



Standards By Design:

Fourth Grade, Fifth Grade and Sixth Grade for Mathematics



Acknowledgment

The Oregon Department of Education gratefully acknowledges the Indiana Department of Education for allowing the modification of some of their materials for use in this document.

Message to Students

Dear Student,

The world is changing quickly. For you to succeed in school, at work, and in the community, you will need more skills and knowledge than ever before. These days, “ready for college” and “ready for work” essentially mean the same thing: “ready for life.”

Getting in shape academically is one of the most important things you can do to prepare for a successful future. Your future starts with Oregon’s academic standards. This booklet explains what you should know and be able to do in each subject, at your grade level.

Please review this guide with your teachers and share it with your parents and family. To be ready for tomorrow, get in top academic shape today. You can use this guide year round to check your progress.



Message to Parents

Dear Parent,

Education is the building block of every student's future. To ensure all students have the opportunity to succeed, Oregon has adopted world-class academic standards in English/language arts, mathematics, science, social studies, the arts, health education, physical education and second languages. The academic content standards clearly outline what students should know and be able to do in each subject, at each grade level. Oregon's teachers are dedicated to helping all students meet these expectations.

Moreover, these standards are the cornerstone of the state's plan for improving student achievement. They provide a comprehensive blueprint for what we must do to support students every step of the way – from their earliest years through post-high school education. To be competitive in today's economy and to earn enough to support a family, all students need to continue their education beyond high school, whether at a two- or four-year college, in an apprenticeship program, or in the military.

How can you help your student meet these challenges? Learning occurs many places, not only in the classroom. Students spend far more time at home than they do in school. How they spend their time can make a real difference. Nothing will have a bigger impact on your student's success than your involvement in his or her education.

On the next page is a list of 12 things you can do to help ensure your child has the best education possible – from preschool to post-high school opportunities. We hope you will use this guide as a tool to help your child succeed today and in the future.

Sincerely,

A handwritten signature in black ink, appearing to read "Susan Castillo". The signature is fluid and cursive, with the first name "Susan" written in a larger, more prominent script than the last name "Castillo".

Susan Castillo
Superintendent of Public Instruction

Twelve things parents can do to help students succeed

- 1. Promote education beyond high school.** Make sure your child knows you expect him or her to continue learning after high school – it's never too early to start raising these expectations. To keep our families, communities, and economy strong, all students need to keep learning.
- 2. Build relationships with your child's teachers.** Find out what each teacher expects of your child. Learn how you can help your child prepare to meet these expectations.
- 3. Read to your child.** Reading is the foundation for all learning and is one of the most important contributions you can make to your child's education. Read to your young child, encourage your older child to read to you, or spend time together as a family reading. All this helps your child develop strong reading habits and skills from the beginning and reinforces these habits and skills as your child grows.
- 4. Practice writing at home.** Letters, journal entries, e-mail messages, and grocery lists are all writing opportunities. Show that writing is an effective form of communication and that you write for a variety of purposes.
- 5. Make math part of everyday life.** Paying bills, cooking, gardening, and even playing games are all good ways to help your child understand and use mathematics skills. Show that there may be many ways to get to the right answer and encourage your child to explain his or her method.
- 6. Ask your child to explain his or her thinking.** Ask lots of "why" questions. Children should be able to explain their reasoning, how they came up with their answer, and why they chose one answer over another.
- 7. Expect that homework will be done.** Keep track of your child's homework assignments and regularly look at his or her completed work. Some teachers give parents a number to call for a recorded message of that day's homework; others put the assignments on the Internet. If your school doesn't offer these features, talk to the teacher about how you can get this important information. Even if there aren't specific assignments, stay informed about what your child is working on so that you can help at home.
- 8. Use the community as a classroom.** Feed your child's curiosity about the world 365 days a year. Use the library to learn more about the history of your town. A visit to a farmer's market can help your child picture our state's rich agricultural tradition. Take your young child to zoos and parks and your older child to museums and workplaces to show how learning connects to the real world.
- 9. Encourage group study.** Open your home to your child's friends for informal study sessions. Promote outside formal study groups through church, school organizations, or other groups. Study groups will be especially important as your child becomes older and more independent. The study habits your child learns now will carry over into college and beyond.
- 10. Spend time at school.** The best way to know what goes on in your child's school is to spend time there. If you're a working parent, this isn't easy, and you may not be able to do it very often. Even so, "once in awhile" is better than "never."
- 11. Start a college savings plan as soon as possible.** Investigate Oregon's College Savings Plan and other investment vehicles and contribute as much as you can.

