### Grade level: 6<sup>th</sup> Grade Lesson Plan Title: Area of Triangles Content area: Mathematics Concept / Topic to Teach: Finding The Area Formula of a Triangle

**General Goal(s)/Rationale:** This lesson plan is designed to have the students use a constructivist method to find and apply the area formula of a triangle. The students will use a discovery learning in order to find the formula for the area of a triangle. The lesson will require the students to apply previous knowledge and manipulate objects to find a relation between the area of a rectangle and the area of a triangle. Once the students identify the formula for the area of a triangle, they will be able to apply this formula to other area problems.

#### **Standards Addressed:**

CCSS.6.G.A.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

#### **Student Objectives:**

-Student will be able to identify the formula for finding the area of a triangle.

-Students will be able to identify the height and the base of a triangle.

-Students will be able to apply the formula in order to find the area of a triangle.

#### Materials:

- Ruler -Pen -Activity Sheet -Scissors -Binder

#### **PROCEDURES:**

#### 1. Anticipatory Set

In the beginning of class, the students will have a "Do-Now" assignment involving finding the area of a rectangle or a square. The students will be split into pairs. Each pair will have a ruler and the students can pick one rectangular object in the room. Using the ruler, the students will measure the object of their choice and will find the area of that object using the measurements they found. The class will come together collectively and the pairs can discuss the object of their choice to the class.

#### 2. Direct Instruction

During instruction, the students will be split into groups of three. Each student will be given a "Can you help me find my formula?" worksheet. This sheet will involve 4 different size rectangles. First, the students must find the area of each rectangle. Once the students have found the area of each rectangle, they must create a diagonal line from bottom corner to top corner in rectangles 1, 2 and 3. In the fourth rectangle, the students must place a point on the top of the rectangle that is not a corner, or vertex. Once they pick a point on the top of the rectangle, they must draw a diagonal line from that point to the two bottom corners of the rectangle. Once all lines are drawn, the student must cut out their rectangular pieces, and cut along the lines they created in these pieces. By using all of their manipulative pieces, the students are asked to compare the relationship of the areas of the triangles to the area of the original rectangles. After the students are given an allotted amount of time to distinguish a relationship between the triangles and the rectangles, the class will be brought back to the front of the room for discussion. Using the information found in the activity, the students will help create a formula for the area of a triangle.

#### 3. Guided Practice

Once the students understand the area of a triangle, the students will have practice problems to apply their new knowledge. They will use the formula they discovered to answer the following problems. For the first few problems, I will go through the problems with the class. The students will guide me through the steps for solving for the area of the triangle. The students will practice identifying different heights and bases of different triangles presented.

#### 4. Closure

The students will end class with completing their exit slips. These exit slips will be worked on independently. Each student will have to leave their exit slip in the exit slip basket before they leave class.

#### 5. Independent Practice

The students will have independent practice in class while working on their exit slips. Additionally, the students will have independent practice when working on their homework at home. This homework will be reviewed the next day in class.

#### **ASSESSMENT:**

#### 8. Assessment and Follow-Up

Students will first be assessed through observations during the activities. Through the observations, I can see if the students meet objective 1. I will be able to see if the students understand the relationship between the area of a triangle a The guided practice, exit slips and homework will allow me to find out if the student can meet objectives 2 and 3. After assessing the students knowledge through the exit slips, I can use that data collected from those slips to find out what to focus on when going over the homework the next day.

#### **ENRICHMENT:**

#### 9. Adaptations (For Students with Learning Disabilities):

For student with disabilities, the manipulatives and group work will be beneficial for their understanding of the topic. They will be able to use hands-on manipulatives to helps demonstrate the area formula of a triangle. Additionally, if they are struggling, the peers in their group can help explain to the students the relationship behind the area of the rectangle and the area of the triangle.

#### 10. Extensions (For Diversity Groups or Gifted Students):

**Diversity Groups:** For ELL students, I will have the activity sheets written in their native language. Since the students will be in groups of three, if applicable, I will try to make groups with an English speaking student, a student who can communicate in English and the other language, and a student who can't really communicate with English. The goal of this is to have the student who can speak both languages be the bridge between the English speaking student and the non-English speaking student.

**Gifted Students:** For students that may finish early, there will be an extension problem. Everyday, an extension problem will be in a basket near my desk. After showing me their work, the students can independently work on this problem. The extension problem is attached at the end of the lesson plan.

#### 11. Possible Connections to Other Subjects/Courses:

**English:** You can have the students create a storyboard that reflects their own personal finding of the formula for the area of a triangle. They can use creativity in their story and apply their writing skills.

# Can you help me find myoo formula???

First: Find the area of each rectangle. Check your answers with your group	)
members.	

Area of a rectangle = \_\_\_\_\_ x \_\_\_\_\_

Area of Rectangle 1 (Blue): \_\_\_\_\_

Area of rectangle 2 (Orange): \_\_\_\_\_

Area of Rectangle 3 (Purple): \_\_\_\_\_

Area of Rectangle 4 (Green): \_\_\_\_\_

**Second:** Using a ruler, draw a diagonal line from a top corner to the opposite bottom corner of Rectangles 1, 2 and 3. Next, pick any point on the top edge (side) of rectangle 4 that is not a corner. From this point, draw a line from the point you picked to both bottom corners of this rectangle. (Note: You should have 3 triangles formed inside this rectangle). After all lines are drawn, cut out each rectangle and cut along the lines you created in each rectangle. (Rectangles 1, 2 and 3 should be divided into two pieces and rectangle 4 should be divided into three pieces.)

Third: Using the pieces you created, answer the following questions.

What is the relationship between the heights and bases of the triangles and the heights and bases of the original rectangle?

How does the area of the triangles compare to the areas of the original rectangles?

Using the area formula of a rectangle and your knowledge of the relationship between the areas of the triangles to the areas of the original rectangles, develop a formula for finding the area of a triangle.





Name: \_\_\_\_\_

Date:\_\_\_\_\_

**Directions:** Answer the following questions and **<u>show all work</u>** when applicable.

1. What is the formula for finding the area of a triangle?

Area of a triangle = \_\_\_\_\_

In your own words, explain the relationship between the area of a rectangle and the area of the triangles created within the rectangle.

Using the formula, find the area of the following problems.





## **Extension Problem**

Do two triangles with the same height have the same area?? Why or why not? Provide examples supporting your answer.

Do these two triangles have the same area? Why? Why not? Show your work.

