

Science KS3:

Year 7

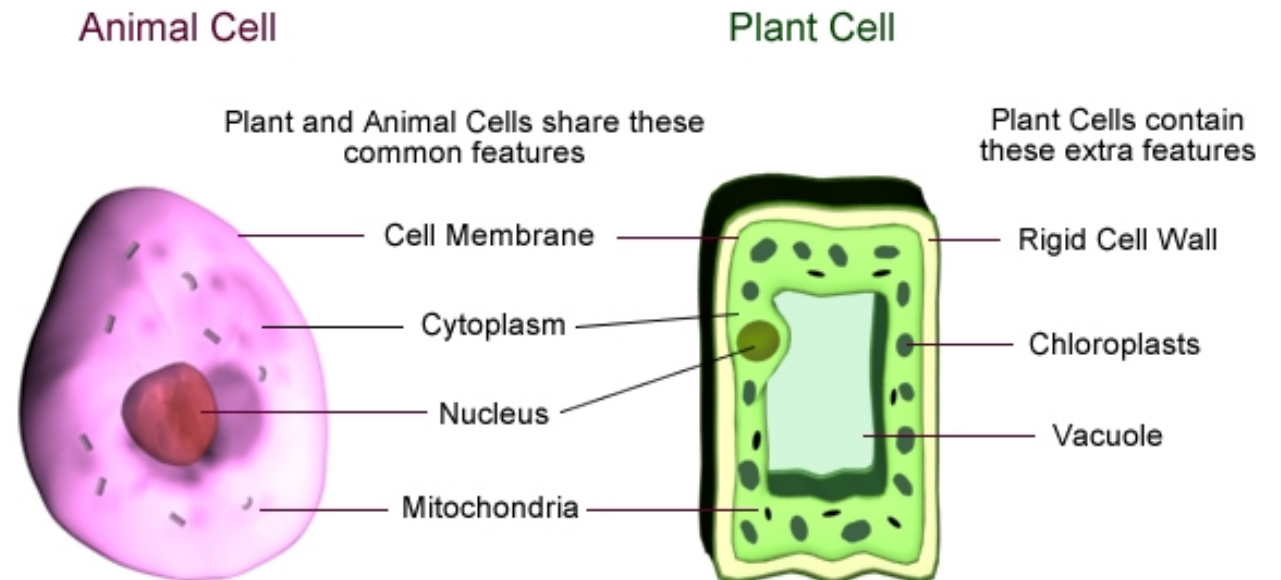
Blended Learning Booklet

Unit 1: Organisms

Name:

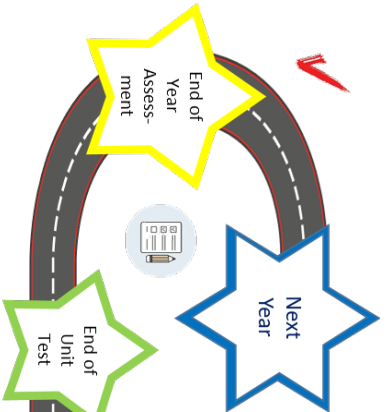
Form:

- *Aim to complete three lessons each week.*
- *Use the online text book to help you*
- <https://www.kerboodle.com/app>
- *Login using your user name (1st initial followed by surname all lower case eg Joe Blogs = jblogs)*
- *Password (initially the same as your user name) should be reset to stewards lower case*
- *Institution code is fu0*
- *Complete the work described in the four part lesson*
- *Use the mark schemes provided to self assess your work and make corrections in blue pen.*

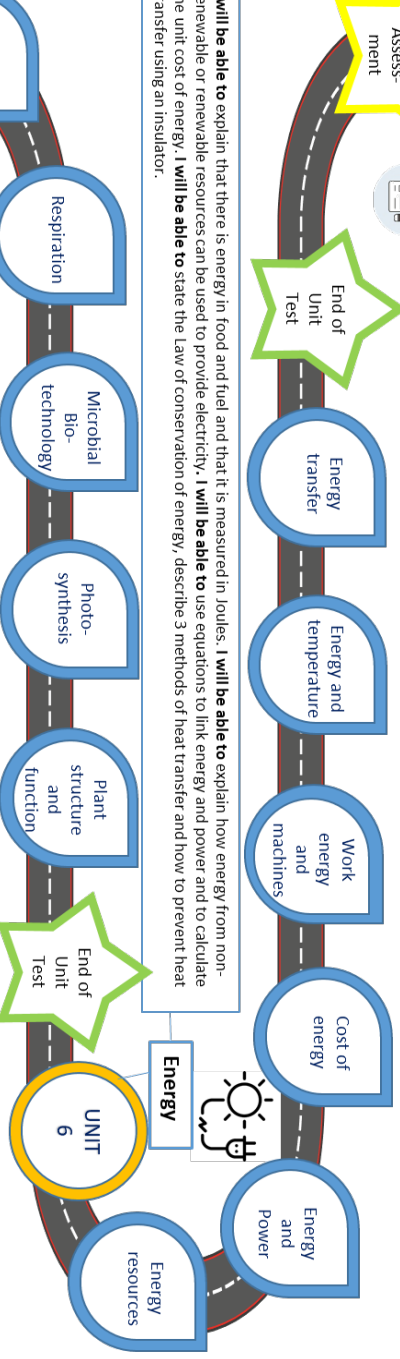




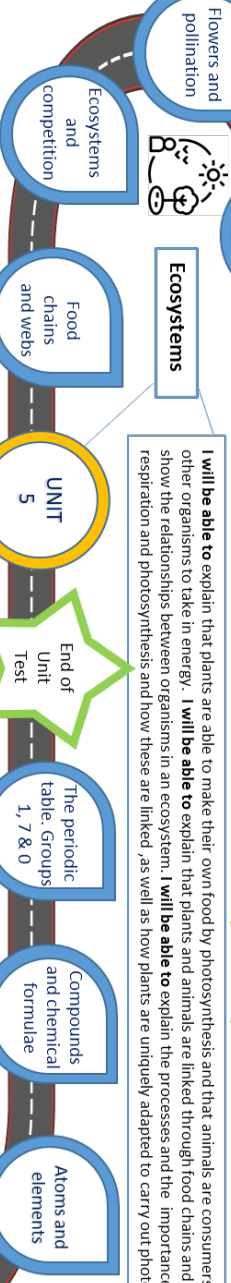
Big Picture – Year 7 Overview Science



I will be able to explain that there is energy in food and fuel and that it is measured in Joules. **I will be able to explain** how energy from non-renewable or renewable resources can be used to provide electricity. **I will be able to use** equations to link energy and power and to calculate the unit cost of energy. **I will be able to state** the Law of conservation of energy, describe 3 methods of heat transfer and how to prevent heat transfer using an insulator.

