



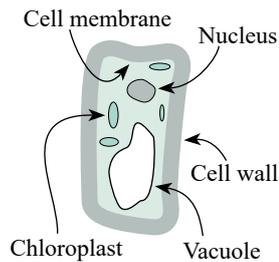
Answers Multi-cellular Organisms

Year 8 Science

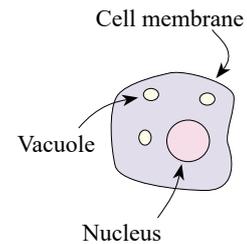
Chapter 3

p61

1 Labelled typical plant cell.



2 Labelled typical animal cell.



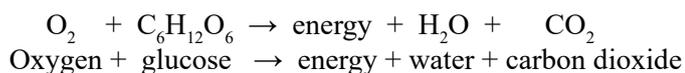
3 Describe the function of each of the following organelles found in plant cells:

- The cell membrane is a thin covering holding and protecting the cell. The cell membrane lets oxygen and dissolved food into the cell, and lets carbon dioxide and wastes out of the cell.
- The nucleus has DNA which controls the action of the cell.
- Mitochondria are tiny powerhouses in the cell. Mitochondria convert glucose into energy (respiration: $O_2 + \text{glucose} \rightarrow \text{water} + CO_2$).
- The cytoplasm is jelly-like substance making up most of the cell and is where the important reactions take place.

4 I would expect to find mitochondria in plant cells as well as animal cells because both cells require energy.

5 More mitochondria would be expected in a muscle cell than in a pancreas cell because muscle cells require more energy than do pancreas cells.

6 Respiration provides every cell with the energy that they require.



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1 Multicellular means many cells.

2 Life processes involves absorbing food and/or nutrients, expelling wastes, reproducing, and movement.

3 Advantages of multicellular organisms over single-celled organisms: Cell life is long because the workload is not so large, only specialised cells are exposed to the environment, an injury is less likely to cause the death of the organism, organisms can reach a large size.

4 Two single-celled organisms are paramecium, euglena, amoebae, algae, bacteria.

5 Five multicellular animals are humans, birds, reptiles, spiders, crabs.

6 Five multicellular plants are trees, flowers, mosses, pines, ferns.

7 A tissue is a group of specialised cells that have a similar structure and function.

8 An example of an animal tissue is muscle tissue.

9 An example of a plant tissue is vascular tissue.

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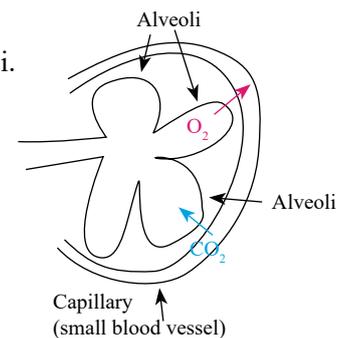
- 1 An organ is a collection of tissues working together to perform a function.
- 2 A tissue is a group of specialised cells that have a similar structure and function while an organ is a collection of tissues working together to perform a function.
- 3 The stomach is an organ that is made of a variety of tissues. The stomach has muscular tissue to churn the food, glandular tissue to produce digestive juices, epithelial tissue to cover the surface of the stomach.
- 4 The leaf of a plant is considered an organ with a variety of tissues: The dermal tissue is like a skin protecting the leaf. The vascular tissue carries water and minerals to the leaf and food away from the leaf. The ground tissue contains a variety of cells with chloroplasts for photosynthesis.
- 5 Organ systems are made of two or more organs working together to perform a function. The human body has a number of organ systems that work together to keep us alive and functioning. Examples of organ systems are: digestive system, circulatory system, respiratory system.

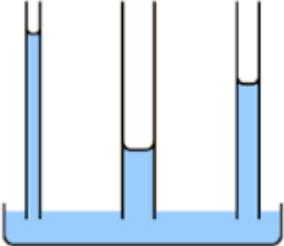
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- 1 The digestive system is a group of organs that absorb nutrients from foods.
- 2 Function of the mouth: The teeth in the mouth grinds the food into smaller pieces for swallowing. The saliva glands moisten the food and secrete enzymes to begin breaking down carbohydrates.
- 3 Function of the stomach: The stomach churns the food with secreted gastric juices into a 'soup'. The gastric juices start breaking down proteins. The gastric juices also kill harmful organisms.
- 4 Function of the small intestine: Enzymes from the pancreas continue the breakdown of proteins, fats, and starches. Most of the nutrients from the digested food is absorbed through the wall of the intestine into the blood stream and then taken to cells of the body.
- 5 Function of the large intestine: Water is absorbed from the wastes. Many vitamins are also absorbed through the wall of the large intestine (The vitamins are produced by the millions of bacteria feeding on the waste).
- 6 The human digestive system is similar to the carnivore digestive system.
- 7 The herbivore digestive system is different to the carnivore digestive system because the foods eaten by herbivores are very different to the foods eaten by carnivores.
- 8 The abomasum chamber of the cow resembles the small intestine and large intestine combined.

