**Unit #2**

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| **Literacy Strategies**  (Check all that apply.) | **Habits of Success**  (Check one per unit.) | **Multiple Intelligence Areas** |
| * Admit/Exit slips * Graphic organizer * Know/Want to Know/Learn chart (KWL) * Open-response questions * Double-entry/Two-column notes * Retelling * Reflection * Jigsaw reading * Anticipation guide * RAFT (Role/Audience/Format/Topic) * Interactive reading guide * Concept definition maps * Frayer model * Visual prediction guide * Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | * Create relationships * Teamwork, responsibility, effective communication) * Study, manage time, organize * (Organization, time management, study skills) * Improve reading/writing skills * (Use reading and writing to learn strategies) * Improve mathematics skills * (Estimate, compute, solve, synthesize) * Set goals/plan * (Set goals, plan, monitor progress) * Access resources * (Research, analyze, utilize) * USE OF TECHNOLOGY | * Logical/Mathematical * Spatial * Musical * Bodily—Kinesthetic * Interpersonal * Intrapersonal * Naturalist * Linguistic |

**UNIT Assessments:**

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| Pre-Assessment: |
| Daily/Weekly: (Included on daily activities plans) |
| Post-Assessment: |

State Standards and Benchmarks:

**9-12.G.1.3** Draw three-dimensional objects and calculate the surface areas and volumes of these figures (e.g. prisms, cylinders, pyramids, cones, spheres) as well as figures constructed from unions of prisms with faces in common, given the formulas for these figures.

**9-12.G.2.3** Use basic geometric ideas (e.g., the Pythagorean theorem, area and perimeter) in the context of the Cartesian coordinate plane (e.g., calculate the perimeter of a rectangle with integer coordinates and with sides parallel to the coordinate axes, and of a rectangle with sides not parallel).

**-12.G.4.1** Solve contextual problems using congruence and similarity relationships of triangles (e.g., find the height of a pole given the length of its shadow).

**9-12.G.4.3** Know that the effect of a scale factor *k* on length, area and volume is to multiply each by *k, k*² and *k*³, respectively.

**9-12.G.4.6** Apply basic trigonometric functions to solve right-triangle problems.

**9-12.G.4.7** Use angle and side relationships in problems with special right triangles (e.g., 30-, 60-, 90-, and 45-, 45-, 90- degree triangles).

**9-12.G.4.**5 Understand how similarity of right triangles allows the trigonometric functions sine, cosine and tangent to be defined as ratios of sides and be able to use these functions to solve problems.

http://upload.wikimedia.org/wikipedia/commons/d/d4/Button_hide.png

**Project:**

**Day 1**

Benchmark: N **/A**

Learning Objective: The student will be able to demonstrate previous concepts necessary to completion of this unit

Assessment: Pre test

Accommodations:

Tier 2:

Tier 3:

Materials: Pretest

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 min | Add 4’5” to 3’6”  Multiply these same dimensions |
| Introduction/Engage | 5 min | Why are there special rules for adding and multiplying these numbers?  Why are these referred to as dimensions? What are dimensions used for? What is meant by shapes? |
| Explore/Review | 5 m | Explain why a pretest is necessary and what it will be used for. |
| Assessment | 20m | Pre test |
| Closure | 10 m | Create a foldable of formulas for surface areas of shapes and one for volumes. |

Reflection:

**Day 2**

Benchmark: **9-12.G.1.3** Draw three-dimensional objects and calculate the surface areas and volumes of these figures (e.g. prisms, cylinders, pyramids, cones, spheres) as well as figures constructed from unions of prisms with faces in common, given the formulas for these figures.

Learning Objective: The student will be able to figure surface area of a cubes, rectangular solids, and prisms

Assessment: Figure the surface area of the following:

1. A cube with sides of 4”
2. A rectangle with height of 5cm, width of 6cm and a length of 2.7cm
3. A triangular prism with a base sides of 3.2cm, 4.5cm, and 2.1cm and a height of 5.6cm

Accommodations:

Tier 2:

Tier 3:

Materials: Graph paper, tape, rulers, scissors

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 m | Find the areas of the following shapes: A triangle with base of 14” and a height of 8”. A rectangle with a length of 4.6cm and a width of 3.4cm. |
| Introduction/Engage | 5m | We have learned that we can find the area and perimeter of various shapes by putting the dimensions into formulas. Surface areas are similar. When we are talking about surface area, we are talking about how much material it would take to make a hollow figure or how much exposure to the environment a figure has. |
| Explore/Review | 25m | We can break surfaces into 2 dimensional shapes and add them together. For example, a rectangular solid can be broken into 6 sides which are also rectangles. Show an example of a net of a rectangular solid. Divide class into 3 groups. One group will construct a cube with sides of 10 cm. One construct a rectangular solid with width 7cm, length of 5 cm, and height of 6 cm. One construct a prism with a triangular base of 5cm, 5cm,and 5cm with a height of 8 cm.  For each shape, figure the area of each side and put on face. Add them together and find total surface are of the shape. Share results with the class and discuss results. |
| Assessment | 5 m | Figure the surface area of the following:   1. A cube with sides of 4” 2. A rectangle with height of 5cm, width of 6cm and a length of 2.7cm 3. A triangular prism with a base sides of 3.2cm, 4.5cm, and 2.1cm and a height of 5.6cm |
| Closure | 5 m | Ticket out the door: Name where you might use these shapes in real life examples.  Add formulas to foldable. |

Reflection:

**Day 3**

Benchmark: **9-12.G.1.3** Draw three-dimensional objects and calculate the surface areas and volumes of these figures (e.g. prisms, cylinders, pyramids, cones, spheres) as well as figures constructed from unions of prisms with faces in common, given the formulas for these figures.

Learning Objective: The student will be able to figure the surface area of cylinders

Assessment: Find the surface area of a cylinder with a radius of 6.3 cm and a height of 5.2cm.

Accommodations:

Tier 2:

Tier 3:

Materials: graph paper, rulers, scissors, compasses

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 m | Find the area of a circle whose radius is 4.2 cm. What is the area of a rectangle whose length is the same as the circumference of the circle and width is 5.4cm. |
| Introduction/Engage | 5 m | Add formula to foldable (SA= 2πr2 + 2πrh). Area consist of two base circles and one rectangular side. Demonstrate using a piece of typing paper. |
| Explore/Review | 20 m | Do a net of a cylinder. Divide class into partners. One partner make a cylinder of a piece of paper with the height being the length of the paper and the other will be the width of the paper. Demonstrate if necessary. They will have to make circular bases. Figure the areas of the surfaces and add together. Put dimensions into formula and compare results. |
| Assessment | 5 m | Find the surface area of a cylinder with a radius of 6.3 cm and a height of 5.2cm. |
| Closure | 10 m | Exit Slip: Name 5 real life objects in the classroom that are cylinders. Pick one and estimate the radius and height. Use this cylinder to estimate surface area. |

Reflection:

**Day 4**

Benchmark: **9-12.G.1.3** Draw three-dimensional objects and calculate the surface areas and volumes of these figures (e.g. prisms, cylinders, pyramids, cones, spheres) as well as figures constructed from unions of prisms with faces in common, given the formulas for these figures.

Learning Objective: The student will be able to figure the surface area of pyramids and cones.

Assessment:

1. Find the SA of a pyramid whose height is 3cm and base is a square 3cm x 3cm.
2. Find the surface area of a cone whose height is 4cm and base is a circle whose radius is 3 cm and slant height is 5 cm.

