Course Title/ Course #: Math Grade 7/8

Unit Title/ Marking Period # (MP): 3

Start day:

Meetings (Length of Unit): 5 days

Desired Results ~ What will students be learning?
Standards of Learning/ Standards
SOL 8.12 The student will determine the probability of independent and dependent events with and without replacement. **SOL 7.9** The student will investigate and describe the difference between the experimental probability and theoretical probability of an event.
Essential Understandings/ Big Ideas
• How are the probabilities of dependent and independent events similar? Different? If events are dependent then the second event is considered only if the first event has already occurred. If events are independent, then the second event occurs regardless of whether or not the first occurs. • The students will understand that: Theoretical probability of an event is the expected probability and can be found with a formula. The experimental probability of an event is determined by carrying out a simulation or an experiment. In experimental probability, as the number of trials increases, the experimental probability gets closer to the theoretical probability
Key Essential Skills and Knowledge
SOL 8.12 The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to: • Determine the probability of no more than three independent events. • Determine the probability of no more than two dependent events without replacement. • Compare the outcomes of events with and without replacement.

Vocabulary	
Academic Vocabulary	**Content Vocabulary**
Ratios Proportions	Cross Product Equivalent

Assessment Evidence ~ What is evidence of mastery? What did the students master & what are they missing?

Assessment/ Evidence

- Mulligan Math check points SOL 8.12

- Mulligan Math check points SOL 7.9

- Interactive Achievement

- Probability of Simple Events Quiz=

- Counting Outcomes Quiz=

- Conditional Probability Quiz

- Probability of Compound Events Quiz=

Learning Plan ~ What are the strategies and activities you plan to use?

Learning Experiences/ Best Practice

Teacher Resources:
- Create a foldable on solving independent events.
- Create a foldable on solving dependent events.
- Cornell Notes in interactive notebook
- Guided Practice

Text
Virginia Math Connects, Course 3, ©2012, Price, et al, McGraw-Hill School Education Group: page(s) 813-818.

Coach book Grade 7 Virginia Gold edition: page(s) 140-146.
Coach book Grade 8 Virginia Gold edition: page(s) 108-111.

Technology Integrations

Compass Learning:
- [Probability](#) (76286, 72687, 76288, 76289)

Gizmo:
- [Independent and Dependent Events](#)
- [Spin the Big Wheel! (Probability)](#)

Brain Pop:
- [Basic Probability](#)
- [Compound Events](#)
- [Independent and Dependent Events](#)

Smart Exchange:
- [Probability of Simple Events ppt.](#) [SMART Notebook lesson]
- [Probability ppt.](#) [SMART Notebook lesson]
- [Independent and Dependent Probability ppt.](#) [SMART Notebook lesson]
- [Probability Jeopardy](#) - [SMART Notebook lesson]

Resources

Virginia Department of Education
- [Objective 7.9 Lesson Plans VDOE](#)
- [Objective 8.12 Lesson Plans VDOE](#)

Other Sites
- The Learning Channel-[Probability of Dependent and Independent Events](#)-Instructional Teacher Video
- [Independent Events](#)
- [Dependent Events](#)

Cross Curricular Connection

Science and Technology:
Have students determine chances of a frog catching a fly with his tongue on five tries.

Social Studies:
Have students determine chances of choosing one of the original thirteen colonies the did not support slavery.

English:
Have students write a paper on the different ways to find probability.

Materials		
Manipulatives	**Technology Resources**	**Student Supplies**
Color Tiles Cubes Cuisenaire Rods Pattern Blocks Tangrams 2-Color Counters Fraction Models	• LCD Projector • Speakers • Computer w/Internet Connection and SmartBoard Software • SmartBoard • Computer Cart	• Whiteboards/Markers • Pencil and Paper • Student Notes • Guided Notes

Course Title/ Course #: Math Grade 7/8

Unit Title/ Marking Period # (MP): 3

Start day:

Meetings (Length of Unit): 13 days

Desired Results ~ What will students be learning?
Standards of Learning/ Standards

SOL 8.6

The student will:
  a. verify by measuring and describe the relationships among vertical angles, adjacent angles, supplementary angles, and complementary angles; and
  b. measure angles of less than 360°.

SOL 8.8

The student will:
  a. Apply transformations to plane figures; and
  b. Identify applications of transformations.

SOL 7.8

The student, given a polygon in the coordinate plane, will represent transformations (reflections, dilations, rotations, and translations) by graphing in the coordinate plane.

Essential Understandings/ Big Ideas

- How are vertical, adjacent, complementary and supplementary angles related?
  Adjacent angles are any two non-overlapping angles that share a common side and a common vertex. Vertical angles will always be nonadjacent angles. Supplementary and complementary angles may or may not be adjacent.

