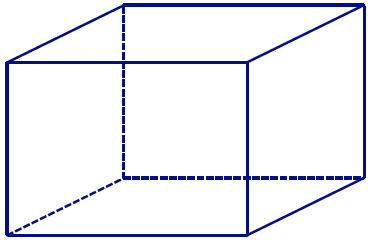
Lesson 18: Slicing on an Angle

Classwork

Example 1

With your group, discuss whether a right rectangular prism can be sliced at an angle so that the resulting slice looks like the figure in Figure 1? If it is possible, draw an example of such a slice into the following prism.

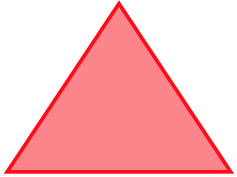


Figure 1

Exercise 1

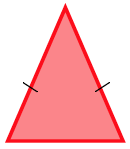


Figure 2

* 1. With your group, discuss how to slice a right rectangular prism so that the resulting slice looks like the figure in Figure 2. Justify your reasoning.
  2. With your group, discuss how to slice a right rectangular prism so that the resulting slice looks like the figure in Figure 3. Justify your reasoning.

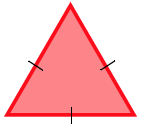


Figure 3

**Example 2**

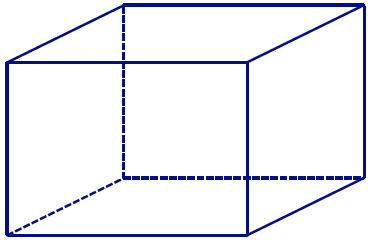
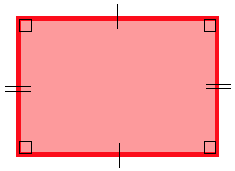
With your group, discuss whether a right rectangular prism can be sliced at an angle so that the resulting slice looks like the figure in Figure 4. If it is possible, draw an example of such a slice into the following prism.

Figure 4



Exercise 2

In Example 2, we discovered how to slice a right rectangular prism to makes the shapes of a rectangle and a parallelogram. Are there other ways to slice a right rectangular prism that result in other quadrilateral-shaped slices?

**Example 3**

* 1. Slicing a plane through a right rectangular prism so that the slice meets the three faces of the prism, the resulting slice is in the shape of a triangle; if the slice meets four faces, the resulting slice is in the shape of a quadrilateral. Is it possible to slice the prism in a way that the region formed is a pentagon (as in Figure 5)? A hexagon (as in Figure 6)? An octagon (as in Figure 7)?

|  |  |  |
| --- | --- | --- |
|  |  |  |
| Figure 5 | Figure 6 | Figure 7 |

* 1. Draw an example of a slice in a pentagon shape and a slice in a hexagon shape.

Example 4

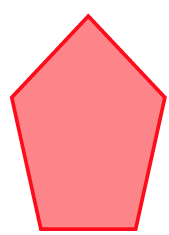
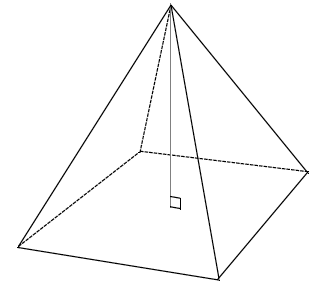


Figure 8

* 1. With your group, discuss whether a right rectangular pyramid can be sliced at an angle so that the resulting slice looks like the figure in Figure 8. If it is possible, draw an example of such a slice into the following pyramid.



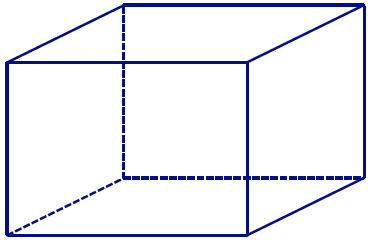
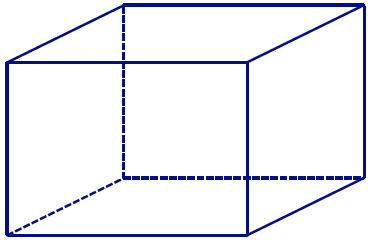
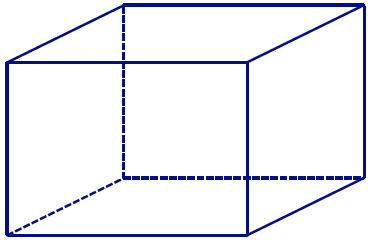
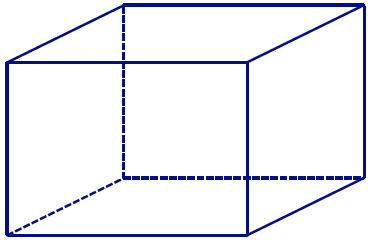
* 1. With your group, discuss whether a right rectangular pyramid can be sliced at an angle so that the resulting slice looks like the figure in Figure 9. If it is possible, draw an example of such a slice into the pyramid above.

Figure 9

Problem Set

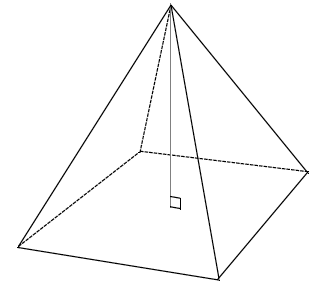
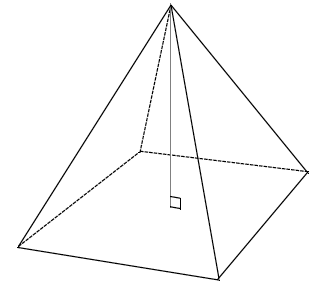
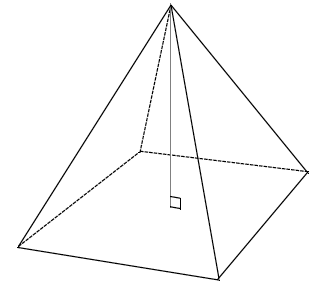
1. Draw a slice into the right rectangular prism at an angle in the form of the provided shape, and draw each slice as a 2D shape.

Slice made in the prism Slice as a 2D shape

* 1. A triangle
  2. A quadrilateral
  3. A pentagon
  4. A hexagon

1. Draw slices at an angle in the form of each given shape into each right rectangular pyramid, and draw each slice as a 2D shape:

Slice made in the pyramid Slice as a 2D shape

* 1. A triangle
  2. A quadrilateral
  3. A pentagon

1. Why isn’t it possible to draw a slice in the shape of a hexagon for a right rectangular pyramid?
2. If the slicing plane meets every face of a right rectangular prism, then the slice is a hexagonal region. What can you say about opposite sides of the hexagon?
3. Draw a right rectangular prism so that rectangles and are base faces. The line segments , , and are edges of the lateral faces.
   1. A slicing plane meets the prism so that vertices , ,, and lie on one side of the plane and vertices , , , and lie on the other side. What other information can be concluded about the slice based on its position?
   2. A slicing plane meets the prism so that vertices , ,, and are on one side of the plane and vertices , ,, and are on the other side. What other information can be concluded about the slice based on its position?