VOLUME MEASUREMENT   Name_____ Hour _____   /14

Volume is yet another way that we measure. Volume is a way of measuring the **space that a certain object takes up**. An easy way of thinking about it is to imagine a candy bar. The wrapper would be the surface area, and the actual candy bar would be the volume. Imagine 2 two-ounce candy bars. They both have the same mass (amount of matter), but one is a 3 Musketeers bar (bigger because it is light and fluffy) and one is a Hershey's chocolate bar (smaller because the chocolate is more tightly packed). We would say that the 3 musketeers has a **greater volume**, because it takes up more space.

In this lab, you will be calculating the volume of several wood blocks. You will be finding out how many cubic centimeters it takes to make a block the exact same length, width, and height. When measuring the volume of objects, the unit label can be written in two ways:
- cubic units or…
- Units^3

The units used in this lab will be cm^3 and in^3.

INSTRUCTIONS:
Make a replica (perfect copy) of the wood block from the plastic cm cubes. Make sure all the dimensions (length, width, and height) are exactly the same. When you have finished, count all the cubes. Don't forget the inside ones! This is the volume of the block, and this number should be entered (along with the label cm^3 or in^3) in the chart below. Blocks D and E are to be done in inches, and there are no inch cubes to build with. You will have to figure out a way to calculate the volume of these two blocks without the help of cubes. You have 5 blocks to complete. Measure A, B, and C in centimeters, and measure D and E in inches. Each empty box is worth 2 points, one for the label and one for the actual number.
1-10.

	A	B	C	D	E
volume→					

11-12. In your own words, pretend that you are describing what volume is to a student in 4th grade. **Do not tell me the formula to calculate volume**; tell me what volume IS. Use complete sentences.

13-14. Can you think of an easier way of doing this so that you don't have to make a replica out of the cubes? Please describe a way of finding out volume in a quicker way.

REAL SCIENCE SCENARIO--volume

A group of scientists are measuring the stroke volume of the heart. Stroke volume is the amount of blood that exits the heart when it beats 1 time. Four groups of people are being tested: sedentary women (women who don't work out), athletic women, sedentary men, and athletic men. The results of the study are summarized below:

		Average stroke volume at rest	Average stroke volume during exercise
Group 1	Sedentary women	49 mL	115 mL
Group 2	Athletic women	60 mL	150 mL
Group 3	Sedentary men	59 mL	135 mL
Group 4	Athletic men	75 mL	180 mL

1. Which group has the greatest stroke volume at rest?

2. Respond to this statement: Men's hearts always pump more blood than women's hearts.

3. The scientists reported that their hypothesis was confirmed. What was the scientists' original hypothesis (their best guess about what the data would look like)?

4. Why would stroke volume increase as people begin to exercise?

5. Why would women have a smaller stroke volume (in general) than men?

6. Why would athletic people have a greater stroke volume at rest and during exercise?

7. 400 people were used for this study. Why did they have such a big **SAMPLE SIZE**? (Why did they pick so many people?) What would have happened if they only picked 4 people for this study?

8. Which graph best represents the results of this study?
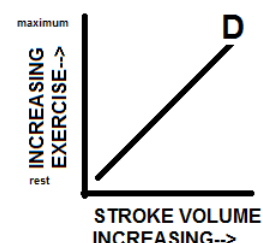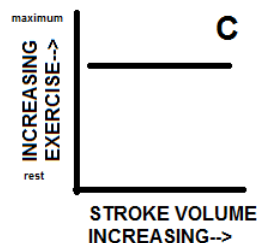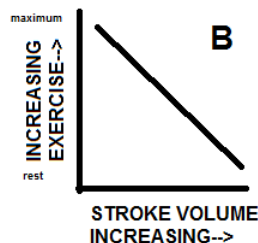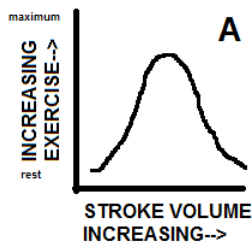
9. A high stroke volume means the heart beats fewer times per minute. Recently, there were a couple of clinical studies which seem to imply that having a slower heart rate leads to fewer heart attacks. Knowing this, how should people change their lives?