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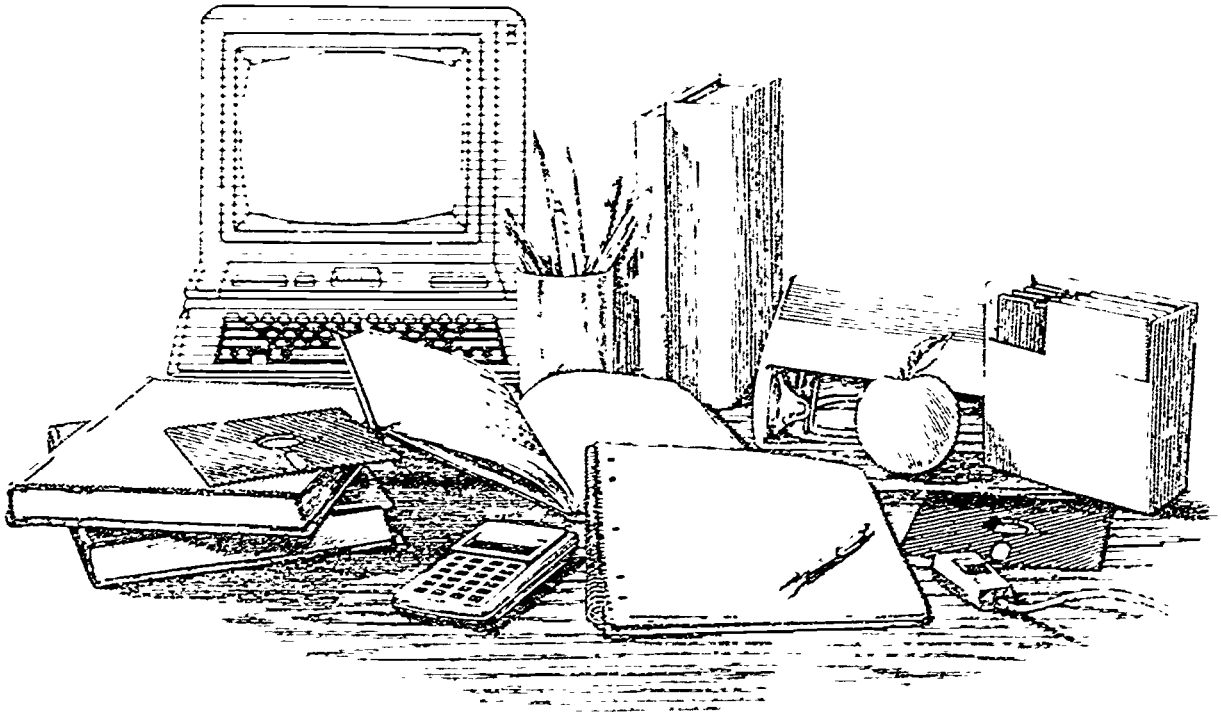
ABSTRACT

In February 1989, statewide assessment tests in reading, mathematics, and writing were given to a sample of eighth graders throughout Oregon. The results and analyses of reading and mathematics assessments are presented. Important trends are described based on the analysis of data from 1985, 1987, and 1989. The 1989 information provides the first comprehensive look at student achievement in the Essential Learning Skills (ELS) strategies and basic skills that are a vital part of the new effort toward a common curriculum core in Oregon schools. Overall, Oregon eighth graders had slightly lower mathematics achievement than in 1987, with a decrease in computation scores, an increase in higher level math skills, and a more heterogeneous mixture of achievement levels. While Oregon students generally performed near the international median in the Second International Mathematics Study, they were slightly above United States levels and lower than Japanese scores. Reading test results were equivalent to 1987 scores, with gains in some areas. Significant gains were made from 1987 to 1989 in literal understanding, locating information, and implied understanding. The use of a "complete story" passage on the 1989 test was found effective. Seven figures and three tables are included. An Appendix contains one form of the reading test. (SLD)

1989 Oregon Statewide Assessment of Mathematics and Reading

Grade 8



Oregon Department of Education, John W. Erickson, State Superintendent of Public Instruction, Salem Oregon 97310-0290

Eighth Grade Assessment of Mathematics and Reading

1989

Summary Report

Prepared by
Assessment and Evaluation Section
Division of School Improvement

June 1990

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FOREWORD

The level of achievement in mathematics and reading of Oregon students is of vital concern to the future of the State. The Oregon Economic Development Department recently predicted (April, 1989) that "Oregon faces a growing shortage of workers capable of filling high skill positions . . . due to technological change and the challenge of growing international competition." Although Oregon educators have always been concerned with basic skills, there is renewed concern for meeting the future need for even greater problem solving skills and "learning how to learn" abilities. A vital part of this challenge will be an annual assessment of the progress of Oregon's students—assessing "where we stand"—the focus of the present report.

This assessment is based on the Essential Learning Skills adopted by the State Board in December, 1985. The Essential Learning Skills (ELS) include learning strategies and higher-order thinking skills that run "across the curriculum" and form a vital part of the common curriculum in Oregon schools.

The 1987 eighth grade assessment, also based on the Essential Learning Skills, provided a baseline for comparison with the 1989 testing and future statewide assessments. As you will see in the following pages, the tests were challenging—somewhat of a departure from previous state tests designed to measure the prevailing curriculum.

The results show that curricular emphasis in Oregon schools is beginning to shift toward some of the higher-order skills needed in our information age. For example, performance has improved in Implied Understanding (inferences and conclusions) and in Mathematical Relationships (e.g., using graphs). In other areas of Mathematics and Reading, gains have not yet been achieved. More work is needed to help Oregon students become competitive in the future workplaces of the Pacific Rim.

With a renewed consensus on common curricula, and the expanded statewide assessment beginning in 1991, we have sent a challenge to Oregon's teachers and students. It should now be the goal of all educators and citizens of Oregon to help us follow through with the training and support necessary to improve student higher-order skills.

Specifically, we must expand the use of state-of-the-art technology, such as calculators and computers; create learning laboratories in which students use tools, equipment, and manipulatives; allow teachers to be facilitators and managers of learning environments in which students actively participate; better prepare our teachers to teach more demanding subject matter; and incorporate business and industry professionals in teaching concepts, serving as role models, and stimulating interest in math and critical reading. Finally, we must be able to assess accurately the progress of learners and be willing to reward performance by students, teachers, and schools.

All of us are participants in an amazing cultural shift which will offer young people unparalleled opportunities. As we engage in this period of change, innovations in curriculum will provide connection to the past, appreciation of our present, and hope for our future.

John W. Erickson
State Superintendent
of Public Instruction

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INTRODUCTION

In February 1989, Statewide Assessment tests in reading, mathematics and writing were given to samples of eighth graders throughout Oregon. The results of the writing assessment have been published separately (Oregon Department of Education, 1989). Results and analyses of the reading and mathematics assessments are presented here. The intended audiences for this report include the State Board, Department of Education staff, the Governor and legislators, local boards of education, school district superintendents and staff, students and their parents, business and community leaders, and all citizens of Oregon. These individuals all have a vital interest in the achievement of Oregon students. This report is intended to add another significant type of data to the array of information these audiences use to make decisions that affect Oregon youth.

Although this report gives important information about the achievement of students in Oregon, it has several limitations. First, it focuses on eighth grade only. Until 1991, when an expanded statewide assessment will be given at four grade levels (3, 5, 8 and 11), statewide data is available for 8th grade only in reading and mathematics.

However, several important trends based on 1985, 1987 and 1989 eighth grade assessments are presented along with ideas for instructional improvement. Also, the 1989 assessment provides the first comprehensive look at student achievement in the Essential Learning Skills (ELS) learning strategies and basic skills that run "across the curriculum" (e.g., interpreting graphs and tables). The ELS goals are a vital part of the new effort to implement a "common curriculum" core in Oregon schools.

PROCEDURES

The 1989 Eighth Grade Assessment was similar in several ways to assessments in 1985 and 1987. As in 1987, the tests were designed to measure the Oregon Essential Learning Skills (ELS) adopted by the Board in December 1985. As in 1985 and 1987, test scores from previous years were compared using common scales in reading and mathematics widely used in the Northwest. Although growth in these curriculum areas was examined, several important changes in test content have occurred that will be noted in the report. The 1989 tests have increasingly expanded coverage of the ELS goals, because improved questions were developed to measure several of the difficult-to-measure goals. Another important difference between the 1985, 1987 and 1989 assessments is the date of testing. The 1985 test was given in April; the 1987 and 1989 tests were given in February.

The 1989 tests represent the most comprehensive assessment to date. The 1985 and 1987 assessments were single test-forms having 45-55 items in each of the two subject areas. The 1989 assessment included four test forms of 40 items each, for a total of 160 questions in reading and 160 questions in mathematics. Each of the forms was equated, based on extensive field testing and item calibration, resulting in parallel, high-reliability test forms in each subject area.

This report provides an overview of the findings for the 1989 eighth grade tests. A supplementary report, describing test characteristics and detailed item results will be available as a Technical Report.

MATHEMATICS TEST RESULTS AND INTERPRETATION

- Summary
- Mathematics Skill Areas Tested
- Comparison to Previous Years
- Interpretation of the Achievement/Curriculum Scale
- Scores by Mathematics Skill Area
- Instructional Emphasis on Mathematics Skills
- Oregon Compared to Second International Math Study
- Curriculum and Instruction Concerns

SUMMARY

MATHEMATICS TEST RESULTS

- Oregon eighth grade students in 1989 had slightly lower overall mathematics achievement than samples collected in 1987.

- The drop of two points in the overall mathematics score (231 to 229) from 1987 to 1989 is equal to approximately one-third of the gain that would typically be found between 7th and 8th grade in Mathematics (six points). The 1989 level is still above the estimated national median. The drop may be partially due to the increased coverage of more difficult "higher level" problem-solving in the 1989 tests compared to 1987.

- Oregon students show a relative increase in "higher level" math skills (e.g., mathematical relationships) compared to 1987 when arithmetic skills (computation) was the highest skill area.

- Computation scores were down in 1989 compared to 1987. This may reflect increased curricular emphasis on mathematical concepts as is appropriate to the current "computer/information age" in American society.

- Repeated items used in both 1987 and 1989 assessments showed performance improvements in Geometry but a decline in some Numeration skills.

