DOCUMENT RESUME

ED 417 213 TM 028 154

TITLE	Missouri Assessment Program Summary Report.
INSTITUTION	Missouri State Dept. of Elementary and Secondary Education, Jefferson City.
PUB DATE	1997-00-00
NOTE	41p.
PUB TYPE	Numerical/Quantitative Data (110) -- Reports - Evaluative (142)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	*Academic Achievement; Achievement Tests; Educational Assessment; Elementary Secondary Education; *Performance Based Assessment; *Standards; *State Programs; *Test Results; *Testing Programs
IDENTIFIERS	*Missouri

ABSTRACT

Missouri is in the middle of the process of developing a performance-based assessment system, the Missouri Assessment Program, which is being developed to measure student progress toward the "Show-Me Standards" adopted by the State Board of Education in 1996. To achieve these standards, students must have a strong foundation of knowledge and skills in the basic subjects and be able to apply what they know as well as what they can do. The Missouri Assessment Program will eventually cover all six subject areas addressed in the standards: mathematics, communication arts, science, social studies, health and physical education, and fine arts. State level assessments are being developed for students in grades 3, 4, 7, 8, 10, and 11 in the areas selected for each grade. Results will be available for individual students, schools, and districts, and achievement levels reporting student progress toward the state standards will also be reported. In the first administration, in 1997, 35% of the regular students in grade 4 were achieving at or above the "Proficient" range, 26% were within the "Proficient" range, and 37% were at "Nearing Proficient." The typical 4th grader scored at the 56th percentile on the norm-referenced part of the test, while the typical 8th grader scored at the 58th percentile, and the typical 10th grader scored at the 65th percentile. Achievement level descriptions are provided for each grade and subject tested. (Contains four graphs and four tables.) (SLD)

Missouri Assessment Program Summary Report

Missouri Department of Elementary and Secondary Education

Missouri Department of Elementary and Secondary Education

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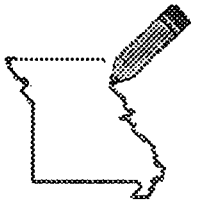
About the Missouri Assessment Program (MAP)



Missouri is in the middle stages of developing a performance-based assessment system, as called for by the Outstanding Schools Act of 1993. The assessment system, called the Missouri Assessment Program, is being designed to measure student progress toward the **Show-Me Standards**, 73 rigorous academic standards developed over a two-year period by Missouri teachers and adopted by the State Board of Education in January 1996. There are still many decisions to be made, but here's an update on the development of the Missouri Assessment Program.

"Knowledge + Performance = Academic Success"

To Achieve the Show-Me Standards, students must have a strong foundation of knowledge and skills in basic subjects and be able to apply what they know to real-world problems and new situations. Therefore, the Missouri Assessment Program must measure what students know as well as what they can do. Previous state-level assessments were designed to measure primarily what students know, not how well they can apply knowledge.

Subject Areas and Grade Levels

The Missouri Assessment Program will eventually cover all six subject areas addressed in the Show-Me Standards—math, communication arts, science, social studies, health/physical education, and fine arts. State-level assessments are being developed for students in the following grades:

Math	4, 8, 10
Communication Arts	3, 7, 11
Science	3, 7, 10
Social Studies	4, 8, 11
Health/PE	to be determined
Fine Arts	to be determined

The Test

In mathematics, the Missouri Assessment Program requires 3 hours of test administration time and includes three types of test items broken into 3 sessions—the familiar multiple-choice, a short-answer or constructed-response test, and performance events.

The **multiple-choice** component of the assessment is the survey portion of a new nationally normed test developed by CTB/McGraw-Hill. It presents students with a question followed by four or five response options, one of which is correct. The multiple-choice portion of this year's assessment was in Session 3.

The **constructed-response** items require students to supply (rather than select) an appropriate response. Students will be asked to show their work in solving a problem. In addition to measuring students' content knowledge, constructed-response items can provide information about how students arrive at their answers. The constructed-response assessments were located in Sessions 1 and 2.

The **performance events** used in Missouri's statewide assessment will require a student to work through a more complicated problem. Performance events often allow for more than one approach to get a correct answer. The advantage of this type of assessment is that it provides insight into a student's ability to apply knowledge and understanding in various situations. One performance event assessment was located in Sessions 1 and 2.