12. Promote high standards for all. To ensure the academic success of our children, everyone must work toward the same goal. Discuss academic expectations with parents and other people in your community. Use your school and employee newsletters, athletic associations, booster clubs, a PTA or PTO meeting, or just a casual conversation to explain why academic standards are important and what they mean to you and your family. Share your tips for helping your own son or daughter succeed in school and encourage others to share their suggestions as well.

Remember: You are the most important influence on your child. Oregon's academic standards give you important tools to ensure your child gets the best education possible and is well prepared for the future.



Measuring Student Learning

Children develop at different rates. Some take longer and need more help to learn certain skills.

Assessments at the state level provide a measure of school accountability – assisting schools in their efforts to align curriculum and instruction with the state’s academic standards and reporting progress to parents and the public.

Assessments at the classroom level help teachers and parents understand how students are progressing and assist in identifying academic areas where students may need additional attention.

The Oregon Assessment of Knowledge and Skills (OAKS) consists of three broad areas:

1. Multiple Choice Tests present the student with a series of questions or problems. The student responds on an answer sheet and responses are scored by machine. These tests are required in grades 3-8 and high school/CIM for English Language Arts and mathematics and for grades 5, 8, and high school/CIM in science. An optional multiple choice test is also available for Social Sciences in grades 5, 8 and high school/CIM.

2. State Writing Assessments require students to give extended written responses to open-ended topics provided by the state in a supervised testing situation. Trained raters at state-run scoring sites judge student work using the state scoring guide. These performance assessments are required for grades 4, 7 and high school/CIM.

3. Classroom Work Samples are a series of formal classroom assessments available to Oregon teachers in grades 3 to high school/CIM that allow students to respond to locally provided topics or complex problems. Student work is rated by teachers in their own schools or districts using state scoring guides. Work samples are collected in Writing, Speaking, Mathematics Problem Solving, Scientific Inquiry and Social Science Analysis.

Who is required to take state assessments?

Third grade is the first time that many students will be taking a statewide assessment. Third grade students take tests in Reading/Literature and Mathematics that are delivered through TESA (Technology Enhanced State Assessment) a computerized adaptive testing system.

The table below lists the statewide assessment schedule, by grade.

Required Statewide Testing

	3	4	5	6	7	8	10/CIM
Reading/Literature	X	X	X	X	X	X	X
Writing		X			X		X
Mathematics	X	X	X	X	X	X	X
Science			X			X	X
Social Sciences (optional)			X			X	X

How is student performance measured on these assessments?

Content Standards describe what students in Oregon should learn. How well they learn the content is determined by Achievement Standards. These Achievement Standards, or “cut scores”, identify the score needed to demonstrate solid understanding of the Content Standards. The following table shows the current Achievement Standards in Reading/Literature and Mathematics for grades 3-8 and 10/CIM.

Grade	<u>Reading/Literature</u>		<u>Mathematics</u>		<u>Science</u>	
	Meet	Exceed	Meet	Exceed	Meet	Exceed
3	204	218	205	217	----	----
4	211	223	212	225	----	----
5	218	230	218	229	225	238
6	222	234	221	232	----	----
7	227	239	226	238	----	----
8	231	241	230	241	234	246
10/CIM	236	248	236	246	239	249

The state writing assessment and classroom work samples are scored using state scoring guides. As an assessment tool, scoring guides provide specific criteria to describe a range of possible student responses and a consistent set of guidelines to rate student work. For the state writing assessment, student work is scored by two different raters and their scores combined to create a “composite score.”

Since the scoring guide serves as the primary assessment tool to determine whether students have met the standards through a collection of work samples, teachers are asked to align their classroom assessments carefully to the criteria described on the scoring guide. **Composite scores are not required for classroom work samples.**

For more information on assessments, please visit <http://www.ode.state.or.us/search/results/?id=169>

Mathematics

Fourth Grade

Fourth grade mathematics students continue to refine their multiplication and division skills by developing strategies for multi-digit multiplication and division. They also add and subtract simple fractions and decimals and begin to explore the concept of probability. In geometry they study quadrilaterals and are introduced to angles and congruency.

