B1: Cell biology and transport

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	What are two types of eukaryotic cell?	
2	What type of cell are bacteria?	
3	Where is DNA found in animal and plant cells?	
4	What is the function of the cell membrane?	
5	What is the function of mitochondria?	
6	What is the function of chloroplasts?	
7	What is the function of ribosomes?	
8	What is the function of the cell wall?	
9	What is the structure of the main genetic material in a prokaryotic cell?	
10	How are electron microscopes different to light microscopes?	
11	What is the function of a red blood cell?	
12	Give three adaptations of a red blood cell.	
13	What is the function of a nerve cell?	
14	Give two adaptations of a nerve cell.	
15	What is the function of a sperm cell?	
16	Give two adaptations of a sperm cell.	
17	What is the function of a palisade cell?	
18	Give two adaptations of a palisade cell.	
19	What is the function of a root hair cell?	
20	Give two adaptations of a root hair cell.	

21 What is diffusion?	
22 Name three factors that affect the rate of diffusion.	
23 How are villi adapted for exchanging substances?	• • •
24 How are the lungs adapted for efficient gas exchange?	• • • •
25 How are fish gills adapted for efficient gas exchange?	• • •
26 What is osmosis?	
27 Give one example of osmosis in a plant.	
28 What is active transport?	
29 Why is active transport needed in plant roots?	
30 What is the purpose of active transport in the small intestine?	

B1: Cell division

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	What is a stem cell?	
2	What are adult stem cells?	
3	Where can adult stem cells be found?	
4	What are embryonic stem cells?	
5	Where are embryonic stem cells found?	
6	What is therapeutic cloning?	
7	Give one advantage of using therapeutic cloning.	
8	Give one advantage of using adult stem cells.	
9	Give two disadvantages of using adult stem cells.	•
10	Give two advantages of using embryonic stem cells.	• •
11	Give two disadvantages of using embryonic stem cells.	• •
12	What are plant meristems?	
13	Give two advantages of using plant meristems to clone plants.	• •
14	Give one disadvantage of using plant meristems to clone plants.	
15	What is cell division by mitosis?	
16	What is the purpose of mitosis?	

17	What happens during the first stage of the cell cycle?	
18	What happens during mitosis?	
19	What happens during the third stage of the cell cycle?	
20	What is the term for cell division in bacteria?	

B2: Organisation and digestive system

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	Name the five levels of organisation.	
2	What is a tissue?	
3	What is an organ?	
4	What is the function of the liver in digestion?	
5	What is the function of saliva in digestion?	
6	Name three enzymes produced in the pancreas.	
7	What are enzymes?	
8	Why are enzymes described as specific?	
9	Describe the function of amylase.	
10	Where is amylase produced?	
11	Describe the function of proteases.	
12	Where are proteases produced?	
13	Describe the function of lipases.	
14	Where are lipases produced?	
15	What are two factors that affect the rate of activity of an enzyme?	
16	What does denatured mean?	
17	Describe the effect of temperature on enzyme activity.	
18	Describe the effect of pH on enzyme activity.	
19	Why do different digestive enzymes have different optimum pHs?	
20	What is an organ system?	

B2: Organising animals and plants

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	Name the four main components of blood.	
2	What is the function of platelets?	
3	Why is the human circulatory system a double circulatory system?	
4	How does the structure of an artery relate to its function?	
5	How does the structure of a vein relate to its function?	
6	How does the structure of a capillary relate to its function?	
7	List the structures air passes through when breathing in.	
8	What is the function of the red blood cells?	
9	What is the function of the white blood cells?	
10	What is the function of the plasma?	
11	Why is a leaf an organ?	
12	How is the upper epidermis adapted for its function?	• •
13	How is the palisade mesophyll adapted for its function?	
14	How is the spongy mesophyll adapted for its function?	
15	What is the function of the guard cells?	
16	What is the function of the xylem?	
17	Give three adaptations of the xylem.	• • •

18	What is the function of the phloem?	
19	What is the purpose of translocation?	
20	Define the term transpiration.	
21	What is the purpose of transpiration?	• • •
22	Name four factors that affect the rate of transpiration.	
23	What effect does temperature have on the rate of transpiration?	
24	What effect does humidity have on the rate of transpiration?	
25	Why does increased light intensity increase the rate of transpiration?	
26	What is the function of the stomata?	
27	Where are most stomata found?	
28	What is the advantage to the plant of having a high number of stomata at this location?	