CTB/McGraw-Hill, one of the nation's leading test publishers, has been hired to assist with developing and scoring the assessment. Missouri educators and citizens are playing a major role in designing the content and format of the assessment program.

The Implementation Schedule

Here is the timeline for developing the Missouri Assessment Program:

SUBJECT	FIELD TEST	ASSESSMENT AVAILABLE	REQUIRED
Math	fall 1996	spring 1997	1998
Communication Arts	fall 1997	spring 1998	1999
Science	fall 1997	spring 1998	1999
Social Studies	fall 1998	spring 1999	2000
Health/PE	fall 1999	spring 2000	2000
Fine Arts	fall 1999	spring 2000	2000

Scoring

In June 1997, all of the performance assessments were scored by CTB/McGraw-Hill. A portion of those assessments were then re-scored by Missouri teachers to ensure that they are being scored reliably.

Achievement Levels in Mathematics

In July 1997, achievement levels were established in the area of mathematics. Levels of proficiency will be identified by one of five descriptors: **Step 1** (lowest), **Progressing**, **Nearing Proficient**, **Proficient**, or **Advanced**. **Each achievement level is inclusive of the skills identified in the preceding levels.**

Achievement levels for mathematics, at each grade, were recommended by Missouri citizens. These "judging panels" included Missouri math teachers, parents, legislators and members of the business community. The panels were committed to setting high expectations for math achievement by Missouri students. Although rigorous levels were established, panelists believe they can be achieved through hard work by teachers, students, and parents.

Throughout the process of developing the Show-Me Standards and the Missouri Assessment Program, business leaders and parents have strongly supported the need for high academic standards and for students to be able to apply their knowledge and skills. The "Proficient" category, which is the corner stone of the math achievement levels, reflects this emphasis.

Use of Results

Results from the Missouri Assessment Program will be available for individual students, for school buildings and for a district. A norm-referenced score will be reported on the multiple-choice items. This score will help districts, teachers, and parents gain an understanding for how well their students are performing in relation to other students across the nation, in the same grade level.

An achievement level measuring student progress toward Missouri's Show-Me Standards will also be reported. All three assessment instruments will contribute information for achievement levels.

While the Missouri Assessment Program is not meant to be a diagnostic assessment, the percent a student received correct on a content strand will be reported in order to assist teachers in determining areas of strength, as well as those that need some improvement. According to the Outstanding Schools Act, the State Board of Education must consider data from the new assessments as one of the performance measures under the Missouri School Improvement Program, the state's accreditation system.

Summary

The **1997 MAP Summary Report** presents data for the spring administration of the first administration of the mathematics portion of the Missouri Assessment Program. The report includes data for grades 4, 8, and 10.

The information contained in this report is based on all students (about 117,000 students) who took part in the assessment. At each grade level, Missouri students performed above the national average on the norm-referenced portion of the test. (The national average is the 50th percentile.) This indicates that Missouri students do well when they are tested on subject-area knowledge. However, when asked to apply their knowledge, they are not nearly as successful, as indicated by the low percentage of students in the proficient and advanced levels.

Grade 4

Thirty-five percent of *Regular Students in grade 4 are achieving at or above the "Proficient" range on the MAP; of those, 9% are within the Advanced range, 26% are within the Proficient range. The largest percent of all 4th graders, 37%, are achieving within the "Nearing Proficient" range. The typical 4th grader scored at the 56th percentile on the norm-referenced portion of the test.

Grade 8

Thirteen percent of *Regular Students in grade 8 are achieving at or above the "Proficient" range on the MAP; of those 1% are within the Advanced range, 12% are within the Proficient range. The largest percent of all 8th graders, 34%, are achieving within the "Progressing" range. The typical 8th grader scored at the 58th percentile on the norm-referenced portion of the test.

Grade 10

Eleven percent of the *Regular Students in grade 10 performed at or above the "Proficient" range on the MAP; of those 1% are within the Advanced range, 10% are within the Proficient range. The largest percent of all 10th graders, 34%, are achieving within the "Step 1" range. The typical 10th grader scored at the 65th percentile on the norm-referenced portion of the test.

*Regular Students are those who completed the MAP under standard conditions.

