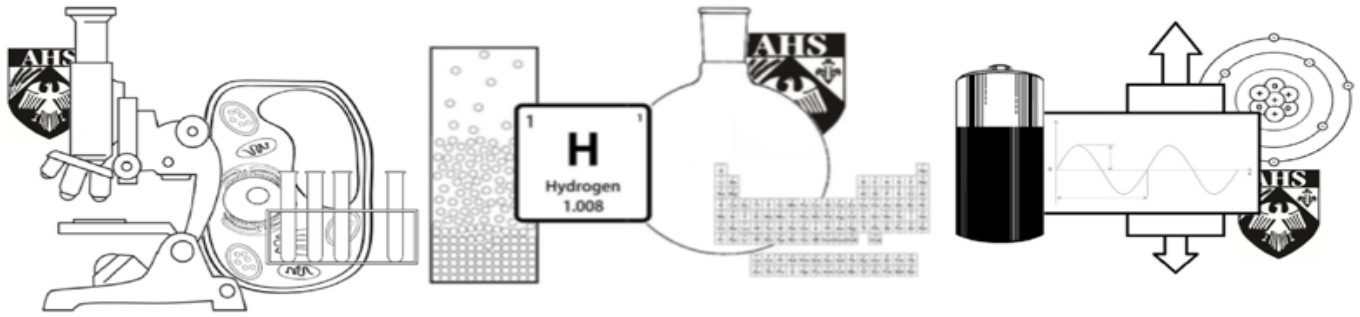
Name:	Class:	Teacher:

Aylsham High School Science Department

Year 9 homework



How to use this workbook

Homework support – gives QR codes which link to BBC Bitesize pages to use for revision and to help you get unstuck when answering the homework questions.

Part 2: The homework tasks – these are in three sections:

- Section 1 tests your recall of core knowledge questions. You can use the core questions at the back of this workbook to get a perfect answer.
- Section 2 reviews your knowledge of this topic from the work you have done in class.
- Section 3 contains exam style questions which test your ability to apply your knowledge on this topic.

Part 3: Core knowledge questions and answers organized by topic. Part of your fortnightly homework is to learn the answers to all these questions as you are doing each topic. You will be tested on your recall of these at the end of each topic.

Science Core Knowledge Questions and Answers

At the back of this booklet you will find core knowledge questions and answers, by topic, for the whole of this year's science. There is a lot of it! These are the questions the science department think are crucial for you to try to learn in order to reach your potential in science.

Knowing this information will mean that you will be able to apply it in a creative way.

Remembering knowledge is a challenge for everyone. Educational theorists are now assembling research that suggests ways we can strengthen long term memory. Some of these strategies are listed below:

- Core knowledge is vital to long term learning. If you know the basics then you can apply it to more challenging problems and this will lead to good retention.
- Recall knowledge repetitively.
- Switch between subjects regularly and solve a variety of problems rather than spending hours on one subject e.g. Don't just practise biology for revision, mix up the science disciplines.
- Space out your work sessions so that your brain has to apply itself to recall information from previous sessions.
- Don't just reread your notes, create summary pages to assimilate the knowledge.

Carousel Learning Study Packs

The science department have uploaded all the year 7 core knowledge questions to the carousel Learning website. Your teacher may set homework for you to do on Carousel Learning or you can use the study pack to do your own independent revision. Use the link to the explainer video to see how easy this is to do, or just dive in, scan the QR code below and then set yourself a challenge – revise just one topic for a core knowledge test, a group of topics for your whole year tests or all the topics for fun.

Link to Carousel Learning study pack	Carousel Learning study pack explainer video

Year 9 Homework support

The following QR codes will guide you to information which may help you to complete each homework.