- How does the transformation of a figure on the coordinate grid affect the congruency, orientation, location and symmetry of an image?
  Translations, rotations and reflections maintain congruence between the pre-image and image but change location. Dilations by a scale factor other than 1 produce an image that is not congruent to the pre-image but is similar. Rotations and reflections change the orientation of the image.

- The students will understand that:
  translations, rotations and reflections do not change the size or shape of a figure.
  a dilation of a figure and the original figure are similar.
  reflections, translations and rotations usually change the position of the figure.

Key Essential Skills and Knowledge

SOL 8.6

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:
- Measure angles of less than 360° to the nearest degree, using appropriate tools.
- Identify and describe the relationships between angles formed by two intersecting lines.
- Identify and describe the relationship between pairs of angles that are vertical.
- Identify and describe the relationship between pairs of angles that are supplementary.
- Identify and describe the relationship between pairs of angles that are complementary.
- Identify and describe the relationship between pairs of angles that are adjacent.
- Use the relationships among supplementary, complementary, vertical, and adjacent angles to solve practical problems.

SOL 8.8

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:
- Demonstrate the reflection of a polygon over the vertical or horizontal axis on a coordinate grid.
- Demonstrate 90°, 180°, 270°, and 360°clockwise and counterclockwise rotations of a figure on a coordinate grid. The center of rotation will be limited to the origin.
- Demonstrate the translation of a polygon on a coordinate grid.
- Demonstrate the dilation of a polygon from a fixed point on a coordinate grid.
- Identify practical applications of transformations including, but not limited to, tiling, fabric, and wallpaper designs, art and scale drawings.
- Identify the type of transformation in a given example.

SOL 7.8

The student will use problem solving, mathematical communication, mathematical reasoning, connections and representations to:
- Identify the coordinates of the image of a right triangle or rectangle that has been translated either vertically, horizontally, or a combination of a vertical and horizontal translation.
- Identify the coordinates of the image of a right triangle or rectangle that has been rotated 90° or 180° about the origin.
- Identify the coordinates of the image of a right triangle or a rectangle that has been reflected over the x- or y-axis.
- Identify the coordinates of a right triangle or rectangle that has been dilated. The center of the dilation will be the origin.

- Sketch the image of a right triangle or rectangle translated vertically or horizontally.
- Sketch the image of a right triangle or rectangle.

Vocabulary	
Academic Vocabulary	**Content Vocabulary**
Complementary Angles	Angle
Supplementary Angles	Degrees
Vertical Angles	Protractor
Adjacent Angles	Linear Pair
Line of Reflection	Vertical
Scale Factor	Reflection
Center of Rotation	Turn
Transformation	Enlarge/Reduce
Translation	Rotation
Horizontal	Slide
Clockwise	Flip
Counterclockwise	Tiling
x-axis	Dilate
y-axis	Quadrant

Assessment Evidence ~ What is evidence of mastery? What did the students master & what are they missing?
Assessment/ Evidence

- Mulligan Math check points SOL 8.6

- Mulligan Math check points SOL 8.8

- Mulligan Math check points SOL 7.8

- Interactive Achievement

- Compass Learning
1. M7153
2. M7156

3. M8135

- [Angles Quiz](#)

- [Line and Angle Relationships Quiz](#)=

- [Transformations Quiz](#)

- [Reflections Quiz](#)=

- [Translations Quiz](#)=

- [Rotations Quiz](#)=

Learning Plan ~ What are the strategies and activities you plan to use?

Learning Experiences/ Best Practice

Teacher Resources:
- Create a foldable defining the different types of angles.
- Create a foldable on finding angle measurements from 0 - 360.
- Create a Frayer model on translations.
- Create a Frayer model on rotations.
- Create a Frayer model on reflections.
- Create a Frayer model on dilations.
- Cornell Notes in interactive notebook
- Guided Practice

Text
Virginia Math Connects, Course 3, ©2012, Price, et al, McGraw-Hill School Education Group: page(s) 619-624, 103-107, 311-316, and 639-644.

Coach book Grade 7 Virginia Gold edition: page(s) 121-138.
Coach book Grade 8 Virginia Gold edition: page(s) 58-63 and 84-90.