Accommodations:

Tier 2:

Tier 3:

Materials: graph paper, rulers, scissors, compasses

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 m | Describe the shape of a pyramid and a cone and give examples of them in real life. |
| Introduction/Engage | 5 m | Pyramids have long been symbols of long life and power in ancient worlds. All major ancient cultures created pyramids. Cones are practical shapes such as funnels or building shapes. We can find the amount of materials needed to build these shapes by finding the SA. |
| Explore/Review | 20 m | Put formulas into foldables. Pyramids: SA = B +½ Pl  Cones: SA= B+πrl . Have half of the students create a pyramid which will fit on their rectangular solid and have a height of 10 cm. the other half should create a cone which will fit on the top of your cylinder and have a height of 10 cm. Figure the surface area of each. Present the results to the class. |
| Assessment | 10 m | 1. Find the SA of a pyramid whose height is 3cm and base is a square 3cm x 3cm. 2. Find the surface area of a cone whose height is 4cm and base is a circle whose radius is 3 cm and slant height is 5 cm. |
| Closure | 5 m | Exit slip: Connect the cylinder and cone and find the resulting surface areas. Hint: there may be surfaces you do not use. |

Reflection:

**Day 5 assessment**

Benchmark: **9-12.G.2.3** Use basic geometric ideas (e.g., the Pythagorean theorem, area and perimeter) in the context of the Cartesian coordinate plane (e.g., calculate the perimeter of a rectangle with integer coordinates and with sides parallel to the coordinate axes, and of a rectangle with sides not parallel).

Learning Objective:

Assessment: From templates, cut out and assemble shapes and find surface areas.

Accommodations:

Tier 2:

Tier 3:

Materials:. See scanned pages for templates rulers, scissors, tape,

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 m | Discuss the project for the closure from the previous day. What did you learn about combination shapes? |
| Introduction/Engage | 5 m | Discuss results Think pair share |
| Explore/Review | 10 | Review formulas. Make a graphic organizer of formulas from foldables. In graphic organizer, tell what the variables mean. |
| Assessment | 25 | From templates, cut out and assemble shapes and find surface areas. Cut out templates and assemble. Find surface areas of all figures and write on spate sheet of paper. |
| Closure | 0 | N/A |

Reflection:

**Day 6**

Benchmark: **9-12.G.1.3** Draw three-dimensional objects and calculate the surface areas and volumes of these figures (e.g. prisms, cylinders, pyramids, cones, spheres) as well as figures constructed from unions of prisms with faces in common, given the formulas for these figures.

Learning Objective: The student will be able to figure surface area of spheres

Assessment: Find the surface area of a sphere with a radius of 11 cm.

Accommodations:

Tier 2:

Tier 3:

Materials: 4 different sized spheres or balls.

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 m | What is meant by a sphere? Give some examples of a sphere that would be hollow. Why would the SA be significant in these cases. |
| Introduction/Engage | 5 m | Have students pair and share with their shoulder partners. Have a report out and discuss. How do you measure the radius of a sphere? Share strategies with class. |
| Explore/Review | 25 m | Have students add the SA of a sphere to their foldable. SA= 4πr2 Have four types of spheres. Students take turns going from sphere to sphere and finding the radius. After all students find the radii, have them find the SA of each. They should make a chart and graph the results. Using the calculator, they should check their results. |
| Assessment | 5 m | Find the surface area of a sphere with a radius of 11 cm. |
| Closure | 5 m | What is the significance of the graph of the radii vs the SA? Is there any clue to the resulting graph from the formula? What type of graph do you think this is? |

Reflection:

**Day 7**

Benchmark: **9-12.G.1.3** Draw three-dimensional objects and calculate the surface areas and volumes of these figures (e.g. prisms, cylinders, pyramids, cones, spheres) as well as figures constructed from unions of prisms with faces in common, given the formulas for these figures.

Learning Objective: The student will be able to find the SA area of the class room to determine the paint needed to paint it.

Assessment: How much paint needed to paint the room?

Accommodations:

Tier 2:

Tier 3:

Materials: Tape measures.

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 m | What shape is the classroom? How could you figure the SA? Would all surfaces need to be painted? How would you adjust for the ones which would not be painted. |
| Introduction/Engage | 5 m | Estimate the amount of paint it would take to paint the room in gallons if you use two coats. Tell your partner how you arrived at this amount. How does your room compare in size to the classroom? How would you compare the SA’s? |
| Explore/Review | 25 m | Have students organize a plan and data sheet for figuring the SA of the room. Some places which do not need paint would be doors, blackboards, cabinet spaces, drop ceilings etc. When completed, share with shoulder partner and refine data sheets. When completed, with shoulder partner, measure the room and find the SA. Measurements should be to the nearest inch. All measurements should be in inches. |
| Assessment | 10 m | Figuring 650 square feet per gallon, figure the gallons of paint needed. Justify your answer using your data sheets and figures. |
| Closure | 5 m | How could this method be used to figure wall paper where the paper goes half way up the wall and one roll covers 54 sq ft? |

Reflection:

**Day 8**

Benchmark: **9-12.G.1.3** Draw three-dimensional objects and calculate the surface areas and volumes of these figures (e.g. prisms, cylinders, pyramids, cones, spheres) as well as figures constructed from unions of prisms with faces in common, given the formulas for these figures.

Learning Objective: The student will be able to find the volume of a rectangular prism and a cylinder.

Assessment: How much air would a room that is 25’ x 15’ x 8’?

How much water would fit into a cylindrical tank with a radius of 4’ and a height of 5’?

Accommodations:

Tier 2:

Tier 3:

Materials: Graph paper, tape measures, cube faces

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 m | What is meant by volume? Do you know other words which might be used instead of volume? Give an example of when volume is an important consideration. |
| Introduction/Engage | 5 m | Share in a report out some of the answers to the answers to the above questions. How is volume associated with weight. What is meant by density? |
| Explore/Review | 25 m | Students measure the length, width, and height of rectangular solid made earlier in the unit. They then figure the volume using the formula V= lwh. This should be added to a separate foldable titled “Volumes” To this same foldable the volume of a cylinder, V=πr2h should be added. Students should also figure the volume of one of their cylinders using this formula. For the rectangular solid, the students should check their volume using centimeter cubes. |
| Assessment | 5 m | How much air would a room that is 25’ x 15’ x 8’?  How much water would fit into a cylindrical tank with a radius of 4’ and a height of 5’? |
| Closure | 5 m | Have shoulder partners explain the process of finding volume and the second partner repeat the process in his own words back to the first. |

Reflection:

**Day 9**

Benchmark: **9-12.G.1.3** Draw three-dimensional objects and calculate the surface areas and volumes of these figures (e.g. prisms, cylinders, pyramids, cones, spheres) as well as figures constructed from unions of prisms with faces in common, given the formulas for these figures.

Learning Objective: The student will be able to calculate the volume of cones, pyramids, and spheres.

