Sequenced Units for the Common Core State Standards in Mathematics
Grade 7

In Grade 6, students developed an understanding of variables from two perspectives—as placeholders for specific values and as representing sets of values represented in algebraic relationships. They applied properties of operations to write and solve simple one-step equations. By the end of Grade 6, students were fluent in all positive rational number operations, and they developed a solid foundation for understanding area, surface area, and volume of geometric figures. The Grade 7 course outlined in this scope and sequence document builds on Grade 6 work by extending students' understanding of ratio to a more formal understanding of rate and its application with percents. Students extend their understanding of operations with rational numbers to include negative rational numbers. Students then continue the work they started in Grade 6 in writing expressions and equations, laying the groundwork for their Grade 8 work with functions. The course then turns to more formal methods for writing and solving multi-step equations and inequalities. Students also build on the Grade 6 work with proportional reasoning as they learn to scale 2-dimensional figures and to apply proportional reasoning to probability and statistical situations. Students gain fluency with area, surface area, and volume of 2- and 3-dimensional shapes composed of polygons, including right prisms and pyramids. They use the formulas for area and circumference of a circle to solve problems and understand the relationships among the components of a circle. The final unit of study lays the groundwork for high school Geometry as students investigate informal proofs of key geometric relationships among triangles.

This document reflects our current thinking related to the intent of the Common Core State Standards for Mathematics (CCSSM) and assumes 160 days for instruction, divided among 14 units. The number of days suggested for each unit assumes 45-minute class periods and is included to convey how instructional time should be balanced across the year. The units are sequenced in a way that we believe best develops and connects the mathematical content described in the CCSSM; however, the order of the standards included in any unit does not imply a sequence of content within that unit. Some standards may be revisited several times during the course; others may be only partially addressed in different units, depending on the focus of the unit. Strikethroughs in the text of the standards are used in some cases in an attempt to convey that focus, and comments are included throughout the document to clarify and provide additional background for each unit.

Throughout Grade 7, students should continue to develop proficiency with the Common Core's eight Standards for Mathematical Practice:

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

These practices should become the natural way in which students come to understand and do mathematics. While, depending on the content to be understood or on the problem to be solved, any practice might be brought to bear, some practices may prove more useful than others. Opportunities for highlighting certain practices are indicated in different units in this document, but this highlighting should not be interpreted to mean that other practices should be neglected in those units.

When using this document to help in planning your district's instructional program, you will also need to refer to the CCSSM document, relevant progressions documents for the CCSSM, and the appropriate assessment consortium framework.

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Unit 1: Proportional reasoning	Suggested number of days: 11

In this unit, students investigate and solve problems involving rates. As part of this work, students apply positive rational number operations to write and solve equations of the form $px + q = r$ and $p(x + q) = r$ in which $q = 0$ (i.e., 1-step equations), thereby reinforcing their Grade 6 work in writing and solving equations (**6.EE.B.7**).[1]

Common Core State Standards for Mathematical Content

Ratios and Proportional Relationships —7.RP

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

1. Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks ½ mile in each ¼ hour, compute the unit rate as the complex fraction ½/¼ miles per hour, equivalently 2 miles per hour.*

The Number System — 7.NS

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

2. Apply and extend previous understandings of multiplication and division and of fractions 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.
3. Solve real-world and mathematical problems involving the four operations with rational numbers.[1]

NOTE: [1] Computations with rational numbers extend the rules for manipulating fractions to complex fractions.

Expressions and Equations —7.EE

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

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 $px + q = r$ and $p(x + q) = r$, 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. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width*?

Geometry — 7.G

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

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~~.

Comments

In this unit, all work with **7.NS.A.3** focuses on positive rational numbers, including positive complex fractions. Negative rational numbers will be addressed in units 4-7.

7.RP.A.1 and **7.NS.A.3** are closely connected because they both deal with complex fractions.