Health and safety	AHS Science website treasure hunt	B1 Cells and body systems
C1 Particle theory	P1 Forces and motion	B2 Respiration
C2 Atoms and the periodic table	P2 Energy	B3 Genetics
C3 Chemical reactions & metals –part A	C3 Chemical reactions & metals – part B	P3 Waves
B4 Plants and ecosystems	C4 Earth and space	P4 Electricity and magnetism

Homework task 1: B1 Cells and body systems

Section 1: Recall essential core knowledge

Question No.	Question	Answer	✓ if correct
1	What do we call diseases that cannot be passed from person to person e.g. are caused by genes or lifestyle?		
2	What are some of the consequences of not getting a balanced diet?		
3	Name some examples of lifestyle diseases		
4	What is the formula for calculating BMI (body mass index)?		
5	What do we call diseases that are passed from person to person because they are caused by a pathogen?		
6	What is a microorganism?		
7	How can we calculate the actual size of a microorganism under the microscope?		
8	What do we call a microorganism that causes a disease?		
9	Which body system responds to infection and fights disease?		
10	How can we safely become immune to a disease without becoming infected by the pathogen that causes it?		
		SCORE:	10

Section 2: Refreshing core knowledge

11. Name 3 deficiency diseases: (3 marks)

_____

_____

12. Name 4 types of pathogen: (4 marks)

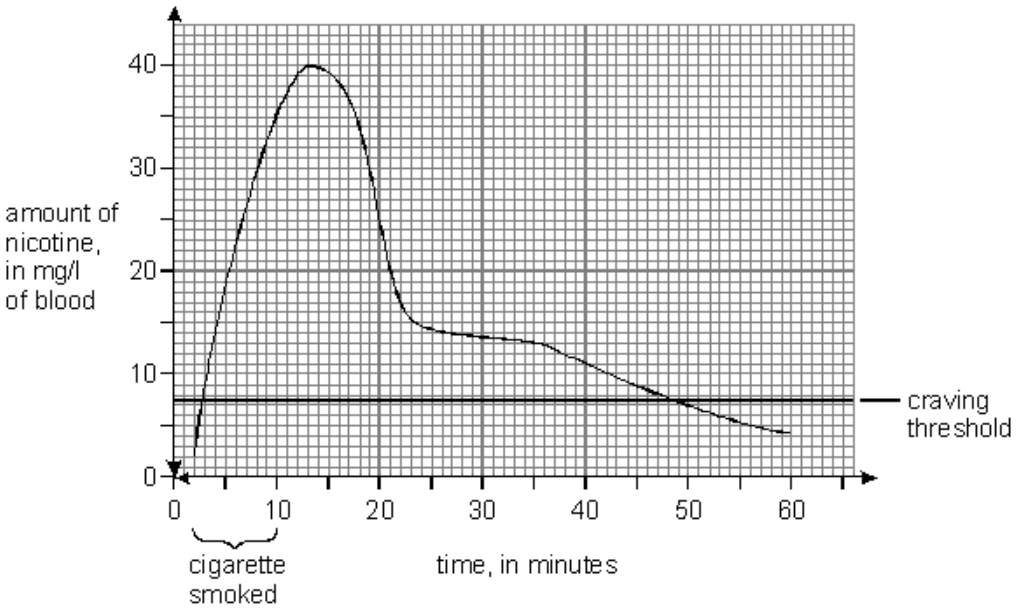
_____

_____

Section 3: Applying core knowledge

13. Wesley wants to give up smoking but finds it difficult.

(a) The graph shows the level of nicotine in Wesley's blood after he smokes a cigarette.
The craving threshold is the amount of nicotine he needs in his blood to stop him wanting a cigarette.



(i) Use the graph to calculate how often Wesley needs to smoke a cigarette to keep the nicotine level above the craving threshold.

..... [1 mark]

(ii) Wesley continues to smoke often. His craving threshold goes up.
Explain why this happens.

.....

..... [1 mark]

(b) The graph below shows how the amount of nicotine in cigarettes changed between 1930 and 1990.

Predict **one** consequence of reducing the amount of nicotine in cigarettes
Give the reason for your answer.

