## Lesson 11: Filling Containers

Let’s fill containers with water.

### 11.1: Which One Doesn’t Belong: Solids

These are drawings of three-dimensional objects. Which one doesn’t belong? Explain your reasoning.



### 11.2: Height and Volume

Your teacher will give you a graduated cylinder, water, and some other supplies. Your group will use these supplies to investigate the height of water in the cylinder as a function of the water volume.

1. Before you get started, make a prediction about the shape of the graph.
2. Fill the cylinder with different amounts of water and record the data in the table.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| * volume (ml)
 | *
 | *
 | *
 | *
 | *
 | *
 |
| * height (cm)
 |  |  |  |  |  |  |

1. Create a graph that shows the height of the water in the cylinder as a function of the water volume.
* 
1. Choose a point on the graph and explain its meaning in the context of the situation.

### 11.3: What Is the Shape?

1. The graph shows the height vs. volume function of an unknown container. What shape could this container have? Explain how you know and draw a possible container.
* 
1. The graph shows the height vs. volume function of a different unknown container. What shape could this container have? Explain how you know and draw a possible container.
* 
1. How are the two containers similar? How are they different?

#### Are you ready for more?

The graph shows the height vs. volume function of an unknown container. What shape could this container have? Explain how you know and draw a possible container.



### Lesson 11 Summary

When filling a shape like a cylinder with water, we can see how the dimensions of the cylinder affect things like the changing height of the water. For example, let's say we have two cylinders, $D$ and $E$, with the same height, but $D$ has a radius of 3 cm and $E$ has a radius of 6 cm.



If we pour water into both cylinders at the same rate, the height of water in $D$ will increase faster than the height of water in $E$ due to its smaller radius. This means that if we made graphs of the height of water as a function of the volume of water for each cylinder, we would have two lines and the slope of the line for cylinder $D$ would be greater than the slope of the line for cylinder $E$.



© CC BY Open Up Resources. Adaptations CC BY IM.