- Statistics and probability was an area of lower relative achievement and much lower instructional emphasis, especially the concepts of "median" and "range."

- Across the five skill areas that were included in both 1987 and 1989, the proportion of lower achieving students (scores under 220) increased an average of 7%. Surprisingly, the average proportion of higher-achieving students (scores over 240) also increased 3.2%. This means that 1989 has brought a more heterogeneous mixture of achievement levels to Oregon mathematics classrooms as compared to 1987.

- Compared to the U.S. and 17 other countries in the Second International Mathematics Study, Oregon students were lower than several countries, but near the international median and slightly above U.S. performance levels. On 11 questions also given in Japan, Oregon students were 14.3% lower on the average.

MATHEMATICS SKILL AREAS TESTED

The following descriptions outline the content that was assessed on the eighth grade mathematics tests. Each of the four test forms had the same mixture of items in each skill area. The content was selected from the Essential Learning Skills (ELS) adopted by the State Board in 1985. References to ELS numbers are provided. This list together with the math common curriculum goals provides a blueprint that can guide curriculum planning in all districts of Oregon.

- **Numeration:** Read and write decimals, order fractions, decimals and percents, and use basic mathematical terms. (Essential Learning Skills 1.4a, b, c)

- **Computation:** Solve addition, subtraction, multiplication, and division problems using mental, manual and calculator procedures. (Essential Learning Skills 1.4d and 1.7i)

- **Geometry:** Classify and sketch or model geometric figures, and identify properties, such as parallel, intersecting and symmetry lines and locate points on a graph. (Essential Learning Skill 1.5)

- **Probability and Statistics:** Solve problems using probability and statistics (including mean, median, mode). (Essential Learning Skills 1.6a, b, d, e)

- **Measurement:** Use scale drawings to determine actual distances and directly measure distances and angles. (Essential Learning Skills 1.6g and 1.7e)

- **Mathematical Relationships:** Solve problems using tables, graphs, formulas and models, including proportions. (Essential Learning Skills 1.6b, 1.6f, 6.1a and 6.3d)

- **Estimation:** Estimate reasonableness of computed answers and estimate measures of distances and angles. (Essential Learning Skills 1.7b, e, i)

- **Problem Solving:** Select relevant data, and apply logic and solution strategies to determine the solutions to mathematical problems by using mental, manual or calculator processes. (Essential Learning Skills 1.7a, d, and 6.3b, c, d)

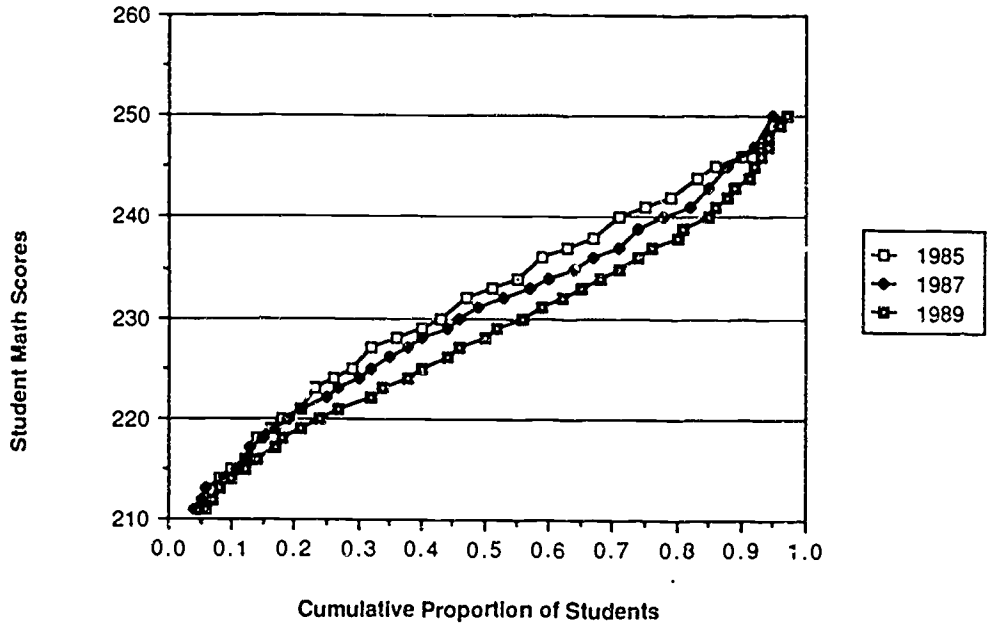
COMPARISON TO PREVIOUS YEARS

Overall Scores

The distribution of total Mathematics scores for the 1985, 1987 and 1989 eighth grade assessments is shown in Figure 1.

Figure 1

Distribution of Math Assessment Scores



The median scores (50th percentile) show a decline from 1987 to 1989, moving from 231 to 229. The percentage of students scoring in the lower range (below 220) also increased from 16.8% in 1987 to 21.3% in 1989. The percentage of students scoring above 240 decreased from 21.7% to 15.4%.

The drop from 233 in 1985 to 231 in 1987 is due to the difference in time of testing – April in 1985 versus February in 1987—which is expected to result in a difference of about two points.

Two possible explanations for the pattern of results for 1987 and 1989 in Figure 1 are: (1) that mathematics achievement is declining slightly, or (2) that the statewide tests have become more mentally challenging, producing a score distribution that is less skewed toward the higher end. The 1985 and 1987 tests had higher proportions of scores above the mean, whereas the 1989 tests had more symmetrical distributions (similar to bell-shaped curves).

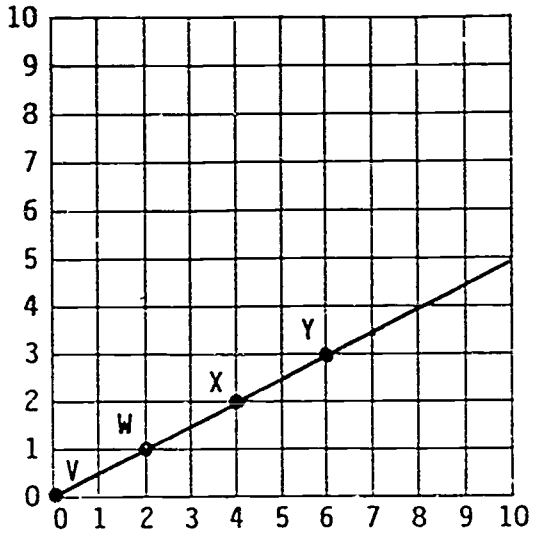
Two curriculum-related interpretations are possible: (1) students are more challenged by the "higher level" essential learning skills contained in the 1989 tests and have also shown a drop in computational skills, or (2) as the statewide tests align more with the ELS curriculum, a greater disparity is found between the state ELS goals and the instructional emphasis in school districts in Oregon. In other words, there may not be a full implementation of ELS-based mathematics instruction in Oregon schools as of the date of the 1989 Assessment.

Repeated Items

A total of 28 items (approximately seven on each of four test forms) were repeated from the 1987 assessment. Few interpretable trends were identified at the item level, due to the varied nature of the results. Ten items showed strong, statistically-significant shifts but five were increases and five were decreases.

Two reporting categories that did show definite trends were Geometry and Numeration. Six Geometry items (ELS 1.5a, c and d) were repeated and the changes in percentages of correct answers ranged from -4.3% to +13.5%, with an average increase of +5.7%. The question below (Form D, Item 9) is an example, showing an improvement of +11.7% (72.7% in 1987 to 84.4% in 1989).

Form D



9. Point V is at (0,0), point W is at (2, 1), point X is at (4, 2). What are the coordinates for point Y? (Use graph above.)

A. (3, 6)
B. (4, 4)
C. (6, 4)
D. (4, 6)
*E. (6, 3)

Five items in Numeration (ELS 1.4a, b and c) were in both 1987 and 1989 assessments. The percentages of correct answers dropped an average of -6.1% (range of differences was +2.4% to -10.7%). Item 31 from Form B, (see below) testing the relative size of two fractions, decreased from 50.8% in 1987 to 40.3% in 1989.

31. Which of the following is TRUE?

*A. 2/3 < 4/5
B. 2/3 = 4/5
C. 2/3 > 4/5
D. 2/3 ~ 4/5
E. None of these

INTERPRETATION OF THE ACHIEVEMENT/CURRICULUM SCALE

An achievement-score scale widely used in the Northwest has been part of the Oregon Statewide Assessment since 1985. The scale, with numbers ranging from about 150 to 250, is similar to standard, longitudinal scales used on other tests such as the Scholastic Aptitude Tests (SAT scale of 200 to 800) or the "growth" scales on publisher's achievement batteries. The scale, originally centered at the 5th grade average (200) by the Northwest Evaluation Association in the 1970's, allows comparisons across tests and across time in Mathematics and Reading and can be used to define curricular levels in these content areas. Figure 2 shows a current interpretation of the levels of the scale. Readers may wish to refer to this display in interpreting the findings of the 1989 Assessment.

Three levels of curriculum are defined in each goal area. This system is similar to the interpretive method used in the National Assessment of Educational Progress (NAEP) Curricular elements for the Essential Learning Skills (tasks or generic classes of test questions) are listed for each of the three levels. The tasks represent items that students at each level can pass with 80% probability, on the average. For example, at Level 1 in computation, students who score in the range under 220 have typically mastered (80% chance of passing) the multiplication of one-place decimals and whole numbers (e.g., 1.6 times 10 equals 16).

The use of three curricular levels will allow the statewide assessment to track the number and proportion of students at each level of the ELS-based curriculum from year to year. Also, the proportions of students at each level can be compared across goal areas for curriculum evaluation.

The proportions of students at the low level of the curriculum as well as the high level should help in answering equity questions—Are our schools helping students at each curricular level?

Figure 2

	Level 1 (Under 220)	Level 2 (220-240)	Level 3 (Over 240)
Numeration	Recognizes that dividing a whole object into 6ths creates larger pieces than 10ths do. Can recognize the meaning of a>b. Identifies a word-description of 2-place decimal numbers such as 208.15.	Orders common and less-familiar fractions from largest to smallest. Identifies a word-description of 3-place decimal numbers.	Recognizes correct or incorrect mathematical statements using symbols (<, =) separating fractions. Orders fractions mixed with decimals from largest to smallest.
Computation	Multiplies a one-place decimal times whole number. Divides a simple food recipe into one-half serving. Computes common percentages (50%) or fractions (1/2) of whole-number amounts.	Adds and subtracts common fractions and mixed numbers. Subtracts two 2-place decimal numbers. Computes less-common percentages (2%, 10%, 25%) or fractions (1/3, 1/8) of whole numbers.	Divides whole numbers by fractions. Solves 2-step word-problems that require computation of percentages of sums of whole numbers. Solves percentage problems with an unknown (40 is 20% of what number?).