B2: Non-communicable diseases

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	What is coronary heart disease?	
2	What is a stent?	
3	What are statins?	
4	What is a faulty heart valve?	
5	How can a faulty heart valve be treated?	
6	When do heart transplants take place?	
7	What are artificial hearts used for?	
8	Define health.	
9	What factors can affect health?	
10	What is a risk factor?	
11	Give five risk factors.	
12	What is cancer?	
13	What are malignant tumours?	
14	What are benign tumours?	
15	What two types of risk factor affect the development of cancers?	
16	What is a carcinogen?	

B3: Communicable diseases

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	What is a communicable disease?	
2	What is a pathogen?	
3	Name four types of pathogen.	
4	How can pathogens spread?	
5	How do bacteria make you ill?	
6	How do viruses make you ill?	
7	Name three examples of viral diseases.	
8	Name two examples of bacterial diseases.	
9	Name four methods of controlling the spread of communicable disease.	
10	Describe an example of a protist disease.	
11	Describe an example of a fungal disease in plants.	
12	How can the cause of a plant disease be identified?	
13	What are three mechanical defences that protect plants?	
14	Give three physical defences of plants.	
15	How can aphids be controlled by gardeners?	
16	How can plant diseases be detected?	

B3: Preventing and treating disease

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	What non-specific systems does the body use to prevent pathogens getting into it?	
2	What three functions do white blood cells have?	
3	What happens during phagocytosis?	
4	What are antigens?	
5	Why are antibodies a specific defence?	
6	What is the function of an antitoxin?	
7	What does a vaccine contain?	
8	How does vaccination protect against a specific pathogen?	
9	What is herd immunity?	
10	What is an antibiotic?	
11	What do painkillers do?	
12	What properties of new drugs are clinical trials designed to test?	
13	What happens in the pre-clinical stage of a drug trial?	
14	What is a placebo?	
15	What is a double-blind trial?	
16	What is a monoclonal antibody?	
17	Give two examples in which monoclonal antibodies can be used for.	

B4: Photosynthesis

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	Where does photosynthesis occur?	
2	What is the name of the green pigment in the leaves?	
3	What type of reaction is photosynthesis?	
4	What type of energy is used in photosynthesis?	
5	Give the word equation for photosynthesis.	
6	Give the balanced symbol equation for photosynthesis.	
7	Define the term limiting factor.	
8	Give the limiting factors of photosynthesis.	• • • •
9	Describe how light intensity affects the rate of photosynthesis.	
10	Describe how carbon dioxide concentration affects the rate of photosynthesis.	
11	Describe how temperature affects the rate of photosynthesis.	
12	Give the equation for the inverse square law for light intensity.	
13	Why are limiting factors important in the economics of growing plants in greenhouses?	
14	How do plants use the glucose produced in photosynthesis?	• • • • •

B4: Respiration

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	Define the term cellular respiration.	
2	What do organisms need energy for?	• • •
3	What is the difference between aerobic and anaerobic respiration?	
4	Write the word equation for aerobic respiration.	
5	Write the word equation for anaerobic respiration in muscles.	
6	Write the balanced symbol equation for aerobic respiration.	
7	Why does aerobic respiration release more energy per glucose molecule than anaerobic respiration?	
8	What is anaerobic respiration in yeast cells called?	
9	Write the word equation for anaerobic respiration in plant and yeast cells.	
10	How does the body supply the muscles with more oxygenated blood during exercise?	
11	What substance builds up in the muscles during anaerobic respiration?	
12	What happens to muscles during long periods of activity?	
13	What is oxygen debt?	
14	How is lactic acid removed from the body?	
15	What is metabolism?	

C1: Atomic structure

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	What is an atom?	
2	What is Dalton's model of the atom?	
3	What is the plum pudding model of the atom?	
4	What did scientists discover in the alpha scattering experiment?	
5	Describe the nuclear model of the atom.	
6	What did Niels Bohr discover?	
7	What did James Chadwick discover?	
8	Where are protons and neutrons?	
9	What is the relative mass of each sub-atomic particle?	
10	What is the relative charge of each sub-atomic particle?	
11	How can you find out the number of protons in an atom?	
12	How can you calculate the number of neutrons in an atom?	
13	Why do atoms have no overall charge?	
14	How many electrons would you place in the first, second, and third shells?	
15	What is an element?	
16	What is a compound?	
17	What is a mixture?	
18	What are isotopes?	
19	What are the four physical processes that can be used to separate mixtures?	
20	What is relative mass?	

