

Standards for Mathematical Practice

- 1. Make sense of problems and persevere in solving them.** *Student understands the meaning of a problem and can explain multiple ways to solve and/or check solution.*
- 2. Reason abstractly and quantitatively.** *Student understands and connects written numbers to quantities.*
- 3. Construct viable arguments and critique the reasoning of others.** *Student explains own mathematical thinking and responds to the thinking of others.*
- 4. Model with mathematics.** *Student represents problem situations in multiple ways including equations, mathematical words, labeled sketches, objects, making a chart, list, or graph.*
- 5. Use appropriate tools strategically.** *Student chooses the best tool, such as estimation or creating a model, for solving mathematical problems.*
- 6. Attend to precision.** *Student uses clear and precise language in mathematical discussions.*
- 7. Look for and make use of structure.** *Student notices attributes and structures in mathematics such as: if $4 \times 7 = 28$, then $28 \div 7 = 4$.*
- 8. Look for and express regularity in repeated reasoning.** *Student notices repetitive actions in computation and looks for shortcut methods: 12×5 is the same as 10×5 and 2×5 to arrive at 60.*

The eight standards for mathematical practice describe the “know-how” or habits of mind that we seek to develop in students. These practices define important methods and skills that students need to be mathematically proficient.

Additional information on the CCSS in Oregon can be found at: <http://www.ode.state.or.us/search/page/?id=3380>

Portland Public Schools



Great Expectations: Standards and Practices for 3-5 Mathematics

The math standards that are listed in this brochure include most, though not all, of the concepts and skills that are taught in grades 3, 4, and 5. You will notice that elementary math curriculum today includes many new topics and students are asked to have a deeper level of mathematical understanding and technical vocabulary. Last year Portland Public Schools began the transition to the **Common Core State Standards for Mathematics** (CCSS) by implementing these high level standards and practices in grades K, 1, and 2. This year we continue our transition to the CCSS in grades 3, 4, and 5. Over the next three years, Portland Public schools, along with districts across Oregon and our nation, will be transitioning to the Common Core State Standards for Mathematics (CCSS) in grades K-12.

What are the Common Core State Standards?

For over a decade, research studies of mathematics education in high performing countries have concluded that mathematics instruction in the United States must become more focused and coherent in order to improve mathematics achievement. Historically, math standards have varied from state to state. In June of 2009, the development of the **Common Core State Standards** began. Oregon, along with over 45 other states, has adopted the CCSS and we will begin to assess them in the 2014-15 school year.

The CCSS provide a clear and consistent understanding of what students are expected to learn in K-12 math. Common standards will help ensure that students are receiving a high quality education consistently, from school to school and from state to state.

The Common Core State Standards (CCSS) for mathematics includes two types of standards: one for **mathematical practices** (how students engage, apply, and extend their understandings of mathematical concepts) and one for **mathematical content** (what mathematical skills and procedures students are expected to know).

Third Grade Math Content Standards	Fourth Grade Math Content Standards	Fifth Grade Math Content Standards
<p>Number and Operations</p> <ul style="list-style-type: none"> Represents and solves problems involving multiplication and division Understands properties of multiplication (commutative, associative, and distributive) Multiplies and divides within 100 Solves problems involving addition, subtraction, multiplication and division Identifies and explains patterns in arithmetic <p>Number and Operations in Base Ten</p> <ul style="list-style-type: none"> Uses place value understanding and properties of operations (commutative, associative, and distributive) to perform multi-digit arithmetic <p>Number and Operations - Fractions</p> <ul style="list-style-type: none"> Understands that the numbers in a fraction represent a quantity partitioned into equal parts Understands fractional quantities and can order them on a number line Recognizes, creates, and compares equivalent fractions <p>Measurement and Data</p> <ul style="list-style-type: none"> Solves problems involving measurement and estimation of intervals of time, liquid volume, and masses of objects Interprets data and creates a variety of graphs to represent data Understands concepts of area and relates area to multiplication and to addition Recognizes perimeter of polygons and understands that an area of a shape can result in different perimeters and a given perimeter can result in different areas <p>Geometry</p> <ul style="list-style-type: none"> Recognizes and describes shapes by their attributes and can divide a shape into fractional parts 	<p>Number and Operations - Fractions</p> <ul style="list-style-type: none"> Extends understanding of fraction equivalence and ordering Uses models and equations to solve problems involving addition and subtraction of fractions including improper fractions and mixed numbers Uses models and equations to solve problems involving multiplication of a fraction by a whole number Determines decimal equivalents or approximations of common fractions <p>Number and Operations and Algebra</p> <ul style="list-style-type: none"> Applies with fluency multiplication facts to 10 times 10 and related division facts Understands models for multi-digit multiplication, place value, and properties of operations (commutative, associative, and distributive) Develops and uses accurate, efficient methods to multiply multi-digit whole numbers <p>Measurement</p> <ul style="list-style-type: none"> Uses arrays (area model) to represent multiplication and to determine the area of a rectangle Determines the appropriate units, strategies, and tools to solve problems that involve estimating or measuring area Recognizes area as an attribute of two-dimensional space Determines area finding the total number of same sized units that cover a shape without gaps or overlaps Solves problems involving perimeters and areas of rectangles and squares Recognizes that rectangles with the same area can have different perimeters and that rectangles with the same perimeter can have different areas Finds the areas of complex shapes that can be subdivided into rectangles 	<p>Number and Operations – Fractions and Decimals</p> <ul style="list-style-type: none"> Uses equivalent fractions as a strategy to add and subtract fractions Solves problems involving multiplication of fractions and mixed numbers Solves problems using division involving fractions (e.g. $5 \div \frac{1}{4} = 20$) Understands multiplication as scaling (enlarging or reducing; e.g., knows $5 \times \frac{3}{4}$ is less than 5 without performing the multiplication) Uses appropriate decimal models, number properties, and efficient strategies to estimate and compute with decimals to the thousandths <p>Data Analysis</p> <ul style="list-style-type: none"> Uses ordered pairs on a coordinate grid <p>Number and Operations and Algebra</p> <ul style="list-style-type: none"> Understands the relationship of division to multiplication to solve problems (e.g., $5 \times 6 = 30$, so $30 \div 5 = 6$) Selects and uses appropriate strategies to estimate and solve division problems Applies concepts of place value and the properties of operations (commutative, associative, and distributive) to solve multi-digit division problems <p>Geometry, Measurement, and Algebra</p> <ul style="list-style-type: none"> Identifies and classifies triangles by their angles and sides Finds and explains relationships among the formulas for the areas of triangles and parallelograms Describes three-dimensional shapes using appropriate vocabulary Recognizes volume as an attribute of three-dimensional space Determines the appropriate units, strategies, and tools for solving problems that involve estimating or measuring volume Uses appropriate strategies and formulas to solve problems that involve area, surface area, and volume