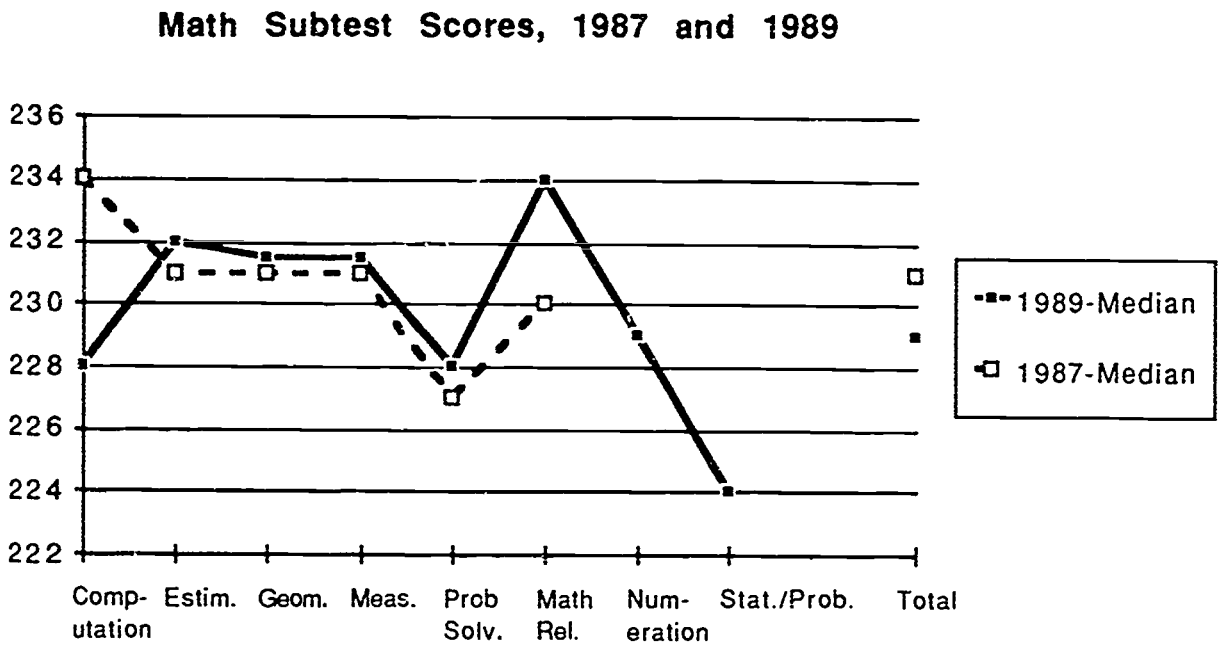
Figure 2 (Continued)

	Level 1 (Under 220)	Level 2 (220-240)	Level 3 (Over 240)
Geometry	Identifies a line of symmetry drawn on a common figure such as a circle or square. Identifies coordinates of a point on a graph when nearby points are given. Distinguishes intersecting versus parallel lines.	Identifies location of line of symmetry on a common household object such as a key or window. Finds a right angle embedded in a set of vector lines.	Identifies approximate coordinates of points on a graph when labels are absent from each axis. Identifies irregularly shaped quadrilaterals.
Probability & Statistics	Identifies the most likely outcome in a simple probability problem (color of most common block in a bag of blocks). Identifies highest or lowest value on a line graph or bar chart.	Computes the probability of an outcome (as a fraction) from a spinner. Computes the average of a set of whole numbers.	Distinguishes the mean from the median of a set of numbers. Identifies an error in an otherwise correct pie chart or graph.
Measurement	Identifies size of an angle superimposed on drawing of a protractor. Directly measures length of a line or drawing of an object using a printed ruler (whole or common fraction of measuring unit).	Directly measures line or object drawn next to printed ruler (to nearest 1/2, 1/4 or 1/8) inch). Discriminates between angles of different sizes (drawn over printed protractor).	Uses proportionality to determine height of object in drawing (where sides of superimposed right triangle are given). Computes volume of a cylinder using formula.
Mathematical Relationships	Solves simple proportion problems (common ratios such as 3 to 4). Classifies simple patterns of integer numbers.	Solves proportion problems, with unfamiliar fractions, including those in word problems. Identifies missing value in a 2-variable table based on a formula (d=4t).	Identifies a table of numbers that matches written description of a 2-variable formula. Identifies a graph that illustrates a 2-variable relationship.
Estimation	Estimates length of a drawing of a common object given a printed ruler. Estimates length (inches, cm.) of common household objects.	Estimates result of subtraction of two decimal numbers. Estimates answer to division of two whole numbers with remainder.	Estimates answer to multiplication or division of two decimal numbers (7.90162 - 1.9178). Identifies approximate answer to 2-step or 3-step word problem.
Problem Solving	Reasons and solves the number of boxes in a 3-dimensional drawing of stacked cubes. Solves simple money problems using multiples of 5¢ or 25¢. Calculates perimeter of common object having equal lengths of sides.	Calculates total cost of retail purchase using amount of down-payment and monthly payments (whole numbers) . Identifies amount of savings from purchase of items on sale versus regular price. States whether multiplication or division is needed to solve a problem.	Solves more complex 2 or 3-step problems such as calculating the arrival time for a trip by car given time, distance and average miles per hour. Finds perimeter of irregular figure where the length of certain segments must be inferred.

SCORES BY MATHEMATICS SKILL AREA

In 1989, eight skill areas were tested, as described on page 8. Four of these areas are similar to categories used in 1987 (Computation, Estimation, Problem Solving and Mathematical Relationships). Geometry and Measurement were merged in 1987 but are reported separately in 1989. Figure 3 shows the results from 1987 and 1989, using the median achievement scale scores for each skill area and for the overall total scores.

Figure 3

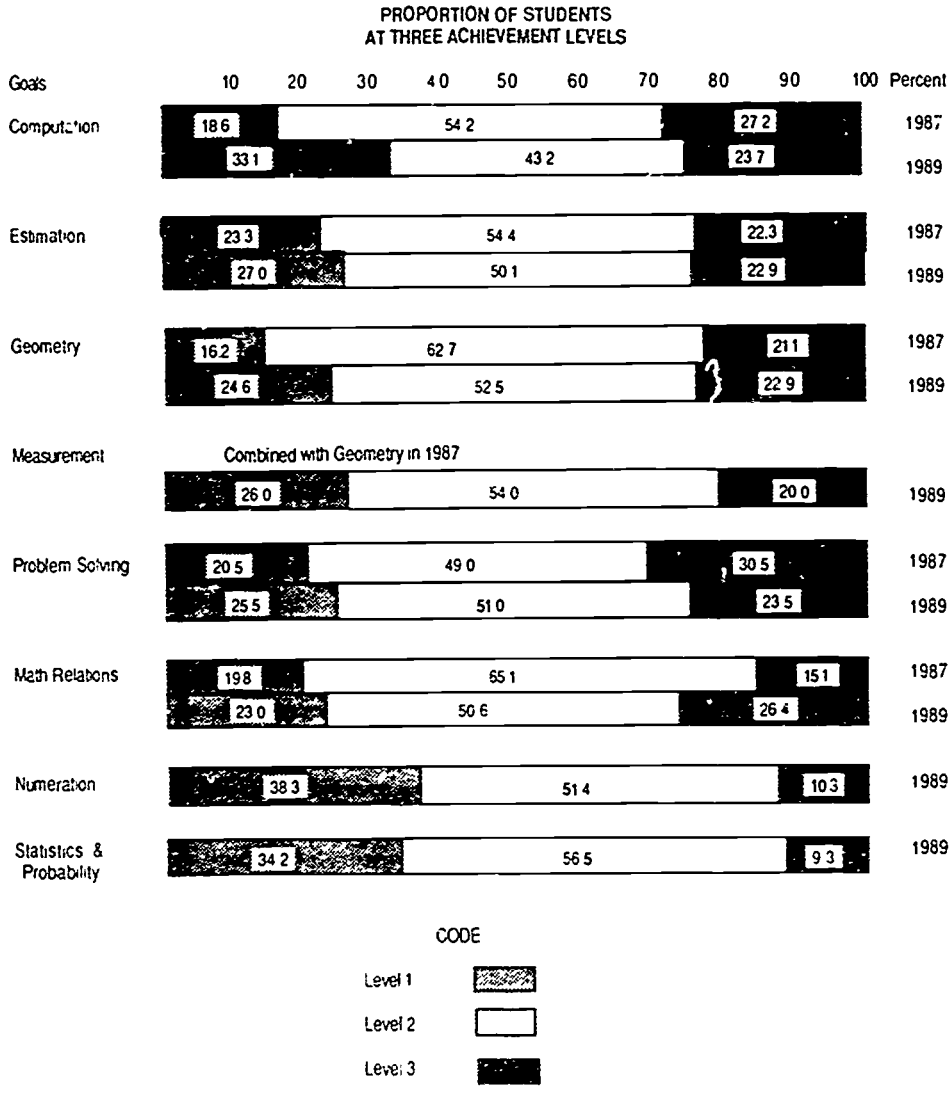


Performance in 1989 was lower in Computation (Arithmetic Skills in 1987) but higher in Mathematical Relationships. Performance levels were particularly lower in Statistics and Probability, a new reporting category for 1989. Inspection of individual items indicated a consistent finding that students were unfamiliar with the concept of "median" (as in "Given this list of annual salaries, what is the median salary?"), which was interpreted incorrectly as an average (mean) rather than the "middle value."

Although performance levels were slightly higher in Estimation, Geometry, Measurement and Problem Solving, the differences were very small. Problem Solving remains one of the lower performance areas across all skills. The increase in Mathematical Relationships is encouraging, however, since it involves graphs, tables, proportions, and formulas that often include "higher level" mathematical thinking.

