 FSHu3CEC Lung capacity

MG1H-1 uses mathematics and statistics to evaluate and construct arguments in a range of familiar contexts

MG1H-2 analyses representations of data in order to make predictions

MG1H-3 makes predictions about everyday situations based on simple mathematical models

MG1H-4 analyses simple two-dimensional and three-dimensional models to solve practical problems

MG1H-5 interprets the results of measurements and calculations and makes judgements about reasonableness, including the conversion to appropriate units

MG1H-10 uses mathematical argument and reasoning to evaluate conclusions drawn from other sources, communicating a position clearly to others.

Content

* recognise lung capacity as a volume by obtaining values for Estimated Vital Lung Capacity by practical means, and statistically analyse the values
* calculate a person’s Theoretical Vital Lung Capacity (in litres)
* convert lung capacity from cubic centimetres to litres
* 1 cm3 = 1 mL (= 0.001 L), 1000 cm3 = 1 L
* compare values of Estimated Vital Lung Capacity with theoretical values.

Teaching Strategies

So body parts have blood circulating around them, but why? It has something to do with receiving oxygenated blood. This cannot occur without breathing. What happens if a person does not breathe/hold their breath? Open discussion.

People have different body sizes already. What about the lung capacity? Introduce the term Vital Lung Capacity. Pose questions such as “Do musicians who play wind instruments develop greater vital capacity than non-wind-players? How does their vital capacity compare to athletes? Design an experiment to find out.”

Experiment through balloon method.

Using volume of a sphere and water displacement method.

Water displacement deals directly with mL conversion, although remember that Theoretical Vital Lung Capacity is expressed in litres, while Estimated Vital Lung Capacity is expressed in cubic centimetres i.e. straightforward using the balloon method.

Discuss disadvantages of the different methods.

Utilise formula to compare estimated and theoretical (with conversions).

Check against online calculators.

Why do they include age and height? Would it be useful to collect class data on this?

Discuss other factors that may affect Vital Lung Capacity.

Resources

<http://www.sciencebuddies.org/science-fair-projects/project_ideas/HumBio_p009.shtml?from=Blog#makeityourown> (has both methods as described below)

<http://www.biologycorner.com/worksheets/lungcapacity.html>

<http://www.glasgowsciencecentre.org/teacher-resources/lung-capacity.html>