

# FOLSOM CORDOVA UNIFIED SCHOOL DISTRICT

## MATH COURSE 2

**Date:** January 2019

**Proposed Grade Level(s):** 7<sup>th</sup>

**Grading:** A - F

**Prerequisite(s):** Completion of Math Course 1

**Intent to Pursue 'A-G' College Prep Status** No

**A-G Course Identifier:** N/A

**Course Length:** 3 Trimesters

**Subject Area:** Mathematics

**Credits:** N/A

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### **COURSE DESCRIPTION:**

Math Course 2 is a 7<sup>th</sup> grade level course that is aligned with the California Common Core Standards for Mathematics. In this course students will build on a strong foundation of number sense, to prepare for higher level mathematics, bridging the concrete concepts of arithmetic and the abstract thinking of Algebra. The Standards provide content to be developed throughout the school year through rich instructional experiences represented in a coherent manner. Instructional time will focus on four critical areas: (1) developing understanding of and applying proportional relationships, including percentages; (2) developing understanding of operations with rational numbers and working with expressions and linear equations; (3) solving problems that involve scale drawings and informal geometric constructions and working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume; and (4) drawing inferences about populations based on samples. Students also work toward fluently solving equations of the form  $px + q = r$  and  $p(x + q) = r$ .

The bulk of instructional time should be given to “Major” clusters and the Standards within them, identified later in this document. However, Standards in the “Additional/Supporting” clusters should not be neglected; to do so would result in gaps in students’ learning, including skills and understandings they may need in later grades. Instruction in this course should reinforce topics in major clusters by using topics in the additional/supporting clusters and including problems and activities that support natural connections between clusters.

### **GENERAL GOALS:**

#### **Goals:**

- Students extend their understanding of ratios and develop an understanding of proportionality to solve single- and multi-step problems.
- Students graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope.
- Students develop a unified understanding of number, recognizing fractions, decimals (that have a finite or a repeating decimal representation), and percent, as different representations of rational numbers.
- Students use the arithmetic of rational numbers as they formulate expressions and equations in one variable and use these equations to solve problems.

- Students solve problems involving the area and circumference of a circle and surface area of three-dimensional objects.
- Students build on their previous work with single data distributions to compare two data distributions and address questions about differences between populations.

## **DETAILED UNITS OF INSTRUCTION:**

### **UNIT 1: RATIOS AND PROPORTIONAL RELATIONSHIPS**

Chapter 1: Ratios and Proportional Reasoning

Chapter 2: Percent

Content: Students will analyze proportional relationships and use them to solve real-world mathematical problems. They will compute unit rates associated with ratios of fractions, ratios of lengths, and of areas. Students will also recognize and represent proportional relationships between quantities and identify the constant of proportionality in tables, graphs, equations, diagrams, and verbal descriptions. Proportional relationships will be used to solve multi-step ratio and percent problems.

Math Practice Standards: Through the lessons and practice, there is an emphasis on making sense of problems and persevering in solving them, constructing viable arguments and critiquing the reasoning of others, modeling with mathematics, and using appropriate tools strategically.

### **UNIT 2: THE NUMBER SYSTEM**

Chapter 3: Integers

Chapter 4: Rational Numbers

Content: Students will apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. The rules of integers are studied with a focus on multiplication and division, and those rules are applied to rational numbers. Students will also convert rational numbers to decimals using long division and understanding repeating and terminal decimals. Real-world mathematical problems will involve the four operations with rational numbers.

Math Practice Standards: Through the lessons and practice, there is an emphasis on making sense of problems and persevering in solving them, constructing viable arguments and critiquing the reasoning of others, using appropriate tools strategically, attending to precision, modeling with mathematics, and looking for and expressing regularity in repeated reasoning.

### **UNIT 3: EXPRESSIONS AND EQUATIONS**

Chapter 5: Expressions

Chapter 6: Equations and Inequalities

Content: Students will use properties of operations to generate equivalent expressions by applying properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. They will also solve real-life and mathematical problems using numerical and algebraic expressions. Students will use numbers in any form, and use variables to represent quantities, in constructing simple equations and inequalities to solve problems. Students work to fluency in solving  $px + q = r$  and  $p(x + q) = r$ , and solving  $px + q > r$  and  $px + q < r$ , where  $p$ ,  $q$ , and  $r$ , are specific rational numbers. Students will learn to graph the solution set of the inequality and interpret it in the context of the problem.

