# Grade 7 Math

ACHIEVING EXCELLENCE TOGETHER

# Priority Standards and Instructional Unit 1

# 7th Grade Math Unit 1: Number Sense (5 Weeks)

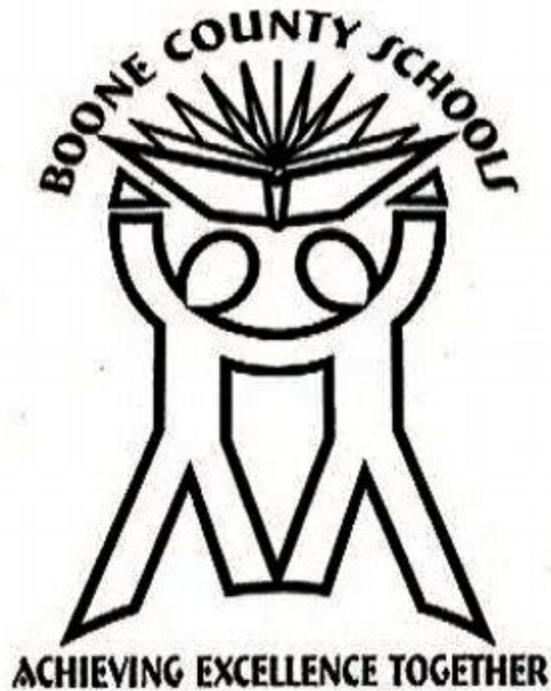| | |
|---|---|
| **KY.7.NS.3** Solve real-world and mathematical problems involving the four operations with rational numbers.<br>MP.1, MP.2, MP.5 | **Priority Standard** |
| **KY.7.EE.3** Solve real-life and mathematical problems posed with positive and negative rational numbers in any form, using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.<br>MP.1, MP.4, MP.6 | **Priority Standard** |
| **KY.7.NS.1** Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. **a.** Describe situations in which opposite quantities combine to make 0. **b.** Understand $p + q$ as the number located a distance $|q|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. **c.** Understand subtraction of rational numbers as adding the additive inverse, $p – q = p + (– q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference and apply this principle in real-world contexts. d. Apply properties of operations as strategies to add and subtract rational numbers.<br>MP.2, MP.4, MP.7 | **Supporting Standard** |
| **KY.7.NS.2** Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. **a.** Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(–1)(–1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. **b.** Understand that integers can be divided, provided that the divisor is not zero and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $–(p/q) = (–p)/q = p/(–q)$. Interpret quotients of rational numbers by describing real-world contexts. **c.** Apply properties of operations as strategies to multiply and divide rational numbers.<br>MP.2, MP.7, MP.8 | **Supporting Standard** |

# Grade 7 Math

Priority Standards
and
Instructional Unit 2

# 7th Grade Math Unit 2: Expressions and Equations & Inequalities
## (5 Weeks)

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| **KY.7.EE.4** Use variables to represent quantities in a real-world or mathematical problem and construct equations and inequalities to solve problems by reasoning about the quantities. **a**. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q and r are specific rational numbers. Solve equations of these forms. Graph the solution set of the equality and interpret it in context of the problem. **b.** Solve word problems leading to inequalities of the form $px + q > r$, $px + q < r$, $px + q \geq r$, $px + q \leq r$; where p, q and r are specific rational numbers. Graph the solution set of the inequality and interpret it in context of the problem. MP.2, MP.4 | **Priority Standard** |
| **KY.7.EE.1** Apply properties of operations as strategies to add, subtract, factor and expand linear expressions with rational coefficients. MP.2, MP.3 | **Supporting Standard** |
| **KY.7.EE.2** Understand that rewriting an expression in different forms in a problem context can clarify the problem and how the quantities in it are related. MP.7, MP.8 | **Supporting Standard** |

# Grade 7 Math



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# Priority Standards and Instructional Unit 3

# 7th Grade Math Unit 3: Proportional Relationships (6 weeks)

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| **KY.7.RP.2** Recognize and represent proportional relationships between quantities.<br>**b**. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams and verbal descriptions of proportional relationships.<br>**c**. Represent proportional relationships by equations. | **Priority Standard** |
| **KY.7.G.1** Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. MP.1, MP.2, MP.5 | **Priority Standard** |
| **KY.7.RP.1** Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. MP.2, MP.6 | **Supporting Standard** |
| **KY.7.RP.2** Recognize and represent proportional relationships between quantities.<br>**a**. Decide whether two quantities represent a proportional relationship.<br>**d**. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate. MP.1, MP.2, MP.3 | **Supporting Standard** |