Since every ratio has an associated unit rate, this is an appropriate place to include conversion of rational numbers to decimals (**7.NS.A.2d**); for example, if Rachel can walk 2 miles in 3 hours, she can walk ⅔ mile in one hour. This fraction can be expressed by the decimal $0.\overline{6}$.

The equations (**7.EE.B.4a**) in this unit are strictly one-step. Students solve multi-step equations in units 6 and 7. Students will solve problems leading to inequalities in unit 7.

Work with scale drawings (**7.G.A.1**) should be included as an instance of proportional reasoning. Since area relationships in scale drawings are not proportional, they will be addressed in unit 13.

[1] Please see additional background and support in the Ratios and Proportional Relationships progressions document, with special attention to the Appendix, pp. 13-15.

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Common Core State Standards for Mathematical Practice	
2. Reason abstractly and quantitatively. 5. Use appropriate tools strategically. 6. Attend to precision.	In this unit, students use appropriate tools (e.g. tables, graphs, equations and verbal descriptions) strategically (**MP.5**) to solve problems dealing with proportional reasoning. They also attend to precision (**MP.6**) and reason abstractly and quantitatively (**MP.2**) as they write and solve 1-step equations.

Unit 2: Proportional relationships	**Suggested number of days: 12**
The standards in this unit are a critical area for this grade. They build on the work of the previous unit to reinforce and formalize understandings of proportional relationships. This unit also builds foundational understandings for slope that will be formalized in Grade 8.	
Common Core State Standards for Mathematical Content **Ratios and Proportional Relationships —7.RP** A. Analyze proportional relationships and use them to solve real-world and mathematical problems. 2. Recognize and represent proportional relationships between quantities. a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. c. Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.* 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. **Common Core State Standards for Mathematical Practice** 4. Model with mathematics. 6. Attend to precision. 8. Look for and express regularity in repeated reasoning.	**Comments** Students model with mathematics (**MP.4**) and attend to precision (**MP.6**) as they look for and express repeated reasoning (**MP.8**) by generating various representations of proportional relationships and use those representations to identify and describe constants of proportionality.

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Unit 3: Proportional reasoning with percents	Suggested number of days: 10
This unit builds on the previous unit as it extends students' understanding of ratio and rate reasoning to percents. Students also write and solve 1-step equations as part of their work with percents; for example, the question "If Kevin paid a total of 13.50, including 8% sales tax, what was the price of the item he purchased?" can be represented by the equation 1.08*x* = 13.50.	
Common Core State Standards for Mathematical Content **Ratios and Proportional Relationships —7.RP** A. Analyze proportional relationships and use them to solve real-world and mathematical problems. 3. Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error. **Expressions and Equations —7.EE** B. Solve real-life and mathematical problems using numerical and algebraic expressions and equations. 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. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation*. **Common Core State Standards for Mathematical Practice** 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 5. Use appropriate tools strategically.	**Comments** **7.RP.A.3** will be reinforced in units 8 and 9. **7.EE.B.3** is a major capstone standard for arithmetic and its applications. In this unit, it should only involve positive rational numbers. Work with negative rational numbers will be introduced in units 4 and 5. The content standards in this unit specify that students use tools strategically (**MP.5**) as they solve multi-step real-life mathematical problems (**MP.1**) using numerical and algebraic expressions (**MP.2**).