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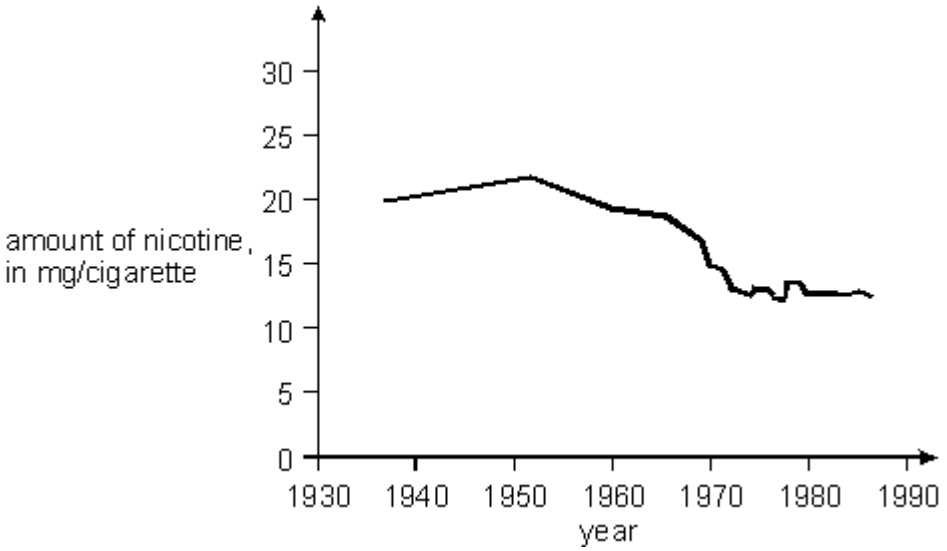


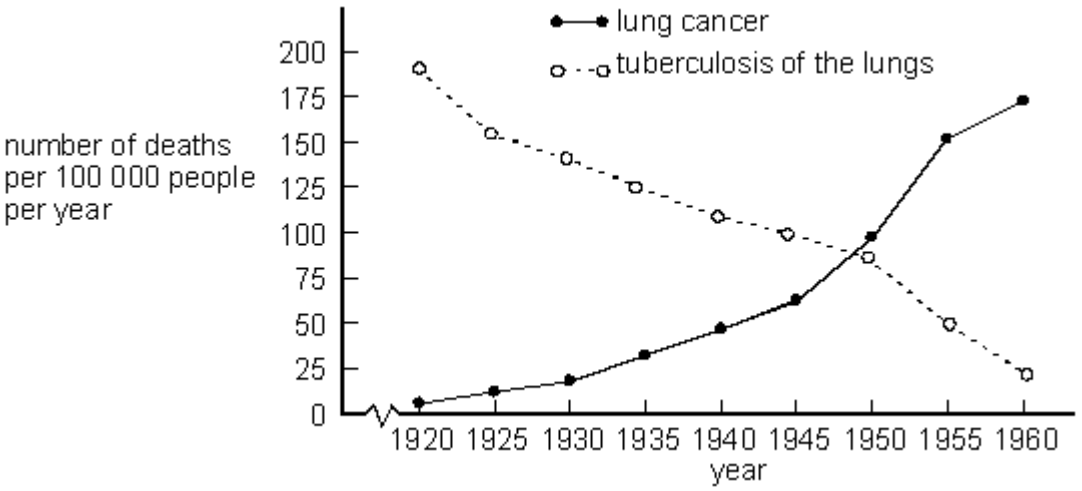
..... [2 marks]

Maximum 4 marks

14**.** (a) The graphs show the number of deaths from lung cancer and from tuberculosis of the lungs, in England and Wales, between 1920 and 1960.

(i) Between which two dates on the graph did the number of deaths from lung cancer rise fastest?

.....
and
.....
1 mark



(ii) Lung cancer may be caused by cigarette smoke. What substance in cigarette smoke causes lung cancer?

..... [1 mark]

(b) The number of deaths from tuberculosis of the lungs went down because of better medical treatment and preventive medicine.

What type of treatment is given to young people nowadays to prevent them from getting tuberculosis?

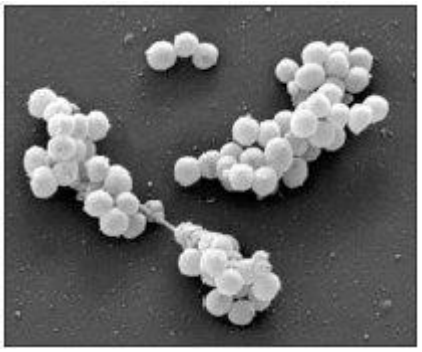
.....

.....

