

**Toms River Regional Schools
Mathematics Curriculum**

Content Area: Mathematics

Course Title: Grade 7 Mathematics

Grade Level: 7

The Number System

8 weeks

Expressions and Equations

8 weeks

Ratios and Proportions

8 weeks

Geometry

4 weeks

**Statistics and
Probability**

6-7 weeks

Date Created: February 6, 2014

Board Approved on:

Toms River Regional Schools
MATHEMATICS Unit Overview

Content Area: Mathematics

Domain: The Number System

Cluster: Operations with Rational Numbers

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

Primary interdisciplinary connections: Infused within the unit are connections to the NJCCCS for Mathematics, Language Arts Literacy, Technology, and 21st Century Life and Career skills.

21st century themes: The unit will integrate the 21st Century Life and Career Standards 9.1 strands A-D. These strands include: Critical thinking and problem-solving, creativity and innovation, collaboration, teamwork, and leadership, and cross cultural understanding and interpersonal communication. For further clarification, see NJ World Class Standards at www.nj.gov/education/aps/cccs/career

Learning Targets

Content Statements

Number	Common Core Standard for Mastery
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.
7.NS.1.a	Describe situations in which opposite quantities combine to make 0.
7.NS.1.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.
7.NS.1.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.
7.NS.1.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.
7.NS.2.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.
7.NS.2.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.
7.NS.2.c	Apply properties of operations as strategies to multiply and divide rational numbers.
7.NS.2.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.

Number	Common Core Standard for Introduction
8.NS.1	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.
<p>Unit Essential Questions</p> <ul style="list-style-type: none"> • What are rational numbers? • How are fractions and decimals related? • How can the additive inverse be applied to solve problems involving rational numbers? • How can numbers be used to describe concepts such as sea level, losing yardage in a football game, or temperatures that drop below 0°? • How can you determine if the sums, differences, products, and quotients of rational numbers are either positive or negative? • How can properties of rational numbers be applied to perform operations? 	<p>Unit Enduring Understandings</p> <ul style="list-style-type: none"> • Apply mathematical operations with rational numbers to real-world contexts. • Explain and interpret the rules for adding, subtracting, multiplying, and dividing with negative numbers.
<p>Unit Objectives <i>Students will know ...</i></p> <ul style="list-style-type: none"> • How to apply operations with rational numbers. • How to compare and order rational numbers. • The concept of absolute value and its application to integers. • How to use and justify the rules for adding, subtracting, multiplying, and dividing integers. 	<p>Unit Objectives <i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Graph rational numbers by using a horizontal or vertical number line diagram. • Use a horizontal or vertical number line diagram to represent addition and subtraction. • Write fractions as terminating or repeating decimals. • Write decimals as fractions. • Compare and order rational numbers. • Add and subtract fractions with like and unlike denominators. • Add and subtract mixed numbers. • Multiply and divide fractions and mixed numbers. • Read and write integers, and find the absolute value of an integer. • Add and subtract integers. • Use commutative, associative, identity, and distributive properties to solve problems.

**Toms River Regional Schools Mathematics Curriculum
Evidence of Learning**

Formative Assessments

- Teacher observations
- Exit Slips/Slate Assessments
- Technology/Manipulatives
- Homework
- Do Now
- Oral Assessments
- Notebook
- Daily Class work
- Whiteboards/Communicators
- Writing Prompts

Summative Assessments

- Tests/Exams
- Quizzes
- Quarterly Exam
- National/State/District Wide Assessments
- Unit Projects
- Presentations

Modifications (ELLs, Special Education, Gifted and Talented)

- Differentiated instruction
- Follow all IEP modifications/504 Plans
- Teacher Tutoring
- Peer Tutoring
- Cooperative Learning Groups
- Modified Assignments

Curriculum development Resources/Instructional Materials/Equipment Needed /Teacher Resources:

For further clarification refer to State Standards Initiative at www.corestandards.org

- Microsoft Excel/Powerpoint
- Teacher-generated assessments, worksheets, warm-ups, and quizzes
- Computer software to support unit
- www.kutasoftware.com
- www.khanacademy.com
- www.studyisland.com
- www.illuminations.nctm.org

Teacher Notes:

Toms River Regional Schools
MATHEMATICS Unit Overview

Content Area: Mathematics

Domain: Expressions and Equations

Cluster: Translate Expressions and Solve Equations

Cluster Summary:

- Use properties of operations to generate equivalent expressions.
- Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Primary interdisciplinary connections: Infused within the unit are connections to the NJCCCS for Mathematics, Language Arts Literacy, Technology, and 21st Century Life and Career skills.