C1: The Periodic Table

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	Questions	Answers
1	How is the modern Periodic Table ordered?	
2	How were the early lists of elements ordered?	
3	Why did Mendeleev swap the order of some elements?	
4	Why did Mendeleev leave gaps in his Periodic Table?	
5	Why do elements in a group have similar chemical properties?	
6	Where are metals and non-metals located on the Periodic Table?	
7	What name is given to the Group 1 elements?	
8	Why are the alkali metals named this?	
9	Give the general equations for the reactions of alkali metals with oxygen, chlorine, and water.	
10	How does the reactivity of the alkali metals change down the group?	
11	Why does the reactivity of the alkali metals increase down the group?	
12	What name is given to the Group 7 elements?	
13	Give the formulae of the first four halogens.	
14	How do the melting points of the halogens change down the group?	
15	How does the reactivity of the halogens change down the group?	
16	Why does the reactivity of the halogens decrease down the group?	
17	What is a displacement reaction?	
18	What name is given to the Group 0 elements?	
19	Why are the noble gases inert?	
20	How do the melting points of the noble gases change down the group?	

C2: Bonding

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	How are covalent bonds formed?	
2	Which type of atoms form covalent bonds between them?	
3	Describe the structure and bonding of a giant covalent substance.	
4	Describe the structure and bonding of small molecules.	
5	Describe the structure and bonding of polymers.	
6	Why do giant covalent substances have high melting points?	
7	Why do small molecules have low melting points?	
8	Why do large molecules have higher melting and boiling points than small molecules?	
9	Why do most covalent substances not conduct electricity?	
10	Describe the structure and bonding in graphite.	
11	Why can graphite conduct electricity?	
12	Explain why graphite is soft.	
13	What is graphene?	
14	Give two properties of graphene.	
15	What is a fullerene?	
16	What is a nanotube?	
17	Give two properties of nanotubes.	
18	Give three uses of fullerenes.	

19	What is an ion?	
20	Which kinds of elements form ionic bonds?	
21	What charges do ions from Groups 1 and 2 form?	
22	What charges do ions from Groups 6 and 7 form?	
23	Name the force that holds oppositely charged ions together.	
24	Describe the structure of a giant ionic lattice.	
25	Why do ionic substances have high melting points?	
26	Why don't ionic substances conduct electricity when solid?	
27	When can ionic substances conduct electricity?	
28	Why do ionic substances conduct electricity when melted or dissolved?	
29	Describe the structure of a pure metal.	
30	Describe the bonding in a pure metal.	
31	What are four properties of pure metals?	
32	Explain why pure metals are malleable.	
33	Explain why metals have high melting and boiling points.	
34	Why are metals good conductors of electricity and of thermal energy?	
35	What is an alloy?	
36	Explain why alloys are harder than pure metals.	
37	How big are nanoparticles?	
38	How are nanomaterials different from bulk materials?	
39	What is the relationship between side length and surface area-to-volume ratio?	
40	What are nanoparticles used for?	

C3: Calculations

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	What is a mole?	
2	Give the value for Avogadro's constant.	
3	Which formula is used to calculate the number of moles from mass and M_r?	
4	Which formula is used to calculate the mass of a substance from number of moles and M_r?	
5	What is a limiting reactant?	
6	What is a unit for concentration?	
7	Which formula is used to calculate concentration from mass and volume?	
8	Which formula is used to calculate volume from concentration and mass?	
9	Which formula is used to calculate mass from concentration in g/dm^3 and volume?	
10	How can you convert a volume reading in cm^3 to dm^3?	
11	If the amount of solute in a solution is increased, what happens to its concentration?	
12	If the volume of water in a solution is increased, what happens to its concentration?	
13	What is the yield of a reaction?	
14	What is the theoretical yield of a reaction?	
15	Why is the actual yield always less than the theoretical yield?	• • •
16	What is the percentage yield?	
17	How is percentage yield calculated?	
18	What is atom economy?	
19	Why is a high atom economy desirable?	
20	How is percentage atom economy calculated?	

21	How can concentration in mol/dm^3 be calculated?	
22	What is a titration?	
23	What is the end-point?	
24	How should solution be added from the burette close to the end point?	
25	Why is a white tile used in titration?	
26	What is a titre?	
27	What volume does one mole of any gas occupy at room temperature and pressure?	