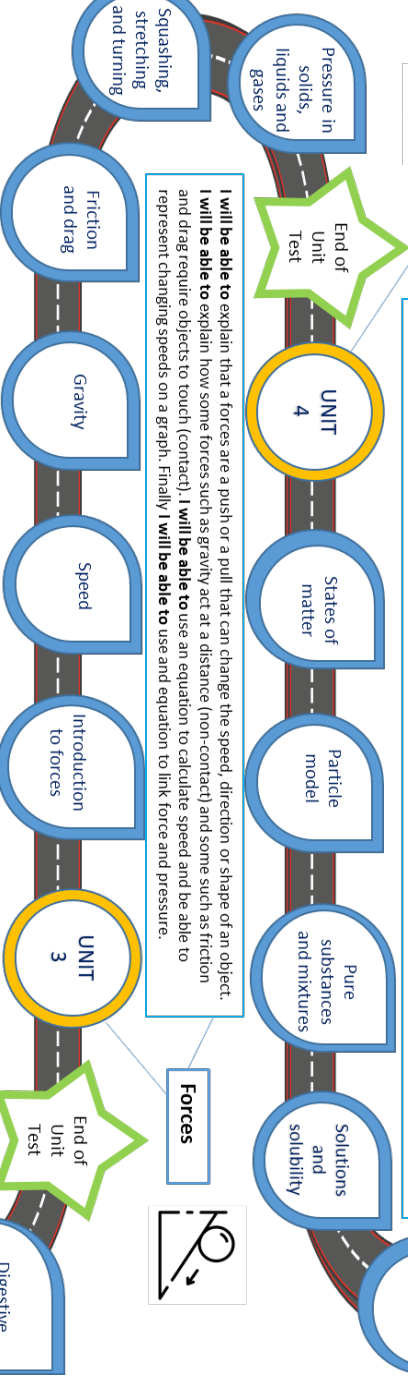


I will be able to explain that plants are able to make their own food by photosynthesis and that animals are consumers eating other organisms to take in energy. **I will be able to explain** that plants and animals are linked through food chains and webs which show the relationships between organisms in an ecosystem. **I will be able to explain** the processes and the importance of respiration and photosynthesis and how these are linked, as well as how plants are uniquely adapted to carry out photosynthesis



Matter

I will be able to use the particle model to explain how particles are arranged in solids, liquids and gases and how a substance can change between these states. **I will be able to use** the particle model to explain the process of diffusion and gas pressure. **I will be able to recognize** a pure substance and be able to describe methods for separating mixtures. **I will be able to identify** substances as elements or compounds and know that the periodic table shows how the elements are grouped together.



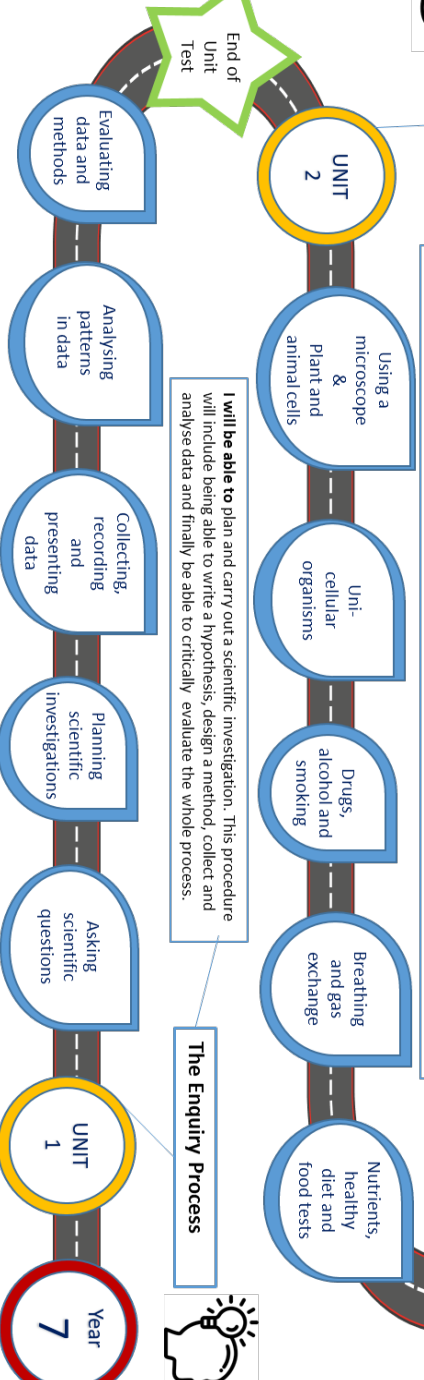
Forces

I will be able to explain that a force is a push or a pull that can change the speed, direction or shape of an object. **I will be able to explain** how some forces such as gravity act at a distance (non-contact) and some such as friction and drag require objects to touch (contact). **I will be able to use** an equation to calculate speed and be able to represent changing speeds on a graph. Finally **I will be able to use** an equation to link force and pressure.



Organisms

I will be able to explain How cells are the basic building blocks of life for both plants and animals. How some organisms can exist as simple single celled organisms and how in others cells are organized into tissues, organs and organ systems to create more complex multicellular organisms. **I will also be able to explain** the structure and function of some of these organ systems and how they are affected by different lifestyle choices



The Enquiry Process

I will be able to plan and carry out a scientific investigation. This procedure will include being able to write a hypothesis, design a method, collect and analyse data and finally be able to critically evaluate the whole process.

ZOOM IN...

MY LEARNING JOURNEY:

Subject: Organisms Year: 7 Unit: 2

In this unit we will use a microscope to look inside organisms to discover what plants, animals and microorganisms are made of. We will learn how it all fits together so that an organism can function. We will also look at how cells get energy from respiration, how this links to breathing and digestion; how essential substances are transported around a multicellular organism via the circulatory system and the importance of enzymes in the digestive system

DEVELOPING COURAGE

- C Learning how amazing our bodies are
- O To use a microscope
- U Work together to carry out experiments
- R Create a microscope slide of onion cells
- A How the different systems in our body all work together
- G Share our knowledge
- E Understanding how our body works

PREVIOUS LEARNING

Pupils should have some experience of the following:
Different parts of plants.
How diet exercise, drugs and lifestyle impact on how the body functions.
The different parts of the digestive system.
The importance of appropriate nutrition

WHAT WE KNOW/ REMEMBER

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-
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-

UP NEXT

Forces.

- Balanced and unbalanced forces
- Speed and acceleration
- Gravity
- Friction and drag
- Squashing and stretching
- Pressure in fluids and solids

CAREERS

- Cytologist
- Vet
- Doctor
- Health worker
- Nutritionist



PERSONAL OBJECTIVES

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RECOMMENDED READING

1. The Osbourne Complete Book of the Microscope.
2. The lucky Escape - An imaginative journey through the digestive system.
3. Body Works: Heroic Heart

Connection

Have a look at the topic overview and the zoom in.

Populate what you know and your personal objectives.

