Unit 1: Probability

Dear Parents/Guardians,

Unit 1 introduces students to probability. Students conduct probability experiments and express the likelihood of events occurring in words, and quantitatively as fractions, decimals, and percents. Students represent the sample space of the theoretical probability of games as lists, outcome grids, and tree diagrams. Based on these sample spaces, students use probability to determine the fairness of games.

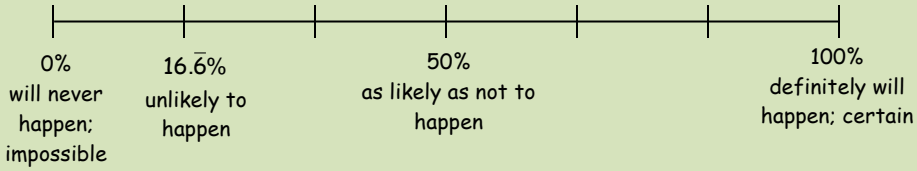
Representing Probability

The probability of an event is a measure of the likelihood of that event occurring. The probability of an event occurring can be represented as a fraction, a decimal, or a percent.

- If an event is impossible, then P(E)=0. Its chance of occurring is 0%.
- If an event is certain, then P(E)=1. Its chance of occurring is 100%.
- If an event is just as likely to happen as not, then P(E)=0.5. Its chance of occurring is 50%.

Students discuss different events and determine the likelihood of their occurrence. They can then estimate the likelihood on a number line.

Example: What is the probability of rolling a 6 on a fair number cube?



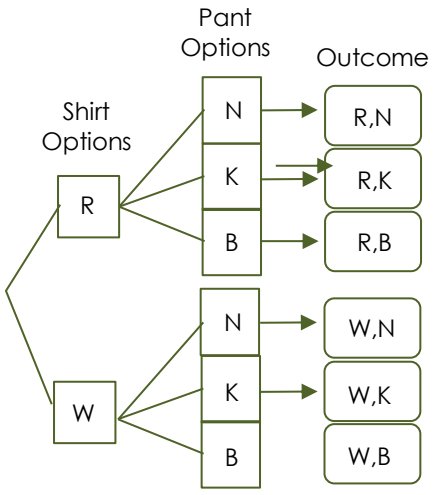
P(rolling a 6): $\frac{1}{6} = 0.1\overline{6} = 16.\overline{6}\%$ This is unlikely to happen, but not impossible.

Probability Data Displays

Students use lists, outcome grids, and tree diagrams to represent the different possible outcomes of a probability experiment.

Example: Show all of the possible outcomes for choosing a red or white shirt with navy, khaki, or black pants. Notice that in each display there are 6 possible outcomes.

Tree diagram



Outcome Grid

	Navy (N)	Khaki (K)	Black (B)
Red (R)	R,N	R,K	R,B
White (W)	W,N	W,K	W,B

Organized List

Red-Navy (R-N)
Red-Khaki (R-K)
Red-Black (R-B)
White-Navy (W-N)
White-Khaki (W-K)
White-Black (W-B)

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By the end of the unit, your student should know…

- That the probability of an event is a number from 0 to 1 [Lesson 1.1]
- How to represent probabilities as fractions, decimals and percents [Lessons 1.1 and 1.2]
- How to represent the data from a probability experiment as a list, outcome grid, and tree diagram [Lesson 1.2]
- How to collect and analyze data from a probability game and determine its fairness [Lesson 1.3]
- How to create a probability spinner and analyze its fairness [Lesson 1.3]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.

Unit 2: Proportional Reasoning: Percent and Scale

Dear Parents/Guardians,

In Unit 2 students explore problems involving percent and scale. In Lesson 1 students will solve percent problems in many ways, including arithmetic and mental strategies, tape diagrams, double number lines, and equations. In Lesson 2 students will learn about simple interest and solve problems involving interest and loans (see videos for additional support). In Lesson 3 students learn about scale, scale factors, and scale drawings.

