

Student or Group Name:

Date:

Activity 3- Blow it Up!

Measuring respiratory values not only helps us understand how the lungs work, but it also can help doctors determine if a patient might have lung disease. In this activity, we will measure vital capacity using balloons and then compare these values to our fellow classmates. Vital capacity is the volume of air that can be expelled after a full inhalation. The total air holding capacity of the lung is the sum of the vital capacity and the residual volume. Even when you try extremely hard to expel all of the air in your lungs, there is still some air left in the alveoli and airways. If there wasn't, then your alveoli and airways would collapse!!

Materials:

1 balloon for each student
Flexible measuring tape
Meter stick/Ruler

Pre-Lab:

1. Make Predictions/Hypothesis

Using what you know about lung health, make predictions on how the following variables will affect the vital capacity. Circle your choice.

Gender:

- Males' vital capacity is greater than Females'
- Females' vital capacity is greater than Males'
- Male's vital capacity is equal to Females'

Why do you predict this?

Height:

- Taller people will have a greater vital capacity than Shorter
 - Shorter people will have a greater vital capacity than Taller
- Why do you predict this?
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Sports Participation:

-People who play sports will have a greater capacity than those who don't play sports

-People who don't play sports will have a greater capacity than those who do play sports

Why do you predict this?

Procedure:

1. Sit down, and take deep breaths in and out five times.
2. Breathe in as deeply as possible.
3. Hold a balloon to your mouth, tightly sealing the opening, and blow all the air out of your lungs.
4. Take the balloon out of your mouth, taking care to keep the opening sealed tightly.
5. Continue holding the balloon while your partner measures the girth of the balloon (in centimeters). The girth is the circumference of the widest part of the balloon.
6. Record this value down on TABLE A as the Vital Capacity Girth.
7. Breathe in and out normally. Have your partner count the number of breaths you take in 30 seconds.
(1 breath = breathing in and then out).
8. Double this number to obtain the breaths taken in 1 minute, and record this number on TABLE A as the Resting Respiratory Rate.
9. With your partner timing you, run in place for 1 minute.
10. At the end of one minute, sit down to have your elevated respiratory rate measured. (Partner: As soon as the student sits down, measure the number of breaths the student takes in 30 seconds.)
11. Double this number to obtain the breaths taken in 1 minute, and record this number on TABLE A as the elevated respiratory rate.
12. Measure your partner's height in inches, and record his/her height and gender on TABLE A.
13. Record your values, and report your values from TABLE A to your teacher in order for him/her to fill out TABLE B.

Table A

Student Name	Gender (M/F)	Height (in)	Vital Capacity Girth (cm)	Resting Respiratory Rate (breaths/min)	Elevated Respiratory Rate (breaths/min)	Plays Sports (Y or N)

Discussion Questions:

1. Look back at your hypothesis. Using the data collected during the activity, report on the results for each variable.

Gender: _____ had greater vital capacity than _____.

Height: _____ had greater vital capacity than _____.

Play Sports: _____ had greater vital capacity than _____.

2. Were your hypotheses (predictions) supported or not supported?

3. Which variable (Gender, Height, Sports Player) seemed to have the greatest effect on the vital capacity? Why?

4. What does vital capacity measure? Why would it change from person to person?