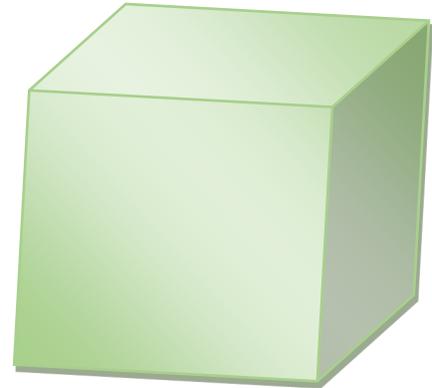# Volume

Horticultural technicians often use volume: any materials that are used on site, such as gravel, soil, and mulches, are spread to a specific level. For example, a garden is 50 feet long and 20 feet wide, you need to cover the area with four inches of mulch.

There are three dimensions to think about when you are calculating the amount of mulch needed to complete this task. As a horticultural technician you will not be expected to do the calculation, but it is good to have a general idea of how volume is used. Just as with area, measurements must be converted into the same units (feet, inches) before volumes can be calculated.

To find the volume of squares or rectangles, start with the area (L × W) and then multiply by the height (H). This gives you the volume (V) or cubic measure. The formula is expressed as V = L × W × H. Other shapes such as triangles, cones and circles have different formulas.

Volume is the amount of space occupied by a three-dimensional object. For example, the amount of water in a swimming pool is measured by volume. Volume is used to measure the capacity of objects or spaces. The following formula is used for finding the volume of **rectangular** objects and **cubes**:

$$V = L \times W \times H$$

In landscaping, many of the conversions to volume (in cubic units) involve changing square feet or yards (area) into cubic feet or yards (volume). For example, the amount of soil needed to fill a raised bed is determined first by the size of the bed. Let's say you have to estimate how much soil you will need to fill the bed. The bed is 5 feet long and 4 feet wide. The soil needs to be 18 inches deep. How would you determine the amount of soil you will need? Soil is sold by the cubic yard. The formula is V = L × W × H.

- L = 5 feet

- W = 4 feet

- H – 18 inches

First, we must change the units into the same form. 18 inches = 1.5 feet.

Therefore, 5 × 4 × 1.5 = 30 cubic feet of soil.

Soil, like gravel and mulches, is sold by the cubic yard. On the next page you will find a learning activity to help you practice the information you just learned.

Learning Activity – Volume

1. In the example of the raised bed in the previous section, how many cubic yards of soil must be ordered to complete the task?

    _____

2. List some of the materials that are used in landscaping that are sold by the cubic yard.

    _____

3. What is the formula for calculating volume?
    _____

    It will help to remember: 9 square feet = 1 square yard

    27 cubic feet = 1 cubic yard

4. How many cubic yards would you have to order to cover the following areas? Fill in the chart:

Cubic Feet	Cubic Yards
27	
54	
81	
60	

5. True or False. Circle your answer.
    a) A cubic yard of concrete weighs approx. 2700 lb. (1215 kg).

    True   False

    b) A cubic foot of concrete weighs approx. 150 lb. (68 kg).

    True   False

c) A cubic yard of sand or gravel weights approx. 2700 lb. (1215 kg).

        True   *False*

d) A cubic foot of sand or gravel weights approx. 100 lb. (45 kg).

        True   *False*

e) A cubic foot of 5/8" crushed gravel weighs approx. 95 lb. (43 kg).

        True   *False*

f) A cubic yard of 5/8" crushed gravel weighs approx. 2500 kg.

        True   *False*