**Geometry in Construction UNIT 2 Lesson Plans**

**Day 36**

1) Classwork: Quarter 1 Project - Bean Bag Boards

**Day 37**

1) Lesson: Classifying Triangles

*Objective:* Student will classify triangles based on their sides and angles. Students will also review the definition of complementary and supplementary.

2)Lesson: Pythagorean Theorem

*Objective:* Students will review Pythagorean theorem and use it to find missing sides of a right triangle. Student will then relate Pythagorean theorem to find the distance formula.

3) Activity: Have each student draw a triangle with a ruler. They then need to cut out the triangles. After that they should cut each angel off the triangle. Have the students put the three angles next to each other and write discuss with their groups what they observe.

4) Activity: Laying the Foundation of House; students will use pythagorean theorem to lay the foundation of a house in parking lot using chalk.

5) Classwork: Pythagorean Theorem W.S.

[CCSS.MATH.CONTENT.HSG.CO.C.10](http://www.corestandards.org/Math/Content/HSG/CO/C/10/)  
Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point*.

[CCSS.MATH.CONTENT.HSG.SRT.B.4](http://www.corestandards.org/Math/Content/HSG/SRT/B/4/)  
Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*

[CCSS.MATH.CONTENT.HSG.SRT.C.8](http://www.corestandards.org/Math/Content/HSG/SRT/C/8/)  
Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.\*

**Day 38**

1) Classwork: Quarter 1 Project - Bean Bag Boards

**Day 39**

1)Lesson: Radicals in Congruent Forms

*Objective:* Student will be able to write radicals in congruent forms. Students will also be able to estimate radicals without a calculator. Students will understand the difference between estimates and exact.

2) Classwork: Radicals in Congruent Form Practice

3) Activity: Congruent Radical Forms Game

4) Lesson: Applications of Pythagorean Theorem

*Objective:* Students will solve problems involving the pythagorean theorem and giving exact solutions.

5) Activity: Students will solve various construction problems using the pythagorean theorem

[CCSS.MATH.CONTENT.HSG.SRT.C.8](http://www.corestandards.org/Math/Content/HSG/SRT/C/8/)  
Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.\*

**Day 40**

1) Classwork: Framing Walls

**Day 41**

1)Lesson: Radicals in Congruent Forms

*Objective:* Student will be able to write radicals in congruent forms. Students will also be able to estimate radicals without a calculator. Students will understand the difference between estimates and exact.

2) Activity: Students will review radicals in congruent forms.

3) Assessment: Lines, Pythagorean Theorem, and Radicals Quiz

[CCSS.MATH.CONTENT.HSG.SRT.C.8](http://www.corestandards.org/Math/Content/HSG/SRT/C/8/)  
Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.\*

**Day 42**

1) Lesson: Ladder Safety

2) Classwork: Framing Walls

3) Classwork: Sill Prep

**Day 43**

1) Lesson: Operations with Radicals

*Objective:* The students will perform mathematical operations with radicals including multiplication and division.

*2)* Activity: The students will play a game to learn how to perform operations of radicals.

3) Classwork: Radical Operations Practice

4) Activity: Students will use pythagorean theorem and radicals to find the lengths of missing sides of a tent

5) Assessment: Radical Operations and Congruent Forms

[CCSS.MATH.CONTENT.HSG.SRT.C.8](http://www.corestandards.org/Math/Content/HSG/SRT/C/8/)  
Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.\*

**Day 44**

1) Classwork: Framing Walls

2) Classwork: Sill Prep

**Day 45**

1)Lesson: Special Right Triangles

*Objective*: The students will use special right triangles to find the diagonals of squares and the heights of equilateral triangles.

2) Activity: The students will explore the activities with the exactness of windows and window trims.

3) Activity: Pipe Fitting; students will use Plumber’s Handbook and special right triangles to find the lengths of pipes to fit a hanging offset.

4) Classwork: Hanging Offset Activity

5) Classwork: Special Right Triangles Application Practice

[CCSS.MATH.CONTENT.HSG.SRT.C.8](http://www.corestandards.org/Math/Content/HSG/SRT/C/8/)  
Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.\*

[*CCSS.MATH.CONTENT.HSG.SRT.A.2*](http://www.corestandards.org/Math/Content/HSG/SRT/A/2/)

*Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.*

**Day 46**

1) Classwork: Framing Walls

**Day 47**

1)Lesson:Cross sections of 3D Objects

*Objective:* The students will explore the cross sections of 3D figures through hands on experiments and develop into finding cross sections from a drawing

*2)* Activity:Food & object slicing activity; students will document through pictures and other resources a learning guide.

