# Lesson 18:  Slicing on an Angle

### 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.
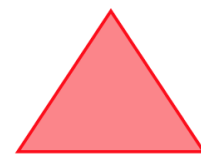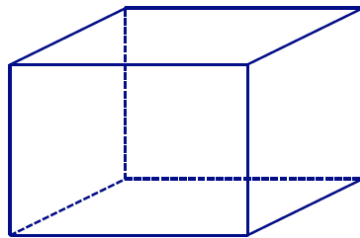
Figure 1

**Exercise 1**

a.  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.

Figure 2

b.  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.
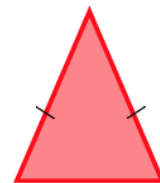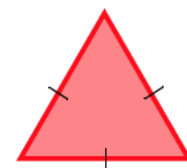
Figure 3

## 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.
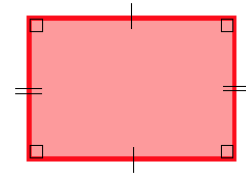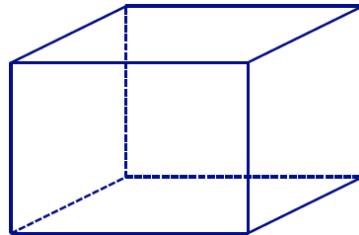
Figure 4

## 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

a.  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)?
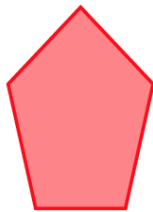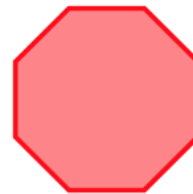
Figure 5          Figure 6          Figure 7

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

## Example 4

a.   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.
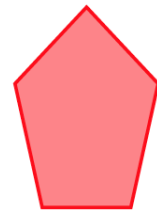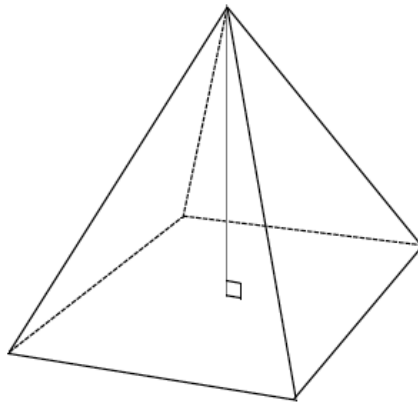


Figure 8

b.   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.
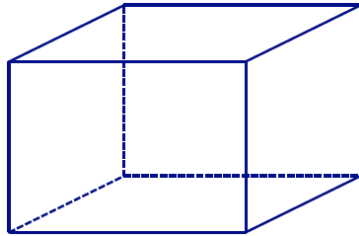
Figure 9

## 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.
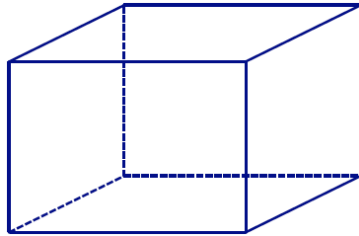
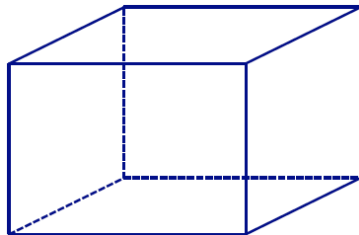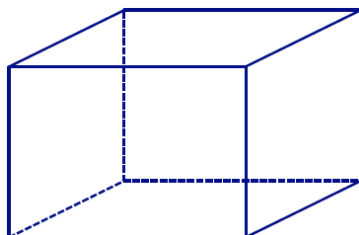Slice made in the prism                                          Slice as a 2D shape

a.  A triangle

b.  A quadrilateral

c.  A pentagon
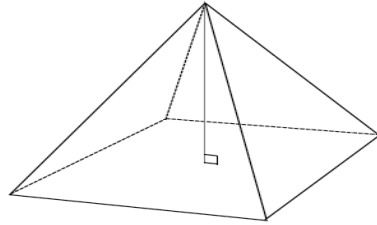
d.  A hexagon

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2.   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:
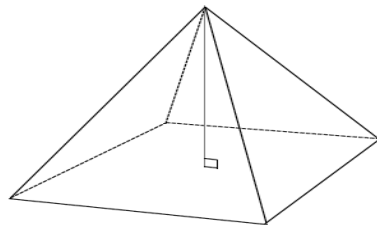
Slice made in the pyramid                          Slice as a 2D shape
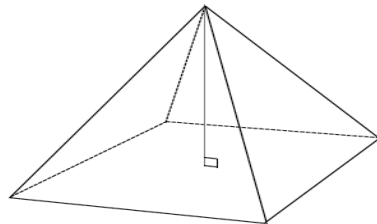
a.   A triangle

b.   A quadrilateral

c.   A pentagon

3.   Why isn't it possible to draw a slice in the shape of a hexagon for a right rectangular pyramid?

4.   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?

5.   Draw a right rectangular prism so that rectangles          and           are base faces.  The line segments     ,    , and        are edges of the lateral faces.

   a.   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?

   b.   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?