Fifth Grade

Fifth grade mathematics students develop strategies for multiplying and dividing decimals and fractions, and work with the properties and order of operations to simplify calculations. They also begin to represent the idea of a variable and to write and evaluate simple algebraic expressions. They study triangles, and measure areas and volumes of geometric shapes using various units. Additionally, they design investigations and interpret and evaluate data using a variety of representations.

Sixth Grade

Sixth grade mathematics students solve problems involving rates and ratios as well as exploring theoretical and experimental probability. They continue their exploration of variables by creating coordinate graphs and solving problems involving linear relationships. In geometry, students study polygons and explore symmetry.

Calculations and Estimations

CCG: Numbers :

Understand numbers, ways of representing numbers, relationships among numbers, and number systems.

Fourth Grade

MA.04.CE.01

Read, write, order, model, and compare whole numbers to one million, common fractions, and decimals to hundredths. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.04.CE.02

Identify the place value and actual value of digits in a number to one million.

MA.04.CE.03

Locate common fractions and decimals on a number line.

MA.04.CE.04

Model, recognize, and generate equivalent forms of decimals to hundredths. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.04.CE.05

Determine factors of whole numbers to 100 using models such as arrays.

Fifth Grade

MA.05.CE.01

Order, model, and compare common fractions, decimals and percentages.

MA.05.CE.02

Locate decimals and percentages on a number line.

MA.05.CE.03

Material in *Italics* is eligible for statewide assessment. **Bold** text is for supporting classroom instruction and assessment.

Model, recognize, and generate equivalent forms of commonly used fractions, decimals, and percents. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.05.CE.04

Identify classes of numbers (e.g., primes, composites, even, odd, multiples) in a 1-to-100 number chart and describe numeric patterns related to them. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.05.CE.05

Recognize characteristics of odd, even, prime, and composite numbers.

Sixth Grade

MA.06.CE.01

Order, model, and compare positive rational numbers (fractions, decimals, and percentages).

MA.06.CE.02

Apply factors and multiples to express fractions in lowest terms and identify fraction equivalents.

MA.06.CE.03

Understand rates and ratios as comparisons of two quantities by division.

MA.06.CE.04

Differentiate between rates and ratios and express both as fractions.

MA.06.CE.05

Solve problems by calculating rates and ratios.

MA.06.CE.06

Locate positive rational numbers (fractions, decimals, and percentages) on a number line.

MA.06.CE.07

Apply equivalent forms of fractions and decimals to solve problems.

MA.06.CE.08

Determine equivalent forms of fractions, mixed numbers and improper fractions.

MA.06.CE.09

Model square numbers and recognize their characteristics.

MA.06.CE.10

Identify prime and composite numbers less than 100.

MA.06.CE.11

Solve problems using concepts related to factoring and determining divisibility (e.g., 2, 3, 5, 9 and 10).

<p>CCG: Computation and Estimation : Compute fluently and make reasonable estimates.</p>

Fourth Grade

MA.04.CE.06

Develop and evaluate strategies for multiplying and dividing whole numbers and adding and subtracting fractions with like denominators.

MA.04.CE.07

Apply with fluency efficient strategies for determining multiplication and division facts 0-9. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.04.CE.08

Multiply a three-digit number by a one-digit number.

MA.04.CE.09

Divide a three-digit number by a one-digit number with or without remainders.

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MA.04.CE.10

Determine the meaning of whole number remainders in a problem situation.

MA.04.CE.11

Add and subtract commonly used fractions with like denominators (halves, thirds, fourths, eighths, tenths) and decimals to hundredths.

MA.04.CE.12

Add and subtract decimals to hundredths, including money amounts.

MA.04.CE.13

Mentally multiply or divide multiples of 10 (e.g., 40×70 or $2700/30$).

MA.04.CE.14

Identify the most efficient operation (add, subtract, multiply, or divide) for solving a problem.

MA.04.CE.15

Select and use an appropriate estimation strategy (overestimate, underestimate, range of estimates) based on the problem situation when computing with whole numbers or money amounts.

