

Westside Consolidated School District
Common Core State Standards
Curriculum Guide for Grade 7 Mathematics

Update 1/5/15

Grade 7 Overview

- **Ratios and Proportional Relationships**
 - Analyze proportional relationships and use them to solve real-world and mathematical problems --- *compute unit rates associated with ratios of fractions; identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships; use proportional relationships to solve multi-step ratio and percent problems --- simple interest, tax, markups & markdowns, percent increase/decrease, gratuities, fees, percent error, etc.*
- **The Number System**
 - Apply and extend previous understanding of operations with fractions to add, subtract, multiply, and divide rational numbers – *extend the rules for manipulating fractions to complex fractions.*
- **Expressions and Equations**
 - Use properties of operations to generate equivalent expressions.
 - Solve real-life and mathematical problems using numerical and algebraic expressions and equations.
- **Geometry**
 - Draw, construct, and describe geometrical figures and describe the relationship between them -- *solve problems involving scale drawings; draw geometric shapes with given conditions; describe the 2-D figures resulting from slicing 3-D 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.
- **Statistics and Probability**
 - Use random sampling to draw inferences about a population.
 - Draw informal comparative inferences about two populations – *use measures of center and measures of variability for numerical data from random samples.*
 - Investigate chance processes and develop, use, and evaluate probability models – *find probabilities of compound events using organized lists, tables, tree diagrams, and simulations.*

Resources:

The Common Core State Standards Home Page: <http://www.corestandards.org/>

The Common Core State Standards for Mathematics: http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf

Common Core Unpacking resource: C2 Collaborative, Inc.: <http://ccstudio.org/Home.aspx>

Wynne County Public Schools, NC: Curriculum Guides: <http://www.waynecountyschools.org/Page/375>

CCSS: 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.**

Domains		K	1	2	3	4	5	6	7	8
Counting and Cardinality	CC									
Operations and Algebraic Thinking	OA				30-35%	12-17%	5-10%			
Number and Operations in Base Ten	NBT				5-10%	22-27%	22-27%			
Measurement and Data	MD				22-27%	12-17%	10-15%			
Geometry	G				10-15%	12-17%	2-7%	12-17%	22-27%	20-25%
Number and Operations -- Fractions	NF				20-25%	27-32%	47-52%			
Ratios and Proportional Relationships	RP							12-17%	22-27%	
The Number System	NS							27-32%	7-12%	2-7%
Expressions and Equations	EE							27-32%	22-27%	27-32%
Statistics and Probability	SP							7-12%	12-17%	15-20%
Functions	F									22-27%

7th Grade Mathematics • Unpacked Content

At A Glance: Comparing the new Common Core State Standards to the old Arkansas Frameworks

NEW to 7th Grade:

- Constant of proportionality (unit rate) (7.RP.2b)
- Percent of error (7.RP.3)
- Factoring to create equivalent expressions (7.EE.1)
- Constructing triangles from three measures of side lengths (7.G.2)
- Area and circumference of circles (7.G.4)
- Angles (supplementary, complementary, vertical) (7. G.5)
- Surface area and volume of pyramids (7.G.6)
- Probability (7.SP.5 – 7.SP.8)

MOVED from 7th Grade:

- Similar and congruent polygons (moved to 8th grade)
- Surface area and volume of cylinders (moved to 8th grade – volume only)
- Creation of box plots and histograms (moved to 6th grade -- 7th grade continues to compare)
- Linear relations and functions (y-intercept moved to 8th grade)
- Views from 3-Dimensional figures (removed from CCSS)
- Statistical measures (moved to 6th grade)

Directions:

This is a live document that will be the foundation for math instruction. The next four pages outline what should be taught during each nine-week period for Common Core Standards and vocabulary as a pacing guide. The fifth page is all of the nine-week periods on one page for all the information at-a-glance.

The Pacing Guide- In the last columns write in the Topic and lesson number from envisionMATH 2011 edition. This will allow you to decide what Topics best fit the standard. You can also add the Big Ideas if you would like to. Add any more information as necessary. Since this is a working document, feel free to make comments for adjustments in the future.

The At-A-Glance - Add page numbers, Topics, or lesson numbers next to the standard listed. At the bottom of each nine-weeks section list any projects, resources, or manipulatives to supplement the text.

Westside Consolidated School District *Common Core State Standards – Mathematics* 7th Grade Pacing Guide

Essential Questions should be incorporated into daily math activities in order to engage students in real life problem solving.

