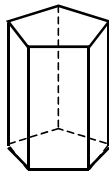


**Lab FW 3.3**  
**Filling “Fancy” Prisms**



Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_

*Filling & Wrapping Unit*



**Materials:** Construction or Oaktag Paper (about 9” x 12”), Centimeter Square Dot Paper, Ruler, Scrap Paper, Calculator, Pencil, Centimeter Cubes (optional)



**Key Learning:** Understand the **connection** between the **area of the base** of a prism, and the resulting total **volume**.



**Background**

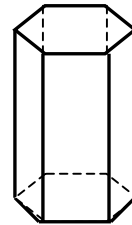
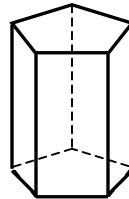
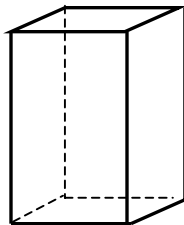
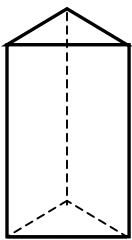


*this is a*  
**GROUP**  
**ACTIVITY**

Prisms come in many shapes and sizes.

**Definition:** A PRISM is a 3-dimensional shape with a TOP and a BASE that are CONGRUENT POLYGONS, and FACES that are PARALLELOGRAMS.

A prism is named for the shape of its base. For example, the base of a rectangular prism is a **rectangle**, and the base of a triangular prism is a **triangle**. Look at the prisms below. Can you name them?

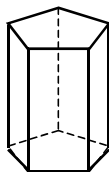


-----  
**PRISM**  
-----

-----  
**PRISM**  
-----

In previous labs, we have seen that the **VOLUME** of a rectangular prism can be calculated by finding the **AREA of the BASE**, and then **MULTIPLYING** by the **NUMBER OF LAYERS** in the prism, which we have also called the **HEIGHT**. Do you think this method can be used for other types of prisms?

# Lab FW 3.3 Filling “Fancy” Prisms



Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_



## Guided Directions



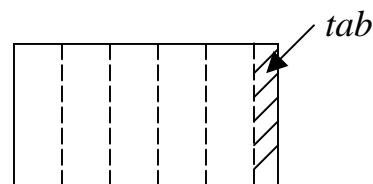
*this is a*  
**GROUP**  
**ACTIVITY**

This LAB is intended for a 3 or 4-member group. Each group member should create **at least three** of the five prisms detailed in steps A-E below. Then, you can develop a team consensus for your results that you will use to complete the **MEASUREMENTS TABLE** provided on the next page.

Measure or cut-out a piece of construction or oaktag paper that is 10cm x 22cm in size. You will use the 12 x 20 area to create your prism, with the remaining 2 centimeters to be used as a tab (to be glued or taped). Measure and crease your sheet so that it divides into a given number of congruent rectangles as specified below. Tape or glue your sheet into the shape of a prism.

*Challenge: Can you figure out a way to create a four-panel or eight-panel figure without measuring?*

- A. Three (3) congruent rectangles.
- B. Four (4) congruent rectangles.
- C. Five (5) congruent rectangles... for example
- D. Six (6) congruent rectangles.
- E. Eight (8) congruent rectangles.
- F. Imagine that each prism has a base. Place the prism “base-down” on a sheet of centimeter grid paper. **TRACE** the outline of the base on the grid paper.
- G. How many centimeter **cubes** would fit in **one layer** at the bottom of your prism? Consider whole cubes and parts of cubes.
- H. Find the **volume** of each prism. Where appropriate, draw and measure the additional line segments that are required to form **sub-figures** – such as triangles, rectangles, and trapezoids – that will help you make your calculations.
- I. Fill in the table provided on the next page with the results of your calculations and the work of your lab partners.



**IF YOU ARE FINISHED** with your work...

... **ASSIST ONE OF YOUR LAB PARTNERS** with their work.

**Lab FW 3.3**  
**Filling “Fancy” Prisms**

Name \_\_\_\_\_

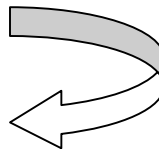
Date \_\_\_\_\_ Period \_\_\_\_\_

**MEASUREMENTS TABLE**

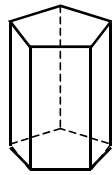
*(all measurements in centimeters)*

Type of Prism	Perimeter of the Base	# of Cubes in Base Layer	Sub-shapes (or main shape) in the base layer	Area of Base Layer (in cm <sup>2</sup> )	Height of Prism (in cm)	Volume of Prism (in cm <sup>3</sup> )
<i>Triangular Prism</i>						
<i>Square Prism</i>						
<i>Pentagonal Prism</i>						
<i>Hexagonal Prism</i>						
<i>Octagonal Prism</i>						

See Follow-up Questions on next page



**Lab FW 3.3**  
**Filling “Fancy” Prisms**



Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_

Follow-up Questions:

1. Suppose you used the same size sheets of paper (10x20cm) to make prisms with 9, 12, and 16 sides and so on.
  - a. What would the **shape** of the prism start to resemble as the number of sides **increased**?
  - b. What would happen to the **volume** as the number of sides **increased**?

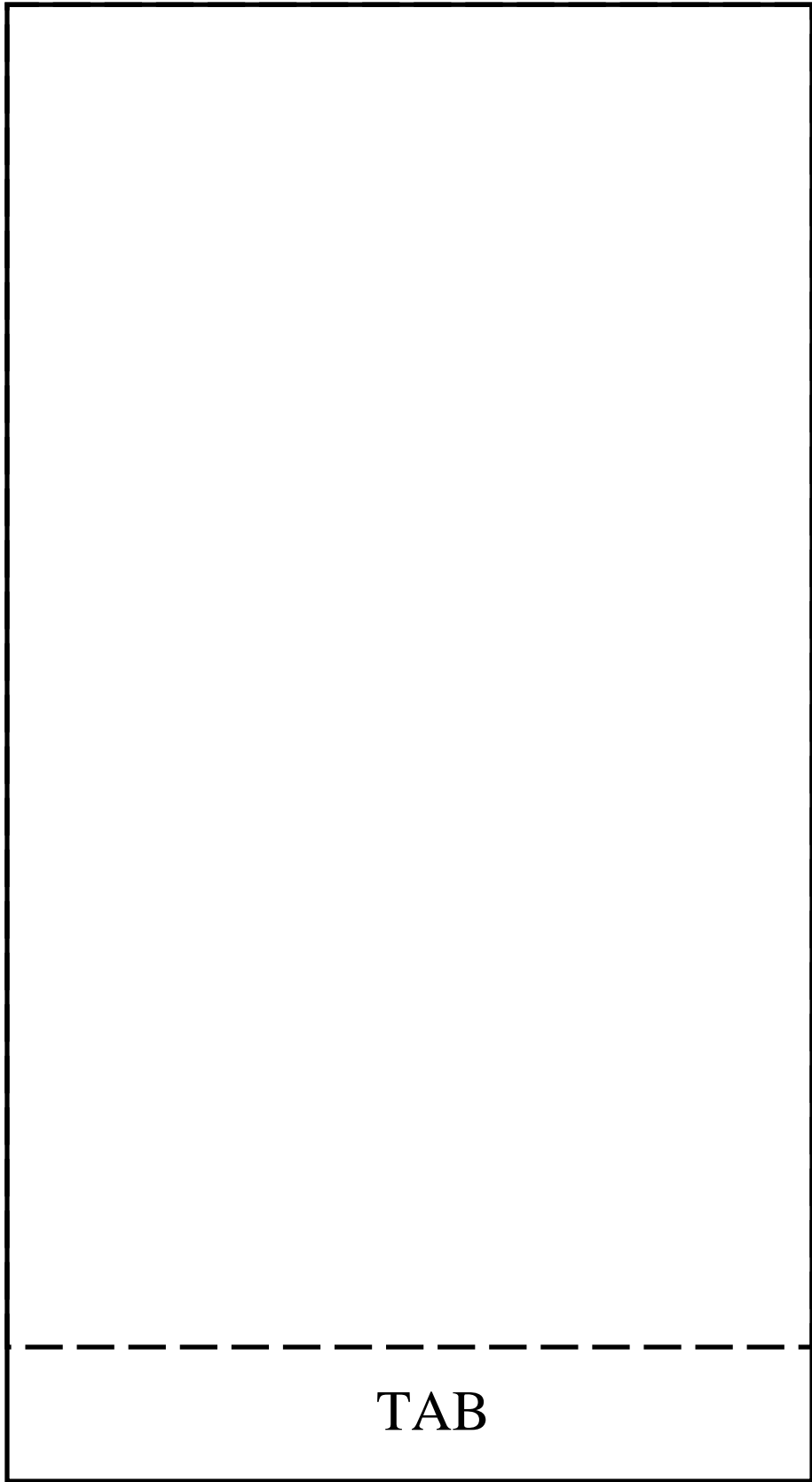
2. Create a **FLAT PATTERN** for one of your prisms. Trace and cut-out your top and bottom using construction paper. Tape the pieces of your flat pattern together. Include your finished pattern with your lab packet.

**Leave your finished pattern FLAT... DO NOT tape it into a prism.**

3. Make a **NEAT** generic “rough sketch” of your flat pattern below (generic means that it does not need to be measured to scale).

SKETCH of FLAT PATTERN





TAB

