piece graph paper, label the axes as shown below. Then construct a graph of Larry's da which are listed in the table below. The table shows the dragging power of the dr ping sinkers. Draw a best-fit line for the plotted points.

Sinkers Dropped	Sinkers Dragged
2	3
4	6
6	9
8	12



02-Core-8A Write an operational definition for *weight*, using an ISCS force measurer in your definition.

02-Core-9A Ask your teacher for a force measurer with an aluminum pin in it. Do not remove the pin.

Answer the following questions by listing the numbers (1, 2, and 3) on your paper and writing after each number the answer to the corresponding question.

1. Does the force measurer have the thin or thick blade attached to it?
2. What is the number of the hole the pin is in?
3. How much force is on the aluminum pin?

02-Core-10A From your teacher, get force measurer scale card 02-Core-10A. Use your force measurer with the thin blade to weigh a sinker. Have your teacher watch you. Report the weight in the units shown on the scale card.

02-Core-11A Write on your paper the name of the metric unit you use in ISCS to measure force

02-Core-12A Suppose you want to know when a force is acting on a football. Write on your paper two kinds of changes you would look for.

Get a compass and a nail from the supply area. Set the compass on your desk. Bring the nail very near to the compass from three different directions. Watch what happens. 02-Core-13A

1. Is there a force acting between the nail and the compass?
2. How do you know?

02-Core-14A

Diagram a Diagram b

The two springs being squeezed by the hands are alike.

1. Which diagram shows the greater amount of force being applied?
2. Explain the reason for your choice.

An operational definition answers two questions. Write an operational definition for *force* in which you answer those two questions. 02-Core-15A

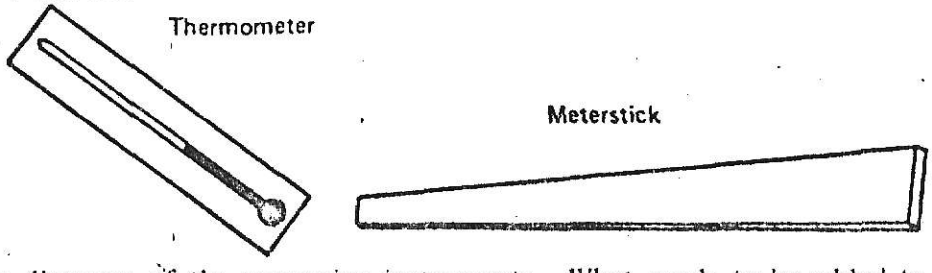
Write on your paper the two questions you would have to answer about something if you wanted to write an operational definition for it. 02-Core-16A

Two sinkers are attached to the blade of a force measurer, and the blade bends down. Name the force that is pulling on the blade. 02-Core-17A

John sat on a chair. After a minute, the chair legs gave way and John ended up on the floor. What force caused a change in the shape of the chair? 02-Core-18A

State two reasons why it is difficult to define operationally such terms as *love* or *beauty*. 02-Core-19A