Percent Increase

Percent increases occur often as tips, taxes, and price mark-ups. Below are three possible strategies for solving problems involving percent increase.
Example: Jake's lunch bill was $30. What would his total amount be if he would like to leave a 25% tip?

Strategy 1

Step 1: Find the amount of the percent increase.

25% of $30 ⟶ 0.25($30) = $7.50

Step 2: Add the amount of the increase to the original quantity.

$30 + $7.50 = $37.50

Strategy 2

A tip of 25% means the total amount will be 125% of the lunch bill.

125% of 30 = 1.25(30) = $37.50

Strategy 3

To find the value of one section, divide 30 by 4.

$\frac{30}{4} = \$7.50$

$7.50	$7.50	$7.50	$7.50	$7.50
Original $30				Tip

The cost with tip is $30 + $7.50 = $37.50.

Percent Decrease

Percent decreases occur often as discount sales or mark-downs. Below are three possible strategies for solving problems involving percent decrease.
Example: A dress costs $30. How much would you pay if it is 25% off?

Strategy 1

Step 1: Find the amount of the percent decrease.

25% of $30 ⟶ 0.25($30) = $7.50

Step 2: Subtract the amount of the decrease from the original quantity.

$30 – $7.50 = $22.50

Strategy 2

A discount of 25% means the dress will cost 75% of the original price.

75% of 30 = 0.75(30) = $22.50

Strategy 3

To find the value of one section, divide 30 by 4.

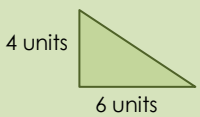
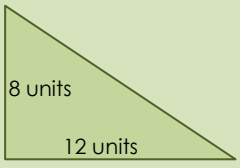
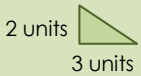
$\frac{30}{4} = \$7.50$

$7.50	$7.50	$7.50	$7.50	$7.50
75% of the original cost				25% discount

The cost of the dress is $30 - $7.50 = $22.50

Scale Drawings

Students will draw figures to scale of the original drawing. Scale drawings are replicas of the original, but may be larger or smaller. If the scale factor is greater than one, the figure will be larger than the original. If the scale factor is between 0 and 1, the figure will be smaller.

Original Drawing (scale factor of 1)	**Enlarged Drawing** (scale factor of 2)	**Reduced Drawing** (scale factor of 0.5)
		

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By the end of the unit, your student should know…

- How to find percent increases and decreases using different strategies [Lesson 2.1]
- How to solve real life problems involving percent [Lessons 2.1 and 2.2]
- Scale and scale factor in visual and symbolic representations [Lesson 2.3]
- How to make and interpret scale drawings [Lesson 2.3]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.
- For more on simple interest: https://youtu.be/m_KU1TA1BHk

Unit 3: Proportional Reasoning: Ratios and Rates

Dear Parents/Guardians,

Unit 3 builds from grade 6 ratios and rates. In Lesson 1, students use tables and graphs to solve ratio and rate problems involving the unit rate, and determine when two quantities are in a proportional relationship. In Lesson 2, students represent proportional relationships as equations and relate equations to specific points on the graphs. In Lesson 3, students use equivalent ratios to write equations and solve problems in context.

Determining Proportionality Using the Unit Rate (Unit Price)

Students create tables to find unit rates to determine if two quantities are proportional. Notice that for a proportional relationship, ratios are constant multiples of one another.

Example: Josie's babysitting hours and earnings.

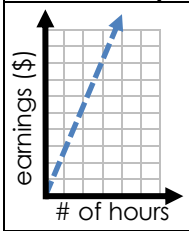
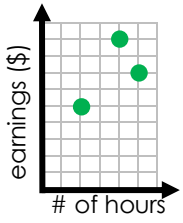
	Friday	Saturday	Sunday
time (hours)	5	2	4
earnings ($)	$26.25	$10.50	$21
Unit rate ($ per hour)	$\frac{26.25}{5} = \$5.25$	$\frac{10.50}{2} = \$5.25$	$\frac{21}{4} = \$5.25$
Proportional?	Yes, because the amount earned is always 5.25 times the number of hours.		