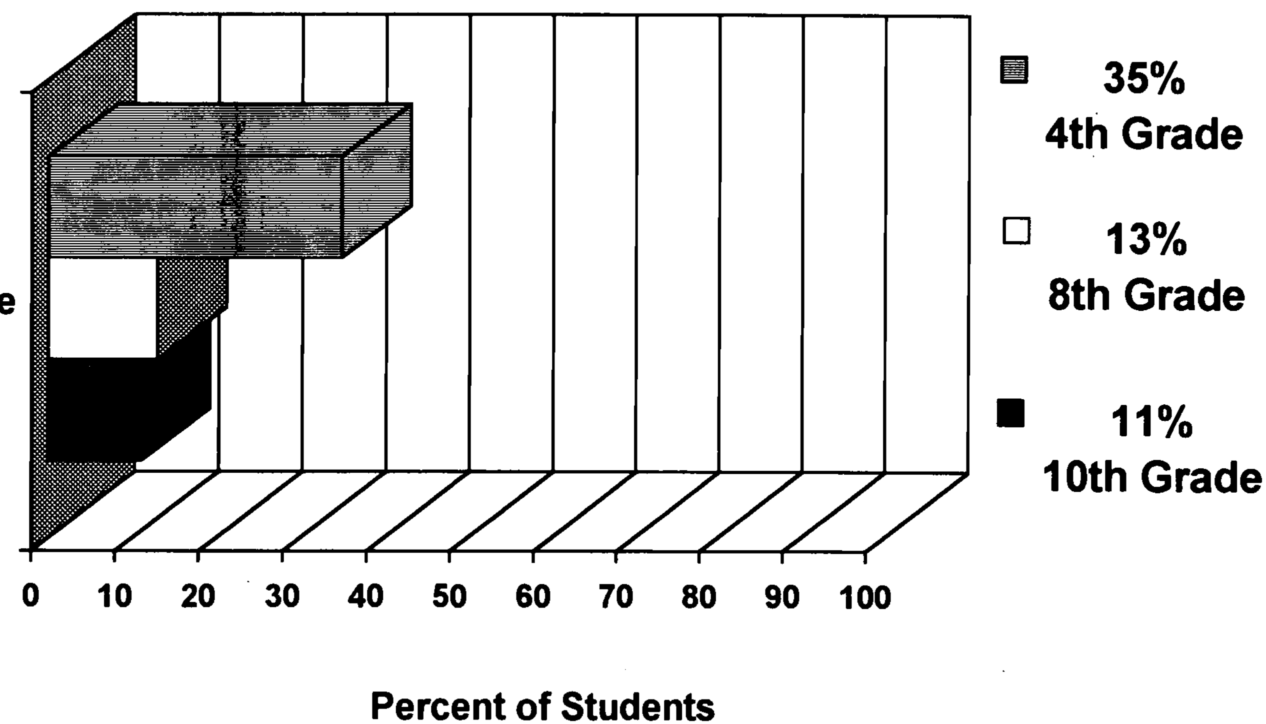
1997

Missouri Assessment Program

Mathematics

Regular Students

Students Who Completed the MAP Under Standard Conditions



National Percentiles: Grade 4 - 56th Percentile; Grade 8 - 58th Percentile; Grade 10 - 65th Percentile

Missouri Assessment Program

Mathematics - Grade 4

1997

	Regular Students Number and Percent		*Male Number and Percent		*Female Number and Percent	
Advanced	3,627	9%	1,933	9%	1,781	9%
Proficient	10,357	26%	5,537	26%	5,113	25%
Nearing Proficient	14,551	37%	7,581	35%	7,799	38%
Progressing	9,217	23%	5,227	24%	5,115	25%
Step 1	1,709	4%	1,141	5%	849	4%
Totals	39,461		21,419		20,657	
National Percentile	56		56		54	

Summary: The table indicates that 35% of Regular Students in grade 4 are achieving **at or above the "Proficient"** range on the MAP. Thirty-five percent of all students who took the test and achieved at or above Proficient are male, 34% are female. **The largest percent of all 4th graders are achieving within the "Nearing Proficient" range.**

The typical 4th grader scored at the 56th percentile on the norm-referenced portion of the test. (The national average is the 50th percentile.) This means that Missouri 4th graders do well when they are tested on subject-area knowledge. When they are asked to apply their knowledge they are not nearly as successful.

*Male and Female Students include all students who completed the MAP under standard or modified administrations.