[1 mark]

Maximum 3 marks

15. The photograph below shows bacteria that have developed resistance to antibiotics.
They are called MRSA bacteria.



(a) When MRSA bacteria reproduce, they pass on their resistance to antibiotics to the next generation.

What part of a cell passes on information? ..... [1 mark]

(b) MRSA bacteria can cause serious infections in people who are ill in hospital. The bacteria can live on a healthy person's **skin** or in their **lungs** without causing any harm.

Use this information to fill in the table below.
Suggest **two** ways MRSA bacteria can be spread from person to person.
Suggest how the spread of the bacteria can be prevented for each method.

method of spread	**method of prevention**

2 marks

(c) People can be vaccinated against some diseases caused by bacteria or viruses.
Describe how vaccination prevents a person getting a disease.

.....

.....

.....

.....

....

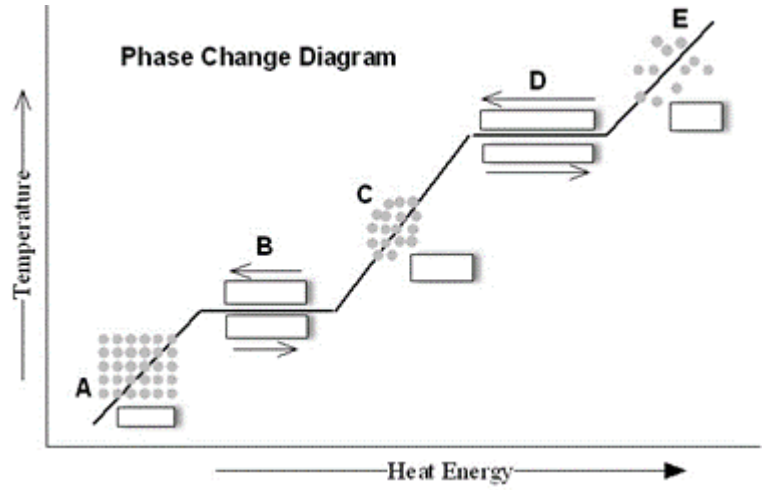
3 marks

maximum 6 marks

TOTAL FOR HOMEWORK B1	30

Homework task 2: C1 Particle theory

Section 1: Recall essential core knowledge

Question No.	Question	Answer	✓ if correct
1	Which changes of state involve energy being transferred to the particles from the surroundings?		
2	Which changes of state involve energy being transferred to the surroundings from the particles?		
			
3	Label A in the diagram above.		
4	Label B in the diagram above.		
5	Label C in the diagram above.		
6	Label D in the diagram above.		
7	Label E in the diagram above.		
8	How does the boiling point change when impurities are present and give a useful example of this? e.g. salt in water to boil vegetables		
9	How does the melting point change when impurities are present and give a useful example of this ? e.g. salt on the road is the temperature if expected to be below 0oC		
		SCORE:	9

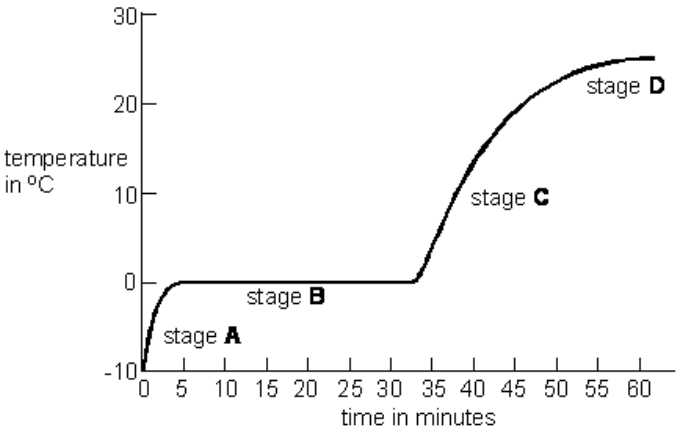
Section 2: Refreshing core knowledge

1) Complete the table below by putting a tick or a cross in each box. (10)

	Solids	Liquids	Gases
Can it be compressed?			
Shape			Fill the container
Density- High or Low	High		
Does it flow?			

2) A test tube of crushed ice is taken out of a freezer and left in a warm room. The graph shows how the temperature in the test tube changes.

