

Section 7.3: Review Answers

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1. The structures illustrated in the diagram are the tonsils. They help to prevent bacteria and other pathogens from entering the body. Tonsillitis is an infection of the tonsils, usually caused by a viral infection.
2. The following chart can be used to compare bronchitis to pneumonia.

	Bronchitis	Pneumonia
Causes	bacterial infection; long term exposure to irritants and foreign bodies (cigarette smoke)	bacterial or viral infections
Symptoms	coughing that expels mucus (because cilia are destroyed)	coughing, shortness of breath
Breathing problems	inflamed mucus- filled bronchi make breathing painful; infections are likely	alveoli become inflamed and filled with liquids; this interferes with gas exchange, and the body becomes starved for oxygen

3. Emphysema is an obstructive respiratory disease caused by smoking. The lungs lose elasticity and breathing becomes difficult. The destruction of alveolar walls reduces the surface area for gas exchange. A low-flow oxygen system increases the concentration of oxygen in the air entering the lungs, thereby increasing the oxygen diffusion gradient. This compensates for the lack of surface area for oxygen diffusion.
4. A person with cystic fibrosis produces thick, sticky mucus that coats the inside of the lungs. The mucus in the lungs normally traps pathogens and then is expelled from the body by coughing. In people who have cystic fibrosis, the mucus is so thick that pathogens are trapped but cannot be expelled. As a result, the lungs get repeated infections that reduce lung function, and the individual has trouble breathing.
5. Asthma is a chronic obstructive lung disease that affects the bronchi and bronchioles, making breathing difficult or impossible because of reduced air flow. The airways of asthmatics are constantly inflamed and are sensitive to some triggers, such as pollen, dust, cigarette smoke, and other air pollutants. During an asthma attack, the bronchi and bronchioles swell, the bronchial muscles tighten, and mucus production increases. These changes obstruct the airways and make breathing difficult or impossible.
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production increases. These changes obstruct the airways and make breathing difficult or impossible. A bronchial dilator helps to reduce the inflammation and relax the bronchial muscles. This helps to reduce the obstruction of the airways making breathing easier.

7. Lung cancer is the uncontrolled and invasive growth of abnormal cells in the lungs. The abnormal cells multiply and form malignant tumours, or carcinomas. The carcinoma continues to grow and invade surrounding tissues, including the lymphatic and blood vessels in the lungs. The lymphatic and blood vessels circulate through the body and carry the cancerous cells to new locations where they can grow and invade new tissues. The spread of a tumour throughout the body is called metastasis, and the cancerous cells that spread are called metastatic cells.
8. Most cases of lung cancer are caused by smoking, making this type of cancer wholly preventable. Not smoking, or quitting if you already smoke, is one way to prevent lung cancer. Another cause of lung cancer is exposure to radon, a heavy gaseous radioactive element that is colourless and odourless. Radon is found in many homes, and testing is the only way to tell if your home has dangerously high levels of this gas.
9. (a) CT scans locate abnormalities in the lungs. A new type of scan, called a helical low-dose CT scan, is able to detect lung cancer when the tumours are still very small.
(b) Liposomes are artificial microscopic vesicles that consist of a liquid centre surrounded by phospholipids layers. They are manufactured in a lab, filled with cancer-fighting drugs, and released into the bloodstream. Their tiny size allows them to follow the spread of the cancerous cells and attack the cells before the cells start their uncontrolled growth at a new location.
10. The following chart could be used to show the four symptoms of asbestosis and the causes of each symptom:

Symptom of asbestosis	Causes
shortness of breath following exercise or other physical activity	scarred lung tissue does not expand and contract normally and cannot perform gas exchange.
dry cough	inflammation of lung tissues would result in a cough
recurrent respiratory infections	the scarring of the lung tissue would likely result in the build-up of mucus that would trap pathogens in the lungs; the inability to remove the mucus would result in multiple lung infections
respiratory failure develop as the disease progresses	as the disease progressed, the lungs would not be able to perform gas exchange and the person would experience respiratory failure

11. Reasons the friend might give for starting smoking might include reference to group acceptance/peer pressure, independence/rebellion (smoking because it's against the wishes of a parent or authority figure), looking/feeling cool, and acting like a favourite person (performer, mentor, parent). Information that could be given to convince the friend to stop includes personal health, affects on the health (physical or even emotional) of others, and cost. Greater significance should be given to the health examples cited and explained.
12. The following chart could be used to summarize the causes of each symptom of lung cancer:

Symptom	Possible causes
chronic cough	inflammation of lung tissue results in over-production of mucus, which is expelled by coughing
hoarseness	if the larynx becomes inflamed, the vocal cords are not able to vibrate normally, reducing the ability to speak in a normal voice or even speak at all
coughing up blood	damage to the alveoli would result in blood entering the lungs; this blood would be expelled when the person coughs
shortness of breath	anything that interferes with gas exchange will result in shortness of breath (the body becomes starved for oxygen)
repeated bouts of bronchitis or pneumonia	in some individuals, lung cancer will result in the lungs becoming inflamed and filled with fluids; this interferes with gas exchange, and the body becomes starved for oxygen