C4: Chemical changes

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	What does reactivity mean?	
2	How can metals be ordered by their reactivity?	
3	What name is given to a list of metals ordered by their reactivity?	
4	In terms of electrons, what makes some metals more reactive than others?	
5	Why are gold and silver found naturally as elements in the Earth's crust?	
6	What is an ore?	
7	How are metals less reactive than carbon extracted from their ores?	
8	In terms of oxygen, what is oxidation?	
9	In terms of oxygen, what is reduction?	
10	Why can metals like potassium and aluminium not be extracted by reduction with carbon?	
11	How are metals more reactive than carbon extracted from their ores?	
12	What is a displacement reaction?	
13	What is an ionic equation?	
14	What type of substance is given as ions in an ionic equation?	
15	What is a spectator ion?	
16	What is a half equation?	
17	In terms of electrons, what is oxidation?	
18	In terms of electrons, what is reduction?	

19	In terms of pH, what is an acid?	
20	In terms of pH, what is a neutral solution?	
21	In terms of H^+ ions, what is an acid?	
22	How is the amount of H^+ ions in a solution related to its pH?	
23	What are the names and formulae of three main acids?	
24	How do you measure the pH of a substance?	
25	What is a strong acid?	
26	What is a weak acid?	
27	What is a salt?	
28	Which type of salts do sulfuric acid, hydrochloric acid, and nitric acid form?	
29	What are the products of a reaction between a metal and an acid?	
30	What are the products of a reaction between a metal hydroxide and an acid?	
31	What are the products of a reaction between a metal oxide and an acid?	
32	What are the products of a reaction between a metal carbonate and an acid?	
33	What is a base?	
34	What is an alkali?	
35	What is a neutralisation reaction?	
36	What is the ionic equation for a reaction between an acid and an alkali?	
37	How can you obtain a solid salt from a solution?	
38	When an acid reacts with a metal, which species is oxidised?	
39	When an acid reacts with a metal, which species is reduced?	
40	What are the four state symbols and what do they stand for?	

C4: Electrolysis

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	What is electrolysis?	
2	What is the name of the positive electrode?	
3	What is the name of the negative electrode?	
4	What is an electrolyte?	
5	Where are metals formed?	
6	Where are non-metals formed?	
7	How can ionic substances be electrolysed?	
8	Why can solid ionic substances not be electrolysed?	
9	In the electrolysis of solutions, when is the metal *not* produced at the cathode?	
10	In the electrolysis of a metal halide solution, what is produced at the anode?	
11	In the electrolysis of a metal sulfate solution, what is produced at the anode?	
12	What is the half equation for the ionisation of water?	
13	What metals are extracted from ionic compounds by using electrolysis?	
14	In the electrolysis of aluminium oxide, why is the aluminium oxide mixed with cryolite?	
15	In the electrolysis of aluminium oxide, what are the anodes made of?	
16	In the electrolysis of aluminium oxide, why do the anodes need to be replaced?	

C5: Energy changes

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	What is an exothermic energy transfer?	
2	What is an endothermic energy transfer?	
3	What is a reaction profile?	
4	What is the activation energy?	
5	What is bond energy?	
6	In terms of bond breaking and making, what is an exothermic reaction?	
7	In terms of bond breaking and making, what is an endothermic reaction?	
8	How are chemical cells made?	
9	What is a battery?	
10	How does the potential difference of a cell depend on the metals that the electrodes are made of?	
11	How can some cells be recharged?	
12	Why can some cells not be recharged?	
13	What is a fuel cell?	
14	In the hydrogen fuel cell, what is the overall reaction?	
15	In the alkaline hydrogen fuel cells, what are the half equations?	
16	Give an advantage of the hydrogen fuel cell.	
17	Give a disadvantage of the hydrogen fuel cell.	

P1: Conservation and dissipation of energy

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	Name the five energy stores	
2	Name the four ways in which energy can be transferred.	
3	What is a system?	
4	What is a closed system?	
5	What is work done?	
6	What is the unit for energy?	
7	What is one joule of work?	
8	Describe the energy transfer when a moving car slows down.	
9	Describe the energy transfer when an electric kettle is used to heat water.	
10	Describe the energy transfer when a ball is fired using an elastic band.	
11	Describe the energy transfer when a battery powered toy car is used.	
12	Describe the energy transfer when a falling apple hits the ground.	
13	Name the unit that represents one joule transferred per second.	
14	A motor is 30% efficient. What does that mean?	