What is happening to the ice at stage B? (1)



……

……

(b) Why does the temperature of the water stop rising during stage B? (1)

……

……

Section 3: Applying core knowledge

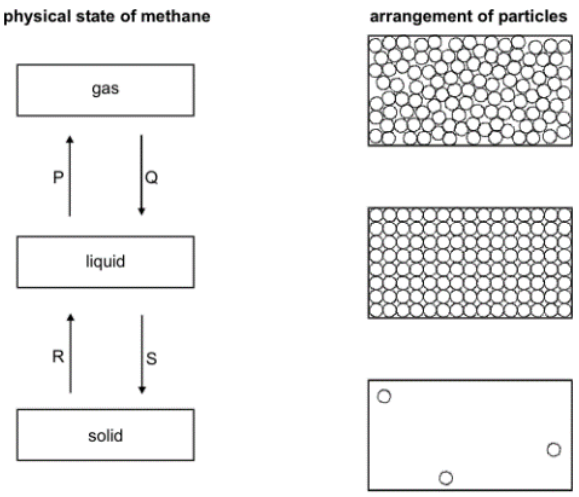
3) This question is about four chemical elements.

(a) The melting points and boiling points of the four elements are shown in the table. Complete the table to give the physical state, solid, liquid or gas, of each element at room temperature, 21°C.

element	melting point in °C	boiling point in °C	physical state at room temperature, 21°C
bromine	–7	59	
chlorine	–101	–34	
fluorine	–220	–188	
iodine	114	184	

(4 marks)

4) (a) Methane can be a gas, a liquid or a solid. In the diagram below, arrows P, Q, R and S represent changes of state. The boxes on the right show the arrangement of particles of methane in the three different physical states. Each circle represents a particle of methane.



(i) Draw a line from each physical state of methane to the arrangement of particles in that physical state.
Draw only three lines. (1)

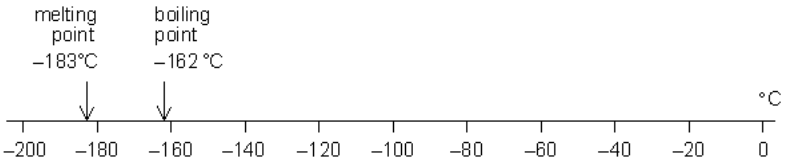
(ii) Arrows P, Q, R and S represent changes of state. Which arrow represents: (2)

evaporation? .....

melting? .....

(b) Methane is the main compound in natural gas. The scale below shows the melting point and the boiling point of methane. Methane has three physical states: solid, liquid and gas.

(i) What is the physical state of methane at –170°C? ..... (1)



TOTAL FOR HOMEWORK C1	29

Homework task 3: P1 Forces and motion

Section 1: Recall essential core knowledge

Question No.	Question	Answer	✓ if correct
1	If a system of motion is in equilibrium what can be said of the forces.		
2	What effect does an unbalanced force have on motion of an object?		
3	What is the name given to a turning force?		
4	How are moments calculated?		
5	How can the motion of an object be described if the forces acting upon it are balanced?		
6	How do you use a distance-time graph to find the speed of an object?		
7	What does the gradient (slope) of a distance-time graph tell you?		
8	What does a curved line on a distance-time graph mean?		
9	What is a free body diagram?		
10	What is Newton's first law of motion?		
11	State Hooke's law		
		SCORE:	11

Section 2: Refreshing core knowledge

Use the HEIST technique and the formulae below to answer the questions in this section.