Kaden's babysitting hours and earnings.

	Friday	Saturday	Sunday
time (hours)	5	2	4
earnings ($)	$15	$10	$18
Unit rate ($ per hour)	$\frac{15}{5} = \$3.00$	$\frac{10}{2} = \$5$	$\frac{18}{4} = \$4.50$
Proportional?	No, because there is no single multiplier to represent a proportional relationship.		

Determining Proportional Relationships in Graphs

For a graph to illustrate a proportional relationship, it must go through the origin (0,0) and have a constant rate of change (unit rate), called the constant of proportionality.

Proportional (Josie)	Not Proportional (Kaden)
 The points lie in a line and would go through the origin.	 The points do not lie in a line and would not go through the origin.

Equivalent Ratios and Equations

Students use equivalent ratios to write and solve equations.

Example: Joey can read 3 pages in 4.5 minutes. At this rate, how many pages can he read in 27 minutes?

Method 1	Method 2
$\frac{3}{4.5} = \frac{x}{27}$ $\frac{3}{4.5}\left(\frac{6}{6}\right) = \frac{x}{27}$ x = 18 pages	$\frac{3}{4.5} = \frac{x}{27}$ $4.5(x) = 3(27)$ $4.5x = 81$ x = 18 pages

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By the end of the unit, your student should know…

- How to create tables and graphs to explore and identify the unit rate [Lessons 3.1 and 3.2]
- How to determine when two quantities are in a proportional relationship [Lesson 3.1]
- How to represent proportional relationships as equations [Lesson 3.2]
- How to write equations to solve proportional reasoning problems [Lesson 3.3]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.
- Determining if two quantities are in a proportional relationship: https://tinyurl.com/khan7thproprelations
- For setting up equations to solve proportional word problems: https://tinyurl.com/khan7thwriteproportions
- How to solve equivalent ratio problems using different methods: https://tinyurl.com/khan7thfind-proportion

Unit 4: Rational Number Addition and Subtraction

Dear Parents/Guardians,

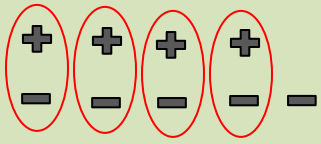
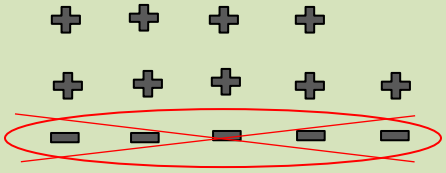
In Unit 4, different representations drive the development of rules to add and subtract rational numbers. In Lesson 1, students use a counter model to investigate adding integers to agree on rules that make sense for this operation. Lesson 2 continues with the counter model to develop rules for subtracting integers. In these lessons, a temperature context from the opening lesson connects to the counter model. In Lesson 3, students use number lines to expand their knowledge of addition and subtraction to other rational numbers (signed fractions and decimals).

The Counter Model

A positive (+) counter represents a value of 1. 

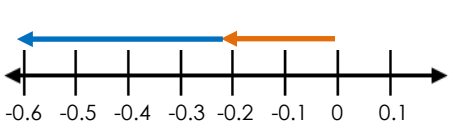
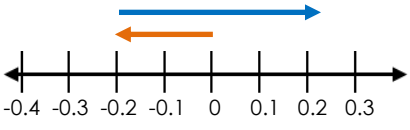
A negative (-) counter represents a value of -1. 

A "zero pair" is represented by one positive and one negative counter and has a value of zero (0). 

