

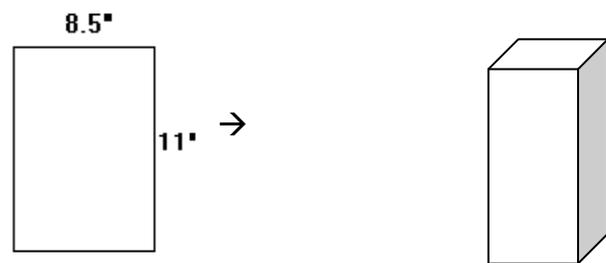
## Answer Key – Popcorn Prisms Anyone?

For this activity you will be comparing the volume of 2 prisms created using the same sheet of paper. You will be determining which can hold more popcorn. To do this, you will have to find a pattern for the dimensions for containers.

Materials:

- 8.5 inch by 11 inch white paper
- 8.5 inch by 11 inch colored paper
- Tape
- Popcorn
- Plate
- Cup
- Ruler

Take the white paper and fold it in half the long way. Do this a 2<sup>nd</sup> time. You are forming a baseless rectangular prism that is tall and narrow. Do not overlap the sides. Tape along the edge. Measure the length, width, and height of each dimension with a ruler. Record your data below and on the rectangular prism. Label it Prism A.



Take the colored paper and fold it in half the wide way. Do this a 2<sup>nd</sup> time. You are forming a baseless rectangular prism that is short and stout. Do not overlap the sides. Tape along the edge. Measure the length, width, and height of each dimension with a ruler. Record your data below and on the rectangular prism. Label it Prism B.



1.

DIMENSION	PRISM A	PRISM B
LENGTH (in.)	[2.125 in]	[2.75 in]
WIDTH (in.)	[2.125 in]	[2.75 in]
HEIGHT (in.)	[11 in]	[8.5 in]

2. Do you think the two prisms will hold the same amount? Do you think one will hold more than the other? Which one? Why?

Answers will vary.

3. Place Prism B on the paper plate with Prism A inside it. Use your cup to pour popcorn into Prism A until it is full. Carefully, lift Prism A so that the popcorn falls into Prism B. Describe what happened. Is Prism B full, not full, or overflowing?

Prism B is not full. There is still room in the prism for more popcorn.

As you share your popcorn snack, answer the questions below.

4. a) Was your prediction correct? How do you know?

Answers will vary.

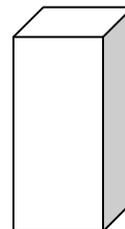
- b) If your prediction was incorrect, describe what actually happened.

Prism B has a greater volume than Prism A.

5. a) State the formula for finding the volume of a prism.

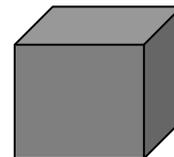
- b) Calculate the volume of Prism A? Label the dimensions in the figure.

$$V = lwh = (2.125)(2.125)(11) \approx 49.7 \text{ in}^3$$



- c) Calculate the volume of Prism B? Label the dimensions in the figure.

$$V = lwh = (2.75)(2.75)(8.5) \approx 64.3 \text{ in}^3$$



- d) Explain why the prisms do or do not hold the same amount. Use the formula for the volume of a prism to guide your explanation.

The prisms have different dimensions, so the volumes are different.

6. a) What do you notice about the length and the width?

They are the same.

- b) Rewrite the formula with only two variables to reflect this observation.

$$V = l^2h \text{ or } V = w^2h$$

7. By how much would you have to decrease the height of Prism B to make the volumes of the two prisms equal?

$$V_A \approx 49.7 \text{ in}^3$$

$$V_B \approx 49.7 \text{ in}^3 = (2.75)(2.75)(h)$$

$$h \approx 6.6 \text{ in}$$

The height would need to be decreased by about  $8.5 - 6.6 \approx 1.9 \text{ in}$ .