Force = spring constant x extension Force = mass x acceleration

12. What force would be needed to extend a spring with a spring constant of 5N/m by 0.3m? (2)

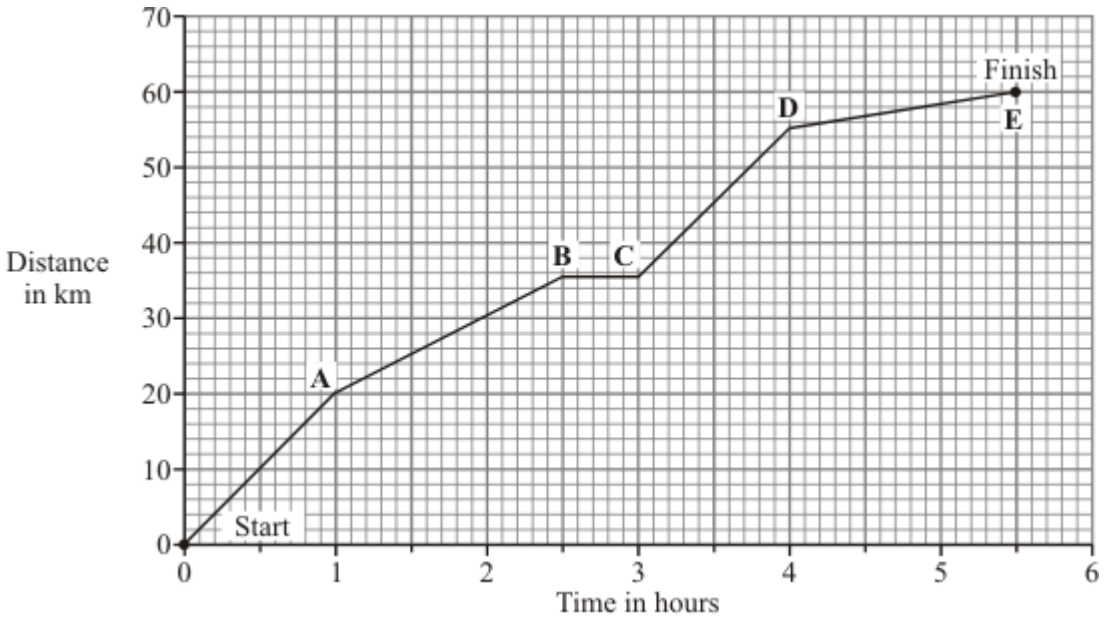
..... N/m

13. Calculate the acceleration of a car of mass 900 kg acted on by a resultant force of 3200N. (3)

..... m

Section 3: Applying core knowledge

14. A horse and rider take part in a long distance race. The graph shows how far the horse and rider travel during the race.



(a) What was the distance of the race? distance = _____ km **(1)**

(b) How long did it take the horse and rider to complete the race? _____ **(1)**

(c) What distance did the horse and rider travel in the first 2 hours of the race? d = _____ km **(1)**

(d) How long did the horse and rider stop and rest during the race? _____ **(1)**

(e) Not counting the time it was resting, between which two points was the horse moving the slowest?

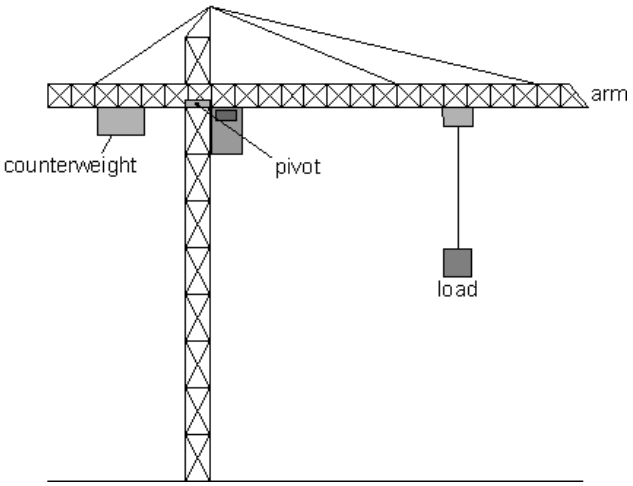
..... and .....

Give a reason for your answer. _____

_____ **(2)**

(Total 6 marks)

15. The diagram shows a crane lifting a load. The counterweight and the load are balanced.



(a) The load is moved away from the pivot, to the right.

(i) What happens to the turning moment produced by the load?