Addition	Subtraction
4 + (-5) = -1 	4 – (-5) = 9 
Start with a value equal to zero. Create a value of 4. Add 5 negative counters. Notice 4 zero pairs. 1 negative counter remains, or -1.	Start with a value of 0. Create a value of 4. Since there aren't 5 negative counters to subtract, we can choose to create an extra 5 zero pairs. The value remains 4, yet we now have 5 positive counters to remove. Subtract (remove) 5 negative counters (-5). 9 positive counters remain. Notice that 4 – (-5) is equivalent to 4 + 5.

Addition and Subtraction on a Number Line

Students use vectors to demonstrate addition and subtraction of rational numbers on number lines. Each vector represents a number by length and direction.

Addition	Subtraction
-0.2 + (-0.4) = -0.6 	-0.2 – (-0.4) = 0.2 
Start at 0. Move to the left 0.2. Move to the left 0.4 more. The ending point is -0.6.	Start at 0. Move to the left 0.2. Move to the opposite of left 0.4. Therefore, move to the right 0.4. The ending point is 0.2. Notice that -0.2 – (-0.4) is equivalent to -0.2 + 0.4.

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By the end of the unit, your student should know…

- How to add integers using representations and rules [Lesson 4.1]
- How to subtract integers using representations and rules [Lesson 4.2]
- How to represent addition and subtraction of rational numbers on a number line [Lesson 4.3]
- How to add and subtract rational numbers using any viable method [Lesson 4.3]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.
- For more on plotting integers on a number line: http://youtu.be/kvPxr7HA6Sc
- For more on adding and subtracting integers: https://youtu.be/hGVm2xs0HEA and https://youtu.be/pU2zPf846L4

Unit 5: Rational Numbers 2

Dear Parents/Guardians,

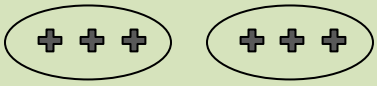
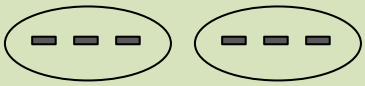
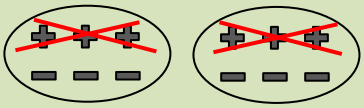
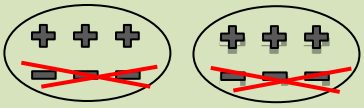
Unit 5 continues with the counter model to develop integer multiplication rules. Students investigate patterns and the inverse relationship between multiplication and division to develop integer division rules. In this lesson, a temperature context from the opening lesson connects to the counter model. In Lesson 2 students use number lines as a way to convince themselves that the integer multiplication and division rules hold for other rational numbers (signed fractions and decimals). In Lesson 3 students make sense of the order of operations conventions and use the order of operations to solve problems involving rational numbers.

The Counter Model

A positive (+) counter represents a value of 1. ➕

A negative (-) counter represents a value of -1. ➖

A "zero pair" is represented by one positive and one negative counter and has a value of zero (0). ➕ ➖

(2) • (3) = 6  Place two groups of 3 on the mat. positive x positive = positive	(2) • (-3) = -6  Place two groups of (-3) on the mat. positive x negative = negative
(-2) • (3) = -6  Start with two rows of 3 zero pairs (to keep the value 0). Remove two groups of 3 from the mat. negative x positive = negative	(-2) • (-3) = -6  Start with two rows of 3 zero pairs (to keep the value 0). Remove two groups of (-3) from the mat. negative x negative = positive

Relating Multiplication and Division

Students use the relationship between multiplication and division to develop rules for signed division.

Multiplication Fact	Related Division Facts	Division Rule
(5) × (8) = 40	40 ÷ (5) = 8 40 ÷ (8) = 5	positive ÷ positive = positive
(3) × (-4) = -12	-12 ÷ (3) = -4 -12 ÷ (-4) = 3	negative ÷ positive = negative negative ÷ negative = positive
(-2) × (7) = -14	-14 ÷ (-2) = 7 -14 ÷ (7) = -2	negative ÷ negative = positive negative ÷ positive = negative
(-5) × (-6) = 30	30 ÷ (-6) = -5 30 ÷ (-5) = -6	positive ÷ negative = negative