P1: Energy resources

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	What is a non-renewable energy resource?	
2	What is a renewable energy resource?	
3	What are the main renewable and non-renewable resources available on Earth?	
4	What are the main advantages of using coal as an energy resource?	
5	What are the main disadvantages of using coal as an energy resource?	
6	What are the main advantages of using nuclear fuel as an energy resource?	
7	What are the main disadvantages of using nuclear fuel as an energy resource?	
8	What are the main advantages of using solar energy?	
9	What are the main disadvantages of using solar energy?	
10	What are the main advantages of using tidal power?	
11	What are the main disadvantages of using tidal power?	
12	What are the main advantages of using wave turbines?	
13	What are the main disadvantages of using wave turbines?	
14	What are the main disadvantages of using wind turbines?	
15	What are the advantages and the disadvantages of using geothermal energy?	
16	What are the main advantages and disadvantages of using biofuels?	
17	What are the main advantages and disadvantages of using hydroelectric power?	

P2: Electric circuits

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	How does a material become charged?	
2	What will two objects carrying the same type of charge do if they are brought close to each other?	
3	What is an electric field?	
4	What happens to the strength of an electric field as you get further from the charged object?	
5	What is electric current?	
6	What units are charge, current, and time measured in?	
7	What is the same at all points when charge flows in a closed loop?	
8	What must there be in a closed circuit so that electrical charge can flow?	
9	Which two factors does current depend on and what are their units?	
10	What happens to the current if the resistance is increased but the p.d. stays the same?	
11	What is an ohmic conductor?	
12	What happens to the resistance of a filament lamp as its temperature increases?	
13	What happens to the resistance of a thermistor as its temperature increases?	
14	What happens to the resistance of a light-dependent resistor when light intensity increases?	
15	What are the main features of a series circuit?	
16	What are the main features of a parallel circuit?	

P2: Electricity in the home

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	Why is the current provided by a cell called a direct current (d.c.)?	
2	What is an alternating current (a.c.)?	
3	What kind of current is supplied by mains electricity?	
4	What is the frequency and voltage of mains electricity?	
5	What colours are the live, neutral, and earth wires in a three-core cable?	
6	What is the function of the live wire in a three-core cable?	
7	What is the function of the neutral wire in a three-core cable?	
8	What is the function of the earth wire in a three-core cable?	
9	When is there a current in the earth wire?	
10	Why is the live wire dangerous?	
11	What is the National Grid?	
12	What are step-up transformers used for in the National Grid?	
13	What are step-down transformers used for in the National Grid?	
14	How does having a large potential difference in the transmission cables help to make the National Grid an efficient way to transfer energy?	
15	What two things does energy transfer to an appliance depend on?	
16	What are the units for power, current, potential difference, and resistance?	

P3: Molecules and matter

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	Which two quantities do you need to measure to find the density of a solid or liquid?	
2	What happens to the particles in a substance if its temperature is increased?	
3	Why are changes of state physical changes?	
4	Why is the mass of a substance conserved when it changes state?	
5	What is the internal energy of a substance?	
6	Why does a graph showing the change in temperature as a substance cools have a flat section when the substance is changing state?	
7	What is the name given to the energy transferred when a substance changes state?	
8	What is the specific latent heat of a substance?	
9	What is the specific latent heat of fusion a substance?	
10	What is the specific latent heat of vaporisation of a substance?	
11	On a graph of temperature against time for a substance being heated up or cooled down, what do the flat (horizontal) sections show?	
12	What property of a gas is related to the average kinetic energy of its particles?	
13	What causes the pressure of a gas on a surface?	
14	Give two reasons why the pressure of a gas in a sealed container increases if its temperature is increased.	
15	Give two reasons why the temperature of a gas increases if it is compressed quickly.	
16	Explain why the pressure of a fixed mass of gas decreases if the volume is increased and kept at constant temperature.	

P4: Radioactivity

Retrieval questions

Answer the following questions using the information from the knowledge organiser.

	questions	Answers
1	Describe the basic structure of an atom.	
2	Describe the plum pudding model of the atom.	
3	What charges do protons, neutrons, and electrons carry?	
4	Why do atoms have no overall charge?	
5	What is the radius of an atom?	
6	What is ionisation?	
7	What is the mass number of an element?	
8	Which particle do atoms of the same element always have the same number of?	
9	What are isotopes?	
10	What were the two main conclusions from the alpha particle scattering experiment?	• •
11	What are the three types of nuclear radiation?	
12	Which type of nuclear radiation is the most ionising?	
13	What is the range in air of alpha, beta, and gamma radiation?	
14	What are the equation symbols for alpha and beta particles?	
15	What is meant by the half-life of a radioactive source?	
16	What is radioactive contamination?	
17	Where does background radiation come from?	
18	Why are gamma-emitting sources used for medical tracers and imaging?	
19	What is nuclear fusion?	
20	How does nuclear fission occur?	