Lesson 1: Book 1 – Levels of Organisation (8.1.1)

Activation

LI: State examples of tissues, organs and organ systems and state the order of hierarchy in a multicellular organism.

1. Make a note of the date, title and the LI
2. Key words – Cell, tissue, organ, organ system
3. Read pages 160 to 161
4. <https://www.youtube.com/watch?v=ZRFykdf4kDc>
5. Copy the pyramid showing the hierarchy of organisation in the human body.

Answer Questions A, B, C, D



Consolidation

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Demonstration

Attempt Summary questions

In 15 mins answer as many questions as you can.

Self-mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:

Single chemistry bottle question is for all students

Double chemistry bottle question are for students looking to extend their knowledge

Triple chemistry bottle question is for students looking to challenge themselves.



N/A

In-text questions	<p>A cell</p> <p>B for example, nervous tissue</p> <p>C for example, skin</p> <p>D for example, circulatory system</p>
Summary questions	<p>1 cell – building blocks of life; tissue – group of similar cells working together; organ – group of tissues working together; organ system – group of organs working together; organism – group of organ systems working together (5 marks)</p> <p>2 For example, the digestive system is made up of the following organs: (pancreas,) stomach, liver, small intestine, large intestine. (2 mark)</p> <p>3 One mark for correctly ordering the levels of organisation; one mark for each correctly linked example. For example, nerve cell (cell) → nerve tissue (tissue) → brain (organ) → nervous system (organ system) → human (multi-cellular organism) (6 marks)</p>

Connection

Q1. Put the following in order of organisation, from smallest to largest: organ, cell, tissue, organ system, organism.

Q2. Give an example of an organ system and its function.

Lesson 2: Book 1 – Observing Cells (8.2.1)

Activation

LI: State what a cell is and explain how to use a microscope.

1. Make a note of the date, title and the LI
2. Key words – Microscope, observation
3. Read pages 168 to 169
4. <https://www.youtube.com/watch?v=Ri8S0M2HbfM>
5. Draw and label the parts of a microscope
6. Answer Questions A, B, C, D



Demonstration

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Consolidation

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Connection

- 1. Cell, tissue, organ, organ system, organism.
- 2. Examples in book are circulatory, respiratory, reproductive, digestive, muscular skeletal and immune. Must include correct function.

Activation & Demonstration

In-text questions	A cells B cork cells that looked like tiny rooms C looking carefully/in detail at an object D eye-piece
Activity	Magnification (10 x 50) = 500
Summary questions	1 cells, building, observe, microscope, magnifies (5 marks) 2a magnifies object (1 mark) b holds microscope slide (or object) you are observing (1 mark) c produces a clear image of the object (1 mark) 3 Extended response question (6 marks). It must be a logical answer, covering: Take a single petal and place on a slide/stage Add dye/stain to make it easier to see Using lowest magnification of objective lens Turn coarse focusing knob to see your object Focus image clearly using fine focus Repeat with higher magnification to observe petal in more detail

Connection

Q1. What are cells?

Q2. What is the purpose of a microscope?

Q3. If the objective lens of a microscope has a magnification of 20x and the eye piece lens has a magnification of 10x, what is the total magnification of the object?



Lesson 3: Book 1 – Plant and animal cells (8.2.2)

Activation

LI: Match cell components to their functions and identify the similarities and differences between plant and animal cells.

1. Make a note of the date, title and the LI
2. Key words – nucleus, cell membrane, cytoplasm, mitochondria, cell wall, vacuole, chloroplast
3. Read pages 170 to 171
4. <https://www.youtube.com/watch?v=CyBWluWuBKI>
5. Draw and label a plant and animal cell
6. Answer Questions A, B, C, D



Consolidation

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Demonstration

Attempt Summary questions

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Connection

- 1. Cells make up all living things. They are the building blocks of life.
- 2. To make items appear larger so that they are easier to view and study.
- 3. $20 \times 10 = 200\times$

Activation & Demonstration

In-text questions	A nucleus, cell membrane, cytoplasm, mitochondria B controls the cell/contains genetic material C cell wall, chloroplast, vacuole D cell sap
Activity	Prefixes bio- = life; biology, biography photo- = light; photograph, photographer micro- = small; microscope, microwave
Summary questions	1 vacuole – contains cell sap to keep the cell firm nucleus – controls the cell’s activities cell wall – rigid structure that supports the cell cytoplasm – where chemical reactions take place chloroplast – where photosynthesis occurs cell membrane – controls what comes in and out of a cell mitochondria – where respiration occurs (7 marks) 2a leaf cells (1 mark) b Leaf cells require chlorophyll to be able to photosynthesise. (1 mark) 3 Extended response question (6 marks). Example answers: Animal cells and plant cells have a nucleus, cytoplasm, cell membranes, and mitochondria. Plant cells also have a cell wall, chloroplasts, and a vacuole. Both cell types can respire (due to the presence of mitochondria). Only plant cells can photosynthesise (due to the presence of chloroplasts).

Connection

Q1. What is the function of the nucleus?

Q2. what part of the cell is known as 'the powerhouse of the cell'?

Q3. Name 3 things that are found in plant cells but not animal cells.



Lesson 4: Book 1 – Specialised cells (8.2.3)

Activation

LI: Name and describe some examples of specialised plant and animal cells.

1. Make a note of the date, title and the LI
2. Key words – structural adaptations, specialised cell
3. Read pages 172 to 173
4. <https://www.youtube.com/watch?v=wAg7Lh9yhqQ>
5. Draw the different types of specialised cells and write a sentence to explain how they are specialised for their function
6. Draw the ciliated epithelial cell from the red detailed description box page 172
7. Answer Questions A, B, C, D, E



Consolidation

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Demonstration

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Connection

Activation & Demonstration

1. It controls the cell and holds the genetic material for producing new cells.
2. The Mitochondria.
3. Cell wall, vacuole, chloroplast.

In-text questions	<div>A cells that can perform particular functions/jobs</div> <div>B transmit messages/electrical impulses around the body</div> <div>C nucleus</div> <div>D streamlined head and long tail</div> <div>E any two from: chloroplasts, vacuole, cell wall</div>
Activity	<div>Detailed descriptions</div> <div>Ciliated cells should appear as rectangular cells with nuclei inside and hairs on top of the rectangles labelled cilia.</div>
Summary questions	<div>1 specialised, function, oxygen, chloroplasts, photosynthesis (5 marks)</div> <div>2 Correct description of specialised features, for example, a red blood cell: no nucleus, disc-like shape. (2 marks)</div> <div>3 A labelled diagram for a sperm cell is drawn, with the following features: streamlined head – enable it to move through water easily; tail – to ‘swim’; many mitochondria – for respiration. (6 marks)</div>

Connection

- Q1. What are specialised cells?
- Q2. Give an example of a specialised cell in an animal.
- Q3. Give an example of a specialised cell in a plant.

Lesson 5: Book 1 – Movement of substances (8.2.4)

Activation

LI: Name some substances that move into and out of the cell and describe diffusion.

