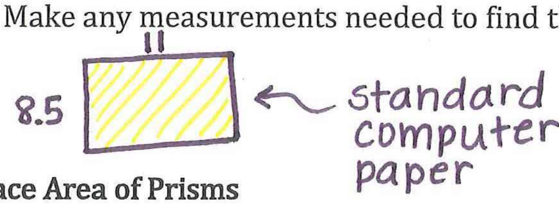
Unit 7: Filling and Wrapping
Investigation 2.1 – Folding Paper

Name Key

You can make models of prisms (with open tops and bottoms) by folding paper. For example, the sketch on page 28 shows how to make a triangular prism. Use the provided paper from your teacher to make the prisms needed for this investigation.

A) Assume the prisms have a top and a bottom. Make any measurements needed to find the surface area of each prism you construct.

1. Complete this table:



Surface Area of Prisms

Prism Type	Area of Sides (in^2)	Area of Top and Bottom (in^2)	Total Surface Area (in^2)	Volume (in^3)
Triangular	93.5	2(5.8) = 11.6	105.1	49.3
Square	93.5	2(7.6) = 15.2	108.7	64.6
Hexagonal	93.5	2(8.7) = 17.4	110.9	73.95
Octagonal	93.5	2(9.1) = 18.2	111.7	77.35

2. How do the surface areas of the prisms compare as the number of faces in the prisms increases?

As the number of sides increases, the surface area also increases.

3. Describe a strategy for finding the surface area of a prism.

Add the area of every face, including the top and bottom.

B) How do the volumes of the prisms compare as the number of faces in a prism increases? Explain.

The volume of each prism increases as the number of sides increases.

C) 1. How could you use another identical sheet of paper to make a figure whose volume is greater than the volume of any of the polygonal prisms in Question A? What might it look like?

Do not fold the paper at all and connect the ends to make a cylinder.

2. How would the surface area of that figure compare to the surface areas of the polygonal prisms in Question A?

The surface area of the cylinder would be greater.

Extension

Calculate the surface area of this prism to the nearest thousandth.

$$93.5 + 2(\underbrace{\pi r^2}_{\text{area of base}}) = SA$$

$$93.5 + 2\left[\pi\left(\frac{11}{2\pi}\right)^2\right] = SA$$

$$93.5 + 2\left(\frac{121\pi}{4\pi^2}\right) = SA$$

$$93.5 + \frac{60.5}{\pi} = \boxed{SA \approx 112.76 \text{ in}^2}$$

$C = 11 = 2r\pi$

$\frac{11}{2\pi} = r$