Sequenced Units for the Common Core State Standards in Mathematics
Grade 7

Unit 4: Rational number operations—addition and subtraction	Suggested number of days: 12
The purpose of this unit is to provide an opportunity for students to reinforce and extend their understanding of addition and subtraction with rational numbers. In builds on students' solid understanding of integers, other rational numbers, and absolute value as described in the Grade 6 CCSSM (**6.NS.C**). Positive and negative fractions, decimals, and whole numbers should be included in this unit.	
Common Core State Standards for Mathematical Content	**Comments**
The Number System — 7.NS A. Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. 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. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.* 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. 3. Solve real-world and mathematical problems involving the four operations with rational numbers.[1] NOTE: [1] Computations with rational numbers extend the rules for manipulating fractions to complex fractions. **Expressions and Equations —7.EE** B. Solve real-life and mathematical problems using numerical and algebraic expressions and equations. 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. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation*.	Work with **7.NS.A.3** should focus on addition and subtraction of positive and negative rational numbers. In this unit, **7.EE.B.3** will focus on problem situations involving addition and subtraction of rational numbers. Problems involving multiplication and division will be addressed in unit 5. Looking for and making use of structure (**MP.7**) aids students' understanding of addition and subtraction of positive and negative rational numbers. Students also engage in **MP.1** and **MP.6** in order to solve the multi-step problems presented in this unit.

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Common Core State Standards for Mathematical Practice	
1. Make sense of problems and persevere in solving them.	
6. Attend to precision.	
7. Look for and make use of structure	

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Unit 5: Rational number operations—multiplication and division	Suggested number of days: 9
The purpose of this unit is to provide students an opportunity to reinforce and extend their understanding of multiplication and division with rational numbers. Problems addressed in this unit will focus on multiplication and division, but may also incorporate addition and subtraction. By the end of this unit, students should be comfortable applying all four operations to positive and negative fractions and decimals.	
Common Core State Standards for Mathematical Content **The Number System — 7.NS** A. Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. 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. 3. Solve real-world and mathematical problems involving the four operations with rational numbers.[1] NOTE: [1] Computations with rational numbers extend the rules for manipulating fractions to complex fractions. **Expressions and Equations —7.EE** B. Solve real-life and mathematical problems using numerical and algebraic expressions and equations. 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. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation*.	**Comments** When addressing **7.NS.A.2a**, note that students already know the distributive property from earlier grades. It was first introduced in grade 3. In grade 6, students applied the distributive property to generate equivalent expressions involving both numbers and variables (**6.EE.A.3**). In this unit, **7.EE.B.3** will focus on problem situations involving all four operations with rational numbers. Work with **7.NS.A.3** should focus on all four operations with positive and negative rational numbers. As with unit 4, looking for and making use of structure (**MP.7**) aids students' understanding of multiplication and division of positive and negative rational numbers. Students also engage in **MP.1** and **MP.6** as they solve the multi-step problems presented in this unit.

Common Core State Standards for Mathematical Practice	
1. Make sense of problems and persevere in solving them. 6. Attend to precision. 7. Look for and make use of structure.	

Unit 6: Solving equations	Suggested number of days: 13
The purpose of this unit is to ensure that students have a strong foundation in manipulating and solving algebraic expressions and equations. This unit builds on work within the Expressions and Equations domain in Grade 6.	
Common Core State Standards for Mathematical Content **Expressions and Equations —7.EE** A. Use properties of operations to generate equivalent expressions. 1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. 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. *For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."* B. Solve real-life and mathematical problems using numerical and algebraic expressions and equations. 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 and 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. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width*? **Common Core State Standards for Mathematical Practice** 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 4. Model with mathematics. 7. Look for and make use of structure.	**Comments** Students have had prior experience in generating equivalent expressions; they should be working toward fluency in solving equations with **7.EE.A.1** in this unit. From their experience in prior units and grades, students already solve one-step equations fluently. In this unit, they are expected to build fluency with writing and solving multi-step equations (**7.EE.B.4a**). Inequalities will be explored in unit 7. Students solve real-life problems (**MP.1**) by modeling them with algebraic equations (**MP.4**). In manipulating these equations to generate equivalent expressions, they also reason abstractly and quantitatively (**MP.2**) and look for and make use of structure (**MP.7**)**.**