The proportions of students at each curricular level in each skill area are shown in Figure 4. Most of the skill areas show the trend toward a decrease in the proportion of students in Level 2. This means that there are more students in Level 1 and in Level 3 in 1989 as compared to 1987. In other words, there was an increase in both the less-able and the more-able students. Two exceptions were Computation and Problem Solving where Level 1 increased but the higher level decreased in 1989. (Note. Although the medians for Problem Solving were 227 in 1987 and 228 in 1989, the average scores were reversed, 230.3 in 1987 and 228.4 in 1989, because the 1987 distribution was skewed toward the upper end).

Figure 4



INSTRUCTIONAL EMPHASIS ON MATHEMATICS SKILLS 1987 to 1989

A questionnaire was distributed and completed by a sampling of eighth grade mathematics teachers during the time of the statewide assessment in February, 1987 and 1989. For each of the skill areas on the test, they indicated the amount of instructional time they devoted to each skill in their classrooms as shown below:

Each question looked like the following:

Goal	Reviewed	Briefly Introduced	Developed or Expanded	No Instruction
1. Computation	_____	_____	_____	_____
2. Estimation	_____	_____	_____	_____

Percentages of teachers who provided "expanded instruction" beyond a review or introductory level are shown below for 1987 and 1989.

Percent of Teachers
Providing Expanded Instruction

Skill Area	1987	1989
Computation	58%	56%
Estimation	32%	28%
Geometry*	29%	34%
Measurement*	29%	21%
Problem Solving	55%	48%
Math Relationships	27%	27%
Numeration*	—	43%
Statistics/Probability*	—	7%

*Note: Geometry and Measurement were combined in 1987. Numeration and Statistics were not separate skill areas in 1987.

As expected from the test score results, Statistics and Probability was the area of lowest instructional emphasis in 1989. Most of the other skill areas for 1989 are surprisingly similar to the 1987 percentages, given the shifts in Computation and Math Relationship scores. Problem Solving and Computation continue to be the two highest areas of instructional emphasis.

OREGON COMPARED TO THE SECOND INTERNATIONAL MATHEMATICS STUDY (SIMS)

The 1989 eighth grade assessment included a total of 15 items from the Second International Mathematics Study (SIMS) sponsored by the International Association for the Evaluation of Educational Achievement (Travers, et al., 1986). Data from samples of 13-year-old students (8th grade in the U.S.) in the U.S. and 17 foreign countries can be compared to the results in Oregon. Comparisons were made using the percentage of students answering each item correctly. Table 1 shows the results for each SIMS item.

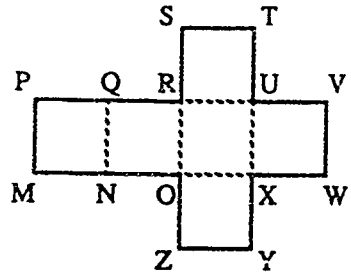
In comparison to students in other countries, Oregon students performed slightly above the international median (percent correct) on the average. Oregon was higher than the international median in Estimation, Geometry and Problem Solving, but lower on Measurement and Statistics items. The higher scoring countries were Japan and the Netherlands, which were occasionally more than 20 percentage points higher on individual items than Oregon or the USA. The United States was near (slightly below) the international median on the average. The lowest scoring countries (averaging 20 percentage points lower) were small developing countries in Africa and the Far East.

U.S. Comparison

In comparison to the USA, Oregon averaged 4.9% higher across the 14 SIMS items in the 1989 assessment. Of the 14 Oregon/U.S. comparisons, (see the right-hand column of Table 1) nine were significantly higher for Oregon, and only two were significantly lower (Items 077 in Numeration and 163 in Statistics). Oregon was higher than the U.S. in Computation, Estimation, Geometry, Measurement, and Problem Solving. Oregon was lower on the one Statistics item included (SIMS 163).

The skill area showing the greatest increment was Geometry (four items in ELS 1.5) in which Oregon averaged 8.8% higher than the USA sample. Item 031 shown below, is an example of a Geometry item (ELS 1.5b) on which Oregon students did well (Oregon 71.6%, USA 59.0%, Japan 81.6%).

SIMS No. 031



The diagram shows a cardboard cube which has been cut along some edges and folded out flat. If it is folded to again make the cube, which two corners will touch corner P?

A. corners Q and S
B. corners T and Y
C. corners W and Y
*D. corners T and V
E. corners U and Y

Table 1

Percent-Correct Results for Items from the Second International Mathematics Study (SIMS)

Report Category (ELS)	SIMS No.	International Median	Japan Results	U.S. Results	1989 Oregon Results	Oregon Compared to Intl. Median	Japan	U.S.
Computation								
(1.4d)	044	56.0	68.9	45.7	52.7	-3.3	-16.2*	+7.0*
(1.7i)	110	43.1	55.8	42.3	46.4	+3.3	-9.4*	+4.1
Estimation								
(1.7b)	045	26.9	33.9	27.4	37.4	+10.5*	+3.5	+10.0*
(1.7b)	185	--	--	63.8	70.3	--	--	+6.5*
Geometry								
(1.5b)	031	60.3	81.6	59.0	71.6	+11.3*	-10.0*	+12.6*
(1.5d)	126	32.8	63.0	30.6	35.3	+2.5	-27.7*	+4.7*
(1.5a)	159	60.7	87.2	59.2	71.3	+10.6*	-15.9*	+12.1*
(1.5b)	198	--	--	33.6	39.6	--	--	+6.0*
Measurement								
(1.6g)	164	67.5	88.2	51.8	58.2	-9.3*	-30.0*	+6.4*
Problem Solving								
(1.7a)	141	58.5	63.3	48.8	64.5	+6.0*	+1.2	+15.7*
Math Relations								
(1.6g)	197	--	--	41.1	40.3	--	--	-0.8
Numeration								
(1.4a)	007	52.4	70.0	53.9	55.4	+3.0	-14.6*	+1.5
(1.5a)	077	64.7	76.4	59.0	52.1	-12.6*	-24.3*	-6.9*
Statistics								
(1.6a)	163	39.8	45.7	42.4	31.8	-8.0*	-13.9*	-10.6*

* Significant difference between proportions, $p<.001$

Note. SIMS percentages estimated for February (64% of U.S. Pre/Post interval).

An example of an item that showed lower performance in Oregon (52.1%) compared to the USA (59.0%) and Japan (76.4%) is in Numeration (ELS 1.4A), Item 077 shown below.

SIMS No. 077

The position on the scale indicated by the arrow is

A. 1.004
*B. 1.04
C. 1.08
D. 1.4
E. 1.8

Other items with large Oregon–USA differences included Item 141, a Problem Solving item showing a higher percentage correct (+15.7%) in Oregon (finding how long it takes the sound of a car horn to reach you if the car is 714 meters away and the speed of sound is 340 meters per second).

Item 045, in Estimation, was also higher (+10.0% above the USA) in Oregon (approximating the value of 0.2131 times 0.02958). Geometry Item 159 was also higher (+12.1%) in Oregon (identifying the top view of a cube that has one corner cut off). Finally, Item 163 in Probability showed lower performance (–10.6%) in Oregon (finding the probability of drawing a red button from a jar containing one red and five black buttons).

Comparison to Japan

Japan averaged 14.3% higher than Oregon on the 11 items in Table 1 given in all locations. Of these 11 items, nine were significantly lower for Oregon and only two were slightly higher than Japan. Oregon compared more favorably to Japan in Estimation and Problem Solving. Results for Oregon students in Computation, Measurement, Numeration and Statistics were particularly low compared to Japan. In Geometry, Oregon students were significantly lower than Japan, but higher than the U.S. results.

The critique of 8th-grade mathematics curricula in the United States by Travers, et al. (1986) was that "arithmetic appears to dominate . . . In many countries, students at this level have moved on to more ambitious treatment of algebra and geometry . . . probability and statistics." This appears to be less characteristic of Oregon, where Geometry, at least, appears to be more emphasized.

CURRICULUM AND INSTRUCTION CONCERNS

- In preparation for the 1991 assessment, continued and expanded dissemination of information on Essential Learning Skills within Oregon districts is recommended.

- Sharing instructional strategies and materials for ELS's in Problem Solving, Numeration, and Statistics/Probability may be particularly important. Sharing among teachers and between schools and districts should be encouraged.

- Curriculum self-studies and dialogue among Oregon educators are recommended on the question of the relative weighting of instructional time on Computation versus the other reporting categories. Research in other states has indicated that teachers often continue to emphasize computation (the Second International study also highlighted this concern) at a time when the computer age emphasizes problem solving and mathematical thinking.

- Inservice workshops and other staff development activities should focus on ways to adjust curriculum and instruction toward problem solving, mathematical relationships (graphs, tables, two-variable formulas) and estimation to respond to future demands of the information age.

- If Oregon students are to be prepared for the competitive nature of the pacific-rim economy, new ways need to be explored for reducing the "gap" between Oregon and Japanese performance in areas such as Measurement, Geometry and Statistics at the 8th grade level.

READING TEST RESULTS AND INTERPRETATION

- Summary
- Reading Skill Areas Tested
- Comparison to Previous Years
- Interpretation of the Achievement/Curriculum Scale
- Scores by Reading Skill Area
- Instructional Emphasis on Reading Skills
- Success of the Complete-Passage Method
- Curriculum and Instruction Recommendations
- APPENDIX: Sample Complete Passage

SUMMARY

Reading Test Results

- Oregon eighth grade students had median Reading scores that matched the 1987 median.

- Significant gains were made from 1987 to 1989 in three areas—Literal Understanding (ELS 2.1), Locating Information (using dictionaries, tables of content) and Implied Understanding (ELS 3.1).

- An important curricular trend was shown in the increased instructional time by teachers in the area of Evaluative Understanding (ELS 6.1, 6.2 and 6.4). This goal area requires students to think analytically and use criteria for judging the quality of what they read. However, the new emphasis reported by teachers did not result in improved test performance in 1989. The median Evaluative Understanding score moved from 227 in 1987 to 222 in 1989 and the proportion of students scoring over 235 decreased from 37.8% to 17.2%. Perhaps the new instructional emphasis is not specifically targeted on the ELS goals in this area.

- The skill area of Mass Media (Accuracy of Information) showed a decrease from 1987 levels and little change was found in instructional emphasis on Mass Media by 8th grade teachers.