Assessment: Figure the volume of the following:

1. A sphere with a radius of 3”
2. A pyramid with a square base with sides of 4cm and a height of 5 cm
3. A cone with a radius of 3’ and a height of 6’

Accommodations:

Tier 2:

Tier 3:

Materials: see volumes of shapes, Geometry reteaching masters pg 90, 94, 96-8 in back materials

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| **Strategy** | **Time** | **Activity** |
| Bell work | 35 m | What is the difference between a cone and a cylinder? A pyramid and a prism? Estimate how the volumes compare. Explain your answer. |
| Introduction/Engage | 5 m | Pair and share your answers. To your Volumes foldable add the formulas, V=1/3πr2 for a cylinder, V= 1/3Bh for a pyramid, and V = 4/3πr3 for a sphere. How do these compare to other volume formulas you have learned? |
| Explore/Review | 25 m | Worksheets on figuring volumes of cones, cylinders, and spheres. Have students grade their own and discuss. |
| Assessment | 10 m | 1. A sphere with a radius of 3” 2. A pyramid with a square base with sides of 4cm and a height of 5 cm 3. A cone with a radius of 3’ and a height of 6’ |
| Closure | 2 min | Exit slip: give 3 volume formulas  2 shapes that involve circles  1 shape that uses a coefficient of 4/3 in the formula |

Reflection:

**Day 10 assessment**

Benchmark: **9-12.G.1.3** Draw three-dimensional objects and calculate the surface areas and volumes of these figures (e.g. prisms, cylinders, pyramids, cones, spheres) as well as figures constructed from unions of prisms with faces in common, given the formulas for these figures.

Learning Objective: The student will be able to show abilities to find SA and volumes of 3 dimensional figures.

Assessment: quiz

Accommodations:

Tier 2:

Tier 3:

Materials: Quiz of SA and volume: see scanned materials and choose problems you like

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 m | Write 3 things you might need help on in this section. Talk with shoulder partner and discuss. |
| Introduction/Engage | 5 m | Discuss problem areas. Review formulas and shapes. |
| Explore/Review | 15 m | Have students create a graphic organizer with the volumes, shapes, meaning of variables, and notes of process of calculating. Put on paper and hang on wall. Be sure to put name on chart. Discuss charts |
| Assessment | 20 m | Quiz |
| Closure | 0 m | N/A |

Reflection:

**Day 11**

Benchmark: **9-12.G.2.3** Use basic geometric ideas (e.g., the Pythagorean theorem, area and perimeter) in the context of the Cartesian coordinate plane (e.g., calculate the perimeter of a rectangle with integer coordinates and with sides parallel to the coordinate axes, and of a rectangle with sides not parallel).

Learning Objective: The student will be able to find the area of a rectangle shown by coordinate points on a coordinate plane.

Assessment: Find the area of a rectangle that has the following vertices.

(-6, 4), (-6, -3), (2, 4), and (2, -3)

Accommodations:

Tier 2:

Tier 3:

Materials graph paper, rulers, calculators

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 m | Find the distance between the points (-2, 5) and (3, 12) using the distance formula give distance formula for students to write in their journal. |
| Introduction/Engage | 5 m | Shapes can be more easily managed sometimes if they can be placed on a coordinate plane. The points can be more accurate and the distances more easily controlled. In this unit we will use the coordinate plane to find areas of some basic shapes. |
| Explore/Review | 25 m | Lay out the points of the vertices of the following rectangles on a coordinate grid and draw in the rectangles. Find the length and widths and calculate the areas. Color in the rectangles and make a key giving the colors and areas. Rectangle 1 : (2, 5), (4, 5 ), (2, 8), and (4, 8)  Rectangle 2: (-3, -2), (-5, -4), (-3, -4), and (-5, -2). Rectangle 3: (-1, 4), (- 5, 4), (-1, 2), and (-5, 2). Rectangle 4: (6, -2), (3, -8), (6, -8), and (3, -2). Grade own papers. |
| Assessment | 5 m | (-6, 4), (-6, -3), (2, 4), and (2, -3) |
| Closure | 5 m | Journal entry: Write your own coordinates, lay out and check to see if it is a rectangle. Adjust if necessary. Find the area. What must the coordinates look like to work? |

Reflection:

**Day 12**

Benchmark: **9-12.G.2.3** Use basic geometric ideas (e.g., the Pythagorean theorem, area and perimeter) in the context of the Cartesian coordinate plane (e.g., calculate the perimeter of a rectangle with integer coordinates and with sides parallel to the coordinate axes, and of a rectangle with sides not parallel).

Learning Objective: The student will be able to find the area of a rectangle whose sides are not parallel to the x and y axes

Assessment: Find the area of a rectangle whose vertices lie on the points (-5, 0), (1, 5), (6, -1), and (0, 6)

Accommodations:

Tier 2:

Tier 3:

Materials: Graph paper, rulers, calculators

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 m | Find the distance between (-3, 6) and ( 2, -3). What formula do you need to figure this distance? |
| Introduction/Engage | 5 m | Show students the way to put coordinates into the formula in the calculator starting with square roots. Why is this easier on the calculator? Why must you know the order of operations anyway, even if using a calculator? |
| Explore/Review | 20 m | Students should follow the process with the following vertices:  (-1, 3), (3, 5), (4, 3), and (0, 1). Say out on grid paper. Using the distance formula, find the length and width. Multiply together to get the area. Cut out and place parallel to axes and check area.  Have students create their own by cutting out a rectangle and drawing on axes. Have them figure area but keep it to themselves. Have them share with shoulder partner and see if they can figure the area. Discuss as partners. |
| Assessment | 10 m | Find the area of a rectangle whose vertices lie on the points (-5, 0), (1, 5), (6, -1), and (0, 6) |
| Closure | 5 m | What would be another way to check your figures? Think Ink, Pair, Share. |

Reflection:

**Day 13**

Benchmark: **9-12.G.2.3** Use basic geometric ideas (e.g., the Pythagorean theorem, area and perimeter) in the context of the Cartesian coordinate plane (e.g., calculate the perimeter of a rectangle with integer coordinates and with sides parallel to the coordinate axes, and of a rectangle with sides not parallel).

Learning Objective: The students should be able to find the perimeter of triangles on a coordinate plane given vertices as coordinate points.

Assessment: Find the perimeter of the triangle whose vertices are (-5, 2), (4, -1), and (0, 3)

Accommodations:

Tier 2:

Tier 3:

Materials: grid paper, rulers, calculators

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 m | Find the distance and midpoint of (-4, 3) and (2, 5). Use the midpoint formula. Give the midpoint formula if necessary. |
| Introduction/Engage | 5 m | Review the answer for the bellwork. Special relationships develop between triangles constructed from each other. We will investigate this relationship. |
| Explore/Review | 30 m | Have students divide into groups of 4. One partner will organize work of creating presentation. One will do calculations of large triangle. One will do calculations of small triangle and the last will create the poster and presentation. Students choose three points from different quadrants which will make a triangle. They will work together to find the midpoints of each side and the triangle they create. They need to find the perimeter of each triangle and compare the perimeter of the larger triangle to the smaller one. They then display the triangles and figures on a poster and present to class. |
| Assessment | 5 m | Presentation  Find the perimeter of the triangle whose vertices are (-5, 2), (4, -1), and (0, 3 |
| Closure | 0 | N/A |

Reflection:

**Day 14**

Benchmark: **9-12.G.2.3** Use basic geometric ideas (e.g., the Pythagorean theorem, area and perimeter) in the context of the Cartesian coordinate plane (e.g., calculate the perimeter of a rectangle with integer coordinates and with sides parallel to the coordinate axes, and of a rectangle with sides not parallel).

Learning Objective: The student will be able to find the area and perimeter of a triangle using vertices as coordinate points.