1. Make a note of the date, title and the LI
2. Key words – diffusion, concentration
3. Read pages 174 to 175
4. <https://www.youtube.com/watch?v=YLBjx92mfr4>
5. Draw the diagram to show diffusion of the burnt toast smell page 175
6. Answer Questions A, B



Consolidation

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Demonstration

Attempt Summary questions

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Connection

- 1. Cells that are adapted and specialised for a specific function.
- 2. Nerve, muscle, sperm, RBC, etc.
- 3. Leaf, root hair, etc

Activation & Demonstration

In-text questions	A Food particles/glucose, and oxygen B carbon dioxide
Activity	Stink-bomb alert! In diffusion, particles travel from an area of high concentration to an area of low concentration. Initially, the smell from the stink bomb is only found in the immediate vicinity but, through diffusion, the smell will spread until the concentration of stink bomb particles becomes constant.
Summary questions	1 high, low, diffusion (3 marks) 2 The smell diffuses from an area of high concentration to one of low concentration. (3 marks) 3 Diagram should show understanding of the following concepts (6 marks): Substances moving in and out of red blood cells through diffusion, smells diffusing across a room, water diffusing into plant cells, including the difference between a healthy plant and a wilting plant. Credit correct use of diagrams.

Connection

Q1. Why might substances need to move in and out of cells?

Q2. Give an example of a substance that our cells require and needs to move into them.

Q3. What is the name of the natural process by which substances move in and out of cells?



Consolidation

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher



Lesson 6: Book 1 – Unicellular organisms (8.2.5)

Activation

LI: Explain what a uni-cellular organism is and describe some of their structures.

1. Make a note of the date, title and the LI
2. Key words – uni-cellular, amoeba, euglena, flagellum
3. Read pages 176 to 177
4. <https://www.youtube.com/watch?v=MnrqVYVJp3E&t=2s>
5. Draw and label the amoeba (Blue pg 176) and the euglena (yellow pg 178)
6. Answer Questions A, B, C



Demonstration

Attempt Summary questions

In 15 mins answer as many questions as you can.

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Connection

Activation & Demonstration

- 1. In – to provide energy and nutrients to cells so they can carry out their processes. Out – removal of waste products.
- 2. Oxygen, glucose, water, etc.
- 3. Diffusion

In-text questions	<p>A Organisms made up of only one cell.</p> <p>B Any two from: cytoplasm, nucleus, cell membrane.</p> <p>C Any from: euglena carries out photosynthesis/has chloroplasts/has an eye spot/has a flagellum.</p>
Activity	<p>Unicellular organisms</p> <p>Some of the following points should be included: both uni-cellular organisms; amoeba looks jelly-like with no fixed structure; euglena are green with a tail-like structure.</p>
Summary questions	<p>1 uni-cellular, one, binary fission, engulf, photosynthesis (5 marks)</p> <p>2 Nucleus in the parent cell divides, two (daughter cells) produced. (3 marks)</p> <p>3 Unicellular organisms have specialised cell components that perform specific functions. (1 mark)</p> <p>Any three named examples and functions, for example:</p> <p>euglena has a flagellum for movement (1 mark)</p> <p>euglena has chloroplasts for photosynthesis (1 mark)</p> <p>amoeba change the shape of the cell to move (1 mark)</p> <p>4 Extended response question (6 marks). Example answers:</p> <p>Both uni-cellular, have a nucleus/cytoplasm, get rid of waste by excretory vesicles. Only euglena can photosynthesise. Both can move – euglena by flagellum, amoeba by pseudopods. Both cells can engulf food.</p>

Connection

Q1. What is a uni-cellular organism?

Q2. Name 2 common types of unicellular organism.

Q3. How do these cells reproduce?

Lesson 7: Book 2 – Gas exchange (8.3.1)

Activation

LI: Describe the function of the gas exchange system and how its parts are adapted for their function.

1. Make a note of the date, title and the LI
2. Key words – gas exchange, respiratory system, inhale, exhale, condense
3. Read pages 122 to 123
4. <https://www.youtube.com/watch?v=IVRSM3SHmGA>
5. Copy the flow chart showing the path the air follows when you breath in
6. Answer Questions A, B, C



Consolidation

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Demonstration

Attempt Summary questions

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Connection

Activation & Demonstration

1. Organisms consisting of a single cell.
2. Amoeba and Euglena
3. Binary Fission


In-text questions	A ribcage B alveolus (plural alveoli) C nitrogen	
Activity	Which chart? A pie chart makes the difference between inhaled and exhaled air clear. A bar chart could also be used.	
Summary questions	1 One mark for each correct row (3 marks).	
	2 Credit correctly labelled diagrams with adaptations of each part. (3 marks) 3 Breathing rate and volume will be lower. Less oxygen is needed to be taken into the body. The cyclist requires less energy to be transferred by respiration to ride on the flat, compared to climbing a hill. (3 marks) 4 Example answers: (6 marks) Carbon dioxide moves/diffuses out of the blood; moves/diffuses into an air sac (alveolus); moves through a bronchiole; moves through a bronchus; moves up the windpipe (trachea); and leaves your body (is exhaled) through your mouth/nose.	

Connection

Q1. In humans where does gas exchange take place?


Q2. During gas exchange what gas is taken into the body for respiration and what gas is removed as a waste product of respiration?

Q3. Why is it beneficial for the alveolus (tiny air sacks in our lungs) to have a large surface area?



Consolidation

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher



Lesson 8: Book 2 – Breathing (8.3.2)

Activation

LI: Describe the process of inhaling and exhaling

1. Make a note of the date, title and the LI
2. Key words – contract, diaphragm, asthma, lung volume
3. Read pages 124 to 125
4. <https://www.youtube.com/watch?v=mOKmjYwfDGU>
5. Create a table (2 columns) to compare what happens to the ribs when you inhale (bullet points pg 124) and when you exhale (bullet points pg 125)
6. Answer Questions C

Demonstration



Attempt Summary questions

In 15 mins answer as many questions as you can.

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Connection

- 1. The lungs.
- 2. In – oxygen. Out – carbon dioxide.
- 3. It allows for a higher rate of diffusion of gases into and out of our blood.