- Use of a "complete story" passage in the 1989 test was effective. This innovative mode allows educators to assess student comprehension and reading strategies on a test that is more similar to "real life" than traditional "short passage" or sentence-reading methods of testing.

READING SKILL AREAS TESTED

The following descriptions outline the content and Essential Learning Skills assessed on the eighth grade reading tests. Each of four test forms had a mixture of items in each skill area, and the forms were equated and comparable in difficulty. This list provides a blueprint of the reporting categories to be used in the 1991 statewide assessment.

- **Word Meanings:** Use context clues, dictionaries, and glossaries to find word meanings. (Essential Learning Skill 1.2.)

- **Literal Understanding:** Recall details of a passage, and distinguish facts and opinions. (Essential Learning Skill 2.1.) In 1987 this included "main ideas."

- **Locating Information:** Use different parts of a book (e.g., table of contents, index, illustrations, etc.) to locate information. (Essential Learning Skill 2.2.)

- **Implied Understanding:** Draw logical conclusions, recognize cause and effect, make inferences, and predict probable future actions. (Essential Learning Skill 3.1.)

- **Mass Media:** Separate relevant and irrelevant information. Identify propaganda techniques, biases and stereotypes, and evaluate mass media influences. (Essential Learning Skills 4.1 and 4.4.) In 1987, this emphasized "accuracy of information."

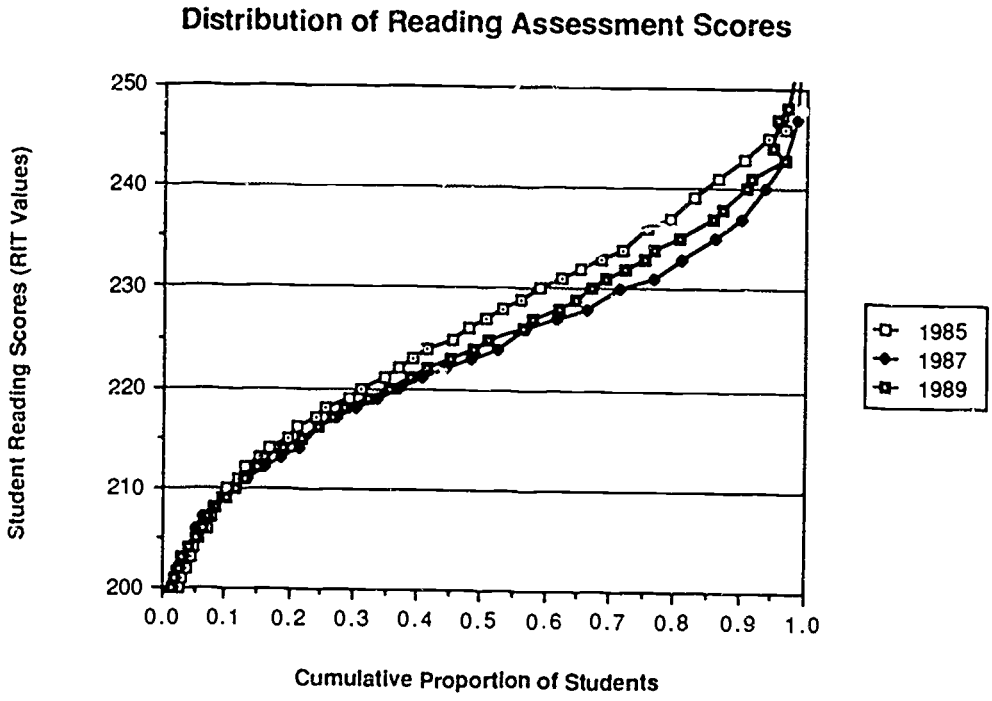
- **Evaluative Understanding:** Understand metaphors, evaluate information related to hypotheses, and identify criteria for making evaluations. (Essential Learning Skills 6.1, 6.2 and 6.4.) In 1987, the emphasis was on 6.4 only.

COMPARISON TO PREVIOUS YEARS

Total Reading Scores

The distribution of total reading scores for the 1985, 1987 and 1989 eighth grade assessments is shown in Figure 5.

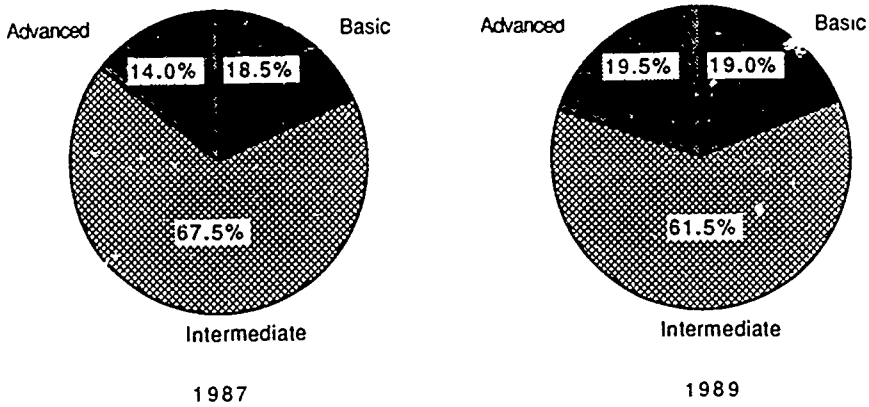
Figure 5



The 1985 results are uniformly higher, because the testing occurred in April as compared to February in 1987 and 1989. The expected difference of two scale points between February and April is present. Also, the 1987 and 1989 tests included more ELS-based items. The 1985 test included an entire block of literal comprehension questions (from the Degrees of Reading Power tests).

The median total scores for 1987 and 1989 were both 225. However, the percentage of students with lower scores (below 215, Basic level) was slightly greater in 1989, and the percentage of students with higher scores (above 235, Advanced level) was significantly greater. This suggests a slight growth in the "gap" between less-able and more-able readers. The two pie charts below show the change in proportions of students from 1987 to 1989.

Proportions of Students
at Three Reading Skill Levels



The total reading score can be converted to a nationally-recognized scale from the Degrees of Reading Power (DRP) tests The DRP, formerly distributed by the College Board, assesses literal comprehension of passages (using the "fill-in-the-word" or "cloze" procedure) and predicts the readability of commonly used textbooks, newspapers and other reading material Students obtain DRP scores and text books also receive DRP ratings on the same numerical scale. The 1989 median is approximately equal to a DRP value of 65.5. This value is substantially above the level of the Oregon Driver's manual (DRP 58), a booklet often read in the 8th or 9th grades. The value is above adult sports magazines (DRP 62) and just below the calculated average for Oregon newspaper front-page stories and editorials (DRP 66 to 69). This means that the majority of Oregon 8th graders have good comprehension of age-appropriate and recreational reading but would be slightly challenged by newspaper front-page stories and editorials. About 7% of Oregon 8th-grade students are at or below the level of children's fiction (DRP 48). There are also about 15% of 8th graders who are reading at or above the level of advanced professional journals (DRP 77).

Repeated Items

A total of 28 items (approximately seven items per form) were repeated exactly from the 1987 test. The results were a mixture of gains and losses, with few interpretable trends.

One area that showed a clear increase on all five of the repeated items in its category was Literal Understanding. These items increased an average of 7.1% correct answers.

The category of items that showed the largest gains was "fact versus opinion" (ELS 2.1a). The item below, which showed a gain of 8.9%, is an example of this trend.

> New reports on T.V. should always show both sides of a story. I think that we often don't get a fair view of events. The best way to give the news is to go into detail on each story.
>
> Which statement is true about the paragraph?
>
> 1. There are no opinions expressed.
> 74.0% *2. The whole paragraph is opinions.
> 3. Only one sentence expresses an opinion.
> 4. Two of the three sentences express opinions.
>
> (65.1% in 1987)

INTERPRETATION OF THE ACHIEVEMENT/CURRICULUM SCALE IN READING

An achievement scale similar to the one used in Mathematics has also been used in Reading since 1985. The scale allows comparisons among skill areas and across time. The scale was originally centered at the 5th grade average (200) in the 1970's. Figure 6 shows a current interpretation of the levels of the scale. Readers may wish to refer back to this scale while reading subsequent sections of the report.

Figure 6

READING SCALE

```
240 -|-
     |
     | Professional Journals*
     | First-year College Textbooks
230 -|-
     | Average Oregon Newspaper Front Page
     | 1989 OREGON 8th GRADE MEDIAN
     | Sports Magazines
220 -|- Oregon Drivers Manual
     | Spring 8th Grade National Median (1980)**
     |
210 -|-
     | Children's Fiction Magazines
     | Spring 5th Grade National Median (1980)
200 -|-
     |
     | Spring 3rd Grade National Median (1980)
190 -|-
```

*For each type of reading material, the scale value is the average readability (instructional) level from the Degrees of Reading Power, a test of literal comprehension using the cloze procedure that predicts the readability of text books and other material.

**Grade levels are national medians from an equating study by Holmes (1980).

CURRICULAR LEVELS OF THE READING SCALE

The reading scale can also be divided into three levels representing increasingly more difficult reading tasks. This system is similar to the reporting method used in the National Assessment of Educational Progress (NAEP). Curricular elements derived from test items measuring the Essential Learning Skills (ELS) are listed for each level in each goal area (see Figure 7). The elements at each level are those that students who score in that range (e.g., 215–235 for Level 2) have typically mastered. Mastery is defined as an 80% chance of passing the item, on the average. For example, a student who scores around 225 will typically pass items dealing with grade-level suffixes (in Word Meaning).

The proportion of Oregon students at each level, in 1989 and subsequent years, should provide useful information for curriculum planning. Effects on students at the low, average, and high levels of the curriculum for grade 8 can be traced over time.