Domain	First Quarter 10/17	Second Quarter 1/9	Third Quarter 3/18	Fourth Quarter
Ratios and Proportional Relationship (22% - 27%)		7.RP.1	7.RP.1 7.RP.2 a, b, c, d 7.RP.3	
The Number System (7% - 12%)	7.NS.1 a, b, c, d 7.NS.2 a, b, c, d 7.NS.3			
Expressions and Equations (18% - 23%)	7.EE.1 7.EE.2	7.EE.3 7.EE.4 a, b		
Geometry (25% - 30%)			7.G.1 7.G.2 7.G.3 7.G.4 7.G.5 7.G.6	
Statistics and Probability (15% - 20%)				7.SP.1 7.SP.5 7.SP.2 7.SP.6 7.SP.3 7.SP.7 a, b 7.SP.4 7.SP.8 a, b, c
Textbook				

1st Nine Weeks

Domain	Common Core State Standards	Major Topics/Concepts	Textbook Alignment & Resources
The Number System	7.NS.1 7.NS.2 7.NS.3	<p>Apply and extend previous understandings of operations with fractions to add, subtract, multiply and divide rational numbers.</p> <ul style="list-style-type: none"> ● 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. <ul style="list-style-type: none"> ➤ a. Describe situations in which opposite quantities combine to make 0. ➤ b. Understand $p + q$ as the number located a distance q from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. ➤ c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. ➤ d. Apply properties of operations as strategies to add and subtract rational numbers. ● 7.NS.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. <ul style="list-style-type: none"> ➤ 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, 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. ➤ 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. (Computations with rational numbers extend the rules for manipulating fractions to complex fractions.) 	7.NS.1: 1.1, 1.3, 2.1, 2.2, 2.6 7.NS.2: 2.3 7.NS.2a: 2.1, 2.5 7.NS.2b: 2.3, 7.NS.2c: 2.2, 2.5, 2.6 7.NS.2d: 1.2, 1.4, 1.5, 7.NS.3: 1.1, 2.4
Expressions and Equations	7.EE.1 7.EE.2	<p>Use properties of operations to generate equivalent expressions.</p> <ul style="list-style-type: none"> ● 7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. 	7.EE.1: 3.1-3.5 7.EE.2: 3.6

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| | | <ul style="list-style-type: none">• 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. | |
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2nd Nine Weeks

Domain	Common Core State Standards	Major Topics/Concepts	Textbook Alignment & Resources
Expressions and Equations	7.EE.3 7.EE.4	<p>Solve real-life & mathematical problems using numerical & algebraic expressions & equations.</p> <ul style="list-style-type: none"> ● 7.EE.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, & decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; assess the reasonableness of answers using mental computation & 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. <ul style="list-style-type: none"> ➤ 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. ➤ 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 	7.EE.3: 3.7 7.EE.4: 4.1-4.5
Ratios and Proportional Relationships	7.RP.1	<p>Analyze proportional relationships and use them to solve real-world and mathematical problems.</p> <ul style="list-style-type: none"> ● 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.1: Chap 4 opener

3RD Nine Weeks

Domain	Common Core State Standards	Major Topics/Concepts	Textbook Alignment & Resources
Ratios and Proportional Relationships	7.RP.1 7.RP.2 7.RP.3	<p>Analyze proportional relationships and use them to solve real-world and mathematical problems.</p> <ul style="list-style-type: none"> ● 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. <ul style="list-style-type: none"> ➤ 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. ➤ 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. ● 7.RP.3 Use proportional relationships to solve multistep ratio and percent problems. 	<p>7.RP.1: chapter opener 7.RP.2: 5.1, 5.4 7.RP.2a: 5.1, 5.4 7.RP.2b: 5.2, 7.RP.2c: 5.2, 5.4 7.RP.2d: 5.3, 7.RP.3: 5.3</p>
Geometry	7.G.1 7.G.2 7.G.3 7.G.4 7.G.5 7.G.6	<p>Draw, construct, and describe geometrical figures and describe the relationships between them.</p> <ul style="list-style-type: none"> ● 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. <p>Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.</p> <ul style="list-style-type: none"> ● 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. 	<p>7.G.1: Hands-on Activity 7.G.2: 6.1-6.4, 7.2-7.5 7.G.3: 8.1 7.G.4: 8.2-8.5 7.G.5: 6.1-6.4 7.G.6: 8.2-8.5</p>

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| | | <ul style="list-style-type: none">• 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. | |
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4TH Nine Weeks