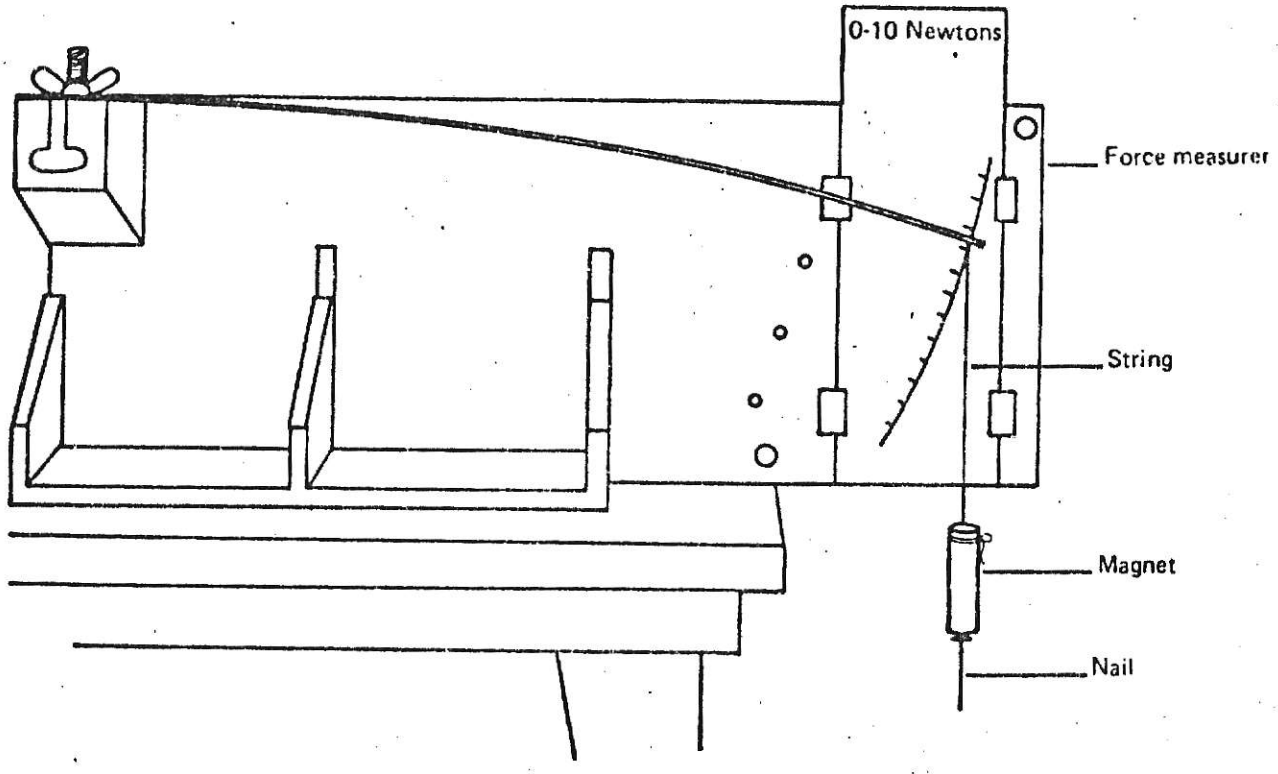
02-Core-20A



Look at the diagrams of the measuring instruments. What needs to be added to them so that you could tell your teacher your measurement without having to show him the thermometer or the meterstick?

02-Core-21A Tie or tape a magnet to a string, as shown below. Hang the magnet on th force measurer blade. Measure the combined weight of the magnet and Number and record your results for each step of the following.

1. Record the combined weight of the magnet and string.
2. Attach a nail to the magnet as shown. Pull gently on the nail un magnet releases it. What is the force measurer reading when the mag leases the nail?
3. How much force did the magnet exert on the nail?



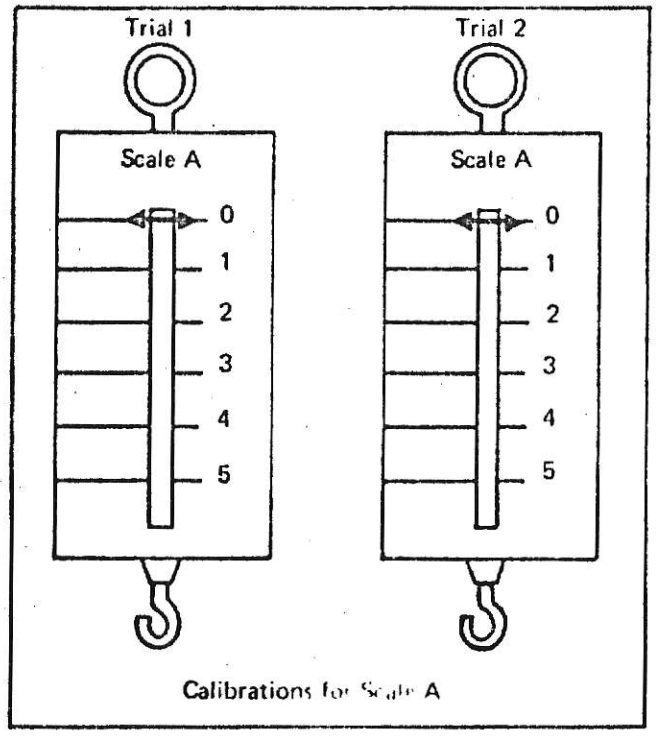
02-Core-22A List the letters of the situations described below in which there is a force acting addition to gravity and friction.