Technology Integrations

Compass Learning:
- Angle Relationships & Transformations (7151, 8133, 8134)

Gizmo:
- Investigating Angle Theorems
- Dilations
- Reflections
- Rotations, Reflections, and Translations

Smart Exchange:
- Angles and Angle Relationships [SMART Notebook lesson]
- Vertical and Adjacent Angles [SMART Notebook lesson]
- Angle Relationships and Transformations[SMART Notebook lesson]
- Types of Transformations[SMART Notebook lesson]

Resources

Virginia Department of Education
- Objective 7.8 Translation and Reflection Lesson Plans VDOE
- Objective 7.8 Dilation Lesson Plans VDOE
- Objective 7.8 Rotations Lesson Plans VDOE
- Objective 8.6 Lesson Plans VDOE
- Objective 8.8 Lesson Plans VDOE

Other Sites
- Shape Mods Game
- Complementary Angles Notes
- Supplementary Angles Notes
- Henrico 8.6ab
- Henrico 8.8ab

Cross Curricular Connection
Science and Technology: Have students draw a beaker on a sheet of paper then use a transformation to move the beaker around the paper. **Social Studies:** Have students demonstrate the motion of troops of the military by transformations. **English:** Have students write a paper on how angles and transformations could help in every day life.

Materials		
Manipulatives • Protractors • Compasses • Rulers • Miras • Pattern Blocks • Patty Paper • Tangrams • Color Tiles • Cubes • Capacity Containers • Geoboards • Geometric Solids	**Technology Resources** • LCD Projector • Speakers • Computer w/Internet Connection and SmartBoard Software • SmartBoard • Computer Cart	**Student Supplies** • Whiteboards/Markers • Pencil and Paper • Student Notes • Guided Notes

Course Title/ Course #: Math Grade 7/8

Unit Title/ Marking Period # (MP): 3

Start day:

Meetings (Length of Unit): 10 days

Desired Results ~ What will students be learning?
Standards of Learning/ Standards

SOL 8.10
The student will:
   a. verify the Pythagorean Theorem, using diagrams, concrete materials, and measurement;
   b. apply the Pythagorean Theorem to find the missing length of a side of a right triangle when given the lengths of the other two sides.
 	
SOL 8.11
The student will solve practical area and perimeter problems involving composite plane figures.

Essential Understandings/ Big Ideas
• How can the area of squares generated by the legs and the hypotenuse of a right triangle be used to verify the Pythagorean Theorem? For a right triangle, the area of a square with one side equal to the measure of the hypotenuse equals the sum of the areas of the squares with one side each equal to the measures of the legs of the triangle. • How does knowing the areas of polygons assist in calculating the areas of composite figures? The area of a composite figure can be found by subdividing the figure into triangles, rectangles, squares, trapezoids and semi-circles, calculating their areas, and adding the areas together.
Key Essential Skills and Knowledge
SOL 8.10 The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to: • Identify the parts of a right triangle (the hypotenuse and the legs). • Verify a triangle is a right triangle given the measures of its three sides. • Verify the Pythagorean Theorem, using diagrams, concrete materials, and measurement. • Find the measure of a side of a right triangle, given the measures of the other two sides.

- Solve practical problems involving right triangles by using the Pythagorean Theorem.

SOL 8.11

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:

- Subdivide a figure into triangles, rectangles, squares, trapezoids and semicircles. Estimate the area of subdivisions and combine to determine the area of the composite figure.
- Use the attributes of the subdivisions to determine the perimeter and circumference of a figure.
- Apply perimeter, circumference and area formulas to solve practical problems.

Vocabulary	
Academic Vocabulary	**Content Vocabulary**
Pythagorean Theorem Hypotenuse Leg Pythagorean Triples Composite(Complex) Figure Subdividing	Right Triangle Square Root Whole Number Altitude Area Perimeter Polygon

Assessment Evidence ~ What is evidence of mastery? What did the students master & what are they missing?

Assessment/ Evidence

- Mulligan Math check points SOL 8.10

- Mulligan Math check points SOL 8.11

- Interactive Achievement

- Compass Learning
1. M7134
2. M8123
3. M8126
4. M7142

- The Pythagorean Theorem Quiz=

- [Using the Pythagorean Theorem Quiz](#)=

Learning Plan ~ What are the strategies and activities you plan to use?

Learning Experiences/ Best Practice

Teacher Resources:
- Create a foldable on defining the Pythagorean Theorem.
- Create a Frayer model on the area of different polygons.
- Create a Frayer model on the perimeter of different polygons.
- Cornell Notes in interactive notebook
- Guided Practice

Text

Virginia Math Connects, Course 3, ©2012, Price, et al, McGraw-Hill School Education Group: page(s) 581-586, 223-228, and 684-689.

Coach book Grade 8 Virginia Gold edition: page(s) 96-100.