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By the end of the unit, your student should know…

- How to multiply integers using counters and then rules [Lesson 5.1]
- How to divide integers based upon the inverse relationship between multiplication and division [Lessons 5.1 and 5.2]
- How to represent multiplication of rational numbers on a number line [Lesson 5.2]
- How to multiply and divide rational numbers using any method [Lesson 5.2]
- How to use the conventions of the order of operations to evaluate expressions and solve problems [Lesson 5.3]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.
- For more on multiplying integers with counters: https://youtu.be/MuZ3Y3PYv2U and https://youtu.be/Yhoz1g35alw
- For more on order of operations: https://tinyurl.com/khan-order-of-operations

Unit 6: Expressions and Equations

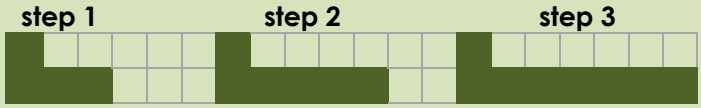
Dear Parents/Guardians,

In Unit 6, students investigate important algebraic ideas involving variables, expressions, and equations in non-traditional ways. In Lesson 1, students generate numerical and variable expressions to represent geometric patterns. In Lesson 2, students describe patterns with words, tables, graphs and equations. In Lesson 3, students revisit the counters model and extend this understanding to build variable expressions involving signed values. In Lesson 4, students use the distributive property to simplify expressions involving rational numbers and solve problems.

Visual Patterns

Students build and draw "growing" square tile patterns, keep track of data in tables, and display the information with graphs and equations.

Example:



Rate of Change

For every increase of x by 1, *y* increases by 3.

Input-Output Rule (in words)

Multiply the x-value by 3, then add 1 for the corresponding y-value.

Input-Output Rule (as an equation)

$3x+1=y$

Table

step # (x-values)	number of tiles (y-values)
1	4
2	7
3	10
4	13
5	16
x	3x+1

Expressions with Cups and Counters

Students extend the counter model with integers to include a "cup," drawn as a V, as in the word "variable;" and an "upside-down cup," drawn as a Λ. A cup represents a value, like x, whereas the upside-down cup represents its opposite, or -x. They manipulate expressions using this model to help with the transition to representing them symbolically.

Symbolic Notation	Visual Representation	
$3x-5+2x+2$	Λ Λ Λ − − − − − V V + +	Combine like terms.
$3x+2x-5+2$	V V V V V − − − − − + +	Remove zero pairs.
$5x-3$	V V V V V − − −	
$-3x-5+2x+2$	Λ Λ Λ − − − − − V V + +	Combine like terms.
$-3x+2x-5+2$	Λ Λ Λ V V − − − − − + +	Remove zero pairs.
$-x-3$	Λ − − −	

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By the end of the unit, your student should know…

- How to write a numerical expression to represent a geometric pattern [Lessons 6.1, 6.2]
- How to generalize a geometric pattern with an algebraic rule [Lessons 6.1, 6.2]
- How to describe patterns with words, tables, graphs, and equations [Lesson 6.2]
- How to use a model to represent variable expressions [Lesson 6.3]
- How to manipulate variable expressions using symbolic notation [Lesson 6.4]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit

Unit 7: Solving Equations and Inequalities

Dear Parents/Guardians,

Unit 7 investigates solving equations and inequalities. In Lesson 1, students use mental math strategies to solve equations. In Lesson 2, students reinforce the properties of equality through a balance model, and cups and counters. Students use these properties of equality (as well as other properties) to justify their steps using symbolic notation. In Lesson 3, students write, solve, and graph inequalities. Students use inequalities and equations to express and solve real world situations involving rational numbers in Lesson 4.

Solving Equations using Cups and Counters

Students will solve for the unknown (the "cup", sketched as a V, as in the word "variable") in equations while recording their steps using algebraic notation and in words. The goal is to figure out what each cup holds (all cups must hold the same amount for a particular problem). Below is an example.