Figure 7

	Level 1 (Under 215)	Level 2 (215–235)	Level 3 (Over 235)
Word Meaning	Recognizes the meaning of words in context (6th to 7th grade vocabulary). Recognizes the meaning of a word with a common prefix (re-stated).	Recognizes the meaning of words in context (8th to 10th grade vocabulary). Identifies meaning of grade-level suffixes (rash-ness).	Recognizes the meaning of words in context (11th to 12th grade vocabulary). Identifies the meaning of words with uncommon suffixes (assur-ance).
Literal Understanding	Identifies clear, brief statements of opinion. Arranges 3 events from a brief fiction passage in order of time. Recalls main factual theme of a story.	Identifies correct outline of a science passage. Arranges 4 events from a literary passage or 3 elements of a poem in order. Identifies time order of one event in a sequence embedded in a fiction passage.	Identifies statements that are not facts or not included in a technical passage. Arranges sequence of facts from a technical (science, social studies) passage.
Locating Information	Identifies the page location of a topic in a simple Table of Contents or Index. Identifies the correct verbal statement of an important fact shown in a line graph.	Recognizes a statement that cannot be supported by a line graph or pie chart. Identifies a major conclusion implied in a line graph of two variables.	Identifies diacritical markings for pronouncing words. Summarizes the underlying theme in a section from a Table of Contents. Identifies the rate of change shown in a graph and its description.

	Level 1 (Under 215)	Level 2 (215-235)	Level 3 (Over 235)
Implied Understanding	Identifies implied facts or background information in a short poem. Identifies an obvious conclusion (unstated) from a passage.	Identifies the mood expressed in a short poem or passage. Recognizes simple cause-and-effect or predictions of future actions from a factual, nonfiction passage.	Recognizes metaphors in fiction passages or poetry. Identifies questions that would lead a reader to deeper meanings of a poem. Recognizes descriptions of authors purpose in an advanced expository passage.
Mass Media	Identifies obvious bias or common stereotyping present in a short passage. Identifies examples of influence of media on teenage retail purchases.	Discriminates among brief statements that are more or less believable. Verifies whether a statement accurately reflects the information in a bar chart or graph.	Identifies the information that would not be useful in finding answers to an investigative research inquiry. Identifies examples of subtle bias, uncommon stereotyping, subtle propaganda and adult-oriented influences of media on society.
Evaluative Understanding	Identifies well-known criteria for evaluating media performances (TV, recorded music). Identifies clear statements of evidence in passage that can be proven true or false.	Identifies statements of conclusions that are based on opinions rather than evidence in a passage. Identifies similarities between points of view of two characters in a story.	Identifies statements of societal criteria for evaluating artistic performances or works of art. Recognizes when stated conclusions are based on evidence presented in a detailed table, graph or diagram.

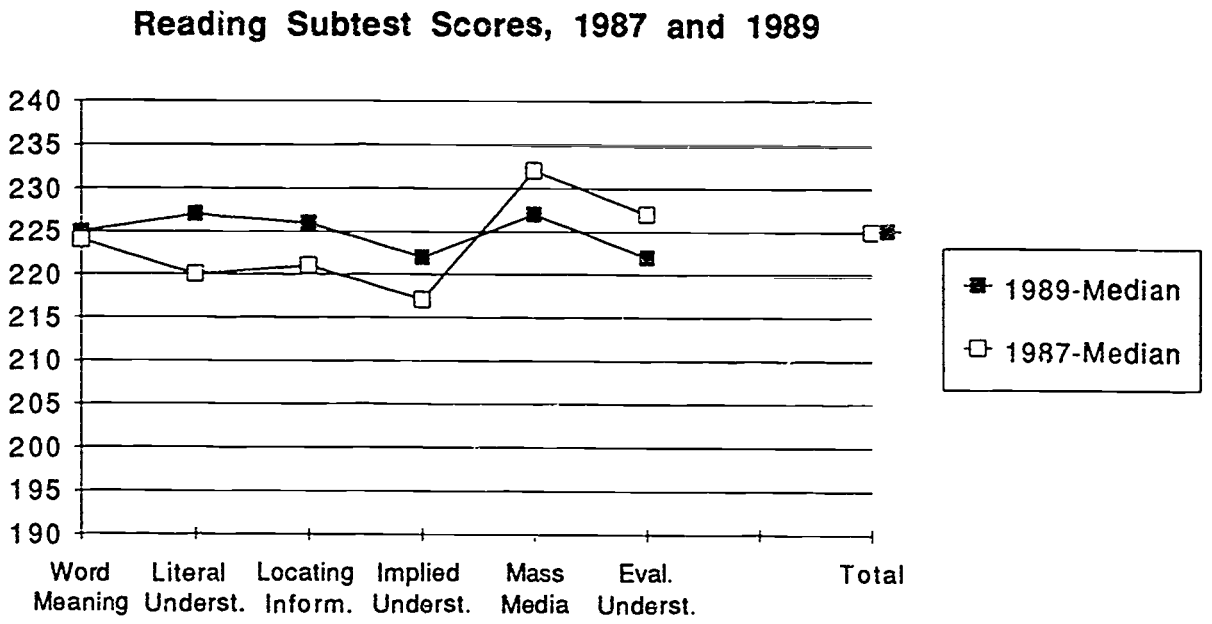
SCORES BY READING SKILL AREA

In 1989, the six skill areas assessed were very similar to the six areas assessed in 1987, although Literal Understanding was called "Main Ideas, Facts & Opinions" in 1987 and Mass Media was called "Accuracy of Information." More items specifically aimed at mass-media influences (ELS 4.4a and 4.4b) were added in 1989.

Figure 8 shows the median scores in each skill area and total scores for 1987 and 1989. This profile represents the "middle student" in each of the areas. The most significant changes are in Literal and Implied Understanding. The movement toward curricular emphasis on "higher level" thinking and interpretive reading may be reflected in the gain for Implied Understanding (ELS 3.1) and for the "fact versus opinion" items on the test (ELS 2.1a).

The 1989 profile of scores also indicates more balance of curricular/instructional coverage since all the skill areas are more similar in level. The next section, Instructional Emphasis, seems to indicate some of this shift as well.

Figure 8



It is somewhat surprising that Evaluative Understanding showed a decline from 1987. However, the area was called "Reasoned Evaluations" in the 1987 test because it concentrated on ELS 6.4. The 1989 tests sampled more types of items including those in classifying ideas (ELS 6.1a), evaluating metaphors (ELS 6.1b), interpreting differences between two explanations (ELS 6.2a) and identifying hypotheses (ELS 6.2b). Also, further investigation of the scores showed that the percentage of students at the higher levels (above scores of 235) decreased from 37.8% in 1987 to 17.2% in 1989. The percentage of students at the lower level (below 215) also increased from 22.8% to 25.7%. This means that the more complex Evaluative Understanding category in 1989 revealed a greater proportion of average-level readers at 8th grade than was seen in 1987.

The Mass Media category also had new types of items in 1989. Items on stereotyping and bias (ELS 4.1c) were greatly expanded in 1989 and additional items evaluating mass media influences on society (4.4a) were included. An example of an item on which performance was below average is shown below.

> On March 25, 1911, a fire broke out in the Triangle Shirtwaist Company in which 146 women workers were killed. There were no sprinkler systems, only one fire escape, and factory doors were kept locked. A jury acquitted the owners because as one of the jurors said, "I think the girls who work in factories are not as intelligent as those in other walks of life and were therefore the more susceptible to panic." What bias does this person demonstrate?

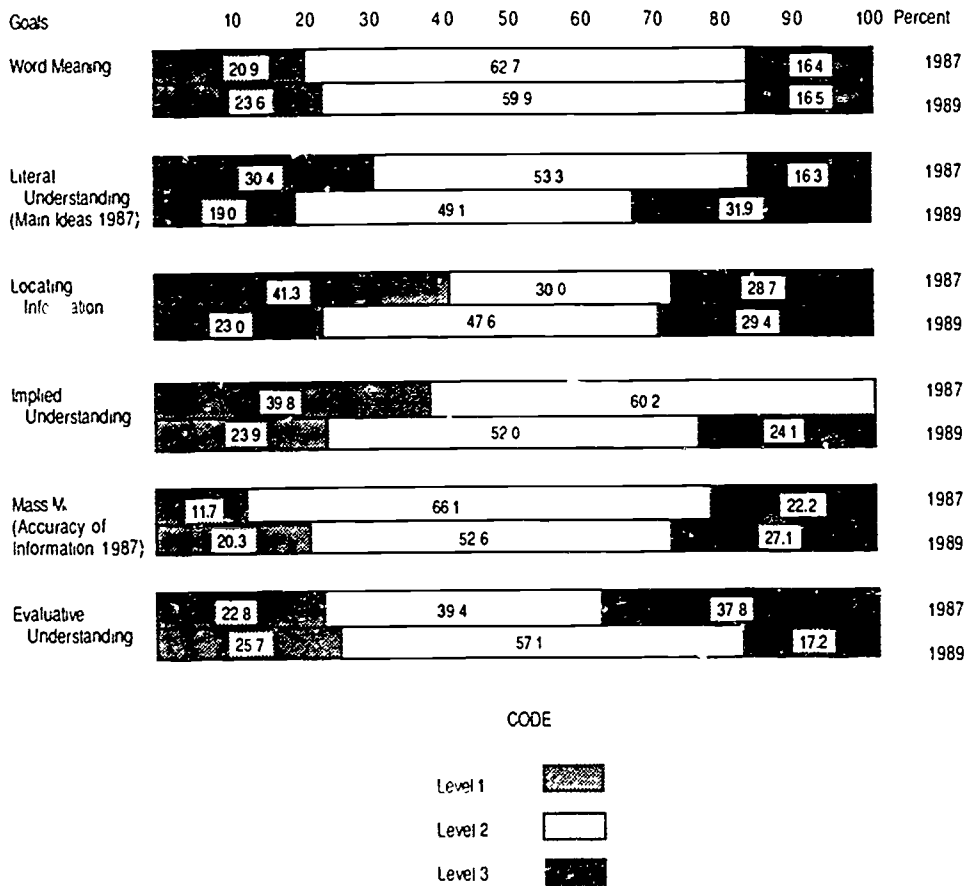
1. Factory owners are not responsible for maintaining a safe place to work.
49.6% *2. Female factory workers are not capable of thinking for themselves.
3. Workers are responsible for their own working conditions.
4. No one is responsible for accidents.

Mass Media
ELS 4.1c

Proportions of students at each curricular level of each skill area in reading are shown in Figure 9.