Domain	Common Core State Standards	Major Topics/Concepts	Textbook Alignment & Resources
Statistics and Probability	7.SP.1 7.SP.2 7.SP.3 7.SP.4	<p>Use random sampling to draw inferences about a population.</p> <ul style="list-style-type: none"> ● 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. <p>Draw informal comparative inferences about two populations.</p> <ul style="list-style-type: none"> ● 7.SP.3 Informally assess the degree of visual overlap of two numerical data distributions with similar variability, 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 	<p>7.SP.1: 9.1, 9.3, 9.4 7.SP.2: 9.4 7.SP.3: 9.2, 9.5 7.SP.4: 9.3, 9.5</p>
Statistics and Probability	7.SP.5 7.SP.6 7.SP.7 7.SP.8	<p>Investigate chance processes and develop, use, and evaluate probability models.</p> <ul style="list-style-type: none"> ● 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. <ul style="list-style-type: none"> ➤ 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. <ul style="list-style-type: none"> ➤ 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 (ex 	<p>7.SP.5: 9.1, 9.3, 10.2, 10.2 7.SP.6: 10.3 7.SP.7: 10.1, 10.4 7.SP.8: 10.2, 7.SP.8a: 10.1, 7.SP.8b: 10.1 7.SP.8c: 10.1</p>

		'rolling double sixes') identify the outcomes in the sample space which compose the event.	
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➤ c. Design and use a simulation tool to generate frequencies for compound events.

Textbook Resource:

Chapter Topics

Seventh Grade – Common Core State Standards -- MATH

Critical Areas

1. Developing understanding of and applying proportional relationships –

Students extend their understanding of ratios and develop understanding of proportionality to solve single- and multi-step problems. Students use their understanding of ratios and proportionality to solve a wide variety of percent problems, including those involving discounts, interest, taxes, tips, and percent increase or decrease. Students solve problems about scale drawings by relating corresponding lengths between the objects or by using the fact that relationships of lengths within an object are preserved in similar objects. Students graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope. They distinguish proportional relationships from other relationships.

2. Developing understanding of operations with rational numbers and

working with expressions and linear equations – Students develop a unified understanding of number, recognizing fractions, decimals (that have a finite or a repeating decimal representation), and percents as different representations of rational numbers. Students extend addition, subtraction, multiplication, and division to all rational numbers, maintaining the properties of operations and the relationships between addition and subtraction, and multiplication and division. By applying these properties, and by viewing negative numbers in terms of everyday contexts (e.g., amounts owed or temperatures below zero), students explain and interpret the rules for adding, subtracting, multiplying, and dividing with negative numbers. They use the arithmetic of rational numbers as they formulate expressions and equations in one variable and use these equations to solve problems.

3. Solving problems involving scale drawings and informal geometric constructions, and working with two- and three-dimensional shapes to

solve problems involving area, surface area, and volume – Students continue their work with area from Grade 6, solving problems involving the area and circumference of a circle and surface area of three-dimensional objects. In preparation for work on congruence and similarity in Grade 8 they reason about relationships among two-dimensional figures using scale drawings and informal geometric constructions, and they gain familiarity with the relationships between angles formed by intersecting lines. Students work with three-dimensional figures, relating them to two-dimensional figures by examining cross-sections. They solve real-world and mathematical problems involving area, surface area, and volume of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

4. Drawing inferences about populations based on samples –

Students build on their previous work with single data distributions to compare two data distributions and address questions about differences between populations. They begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences.

Mathematical Practices

- 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.

Ratios and Proportional Relationships (Weight of Std: 22 – 27%) 7.RP

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. *For example, if a person walks $1/2$ mile in each $1/4$ hour, compute the unit rate as the complex fraction $(1/2)/(1/4)$ miles per hour, equivalently 2 miles per hour.*
- 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 or by 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 descriptions of proportional relationships.
 - Represent proportional relationships by equations. *For example, if total cost t is proportional to the number of items purchased at a constant price p , the relationship between the total cost and the number of items can be expressed as $t = pn$.*
 - 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 multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*

The Number System (Weight of Standard: 7 – 12%) 7.NS

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.
- 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.
 - 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 & q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.
 - Apply properties of operations as strategies to multiply and divide rational numbers.
 - 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. (NOTE: Computations with rational numbers extend the rules for manipulating fractions to complex fractions.)

Expressions and Equations (Weight of Std: 22 – 27%)

7.EE

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.
For example, $a + 0.05a = 1.05a$ means that “increase by 5%” is the same as “multiply by 1.05.”

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. *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 $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ 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.*
- 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 $px + q = r$ 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.*

Geometry (Weight of Standard: 22 – 27%)

7.G

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 (Weight of Standard: 12 – 17%) 7.SP

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. *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.*

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. *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.*
- 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. *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.*

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

