

Full of Hot Air

Name: _____

Date: _____ Period: _____

Materials (per pair)

- 2 balloons
- meter stick
- piece of string
- calculator

In your own words, what is lung capacity? (2 points) _____

In the metric system, what are two different units to measure volume?
(2 points) HINT: read ahead in this activity.

1. _____
2. _____

Procedure:

- 1) Blow up your balloon 3 times so it is easier to inflate.
- 2) Take 2 normal breaths.
- 3) Inhale as much air as you can. Exhale into the balloon, emptying your lungs as much as possible.
- 4) Hold the balloon closed, but do not tie it.
- 5) Wrap string around the balloon at the widest point.
- 6) Measure the length of the string to determine the balloon's circumference.
- 7) Carefully let the air out of the balloon.
- 8) Repeat steps 2-7 four more times.

Observations (6 points)

	Circumference (cm)	
	Partner 1: _____	Partner 2: _____
Trial 1		
Trial 2		
Trial 3		
Trial 4		
Trial 5		
Average		

Calculations:

To determine the volume of a sphere, you need to use the following formula:

$$V = \frac{4}{3}\pi r^3$$

However, you measured circumference and not the radius. You must first determine the radius. Use the following formula below. **Don't forget units (2 points)**

Formula	$C = 2 \pi r$
Substitute (2 points)	
Solve (2 points)	

Calculate the volume of the balloon. **Don't forget units (2 points)**

Formula	$V = \frac{4}{3}\pi r^3$
Substitute (2 points)	
Solve (2 points)	

If done correctly, you should have determined the volume in cubic centimeters (cm³). Volume is also measured in milliliters (mL). 1 cm³ = 1 mL

What is the volume of the balloon in milliliters (2 points)? _____

Analysis Questions

1) What does the volume of the balloon tell you? (2 points) _____

2) Compare your vital capacity with your classmates'. Is everyone's vital capacity similar? Why/why not? (2 points) _____

3) Count how many breaths you take in 1 minute. (1 point) _____

Calculate how much air could go into your lungs in 1 minute. (2 points)

4) How might an athlete's vital capacity be different from a non-athlete? Why? (3 points) _____

5) Who do you think has a greater vital capacity: Louis Armstrong (trumpet) or B. B. King (guitar)? Why? (3 points) _____



