Bubble Blowup

Lung capacity is the amount of air your lungs can hold. Good lung capacity is helpful in competitive sports. In this activity, you can have fun blowing bubbles while getting an idea of what your lung capacity is.

Stuff You'll Use:

▸pipet ▸plastic tray at least 25 cm x 25 cm (10 inches x 10 inches) in area ▸distilled water ▸bubble solution ▸metric ruler

What to Do:

1. Pour a small puddle of bubble solution in the center of the tray and add 3 mL (¼ tablespoon) distilled water. Use your hands to smear the solution all over the tray. (The whole tray should be wet.)
2. Pour another puddle of bubble solution in a corner of the tray. Dip your straw into the liquid and blow some bubbles, holding your straw 1–2 cm above the tray.
3. Dip the straw again, and while holding it near the center of the tray, take a big breath and blow the biggest bubble dome you can without taking another breath. Pop the bubble and measure the diameter (longest distance across a circle) of the ring of soap left behind (in cm). Half of the diameter is called the radius of the circle. Write the radius in your data table.
4. The volume of a sphere is:

   $$V = (4/3) \times (\pi) \times (r^3)$$, where r is the radius

5. Calculate the volume and divide it by half (because the bubble domes are half-spheres). This is your lung capacity in cubic centimeters, cm^3. (Cubic centimeters are equivalent to milliliters.)
6. Do steps 3–5 two more times and calculate the average. Record your results in the data table.
7. Compare your results with the rest of the class. *Who has the largest lung capacity (blew the biggest bubble)?*

FYI...

It may take you a couple of tries to get the blowing technique down. Experiment with the height of the straw above the tray until you are comfortable blowing large bubbles.

If the bubble hits the edge of the tray it is likely to burst. Make sure you use a tray big enough to hold at least a 10-inch diameter bubble.

Sample data table

Trial	Radius (cm)	Lung Capacity (mL)
1		
2		
3		
	Average	

How It Works:

If you could completely empty your lungs, the amount of air in the bubble dome would equal your total lung capacity, which is 6 L (6,000 mL) for the average adult. In reality, it is impossible for you to empty all the air from your lungs. No matter how completely you exhale, some air will always remain in your lungs. What this activity measures is called vital lung capacity, which is about 4.6 L on average. Also, you may have found it hard to blow a bubble big enough to hold all the air you were capable of blowing without the bubble bursting first. A bubble dome holding 4.6 L of air would be about 26 cm (10 inches) in diameter.

People can increase their lung capacity through training, so you may find higher lung capacities among classmates who participate in competitive sports. Also, larger people usually have greater lung capacities than smaller people.