# Grade 7 Math



# Priority Standards
and
Instructional Unit 4

# 7th Grade Math Unit 4: Percents (4 weeks)

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| **KY.7.RP.3** Use percents to solve mathematical and real-world problems.<br>**b.** Use proportional relationships to solve multistep ratio and percent problems. MP.5, MP.6 | **Priority Standard** |
| **KY.7.RP.3** Use percents to solve mathematical and real-world problems.<br>**a**. Find a percent of a quantity as a rate per 100; solve problems involving finding the whole, a part and a percent, given two of these. | **Supporting Standard** |

# Grade 7 Math

Priority Standards
and
Instructional Unit 5

# 7th Grade Math Unit 5: 2D Geometry (5 weeks)

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| **KY.7.G.5** Apply properties of supplementary, complementary, vertical and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. MP.3, MP.6, MP.7 | **Priority Standard** |
| **KY.7.G.4** Use formulas for area and circumference of circles and their relationships. **a.** Apply the formulas for the area and circumference of a circle to solve real-world and mathematical problems. | **Priority Standard** |
| **KY.7.G.6** Solve problems involving area of two-dimensional objects and surface area ~~and volume of three-dimensional objects.~~ **a.** Solve real-world and mathematical problems involving area of two-dimensional objects composed of triangles, quadrilaterals and other polygons. | **Priority Standard** |
| **KY.7.G.2** Draw (freehand, with ruler and protractor and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. MP.6, MP.7 | **Supporting Standard** |

# Grade 7 Math



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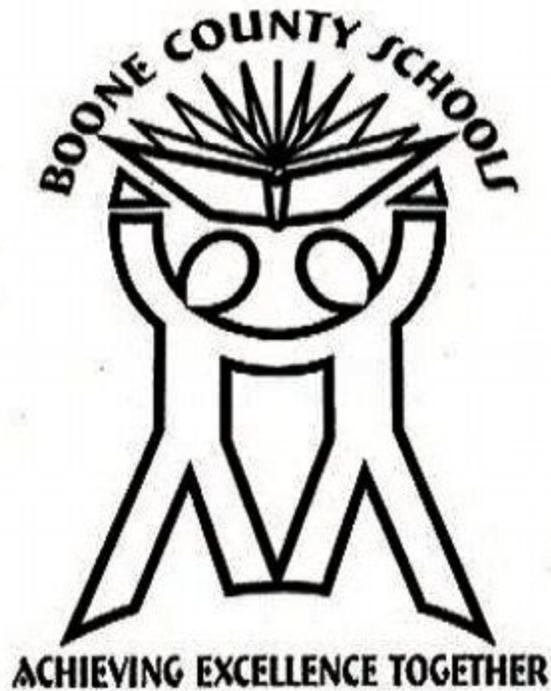
# Priority Standards
# and
# Instructional Unit 6

# 7th Grade Math Unit 6: 3D Geometry (4 weeks)

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| **KY.7.G.6** Solve problems involving ~~area of two-dimensional objects and~~ surface area and volume of three-dimensional objects. **b.** Solve real-world and mathematical problems involving volume and surface area, using nets as needed, of three-dimensional objects including cubes, pyramids and right prisms. MP.3, MP.4, MP.5 | **Priority Standard** |
| **KY.7.G.6** Solve problems involving ~~area of two-dimensional objects and~~ surface area and volume of three-dimensional objects. **a.** Solve real-world and mathematical problems involving area of two-dimensional objects composed of triangles, quadrilaterals and other polygons. | **Supporting Standard** |
| **KY.7.G.3** Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. MP.5, MP.6 | **Supporting Standard** |

