**Day 7:**

**VOLUME AND CAPACITY**

The **volume** of a three-dimensional object is the amount of space it occupies. There are specific formulas used to find the volume of different geometric solids. Just as area is expressed in square units, volume is ***ALWAYS*** expressed in cubic units; – cm3, in3, m3, etc.

**Capacity** is the maximum amount that a container can hold. It is related to volume in that the capacity of a container can be the volume of the container. But capacity is most often used with liquid measurements. Therefore, capacity is measured in liquid units like litres and gallons.

Volume and capacity are closely related. In the metric system, a volume of 1000 cm3 is equal to a capacity of 1 L. Also, 1 cm3 = 1 mL and 1 ft3 = 7.48 US gallons. These are useful conversions to remember.

In equations, the symbol for volume is a capital v 🡪 **V**.

**VOLUME AND CAPACITY OF PRISMS**

The volume of a prism is found by multiplying the area of the base by the height of the object. This formula is the same for prisms and cylinders, even if the prism is oblique. In that case, the height just has to be perpendicular to the base.

Example 1: Calculate the volume and capacity of the rectangular prism below.

12 cm

6 cm

15 cm

**V = Abase × *h***

***V = l × w × h***

Example 2: Calculate the volume and capacity of the following triangular prism.

3 ft. 4 ft.

2 ft.

.

**V = Abase × *h***

***V = (b × h ÷ 2) × h***

Note that in the formula ***(b × h ÷ 2)***, the b and h refer to the base and height of the **triangular face** NOT the prism itself. To avoid this confusion, often these two lengths are referred to as “a” and “b”.

***Capacity*** =

Example 3: A rectangular prism has a square base with sides that are 12 cm long. If the volume of the prism is 2304 cm3, what is the height of the prism?

Solution: Use the formula for volume of a rectangular prism and solve for *h*.

**V = Abase × *h***

***V = l × w × h***

**ASSIGNMENT 11 – VOLUME AND CAPACITY OF PRISMS**

1) Calculate the volume and capacity of the following prisms.

a) A rectangular prism with a base of 17.5 cm by 13.2 cm and the height is 18.8 cm.

b) A rectangular prism with a square base with sides of 2.75 ft, and a height of 5.8 ft.

2) A rectangular prism has a base of 6.9 cm by 8.8 cm. If the volume is 212.5 cm3, what is the height of the prism? Answer to one decimal place.

3) One rectangular prism has dimensions of 8 mm by 12 mm by 20 mm. A second prism has a base of 32 mm by 6 mm. What must the height of the second prism be so their volumes are the same?

4) A hole 18 m by 8 m by 5 m is being dug in a backyard to make a swimming pool. A dump truck can only carry 12 m3 of dirt. How many trips will the truck have to make to remove the dirt for the pool?