Rosary School – Marj Elhamam

Unit 2: Chapter 3 - Answers

Name: _____ Date: __ /__ /____

Grade: 9 (A, B, C, D) Subject: Biology

CHAPTER 3

1 ▶ C **2 ▶** A **3 ▶** B **4 ▶** B

5 ▶

	Action during inhalation	Action during exhalation
external intercostal muscles	(contract)	relax
internal intercostal muscles	relax	contract
ribs	move up and out	(move down and in)
diaphragm	contracts and flattens	relaxes and becomes dome-shaped
volume of thorax	increases	decreases
pressure in thorax	decreases	increases
volume of air in lungs	increases	decreases

6 ▶ When we breathe in, the external intercostal muscles between our ribs contract, pulling the ribs up and out. The diaphragm muscles contract, flattening the diaphragm. This increases the volume in the chest cavity, lowering the pressure there, and causing air to enter from outside the body, through the nose or mouth. This is called ventilation. In the air sacs of the lungs, oxygen enters the blood. The blood then takes the oxygen around the body, where it is used by the cells. The blood returns to the lungs, where carbon dioxide leaves the blood and enters the air sacs. When we breathe out, the external intercostal muscles relax and the ribs move down and in. The diaphragm muscles relax, and the diaphragm returns to a dome shape. These changes decrease the volume of the chest cavity, increasing the pressure in the cavity, pushing the air out of the lungs.

7 ▶ a When the volume of the chest is increased by the movements of the ribs and diaphragm, the drop in pressure in the chest cavity draws air into the pleural cavity through the puncture in the chest wall, instead of through the mouth or nose into the lung.

b Each lung is isolated from the other by being in a separate pleural cavity, so a pneumothorax on one side will not affect the opposite lung.

c A tube is inserted through the chest wall into the pleural cavity on the side of the injured lung. This stops ventilation in that lung, while the other lung will be ventilated normally.

8 ▶ a The rings support the trachea so that it does not collapse during inhalation.

The gap in the 'C' allows food to pass down the oesophagus, which runs next to the trachea, without catching on the rings.

b The short distance allows easy diffusion of oxygen into the blood, and diffusion of carbon dioxide out of the blood.

c The mucus traps bacteria and dirt particles. The cilia beat backwards and forwards to sweep these towards the mouth, preventing them entering the lungs.

d Smoke contains carbon monoxide, which displaces oxygen from the haemoglobin of the red blood cells of the smoker.

e The addictive drug in tobacco smoke is nicotine. Smokers who are trying to give up can use patches or gum to provide the nicotine they normally get from cigarettes, reducing the craving to smoke.

f The large surface area is provided by the alveoli. It allows for efficient diffusion of oxygen into the large blood supply, and efficient removal of the waste product, carbon dioxide.

9 ▶ Bronchitis is a lung disease caused by irritation of the linings of the airways to the lungs, and may be made worse by bacteria infecting the bronchial system.

Emphysema is a lung disease where the walls of the alveoli break down and then fuse together, reducing their surface area. (Both diseases may be caused by smoking.)

10 ▶ a Some points are:

- non-smokers have a low death rate from lung cancer at all ages
- the death rate from lung cancer among smokers increases with age
- the death rate increases with the number of cigarettes smoked per day.
- (Numbers should be used from the graph to illustrate any of these points.)

b For 55-year-olds smoking 25 a day: about 4.5 per 1000 men (or 45 per 10 000 men).

For 55-year-olds smoking 10 a day: about 1 per 1000 men.

c Probably this investigation. The graph shows a direct relationship between number of cigarettes smoked and incidence of lung cancer, in one particular type of person (middle-aged male doctors): in other words, a more controlled group. In Table 3.2 the patients were matched for age, sex etc. but were from a more varied background. There could be other reasons for the correlation that had not been considered. However, they both show a strong link.