Figure 9

PROPORTION OF STUDENTS
AT THREE ACHIEVEMENT LEVELS



Results for 1989 can be compared to 1987 in each area in Figure 7. The size of the "bands" for Level 1 (low) and Level 3 (high) are particularly meaningful. Substantial decreases in the proportion of Level 1 students were found in Literal Understanding, Locating Information and Implied Understanding. These three areas, and Mass Media, also show increases in the proportion of Level 3 students, with Implied Understanding having a major increase (from 0% in 1987 to 24.1% in 1989). Evaluative Understanding showed a drop from 1989 at Level 3, again due, perhaps, to the increased complexity of items in this area. However, it should be noted that a large number of students in 1987 were in the range of 236–237 (22.6%). When students above 237 were compared in Evaluative Understanding, the results were more similar across the two years (15.2% in 1987 to 12.7% in 1989).

INSTRUCTIONAL EMPHASIS ON READING SKILLS 1987 to 1989

A questionnaire, similar to the one used in 1987, was completed by a sampling of eighth grade teachers who administered the reading tests. The questionnaire asked them to indicate the amount of instruction their students received on each of the curriculum areas of the test.

Each question looked like the following:

Goal	Reviewed	Briefly Introduced	Developed or Expanded	No Instruction
1. Word Meaning	_____	_____	_____	_____
2. Literal Understanding	_____	_____	_____	_____

The percentages of teachers who indicated "Developed/Expanded" instruction (beyond a review or introductory level) or "No Instruction" were particularly noteworthy. The results for both 1987 and 1989 are shown below.

Percent of Teachers
Providing "Expanded" or No Instruction

	Expanded		No Instruction	
Skill Area	1987	1989	1987	1989
Word Meaning	51%	55%	14%	3%
Literal Understanding	53%	58%	15%	5%
Locating Information	39%	37%	16%	12%
Implied Understanding	45%	47%	16%	8%
Mass Media/Accuracy	17%	17%	27%	34%
Evaluative Understanding	10%	35%	42%	11%

The largest increase in instructional emphasis is on Evaluative understanding for which 35% of teachers now report expanded coverage (up from 10% in 1987). Also, the "No instruction" categories showed significant declines, meaning that more elements have entered the classroom since 1987.

Except for decreases in the percentages of "no instruction," the first four areas—word meaning, literal understanding, locating information, and implied understanding—had nearly the same coverage in 1987 and 1989. The two highest areas continue to be basic instruction in word meanings and literal understandings.

The dramatic increase in coverage of Evaluative Understanding and the smaller increase in Implied Understanding are very positive trends that should help students prepare for the "information age." As was shown in the previous section on Reading Skill areas, the instructional emphasis on evaluative reading may have been targeted more to the average readers (a larger group in 1989). Alternatively, the effects of instruction may be delayed or targeted at facets of Evaluative Understanding that are different from the categories of the Essential Learning Skills. Also, new emphasis may have resulted, indirectly, in the gains for Implied Understanding.

SUCCESS OF THE COMPLETE-PASSAGE METHOD

An innovation in Reading assessment was included in one of the 1989 test forms — a complete short-story. The Flying Machine by Roy Bradbury was included in three pages of the test booklet. A pre-reading section with a concept mapping of the story was given first so that "passage familiarity" and background information on ancient China could be controlled. The story and questions are included in the Appendix, which can be used as a model for classroom or district testing. A total of 21 questions were included covering the skill areas (except Locating Information and Mass Media), and they also provide models of ELS-related questions.

Several sources of evidence show that this method of testing was successful:

- About 90% of the students correctly identified the background information taught in the pre-reading section, indicating that the passage was equitable to students in terms of familiarity.

- Most of the Literal and Implied questions showed approximately 80% correct answers, indicating that the longer passage was fair.

- Data across test forms indicated that, with scali the forms were comparable and did not put the students given the long passage at a sadvantage.

The only improvement that was suggested by the results was to format the Word Meaning items differently. Apparently, students could not easily find the target words in the passage (although they were underlined) to obtain "context clues" since the percent-correct results were on the low side (35% to 58%). Better markings for each word (e.g., with a graphic symbol) or repetition of the target sentence may be required.

The pre-reading section also provides a model for classroom instruction and assessment. A concept-map method is used to assure that students are familiar with Ancient China and its Emperors, before reading the story. Other methods or diagrams useful in pre-reading would include advanced organizers, clusters, semantic webs, flow charts or "sunbursts." Each of these helps the student to plan reading strategies and to actively search for key elements in the passage.

The method is strongly recommended for classroom assessment because it is closer to "real life" reading of complete books and articles. If specific words are tested, a repeating of the context sentence is recommended.

CURRICULUM AND INSTRUCTION CONCERNS

- The trend toward increased emphasis on implied and evaluative understanding in reading should continue as a curricular priority in Oregon.

- Searches for innovative ways to reach the more-able reader should be continued, given the trend toward a higher percentage of students in this category.

- Studies of the background characteristics of students in both the less-able and advanced groups should be encouraged so that targeted interventions or enhancements can be appropriately designed for these expanding groups.

- English language arts teachers should examine the category of Evaluative Understanding and its ELS components, to see if new instructional emphasis includes these goals.

- The skill areas in Mass Media continue to be challenging, and will require coordination between teachers from the variety of 8th grade courses in which these skills are taught.

- The innovative use of "complete passages," whether they are short stories or non-fiction pieces, should be encouraged. Classroom assessment other testing programs could include more emphasis on this method.

- In preparation for the 1991 Statewide Assessment, in which Reading and Literature will be integrated within the same tests, schools should experiment with "complete passages" designed to measure both types of goals (see the Language Arts Common Curriculum Goals). This would include "appreciation of literature" as well as cognitive skills.

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APPENDIX

Form 4

PART 1

You are about to read a story about something that happened in China in 400 A.D. Before you read the story, look at the list below. This list was created as a map of the background of the story. It will help you think about what might be in a story of ancient China. Study the list and then answer the questions (1 to 3) that follow.

LIFE IN CHINA IN 400 A.D.

PEOPLE

- Farmers
- War-like
- Suspicious of foreigners
- Family extremely important
- Loyal to Emperor
- Appreciated beauty
- Saving face
- Lots of ritual
- Protective of their country

RULERS

- Absolute power
- Educated
- Total control
- Revered by people
- Aristocracy
- Maker of rules and laws
- Power of life and death
- Benevolent

CULTURE/BELIEFS

- Live in harmony with nature
- Charity, kindness, hard work courtesy
- Respect for elders (Honor people over you— parents, elderly, emperors)
- China at center of world
- Strong class system
- Rich, educated people had time to learn and invent
- Only rich educated
- Built The Great Wall to protect from invaders

(Go on to the Next Page)

Form 4

Answer the following questions, using the list on the previous page ("Life in China in 400 A.D.").

1. Which of the following was true of ancient China?

1. Groups of people rode in airplanes.
2. There were never any wars.
89.7% *3. Rulers were very respected.
4. They welcomed all visitors.

Implied
ELS 3.1

2. Look at the list under the heading "Rulers." Which of the following could you add to the list?

68.9% *1. Could have a person killed if they were guilty of a crime.
2. Laws could be changed by a legislature.
3. Elected by votes from the people.
4. Could be forced by a supreme court to stop ruling.

Implied
ELS 3.1

3. Suppose you lived in 400 A.D. China and you invented a moving ramp that would allow you to climb over the Great Wall of China. What might the rulers say about your new invention?

1. "Great! That will help our country."
87.6% *2. "Bad! That could be used by foreign invaders."
3. "Good! Our people need ways to cross the border."
4. "That will help us to stay in harmony with nature."

Implied
ELS 3.1

(Go on to the Next Page)

PART 2

Now, read the story and answer the questions that follow.

THE FLYING MACHINE

by Ray Bradbury

In the year A.D. 400, the Emperor Yuan held his throne by the Great Wall of China, and the land was green with rain, readying itself toward the harvest, at peace, the people in his dominion neither too happy nor too sad.

Early on the morning of the first day of the first week of the second month of the new year, the Emperor Yuan was sipping tea and fanning himself against a warm breeze when a servant ran across the scarlet and blue garden tiles, calling, "Oh, Emperor, a miracle!"

"Yes " said the Emperor, "the air is sweet this morning."

"No, no, a miracle!" said the servant, bowing quickly.

"And this tea is good in my mouth, surely that is a miracle."

"No, no, Your Excellency."

"Let me guess then--the sun has risen and a new day is upon us. Or the sea is blue. That now is the finest of all miracles."

"Excellency, a man is flying!"

"What?" The Emperor stopped his fan.

"I saw him in the air, a man flying with wings. I heard a voice call out of the sky, and when I looked up, there he was, a dragon in the heavens with a man in its mouth, a dragon of paper and bamboo, colored like the sun and the grass."

"It is early," said the Emperor, "and you have just wakened from a dream."

"It is early, but I have seen what I have seen! Come, and you will see it too."

"Sit down with me here," said the Emperor. "Drink some tea. It must be a strange thing, if it is true, to see a man fly. You must have time to think of it, even as I must have time to prepare myself for the sight."

They drank tea.

"Please," said the servant at last, "or he will be gone."

The Emperor rose thoughtfully. "Now you may show me what you have seen."

They walked into a garden, across a meadow of grass, over a small bridge, through a grove of trees, and up a tiny hill.

"There!" said the servant.

The Emperor looked into the sky.

And in the sky, laughing so high that you could hardly hear him laugh, was a man; and the man was clothed in bright papers and reeds to make wings and a beautiful yellow tail, and he was soaring all about like the largest bird in a universe of birds, like a new dragon in a land of ancient dragons.

The man called down to them from high in the cool winds of morning, "I fly, I fly!"

The servant waved to him. "Yes, yes!"

The Emperor Yuan did not move. Instead he looked at the Great Wall of China now taking shape out of the farthest mist in the green hills, that splendid snake of stones which writhed with majesty across the entire land.

(Go on to the Next Page)

That wonderful wall which had protected them for a timeless time from enemy hordes and preserved peace for years without number. He saw the town, nestled to itself by a river and a road and a hill, beginning to waken.

"Tell me," he said to his servant, "has anyone else seen this flying man?"

"I am the only one, Excellency," said the servant, smiling at the sky, waving.

The Emperor watched the heavens another minute and then said, "Call him down to me."

"Ho, come down, come down! The Emperor wishes to see you!" called the servant, hands cupped to his shouting mouth.

The Emperor glanced in all directions while the flying man soared down the morning wind. He saw a farmer, early in his fields, watching the sky, and he noted where the farmer stood.

The flying man alit with a rustle of paper and a creak of bamboo reeds. He came proudly to the Emperor, clumsy in his rig, at last bowing before the old man.