Visual Representation		Symbolic Notation	
2x + 4	-2	2x + 4 = -2	
V V + + + +	– –	2x + 4 = -2	
– – – –	– – – –	– 4 – 4	Add -4 (or subtract 4)
VV	– – – – – –	2x = -6	
V V	– – – – – –	$\frac{2x}{2} < \frac{-6}{2}$ x = -3	Take half (or divide by 2)

To Flip or Not to Flip…

Students will operate on inequalities and determine when the inequality symbol should change direction to keep the inequality true.

Begin each operation with this inequality…	…then do this to both sides…	Steps		New inequality (make sure this is true)
		Left	Right	
4 < 10	Multiply by 8	4 × 8 = 32	10 × 8 = 80	32 < 80
	Multiply by -8	4 × (-8) = -32	10 × (-8) = -80	-32 > -80
	Divide by 2	4 ÷ 2 = 2	10 ÷ 2 = 5	2 < 5
	Divide by -2	4 ÷ (-2) = -2	10 ÷ (-2) = -5	-2 > -5

Notice when the original inequality was multiplied or divided by a negative value, the inequality symbol changed direction to keep the inequality true.

Students will solve inequalities, noting when to keep or reverse the inequality symbol.

Example:

1. Add 6 to both expressions.

$$-3x - 6 < 12$$
$$+6 \quad +6$$
$$-3x < 18$$

2. Divide each expression by -3.

$$\frac{-3x}{-3} < \frac{18}{-3}$$

3. Reverse the inequality symbol to keep the statement true (see above).

$$x > -6$$

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By the end of the unit, your student should know…

- How to use substitution as a mental math strategy to solve equations [Lesson 7.1]
- How to solve equations using the cups and counters model [Lesson 7.2]
- How to solve equations algebraically [Lessons 7.2, 7.4]
- How to solve and graph inequalities [Lessons 7.3, 7.4]
- How to solve equations and inequality problems using rational numbers [Lesson 7.4]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit
- To graph inequalities in one variable: https://youtu.be/nif2PKA9bXA

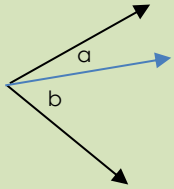
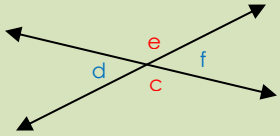
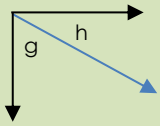
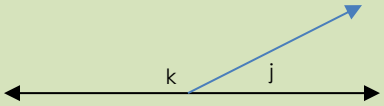
Unit 8: Plane and Solid Figures

Dear Parents/Guardians,

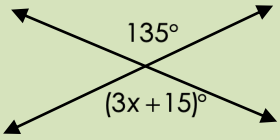
In Unit 8, students explore a variety of geometric relationships in 2- and 3-dimensions. In Lesson 1, students investigate angle relationships and use them to find missing angle measures. In Lesson 2, students draw figures with given characteristics, using tools and technology when applicable. In Lesson 3, students describe the 2-dimensional cross sections that can be created by slicing 3-dimensional figures.

Angles

Students will investigate angles and special angle relationships.

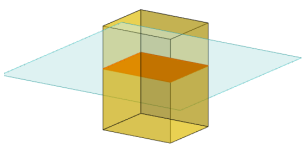
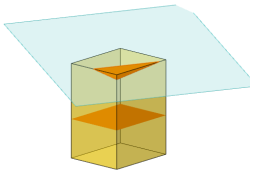
adjacent angles	vertical angles
	 ∠e and ∠c are vertical angles. ∠d and ∠f are vertical angles.
Share a common vertex and a common side.	Opposite angles formed by two lines that intersect at a point. Vertical angles have the same measure.
complementary angles (Do not have to be adjacent.)	**supplementary angles** (Do not have to be adjacent.)
	
Angles whose measures add up to 90°.	Angles whose measures add up to 180°.

