

UNIT 5 Breathing and Respiration

	Learning Outcomes	Suggested Teaching Activities	Online Resources	Other resources
	6 (a) Define breathing as the movement of air into and out of the lungs	Students should be given definitions of both respiration and breathing and the difference between the two emphasised.		P. Gadd pg 66 D. Mackean pg 88-89 figs 12.7-12.10
	6 (b) Describe and recognise from a drawing the arrangement of the trachea, bronchi, Outline of the lungs and diaphragm, as seen in front section through the thorax	Students should see a demonstration of a pluck dissection pointing out the parts and seeing it being inflated. The interactive thorax is very useful here!	http://www.schoolscience.co.uk/content/4/biology/abpi/asthma/asth3.html Interactive Thorax diagram	P. Gadd pg 69 fig 8.7 and Summary table Practical pg 68 D. Mackean pg 85 fig 12.1
	6 (c) Describe the functions of the ribs, internal and external intercostal muscles, muscular and fibrous parts of the diaphragm in the process of breathing. 6 (d) Describe the relationship between changes in pressure and volume in the lungs during breathing	Students should be shown the “bell-jar” model of the breathing system. It should be demonstrated that inflating and deflating the balloon is solely a physical process resulting from increasing and decreasing the volume of the bell jar. They should fill in a table comparing inhalation and exhalation	http://biomedia.bio.purdue.edu/GenBioLM/GBRespiration/html/ventilation.html Simple breathing animation http://www.mhhe.com/cgi-bin/netquiz_get.pl?qfooter=/usr/web/home/mhhe/biosci/genbio/animation_quizzes/animate_11fq.htm&afooter=/usr/web/home/mhhe/biosci/genbio/animation_quizzes/animate_11fa.htm&test=/usr/web/home/mhhe/biosci/genbio/animation_quizzes/animate_11q.txt&answers=/usr/web/home/mhhe/biosci/genbio/animation_quizzes/animate_11a.txt Movie of gas ex.	P. Gadd pg 71 fig 8.11 and 8.12 and practical. Summary table pg 72 Pg 72 fig 8.13 model showing intercostal muscle action D. Mackean pg 88-89 figs 12.7-12.10
	6 (e) Define gas exchange as uptake of oxygen and release of carbon dioxide in the alveoli	Students should be given a diagram of an alveoli in cross section to put on direction of flow of CO ₂ and O ₂ . Animation on internet is excellent here!	http://www.mdhs.unimelb.edu.au/bmu/examples/gasxlung/ Animation of gas ex and lung structure (needs	P. Gadd pg 70-71 fig 8.9 and 8.10 D. Mackean pg 86-87 figs 12.2-12.6

			SHOCKWAVE)	
	6 (f) State the differences between inspired and expired air Investigate the differences in composition between inspired (atmospheric) air and expired air.	Students should investigate inspired and expired air using the “huff and puff” experiment		P. Gadd pg 73 practical fig 8.15 D. Mackean pg 86 table Pg 90 exp 1 and 2
	6 (g) Define vital capacity Investigate differences in vital capacity in a group of students and relate it to height and to body mass.	Students should be given a definition of vital capacity and then investigate their own using the displacement of water from a bell jar (or a 5 litre plastic bottle). They can compare others in class with their height and mass.	http://www.chemheritage.org/EducationalServices/pharm/tg/chemo/activity/capacity.htm#adv Measurement of vital capacity http://www.caosclub.org/freelessons/hbody3.html Measurement of vital capacity	P. Gadd pg 73-74 practical investigating capacity of the lungs D. Mackean pg 89 fig 12.11 Pg 91 exp 3
	6 (h) Describe the effects of changes in physical activity on the rate and depth of breathing P. Gadd pg 66 Investigate the effects of changes in physical activity on the rate and depth of Breathing.	Students should investigate their breathing and pulse before and after exercise, using a spirometer or a simple measurement	http://www.arb.ca.gov/knowz/one/teachers/lessons/k-6/exercise.htm Protocol for practical to observe and record how breathing changes with physical activity.	P. Gadd pg 74 experiment 2 or 3 D. Mackean pg 89
	6 (i) Describe the technique of mouth-to-mouth resuscitation	Students should be shown how to carry out “mouth-to-mouth” on a model or see pictures of the technique with a description. Animation from internet is excellent here!	http://www.health.harvard.edu/fhg/firstaid/mResusc.shtml In diagrams/text http://www.pacificcrimep.com/default.htm Right click on: Animation of procedure (right click on CPR 2 (CARDIO PULMONARY RESUSCITATION))	P. Gadd pg 72-73 D. Mackean pg 90 and pg 316 fig 42.2

			and select 'save target as' to download the movie	
	6 (m) List activities where energy is required: cell division, active transport, maintenance of a constant body temperature and muscle action 6 (j) Define respiration as the release of energy from glucose in living cells 6 (k) State the equation for aerobic respiration, using either words or chemical symbols 6 (l) State the function of mitochondria in cells as the site of energy transfer in respiration	The class should brainstorm what energy is needed for and then summarise this as a list. Reference should be made back to Unit 2 and to where energy comes from, i.e. food and that glucose is the basic "energy food". The equation for respiration should be built up in class from knowledge about combustion needing Oxygen and producing Carbon Dioxide and that food is a carbon containing compound. A diagram of mitochondria should be given to students to annotate.		P. Gadd pg 66-67 Fig 8.1 b mitochondria D. Mackean pg 27-28 and 85
	6 (q) Describe the effects of cigarette smoke on the cilia, which form the cleaning mechanism of the lungs Investigate the tar content and acidity of cigarette smoke. 6 (n) List the toxic materials in cigarette smoke: particles, nicotine, tar and carbon monoxide. 6 (o) State the effect of tar as a carcinogen 6 (p) Discuss the effects of nicotine and carbon monoxide on the body and on a developing fetus.	Students should see the smoking machine in operation and have the components pointed out i.e. • Tar • Acid gas • Carbon dioxide • Temperature Different types of cigarettes should be run to show comparisons. The students should engage in class discussion about the reasons why people smoke and why they shouldn't. An essay can be written on this and/or a health leaflet/poster produced. Health leaflets should be looked at.	http://web.ukonline.co.uk/webwise/spinneret/humans/smach.htm Photos of smoking machine experiment. http://www.ash.org.uk/html/factsheets/html/fact12.html cig smoke fact sheet http://www.benetton.com/colours/issues/smoke.html	P. Gadd pg 212-215 Fig 20.8 D. Mackean pg 268-270 Smoking machine figs 35.6 health leaflets