MA.04.CE.16

Use place value concepts such as rounding to nearest 10, 100, and 1000 to estimate and check reasonableness of answers.

Fifth Grade

MA.05.CE.06

Develop and evaluate strategies for computing with decimals and fractions.

MA.05.CE.07

Divide by two-digit numbers.

MA.05.CE.08

Determine the meaning of a remainder expressed as a whole number, fraction, or decimal in a problem situation involving division.

MA.05.CE.09

Add and subtract fractions and mixed numbers with common fractions found on a ruler (2, 4, 8, 16).

MA.05.CE.10

Add, subtract, multiply, and divide decimals, including money amounts.

MA.05.CE.11

Model percentages on a hundreds grid to determine equivalent decimals and percentages.

MA.05.CE.12

Determine the order of operations for multiple-step calculations involving addition, subtraction, multiplication, and division.

MA.05.CE.13

Select and use an appropriate estimation strategy (overestimate, underestimate, range of estimates) based on the problem situation when computing with decimals.

MA.05.CE.14

Use referent numbers and rounding to estimate the magnitude of calculations with decimals.

Sixth Grade

MA.06.CE.12

Develop and analyze algorithms for computing with fractions and mixed numbers.

MA.06.CE.13

Add and subtract fractions with like and unlike denominators.

MA.06.CE.14

Understand linear, area, and discrete models to multiply and divide fractions. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

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MA.06.CE.15

Solve problems involving common percentages.

MA.06.CE.16

Convert mentally among common decimals, fractions and percentages.

MA.06.CE.17

Apply grouping symbols to simplify calculations and evaluate expressions.

MA.06.CE.18

Develop and use strategies to estimate the results of positive rational number computations and judge the reasonableness of results. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.06.CE.19

Use referent numbers in estimating answers to adding and subtracting fractions and mixed numbers (e.g., $2 \frac{1}{4} + \frac{3}{8} < 3$, since both $\frac{1}{4}$ and $\frac{3}{8}$ are less than $\frac{1}{2}$).

CCG: Operations and Properties :

Understand meanings of operations and how they relate to one another.

Fourth Grade

MA.04.CE.17

Demonstrate the meaning of fractions as part of a unit whole or as parts of a collection or set.

MA.04.CE.18

Use inverse operations (addition and subtraction, multiplication and division) to solve problems and check solutions involving calculations with whole numbers. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.04.CE.19

Apply the commutative, associative and identity properties of addition and multiplication and the distributive property to simplify calculations with whole numbers.

Fifth Grade

MA.05.CE.15

Use inverse operations (addition and subtraction, multiplication and division) to solve problems and check solutions involving calculations with decimals. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.05.CE.16

Apply the commutative, associative and identity properties of addition and multiplication and the distributive property to simplify calculations with decimals.

Sixth Grade

MA.06.CE.20

Use the inverse operations of addition and subtraction to solve problems and check solutions involving adding and subtracting fractions and mixed numbers. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.06.CE.21

Apply the associative, commutative, and distributive properties to simplify computations with positive rational numbers.

Statistics and Probability

Material in *Italics* is eligible for statewide assessment. **Bold** text is for supporting classroom instruction and assessment.

CCG: Statistics :
Select and use appropriate statistical methods to analyze data.

Fourth Grade

MA.04.SP.01

Determine the median for a set of data and understand what each statistic does and does not indicate about the data. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

Fifth Grade

MA.05.SP.01

Compare two related sets of data using measures of center (mean, median, and mode) and spread (range).

Sixth Grade

MA.06.SP.01

Find, use, and interpret measures of center and spread.

CCG: Probability :
Understand and apply basic concepts of probability.

Fourth Grade

MA.04.SP.02

Determine probability of a single event.

MA.04.SP.03

Understand that the probability of an event can be represented by a number from 0 (impossible) to 1 (certain).

Fifth Grade

MA.05.SP.02

Connect simple fractional probabilities to events (e.g., heads is 1 out of 2; rolling a 5 on a six-sided number cube is $\frac{1}{6}$).

Sixth Grade

MA.06.SP.02

Determine experimental probability of an event from a set of data.

MA.06.SP.03

Express probability using fractions, ratios, decimals and percents.

MA.06.SP.04

Understand that probability cannot determine an individual outcome, but can be used to predict the frequency of an outcome.