Assessment: Find the area and perimeter of a triangle with vertices of ( -5, 2), (3, 0), and (1, -4)

Accommodations:

Tier 2:

Tier 3:

Materials: Grid paper, rulers, protractors

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 m | Draw and measure 3 lines in cm. Place these on the grid paper and check your answers. Remember, the paper is cm grid paper. |
| Introduction/Engage | 5 m | We will tie in the processes you have learned to find the final part of this skill. We will find the area and perimeter of a triangle whose vertices are coordinate points. You will need to be able to construct a height of your triangle. To do this, you will need to use the protractor to make a line perpendicular to the base(any side you choose) to the opposite vertex. You can use the Pythagorean theorem, or measure this distance. For this exercise, you may measure the sides. |
| Explore/Review | 20 m | Each group of 3 students will draw 3 vertex cards from a hat. They will then use these to find the area and perimeter of the triangle. They should then cut out the triangle and cut along a center line to create a rectangle and check the area. They should present this to another group. |
| Assessment | 10 m | Find the area and perimeter of a triangle with vertices of ( -5, 2), (3, 0), and (1, -4) |
| Closure | 5 m | Ticket out the door: What about this assignment did you like? Dislike? How could it be improved? |

Reflection:

**Day 15 assessment**

Benchmark: **9-12.G.2.3** Use basic geometric ideas (e.g., the Pythagorean theorem, area and perimeter) in the context of the Cartesian coordinate plane (e.g., calculate the perimeter of a rectangle with integer coordinates and with sides parallel to the coordinate axes, and of a rectangle with sides not parallel).

Learning Objective: The student will be able to demonstrate abilities to find areas and perimeters of figures on a coordinate plane.

Assessment: quiz

Accommodations:

Tier 2:

Tier 3:

Materials:

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 m | Think, Ink, Pair, Share How would you use this process in real life situations. How can you create a set of axes when there is not one? |
| Introduction/Engage | 5 m | Report out on results of bellwork. |
| Explore/Review | 20 m | Review of process by going over assignments and partners doing think aloud. All partners should participate. |
| Assessment | 15m | Find the perimeter of a triangle triangle with vertices at (2, -5), (-1, 2), and (0 , -7) |
| Closure | 0 m | N/A |

Reflection:

**Day 16**

Benchmark: **9-12.G.4.1** Solve contextual problems using congruence and similarity relationships of triangles (e.g., find the height of a pole given the length of its shadow).

Learning Objective: The student will be able to find the height of a pole or building using similarity relationships of right triangles.

Assessment: Juan is 6’4” tall. At 3 o’clock today, he cast a shadow of 4’ 5”. At the same time, the Bank Of America building cast a shadow of 35’ 6”. How tall is the building?

Accommodations:

Tier 2:

Tier 3:

Materials: tape measures, data sheets. Holt reteaching masters ph143, 144

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 m | What is meant by the term “similar” in reference to geometric figures. What characteristics do they share? |
| Introduction/Engage | 5 m | Answer bellwork questions. Give some examples of where one might find similar triangles. Talk about how they estimate the height of tall trees or mountains. |
| Explore/Review | 10 m | Divide students into groups of 2. Give each group a tape measure and have them make a data sheet. Model the process of finding the height of a tree using similar triangles. Have them go out to a building which is casting a shadow and estimate the height of the building. Have them draw a diagram and show all figures. Compare heights when back in building and discuss any discrepancies. |
| Assessment | 20 m | Juan is 6’4” tall. At 3 o’clock today, he cast a shadow of 4’ 5”. At the same time, the Bank Of America building cast a shadow of 35’ 6”. How tall is the building? |
| Closure | 5 m | Pair Share. How else could this be helpful? Name three ways. Report out in discussion. |

Reflection:

**Day 17**

Benchmark: **9-12.G.4.1** Solve contextual problems using congruence and similarity relationships of triangles (e.g., find the height of a pole given the length of its shadow).

Learning Objective: Student will be able to use congruent triangles to find the area of a parallelogram.

Assessment: correct area of parallelograms,

Accommodations:

Tier 2:

Tier 3:

Materials: graph paper, ruler, scissors

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 m | Find the area of a rectangle whose length is 4’ 6”x 5’ 3” |
| Introduction/Engage | 5 m | Sometimes, rectangles get distorted by lines of vision or forces to create a new shape, the parallelogram. This can still be a useful tool. We can use congruent triangles to find the area of the parallel o grams by taking a right triangle, placing it on the other side and finding the area of the resulting rectangle. |
| Explore/Review | 15 m | Measure in on parallel sides on diagonal angles of a sheet of graph paper equal distances. Fold and cut off edges to make a parallogram. Fold the side to create a right triangle and cut off. Place on the other side to create a rectangle. The resulting area of the rectangle is the area of the parallelogram. Do others as time allows. What do you call the side of the triangle that you cut off the parallelogram? |
| Assessment | 5 minutes | Find the area of a parallelogram with a height of 12’6” and a base of 14’ 3” |
| Closure | 5 minutes | Journal writing: How can this method be used in other shapes to find area? Hint: A trapezoid. |

Reflection:

**Day 18**

Benchmark: **9-12.G.4.1** Solve contextual problems using congruence and similarity relationships of triangles (e.g., find the height of a pole given the length of its shadow).).

Learning Objective: The students will be able to find the distance across a river by using congruent triangles.

Assessment: Using the street as a river students use congruent triangles to find distance across.

Accommodations:

Tier 2:

Tier 3:

Materials: tape measures, paper to use for right angles, data sheets

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 minutes | Define congruent triangles. Do they need to be faced the same way to be congruent? Discuss responses |
| Introduction/Engage | 5 minutes | Often distances cannot physically measured. An example of this is the distance across a river. This distance can be measured by the use of congruent triangles. This method has been used by hikers, hunters and explorers for centuries, and is a handy trick to learn. |
| Explore/Review | 25 minutes | Students go outside to a non busy street. We will pretend that this is a river. They should identify an object across the street that is easily visible. They should construct a line about 20 feet long on the side they are on. Using a piece of paper or other object that is 90 degrees, they can sight across to the object on the other side and find a point on the line that is on the perpendicular line that goes through the original point. They can then measure 10 feet along the parallel line and place a rock of drive a stake. They can go an additional 10 feet and make a perpendicular line away from the street. Walking down that line, as soon as they can sight down the stake and the object on the other side, the distance across the street is the distance to the original line. You have created congruent triangles. Have students do a write up on their experience. |
| Assessment | 5 minutes | Write up |
| Closure | 5 minutes | Exit slip: Why did this experience create congruent triangles? Could this process be used in other applications? Explain how. |

Reflection:

**Day 19**

Benchmark: **9-12.G.4.1** Solve contextual problems using congruence and similarity relationships of triangles (e.g., find the height of a pole given the length of its shadow).

Learning Objective: The students will be able to make clinometers.

Assessment: Measurements made and tested with the clinometers.

Accommodations:

Tier 2:

Tier 3:

Materials: Protractors, straws, scissors, tape, string, weight, Simms Level 1-pg 300.

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 minutes | Explain the process of measuring angles using a protractor. |
| Introduction/Engage | 5 minutes | Angles that are in nature give a sense of order to the world around us. We constantly use right angles to build. We adjust our bow angle to make far shots in archery. We turn our cars to stay on the street. Control of angles give us control of our situations. We use a protractor to measure angles on a paper, but do not have effective methods for measuring angles in real life without expensive equipment. We can make an inexpensive measuring tool here in class. |
| Explore/Review | 25 minutes | Students create clinometers and set up instructions for use |
| Assessment | 10 minutes | Measurements made and tested with the clinometers. Record all measurements. |
| Closure |  |  |

Reflection:

**Day 20 assessment**

Benchmark: **9-12.G.4.1** Solve contextual problems using congruence and similarity relationships of triangles (e.g., find the height of a pole given the length of its shadow).