Technology Integrations

Compass Learning:
- [2-D Plane Figures](#) (7133, 8121, 8122, 7141)

Gizmo:
- [Pythagorean Theorem with a Geoboard](#)
- [Pythagorean Theorem](#)

Brain Pop:
- [Pythagorean Theorem](#)

Smart Exchange:
- [Pythagorean Theorem ppt.](#) [SMART Notebook lesson]
- [Understanding Pythagorean Theorem ppt.](#) [SMART Notebook lesson]
- [Applying the Pythagorean Theorem](#) [SMART Notebook lesson]
- [Composite Figures](#) [SMART Notebook lesson]

Resources

Virginia Department of Education
    • Objective 8.10a-b Lesson Plans VDOE
    • Objective 8.11 Lesson Plans VDOE
 	
Other Sites
    • Pythagorean Theorem – Lesson Planning
    • Regents Prep-Demonstrating the Pythagorean Theorem-
    • Alex-Pythagorean Theorem-Alabama Learning Exchange Lesson Plan
    • The Pythagorean Theorem Worksheets
    • Pythagorean Theorem Activities
    • Extra Pythagorean Theorem Activities
    • Pythagorean Theorem Notes
    • Henrico 8.10ab
    • Henrico 8.11

Cross Curricular Connection
Science and Technology: Have students show how to determine the distance of the height of a microscope by using a triangular relationship. **Social Studies:** Have students demonstrate the trajectory of a missile shot threw the air. **English:** Have students write a paper about how Pythagorean came up with the Pythagorean Theorem.

Materials		

Manipulatives
  • Color Tiles
  • Cubes
  • Geoboards
  • Rulers
	Technology Resources
	    • LCD Projector
	    • Speakers
	    • Computer w/Internet Connection and SmartBoard Software
	    • SmartBoard
	    • Computer Cart
		Student Supplies
		    • Whiteboards/Markers
		    • Pencil and Paper
		    • Student Notes
		    • Guided Notes

Course Title/ Course #: Math Grade 7/8

Unit Title/ Marking Period # (MP): 3

Start day:

Meetings (Length of Unit): 11 days

Desired Results ~ What will students be learning?
Standards of Learning/ Standards

SOL 8.7
The student will:
    a. investigate and solve practical problems involving volume and surface area of prisms, cylinders, cones, and pyramids; and
    b. describe how changing one measured attribute of a figure affects the volume and surface area.
 	
SOL 8.9
The student will construct a three-dimensional model, given the top or bottom, side, and front views.
 	
SOL 7.5
The student will:
    a. describe volume and surface area of cylinders
    b. solve practical problems involving the volume and surface area of rectangular prisms and cylinders; and
    c. describe how changing one measured attribute of a rectangular prism affects its volume and surface area.

Essential Understandings/ Big Ideas
• How does the volume of a three-dimensional figure differ from its surface area? Volume is the amount a container holds. Surface area of a figure is the sum of the area on surfaces of the figure. • How are the formulas for the volume of prisms and cylinders similar? For both formulas you are finding the area of the base and multiplying that by the height. • How are the formulas for the volume of cones and pyramids similar? For cones you are finding $\frac{1}{3}$ of the volume of the cylinder with the same size base and height.

For pyramids you are finding $\frac{1}{3}$ of the volume of the prism with the same size base and height.

- In general what effect does changing one attribute of a prism by a scale factor have on the volume of the prism?
  When you increase or decrease the length, width or height of a prism by a factor greater than 1, the volume of the prism is also increased by that factor.

- How does knowledge of two-dimensional figures inform work with three-dimensional objects?
  It is important to know that a three-dimensional object can be represented as a two-dimensional model with views of the object from different perspectives.

- The students will:
  Understand how to apply volume and surface area in real-life situations.
  Understand the derivation of formulas related to volume and surface area of polygons.

Key Essential Skills and Knowledge

SOL 8.7
The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:
- Distinguish between situations that are applications of surface area and those that are applications of volume.
- Investigate and compute the surface area of a square or triangular pyramid by finding the sum of the areas of the triangular faces and the base using concrete objects, nets, diagrams and formulas.
- Investigate and compute the surface area of a cone by calculating the sum of the areas of the side and the base, using concrete objects, nets, diagrams and formulas.
- Investigate and compute the surface area of a right cylinder using concrete objects, nets, diagrams and formulas.
- Investigate and compute the surface area of a rectangular prism using concrete objects, nets, diagrams and formulas.
- Investigate and compute the volume of prisms, cylinders, cones, and pyramids, using concrete objects, nets, diagrams, and formulas.
- Solve practical problems involving volume and surface area of prisms, cylinders, cones, and pyramids.

SOL 8.9
The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:
- Construct three-dimensional models, given the top or bottom, side, and front views.
- Identify three-dimensional models given a two-dimensional perspective.