MA.06.SP.05

Determine the number of possible combinations of two or more classes of objects (e.g., shirts, pants and shoes).

CCG: Collect and Display Data :
Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.

Fourth Grade

MA.04.SP.04

Conduct experiments and simulations to determine experimental probability of different outcomes.

MA.04.SP.05

Material in *Italics* is eligible for statewide assessment. **Bold** text is for supporting classroom instruction and assessment.

Represent and interpret data collected from probability experiments and simulations using tallies, charts, pictograms, and bar graphs, including determining probabilities of single events. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

Fifth Grade

MA.05.SP.03

Design investigations to address a question and recognize how data collection methods affect the nature of a set of data.

MA.05.SP.04

Understand basic concepts of sampling (e.g., larger samples yield better results, the need for representative samples).

MA.05.SP.05

Represent and interpret data using tables, circle graphs, bar graphs, and line graphs or plots (first quadrant). (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.05.SP.06

Compare different representations of the same data and evaluate how well each representation shows important aspects of the data (e.g., circle and bar graphs, histograms with different widths).

MA.05.SP.07

Evaluate the appropriateness of representations of categorical and numeric data (e.g., categorical: types of lunch food; and numerical: heights of students in a class).

Sixth Grade

MA.06.SP.06

Design experiments and simulations to determine experimental probability of different outcomes.

MA.06.SP.07

Understand that experimental probability approaches theoretical probability as the number of trials increases.

MA.06.SP.08

Recognize and understand the connections among concepts of independent outcomes, picking at random, and fairness.

MA.06.SP.09

Represent and interpret the outcome of a probability experiment using a frequency distribution, including determining experimental probabilities. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

<p>CCG: Data Analysis and Predictions : Develop and evaluate inferences and predictions that are based on data.</p>
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Fourth Grade

MA.04.SP.06

Predict the degree of likelihood of a single event occurring using words such as certain, impossible, most often, least often, likely, and unlikely.

MA.04.SP.07

Predict the likelihood of an outcome prior to an experiment and compare predicted probability with the actual results. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

Fifth Grade

MA.05.SP.08

Analyze data from tables and bar graphs using mean, median, mode, and range, and draw conclusions.

Sixth Grade
MA.06.SP.10

Make predictions for succeeding trials of a probability experiment given the outcome of preceding repeated trials.

MA.06.SP.11

Predict the outcome of a probability experiment by computing and using theoretical probability.

Algebraic Relationships

CCG: Patterns and Functions :
Understand patterns, relations, and functions.

Fourth Grade
MA.04.AR.01

Describe, extend and make generalizations about patterns and sequences and supply missing elements in chart or table format. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.04.AR.02

Supply a missing element in or determine a rule that extends number patterns involving addition or subtraction of decimals.

Fifth Grade

MA.05.AR.01

Represent and analyze patterns and functions using words, table, graphs or simple algebraic expressions. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.05.AR.02

Supply a missing element in or determine a rule that extends number patterns involving multiplication or division.

Sixth Grade

MA.06.AR.01

Represent, analyze and determine rules for finding patterns involving positive rational numbers with tables, graphs, words, and when possible, symbolic rules. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

CCG: Algebraic Relationships :
Represent and analyze mathematical situations and structures using algebraic symbols.

Fourth Grade
MA.04.AR.03

Select operational and relational symbols to make a number sentence true (e.g., $4 _ 3 = 12$, $5 + 17 _ 25$).

MA.04.AR.04

Represent and solve open sentences or problems involving numeric equations or inequalities (e.g., $3 + ? = 4$; $2 + 1 > ?$, $4 < 2 + ?$).

MA.04.AR.05

Translate between different representations (words, numeric, pictorial) of a simple quantitative relationship (e.g., match a table of values to its rule).

Fifth Grade

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MA.05.AR.03

Use letters, boxes, or other symbols to stand for an unknown quantity in expressions or equations.

MA.05.AR.04

Represent the idea of a variable as an unknown quantity using a letter or symbol.

MA.05.AR.05

Represent and evaluate algebraic expressions involving a single variable (e.g., $4s$, $.05n$).