Activation & Demonstration

In-text questions	A The ribcage moves up and out. B It moves up. C Any two from: smoking, asthma, old age, other named lung conditions.		
Activity	Lung volume Lung volume can be found from the practical activity. Doctors would not use this method as the resolution of the water bottle is poor, which leads to imprecise results.		
Summary questions	1 One mark for each correct row (3 marks).		
		Inhaling	Exhaling
	ribs move	up and out	down and in
	diaphragm moves	down	up
	chest volume	increases	decreases
	2 When you inhale the volume inside your chest cavity increases. This causes the pressure inside your chest to decrease. Air rushes in as the pressure outside of your body is higher. When you exhale the volume inside your chest cavity decreases. This causes the pressure inside your chest to increase. Air is forced out as the pressure inside of your body is higher than that of your environment. (6 marks) 3 Take a bottle containing a known volume of water. Turn bottle upside down so neck of bottle is underwater. Ask athlete to breathe out through a tube inserted into the bottle. Difference in volume of water at the end and the start is the athlete’s lung volume. (3 marks) 4 Example answers (6 marks): Rubber sheet represents the diaphragm; bell jar – chest cavity; balloons – lungs; pulling sheet down – diaphragm contracting. Volume in bell jar now increased. Decreased pressure pulls air into balloons. Balloons inflate, representing air in lungs. At least one problem with the model. Credit suitable suggestions, for example, bell jar walls represent ribcage, but do not move. Area around balloons is air – not correct in the body.		

Connection

- Q1. What happens to your ribs when you inhale?
- Q2. What is the name of the sheet of muscle, located directly beneath your lungs, that contracts when you inhale?
- Q3. What is one way you can increase lung volume?



Lesson 9: Book 2 – Drugs (8.3.3)

Activation

LI: State the difference between medicinal and recreational drugs and describe their effects on behaviour and health.

1. Make a note of the date, title and the LI
2. Key words – drug, medicinal, recreational, addiction, withdrawal symptoms
3. Read pages 126 to 127
4. <https://www.youtube.com/watch?v=0a5OebWu5IM>
5. Answer Questions A, B, C, D, E



Consolidation

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher



Demonstration

Attempt Summary questions

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Connection

1. They open up and out.
2. The diaphragm.
3. Regular exercise.

Activation & Demonstration

In-text questions	<p>A A chemical substance that affects the way the body works.</p> <p>B A drug taken for a medical purpose.</p> <p>C A drug taken for enjoyment.</p> <p>D Any three from: heroin, cocaine, cannabis, and ecstasy.</p> <p>E Dependency on a drug.</p>
Activity	<p>Drug factsheet</p> <p>Factsheet should include information on one of cannabis, cocaine, ecstasy, or heroin. Factsheet should be suitable for a teenage audience, but include scientific information about the effects of taking this drug.</p>
Summary questions	<p>1 chemicals, recreational, medicinal, addiction, withdrawal symptoms (5 marks)</p> <p>2 Any three paired reasons, for one mark each: Medicinal drugs are used in medicine, benefit health, treat symptoms, or cure an illness. Recreational drugs are used for enjoyment, may help a person relax or give them more energy, have no health benefit, are harmful in some cases, and many are illegal.</p> <p>3 Example answers (6 marks): Drugs are chemicals that affect the ways the body works. They alter chemical reactions inside the body. Medicinal drugs are beneficial to health/not taken for enjoyment. For example, paracetamol reduces pain. Recreational drugs are often harmful to health. These are taken for enjoyment/not beneficial to health. For example, caffeine speeds up the nervous system. You can become dependent on a drug/become addicted. If you try to give up you may suffer withdrawal symptoms.</p>

Connection

Q1. What are drugs?

Q2. What are the 2 types of drugs?

Q3. What happens when someone develops an addiction to a drug?

Lesson 10: Alcohol (8.3.4)

Activation

LI: State what kind of drug ethanol is and describe its effect on health and behaviour.

1. Make a note of the date, title and LI
2. Key words – ethanol, depressant, alcoholic, unit of alcohol
3. Read pages 128 to 129
4. <https://www.youtube.com/watch?v=y2Rgxm7Vvi8>
5. Copy the flow diagram showing how alcohol affects the body pg 128
6. Make a note of the number of units of alcohol in different drinks pg 129
7. Answer questions A, B, C, D



Consolidation

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Demonstration

Attempt Summary questions

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Connection

- 1. Drugs are chemical substances that have an effect on our body.
- 2. Medicinal and recreational.
- 3. Their body becomes dependent on the drug. If they try to stop taking it they will suffer withdrawal symptoms.

Activation & Demonstration

In-text questions	<p>A ethanol</p> <p>B A person who is addicted to alcohol.</p> <p>C 14 units</p> <p>D Any three from: stomach ulcers, heart disease, brain damage, liver damage (cirrhosis).</p>
Activity	<p>Units of alcohol</p> <p>One unit of alcohol = 10 ml pure alcohol. So, 200 ml of 10% wine = $0.1 \times 200 \text{ ml} = 20 \text{ ml}$ of pure alcohol.</p> <p>Units of alcohol in 200 ml of wine = $20 \div 10 = 2 \text{ units}$</p>
Summary questions	<p>1 ethanol, depressant, nervous, liver (4 marks)</p> <p>2 Alcohol passes through to baby’s bloodstream. It affects development of organs/brain/nervous system. This increases the risk of miscarriage, Fetal Alcohol Syndrome (FAS), stillbirth, premature birth, or low weight babies. (3 marks)</p> <p>3 Visual summary example answers (6 marks):</p> <p>Alcohol is a depressant. It affects the nervous system. Some people feel relaxed and happy, while others get aggressive and depressed. Alcohol slows reaction times. People under the influence are more likely to have an accident. Large amounts of alcohol can cause stomach ulcers, heart disease, brain damage, and liver damage. Drinking alcohol while pregnant affects the development of the foetus’ organs. This increases the risk of miscarriage, FAS, stillbirth, premature birth, or low-weight babies.</p>

Connection

- Q1. Name the drug found in alcohol.
- Q2. What would you call someone who has an addiction to alcohol?
- Q3. Name 3 conditions that are more likely to occur if an individual regularly drinks too much alcohol.



Lesson 11: Book 2 – Smoking (8.3.5)

Activation

LI: Describe and explain the effects of tobacco smoke on health.

1. Make a note of the date, title and the LI
2. Key words – passive smoking, stimulant.
3. Read pages 130 – 131
4. <https://www.youtube.com/watch?v=jrZiTdwmsA>
5. Draw the diagram of the ciliated epithelial cells. Write a sentence to explain how they are affected by smoke.
6. Answer Questions A, B, C



Consolidation

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher



Demonstration

Attempt Summary questions

In 15 mins answer as many questions as you can.

Self-mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:

Single chemistry bottle question is for all students

Double chemistry bottle question are for students looking to extend their knowledge

Triple chemistry bottle question is for students looking to challenge themselves.

