Grade Five
Ohio Mathematics Standards and Indicators

Number, Number Sense and Operations Standard

Number and Number Systems

1. Use models and visual representation to develop the concept of ratio as part-to-part and part-to-whole, and the concept of percent as part-to-whole.
2. Use various forms of "one" to demonstrate the equivalence of fractions; e.g., $\frac{18}{24} = \frac{9}{12} \; x \; \frac{2}{2} = \frac{3}{4} \; x \; \frac{6}{6}$
3. Identify and generate equivalent forms of fractions, decimals and percents.
4. Round decimals to a given place value and round fractions (including mixed numbers) to the nearest half.
5. Recognize and identify perfect squares and their roots.

Meaning of Operations

6. Represent and compare numbers less than 0 by extending the number line and using familiar applications; e.g., temperature, owing money.
7. Use commutative, associative, distributive, identity and inverse properties to simplify and perform computations.
8. Identify and use relationships between operations to solve problems.
9. Use order of operations, including use of parentheses, to simplify numerical expressions.
10. Justify why fractions need common denominators to be added or subtracted.
11. Explain how place value is related to addition and subtraction of decimals; e.g., 0.2 + 0.14; the two tenths is added to the one tenth because they are both tenths.

Computation and Estimation

12. Use physical models, points of reference, and equivalent forms to add and subtract commonly used fractions with like and unlike denominators and decimals.
13. Estimate the results of computations involving whole numbers, fractions and decimals, using a variety of strategies.

Measurement Standard

Measurement Units

1. Identify and select appropriate units to measure angles; i.e., degrees.
2. Identify paths between points on a grid or coordinate plane and compare the lengths of the paths; e.g., shortest path, paths of equal length.
3. Demonstrate and describe the differences between covering the faces (surface area) and filling the interior (volume) of three-dimensional objects.
4. Demonstrate understanding of the differences among linear units, square units and cubic units.

Use Measurement Techniques and Tools

5. Make conversions within the same measurement system while performing computations.
6. Use strategies to develop formulas for determining perimeter and area of triangles, rectangles and parallelograms, and volume of rectangular prisms.
7. Use benchmark angles (e.g.; 45º, 90º, 120º) to estimate the measure of angles, and use a tool to measure and draw angles.

Geometry and Spatial Sense Standard

Characteristics and Properties

1. Draw circles, and identify and determine relationships among the radius, diameter, center and circumference; e.g., radius is half the diameter, the ratio of the circumference of a circle to its diameter is an approximation of π.
2. Use standard language to describe line, segment, ray, angle, skew, parallel and perpendicular.
3. Label vertex, rays, interior and exterior for an angle.
4. Describe and use properties of congruent figures to solve problems.
5. Use physical models to determine the sum of the interior angles of triangles and quadrilaterals.

Spatial Relationships

6. Extend understanding of coordinate system to include points whose *x* or *y* values may be negative numbers.

Transformations and Symmetry

7. Understand that the measure of an angle is determined by the degree of rotation of an angle side rather than the length of either side.
8. Predict what three-dimensional object will result from folding a two-dimensional net, then confirm the prediction by folding the net.

Patterns, Functions and Algebra Standard

Use Patterns, Relations and Functions

1. Justify a general rule for a pattern or a function by using physical materials, visual representations, words, tables or graphs.
2. Use calculators or computers to develop patterns, and generalize them using tables and graphs.

Use Algebraic Representations

3. Use variables as unknown quantities in general rules when describing patterns and other relationships.
4. Create and interpret the meaning of equations and inequalities representing problem situations.
5. Model problems with physical materials and visual representations, and use models, graphs and tables to draw conclusions and make predictions.

Analyze Change

6. Describe how the quantitative change in a variable affects the value of a related variable; e.g., describe how the rate of growth varies over time, based upon data in a table or graph.

Data Analysis and Probability Standard

Data Collection

1. Read, construct and interpret frequency tables, circle graphs and line graphs.
2. Select and use a graph that is appropriate for the type of data to be displayed; e.g., numerical vs. categorical data, discrete vs. continuous data.
3. Read and interpret increasingly complex displays of data, such as double bar graphs.
4. Determine appropriate data to be collected to answer questions posed by students or teacher, collect and display data, and clearly communicate findings.

Statistical Methods

5. Modify initial conclusions, propose and justify new interpretations and predictions as additional data are collected.
6. Determine and use the range, mean, median and mode, and explain what each does and does not indicate about the set of data.

Probability

7. List and explain all possible outcomes in a given situation.
8. Identify the probability of events within a simple experiment, such as three chances out of eight.
9. Use 0, 1 and ratios between 0 and 1 to represent the probability of outcomes for an event, and associate the ratio with the likelihood of the outcome.
10. Compare what should happen (theoretical/expected results) with what did happen (experimental/actual results) in a simple experiment.
11. Make predictions based on experimental and theoretical probabilities.