Learning Objective: Students will be able to show abilities of using congruence and similarity relationships of triangles to solve problems of length

Assessment:

Accommodations:

Tier 2:

Tier 3:

Materials: See scanned materials

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 minutes | Review notes with shoulder partner |
| Introduction/Engage | 5 minutes | Go over areas of concern with class |
| Explore/Review | 10 minutes | Study group discussions |
| Assessment | 20 minutes | See scanned sheet with problems and take problems that you want for quiz. |
| Closure | 5 minutes | Have students bring a cylinders for view tubes. Assorted sizes. |

Reflection:

**Day 21**

Benchmark: **9-12.G.4.1** Solve contextual problems using congruence and similarity relationships of triangles (e.g., find the height of a pole given the length of its shadow).

Learning Objective: The student will be able to construct and use view tubes to figure distances.

Assessment: Worksheets on view tubes

Accommodations:

Tier 2:

Tier 3:

Materials: View tubes work lab activity(see appendix)

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 minutes | Video for similar triangles mms://media.scctv.net/annenberg/lm\_geo\_08\_b2.wmv |
| Introduction/Engage | 5 minutes | Cord Unit 21, pg 37and 38 |
| Explore/Review | 20 minutes | Use view tubes to do experiment. |
| Assessment | 10 minutes | View tube data interpretations |
| Closure | 5 minutes | How else could these used? What do these tell us about similar angles? |

Reflection:

**Day 22**

Benchmark: **9-12.G.4.7** Use angle and side relationships in problems with special right triangles (e.g., 30-, 60-, 90-, and 45-, 45-, 90- degree triangles).

Learning Objective: the students will be able to use special right triangles to solve contextual problems.

Assessment: Have students present triangles they produces and discuss the results.

Accommodations:

Tier 2:

Tier 3:

Materials: video on triangle relationships

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 minutes | Cord video on triangle relationships. |
| Introduction/Engage | 5 minutes | The more short cuts we have to using angles, the more we will use them and the more effective they will be. There are two very special triangles that architects use in drawing. These are the 30-60-90 triangle and the 45=45-90 triangle. The properties of these triangles are so special, they are part of most drawing kits. We will learn to use these special triangles in this class. |
| Explore/Review | 15 minutes | Go over ratios by using Pythagorean theorem on drawn triangles. Enlarge sizes and do again as time permits. |
| Assessment | 15 minutes | Have students present triangles they produces and discuss the results. |
| Closure | 5 minutes | Tomorrow we will look at taking some notes and doing some problems using these ratios. |

Reflection:

**Day 23**

Benchmark: **9-12.G.4.7** Use angle and side relationships in problems with special right triangles (e.g., 30-, 60-, 90-, and 45-, 45-, 90- degree triangles).

Learning Objective: The students will be understand the relationships of special right triangles through taking Cornell Notes on Geometry Concepts and Skills pg 542-547, and 549 - 553

Assessment: McDougall Littell Geometry Concepts and Skills. Assorted Problems pg 545 and 547 and 552 to 553.

Accommodations:

Tier 2:

Tier 3:

Materials: McDougall Littell Geometry Concepts and Skills. pg 542 – 553. Additional source: Cord unit 21, pg 13 - 21

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 minutes | What are the special triangles and what ratios are the sides of each? How might you use these ratios? |
| Introduction/Engage | 5 minutes | We will now give you some resources on these triangles and some practice on using them. They are common angles that occur in nature and construction. |
| Explore/Review | 20 minutes | Read and take Cornell notes on McDougall Littell Geometry Concepts and Skills pg 542-553 and Cord Unit 21 ph 13 – 21. |
| Assessment | 15 minutes | Problems Geometry Concepts and Skills pg 545 – 547 and 552 – 553. |
| Closure |  |  |

Reflection:

**Day 24**

Benchmark: **9-12.G.4.7** Use angle and side relationships in problems with special right triangles (e.g., 30-, 60-, 90-, and 45-, 45-, 90- degree triangles).

Learning Objective: The students will be able to find the diagonals of a room using triangle properties.

Assessment: Drawing and measurement figures

Accommodations:

Tier 2:

Tier 3:

Materials: Cord Unit 21 Lab activity 2 Calculating diagonal lengths of rectangles.

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| **Strategy** | **Time** | **Activity** |
| Bell work | 10 minutes | Grade previous day’s assigned problems. |
| Introduction/Engage | 5 minutes | Today we will be doing a two stage calculation on diagonals. We must first find the floor diagonal and use this distance to find the 3D diagonal. This is an important triangulation layout technique that is essential to do most layouts. |
| Explore/Review | 20 minutes | Have students divide into groups of three. Give each group a tape measure and have them draw a figure like the classroom. They should measure and dimension their drawing and use the Pythagorean theorem to figure the diagonals. Be sure to show all calculations. Write up the process and results to turn in. |
| Assessment | 5 minutes | Write up, picture, and figures. |
| Closure | 5 minutes | Journal entry: Where might this information come in handy? Why is it important to think of stress in 3 dimensions instead of 2? |

Reflection:

**Day 25 assessment**

Benchmark: **9-12.G.4.7** Use angle and side relationships in problems with special right triangles (e.g., 30-, 60-, 90-, and 45-, 45-, 90- degree triangles).

Learning Objective: The student will be able to use the right triangle properties to solve problems.

Assessment: Quiz

Accommodations:

Tier 2:

Tier 3:

Materials: Quiz, see Kagan pg 304 - 307

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 minutes | What are the special triangles and their side ratios? |
| Introduction/Engage | 5 minutes | Discuss the significance of how these ratios are used. |
| Explore/Review | 10 minutes | Use study groups to play tennis to review. |
| Assessment | 20 minutes | Quiz |
| Closure | 5 minutes | Now we will learn how to use some special ratios for all angles to solve problems. These are called trigonometric ratios. There are three that we will be learning this year, sine, cosine and tangent. |

Reflection:

**Day 26**

Benchmark: G.4.6 Apply the basic trigonometric functions to solve right triangle problems.

**9-12.G.4.**5 Understand how similarity of right triangles allows the trigonometric functions sine, cosine and tangent to be defined as ratios of sides and be able to use these functions to solve problems.

Learning Objective: The student will be able to research trigonometric functions on the internet and produce a graphic organizer or foldables of functions. Include websites on foldables.

Assessment:

Foldables.

Accommodations:

Tier 2:

Tier 3:

Materials: computers with internet access. Materials to make foldables. Foldable example.

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 minutes | What words might you search to find information on the trigonometric functions. What types of sites do you think might be helpful or not helpful? |
| Introduction/Engage | 5 minutes | Rules and expectations of search. Directions for making foldable, show example. |
| Explore/Review | 30 minutes | Internet search and foldable construction. |
| Assessment |  | Foldables |
| Closure | 5 minutes | Finishing touches on foldables and putting away computers. |

Reflection:

**Day 27**

Benchmark: G.4.6 Apply the basic trigonometric functions to solve right triangle problems.

**9-12.G.4.**5 Understand how similarity of right triangles allows the trigonometric functions sine, cosine and tangent to be defined as ratios of sides and be able to use these functions to solve problems.

Learning Objective: The students will be able to use tangent functions to solve trigonometric problems

Assessment: Holt Algebra 1 Reteaching Masters. Pg 149 and 150.

Accommodations:

Tier 2:

Tier 3:

Materials: Holt Algebra 1 Reteaching Masters. Pg 149 and 150.