Lesson 11: Answers **8.3.5 Smoking**

Connection

1. Ethanol

2. Alcoholic

3. Stomach ulcers, heart disease, brain and liver damage.

Activation & Demonstration

In-text questions	<p>A Any three from: breathing conditions, cancer, strokes, heart attacks</p> <p>B Breathing in other people's smoke.</p> <p>C nicotine</p>
Activity	<p>Deadly smoke</p> <p>1 lung diseases</p> <p>2 $1\,200\,000 - 900\,000 = 300\,000$</p> <p>3 $1\,000\,000 \div 500\,000 = 2$; twice as likely</p>
Summary questions	<p>1 Tar – contains chemicals which cause cancer. Nicotine – addictive and makes the heart beat faster. Carbon monoxide – reduces the amount of oxygen the blood can carry. (3 marks)</p> <p>2 To remove mucus, as cilia that would normally do this are paralysed by smoking. (2 marks)</p> <p>3 Any two of the following, for one mark each: Increased risk of a miscarriage (1), cause low-birth-weight babies(1), affects fetal development(1). Carbon monoxide in cigarette smoke stops oxygen binding to haemoglobin, so less oxygen reaches baby (1).</p> <p>4 Example answers (6 marks): Heart disease – arteries blocked, prevents blood flowing properly, causes heart attacks or strokes. Emphysema – weakens walls in alveoli/burst, reduces amount of oxygen supplied to blood, person becomes breathless. Respiratory infections – cilia paralysed, mucus flows into lungs, makes breathing hard, mucus in lungs causes infections.</p>

Connection

Q1. What is the addictive drug in tobacco?

Q2. What is meant by passive smoking?

Q3. What part of the body does smoking primarily effect?

Consolidation

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Lesson 12: Book 2 – Nutrients (8.4.1)

Activation

LI: Describe the components of a healthy diet and their functions for the body.

1. Make a note of the date, title and the LI
2. Key words – nutrient, carbohydrate, lipid, vitamin, protein, mineral, fibre
3. Read pages 132 -133
4. <https://www.youtube.com/watch?v=EgmTRLWQy4o>
5. Make a table with each key nutrient, its function in the body and examples of foods that contain it eg
6. Answer Questions B, C, D

nutrient	function	examples
carbohydrate	Provides energy	Bread pasta (complex) sugar fruit (simple)

Demonstration

Attempt Summary questions

In 15 mins answer as many questions as you can.

Self-mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:

Single chemistry bottle question is for all students

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Triple chemistry bottle question is for students looking to challenge themselves.

Connection

- 1. Nicotine
- 2. Passive smoking is when others are forced to inhale tobacco smoke by being in close proximity to a smoker.
- 3. lungs

Activation & Demonstration

In-text questions	<p>A An essential substance the body needs to survive.</p> <p>B provide energy</p> <p>C For growth (new cells) and to repair body tissues.</p> <p>D Calcium is needed for strong teeth and bones, iron is needed for red blood cells.</p>
Activity	<p>Healthy eating</p> <p>Advert should include all seven nutrients, emphasise their function in a healthy diet, and be engaging to young people to encourage them to eat a balanced diet.</p>
Summary questions	<p>1 carbohydrates – provide energy vitamins and minerals – needed in small amounts to keep you healthy lipids – energy store and insulation water – needed in cells and bodily fluids protein – growth and repair dietary fibre – provide bulk to food (6 marks)</p> <p>2 Provides you with a store of energy (1), keeps you warm by providing a layer of insulation under your skin(1), protects your organs from damage (1).</p> <p>3 Constipation can be caused by a lack of fibre in the diet. Therefore they would need to eat fibre-rich foods, such as fruit and vegetables. This provides bulk to move faeces through the gut. (3 marks)</p> <p>4 Example answers (6 marks): A balanced diet is eating food containing the right nutrients in the correct amounts. Nutrients are essential substances that your body needs to survive. A balanced diet should contain: carbohydrates to provide energy; lipids to provide an energy store and insulation; proteins for growth and repair; vitamins and minerals to keep you healthy; water, which is needed in all cells and body fluids; dietary fibre, which provides bulk to food to keep it moving through the gut. (Only award a maximum of 5 marks if a definition of a balanced diet is not given.)</p>

Connection

Q1. Name the seven different types of nutrients.

Q2. What do carbohydrates provide us with?

Q3. What substance provides bulk to food to help it pass through our system?



Lesson 13: Book 2 – Food tests (8.4.2)

Activation

LI: Describe how to test foods for starch, lipid, proteins and sugars.

1. Make a note of the date, title and the LI
2. Key words – food tests, hypothesis
3. Read pages 134 – 135
4. <https://www.youtube.com/watch?v=HtooKslsBOY>
5. Carry out the food tests (practical)
6. Answer Questions A, B, C, D



Consolidation

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher



Demonstration

Attempt Summary questions

In 15 mins answer as many questions as you can.

Self-mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:

Single chemistry bottle question is for all students

Double chemistry bottle question are for students looking to extend their knowledge

Triple chemistry bottle question is for students looking to challenge themselves.

Connection

1. carbs, lipids, proteins, vitamins, minerals, water, dietary fibre.

2. Energy

3. Fibre

Activation & Demonstration

In-text questions	<p>A orange-yellow to blue-black</p> <p>B Rub some food onto a piece of filter paper – if the paper becomes translucent then the food contains lipids.</p> <p>C blue to orange-red</p> <p>D pale blue to purple</p>
Summary questions	<p>1 starch – turns blue-black sugar – turns orange-red lipids – makes paper translucent protein – turns purple (4 marks)</p> <p>2 Crush cereal with a pestle and mortar, add a few drops of water, mix well. (3 marks)</p> <p>3 Example answers (6 marks):</p> <p>Take three samples of the gingerbread-biscuit solution. To test for starch add iodine to one sample. If solution turns blue-black then starch is present.</p> <p>To test for sugar add Benedict’s solution to another sample and heat in a water bath. If solution turns orange-red then sugar is present.</p> <p>To test for protein add copper sulfate and sodium hydroxide to the third sample. If solution turns purple then protein is present.</p>

Connection

Q1. What would you use to test for starch.

Q2. What does benedict's solution test for?

Q3. If a food contains lipids what observation can be made when adding ethanol to the food solution?



Lesson 14: Book 2 – Unhealthy diet (8.4.3)

Activation

LI: Describe some health issues related to an unbalanced diet.

1. Make a note of the date, title and the LI
2. Key words – malnourishment, starvation, obese, deficiency
3. Read pages 136 – 137
4. <https://www.youtube.com/watch?v=24DgYcm2CwA>
5. List 3 problems associated with being underweight and 4 problems associated with being over weight (bullet points page 136)
6. Answer Questions A, B, C, D



Consolidation

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher



Demonstration

Attempt Summary questions

In 15 mins answer as many questions as you can.

Self-mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:

Single chemistry bottle question is for all students

Double chemistry bottle question are for students looking to extend their knowledge

Triple chemistry bottle question is for students looking to challenge themselves.

Connection

- 1. Iodine solution
- 2. Sugar
- 3. It will turn cloudy.