SOL 7.5

The student will use problem solving, mathematical communication, mathematical reasoning, connections and representations to:
- Find the volume of a rectangular prism.
- Find the surface area of a rectangular prism.
- Find the volume of a cylinder.
- Find the surface area of a cylinder.
- Determine if a practical problem involving a rectangular prism or cylinder represents the application of volume or surface area.
- Solve practical problems that require finding the surface area of a rectangular prism.
- Solve practical problems that require finding the surface area of a cylinder.
- Solve practical problems that require finding the volume of a rectangular prism.
- Solve practical problems that require finding the volume of a cylinder.
- Describe how the volume of a rectangular prism is affected when one measured attribute is multiplied by a scale factor. Problems will be limited to changing attributes by scale factors only.
- Describe how the surface area of a rectangular prism is affected when one measured attribute is multiplied by a scale factor. Problems will be limited to changing attributes by scale factors only.

Vocabulary	
Academic Vocabulary	**Content Vocabulary**
Rectangular Prism	Cylinder
Triangular Prism	Cone
Rectangular Pyramid	Base
Triangular Pyramid	Volume
Surface Area	Faces
Lateral Faces	Polyhedron
l:Slant Height	h: Height
B: Area of Base	l:Length
p: Perimeter of Base	w:Width
Three-Dimensional	Models
Two-Dimensional	View
adjacent sides	Net

Assessment Evidence ~ What is evidence of mastery? What did the students master & what are they missing?
Assessment/ Evidence

- Mulligan Math check points SOL 8.7

- Mulligan Math check points SOL 8.9

- Mulligan Math check points SOL 7.5

- Interactive Achievement

- Compass Learning
1. M7175
2. M7178
3. M7178
4. M7181

- Volume and Surface Area Quiz

- Volume of Prisms and Cylinders Quiz=

- Volume of Pyramids and Cones Quiz=

- Surface Area of Prisms and Cylinders Quiz=

Learning Plan ~ What are the strategies and activities you plan to use?
Learning Experiences/ Best Practice

Teacher Resources:
- Create a Frayer model on volume of prisms, cylinders, cones, and pyramids.
- Create a Frayer model on surface area of prisms, cylinders, cones, and pyramids.
- Create a Frayer model on how to draw three dimensional figures.
- Cornell Notes in interactive notebook
- Guided Practice

Text

Virginia Math Connects, Course 3, ©2012, Price, et al, McGraw-Hill School Education Group: page(s) 705-736.

Coach book Grade 7 Virginia Gold edition: page(s) 82-101.
Coach book Grade 8 Virginia Gold edition: page(s) 64-76 and 91-95.

Technology Integrations

Compass Learning:
- 3-D Figures (7173,7174, 7179, 7180)

Gizmo:
- Prisms and Cylinders
- Pyramids and Cones
- Surface and Lateral Areas of Prisms and Cylinders
- Surface and Lateral Areas of Pyramids and Cones
- 3D and Orthographic Views

Brain Pop:
- Volume of Cylinders
- Volume of Prisms

Smart Exchange:
- Volume Surface Area ppt. [SMART Notebook lesson]
- Volume Problems ppt. [SMART Notebook lesson]

Resources

Virginia Department of Education
- Objective 7.5a Lesson Plans VDOE
- Objective 7.5b Lesson Plans VDOE
- Objective 7.5b Lesson Plans 2 VDOE
- Objective 7.5c Lesson Plans VDOE
- Objective 8.6 Lesson Plans VDOE
- Objective 8.9 Lesson Plans VDOE

Other Sites
- Radford University Lesson-Volume and Surface Area-Lesson Plan Performance Task
- Math Science Innovation Center-Cubenometry-Lesson Plan
- Change in Attributes
- Surface Area of Pyramids and Cones=
- Extra Prisms Work
- Henrico 8.7
- Henrico 8.9

Cross Curricular Connection

Science and Technology:
Have students determine the volume and surface area of a science text book.

Social Studies:
Have students determine the volume and surface area a battleship.

English:
Have students write a paper on the difference between volume and surface area.

Materials

Manipulatives	**Technology Resources**	**Student Supplies**
- Color Tiles - Cubes - Capacity Containers - Geometric Solids - Rulers - Capacity Containers - Graph Paper - Models of Solids - Boxes and cans (i.e. cereal, shoe, oatmeal, etc.)	- LCD Projector - Speakers - Computer w/Internet Connection and SmartBoard Software - SmartBoard - Computer Cart	- Whiteboards/Markers - Pencil and Paper - Student Notes - Guided Notes