21st century themes: The unit will integrate the 21st Century Life and Career Standards 9.1 strands A-D. These strands include: Critical thinking and problem-solving, creativity and innovation, collaboration, teamwork, and leadership, and cross cultural understanding and interpersonal communication. For further clarification, see NJ World Class Standards at www.nj.gov/education/aps/cccs/career

Learning Targets

Content Statements

Number	Common Core Standard for Mastery
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.
7.EE.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form, using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
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.
7.EE.4.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.
7.EE.4.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.

Number	Common Core Standard for Introduction	
8.EE.7	Solve linear equations with whole number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	
Unit Essential Questions <ul style="list-style-type: none"> • What is a mathematical expression and how is it useful? • What do you know about the solution to an equation? An inequality? 		Unit Enduring Understandings <ul style="list-style-type: none"> • Write algebraic expressions and equations given real-world situations. • Use inverse operations to solve multi-step equations.
Unit Objectives <i>Students will know ...</i> <ul style="list-style-type: none"> • How to write and solve inequalities from real-world contexts. • How to translate word phrases into algebraic expressions and equations. • Expressions are simplified by various means. • Equations can be solved using the properties of equality and inverse operations. 		Unit Objectives <i>Students will be able to...</i> <ul style="list-style-type: none"> • Evaluate expressions using the order of operations. • Evaluate simple algebraic expressions. • Describe the relationships and extend terms in arithmetic and geometric sequences. • Find squares of numbers. • Solve one, two, and multi-step equations with rational coefficients. • Solve one, two, and multi-step inequalities.

Toms River Regional Schools

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Toms River Regional Schools
Unit Overview

Content Area: Mathematics

Domain: Ratios and Proportions

Cluster: Applying Proportional Relationships

Cluster Summary: Analyze proportional relationships and use them to solve real-world and mathematical problems.

Primary interdisciplinary connections: Infused within the unit are connections to the NJCCCS for Mathematics, Language Arts Literacy, Technology, and 21st Century Life and Career skills.

21st century themes: The unit will integrate the 21st Century Life and Career Standards 9.1 strands A-D. These strands include: Critical thinking and problem-solving, creativity and innovation, collaboration, teamwork, and leadership, and cross cultural understanding and interpersonal communication. For further clarification, see NJ World Class Standards at www.nj.gov/education/aps/cccs/career

Learning Targets

Content Statements

Number	Common Core Standard for Mastery
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.
7.RP.2.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.
7.RP.2.b	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
7.RP.2.c	Represent proportional relationships by equations.
7.RP.2.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.
Number	Common Core Standard for Introduction
8.EE.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.

<p>Unit Essential Questions</p> <ul style="list-style-type: none"> • What are ratios, proportions and percents, and how do we use them in our daily lives? • How can you determine if two quantities are proportional? • When is it appropriate to reason proportionally? • Can proportions be used to solve problems involving similar figures? 	<p>Unit Enduring Understandings</p> <ul style="list-style-type: none"> • Apply proportional reasoning and its applications to real-world contexts (ie: sales tax, discounts, tips). • Recognize that proportional relationships exist between two quantities. • Understand that in a proportion, the ratio for two quantities remains constant as the corresponding values of the quantities change. 	
<p>Unit Objectives <i>Students will know ...</i></p> <ul style="list-style-type: none"> • Proportions are comparisons between two quantities. • How to use proportions to solve problems. • Unit rates are the slopes of related linear functions. 	<p>Unit Objectives <i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Determine unit rates. • Identify proportional and non-proportional relationships. • Use proportions to solve problems. • Find the percent of a number. • Estimate percents by using fractions and decimals. • Solve problems using the percent proportion. • Solve problems using the percent equation. • Find the percent of the increase or decrease. • Solve problems involving sales tax, tips, discounts, and interest. • Solve problems involving scale drawings. • Recognize and represent proportional relationships between quantities. • Solve multistep problems using ratios and proportions. • Use ratios to solve a wide variety of percent problems. • Graph proportional relationships. 	

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Teacher Notes:

Toms River Regional Schools

Unit Overview

Content Area: Mathematics

Domain: Geometry

Cluster: Apply Formulas to Geometric Figures

Cluster Summary:

- Draw, construct, and describe geometrical figures and describe the relationships between them.
- Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Primary interdisciplinary connections: Infused within the unit are connections to the NJCCCS for Mathematics, Language Arts Literacy, Technology, and 21st Century Life and Career skills.