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Unit 7: Solving equations and inequalities	Suggested number of days: 11
In this unit, students extend their understanding of equations to include inequalities. Students reinforce their previous learning about solving equations as they learn to solve inequalities.	
Common Core State Standards for Mathematical Content **Expressions and Equations —7.EE** B. Solve real-life and mathematical problems using numerical and algebraic expressions and equations. 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 and 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. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width*? b. Solve word problems leading to inequalities of the form px + q > r or 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. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.* **Common Core State Standards for Mathematical Practice** 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 4. Model with mathematics. 7. Look for and make use of structure.	**Comments** In this unit, they are expected to continue to build fluency with writing and solving multi-step equations (**7.EE.B.4a**) and they extend those understandings to investigate solving word problems leading to inequalities. As with unit 6, students solve real-life problems (**MP.1**) by modeling them with algebraic inequalities (**MP.4**). In manipulating these equations and inequalities to generate equivalent expressions, they also reason abstractly and quantitatively (**MP.2**) and look for and make use of structure (**MP.7**).

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Unit 8: Probability of simple events	Suggested number of days: 12
Students in Grade 7 have not previously encountered probability. This unit focuses on the foundational understandings related to simple probability (e.g. chance, randomness, relative frequency, probability models).	
Common Core State Standards for Mathematical Content **Statistics and Probability — 7.SP** C. Investigate chance processes and develop, use, and evaluate probability models. 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 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. 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. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times*. 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. *For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.* b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that 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? **Ratios and Proportional Relationships —7.RP** A. Analyze proportional relationships and use them to solve real-world and mathematical problems. 3. Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error. **Common Core State Standards for Mathematical Practice** 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics.	**Comments** **7.RP.A.3** is repeated in this unit because of the strong application of percents in this unit. In this unit, **7.SP.C.5**, **7.SP.C.6**, and **7.SP.C.7** are investigated with simple events only. In unit 9, students will apply these concepts and skills with compound events. In this unit, students engage in developing probability models and thereby engage in **MP.4**. For many probability situations, more than one model may be developed and applied to answer real-world questions; therefore, students construct viable arguments and critique the reasoning of others (**MP.3**).

Unit 9: Probability of compound events	Suggested number of days: 11
This unit supports continued work with **7.SP.C.5**, **7.SP.C.6**, and **7.SP.C.7** as students extend their understanding of probability to include compound events	
Common Core State Standards for Mathematical Content **Statistics and Probability — 7.SP** C. Investigate chance processes and develop, use, and evaluate probability models. 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. *For example, 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 that it will take at least 4 donors to find one with type A blood*? **Ratios and Proportional Relationships —7.RP** A. Analyze proportional relationships and use them to solve real-world and mathematical problems. 3. Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error. **Common Core State Standards for Mathematical Practice** 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision.	**Comments** **7.RP.A.3** is repeated in this unit because of the strong application of percents in probability. In this unit, students continue modeling with mathematics (**MP.4**). Students use appropriate tools (e.g. organized lists, tables, tree diagrams) (**MP.5**) and attend to precision (**MP.6**) as they create and use probability models.

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Unit 10: Sampling, inferences, and comparing populations	Suggested number of days: 12
This unit includes work with single populations as well as multiple populations. In this unit, students apply their understanding of randomness. Ratio reasoning—including percents—is implicit in this unit (**7.RP.A.3**).	
Common Core State Standards for Mathematical Content **Statistics and Probability — 7.SP** A. Use random sampling to draw inferences about a population. 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. 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. *For example, 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. Gauge how far off the estimate or prediction might be.* B. Draw informal comparative inferences about two populations. 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. *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*. 4. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book*. **Common Core State Standards for Mathematical Practice** 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 6. Attend to precision.	**Comments** In this unit, students engage in modeling (**MP.4**) as they draw inferences about a population. They also use data to construct and critique arguments (**MP.3**). In doing so, they should also attend to the precision of their use of language and mathematics (**MP.6**).