Students will write and solve equations for missing angle measures.

Example	Equations	Reasoning
Solve for x. 	3x + 15 = 135 3x = 120 x = 40 Check: 3x + 15 3(40) +15 = 135	Vertical angles are congruent. Subtract 15 from both sides. Divide both sides by 3. Check by substituting 40 in for x. 3x + 15 = 135 for x = 40.

Cross-Sections

Students will explore different 2-D cross sections of 3-D figures. A cross section is created when a plane intersects a 3-D figure. This may be done using a physical model (like slicing play-doh) or with technology (like Geogebra). Below are two different cross-sections within a rectangular prism.

Horizontal Cross Section	**Diagonal Cross Section**
Creates a rectangle identical to the base of the prism.	Creates a triangle at the top of the prism.
	

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Math Links GRADE 7

By the end of the unit, your student should know…

- Facts about supplementary, complimentary, vertical, straight, and adjacent angles [Lesson 8.1]
- How to use facts about angles to write and solve equations involving angle measures [Lesson 8.1]
- How to construct polygons with given side lengths and angle measures [Lesson 8.2]
- How to identify and describe two-dimensional cross sections of three-dimensional figures [Lesson 8.3]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.
- Measuring angles with a protractor: https://youtu.be/LiHutbul6FM

Unit 9: Length, Area, and Volume

Dear Parents/Guardians,

Unit 9 introduces students to measurements with circles, and area and volume of composite figures. In Lesson 1, students discover approximations for pi (π) and use them to solve problems involving circumferences of circles. In Lesson 2, students review areas of two-dimensional shapes. They use this knowledge to derive the formula for the area of a circle and calculate areas of figures. In Lesson 3, students calculate the surface areas and volumes of three-dimensional figures.

Circles

A circle is a closed curve in a plane consisting of all points at a fixed distance (called the radius) from a specified point (called the center).

Two radii create a diameter.

$d = 2r$ or $r = \frac{d}{2}$

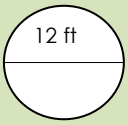
The circumference is the length of the circle, or the distance around it.
The exact number of diameters that go around the circumference length is pi, or π. Students approximate pi as 3.14 or $\frac{22}{7}$.

$$C = \pi d \text{ or } C = 2\pi r$$

The area of a circle is the square of its radius multiplied by pi.

$$A = \pi r^2$$

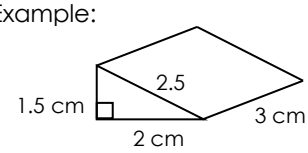
Students solve problems involving circumference and area of circles.

Example: Find the circumference and area of this circle.	Circumference	Area
	$C = 2d$ $C = 2(12) = 24$ ft	$A = \pi r^2$ $A = 3.14(6^2) = 3.14(6)(6)$ $A = 113.04\ ft^2$

Surface Area and Volume

Students calculate surface areas and volumes of 3-D figures.

Example:



This triangular prism is made with two bases that are right triangles and three lateral sides that are rectangles.

Surface Area (SA)	Volume (V)
Find the total of the areas of each polygon that create the prism.	Find the area of the base (denoted as B) and multiply by the prism's height.
Area of each triangle: $\left(A = \frac{1}{2}bh\right)$ $A = \frac{1}{2}(1.5)(2) = 1.5\ cm^2$ Area of a rectangle: ($A = lw$) Front: $A = (2.5)(3) = 7.5\ cm^2$ Bottom: $A = (2)(3) = 6\ cm^2$ Side: $A = (1.5)(3) = 4.5\ cm^2$ Surface Area = 1.5 + 1.5 + 7.5 + 6 + 4.5 $SA = 21\ cm^2$	Area of base triangle: $\left(B = \frac{1}{2}bh\right)$ $A = \frac{1}{2}(1.5)(2) = 1.5\ cm^2$ Volume = $(1.5)(3) = 4.5\ cm^2$ $V = (1.5)(3) = 4.5\ cm^2$