MA.05.AR.06

Identify and represent whole number data on a coordinate graph (first quadrant). (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

Sixth Grade

MA.06.AR.02

Develop an understanding of different uses of variables (e.g., as a placeholder for a specific unknown, as representative of a range of values).

MA.06.AR.03

Represent and evaluate algebraic expressions involving two variables (e.g., $bh/2$, $2w + 2l$).

MA.06.AR.04

Describe and interpret relationships using information from tables and graphs including coordinate graphs (first quadrant). (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.06.AR.05

Graph linear equations on a coordinate grid by making a table using whole number coordinates.

CCG: Modeling :

Use mathematical models to represent and understand quantitative relationships.

Fifth Grade

MA.05.AR.07

Identify or describe a situation which may be modeled by a given graph. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

Sixth Grade

MA.06.AR.06

Model and solve contextualized problems using various representations such as graphs, tables, and equations.

MA.06.AR.07

Recognize and represent direct variation using tables and graphs.

MA.06.AR.08

Identify and sketch a graph that models a given situation.

CCG: Change :

Analyze change in various contexts.

Fifth Grade

MA.05.AR.08

Identify and describe situations with constant or varying rates of change and compare them.

Sixth Grade

MA.06.AR.09

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Investigate how a change in one variable relates to a change in a second variable.

Measurement

CCG: Units and Tools :
Understand measurable attributes of objects and the units, systems and processes of measurement.

Fourth Grade

MA.04.ME.01

Select the most appropriate tool and U.S. customary unit to measure length, perimeter, weight, and volume.

MA.04.ME.02

Carry out simple unit conversions within the U.S. customary system (e.g., inches to feet, ounces to pounds).

Fifth Grade

MA.05.ME.01

Using estimation, convert from a measurement expressed using one unit within a system to one using a comparable unit within the other system (e.g., inches to centimeters).

MA.05.ME.02

Understand that measurements are approximations and understand how differences in units and tools affect precision.

Sixth Grade

MA.06.ME.01

Select the most appropriate unit to measure area and perimeter.

MA.06.ME.02

Carry out unit conversions in the U.S. customary system as a result of calculations involving measurements of length, perimeter, volume, and weight (e.g., $6\frac{1}{2} + 10\frac{1}{4} = 16\frac{3}{4}$ or 1 ft 4 $\frac{3}{4}$ ”).

MA.06.ME.03

Convert from a measurement expressed in one unit within a system to another using a different unit within the same system to measure perimeter and area.

CCG: Direct & Indirect Measurement :
Apply appropriate techniques, tools, and formulas to determine measurements.

Fourth Grade

MA.04.ME.03

Determine elapsed time requiring unit conversions (e.g., weeks to months, minutes to hours).

MA.04.ME.04

Read temperature measurements of thermometers with Fahrenheit and Celsius units and recognize reasonable ranges of temperatures for different events (e.g., cold or hot day). (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.04.ME.05

Determine measurements of length and perimeter to the nearest inch and nearest foot.

MA.04.ME.06

Estimate the length of objects in inches, feet, and yards.

MA.04.ME.07

Determine measurements of volume to the nearest $\frac{1}{4}$ cup, quart, or gallon of measuring cups, beakers, or graduated cylinders.

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MA.04.ME.08

Estimate the volume of objects in cups, quarts, and gallons.

MA.04.ME.09

Determine measurements of weight to the nearest ounce and pound.

MA.04.ME.10

Estimate the weight of objects in ounces and pounds.

MA.04.ME.11

Relate the area of a rectangle and its dimensions to area models for multiplication and division.

MA.04.ME.12

Determine perimeter and area of rectangles given lengths of sides.

MA.04.ME.13

Estimate and measure the area of a rectangular surface using unit squares.

MA.04.ME.14

Use referents for U.S. customary measurements to make estimates of length, weight, and volume and evaluate the reasonableness of the estimate (e.g., length of one floor tile and estimate length of classroom). (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

Fifth Grade

MA.05.ME.03

Know common referents for Fahrenheit and Celsius temperatures (e.g., freezing point, boiling point).

MA.05.ME.04

Determine measurements of length and perimeter to the nearest tenth centimeter (millimeter) and nearest tenth meter.

MA.05.ME.05

Estimate the measure of acute, right and obtuse angles in degrees using referent angles of 45 and 90 degrees and determine the measurement of angles between 0 and 180 degrees to the nearest degree.