3) Classwork: 3D Cross Sections Worksheet

4) Lesson: Shapes formed by rotating 2D figures

*Objective:* Students will discover the shapes that are formed from the rotation of 2D figures around a fixed point

*5)* Activity: The students will use cutouts of figures to discover the shapes formed by its rotation around a fixed point and will cut shapes up to determine the original shaped being rotated around a fixed point.

6) Classwork: 2D Rotation W.S.

[CCSS.MATH.CONTENT.HSG.GMD.B.4](http://www.corestandards.org/Math/Content/HSG/GMD/B/4/)  
Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

**Day 48**

1) Classwork: Framing Walls

**Day 49**

1)Lesson: Volume of prism, pyramid, cone, cylinder, and sphere

*Objective:* The students will use formulas to calculate the volume of 3D figures in problem solving situations.

2) Activity: The students will be given boxes and containers to find the possible volume for each object. Students will create formula packet with pictures and drawings to calculate volume of each shape.

3) Activity: Popcorn container construction & volume exploration

4) Activity: Cones & Pyramid water filling comparison to prism

5) Classwork: Volume Problem Solving Worksheets

[CCSS.MATH.CONTENT.HSG.GMD.A.1](http://www.corestandards.org/Math/Content/HSG/GMD/A/1/)  
Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. *Use dissection arguments, Cavalieri's principle, and informal limit arguments*.

[CCSS.MATH.CONTENT.HSG.GMD.A.3](http://www.corestandards.org/Math/Content/HSG/GMD/A/3/)  
Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.\*

**Day 50**

1) Classwork: Framing Walls

**Day 51**

1)Lesson: Volume of prism, pyramid, cone, cylinder, and sphere

*Objective:* The students will use formulas to calculate the volume of 3D figures in problem solving situations.

2) Activity: Students will calculate the total volume and insulation required for a house. Students will compare pricings of different insulation.

*3)* Activity: The students will continue to solve problems involving the formulas for the volume of 3D figures, including finding the volume of shapes constructed of multiple 3D figures (i.e. a cone on top of a cylinder)

4) Activity: The students will be given an object and will be required to design a 3D figure to contain the object.

5) Classwork: Volume Problem Solving Worksheets

[CCSS.MATH.CONTENT.HSG.GMD.A.1](http://www.corestandards.org/Math/Content/HSG/GMD/A/1/)  
Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. *Use dissection arguments, Cavalieri's principle, and informal limit arguments*.

[CCSS.MATH.CONTENT.HSG.GMD.A.3](http://www.corestandards.org/Math/Content/HSG/GMD/A/3/)  
Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.\*

**Day 52**

1) Classwork: Framing Walls

2) Classwork: Wall Erecting

3) Classwork: Strapping

4) Classwork: Trusses - Installing and Bracing

**Day 53**

1)Assessment: The students will be assessed on concepts related to special right triangles and volume

2) Activity: The students will use pythagorean theorem and volume formulas to find volumes of composite figures in construction

3) Classwork: Pyramid & Cone Exploration

[CCSS.MATH.CONTENT.HSG.GMD.A.3](http://www.corestandards.org/Math/Content/HSG/GMD/A/3/)

Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.\*

[CCSS.MATH.CONTENT.HSG.GMD.A.1](http://www.corestandards.org/Math/Content/HSG/GMD/A/1/)

Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. *Use dissection arguments, Cavalieri's principle, and informal limit arguments*.

**Day 54**

1) Classwork: Wall Framing

2) Classwork: Subfloor Framing

3) Classwork: Strapping

4) Classwork: Trusses - Installing and Bracing

**Day 55**

1) Lesson: Problem solving with volume of 3D Objects

*Objective:* Students will use concepts related to area, right triangles, and algebra to solve various problem solving situations

2) Activity: Students will determine amount of concrete bags need for fence posting to meet construction regulations.

2) Classwork: Cost Analysis Problems

**Day 56**

1) Classwork: Wall Framing

2) Classwork: Subfloor Framing

3) Classwork: Strapping

4) Classwork: Trusses - Installing and Bracing

5) Classwork: Sheathing Exterior Walls

6) Classwork: Install Fascia Header Board

7) Classwork: Install Fascia

**Day 57**

1) Review

Students will either review concepts related to unit 2 or will continue construction process for house

**Day 58**

1) Classwork: Wall Framing

2) Classwork: Subfloor Framing

3) Classwork: Strapping

4) Classwork: Trusses - Installing and Bracing

5) Classwork: Sheathing Exterior Walls

6) Classwork: Install Fascia Header Board

7) Classwork: Install Fascia

8) Classwork: Decking the Roof

**Day 59**

1) Assessment

The students will be assessed on Unit 2 learning objectives

2) Construction - Students will continue with the build after assessment is completed.