Math Practice Standards: Through the lessons and practice, there is an emphasis on making sense of problems and persevering in solving them, reasoning abstractly and quantitatively, constructing viable arguments and critiquing the reasoning of others, attending to precision, modeling with mathematics, and looking for and making use of structure.

#### **UNIT 4: GEOMETRY**

Chapter 7: Geometric Figures

Chapter 8: Measure Figures

Content: Students will draw, construct, and describe geometric figures and describe the relationships between them. Problems will involve scale drawings of geometric figures, the use of a ruler and protractor, and technology, to construct triangles, using three angle or three sided measures. Students will also describe cross-sections of three-dimensional figures. Real-life and mathematical problems involving angle measure, area, and volume will be solved using circumference and area formulas and rules about supplementary, complementary, vertical, and adjacent angles. Area, surface area, and volume will be used to solve real-world mathematical problems of two- and three-dimensional figures.

Math Practice Standards: Through the lessons and practice, there is an emphasis on making sense of problems and persevering in solving them, constructing viable arguments and critiquing the reasoning of others, using appropriate tools strategically, attending to precision, look for and make use of structure, modeling with mathematics, and looking for and expressing regularity in repeated reasoning.

#### **UNIT 5: STATISTICS AND PROBABILITY**

Chapter 9: Probability

Chapter 10: Statistics

Content: Students will use random sampling to draw inferences about a population by examining a sample of the population. Students will use data from a random sample to generate multiple samples of the same size to gauge the variation in estimates or predictions. Students will draw informal comparative inferences about two populations using measures of center, and measures of variability, to draw informal comparative inferences about two populations. Students will investigate chance processes to develop, use, and evaluate probability models.

Math Practice Standards: Through the lessons and practice, there is an emphasis on making sense of problems and persevering in solving them, constructing viable arguments and critiquing the reasoning of others, using appropriate tools strategically, attending to precision, modeling with mathematics, and looking for and expressing regularity in repeated reasoning.

### **SUBJECT AREA CONTENT STANDARDS TO BE ADDRESSED:**

#### **Standards for Mathematical Practice**

The *Standards for Mathematical Practice* (SMP) describe the attributes and expertise that mathematics educators at all levels should seek to develop in their students. The Standards for Mathematical Practice represent a picture of what it looks like for students to *do mathematics*. Mathematical practices provide a vehicle through which students engage with and learn mathematics with a focus on reading, writing, and explaining. The Standards for Mathematical Practice along with the Standards for Mathematical Content (which follow this section), prescribe that students experience mathematics as a coherent, relevant, and meaningful subject.

- SMP 1: Make sense of problems and persevere in solving them.  
SMP 2: Reason abstractly and quantitatively.  
SMP 3: Construct viable arguments and critique the reasoning of others.  
SMP 4: Model with mathematics.  
SMP 5: Use appropriate tools strategically.  
SMP 6: Attend to precision.  
SMP 7: Look for and make use of structure.  
SMP 8: Look for and express regularity in repeated reasoning.

## **Mathematics Content Standards**

The bulk of instructional time should be given to “major” clusters and the Standards within them. However, Standards in the “additional/supporting” clusters should not be neglected. To do so would result in gaps in students’ learning, including skills and understanding they may need in later grades. Instruction in this course should reinforce topics in major clusters by using topics in the additional/supporting clusters and including problems and activities that support natural connections between clusters.

## **Ratios and Proportional Relationships**

*Analyze proportional relationships and use them to solve real-world and mathematical problems.*

- 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.
- 7.RP.2. Recognize and represent proportional relationships between quantities.
- Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
  - Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal description of proportional relationships.
  - Represent proportional relationships by equations.
  - 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.
- 7.RP.3. Use proportional relationships to solve multi-step ratio and percent problems.

## **The Number System**

*Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.*

- 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.
- Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.
  - 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.
  - 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.
  - Apply properties of operations as strategies to add and subtract rational numbers.
- 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. Interpret quotients of rational numbers by describing real-world contexts.
  - c. Apply properties of operations as strategies to multiply and divide rational numbers.
  - d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
- 7.NS.3. Solve real-world and mathematical problems involving the four operations with rational numbers.