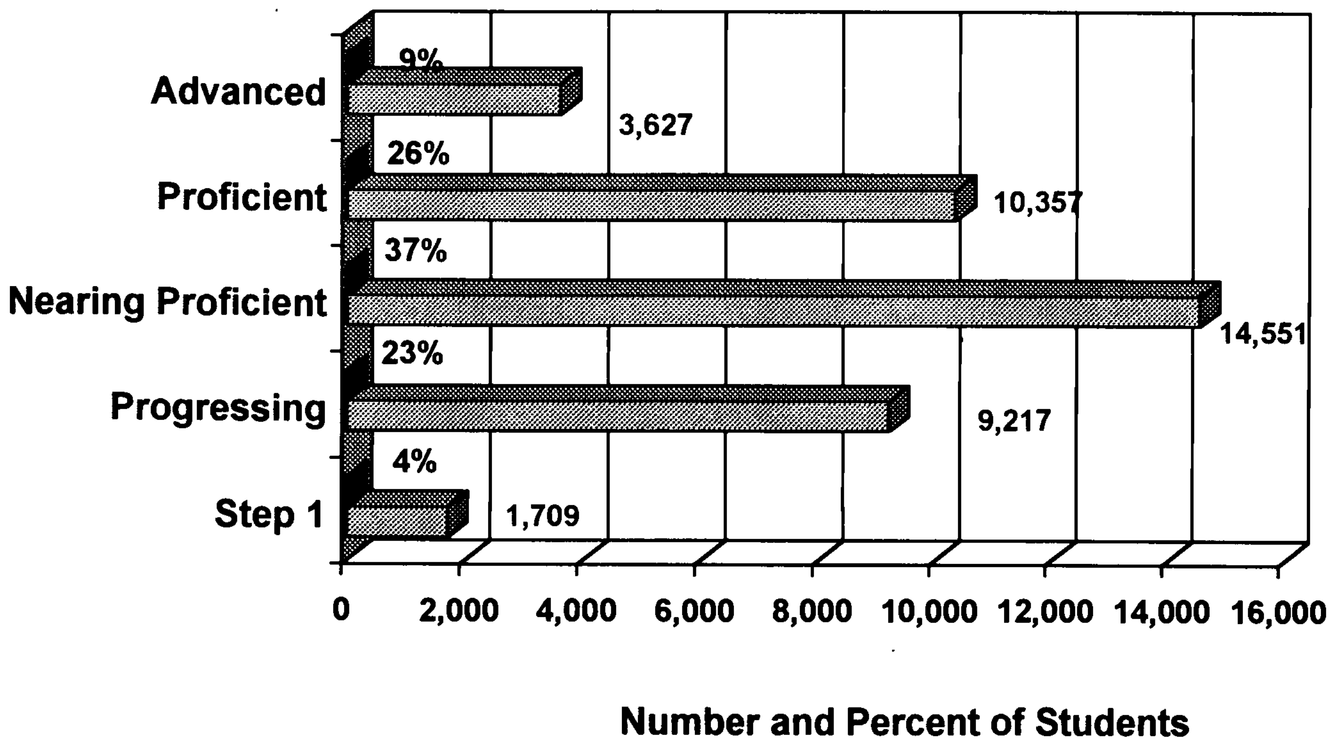
1997

Missouri Assessment Program

Mathematics - Grade 4

Regular Students

Students Who Completed the MAP Under Standard Conditions



National Percentile: 56

Missouri Assessment Program

Mathematics - Grade 8

1997

	Regular Students Number and Percent		*Male Number and Percent		*Female Number and Percent	
Advanced	505	1%	269	1%	241	1%
Proficient	4,631	12%	2,533	13%	2,171	11%
Nearing Proficient	10,034	27%	5,098	26%	5,102	26%
Progressing	12,707	34%	6,389	33%	6,695	35%
Step 1	9,321	25%	5,083	26%	5,109	26%
Totals	37,198		19,372		19,318	
National Percentile	58		58		56	

Summary: The table indicates that only 13% of Regular Students in grade 8 are achieving **at or above the "Proficient"** range on the MAP. Fourteen percent of all students who took the test and achieved at or above Proficient are male, 12% are female. **The largest percent of all 8th graders are achieving within the "Progressing" range.**

The typical 8th grader scored at the 58th percentile on the norm-referenced portion of the test. (The national average is the 50th percentile.) This means that Missouri 8th graders do well when they are tested on subject-area knowledge. When they are asked to apply their knowledge they are not nearly as successful.