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 minutes | What is meant by a trigonometric ratio? How is this useful to find lengths of triangle sides? What type of triangle does it need to be to work? |
| Introduction/Engage | 5 minutes | The first function we will be working with is the tangent function. This function is the ratio of the opposite side to the adjacent side |
| Explore/Review | 25 minutes | Review process on some of the problems in the reteaching master. Go over Skills A and B and typical problems. |
| Assessment | 5 | Holt Algebra 1 Reteaching Masters. Pg 149 and 150. |
| Closure | 5 minutes | How can you see this ratio being used in other applications. How can you make a right triangle when there is not one? |

Reflection:

**Day28**

Benchmark: G.4.6 Apply the basic trigonometric functions to solve right triangle problems.

**9-12.G.4.**5 Understand how similarity of right triangles allows the trigonometric functions sine, cosine and tangent to be defined as ratios of sides and be able to use these functions to solve problems.

Learning Objective: Students will be able to use tangent functions to find distances on building.

Assessment: Holt Algebra 1 Pg636, 637

Accommodations:

Tier 2:

Tier 3:

Materials: Clinometers, tape measures, tape, Holt Algebra 1 pg 636, 637.

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 minutes | Have students read and discuss process of experiment. |
| Introduction/Engage | 5 minutes | Explain the process and answer any questions before going to the building. |
| Explore/Review | 30 minutes | Go through the process and fill out all parts. Work in groups of 3. Before starting, demonstrate the use of the clinometers |
| Assessment |  | Problems in exercise |
| Closure | 5 minutes | Have students reflect on effectiveness of experiment. |

Reflection:

**Day 29**

Benchmark: G.4.6 Apply the basic trigonometric functions to solve right triangle problems.

**9-12.G.4.**5 Understand how similarity of right triangles allows the trigonometric functions sine, cosine and tangent to be defined as ratios of sides and be able to use these functions to solve problems.

Learning Objective: The students will be able to solve problems using the sine and cosine functions

Assessment: worksheet problems

Accommodations:

Tier 2:

Tier 3:

Materials: Holt Algebra 1 Reteaching Masters pg 151 and 152.

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 minutes | What are the sine and cosine ratios? How are they related? |
| Introduction/Engage | 5 minutes | Sometimes the tangent does not address the parts of the triangle that are given so another ratio is needed. Two such ratios are the sine and cosine. Go over skill A and B and work some problems in each. |
| Explore/Review | 25 minutes | Work problems on sheets. Students may work in groups of no larger than two. |
| Assessment | 5m | Worksheet problems |
| Closure | 5 minutes | Why are these two ratios needed? How could you see these being used in real life situations? |

Reflection:

**Day 30**

Benchmark: G.4.6 Apply the basic trigonometric functions to solve right triangle problems.

**9-12.G.4.**5 Understand how similarity of right triangles allows the trigonometric functions sine, cosine and tangent to be defined as ratios of sides and be able to use these functions to solve problems.

Learning Objective: Students will be able to use the sine and cosine functions to solve problems

Assessment: Data sheets filled out correctly.

Accommodations:

Tier 2:

Tier 3:

Materials: Resource: Holt Algebra 1.Pg 626, ladder, tape measures, tape, clinometers

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 minutes | Give the trigonometric ratios and which parts they help you find. |
| Introduction/Engage | 5 minutes | Ladder safety is a concern in many places in our society. Ladders are a major cause of industrial accidents and cost companies a lot of money. Most Ladder safety is in the angle and reach of the ladder. We will investigate some angles of ladders in this investigation. |
| Explore/Review | 30 minutes | Students build a data sheet on angles of measurements and distances up the wall and distances from wall. Sheet should include all parts as variables, including angles.. there should be 10 different angle entries. |
| Assessment |  | Completed data sheets. |
| Closure | 5 minutes | How do you think the angle of the ladder is significant in the safety? What angle do you think is the safest? Explain your answer. |

Reflection:

**Day 31**

Benchmark: G 4.3 Know that the effect of a scale factor k on length, area and volume is to multiply each by k, k2, and k3, respectively.

Learning Objective: The students will be able to show the scale factors change with linear, area and volume.

Assessment: K factor worksheets Interactive site: [www.cimt.plymouth.as.uk/projects/mepres/book8/bk8i19/bk8\_19i3.html](http://www.cimt.plymouth.as.uk/projects/mepres/book8/bk8i19/bk8_19i3.html)

Accommodations:

Tier 2:

Tier 3:

Materials: k factor worksheets, Day 1 Interactive site: [www.cimt.plymouth.as.uk/projects/mepres/book8/bk8i19/bk8\_19i3.html](http://www.cimt.plymouth.as.uk/projects/mepres/book8/bk8i19/bk8_19i3.html)

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 minutes | What is meant by a scale drawing? Does scale mean the same thing in area as in linear measurements? |
| Introduction/Engage | 5 minutes | Discuss bellwork answers. Review process of 2 day project. |
| Explore/Review | 30 minutes | Project. Work in groups of three. Have students be sure to explain the process in their journal. |
| Assessment |  | Completed worksheet |
| Closure | 5 minutes | How do you think the scales compare and why? |

Reflection:

**Day 32**

Benchmark: G 4.3 Know that the effect of a scale factor k on length, area and volume is to multiply each by k, k2, and k3, respectively.

Learning Objective: The students will be able to show the scale factors change with linear, area and volume.

Assessment: k factor worksheets Day 2 interactive site: [www.cimt.plymouth.as.uk/projects/mepres/book8/bk8i19/bk8\_19i3.html](http://www.cimt.plymouth.as.uk/projects/mepres/book8/bk8i19/bk8_19i3.html)

Accommodations:

Tier 2:

Tier 3:

Materials: k factor work sheet Day 2 interactive site: [www.cimt.plymouth.as.uk/projects/mepres/book8/bk8i19/bk8\_19i3.html](http://www.cimt.plymouth.as.uk/projects/mepres/book8/bk8i19/bk8_19i3.html)

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 minutes | Explain the previous days work to your partner and have him explain it to you |
| Introduction/Engage | 5 minutes | Tie in the previous days work to the finishing of the project and the outcome. Set final expectations. They must be able to explain the k factor. |
| Explore/Review | 30 minutes | Finish project and do write up of process and significance. Write up should be at least one full page. |
| Assessment |  | Worksheets and write up |
| Closure | 5 minutes | Exit slip: tell the significance of the k, k2, k3 scale factors.R |

Reflection:

**Day 33**

Benchmark: G.4.6 Apply the basic trigonometric functions to solve right triangle problems.

**9-12.G.4.**5 Understand how similarity of right triangles allows the trigonometric functions sine, cosine and tangent to be defined as ratios of sides and be able to use these functions to solve problems.

Learning Objective: The students will be able to show abilities to use trigonometric functions to solve contextual problems

Assessment Review sheet

Accommodations:

Tier 2:

Tier 3:

Materials: Review sheet, See scanned sheets.

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 minutes | Have students identify concern areas in a consensogram. |
| Introduction/Engage | 5 minutes | Go over worst troubled areas |
| Explore/Review | 30 minutes | Review sheet |
| Assessment |  |  |
| Closure | 5 minutes | Review hints on what to study for the assessment |

Reflection:

**Day 34**

Benchmark: **9-12.G.1.3** Draw three-dimensional objects and calculate the surface areas and volumes of these figures (e.g. prisms, cylinders, pyramids, cones, spheres) as well as figures constructed from unions of prisms with faces in common, given the formulas for these figures.