Activation & Demonstration

In-text questions	<p>A joules/kilojoules</p> <p>B The person will often suffer health problems (poor immune system), lack energy, and is likely to suffer from a lack of vitamins or minerals.</p> <p>C Any three from: heart disease, stroke, diabetes, some cancers D night blindness</p>
Activity	<p>Energy requirements</p> <p>Approximately 9000 kJ, equivalent to a female office worker.</p>
Summary questions	<p>1 energy, joules/kilojoules, gain, obese, heart, tired (6 marks)</p> <p>2a 11 000 kJ – 9000 kJ = 2000 kJ (2 marks)</p> <p>b Difference in energy requirement = 15 000 kJ – 10 000 kJ = 5000 kJ</p> <p>Percentage increase from original job = 5000 kJ ÷ 10 000 kJ × 100 = 50% (4 marks)</p> <p>3 Example answers (6 marks):</p> <p>Underweight people often suffer from health problems, such as a poor immune system, often lack energy to do things, and are likely to suffer from a lack of vitamins or minerals.</p> <p>Overweight people have an increased risk of heart disease, strokes, diabetes, and some cancers.</p>

Connection

Q1. Name a health problem that can occur from being underweight.

Q2. Name a health problem that can occur from being overweight.

Q3. What is a vitamin deficiency?

Lesson 15: Book 2 – Digestive system (8.4.4)

Activation

LI: State what happens during digestion and describe the main parts of the digestive system.

1. Make a note of the date, title and the LI
2. Key words – digestion, gullet, villi
3. Read pages 138 – 139
4. <https://www.youtube.com/watch?v=ZBZWgrfZFbU>
5. Draw diagram showing how digested food is absorbed (top page 138)
6. Answer Questions A, B, C



Demonstration

Attempt Summary questions

In 15 mins answer as many questions as you can.

Self-mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:

Single chemistry bottle question is for all students

Double chemistry bottle question are for students looking to extend their knowledge

Triple chemistry bottle question is for students looking to challenge themselves.



Consolidation

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher



Connection

- 1. Poor immune system, lack of energy, lack of vitamins and minerals.
- 2. Heart disease, diabetes, stroke, some cancers.
- 3. A lack of vitamins.

Activation & Demonstration

In-text questions	A Large molecules are broken down into smaller molecules. B gullet C Muscles in the wall of the gut squeeze food along it.
Activity	Wordbank Wordbanks should include all the key words on the student-book spread. Credit sensible additions to this list.
Summary questions	1 stomach – food is mixed with acid and digestive juices small intestine – small molecules of nutrients are absorbed into the bloodstream large intestine – water is absorbed back into the body rectum – faeces are stored here until they pass out of the body mouth – food is chewed and mixed with saliva (5 marks) 2 The small intestine has a thin wall, large surface area due to villi, and blood capillaries to carry away any nutrients absorbed. (3 marks) 3 Dietary fibre is not digested. It adds bulk to the food, allowing muscles to push against this as food is squeezed along the gut. This prevents constipation. (3 marks) 4 Example answers (6 marks): Food is chewed and mixed with saliva in the mouth. Teeth help to break the food into smaller chunks. Food passes down the gullet into the stomach. Food is churned with digestive juices and acid in the stomach. Small molecules pass through the villi of the intestine wall into the bloodstream in the small intestine. Water passes back into the body in the large intestine. This leaves a solid waste of undigested food called faeces. Faeces are stored in the rectum. They are passed out of the body through the anus.

Lesson 16: Book 2 – Bacteria and enzymes in digestion (8.4.5)

Activation

LI: Describe the roles of bacteria and enzymes in digestion.

1. Make a note of the date, title and the LI
2. Key words – gut bacteria, enzyme, catalyst, carbohydrase, protease, lipase, bile
3. Read pages 140 - 141
4. <https://www.youtube.com/watch?v=5R11qTlqqEU>
5. Draw and label the diagrams showing the digestion by carbohydrase, protease, lipase (page 141)
6. Answer Questions A, B, C



Demonstration

Attempt Summary questions

In 15 mins answer as many questions as you can.

Self-mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:

Single chemistry bottle question is for all students

Double chemistry bottle question are for students looking to extend their knowledge

Triple chemistry bottle question is for students looking to challenge themselves.



Connection

Q1. What is the purpose of the digestive system.

Q2. What is the role of the small intestine?

Q3. Where does digestion begin?

Consolidation

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Connection

1. To absorb nutrients and energy from food.
2. It’s where food is broken down into small molecules of nutrients that pass into the blood stream.
3. The mouth.

Activation & Demonstration

In-text questions	<p>A Bacteria in the digestive system make vitamins.</p> <p>B They speed up the reaction by which large molecules are broken down, without being used up.</p> <p>C To break lipids down into small droplets.</p>
Activity	<p>What happens to the bread you eat?</p> <p>The flow diagram should start from the breaking down of starch using carbohydrase in saliva, include absorption in the small intestine, and finally the excretion of faces through the anus. There should also be a mention of the importance of bacteria in digestion.</p>
Summary questions	<p>1 carbohydrates, carbohydrase, amino acids, protease, fatty acids and glycerol, lipase (6 marks)</p> <p>2 Live yoghurt contains useful bacteria that remain in your gut. These help to break down fibre and produce important vitamins. (3 marks)</p> <p>3 Visual summary example answers (6 marks):</p> <p>Enzymes are proteins/catalysts.</p> <p>Bacteria are organisms that aid the digestion process.</p> <p>They speed up digestion by breaking down large molecules into small molecules.</p> <p>Three different enzymes exist.</p> <p>Carbohydrase breaks down carbohydrates into sugar molecules.</p> <p>Lipase breaks down lipids into fatty acids and glycerol.</p> <p>Protease breaks down proteins into amino acids.</p>

Lesson 17 & 18: Revision - Organisms

Activation

LI: Complete a piece of revision work

1. Make a summary sheet OR
2. Make flash cards OR
3. Complete the revision questions from book 1 (page 179) and 2 (page 143)



Demonstration

Use your revision work to quiz the person sat next to you OR work in a group to quiz each other.



Connection

Q1. What does gut bacteria help us to do?

Q2. Name the enzymes that break down carbohydrates, lipids and proteins.

Q3. What is the function of bile?