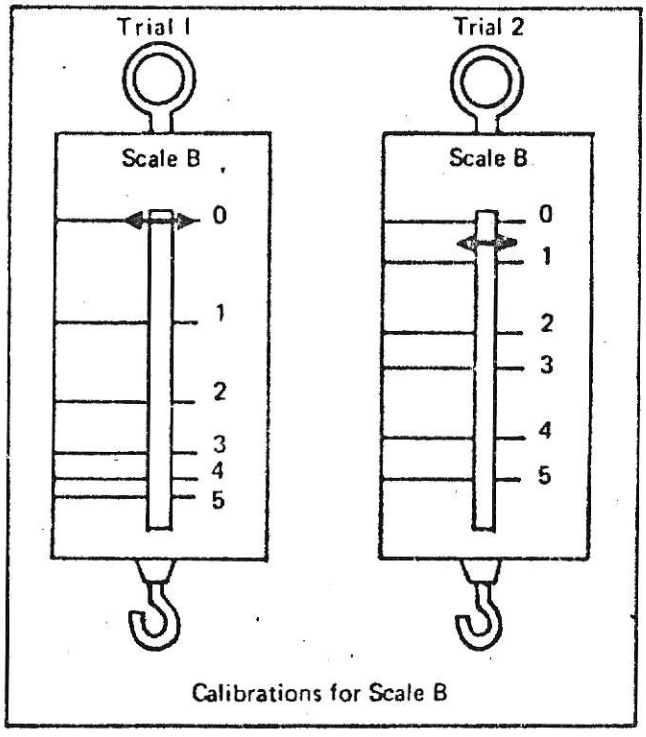
a. A motorcycle parked in a garage
b. A stone smashing through a window
c. A sinker sitting on a shelf
d. Two football players hitting head-on
e. A washer lifted from a desk

02-Core-23A List four things which should be true of an object if it is to be used as a sta unit of measurement.

Sol was given two old and uncalibrated spring scales, A and B. He calibrated each spring scale two times. The two drawings below show the results of his calibrations for each scale. Sol must use one of these two scales in an experiment. 02-Core-24A

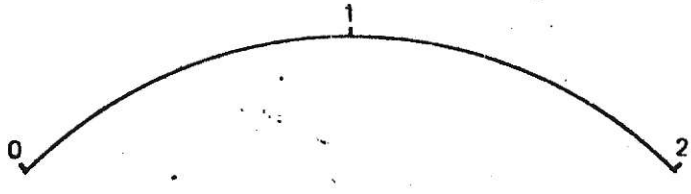
1. Which spring scale should he use?
2. Why?





In this course you often make several measurements which you are then asked to multiply and divide. Suppose you were to use the scale below. 02-Exc 06-1A

1. Would it be easiest to report, multiply, and divide the measurements if the units on the scale were divided into 9, into 10, or into 11 subunits?
2. Why?