**9-12.G.2.3** Use basic geometric ideas (e.g., the Pythagorean theorem, area and perimeter) in the context of the Cartesian coordinate plane (e.g., calculate the perimeter of a rectangle with integer coordinates and with sides parallel to the coordinate axes, and of a rectangle with sides not parallel).

**-12.G.4.1** Solve contextual problems using congruence and similarity relationships of triangles (e.g., find the height of a pole given the length of its shadow).

**9-12.G.4.3** Know that the effect of a scale factor *k* on length, area and volume is to multiply each by *k, k*² and *k*³, respectively.

**9-12.G.4.6** Apply basic trigonometric functions to solve right-triangle problems.

**9-12.G.4.7** Use angle and side relationships in problems with special right triangles (e.g., 30-, 60-, 90-, and 45-, 45-, 90- degree triangles).

**9-12.G.4.**5 Understand how similarity of right triangles allows the trigonometric functions sine, cosine and tangent to be defined as ratios of sides and be able to use these functions to solve problems.

Learning Objective:

Assessment:

Accommodations:

Tier 2:

Tier 3:

Materials: Unit Assessment

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| **Strategy** | **Time** | **Activity** |
| Bell work |  |  |
| Introduction/Engage |  |  |
| Explore/Review |  |  |
| Assessment | 45 minutes | Unit Assessment |
| Closure |  |  |

Reflection:

**Transformation**

**Cartoon project**

**9-12.G.3.1** Use rigid motions (compositions of reflections, translations and rotations) to determine whether two geometric figures are congruent in a coordinate plane.

**9-12.G.3.3** Identify similarity in terms of transformations.

**9-12.G.3.2** Sketch a planar figure that is the result of given transformations (i.e., translation, reflection, rotation, and/or dilation).

**9-12.G.3.4** Determine the effects of transformations on linear and area measurements of the original planar figure.

**Day 35**

Benchmark: **9-12.G.3.1** Use rigid motions (compositions of reflections, translations and rotations) to determine whether two geometric figures are congruent in a coordinate plane.

**9-12.G.3.2** Sketch a planar figure that is the result of given transformations (i.e., translation, reflection, rotation, and/or dilation).

Learning Objective: The student will identify transformations.

Assessment: Foldable on transformations. Use from Pg 132 Simms level 2

Accommodations:

Tier 2:

Tier 3:

Materials: Simms Level 2 book. Page 132 Introduction, Discussion, Activity 1, Exploration 1

Graph paper,rulers, protractors, tracing paper,

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5m | Think about your favorite cartoon. You have probably seen it flipped or smashed. Draw your favorite cartoon. |
| Introduction/Engage | 10 m | Page 132 Discussion a and b |
| Explore/Review | 20m | Students will work on translation, Activity 1 and Exploration 1 page 133-4  Students will pair up and do page 135 a-f. |
| Assessment | 5m | Students will do a foldable /transformations  (discuss project at the end of unit/start thinking about your favorite cartoon) |
| Closure | 5 | Exit slip Explain and draw a preimage, image, and a one to one correspondence. What are transformations? Give examples? |

Reflection:

**Day 36**

Benchmark: **9-12.G.3.1** Use rigid motions (compositions of reflections, translations and rotations) to determine whether two geometric figures are congruent in a coordinate plane.

**9-12.G.3.2** Sketch a planar figure that is the result of given transformations (i.e., translation, reflection, rotation, and/or dilation).

Learning Objective: Students will calculate the distance between points in the Cartesian plane, and examine the relationship between the distance formula and the Pythagorean Theroem.

Assessment: What is the relationship between the distance formula and the Pythagorean Theorem?

Accommodations:

Tier 2:

Tier 3:

Materials: Simms , page 136 Discussion 1 a-h, page 138 Exploration 2 a-h,

Graph paper

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| --- | --- | --- |
| **Strategy** | **Time** | **Activity** |
| Bell work | 5m | Find the distance between (7,5) and (3,6) |
| Introduction/Engage | 5m | Discuss what is the relationship between the distance formula and the Pythagorean Theoream.  Discussion page 136 1 a-h |
| Explore/Review | 25m | Students will pair up and use graph paper to construct a point –perspective drawing, page 138 Exploration 2 a-h. |
| Assessment | 5m | What is the relationship between the distance formula and the Pythagorean Theorem? |
| Closure | 5m | Think aloud with a partner about how to find the distance between two points.(Have you picked a cartoon.) |

Reflection:

**Day 37**

Benchmark: **9-12.G.3.1** Use rigid motions (compositions of reflections, translations and rotations) to determine whether two geometric figures are congruent in a coordinate plane.

**9-12.G.3.2** Sketch a planar figure that is the result of given transformations (i.e., translation, reflection, rotation, and/or dilation).

Learning Objective: Students will use point-perspective drawings to examine dilations in the coordinate plane.

Assessment: Describe the similarities between a point-drawing and a dilation?

Accommodations:

Tier 2:

Tier 3:

Materials: Simms 2 page Activity 1, Discussion 2, Warm up

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5m | What is a dilation. Give an example?  What is a scale factor? |
| Introduction/Engage | 5m | Students will go over discussion 2 page 139 a-k discuss as a class. |
| Explore/Review | 25 m | Students will do warm-up page 141 1-4 and assignment page 144 1.4a-d |
| Assessment | 5m | Describe the similarties between a point-drawing and a dilation? |
| Closure | 5 m | The vertices of square JUMP are the points J(4,5), U(4,-3), M(-2,-3), P(-2,5). For the transformation ‹6,2›determine the coordinates of JʹUʹMʹPʹ.  (Start working on your carton using dilation.) |

Reflection:

**Day 38**

Benchmark: **9-12.G.3.1** Use rigid motions (compositions of reflections, translations and rotations) to determine whether two geometric figures are congruent in a coordinate plane.

**9-12.G.3.2** Sketch a planar figure that is the result of given transformations (i.e., translation, reflection, rotation, and/or dilation).

Learning Objective: Students will explore translations in the coordinate plane using 2x2 and 3x3 matrices.

Students will examine the use of matrix addition to translate figures on a coordinate plane.

Assessment: Skip picture

Accommodations:

Tier 2:

Tier 3:

Materials: Simms 2 Page 146 Exploration,Discussion page 147, flashback 1,

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5m | Give three examples of real life situation of a translation. |
| Introduction/Engage | 5m | Discuss translation |
| Explore/Review | 20m | Students pair up and will draw Skip on a coordinate plane. Page 146 Exploration 1a-e. Discussion 1 page 147 a-e |
| Assessment | 10m | Skip picture |
| Closure | 5m | Flashback1  (Are there any questions about dilation with your cartoon. Start working with translation) |

Reflection:

**Day 39**

Benchmark: **9-12.G.3.1** Use rigid motions (compositions of reflections, translations and rotations) to determine whether two geometric figures are congruent in a coordinate plane.

**9-12.G.3.2** Sketch a planar figure that is the result of given transformations (i.e., translation, reflection, rotation, and/or dilation).

Learning Objective: Students will use matrix multiplication to translate figures on a coordinate plane.

Assessment: What must be true about the dimensions of two matrices to add them?

What must be true about the dimensions of two matrices to multiply them?