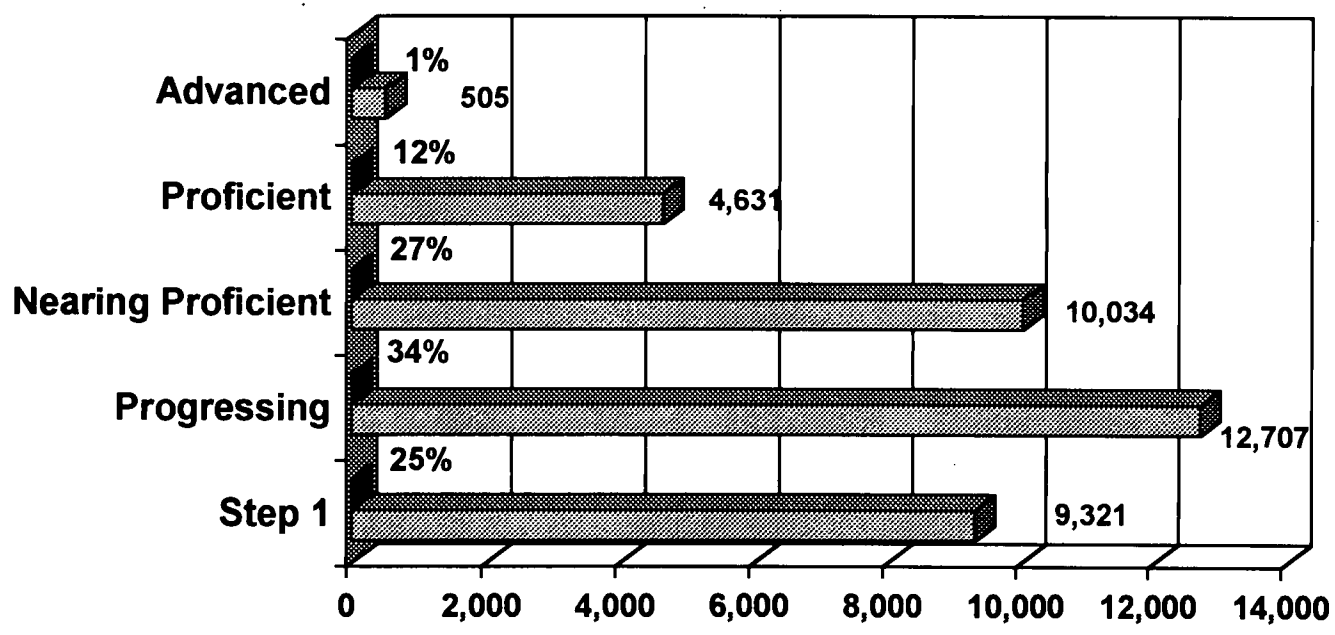
*Male and Female Students include all students who completed the MAP under standard or modified administrations.

Missouri Assessment Program

Mathematics - Grade 8

Regular Students

Students Who Completed the MAP Under Standard Conditions



National Percentile: 58

Missouri Assessment Program

Mathematics - Grade 10

1997

	Regular Students Number and Percent		*Male Number and Percent		*Female Number and Percent	
Advanced	365	1%	221	1%	153	1%
Proficient	3,087	10%	1,752	12%	1,419	9%
Nearing Proficient	6,844	23%	3,501	23%	3,495	22%
Progressing	9,545	32%	4,575	30%	5,175	33%
Step 1	10,182	34%	5,119	34%	5,630	35%
Totals	30,023		15,168		15,872	
National Percentile	65		66		63	

Summary: The table indicates that only 11% of Regular Students in grade 10 are achieving **at or above the "Proficient"** range on the MAP. Thirteen percent of all students who took the test and achieved at or above Proficient are male, 10% are female. **The largest percent of all 10th graders are achieving within the "Step 1" range.**

The typical 10th grader scored at the 65th percentile on the norm-referenced portion of the test. (The national average is the 50th percentile.) This means that Missouri 10th graders do well when they are tested on subject-area knowledge. When they are asked to apply their knowledge they are not nearly as successful.

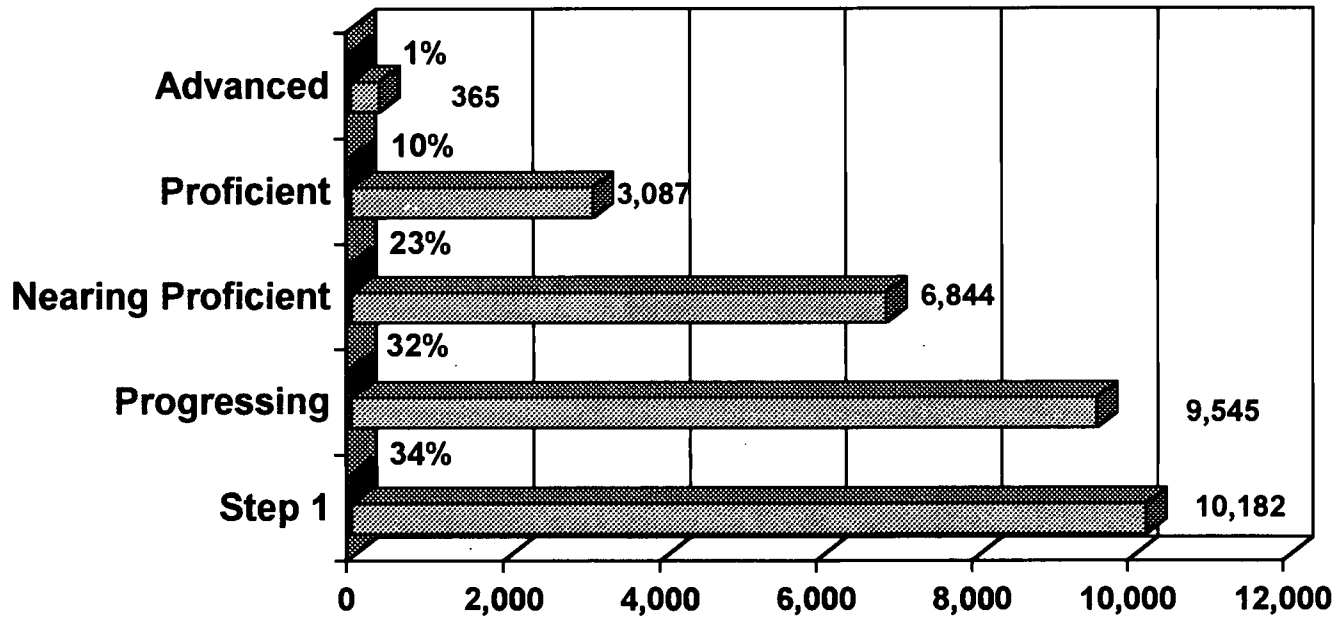
*Male and Female Students include all students who completed the MAP under standard or modified administrations.

Missouri Assessment Program

Mathematics - Grade 10

Regular Students

Students Who Completed the MAP Under Standard Conditions



National Percentile: 65

Missouri Achievement Level Descriptions

Mathematics - Grade 4

NOTE: Each achievement level is inclusive of the skills identified in the preceding levels.

Advanced

Students demonstrate a high degree of accuracy by relating counting, grouping, and place value concepts. They interpret and make inferences from visual models (maps, charts, tables, and graphs) used in representing real-life problems. They use a variety of mental computation and estimation strategies to solve problems. They demonstrate a high degree of accuracy in the use and application of geometric and spatial relationships involving measurements. They investigate and predict the outcome of combining, subdividing, and changing shapes. They use and apply concepts of lines, angles, similarity, congruency, and symmetry. They consistently demonstrate accuracy in construction and interpretation of displays of data (graphs, tables, and charts) through written, graphic, and symbolic forms. They determine probability based on real-life situations. They demonstrate accuracy when they create, complete, explain, and generalize both geometric and numeric patterns. They begin to develop a strategy to represent and explain mathematical relationships, including multiples and factors. They compare and represent fractions and decimals (money). They consistently demonstrate facility in solving problems using networks (paths) and Venn diagrams. They illustrate and/or explain comparison of subsets to each other and to the whole set. They explain the process used to solve simple, logic problems.

