

Fishing for the Best Prism

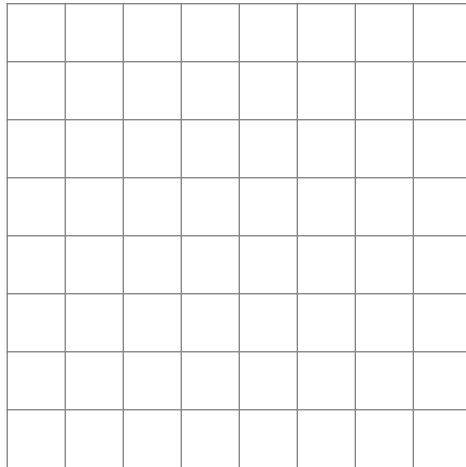
NAME _____

1. Suggest three different sets of dimensions that you could use to build a rectangular prism that has a volume of 8 cubic units.

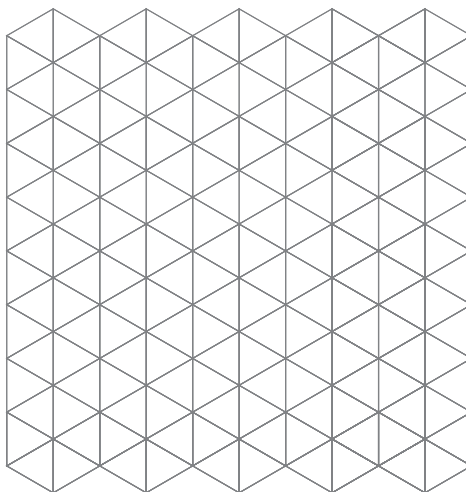


Build the prism assigned to your group with polydrons, and then answer the following questions.

2. Sketch your assigned net below.



3. Create a 3-dimensional sketch of your assigned rectangular prism below. Label the length, the width, and the height.



4. What is the surface area of your assigned rectangular prism? Explain your calculations.

Suppose your assigned rectangular prism is a fish tank, which has only 5 faces and an open top. There are three ways to turn your fish tank. You can turn it so the height is perpendicular to your desk, so the length is perpendicular, and so the width is perpendicular. You may want to label the length, width, and height on your polydron model to help you with the following questions.

5. With the height perpendicular to your desk, find the surface area of the fish tank. Explain your answer.
6. Turn your rectangular prism so the length is perpendicular to the desk. What is the surface area? Did it change? Explain your answer. (**Remember:** The top is always the missing face of your fish tank, so when you turn it, a different face is missing.)
7. Turn your rectangular prism so that the width is perpendicular to the desk. What is the surface area? Did it change? Explain your answer.

The tropical fish company has hired you to build a glass fish tank that is both visually appealing and cheap to construct.

8. Glass costs \$0.15 per square foot. Find the cost of the glass for each of the 3 possible fish tank configurations.
9. What is the best fish tank design? Write a convincing proposal to the fish tank company on which design to use and why.

After all groups have shared their answers, answer the questions below.

10. Compare the volumes of the three rectangular prisms. What do you notice?

11. Compare the surface areas of the 3 rectangular prisms. What were the largest and smallest surface areas? What were the dimensions of the prisms with these surface areas?

12. Compare your fish tank proposal from Question 9 with other groups' proposals. Revise your proposal to explain why your design is better than the other groups.

13. Which fish tank proposal do you think the company should accept? Why?

14. What guidelines would you provide a company to create a container with a set volume and minimum surface area? Include mathematical reasoning to convince the company.

15. Explain the different methods you could use to determine surface area?

16. What is the difference between volume and surface area?

17. Give the dimensions of two rectangular prisms that have the same volume but different surface areas.

18. Give the dimensions of two rectangular prisms that have the same surface area but different volumes.