MA.05.ME.06

Develop and use formulas for determining the perimeter and area of rectangles, and related triangles and parallelograms. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.05.ME.07

Develop strategies to measure the perimeter of simple polygons and everyday objects.

MA.05.ME.08

Analyze the effects on area and perimeter by combining two simple geometric figures (e.g., two right triangles and a rectangle).

MA.05.ME.09

Compare and contrast the formulas for area of rectangles, related triangles, and parallelograms.

MA.05.ME.10

Estimate and measure volume of a rectangular solid using unit cubes.

MA.05.ME.11

Use referents for metric measurements to make estimates of length, weight, and volume and evaluate the reasonableness of the estimate (e.g., height of teacher estimated in height of student lengths). (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

Sixth Grade

MA.06.ME.04

Material in *Italics* is eligible for statewide assessment. **Bold** text is for supporting classroom instruction and assessment.

Determine measurements of length and perimeter to the nearest eighth inch (for lengths less than one foot) and nearest inch (for lengths greater than one foot).

MA.06.ME.05

Estimate the measures of angles greater than 180 degrees.

MA.06.ME.06

Develop and use formulas for finding perimeter and area of polygons. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.06.ME.07

Calculate the area and circumference of a circle using pi as well as common approximations of pi (e.g., 3.14, 22/7).

MA.06.ME.08

Develop strategies for determining approximate perimeter and area of irregular shapes.

MA.06.ME.09

Determine the area of a complex figure representative of a problem situation composed of a combination of two or more geometric figures (e.g., attach a triangle to a parallelogram).

MA.06.ME.10

Recognize that two-dimensional shapes having the same perimeter may have different areas and that shapes having the same area may have different perimeters.

MA.06.ME.11

Analyze how changes in area of a figure affect the dimensions of the figure.

MA.06.ME.12

Use referents to make estimates of area and evaluate the reasonableness of the estimate (e.g., estimate area of classroom by measuring area of one floor tile). (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.06.ME.13

Calculate rates (e.g., miles per hour, simple interest, people per square mile) to solve problems.

Geometry

CCG: Properties and Relationships :

Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships

Fourth Grade

MA.04.GM.01

Identify, describe, compare and classify quadrilaterals by their sides and angles. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.04.GM.02

Identify right, acute, and obtuse angles in isolation and in geometric figures.

MA.04.GM.03

Use properties of quadrilaterals to determine the lengths of their sides and perimeters.

MA.04.GM.04

Develop, understand, and apply the property that the sum of the angle measures in a quadrilateral is 360 degrees. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.04.GM.05

Identify congruent quadrilaterals using concrete methods.

MA.04.GM.06

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Draw conclusions about the measures of corresponding sides and angles of two congruent quadrilaterals.

Fifth Grade

MA.05.GM.01

Identify, describe, compare and classify triangles by their sides and angles. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.05.GM.02

Use properties of triangles to determine the lengths of their sides and perimeters.

MA.05.GM.03

Develop, understand, and apply the property that the sum of the angle measures in a triangle is 180 degrees. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.05.GM.04

Draw conclusions about the measures of corresponding sides and angles of two congruent and similar triangles.

Sixth Grade

MA.06.GM.01

Identify, describe, compare and classify polygons by their sides and angles. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.06.GM.02

Identify and represent the radius, center, diameter, chord and circumference of a circle.

MA.06.GM.03

Identify combinations of angles that are complementary or supplementary and determine their measures.

MA.06.GM.04

Use properties of polygons to determine the lengths of sides and perimeters.

MA.06.GM.05

Develop, understand, and apply the property of the sum of the measures of the interior angles in a polygon as well as the sum of the exterior angles. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.06.GM.06

Find and use congruent polygons which will cover a surface without overlapping (tessellation).

CCG: Modeling :

Use visualization, spatial reasoning, and geometric modeling to solve problems.

Fourth Grade

MA.04.GM.07

Model, sketch, draw, and label points, lines, line segments, angles, rays, quadrilaterals, and parallel, perpendicular, and intersecting lines.

MA.04.GM.08

Build three-dimensional objects and sketch two-dimensional representations of the object.