Proficient

Students communicate mathematical processes. They recognize simple fractions and decimals (related to money) in a variety of real-life problems. They determine the reasonableness of an answer. They use basic operations to solve word problems. They begin to apply problem-solving strategies to solve multi-step problems. They recognize, compare, and identify attributes of pattern blocks and three-dimensional shapes (congruency, similarity, and symmetry). They use standard and metric tools to accurately measure length (to the nearest centimeter or half-inch) and temperature. They read, interpret, compare, and analyze data using graphs, tables, and charts to solve problems. They organize data and construct graphs to represent the data. They write and solve problems using data from graphs, tables, and charts. They recognize, extend, and describe number patterns representing mathematical relationships. They extend pictorial patterns using multiple attributes. They create models to communicate and use number theory concepts (factors, multiples, odd/evens, and doubling) in problem solving. They identify or develop algorithms using basic facts. They use strategies that include systematic listings, counting, and reasoning. They construct graphs, tree diagrams, and charts. They solve simple, logic problems using clues.

Nearing Proficient

Students add and subtract with regrouping and multiply with a one-digit multiplier. They determine the appropriate process to solve a problem. They recognize evens, odds, ordinals, and multiples and correctly order three-digit numbers. They find multiple combinations of coins for a given monetary value. They identify three-dimensional figures and their attributes. They recognize geometric figures in various rotations. They read analog and digital displays of time. They use terms relevant to predicting, interpreting, and organizing data. They determine missing information needed to solve problems. They compare information from graphs and tables. They make decisions based on equally like events. They recognize and extend numerical and pictorial patterns. They solve monetary problems based on real-life situations. They select a number sentence to match a model. They read Venn diagrams and use deductive reasoning to come to a logical solution.

Progressing

Students attempt an appropriate strategy for solving real-world problems. They identify coin values. They find a combination of coins that equals a given value. They add one- or two-digit whole numbers with regrouping. They identify attributes of polygons up to six sides. They visually rotate geometry figures in order to compare shapes. They read Fahrenheit thermometers with various gradations. They use information from graphs to solve problems. They begin to use the concept of frequency of an occurrence. They extend numeric patterns using addition. They begin to set up monetary problems related to real-life situations. They use given information to make logical decisions.

Step 1

Students identify congruent shapes. They read simple tables and graphs to locate information. They begin to identify and extend geometric and/or numeric patterns. They order whole numbers less than 100 in a specified order.

Missouri Achievement Level Descriptions
Mathematics - Grade 8

NOTE: Each achievement level is inclusive of the skills identified in the preceding levels.

Advanced

Students describe connections and relationships of numbers in real-life situations. They evaluate problems to determine the proper application of computational skills with an emphasis on fractions, decimals, and percents. They select and apply appropriate units and processes to estimate, analyze, and make linear and time measurements. They utilize and apply knowledge of geometric terms and concepts such as area, perimeter, and scale drawings in order to solve problems. They make, read, and interpret multiple representations of data including graphs and tables. They analyze information and formulate and defend predictions based on given data. They investigate sample spaces to predict probable outcomes. They recognize relationships between dependent and independent variables. They extend and describe patterns and/or relationships using algebraic equations. They develop or use diagrams, patterns, and functions to solve problems in real-life situations and justify the solution. They apply number theory concepts including primes, factors, and multiples to solve problems. They recognize and justify reasonableness of a solution. They analyze problems and select and apply an appropriate method, model, or tool (including the counting principal, tree diagram, and student developed diagrams) for solving problems and justifying the solutions.

Proficient

Students communicate math processes. They apply appropriate computational algorithms and concepts in solving consumer problems. They demonstrate transformational concepts of geometric shapes through rotations, reflections, and translations. They compute and apply perimeter and area using the appropriate units. They demonstrate the ability to interpret data from multiple representations including graphs and tables. They use measures of central tendency to interpret data from multiple representations including graphs and tables. They use measures of central tendency to interpret mathematical real-life models. They analyze and extend patterns. They use algebraic expressions to extend and describe patterns and relationships. They identify prime numbers. They develop and apply number theory-concepts to problem situations. They use deductive and inductive reasoning to solve problems.

Nearing Proficient

Students perform basic operations with various forms of fractions. They solve basic problems involving percent. They determine elapsed time in order to solve simple real-life problems. They utilize unit conversion within a measurement system. They use data from tables and graphs to make elementary predictions and recommendations. They find simple probabilities. They choose an appropriate random sampling method. They accurately show the process of finding mean (average). They identify and extend patterns using simple computations. They solve equations given a real-life situation. They find and order equivalent forms of fractions. They solve simple logic problems.