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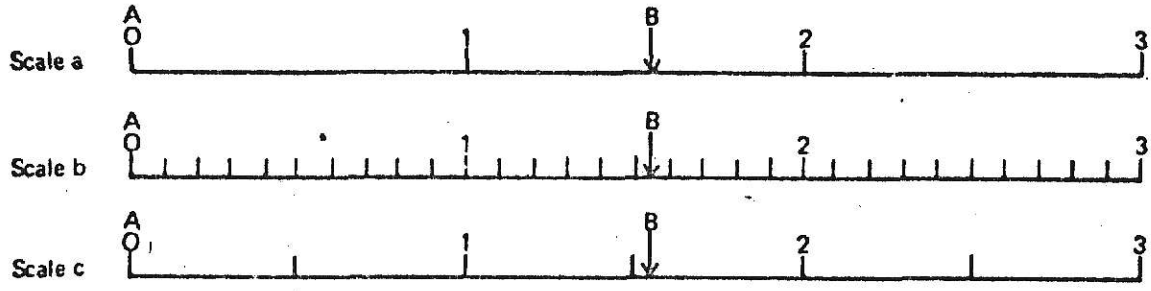
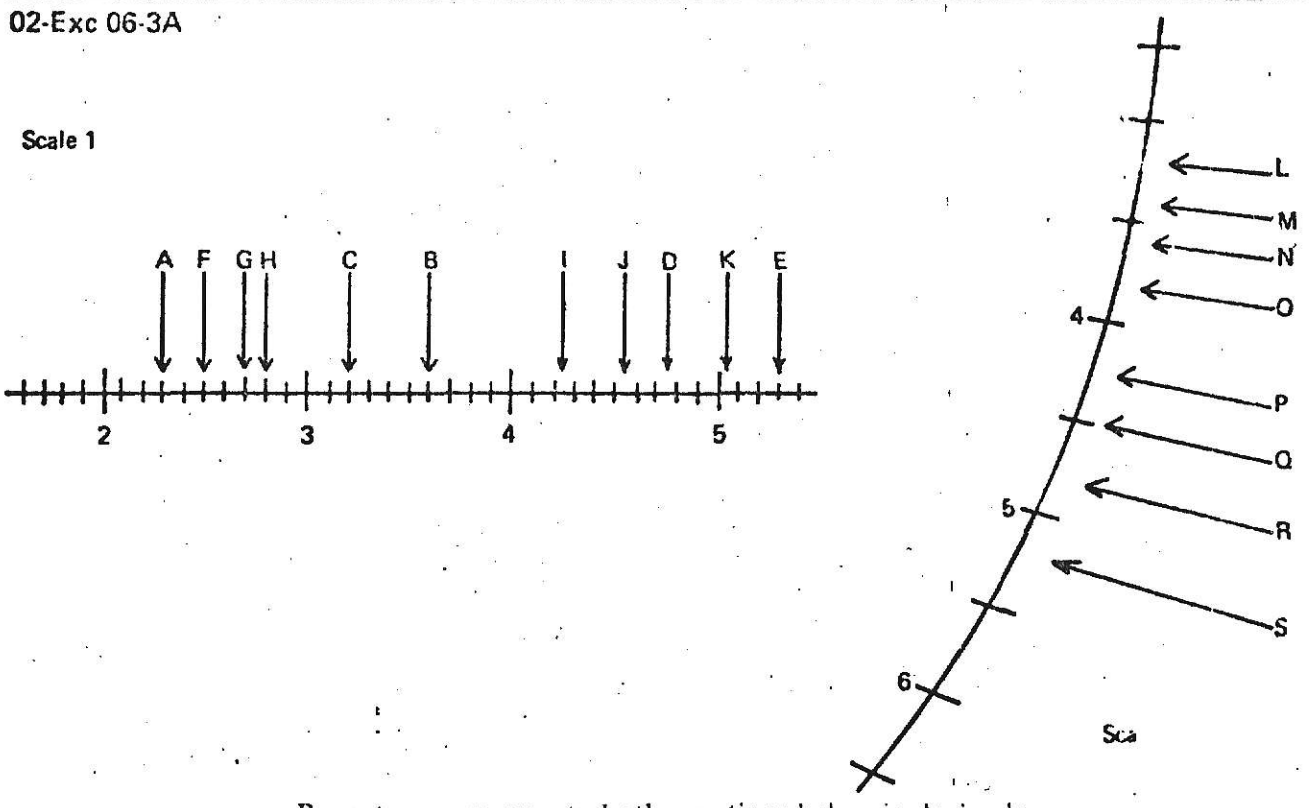
02-Exc 06-2A

1. From which of the three scales below could you report the most accura measurement of the distance from A to B?
2. Why?



02-Exc 06-3A



Report your answers to both questions below in decimals.

1. On scale 1, what is the reading at H? At I?
2. On scale 2, what is the reading at N? At R?

02-Exc 07-1A

Write the letter of the best answer. When the size of a unit of measurement such as the meter was first determined, it was

a. discovered by scientists.
b. taken from a list of standards passed down through the years.
c. naturally set by something in nature.
d. set by a group of men who agreed on its size.

