Measuring Lung Capacity

Annotation:
This lesson will provide students with a concrete way to determine their individual lung capacity using both a measured balloon activity as well as a formula that relates body surface area to expected lung capacity.

Primary Learning Outcome:
Students should be able to hypothesize what factors might affect an individual's lung capacity i.e. height, weight, size, athletics, musical instruments that require heavy breathing etc. Students will learn basic anatomy and physiology of the respiratory system. Students should be able to utilize a graph to properly correlate the width of the diameter of a balloon they blow up to their lung capacity using a graph of balloon diameter vs. lung volume. Students will also learn to calculate their body surface area.

Georgia Performance Standards:
SB3
SB4
SCSh1
SCSh3
SCSh4
SCSh5
SCSh6

Materials:
Calculators with a square root function key, latex balloons, metric rulers.
Bathroom scale (optional)

Total Duration:
1.5 hrs. (includes a 45 minute lecture on basic respiratory system anatomy and physiology)
**note: see included lung images and respiratory system tidbits handout

Procedures:

Step 1	
Description	Measuring Tidal Volume- the amount of air that you move in and out of your lungs while breathing normally
Duration in hours/minutes	15 minutes
Attachment #1 – Name and description	Measuring Lung Capacity Handout
Step 2	
Description	Measuring Vital Capacity- the maximum amount of air moved in and out of the lungs
Duration in hours/minutes	15 minutes

Attachment #1 – Name and description	Measuring Lung Capacity Handout
Step 3	
Description	Estimating Vital Capacity- utilizing the BSA equation
Duration in hours/minutes	15 minutes
Attachment #1 – Name and description	Measuring Lung Capacity Handout

Assessment:
The lesson will be assessed by determining if the students calculated their BSAs properly, if they utilized the given graph correctly to determined their measured lung capacities, and through the analysis questions that ask the students to hypothesize why there might be a difference between estimated and measured lung capacities.

Extension:
Additional activities might include measuring students' lung capacities before and after engaging in intense cardiovascular exercise as well as in a variety of temperatures.

Remediation:
Students who are having difficulty should be placed into pairs with students who did understand the activity and should guide the students through how they measured their own lung capacities.