Clue Construction

**Objectives:** Students draw geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides. Noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

Common Core Standards Addressed:

7.G.2 Draw ( freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides. Noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

Practices:

1. Make sense of problems and persevere in solving them.

3. Construct viable arguments and critique the reasoning of others.

5. Use appropriate tools strategically.

6. Attend to precision.

7. Look for and make use of structure.

**Materials:** Pencil and math journal, protractor, ruler, string, pushpins, corkboard, Clue Construction worksheet, Geometer’s Sketchpad-Shapes Maker, or similar program (if available), interactive white board.

**Procedures:** Begin with a review of vocabulary: line segment, vertex, interior angle measure, and how to use a protractor. Take student volunteers at the board to write a brief definition of each on the review sheet to be displayed during class for students to refer back to. Assign students to work with a partner to complete the Clue Construction worksheet. Read directions for the worksheet. Students will work together using pencil, paper, and protractor, string pushpins on corkboard, or Shapes Maker to complete the worksheet. Model construction of a figure using string and pushpins and remind students to sketch their constructions on the worksheet. Model Shapes Maker (if using) and remind students to sketch their constructions on the worksheet. Give students time to complete worksheet and make observations.

Closing: Class will come together to look at and compare the shapes that they drew followed by a discussion of the “What do you notice” questions on the worksheet. Guide to or focus discussion on the conditions that created unique triangles and no triangle. Discuss any predictions that the students were able to make and test.

**Assessment:** Teacher will note discussion with partners. Teacher will also read student responses on worksheets to check for understanding or clarification needed. Check for precise use of vocabulary on worksheet and in discussion. Note any common misconceptions to address in closing or the following lesson.

**Differentiation:** Students may need help with using the tools to create the shapes, provide additional modeling. Students will respond as they can to the “what do you notice” questions; encourage analysis leading to structure. Push for testing of predictions from students that made them. Can they find another example that works? How about one that doesn’t work?

**Review:**

Vertex

Line Segment

Interior Angle

How to use a protractor

Types of triangles: isosceles, scalene, obtuse, right

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For each question, follow the clues to construct a shape. Make sure to only use the clues and discuss with your partner why you think the shape should be drawn a certain way and what label you should give it. Label your shape and be prepared to discuss.\*Not all the shapes are polygons\*

1. I have three sides and one right interior angle, what am I?

2. I have three sides of equal lengths and one angle that measures 45°, what am I?

3. I have three sides of different lengths, I have one interior angle that measures 60°, what am I?

4. I have three line segments and two right angles, what am I?

5. I have two interior angles that measure 45° and exactly one other interior angle, what am I?

6. I have three vertices and an interior angle measuring 120° and an opposite side length of 10units, what am I?

7. I have exactly three line segments lengths 3units, 5units, and 8units, what am I?

What do you notice? Record your observations about side length and angle measure. Can you make any predictions based on your observations? If so, test them here too. Be prepared to share.