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Unit 11: 2-D figures	Suggested number of days: 12
In this unit, students build on their Grade 6 work with two-dimensional figures and extend their learning to work with circumference and area of circles. While working with formulas for area and circumference, students will be reinforcing previous work with expressions and equations.	
Common Core State Standards for Mathematical Content **Geometry — 7.G** B. Solve real-life and mathematical problems involving angle measure, area, surface area, and volume. 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. 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~~. **Common Core State Standards for Mathematical Practice** 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and computationally. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	**Comments** Students in Grade 7 have not previously studied pi. When addressing **7.G.B.4**, they should develop an understanding of pi as the ratio of the circumference of a circle to its diameter. **7.G.B.6** only includes perimeter and area, including the circumference and area of circles. Work with 3-dimensional figures will be the focus of unit 12. In this unit, students engage in **MP.7** and **MP.8** as they relate formulas in this unit to particular real-world and mathematical problems. As students persevere in solve real-life and mathematical problems involving measurement (**MP.1**), they need to consider the units involved and attend carefully to the meaning of the quantities (**MP.2**).

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Unit 12: 3-D figures	**Suggested number of days: 12**
In this unit, students begin working with three-dimensional figures by exploring their plane sections and volumes. In Grade 6, students worked with the volume of rectangular prisms and determined surface areas from nets. This unit extends those understandings as students work with non-rectangular prisms and pyramids.	
Common Core State Standards for Mathematical Content **Geometry — 7.G** A. Draw, construct, and describe geometrical figures and describe the relationships between them. 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. B. Solve real-life and mathematical problems involving angle measure, area, surface area, and volume. 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. **Common Core State Standards for Mathematical Practice** 4. Model with mathematics. 5. Use appropriate tools strategically. 7. Look for and make use of structure.	**Comments** Students also investigate the volume and surface area of right pyramids; this is implied in **7.G.B.6**. Students select appropriate tools (**MP.5**) and look for and make use of structure (**MP.7**) as they investigate 3-dimensional figures. They also model with mathematics as they solve multi-step real-life measurement problems (**MP.4**).

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Unit 13: Scale drawings	Suggested number of days: 12
This unit builds on students' understanding of scale drawings from unit 1, but extends that understanding to include the relationship between the areas of scale drawings. This unit provides a strong foundation for more formal work with the similarity and congruence transformations that students will investigate in Grade 8.	
Common Core State Standards for Mathematical Content **Geometry — 7.G** A. Draw, construct, and describe geometrical figures and describe the relationships between them. 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. **Common Core State Standards for Mathematical Practice** 4. Model with mathematics. 6. Attend to precision. 8. Look for and express regularity in repeated reasoning.	**Comments** In unit 1, work with scale drawings (**7.G.A.1**) was included as an instance of proportional reasoning; however, students did not generate scale drawings at a different scale. Since area relationships in scale drawings are not proportional, they were not addressed at that time. To build an understanding of how areas of two or more scale drawings relate, students engage in **MP.8**. They also model with mathematics (**MP.4**) and attend to precision (**MP.6**) as they engage in solving problems relating to scale drawings.

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Unit 14: Geometric constructions	Suggested number of days: 11
In this unit, students engage in hands-on investigation of the properties of triangles and other geometric shapes. Students also explore numerous angle relationships and use those angle relationships to ask and answer questions in a variety of contexts.	
Common Core State Standards for Mathematical Content **Geometry — 7.G** A. Draw, construct, and describe geometrical figures and describe the relationships between them. 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. B. Solve real-life and mathematical problems involving angle measure, area, surface area, and volume. 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. **Common Core State Standards for Mathematical Practice** 3. Construct viable arguments and critique the reasoning of others. 5. Use appropriate tools strategically. 7. Look for and make use of structure.	**Comments** In this unit, students choose appropriate tools (**MP.5**) to create constructions with various constraints. Investigating and describing the relationships among geometrical figures requires that students look for and make use of structure (**MP.7**) as they construct and critique arguments (**MP.3**) that summarize and apply those relationships.