## **Expressions and Equations**

### ***Use properties of operations to generate equivalent expressions.***

- 7.EE.1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- 7.EE.2. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.

### ***Solve real-life and mathematical problems using numerical and algebraic expressions and equations.***

- 7.EE.3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), 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.
- 7.EE.4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
  - a. Solve word problems leading to equations of the form  $px + q = r$ ,  $p(x + q) = r$ , where  $p, q,$  and  $r$ , are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.
  - b. Solve word problems leading to inequalities of the form  $px + q > r$ , and  $px + q < r$ , where  $p, q,$  and  $r$ , are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.

## **Geometry**

### ***Draw, construct, and describe geometrical figures and describe the relationships between them.***

- 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.
- 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.
- 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.

### ***Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.***

- 7.G.4. Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
- 7.G.5. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.

7.G.6. Solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

## **Statistics and Probability**

*Use random sampling to draw inferences about a population.*

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 sampling tends to produce representative samples and support valid inferences.

7.SP.2. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions

*Draw informal comparative inferences about two populations.*

7.SP.3. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.

7.SP.4. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.

*Investigate chance processes and develop, use, and evaluate probability models.*

7.SP.5 Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around  $\frac{1}{2}$  indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

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.

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.

7.SP.8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

a. Understand that, 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.

b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event.

c. Design and use a simulation to generate frequencies for compound events.

## **COMMON CORE STATE ANCHOR STANDARDS FOR READING (K-12):**

### **Key Ideas and Details**

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

3. Analyze how and why individuals, events, or ideas develop and interact over the course of a text.

### **Craft and Structure**

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
6. Assess how point of view or purpose shapes the content and style of a text.

### **Integration of Knowledge and Ideas**

7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

### **Reading Range / Text Complexity**

10. Read and comprehend complex literary and informational texts independently and proficiently.

## **COMMON CORE STATE ANCHOR STANDARDS FOR WRITING (K-12):**

### **Text Types and Purposes**

1. Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.
2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details and well-structured event sequences.

### **Production and Distribution of Writing**

4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. Develop and strengthen writing, as needed, by planning, revising, editing, rewriting, or trying a new approach.
6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

### **Research to Build Knowledge**

7. Conduct short, as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

### **Range of Writing**

10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

## **COMMON CORE STATE ANCHOR STANDARDS FOR SPEAKING AND LISTENING (K-12):**

### **Comprehension and Collaboration**

1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas, and expressing their own clearly and persuasively.
2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.

### **Presentation of Knowledge and Ideas**

4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning, and ensure that the organization, development, and style are appropriate to task, purpose, and audience.
5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
6. Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

## **TEXTBOOKS AND RESOURCE MATERIALS:**

### **Textbook**

*California Math Course 2*, by McGraw Hill, 2015.

## **DISTRICT ESLRS TO BE ADDRESSED:**

### **Students will be:**

- **Self-Directed Learners:** who will be able to use notes and a textbook to assist them in continuing their learning outside of the classroom setting.
- **Constructive Thinkers:** who are able to engage in problems from a variety of approaches.
- **Effective Communicators:** who can explain mathematical concepts to others and use mathematics to organize, explain and justify their reasoning.
- **Collaborative Workers:** who can work effectively in a variety of settings in culturally diverse groups.
- **Quality Producers/Performers:** who understand the importance of neat, organized work that demonstrates their thinking and understanding.
- **Responsible Citizens:** who make positive decisions that benefit their personal, social, and professional circles.

The Folsom Cordova Unified School District prohibits discrimination, intimidation, harassment (including sexual harassment) or bullying based on a person's actual or perceived ancestry, color, disability, race or ethnicity, religion, gender, gender identity or gender expression, immigration status, national origin, sex, sexual orientation, or association with a person or group with one or more of these actual or perceived characteristics. **For concerns/questions or complaints, contact the Title IX Coordinator(s) and Equity Compliance Officer(s): Curtis Wilson, [cmwilson@fcusd.org](mailto:cmwilson@fcusd.org) (grades K-5) and Jim Huber, ED. D., [jhuber@fcusd.org](mailto:jhuber@fcusd.org) (grades 6-12), 1965 Birkmont Drive, Rancho Cordova, CA 96742, 916-294-9000 ext.104625**