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- 1 The respiratory system is a group of organs that supplies blood with oxygen from the air and takes carbon dioxide from the blood and puts it in the air.
- 2 Three main organs in the respiratory system: nose, bronchi, lungs, alveoli.
- 3 The alveoli are sac-shaped bodies inside the lungs.
The alveoli are covered in capillaries.
Oxygen passes through the walls of alveoli into the red blood cells of the capillaries.
Carbon dioxide passes from the red blood cells through the walls of the alveoli into the lungs.
- 4 Two differences between the bird respiratory system and the human respiratory system.
Birds have lungs and from seven to nine air sacs. Humans have lungs but no air sacs. Birds need two breathe-in and breathe-out cycles to move air through their respiratory system. Humans need one breathe-in and breathe-out cycle.
- 5 What is common to insect, bird, and human respiratory systems? The function of the respiratory system is the same. Each have a group of organs that supplies blood with oxygen from the air and takes carbon dioxide from the blood and puts it in the air.
- 6 The left lung is smaller than the right lung in humans because of the space taken up by the heart.
- 7 Have you noticed that the 'left' in a diagram is on the wrong side. Our left is as we face forward. For example, our left hand is on our left as we face forward. When our image is in a book looking out at us, our left is on the right side as we look at the image.



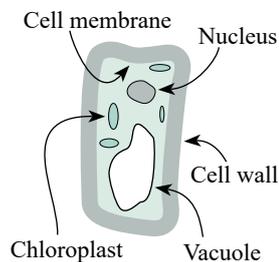
<p>p71</p>	<ol style="list-style-type: none"> 1 The circulatory system is a group of organs that transports oxygen, nutrients, and hormones to the cells of the body and transports wastes such as carbon dioxide and urea from the cells of the body to the lungs and kidneys. 2 Two main organs in the circulatory system: the heart, the blood vessels, and the blood. 3 An artery carries blood from the heart to the body. A vein carries blood from the body to the heart. 4 The pulmonary artery carries blood from the heart to the lung. This blood would be oxygen poor and would be on its way to the lungs to get oxygen. 5 Most diagrams of the circulatory system have red and blue coloured blood vessels. Red blood vessels indicate oxygen rich blood. Blue blood vessels indicate oxygen poor blood. 6 A fish has a heart with two chambers and a human has a heart with four chambers. Humans have two extra chambers appears to be an evolutionary development. Four chambered hearts allows for more efficient transport of oxygen rich blood and the cleansing of waste products such as carbon dioxide. <p>The more efficient heart allows humans to move large distances over land in search of food compared to the relatively less effort needed to move through water.</p>
<p>p73</p>	<ol style="list-style-type: none"> 1 The urinary system, or the renal system, is a group of organs that filters wastes from the blood. Some of the organs in the urinary system that work together are the kidneys, the ureters, the bladder, and the urethra. 2 Another common name for the urinary system is the renal system. 3 The kidneys filter the blood, removing wastes such as urea and ammonium. The kidneys also maintain the correct balance of substances such as water, glucose, amino acids, and electrolytes in the blood. The kidneys excrete the urine into the ureter. 4 The ureter is a muscular tube that propels urine from the kidney to the bladder. 5 The bladder stores urine. Your brain gives the signal to empty the bladder. The bladder outlet muscles relax and the bladder squeezes to empty your bladder of urine. 6 In order of urinary flow: kidney, ureter, bladder, urethra. 7 The urinary system of a spider is similar to that of a human in that the malpighian tubules in a spider function in a similar way to the kidneys in humans. The malpighian tubules absorb water and wastes such as urea and amino acids, and water from the surrounding tissues. 8 The urinary system of a spider is different to that of a human in that the urine and wastes merge with digested foods in the cloacal chamber and are either reabsorbed or excreted.
<p>p76</p>	<ol style="list-style-type: none"> 1 The xylem carries water, and minerals, up the stem of the plant. The xylem are long tubes that are connected together in bundles. 2 The phloem carries food down the stem of the plant. 3 Hyperion, the world's tallest living tree, is 115.72 m. This suggests that capillary action is able to rise water to a height of 100 m. 4 Design an investigation to answer the question: Can water rise 1 m through capillary action? There are many 'capillary action' investigations on the Internet. <div style="text-align: center;">  </div>