Progressing

Students apply place value concepts. They solve simple word problems using whole numbers or numbers in decimal form. They apply basic geometric concepts. They read and interpret tables, bar graphs, line graphs, and pictographs. They begin to find measures of central tendency (mean, median, mode). They extend patterns to a given term. They identify the order integers. They solve equations using a replacement set.

Step 1

Students add and subtract whole numbers. They use information from tables and graphs. They discover and continue simple numeric patterns. They begin to solve simple word problems.

Missouri Achievement Level Descriptions
Mathematics - Grade 10

NOTE: Each achievement level is inclusive of the skills identified in the preceding levels.

Advanced

Students effectively communicate mathematical processes in a variety of ways. They consistently recognize and work with different forms of numbers and translate from one form to another. They evaluate the reasonableness of a problem's solution. They analyze multi-step problems that require the selection and use of appropriate geometric formulas. They thoroughly explain the solution in terms of language, diagrams, equations, and graphs. They introduce, as necessary, auxiliary information into problem-solving. They recognize that a problem may have multiple-solutions, and thereby solve open-ended questions. They consistently demonstrate effective and accurate presentation of data in graphical or chart form. They analyze data using various statistical processes to reach and communicate a solution for a real-life problem. They consistently and accurately interpret and analyze patterns and relationships represented in charts or tables. They use appropriate methods of comparison. They begin to solve problems involving a system of equations. They correctly select and apply concepts to solve problems that have multiple solutions. They comprehend and evaluate visual representations in order to correctly solve problems. They consistently analyze and select information displayed in diagrams (tree, Venn, etc.) that address specific problems. They form conclusions based on valid inductive and deductive reasoning.

Proficient

Students communicate mathematical processes. They perform computations accurately when numbers are given in different forms. They recognize reasonable answers in the context of the problem. They demonstrate use of approximations and estimations when appropriate. They apply understanding of perimeter, areas, volume, angle measure, capacity, weight, and mass. From given assumptions, they deduce properties of and relationships between figures. They use formulas to solve problems. They solve real-life problems using similarity, congruence relationships, and transformations (reflections, translation, and rotation). They determine pertinent and extraneous data consistently. They interpret and summarize data from tables and graphs. They use various forms of data analysis to make predictions and determine probability. They identify or construct an appropriate graph from given data. They represent and/or solve real-life problems using mathematical expressions, equations, or inequalities. They extend understanding and apply appropriate properties that can be used to solve a problem. They solve application problems using networks and counting techniques. They use tree and Venn diagrams to analyze and interpret data.

Nearing Proficient

Students represent numbers in equivalent forms including decimals, fractions, percents, and scientific notation. They perform basic operations with signed numbers. They translate word problems into single- or multi-step problems using basic arithmetic operations. They distinguish between significant and extraneous data. They recognize correct transformations. They make conversions within a measurement system. They measure precisely. They determine whether a graph correctly represents data contained in a table. They analyze simple data sets using a graph. They find mean (average) and median and recognize how to use data when given a set of values or range over a given interval. They determine how a circle graph would change when data changes. They identify an equation that describes given data. They determine, extend, and describe a pattern. They identify appropriate operations to use in solving problems. They solve problems involving simple networking (paths). They solve simple problems with combinations or permutations using lists of possibilities, tree diagrams, or the counting principle.

Progressing

Students solve word problems using positive rational numbers. They begin to express numbers in various forms including commonly used fractions (1/2, 1/4), decimals, scientific notion, words, and standard form. They simplify exponential expressions involving whole numbers. They identify similarity and congruence in plane (two dimensional) figures. They determine perimeter, area, volume, and angle measures in simple applications. They accurately demonstrate the process and compute the mean (average) for a given set of data. They demonstrate rudimentary knowledge of data representation using graphs. They locate relevant data in a table or chart and identify trends in the data. They show some evidence of the mathematical knowledge needed to begin a problem involving a pattern or relationship. They find factors or multiples of whole numbers.

Step 1

Students add, subtract, multiply, and divide whole numbers. They solve simple word problems involving money. They use information from more than one table or graph to solve problems. They begin to find measures of central tendency (mean, median, mode). They solve simple equations using a replacement set.

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