21st century themes: The unit will integrate the 21st Century Life and Career Standards 9.1 strands A-D. These strands include: Critical thinking and problem-solving, creativity and innovation, collaboration, teamwork, and leadership, and cross cultural understanding and interpersonal communication. For further clarification, see NJ World Class Standards at www.nj.gov/education/aps/cccs/career

Learning Targets

Content Statements

Number	Common Core Standard for Mastery
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.
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 multistep 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.
Number	Common Core Standard for Introduction
8.G.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

<p>Unit Essential Questions</p> <ul style="list-style-type: none"> • How is geometry used in the real-world? • How is finding the volume of a composite figure different than finding the surface area of a composite figure? How is it similar? • How are scales used to reproduce scale drawings? 	<p>Unit Enduring Understandings</p> <ul style="list-style-type: none"> • Solve real-life and mathematical problems involving angle measure, area, perimeter, surface area, and volume. • Realize that scale drawings have corresponding quantities that vary proportionally. 	
<p>Unit Objectives <i>Students will know ...</i></p> <ul style="list-style-type: none"> • The formulas used to find area, surface area, and volume of figures and circumference of circles. • How to find unknown measures and the sum of angles in polygons. • Fundamental angle relationships. • Changes in dimensions affect area and volume. • Proportional relationships by using scale drawings. 	<p>Unit Objectives <i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Find the volume of rectangular and triangular prisms. • Find the volume of cylinders, cones, and pyramids. • Find the surface area of prisms, cylinders, and pyramids. • Find the volume and surface area of composite figures. • Classify and identify angles and find missing measures. • Classify and identify triangles and find missing measures. • Classify quadrilaterals and find missing angle measures. • Solve problems involving scale drawings of geometric figures. • Draw freehand two and three dimensional figures. 	

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Teacher Notes:

Toms River Regional Schools

Unit Overview

Content Area: Mathematics

Domain: Statistics and Probability

Cluster: Draw Inferences

Cluster Summary:

- Use random sampling to draw inferences about a population.
- Draw informal comparative inferences about two populations.
- Investigate chance processes and develop, use, and evaluate probability models.

Primary interdisciplinary connections: Infused within the unit are connections to the NJCCCS for Mathematics, Language Arts Literacy, Technology, and 21st Century Life and Career skills.

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Learning Targets

Content Statements

Number	Common Core Standard for Mastery
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 of the same size to gauge the variation in estimates or predictions.
7.SP.3	Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.
7.SP.4	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.
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 0.5 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.
7.SP.7.a	Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.

7.SP.7.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.				
7.SP.8.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.				
7.SP.8.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.				
7.SP.8.c	Design and use a simulation to generate frequencies for compound events.				
Number	Common Core Standard for Introduction				
8.SP.1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.				
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>Unit Essential Questions</p> <ul style="list-style-type: none"> • What are some real-world situations in which you can use probability to make predictions? • How can experimental and theoretical probabilities be used to make predictions or to draw conclusions? • How can data samples inform us about a given population? </td> <td style="width: 50%; vertical-align: top;"> <p>Unit Enduring Understandings</p> <ul style="list-style-type: none"> • Develop a sense of the application of probability and data to the surrounding world. • Use random sampling to draw inferences about a population. </td> </tr> <tr> <td style="vertical-align: top;"> <p>Unit Objectives <i>Students will know ...</i></p> <ul style="list-style-type: none"> • Which graph most appropriately displays a given set of data. • How to make predictions based on theoretical probability of independent or dependent events. • How to determine the outcomes of an experiment and predict whether events are likely or unlikely and fair or unfair. • Chance events have a probability between 0 and 1. </td> <td style="vertical-align: top;"> <p>Unit Objectives <i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Find the probability of a simple event. • Find the probability of compound events. • Find the probability of chance events. • Find sample spaces and probabilities. • Use multiplication to count outcomes and find probabilities. • Find the probability of independent and dependent events. • Find and compare experimental and theoretical probabilities. • Use experimental and theoretical probabilities to decide whether a game is fair or unfair (likely or unlikely). • Predict actions of a larger group by using a sample. </td> </tr> </table>		<p>Unit Essential Questions</p> <ul style="list-style-type: none"> • What are some real-world situations in which you can use probability to make predictions? • How can experimental and theoretical probabilities be used to make predictions or to draw conclusions? • How can data samples inform us about a given population? 	<p>Unit Enduring Understandings</p> <ul style="list-style-type: none"> • Develop a sense of the application of probability and data to the surrounding world. • Use random sampling to draw inferences about a population. 	<p>Unit Objectives <i>Students will know ...</i></p> <ul style="list-style-type: none"> • Which graph most appropriately displays a given set of data. • How to make predictions based on theoretical probability of independent or dependent events. • How to determine the outcomes of an experiment and predict whether events are likely or unlikely and fair or unfair. • Chance events have a probability between 0 and 1. 	<p>Unit Objectives <i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Find the probability of a simple event. • Find the probability of compound events. • Find the probability of chance events. • Find sample spaces and probabilities. • Use multiplication to count outcomes and find probabilities. • Find the probability of independent and dependent events. • Find and compare experimental and theoretical probabilities. • Use experimental and theoretical probabilities to decide whether a game is fair or unfair (likely or unlikely). • Predict actions of a larger group by using a sample.
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Teacher Notes:

Pre-requisite Knowledge & Skills	Expected Mastery	Skills & Knowledge to be introduced but not mastered
The Number System		
<ul style="list-style-type: none"> • Fluently divide • Identify & Represent Integers • Order & Compare Integers • Identify & describe Absolute Value of Integers 	<ul style="list-style-type: none"> • Apply & extend previous understandings of operations with fractions to add, subtract, multiply and divide rational numbers. • Find the absolute value of integers. • Add, subtract, multiply and divide integers • Use and justify rules for addition, subtraction, multiplication and division of integers. 	<p>Know that numbers that are not considered rational are called Irrational Numbers.</p>
Expressions and Equations		
<ul style="list-style-type: none"> • Write and evaluate numerical expressions involving whole number exponents. • Read write and evaluate algebraic expressions. • Apply the properties of operations to generate equivalent expressions. • Factor out the Greatest Common Factor in algebraic and numerical expressions. • Identify equivalent expressions • Determine if a value is a solution of an equation • Solve one step equations 	<ul style="list-style-type: none"> • Add, subtract, factor and expand linear expressions with rational coefficients. • Write, graph and solve one step equations including negative numbers. • Solve two step equations • Compare algebraic solutions to arithmetic solutions. • Solve real life and mathematical problems using numerical and algebraic expressions and equations. 	<p>Solve linear equations with whole number coefficients, including equations whose solutions require expanding expressions using the distributive property.</p>
Ratios and Proportions		
<ul style="list-style-type: none"> • Graph ordered pairs in all four quadrants of the coordinate plane. • Understand ratios and describe ratio relationships. • Compare ratios using tables • Use ratio reasoning to convert measurement units. • Understand rates and unit rates 	<ul style="list-style-type: none"> • Find unit rates associated with ratios of fractions, areas and other quantities. • Decide whether two quantities are proportional using ratio tables and graphs • Identify the constant of proportionality (unit rates) in tables, graphs, equations, diagrams and verbal descriptions. • Explain what a point (x, y) on a proportional graph in context, particularly $(0, 0)$ and $(1, r)$, where r is the unit rate). • Analyze proportional relationships and use them to solve real world and mathematical problems. 	<ul style="list-style-type: none"> • Graph proportional relationships • Interpret the unit rate as the slope of the graph
Geometry		
<ul style="list-style-type: none"> • Draw polygons on the coordinate plane • Use formulas to find the areas of parallelograms, triangles and trapezoids. • Find the areas of triangles, special quadrilaterals and polygons. • Use nets made up of rectangles and triangles to find surface areas. • Find the volumes of prisms 	<ul style="list-style-type: none"> • Draw construct and describe geometrical figures and describe the relationships between them. • Use supplementary, complementary, vertical and adjacent angles. • Reproduce a scale drawing at a different scale. • Describe the cross sections that result from slicing three dimensional figures. 	<ul style="list-style-type: none"> • Apply the Pythagorean Theorem to determine unknown side lengths in right triangles.

with fractional edge lengths	<ul style="list-style-type: none"> • Understand pi and its estimates 	
Statistics and Probability		
<ul style="list-style-type: none"> • Understand that a measure of center summarizes all of the values in a data set in a single number. • Understand that a measure of variation summarizes how all of the values in the data set vary with a single number. • Display data on a number line in dot plots and box and whisker plots • Choose measures of center and variation based on shape 	<ul style="list-style-type: none"> • Use random sampling to draw inferences about a population • Investigate chance processes and develop, use and evaluate probability models. • Compare two populations from random samples using measures of center and variability. • Understand that probability is the likelihood of an event occurring expressed as a number from zero to 1. • Find the probabilities of compound events 	<ul style="list-style-type: none"> • Construct and interpret scatter plots, for bivariate measurement data.