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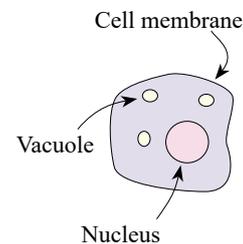
- 1 In 1895, Roentgen discovered that an unknown ray could penetrate his body and that the image could be captured on photographic plate. Roentgen called the unknown rays X-rays.
- 2 While X-rays can be harmful, the benefits are such that X-rays have a number of medical uses:
 - X-rays are used in medical imaging to examine bone and tissue structure.
 - X-rays are used to kill malignant cancer cells through radiation therapy.
- 3 X-rays have many other uses:
 - X-ray microscopy is used to produce high quality images.
 - X-ray crystallography is used to decide the position of atoms in crystals.
 - X-rays are used in airport security.
 - X-ray emissions are used to study objects in space.
 - X-rays are used to inspect paintings.
- 4 X-rays were called X-rays because they were unknown rays.
- 5 An X-ray tube works by using a high direct current, around 10-100 kV, causing electrons to be fired at the anode and producing X-rays on impact.

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2 Labelled typical animal cell.

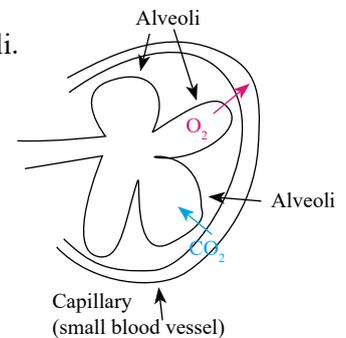


3 Describe the function of each of the following organelles found in plant cells:

- a) The cell membrane is a thin covering holding and protecting the cell. The cell membrane lets oxygen and dissolved food into the cell, and lets carbon dioxide and wastes out of the cell.
 - b) The nucleus has DNA which controls the action of the cell.
 - c) Mitochondria are tiny powerhouses in the cell. Mitochondria convert glucose into energy (respiration: $O_2 + \text{glucose} \rightarrow \text{water} + CO_2$).
 - d) The cytoplasm is jelly-like substance making up most of the cell and is where the important reactions take place.
- 4 I would expect to find mitochondria in plant cells as well as animal cells because both cells require energy.
 - 5 More mitochondria would be expected in a muscle cell than in a pancreas cell because muscle cells require more energy than do pancreas cells.
 - 6 Respiration provides every cell with the energy that they require.
$$O_2 + C_6H_{12}O_6 \rightarrow \text{energy} + H_2O + CO_2$$
Oxygen + glucose \rightarrow energy + water + carbon dioxide
 - 7 Multicellular means many cells.
 - 8 Life processes involves absorbing food and/or nutrients, expelling wastes, reproducing, and movement.
 - 9 Advantages of multicellular organisms over single-celled organisms: Cell life is long because the workload is not so large, only specialised cells are exposed to the environment, an injury is less likely to cause the death of the organism, organisms can reach a large size.
 - 10 Two single-celled organisms are paramecium, euglena, amoebae, algae, bacteria.
 - 11 Five multicellular animals are humans, birds, reptiles, spiders, crabs.
 - 12 Five multicellular plants are trees, flowers, mosses, pines, ferns.
 - 13 Single-celled organisms have an advantage over a multicellular organisms by being able to reproduce very quickly to take advantage of a changing environment.

- 1** A tissue is a group of specialised cells that have a similar structure and function.
- 2** An example of an animal tissue is muscle tissue.
- 3** An example of a plant tissue is vascular tissue.
- 4** An organ is a collection of tissues working together to perform a function.
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- 6** The stomach is an organ that is made of a variety of tissues. The stomach has muscular tissue to churn the food, glandular tissue to produce digestive juices, epithelial tissue to cover the surface of the stomach.
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- 8**
 - a)** The circulatory system transports nutrients and oxygen to the cells of the body and returns wastes and carbon dioxide.
 - b)** The digestive system breaks down food into nutrients suitable for use by the cells of the body.
 - c)** The endocrine system consists of a system of glands that secretes hormones into the circulatory system.
 - d)** The immune system fights disease.
 - e)** Integumentary system. The skin protects the body from the outside environment.
 - f)** The lymphatic system transfers lymph from between the tissues back to the blood.
 - g)** The muscular system gives the body its external movement and internal movement
 - h)** The nervous system monitors and coordinates internal and external functions.
 - i)** The reproductive system is a system of organs that work together for the purpose of reproduction.
 - j)** The respiratory system moves oxygen from the air into the blood and moves carbon dioxide from the blood into the air.
 - k)** The skeletal system supports and protects the body.
 - l)** The urinary system excretes some body wastes in the form of urine and maintains fluid balance.