Fifth Grade

MA.05.GM.05

Accurately draw and label triangles, angles, and line segments using measurement tools.

MA.05.GM.06

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Identify and build three-dimensional objects from two-dimensional representations. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

Sixth Grade

MA.06.GM.07

Model, sketch, draw and label polygons, circles (including the center, radius, and diameter), complementary angles, supplementary angles, vertical angles, and adjacent angles.

MA.06.GM.08

Identify and describe the intersection of two or more geometric figures in the plane (e.g., the intersection of a circle and a line). (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

CCG: Coordinate Geometry :
Specify locations and describe spatial relationships using coordinate geometry and other representational systems.

Fourth Grade

MA.04.GM.09

Locate coordinates of points on graph paper, maps, globes and other charts.

MA.04.GM.10

Determine the shortest path of horizontal and vertical movement between two locations grid.

Fifth Grade

MA.05.GM.07

Make and use coordinate systems to specify location and describe paths. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.05.GM.08

Find the distance between points along the horizontal and vertical lines of a coordinate system.

Sixth Grade

MA.06.GM.09

Plot polygons on coordinate graphs (first quadrant).

MA.06.GM.10

Determine lengths and areas of simple polygons from coordinate graphs.

CCG: Transformations and Symmetry :
Apply transformations and use symmetry to analyze mathematical situations.

Fourth Grade

MA.04.GM.11

Predict and describe the results of performing reflections, rotations and translations of quadrilaterals. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.04.GM.12

Identify and describe a motion or series of motions that will show two quadrilaterals are congruent. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

Fifth Grade

MA.05.GM.09

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Identify and describe line and rotational symmetry in two-dimensional shapes and designs. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

MA.05.GM.10

Identify and describe a motion or series of motions that will show two triangles are congruent. (Some of the skills and concepts in the preceding standard are assessed at the classroom level and others at the state level. See the Oregon Standards Newspaper for specifics.)

Sixth Grade

MA.06.GM.11

Build or sketch a shape that has a given number of lines of symmetry, or rotational symmetries (e.g., sketch a simple polygon with a given number of lines of symmetry).

Mathematical Problem Solving

CCG: Conceptual Understanding :
Select, apply, and translate among mathematical representations to solve problems.

Fourth Grade

MA.04.PS.01

Interpret the concepts of a problem-solving task and translate them into mathematics.

Fifth Grade

MA.05.PS.01

Interpret the concepts of a problem-solving task and translate them into mathematics.

Sixth Grade

MA.06.PS.01

Interpret the concepts of a problem-solving task and translate them into mathematics.

CCG: Processes and Strategies :
Apply and adapt a variety of appropriate strategies to solve problems.

Fourth Grade

MA.04.PS.02

Choose strategies that can work and then carry out the strategies chosen.

Fifth Grade

MA.05.PS.02

Choose strategies that can work and then carry out the strategies chosen.

Sixth Grade

MA.06.PS.02

Choose strategies that can work and then carry out the strategies chosen.

CCG: Verification :
Monitor and reflect on the process of mathematical problem solving.

Fourth Grade

MA.04.PS.03

Produce identifiable evidence of a second look at the concepts/strategies/calculations to defend a solution.

Fifth Grade

MA.05.PS.03

Produce identifiable evidence of a second look at the concepts/strategies/calculations to defend a solution.

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Sixth Grade
MA.06.PS.03

Produce identifiable evidence of a second look at the concepts/strategies/calculations to defend a solution.

CCG: Communication :
Communicate mathematical thinking coherently and clearly. Use the language of mathematics to express mathematical ideas precisely.

Fourth Grade
MA.04.PS.04

Use pictures, symbols, and/or vocabulary to convey the path to the identified solution.

Fifth Grade
MA.05.PS.04

Use pictures, symbols, and/or vocabulary to convey the path to the identified solution.

Sixth Grade
MA.06.PS.04

Use pictures, symbols, and/or vocabulary to convey the path to the identified solution.

CCG: Accuracy :
Accurately solve problems that arise in mathematics and other contexts.

Fourth Grade
MA.04.PS.05

Accurately solve problems using mathematics.

Fifth Grade
MA.05.PS.05

Accurately solve problems using mathematics.

Sixth Grade
MA.06.PS.05

Accurately solve problems using mathematics.