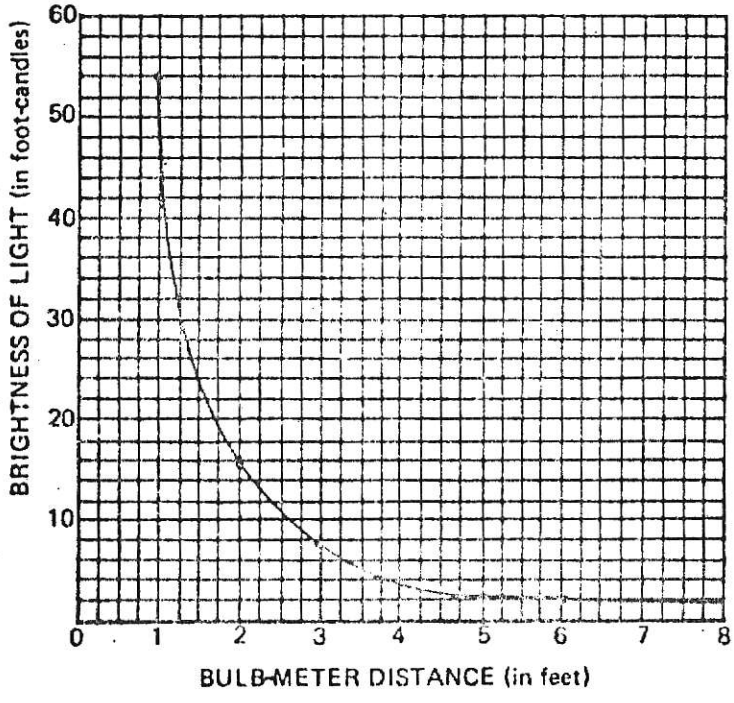
The *palm* is a unit of length based on the width of a man's hand. The *digit* is a unit of length based on the width of a man's index finger. 02-Exc 07-2A

1. Why aren't measurement units such as the palm and digit used very much today?
2. Why are standard units such as the meter and the gram used instead?

The brightness of a lighted bulb was measured with a light meter at several distances from the bulb. The data were graphed as shown below. Notice that the light brightness decreases as the distance increases. 02-Exc 08-1A

Compare the change in brightness between the distances of 1 foot and 2 feet with the change between 4 feet and 8 feet. Choose the words which correctly complete the following two sentences.

1. When the bulb and meter are close together, a small change in distance produces a (large)(small) change in brightness.
2. When the meter and bulb are far apart, a large change in distance produces a (large)(small) change in brightness.



A COMPARISON OF LOW LEVEL READERS' SUCCESS IN TAKING ORAL TESTS VERSUS PRINTED TESTS IN THE LEVEL ONE INTERMEDIATE SCIENCE CURRICULUM STUDY CLASSROOM

by

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B. A., Kansas State University, 1971

AN ABSTRACT OF A MASTER'S REPORT

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MASTER OF SCIENCE

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1975

Traditionally, subject oriented classroom teachers educate as well as evaluate students by means of the printed page. It is assumed that all children read at a level allowing them to comprehend subject matter and testing material. Low level readers seem to be the group of students who are discriminated against the most by printed materials. The primary purpose of this study is to determine whether low level readers will be more successful in taking an oral test than a traditional printed test.

This study took place in the Level I Intermediate Science Curriculum Study (ISCS) classes at Abilene Junior High School in Abilene, Kansas. The primary difference between the ISCS program and a more conventional approach is it allows each student to progress at his own pace, and it permits the scope and sequence of instruction to vary with the students' interests, abilities and background.

All students in Abilene Junior High School were randomly assigned to the four seventh grade Level I ISCS science classes. In this study two sections were selected at random by the flipping of a coin to make up the control group. Likewise, two sections were selected at random to make up the experimental group. In order to avoid experimental bias, all students in the experimental group took oral tests and all students in the control group took printed tests. Only the test results for low level readers in both groups were analyzed.

The design used in this study was a modification of the Posttest-only control group design. Subjects were randomly assigned to sections. Because subjects were to remain in their assigned sections, entire

sections were randomly assigned to experimental conditions rather than subjects themselves being assigned to experimental conditions. This was the only modification that was necessary to make in the Posttest-only control group design.

In order to analyze the data of this study, the null form of the hypothesis was tested:

> Low level readers in Level I ISCS will be no more successful in taking either the oral or written tests.

The data for Unit I is found to be significant at a .1 level. Although the null hypothesis may be rejected at a .1 level of significance the reader should accept the data cautiously. The data for Unit II is found to be significant at a .025 level. One should note that the level of significance at which the hypothesis may be rejected is lower for Unit II as compared with Unit I.

The basic assumption throughout this study was that low level readers have difficulty in taking printed tests. Results of this study show that this assumption is true. Likewise, the results show that low level readers are able to achieve higher test scores on oral tests than they are on printed tests.