# Grade 7 Math



# Priority Standards
and
Instructional Unit 7

# 7th Grade Math Unit 7:  Probability and Statistics (3 weeks)

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| **KY.7.SP.4** Calculate and use measures of center (mean and median) and measures of variability (interquartile range when comparing medians and mean absolute deviation when comparing means) for numerical data from random samples to draw informal comparative inferences about two populations. MP.2, MP.5, MP.7 For example, decide whether the words in a chapter of a grade seven science book are generally longer than the words in a chapter of a grade four science book. KY.HS.SP.10 Coherence KY.6.SP.2→KY.7.SP.4→KY.HS.SP.13 | **Priority Standard** |
| **KY.7.SP.5** Describe the probability of a chance event is a number between 0 and 1, which tells how likely the event is, from impossible (0) to certain (1). A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely and a probability near 1 indicates a likely event. MP.5, MP.6, MP.7 Emphasis is on descriptive language used to describe numerical probabilities; impossible event, unlikely event, equally likely event, likely event, certain event. Students understand all probabilities must fall between 0 and 1. | **Priority Standard** |
| **KY.7.SP.8** Find probabilities of compound events using organized lists, tables, tree diagrams and simulations Example: a. If the probability of heads occurring on a coin is ½, then the probability of three heads in a row is ½ · ½ · ½ = ⅛. 152 Standards Clarifications **a.** Explain just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. | **Priority Standard** |
| **KY.7.SP.0** Create displays, including circle graphs (pie charts), scaled pictographs and bar graphs, to compare and analyze distributions of categorical data from both matching and different-sized samples. MP.2, MP.3, MP.6 Students have been introduced to pictographs and bar graphs in grades 2 and 3; Circle graphs are new and connect to the grade 7 focus on percents. Also, students' knowledge of rates mean they can approach scaled pictographs in a more sophisticated manner. An important aspect of doing statistics is selecting an appropriate data display for the question under investigation. Students need to be asked, "Which data display fits this data set and why?" The circle graph focuses more on the relative values of the clustering of data, whereas the bar and pictographs add a dimension of quantity. The choice of which data display (and how categories are set up within each display) will result in different pictures of the shape of data. Finally students are comparing two distributions. When comparing two different distributions, circle graphs lend to comparing different sized samples, because circle graphs are based on percentages. KY.7.SP.0 KY.7.SP.2 Coherence KY.6.SP.O→KY.7.SP.4 | **Supporting Standard** |
| **KY.7.SP.1** Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random Recognize what makes a valid and non-valid sample of a population. Recognize the size of the sample holds importance to the accuracy of the sample. KY.6.SP.0 149 Standards Clarifications sampling tends to produce representative samples and support valid inferences. MP.3, MP.6 KY.6.SP.1 Coherence KY.6.SP.2→KY.7.SP.1→KY.HS.SP.9 | **Supporting Standard** |
| **KY.7.SP.2** Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. **a**. Generate multiple samples of categorical data of the same size to gauge the variation in estimates or predictions. **b**. Generate multiple samples (or | **Supporting Standard** |

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| simulated samples) of numerical data to gauge the variation in estimates or predictions. **c.** Gauge how far off an estimate or prediction might be related to a population character of interest. MP.2, MP.3, MP.7 Emphasis is on the sample size and how this affects the validity of the estimate or prediction. Examples: a. Randomly sample 6th, 7th and 8th graders about who their favorite superhero is to generate samples of data that are roughly the same size, looking specifically at patterns, if any. **b.** Estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Coherence KY.6.SP.0→ 7.SP.2→ KY.HS.SP.12 | |
| **KY.7.SP.3** Describe the degree of visual overlap (and separation) from the graphical representations of two numerical data distributions (box plots, dot plots) with similar variabilities with similar contexts (same variable), measuring the difference between the centers (medians or means) by expressing this difference as a multiple of a measure of variability (interquartile range when comparing medians or the mean absolute deviation when comparing means). MP.1, MP.5, MP.7 For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable. KY.6.SP.2 Coherence KY.6.NS.1→KY.7.SP.3→KY.HS.SP.13 KY.HS.SP.10 | **Supporting Standard** |
| **KY.7.SP.6** Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency and predict the approximate relative frequency given the probability. MP.1, MP.2 Estimate the likelihood of an event, test the estimate by trial and collect data. Students observe accuracy of the estimate will increase with the frequency of repeated trials. Coherence KY.7.SP.6→ KY.HS.SP.10 | **Supporting Standard** |
| **KY.7.SP.7** Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. **a**. Develop a uniform probability model by assigning equal probability to all outcomes and use the model to determine probabilities of events. b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. MP.4, MP.7, MP.8 For example: **a.** If a student is selected at random from a class, find the probability Jane will be selected and the probability a girl will be selected. **b.** Find the approximate probability a spinning penny will land heads up or a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies? KY.7.RP.3 Coherence KY.7.SP.7→ KY.HS.SP.14 | **Supporting Standard** |
| **KY.7.SP.8** Find probabilities of compound events using organized lists, tables, tree diagrams and simulations <br> **b**. Represent sample spaces for compound events described in everyday language using methods such as organized lists, tables and tree diagrams. **c**. Design and use a simulation to generate frequencies for compound events. MP.2, MP.4, MP.7 **b**. For a simulation of tossing two fair coins: **c.** Use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability it will take at least 4 donors to find one with type A blood? Coherence KY.7.SP.8→ KY.HS.SP.14 Attending to the Standards for Mathematical Practice Thinking of probability as being on a continuum ranging from a probability of 0 to a probability of 1 allows students to visualize th | **Supporting Standard** |