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By the end of the unit, your student should know…

- How to solve problems involving the circumference of circles. [Lesson 9.1]
- Common approximations for π, and what this number represents. [Lesson 9.1]
- How to solve problems that involving circumference and area of circles. [Lessons 9.1, 9.2]
- How to find areas of composite two-dimensional figures [Lesson 9.3]
- How to find surface areas and volumes of various three-dimensional figures [Lesson 9.3]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.
- For more information on circumference: https://youtu.be/2fC6vxszhHk
- For more information on are of a circle: https://youtu.be/YokKp3pwVFc

Unit 10: Sampling

Dear Parents/Guardians,

In Unit 10, students apply their previous learning about statistics and probability to compare populations through sampling. In Lesson 1, students identify populations and samples and explore random sampling. In Lesson 2, students create data displays and use measures of center and spread to compare data sets. These statistical measures are applied in Lesson 3 when students create a mathematical model and make inferences about populations of fish in a lake.

Populations and Sampling

When asking a statistical question, students recognize the efficiency of a sample rather than survey an entire population. They learn to identify when a sample is randomly chosen (not biased) and can be utilized to make inferences about an entire population.

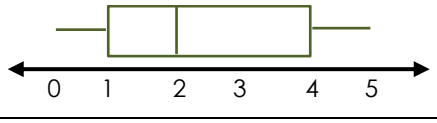
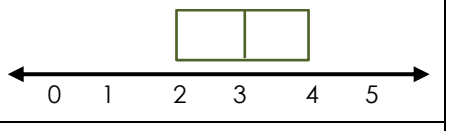
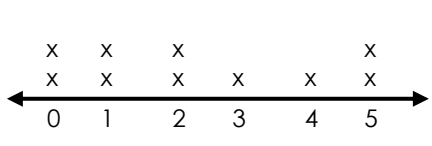
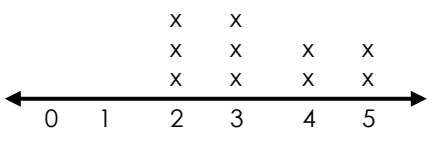
Example: Xander wants to know how many students use reusable water bottles in his junior high school. He wants to survey only a sampling of the population.

Random Sampling	Not a Random Sampling (Biased)
Xander uses the student ID numbers of all students in his school and randomly selects 200 of the ID Numbers as the students to survey.	Xander surveys every student in his Eco Club after school.

Data Displays

Two commonly used visual representations for statistics are box plots and line plots. Students will create both and use them to compare data sets and make inferences about populations.

Example: Christy and Dayna spent spring break babysitting. Their daily work hours are listed below. Note that both graphics show that Christy's data is more spread out (more variability) and has a lesser median value than Dayna's.

Christy **5, 2, 0, 0, 4, 1, 3, 1, 2, 5**	**Dayna** **5, 3, 3, 2, 4, 5, 2, 2, 4, 3**
A box plot is a graphical representation of the 5-number summary set.	
	
A dot plot, or line plot, is a graphical representation of a data set where each data point is represented by dots, or x, above a number line.	
	

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By the end of the unit, your student should know…

- How to determine if a sampling is random or biased and use random sampling to make valid inferences about populations [Lesson 10.1]
- How to calculate measures of center and spread to use to compare data sets [Lessons 10.2, 10.3]
- How to create dot plots and box plots to visually represent and compare data sets [Lessons 10.2, 10.3]
- How to create a mathematical model that uses random sampling and proportional reasoning to make valid inferences about a population [Lesson 10.3]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.
- Random sampling: https://tinyurl.com/khan-reasonable-samples
- Comparing data sets in dot plots: https://tinyurl.com/khan-distributions-dot-plot
- The Five Number Summary and how to create a box plot: https://tinyurl.com/khan-box-and-whiskers-plot
- Calculating the mean, median and mode of a data set: https://tinyurl.com/khan-mean-median-mode