

## Lab Framework

**Text:**CORD

**Unit number and title:** Unit 6 – Working with Lines and Angles

**Short Description:** Students will explore the sum of interior angles of polygons and derive the formula to find the sum for n-gons.

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### Lab Title

## Adding Angles: Beyond the Triangle

### LAB PLAN

**TEACHER:** Teacher Prep/ Lesson Plan

- **Lab Objective**

For students to be able to find the sum of interior angles of polygons with any number of sides.

- **Statement of pre-requisite skills needed** (i.e., vocabulary, measurement techniques, formulas, etc.)

Vocabulary – triangle, quadrilateral, pentagon, hexagon

Measurement Techniques – measuring interior angles of polygons

Sum of interior angles of a triangle = 180

- **Vocabulary**

Triangle, quadrilateral, pentagon, hexagon, interior angle, sum, polygon

- **Materials List**

Paper, protractors, handout with pre-drawn polygons (if not having students draw them), handout with instructions and table to record angle sums.

- **State Standards addressed**

**Math:** 8.2 C - Demonstrate that the sum of the angle measures in a triangle is 180 degrees, and apply this fact to determine the sum of the angle measures of polygons and to determine unknown angle measures.

**Reading:** 1.1 - Use word recognition skills and strategies to read and comprehend text.

2.1. Demonstrate evidence of reading comprehension.

3.1. Read to learn new information.

**Writing:** 2.2. Writes for different purposes.

- **Leadership Skills**

Communicate their ideas to the class in conclusions.

- **SCAN Skills/Workplace Skills**

A. Performs basic computations

C. Makes reasonable estimates of arithmetic results without a calculator

- **Set-up information**

1. Have students measure the interior angles of a triangle, quadrilateral, pentagon and hexagon using a protractor. Record sums in a table.

2. Share the sums students calculated as a class and discuss why they are getting the same/similar answers.

3. Challenge students to cut the polygons into triangles and then compare the angle sums with how many triangles fit inside the polygons.

4. Help students make final conclusions about the interior angle sums of polygons.
- **Lab organization**(-Grouping/leadership opportunities/cooperative learning expectations; -**Timeline required**)
    1. 15 minutes, individual work
    2. 5 minutes, class discussion
    3. 20 minutes, individual work with partner/team support
    4. 10 minutes, class discussion and individual conclusion statements
  - **Teacher Assessment of student learning** (scoring guide, rubric)  
Turn in drawings, table and conclusion statements and grade according to normal note grading practices.
  - **Summary of learning** (to be finished after student completes lab)
    - discuss real world application of learning from lab
    - opportunity for students to share/present learning
    - summarize conclusions
  - **Optional activities**  
If students get through their conclusions they can be challenged to turn the information into a formula that can be used for a polygon of any number of sides (n-gons).
  - **Career Applications**  
Any construction that requires students to create different polygons with certain angle measures given. Students would be able to solve for an unknown angle or to find the angle measures necessary to make them all congruent.

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**LAB TITLE: Angle Addition: Beyond the Triangle**

**STUDENT INSTRUCTIONS:**

- **Statement of problem addressed by lab**  
How do you find the sum of the interior angle measures of a polygon.
- **Grouping instructions and roles**  
Step 1 is to be completed individually, Step 2 as a class, Step 3 individually with support from your partner or team and Step 4 as a class.
- **Procedures – steps to follow/instructions**  
Step 1: Draw a triangle, quadrilateral, pentagon and hexagon and measure and sum the interior angles of each figure. Record your data in the table  
Step 2: Discuss your measurements with your partner or team and be prepared to discuss results as a class.  
Step 3: Divide the polygons into triangles using diagonals. How many triangles make up each polygon (add this data to your table)? Look for a connection between the number of triangles, the number of sides of the polygon and the sum of the interior angles.  
Step 4: Write instructions of how to find the sum of the interior angle measures in polygons. Compare your instructions with your partner or team. Be prepared to discuss conclusions as a class.

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## Lab Data Collection

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

Unit: 6 – Working With Lines and Angles

Lab Title: Angle Addition: Beyond the Triangle

Criteria: **Write the problem/objective in statement form**

To be able to find the sum of the interior angle measures of polygons with any number of sides.

Data Collection: **Record the collected/given data**

Name of Polygon	Number of Sides	Number of Triangles	Sum of Interior Angles
Triangle			
Quadrilateral			
Pentagon			
Hexagon			
n-gon			

Conclusion Statement:

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