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- 2 Function of the mouth: The teeth in the mouth grinds the food into smaller pieces for swallowing. The saliva glands moisten the food and secretes enzymes to begin breaking down carbohydrates.
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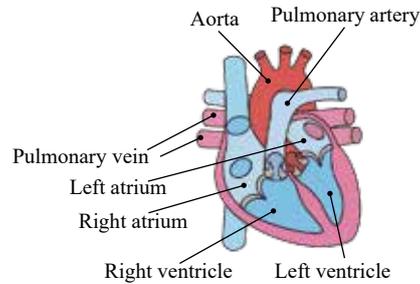
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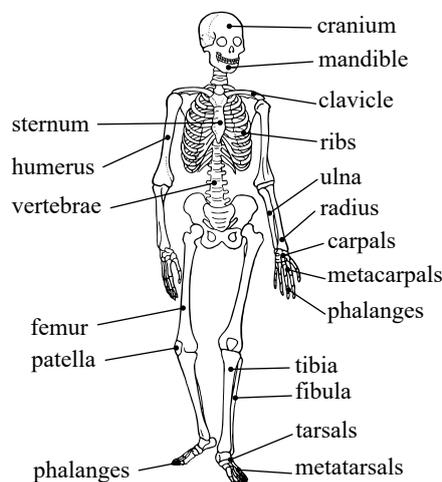


- 2 Anti-clockwise.

- 1 The circulatory system is a group of organs that transports oxygen, nutrients, and hormones to the cells of the body and transports wastes such as carbon dioxide and urea from the cells of the body to the lungs and kidneys.
- 2 Two main organs in the circulatory system: the heart, the blood vessels, and the blood.
- 3 An artery carries blood from the heart to the body. A vein carries blood from the body to the heart.
- 4 The pulmonary artery carries blood from the heart to the lung. This blood would be oxygen poor and would be on its way to the lungs to get oxygen.
- 5 Most diagrams of the circulatory system have red and blue coloured blood vessels. Red blood vessels indicate oxygen rich blood. Blue blood vessels indicate oxygen poor blood.
- 6 Labelled sketch of the heart.



- 7 The urinary system, or the renal system, is a group of organs that filters wastes from the blood. Some of the organs in the urinary system that work together are the kidneys, the ureters, the bladder, and the urethra.
- 8 The kidneys filter the blood, removing wastes such as urea and ammonium. The kidneys also maintain the correct balance of substances such as water, glucose, amino acids, and electrolytes in the blood. The kidneys excrete the urine into the ureter.
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- 13 The urinary system of a spider is different to that of a human in that the urine and wastes merge with digested foods in the cloacal chamber and are either reabsorbed or excreted.
- 14 The skeletal system supports and protects the body.
- 15 Label 19 bones on a skeleton (Label free skeleton images are available on the internet).



p85

- 1 d)
- 2 c)
- 3 c)

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- 1 Peristalsis is involuntary because we are unaware that it is happening.
- 2 Retroperistalsis, or reverse peristalsis is probably a wave motion that has a reverse motion to normal food flow through the digestive system. Retroperistalsis might happen when we vomit.
- 3 A blood vessel that is accidentally cut and the blood spurts from the wound is probably an artery because an artery has more pressure. An artery carries blood that has been pumped from the heart and has more pressure than a vein.
- 4 Alice has a heart rate of 64 beats per minute when she is sitting at her desk. After Alice has jogged around the oval twice, her heart rate is 123 beats per minute. Alice's heart beat faster when exercising to get more oxygen to the cells of her body to produce the energy for exercising (and remove the extra carbon dioxide produced by exercising).
- 5 Person B might have a problem because the urine isn't clear meaning that the kidney isn't functioning clearly in filtering the blood. The urine also appears to have an excess of sugar which also indicates a problem in that blood sugar levels aren't being controlled.
- 6 Kidney stones are solid crystals that form in the kidney. Kidney stones can continue to grow in size from a grain of sand to the size of a pearl and move through the excretory system.
Large kidney stones can cause blockages of the kidney and impede proper functioning.
Kidney stones can cause extreme pain as they pass through the urinary system.

7 The diagram above shows a simplified view of the circulatory system.

- a) A - artery
B - vein
C - artery
D - vein
- b) A is the pulmonary artery.
B is the pulmonary vein.
- c) A - oxygen poor
B - oxygen rich
C - oxygen rich
D - oxygen poor
- d) A - carbon dioxide rich
B - carbon dioxide poor
C - carbon dioxide poor
D - carbon dioxide rich