Accommodations:

Tier 2:

Tier 3:

Materials: Simms page 148 Activity 2: Exploration 2, Discussion 2, flashback 2

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5m | Flashback 2 |
| Introduction/Engage | 5m | Discussion in the use of matrix multiplication to translate figures on a coordinate plane. |
| Explore/Review | 25m | Students will work with a partner in use matrix multiplication to translate figure on coordinate plane page 148 a-h and Discussion 2 page 150 a-f |
| Assessment | 5m | What must be true about the dimensions of two matrices to add them?  What must be true about the dimensions of two matrices to multiply them? |
| Closure | 5m | Exit slip Warm-up page 150 1(Questions or concerns on project.) |

Reflection:

**Day 40 assessment**

Benchmark: **9-12.G.3.1** Use rigid motions (compositions of reflections, translations and rotations) to determine whether two geometric figures are congruent in a coordinate plane.

**9-12.G.3.2** Sketch a planar figure that is the result of given transformations (i.e., translation, reflection, rotation, and/or dilation).

Learning Objective: Students will use matrix addition and matrix multiplication to describe translations.

Assessment: quiz (Periodic assessment 2)

Accommodations:

Tier 2:

Tier 3:

Materials: Simms 2 page 150 Warm up 2-4, assignment page 151 2.2,2.4 (periodic assessment)

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| --- | --- | --- |
| **Strategy** | **Time** |  |
| Bell work | 5m | Warm-up page 150 2-4 |
| Introduction/Engage | 5m | Discuss warm-up |
| Explore/Review | 25m | Students will work on assignment page 151 2.2,2.4 |
| Assessment | 10 | Quiz Teacher rescources (Periodic Assessment2 ) |
| Closure |  | If time permits students may work on project. |

Reflection:

**Day 41**

Benchmark: **9-12.G.3.1** Use rigid motions (compositions of reflections, translations and rotations) to determine whether two geometric figures are congruent in a coordinate plane.

**9-12.G.3.2** Sketch a planar figure that is the result of given transformations (i.e., translation, reflection, rotation, and/or dilation).

Learning Objective: Students will use matrix multiplication to describe dilations with center at the origin.

Assessment: Warm-up page 155 1-4

Accommodations:

Tier 2:

Tier 3:

Materials: Simms 2 page 153 Activity 3 ,Exploration page 154

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5m | A quadrilateral has vertices at (1,10, ( 5,1), (4,4), (0,4). Determine its image under the translation vector ‹4, -2› by writing a matrix equation for the translation using matrix addition. Page 151 Assignment 2.1 |
| Introduction/Engage | 5m | Introduction to dilation. Discuss |
| Explore/Review | 20m | Exploration page 154 Students will use Skip’s face from activity two to dilate. In groups of three students will do page 154 a-e, Discussion page 155 a-f |
| Assessment | 10m | Warm-up page 155 1-4 |
| Closure | 5m | Exit slip What did you learn about dilation from today lesson? What would you do different? (Work on project.) |

Reflection:

**Day 42**

Benchmark: **9-12.G.3.1** Use rigid motions (compositions of reflections, translations and rotations) to determine whether two geometric figures are congruent in a coordinate plane.

**9-12.G.3.2** Sketch a planar figure that is the result of given transformations (i.e., translation, reflection, rotation, and/or dilation).

Learning Objective: Students will use matrix multiplication to describe dilations with center at the origin.

Assessment: Flashback 3

Accommodations:

Tier 2:

Tier 3:

Materials: Simms 2 Activity 3, Assignment 3, 3.4,3.5, Flashback 3

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| **Strategy** | **Time** | **Activity** |
| tio | 5m | Write some examples in real life where we might see dilation being use? |
| Introduction/Engage | 5m | Discussion on dilation. Are there any questions unclear from exploration and discussion section that was not clear? |
| Explore/Review | 20m | Students will work in groups of three on assignment page 157 3.4, and 3.5. |
| Assessment | 10m | Flashback 3 |
| Closure | 5 m | (Work on your cartoon on dilation. How is it working? Are there any problems) |

Reflection:

**Day 43**

Benchmark: **9-12.G.3.1** Use rigid motions (compositions of reflections, translations and rotations) to determine whether two geometric figures are congruent in a coordinate plane.

**9-12.G.3.2** Sketch a planar figure that is the result of given transformations (i.e., translation, reflection, rotation, and/or dilation).

Learning Objective: Students will use matrix multiplication to perform reflections.

Assessment: Find the image of point (-2, 7) under each of the following:

1. A reflection in the x-axis
2. A reflection in the y-axis

Accommodations:

Tier 2:

Tier 3:

Materials: Simms 2, Activity 4: Exploration page 160

Graph paper, ruler

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 m | What is a reflection? Draw an example of a reflection. |
| Introduction/Engage | 10m | Explain and discuss reflections. |
| Explore/Review | 20m | Students will work in groups of three on Exploration page 160 a-f, Discussion page 164 a-e |
| Assessment | 5m | Find the image of point (-2,7) under each of the following:   1. A reflection in the x-axis 2. A reflection in the y-axis |
| Closure | 5m | Exit slip Find the image of point (-3,6)under each of the following;   1. A reflection in the x-axis 2. A reflection in the y-axis |

Reflection:

**Day 44**

Benchmark: **9-12.G.3.1** Use rigid motions (compositions of reflections, translations and rotations) to determine whether two geometric figures are congruent in a coordinate plane.

**9-12.G.3.2** Sketch a planar figure that is the result of given transformations (i.e., translation, reflection, rotation, and/or dilation).

Learning Objective: Students will use matrix multiplication to perform reflections.

Students will learn rotations.

Assessment: flashback 4

Accommodations:

Tier 2:

Tier 3:

Materials: Simms 2 Activity 4 , flashback 4

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5m | Give an example of a rotation. When might you see this in real life situations? |
| Introduction/Engage | 10m | Use Warm-up page 162 1-4 |
| Explore/Review | 15m | Students will work in groups of three to do assignment on page 163 4.2, and 4.5 |
| Assessment | 10m | Flashback 4 |
| Closure | 5m | Exit slip (How is the reflection and rotation of your cartoon working? Do you have any concerns?) |

Reflection:

**Day 45**

Benchmark: **9-12.G.3.1** Use rigid motions (compositions of reflections, translations and rotations) to determine whether two geometric figures are congruent in a coordinate plane.

**9-12.G.3.2** Sketch a planar figure that is the result of given transformations (i.e., translation, reflection, rotation, and/or dilation).

Learning Objective: Students will present their work on their cartoon using transformations.

Assessment: Presentation of cartoon transformations.

Accommodations:

Tier 2:

Tier 3:

Materials: Activity 4: Assignments

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5m | Write any notes on a 3x5 card about transformations. |
| Introduction/Engage |  |  |
| Explore/Review |  |  |
| Assessment | 35m | Students will present their cartoon transformations. |
| Closure | 5m | Ticket out the door: Which presentation did you like the best? What three things did you like about the presentation? How would you improve your presentation? ( If time permits students will work on project.) |

Reflection:

**Day 46**

**9-12.G.3.1** Use rigid motions (compositions of reflections, translations and rotations) to determine whether two geometric figures are congruent in a coordinate plane.

**9-12.G.3.3** Identify similarity in terms of transformations.

**9-12.G.3.2** Sketch a planar figure that is the result of given transformations (i.e., translation, reflection, rotation, and/or dilation).

**9-12.G.3.4** Determine the effects of transformations on linear and area measurements of the original planar figure.

Learning Objective: Students will take an assessment on transformations.

Assessment: Module Assessment

Accommodations:

Tier 2:

Tier 3:

Materials: Summary assessment

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5m | Write any questions you might still have a concern about transformations |
| Introduction/Engage | 10m | Answer any question about bellwork. |
| Explore/Review | 10m | Review transformations using the white boards |
| Assessment | 20 | Assessment Module in Simms |
| Closure |  |  |

Reflection: