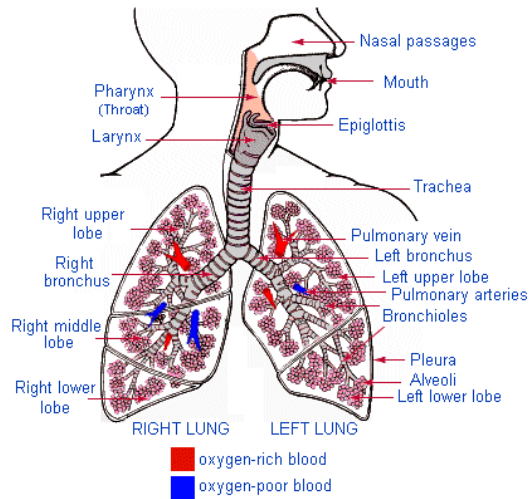


Determining Lung Capacity



In this exercise you will look at the capacity of your lungs. You will look at the Tidal capacity, which is the amount of air your lungs take in naturally during breathing, and you will look at reserve volume. This is the amount of air you can voluntarily force in or out after a normal breathe.

Materials:

1. Meter stick
2. Calipers
3. String
4. Spirometer

Procedures:

Part I (Simulated breathing)

1. Look at the models of lungs and explain the process of negative ventilation and contrast this with positive ventilation that would be found among frogs etc.
2. Look at the functioning lung model and push down on the rubber diaphragm. Does the volume increase or decrease in the container?
3. What happened to the balloons when you pulled down on the rubber diaphragm?
4. Why do the balloons inflate?
5. Push up on the rubber diaphragm. What happens to the volume of the container?
6. Pull down on the diaphragm and pull up on the diaphragm several times to simulate breathing.

Part IIA (Measuring of Vital Capacity of Lungs)

1. Measure the anterior posterior diameter. This is the front of the chest to the back at the nipple line.
2. Measure the lateral diameter at the nipple line.
3. Measure the circumference at the arm pits and at the xiphoid process of the sternum.
4. Measure the vertical height. From the top of sternum to diaphragm.
5. Record the changes in chest size at restful inspiration, passive expiration, forced inspiration, and forced expiration. (Record all measurements to calculate change in volume)

Part II B (Vital Capacity and Spirometry)

You will be measuring the Vital Capacity of your lungs. The vital capacity equals the inspiratory reserve volume plus the expiratory reserve volume and the tidal volume.

$$VC = TV + IRV + ERV$$

1. Measure the tidal volume of the lungs by measuring the amount of air exhaled during a normal breath. Do three trials and average your results.
2. Measure the volume of air that you can forcefully exhale after restful inspiration. This is the expiratory reserve volume and tidal volume at rest.
3. Measure the volume of air that you can forcefully exhale after forceful inspiration. This is the vital capacity.
4. Calculate the ERV.
5. Calculate the IRV.
6. Place your results in a data table.
7. Does tidal volume change as vital capacity increases or decreases?
8. Compare Vital Capacity to Height and sex.