SIOP Lesson Plan: 8th grade Math

Topic: Angles in Triangles

Content Objectives:

TEKS: (8.15.A) communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models;

- Students will learn to observe triangles and distinguish what makes them different: acute triangle, right triangle, obtuse triangle, equilateral triangle, isosceles triangle, and scalene triangle.
- Students will learn the Triangle Sum Theorem, which states, the three angles measurements add to 180°.
- Students will learn to solve for the missing side of a triangle.
- Students will learn to create triangles using a protractor and ruler.

Language Objectives:

- Give and follow oral directions on how to read the degrees of an angle using a protractor.
- Give oral and written directions on how to read the degrees of an angle using a protractor.
- Demonstrate the correct use of a protractor.
- Read and understand the degrees of an angle.
- Show or draw the different types of triangles.
- Classify or categorize various triangles according to sides and angles of triangles.
- Define and create a foldable using vocabulary.

Key Vocabulary:

- Protractor
- Degrees
- Acute angle
- Right angle
- Obtuse angle
- Acute triangle
- Right triangle
- Obtuse triangle
- Equilateral triangle
- Isosceles triangle
- Scalene triangle

Materials:

- Protractors will be used to read and create angles.
- Rules will be used to draw specified lengths of the sides of triangles.
- Holt Mathematics Course 3 textbook: Chapter 7 section 3: Angles in Triangles.
- View PowerPoint: Angles in Triangles.
- Two different color papers to create foldable.
- Notebook paper or plain paper to sketch seven triangles.
- Pencil

Higher-order questions:

- Explain the steps to another student on the proper use of a protractor.
- How can learning something like this be applied later in your life, in a job?
- Can you think of a job where using a protractor might be beneficial?
- Design a picture using the different triangles or angles.
- Create a triangle using any measurements you want, and then add the angles together. Do you notice something about the total measurement of the angles in the triangle? What do they add up to? Predict what the total measurement of the angles will be for any triangle. Does it work with all triangles? Test your theory. Create two more triangles and compare your results to your initial prediction.

Teacher Activities:

Building background

- **Links to experience**
  - Students will share experiences as to where they have seen triangular shapes in the community. Examples: on the roof of a house, flags, and Pythagorean Theorem.
  - Demonstrate PowerPoint that depicts triangles in various places: history, art, computer graphics, and buildings.
  - Ask if students have previously used graphing tools like: the protractor and the compass.
  - Have orally share experiences of where the student has seen a protractor used by parents, relatives, friends, or anyone else.
  - Have students identify their respective uses of the tools. Protractor to measure angles. Compass to create perfect circles.
  - Provide opportunities for students to demonstrate correct use of protractor to read and create triangles with given dimensions. It is a good idea not to assume students know how to use a protractor. Spend time modeling.

- **Links to previous learning**
  - Students previously used the protractor to read and sketch specified angles using two rays and a vertex.

- **Vocabulary**
  - Protractor
  - Degrees
  - Acute angle
  - Right angle
  - Obtuse angle
  - Acute triangle
  - Right triangle
  - Obtuse triangle
  - Equilateral triangle
  - Isosceles triangle
  - Scalene triangle

Student Activities

Highlight all that apply for activities throughout the lesson, then describe in detail..

Scaffolding: modeling, guided, independent

Students learned how to read and create angles using two rays and a vertex. The students will now combine their previous knowledge to create the three angles that comprise a triangle. Teacher will model for students how to use the protractor. When students get confuse, another student will help explain how to properly align a protractor; how to read the correct angle measurement using a protractor; and how to create a specified angle using the protractor. Students will measure angles and side lengths using a protractor and ruler. From my observations students find it confusing when it comes to setting the protractor and orient the protractor in the right direction to take a angle reading. Secondly, students find it confusing when selecting the correct angle from two markings on the protractor. One line increasing from left to right and the other line increases from right to left.

Grouping: whole class, small group, partners, independent

- This task can be done as a whole class, in small groups, in partners or independently. Each student is to create their own independent sketches of the triangles. Students can receive assistance from others if needed.

Processes: reading, writing, listening, independent

- Teacher models how to use the protractor to create the specific triangles. Teacher writes on the board the specified angles and side lengths to create the triangle. Students are involved by providing desired angles to use in triangle sketches. Students listen to the step-by-step process and recreate or reproduce the triangles independently. The triangles they reproduce should make sense to them, because they know what type of angle to expect (acute, right, or obtuse angle). Students should be exposed to vocabulary as much as possible. During the modeling process use vocabulary: acute, obtuse, right, the names of the triangles we are trying to create, and protractor the tool we are using. Encourage students to use new vocabulary as they identify the types of angles being created at each step and the type of triangle being created when finished.

- At the end, the student summarizes the observations in a foldable. The foldable will contains the vocabulary word, definition, and picture of the new triangles.

Strategies: hands-on, meaningful, links to objectives

- On a previous day the students came up with all the possible words they could think of and categorized them into groups, known as **Word Sort**. Attached is the student created PowerPoint example of their word sort. Each student was given two minutes to write down as many geometry words as they could think of. Then each student was asked to write one in any of the categories provided. As a student wrote it down they were to scratch it off their list. Once all students got a chance anyone who wanted was allowed to go and type in other words still remaining on their list.
- Students will do a **hands-on activity** involving the sketching of triangles using a protractor and ruler.
- Students will create a type of **Personal Dictionary** (known by some as the Magical Flip Book). The students create a foldable by folding a full sheet of paper into fourths (see video clip). Then cut it up along the middle spine of the center fold. Fold another paper in fourths, the same direction as the first then cut off two pieces and weave through the center of the first foldable paper. Students write the vocabulary word on the outer tab. Open the tabs to find the checkered section, the students write their own definition. My students really love playing with this foldable because of their curiosity to find the hidden section. In my class there were a few that we lost, but some of the others demonstrated to them until they could figured it out. Open from the center of the spin to reveal the "secret hidden place" and have the students create an image or something they can visually associate the new vocabulary word with. This foldable allows for 20 vocabulary words.

Review and Assessment

(highlight all that apply): individual, group, written, oral

How will key vocabulary be reviewed?

- The key vocabulary (*acute, right, and obtuse angles*) will be reviewed throughout the class as we classify each angle of the triangles we are creating. This help in determining the correct names for each triangle.
- As each triangle is completed, students will use the key vocabulary (*right, acute, and obtuse triangles*) to identify each triangle by its angles and (*equilateral, isosceles, and scalene triangle*) to identify each triangle by its sides.
- The foldable will help review all the triangles as we summarize each triangle according to its properties. Also, the foldable can be used to review at a later point in time. It is easier and more exiting to reference in the foldable than looking it up in the book or notes.

How will key content objectives be reviewed?

- The key vocabulary (*acute, right, and obtuse angles*) will be reviewed throughout the class as we classify each angle of the triangles we are creating. This help in determining the correct names for each triangle.
- As each triangle is completed, students will use the key vocabulary (*right, acute, and obtuse triangles*) to identify each triangle by its angles and (*equilateral, isosceles, and scalene triangle*) to identify each triangle by its sides.
- The foldable will help review all the triangles as we summarize each triangle according to its properties. Also, the foldable can be used to review at a later point in time. It is easier and more exiting to reference in the foldable than looking it up in the book or notes.
- Creating the foldable will help students organize their thoughts about what properties give triangles their specific names depending on angles and sides. Each foldable can hold up to 20 vocabulary words.