Consolidation

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Lesson 17: Revision Answers

Connection

8 Organisms – Part 1 Checkpoint

Activation & Demonstration

1. Break down food

2. Carbohydrase, lipase, protease.

3. It breaks lipids into small droplets that are easier for lipase to break down.

End-of-Big Idea questions

1a nucleus (1 mark)
b trap light/carry out photosynthesis (1 mark)
c W (vacuole) (1 mark)
d Two from: nucleus, cytoplasm, cell membrane (2 marks)
2 reproductive system – produces new organisms, digestive system – breaks down food so it can be absorbed, respiratory system – takes in oxygen, removes carbon dioxide, circulatory system – transports materials around the body. (4 marks)
3a microscope (1 mark)
b add stain/dye/coloured liquid (1 mark)
c It could transmit a disease or cause an infection as blood is removed. (1 mark)
d Diagram should show a cell containing a nucleus, cytoplasm, and cell membrane. (3 marks)
4a A cell whose structure is adapted to suit its function. (1 mark)
b red blood cell (1 mark), transport oxygen (1 mark)
transmits messages (1 mark)
carry out photosynthesis (1 mark), packed with chloroplasts (1 mark)
c Water moves into the root hair cell by diffusion/osmosis.
It moves from an area of high water concentration to an area of low water concentration, through a cell membrane. (3 marks)
5a Uni-cellular organisms consist of one cell, multi-cellular organisms are made of many cells. (1 mark)
b appropriate example, e.g., amoeba, euglena (1 mark)
c For example:
Transport systems are needed to deliver substances such as oxygen (1 mark) / remove waste (1 mark); transport distance is too far for diffusion (1 mark). Nervous systems are also needed to enable communication (1 mark).
6a ligament – X (1 mark), tendon – Y (1 mark)
b cartilage covers the end of the bones (1 mark)
cartilage is strong smooth tissue that prevents bones rubbing / wearing away (1 mark)
fluid present makes cartilage slippery (1 mark)
c Bones would rub together / not move freely / movement would be restricted (1 mark)
leading to pain / arthritis. (1 mark)
d reference to antagonistic muscles (1 mark)
one muscle contracts to move bone (1 mark)
as extensor muscle contracts, arm bends (1 mark)
as flexor muscle contracts, arm straightens (1 mark)

End-of-Big Idea questions	<p>1 carbohydrates – provide energy lipids – provide a store of energy and are used to insulate the body proteins – used for growth and repair vitamins and minerals – needed in small amounts to keep you healthy (4 marks)</p> <p>2a gullet (1 mark) b Nutrients are absorbed into the blood. (1 mark) c U (1 mark)</p> <p>d Any two of the following, for one mark each: churns/mixes the food (1), contains acid (1), contains enzymes (1), breaks down/digests food (1).</p> <p>3a pestle and mortar (1 mark) b Any two of the following, for one mark each: wear eye protection (1), wash hands immediately if chemicals come into contact with skin (1), wear gloves (1), keep alcohol away from naked flame (1).</p> <p>c Add copper sulfate solution and sodium hydroxide solution to the food solution. If the solution turns purple, protein is present. (3 marks)</p> <p>4a ribs/ribcage (1 mark) b diffusion (1 mark) c muscle (1 mark) d Any three of the following, for one mark each: Diaphragm relaxes (1), rib cage lowers/moves in (1), chest cavity decreases in volume (1), pressure in chest increases (1), air/carbon dioxide forced out of the lungs (1).</p> <p>5a Enzymes break large molecules down into smaller molecules. (1 mark) b Enzymes speed up reactions without being used up. (2 marks) c Example answers (4 marks): Both are broken down from large molecules into smaller ones. Both are broken down by enzymes. Both are broken down in the stomach and small intestine. Carbohydrate is broken down by carbohydrase whereas protein is broken down by protease. Carbohydrates are broken down into sugar molecules whereas protein is broken down into amino acids. Carbohydrates are also broken down/digested in the mouth.</p> <p>d Bile breaks fat into small droplets. Lipase digests fat into fatty acids and glycerol. (3 marks) Do not accept bile digests fat.</p> <p>6 Examples answers (6 marks): Inhaled air contains more oxygen. Oxygen is used in respiration. Exhaled air contains more carbon dioxide. Carbon dioxide is a waste product of respiration. Exhaled air contains more water vapour. Water vapour is a waste product of respiration. Exhaled air is warmer.</p>
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Attainment Band	Cells & Organ Systems Knowledge and Understanding
Yellow/Yellow +	<ul style="list-style-type: none"> Describe the functions of the nucleus, cell membrane, mitochondria, cytoplasm, cell wall, vacuole and chloroplast. Use models to explain the function of specialised cells and how their structure enables them to do their job. Explain how different structures help organisms to survive. Describe some benefits and disadvantages of multicellular organisms compared to single-celled organisms. Calculate changes in pressure and explain how these changes bring about breathing. Interpret and evaluate data from a lung-volume investigation. Organise group discussion and communicate effectively to evaluate the human gas exchange system. Explain the factors that affect diffusion. Demonstrate an understanding of role of diffusion in gas exchange in the lungs. Explain how the understanding of the effects of smoking has developed over time. Explain how the understanding of the effects of smoking has developed over time. Critically evaluate diets with regard to health. Creatively communicate ideas about prevention. Evaluate risks involved with food tests. Suggest how to meet energy requirements healthily using numerical data. Interpret data about deaths from starvation and obesity. Interpret the results of chewing starch and suggest improvements to a demonstration to show that chemical digestion occurs in the mouth. Apply the structure and function of the digestive system organs to creative writing. Analyse a model of the digestive system used in an enzyme investigation. Analyse data related to the disturbance of the natural flora.
Blue	<ul style="list-style-type: none"> Compare and contrast the similarities and differences between plant cells and animal <u>cells</u> and use a microscope independently to make observations. Describe the structure of specialised cells. Describe the functions of specialised parts of different unicellular organisms. Explain the terms cell, tissue, organ and organ system, and the function of main organ systems in the body. Evaluate a model of the breathing system. Plan a simple lung-volume investigation considering variables. Explain how the alveoli and blood capillaries are adapted to function. Identify key variables to control, measure and change to investigate factors affecting diffusion. Explain observations in terms of the diffusion of particles. Explain the physical effects of exercise, asthma and smoking. Explain the physical effects of smoking. Explain the function of each of the components of a healthy diet. Describe and explain several deficiency diseases and suggest foods that could prevent them. Predict results from food tests with a range of foods. Compare and explain the energy requirements of different people. Explain some of the physical effects of obesity and starvation respectively. Describe precisely what is meant by physical and chemical digestion and explain the results of chewing starch. Explain how the structure of each digestive system organ relates to its function. Explain the results of an enzyme investigation. Explain how the natural flora may be disturbed.



Green	<ul style="list-style-type: none"> Label an animal cell and a plant cell. Identify different specialised animal and plant cells. Describe unicellular organisms – including yeast, bacteria, euglena, a paramecium and an amoeba – as being either prokaryotes or eukaryotes. Recognise the hierarchy of cell, tissue, organ and organ system; name some common tissues, organs and organ systems in humans. Describe the movement of the ribs and the diaphragm during breathing. Describe simple ways of measuring lung volume. Describe some of the features of the human gas exchange system. Recognise that diffusion is the process by which materials move in and out of cells. Define diffusion, giving examples. Identify some of the physical effects of exercise, asthma and smoking. Identify some of the physical effects of smoking. Identify various components of a healthy diet. Describe the cause of some deficiency diseases. Recall tests for some food groups. Describe how we use energy. Describe some of the physical effects of obesity and starvation. Describe in simple terms what is meant by physical and chemical digestion. Describe the roles of some of the organs of the digestive system. Describe the roles of some of the digestive enzymes. Describe some roles of bacteria in digestion.
White	<ul style="list-style-type: none"> Some of the above elements have been achieved.