

Name: _____

USING A BALLOON TO MEASURE VITAL CAPACITY

PURPOSE: To measure your vital capacity using a balloon.

MATERIALS AND METHODS:

Vital capacity is measured in liters (l), milliliters (mL) and cubic centimeters (cm³). One mL = one cm³.

1. Blow up the balloon several times to stretch it thoroughly.
2. Take a deep breath and blow up the balloon as much as you can with **ONE BREATH**. Hold the opening of the balloon closed with your fingers.
3. Use the string and ruler to measure the circumference (the distance around) the biggest part of the balloon. Repeat this for a total of 5 trials and record your results for each trial in Table 1.
4. Calculate the average circumference of the balloon and record it in Table 1.
5. Determine the **volume of the air** in the balloon using these 3 steps and record the numbers in Table 2.
 - (a) Calculate the **diameter** of the balloon = **average circumference ÷ Pi (3.14)**
 - (b) Calculate the **radius** of the balloon = **diameter ÷ 2**
 - (c) Calculate the **volume** of the sphere = $\frac{3}{4} \times \text{Pi (3.14)} \times r^3$

OBSERVATIONS:

TABLE 1

CIRCUMFERENCE OF BALLOON IN CENTIMETRES						
Trial	1	2	3	4	5	Average Circumference
Circumference						

TABLE 2

Diameter of Balloon (cm)	Radius of Balloon (cm)	Volume of Sphere (mL or cm ³)	Volume of Air (L)

The volume you have calculated is your **Experimental Vital Capacity**. Your **Actual Vital Capacity** is the amount of air you should be able to hold considering your height and age.

To determine your **Actual Vital Capacity**:

- (a) Measure your height in centimeters: _____
- (b) **Actual Vital Capacity = 0.041 X height in cm – 0.018 X age – 2.69 = _____**

DISCUSSION QUESTIONS:

1. How does your experimental vital capacity compare to your actual vital capacity?

2. What might account for any differences in the capacities?

3. Compare your vital capacity with that of other students. Are they same? Explain your answer.

4. Athletes have to be in very good condition. What type of athlete do you think would have the largest vital capacity? Explain your answer.