"What have you done?" demanded the Emperor.

"I have just told you!" cried the flier.

"You have told me nothing at all." The Emperor reached out a thin hand to touch the pretty paper and the birdlike keel of the apparatus. It smelled cool, of the wind.

"Is it not beautiful, Excellency?"

"Yes, too beautiful."

"It is the only one in the world!" smiled the man. "And I am the inventor."

"The only one in the world?"

"I swear it!"

"Who else knows of this?"

"No one, not even my wife, who would think me mad with the sun. She thought I was making a kite. I rose in the night and walked to the cliffs far away. And when the morning breezes blew and the sun rose, I gathered my courage, Excellency, and leaped from the cliff. I flew. But my wife does not know of it."

"Well for her, then," said the Emperor. "Come along."

They walked back to the great house. The sun was full in the sky now, and the smell of the grass was refreshing. The Emperor, the servant, and the flier paused within the huge garden.

The Emperor clapped his hands. "Ho, guards!"

The guards came running.

"Hold this man."

The guards seized the flier.

"Call the executioner," said the Emperor.

"What's this!" cried the flier, bewildered. "What have I done?" He began to weep, so that the beautiful paper apparatus rustled.

"Here is the man who has made a certain machine," said the Emperor, "and yet asks us what he has created. He does not know himself. It is only necessary that he create, without knowing why he has done so, or what this thing will do."

The executioner came running with a sharp silver ax. He stood with his naked, large-muscled arms ready, his face covered with a serene white mask.

"One moment," said the Emperor. He turned to a nearby table upon which sat a machine that he himself had created. The Emperor took a tiny golden key from his own neck.

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He fitted this key to the tiny, delicate machine and wound it up. Then he set the machine going.

The machine was a garden of metal and jewels. Set in motion, birds sang in tiny metal trees, wolves walked through miniature forests, and tiny people ran in and out of sun and shadow, fanning themselves with miniature fans, listening to the tiny emerald birds, and standing by impossibly small but tinkling fountains.

"Is it not beautiful?" said the Emperor. "If you asked me what I have done here, I could answer you well. I have made birds sing, I have made forests murmur, I have set people to wailing in this woodland, enjoying the leaves and shadows and songs. That is what I have done."

"But, oh, Emperor!" pleaded the flier, on his knees, the tears pouring down his face. "I have done a similar thing! I have found beauty. I have flown on the morning wind. I have looked down on all the sleeping houses and gardens. I have smelled the sea and even seen it, beyond the hills, from my high place. And I have soared like a bird; oh, I cannot say how beautiful it is up there, in the sky, with the wind about me, the wind blowing me here like a feather, there like a fan, the way the sky smells in the morning! And how free one feels! That is beautiful, Emperor, that is beautiful, too!"

"Yes," said the Emperor sadly, "I know it must be true. For I felt my heart move with you in the air and I wondered: What is it like? How does it feel? How do the distant pools look from so high? And how my houses and servants? Like ants? And how the distant towns not yet awake?"

"Then spare me!"

"But there are times," said the Emperor, more sadly still, "when one must lose a little beauty if one is to keep what little beauty one already has. I do not fear you, yourself, but I fear another man."

"What man?"

"Some other man who, seeing you, will build a thing of bright papers and bamboo like this. But the other man will have an evil face and an evil heart, and the beauty will be gone. It is this man I fear."

"Why? Why?"

"Who is to say that someday just such a man, in just such an apparatus of paper and reed, might not fly in the sky and drop huge stones upon the Great Wall of China?" said the Emperor.

No one moved or said a word.

"Off with his head," said the Emperor.

The executioner whirled his silver ax.

"Burn the kite and the inventor's body and bury their ashes together," said the Emperor.

The servants retreated to obey.

The Emperor turned to his handservant, who had seen the man flying. "Hold your tongue. It was all a dream, a most sorrowful and beautiful dream. And that farmer in the distant field who saw, tell him it would pay him to consider it only a vision. If ever the word passes around, you and the farmer die within the hour."

"You are merciful, Emperor."

"No, not merciful," said the old man. Beyond the garden wall he saw the guards burning the beautiful machine of paper and reeds that smelled of the morning wind. He saw the dark smoke climb into the sky. "No, only very much bewildered and afraid." He saw the guards digging a tiny pit wherein to bury the ashes. "What is the life of one man against those of a million others? I must take solace from that thought."

He took the key from its chain about his neck and once more wound up the beautiful miniature garden. He stood looking out across the

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land at the Great Wall, the peaceful town, the green fields, the rivers and streams. He sighed. The tiny garden whirred its hidden and delicate machinery and set itself in motion; tiny people walked in forests, tiny foxes loped through sun-speckled glades in beautiful shining pelts, and among the tiny trees flew little bits of high song and bright blue and yellow color flying, flying, flying in that small sky.

"Oh," said the Emperor, closing his eyes, "look at the birds, look at the birds!"

Refer to the story to answer questions 4--24.

4. In this story, apparatus means

1. a set of flapping wings.
2. a newly created dragon.
3. a large man-made bird.

53.8% *4. a piece of equipment.

Word Meanings
ELS 1.2a

5. In this story, hordes means

1. insects flying around in a circle.
2. large groups of wild animals.
3. dangerous spies.

57.6% *4. very large group of people.

Word Meanings
ELS 1.2a

6. In this story, dominion means

1. a land of green grass.
2. emperor's castle.

56.3% *3. territory or land.

4. people who live in China.

Word Meanings
ELS 1.2a

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7. In this story, solace means

1. grief.
35.7% *2. comfort.
3. pity.
4. revenge.

Word Meanings
ELS 1.2a

8. What was called "that splendid snake of stones" in the story?

1. the emperor's invention
2. the servant's whip
3. the flying apparatus
84.9% *4. the Great Wall of China

Literal
ELS 2.1d

9. Which of the following best explains what happened in the story?

1. The Emperor felt man was not meant to fly and so he ordered the man killed.
2. A cruel Emperor has an inventor beheaded so he can enjoy the birds.
77.9% *3. An inventor is executed by an Emperor who worried about the future security of the wall.
4. A man is executed because a jealous Emperor doesn't like his invention.

Literal
ELS 2.1d

10. Which of the following happens immediately after the Emperor sees the flying man?

1. He shows the flying man his own invention.
73.9% *2. He checks to see who else has seen the invention.
3. He orders the executioner to behead the man.
4. He asks the man to explain his invention.

Literal
ELS 2.1c

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11. Which is the correct sequence of events in the story?

1. The Emperor talks to the flying man, burns the flying apparatus, and has the man beheaded.
66.3% *2. After being told to look in the sky, the Emperor sees a man flying, talks to him and has him executed.
3. A servant tells the Emperor of the flying machine, the Emperor destroys the machine and then has the man beheaded.
4. The Emperor shows the flying man his invention, calls for the executioner and has the man beheaded.

Literal
ELS 2.1c

12. You can conclude from the story that the Emperor

81.0% *1. felt the flying man's invention could be used for evil purposes.
2. was jealous of any other man's invention.
3. executed people for no apparent reason.
4. did not like any apparatus made of bamboo.

Implied
ELS 3.1b

13. What can you conclude from the story about the rulers of China in 400 A.D.?

81.8% *1. They had control over life and death.
2. They loved only beautiful, miniature machines.
3. They had courts and juries to make decisions.
4. They felt safe and secure from their enemies.

Implied
ELS 3.1f

14. When the Emperor asks the flier, "What have you done?" he really means

82.8% *1. "Do you realize the danger this could bring?"
2. "What can you see from the sky?"
3. "How did you go about building the machine?"
4. "What did you use to make this beautiful apparatus?"

Implied
ELS 3.1f

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15. To the Emperor, the Great Wall of China represents

85.0% *1. security.
2. beauty.
3. danger.
4. happiness.

Implied
ELS 3.1

16. Which best characterizes the Emperor?

1. kind and curious
78.7% *2. wise but cautious
3. cruel and uncaring
4. stupid but friendly

Implied
ELS 3.1f

17. Why was the life of the inventor's wife saved?

1. The Emperor didn't know where to find her.
2. She thought her husband was "mad".
81.3% *3. She did not know that he built a flying machine.
4. She was not present at the time the inventor landed in the field.

Implied
ELS 3.1f

18. Which of the following quotations best illustrates the main message of the story?

1. "Oh, Emperor, Emperor, a miracle!"
69.9% *2. "But there are times when one must lose a little beauty if one is to keep what little beauty one already has."
3. "Here is the man who has made a certain machine and yet asks us what he has created."
4. "I have made the birds sing, I have made the forests murmur."

Implied
ELS 3.1c

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Form 4

19. Why did the author say that the Great Wall of China "writhed with majesty across the entire land?"

1. It was broken in several places.
2. It covered the entire landscape.
64.6% *3. It twisted over the land like a snake.
4. He was describing a type of large snake found all over China.

Implied
ELS 3.1f

20. How is the point-of-view of the Emperor and the inventor the same?

71.6% *1. Both search for beauty.
2. Both are afraid of change.
3. Both want to visit distant lands.
4. Both like power and control of other people.

Evaluative
ELS 6.2b

21. According to the Emperor, what is the difference between his invention and the man's flying apparatus?

1. The man's was dangerous; the Emperor's more creative.
65.5% *2. The man's was threatening; the Emperor's close to nature.
3. The man's was ugly; the Emperor's beautiful.
4. The man's was bamboo; the Emperor's paper.

Evaluative
ELS 6.2

Form 4

22. Based on the story how do you think the Emperor will react the next time he sees a new invention.

1. Accept it if it is a piece of art.
2. Ask the inventor to make him one.
73.0% *3. Question it's use and function.
4. Immediately have the man beheaded.

Implied
ELS 3.1e

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23. Which of the Emperor's statements is a fact?

1. "The air is sweet this morning."
2. "It is only necessary that he create, without knowing why . . ."
70.3% *3. "The sun has risen and a new day is upon us."
4. "It was all a dream, a most sorrowful and beautiful dream."

Literal
ELS 3.1a

24. What is the best way to describe the Emperor's statement, "I do not fear you, yourself, but I fear another man. The other man will have an evil face and an evil heart."

1. a fact or finding
2. a persuasion technique
68.4% *3. a conclusion or prediction
4. an impossible idea

Evaluative
ELS 6.4

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