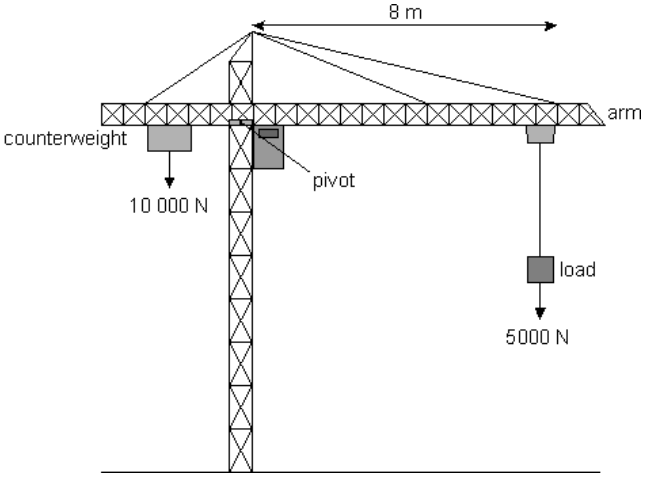
..... 1 mark

(ii) What should happen to the counterweight to keep the arm balanced?

.....

……..... 1 mark

(b) A load of 5000 N is placed 8 m from the pivot.



(i) What is the turning moment of the load? Give the unit.

.....

.....

2 marks

(ii) How far from the pivot must the 10000 N counter weight be placed in order to balance the load?

..... m

1 mark

(iii) The counterweight is placed 3 m from the pivot.
What load could now be balanced 8 m from the pivot?

.....

..... N

1 mark

Maximum 6 marks

TOTAL FOR HOMEWORK P1	28

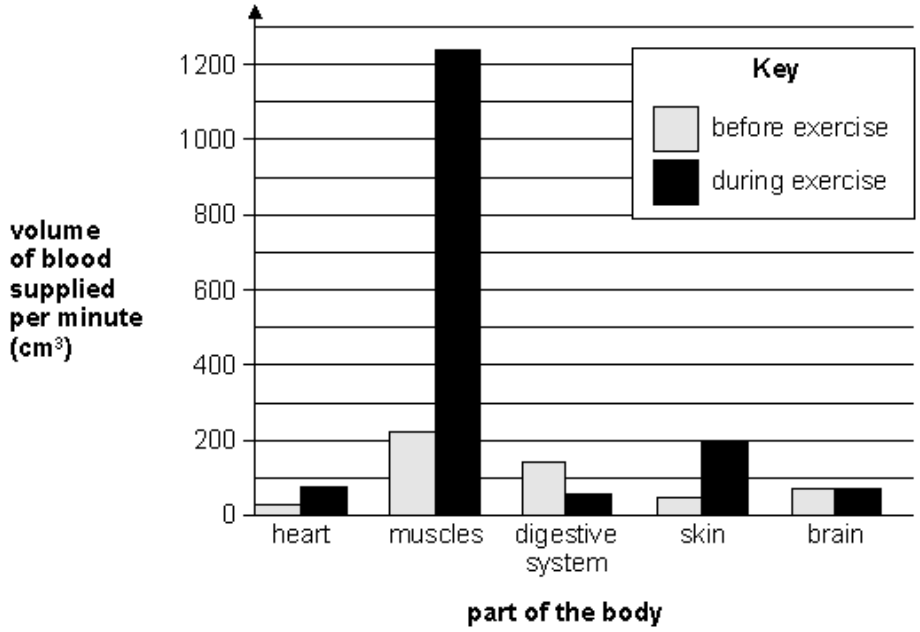
Homework task 4: B2 Respiration

Section 1: Recall essential core knowledge

Question No.	Question	Answer	✓ if correct
1	What is the symbol equation for aerobic respiration?		
2	What is Anaerobic respiration in humans		
3	What is Anaerobic respiration in microorganisms e.g. yeast		
4	Why do we breathe faster during exercise?		
5	Name 3 effects of exercise on our bodies		
6	What is EPOC?		
7	Name a non-communicable disease that can affect your lungs		
8	Name a lifestyle choice that can affect your lungs		
9	How does aerobic respiration compare to anaerobic respiration?		
10	Name a type of cell that will have high numbers of mitochondria due to its energy requirements		
		SCORE:	10

Section 2: Refreshing core knowledge

When people exercise, the volume of blood per minute needed to supply different parts of the body changes. This is shown in the bar chart below.



(a) Explain why muscles need **more** blood during exercise. Give **three** reasons. **[3]**

.....

.....

.....

(b) Look at the bar chart.
Suggest why you should not go for a long run just after eating a meal. **[1]**

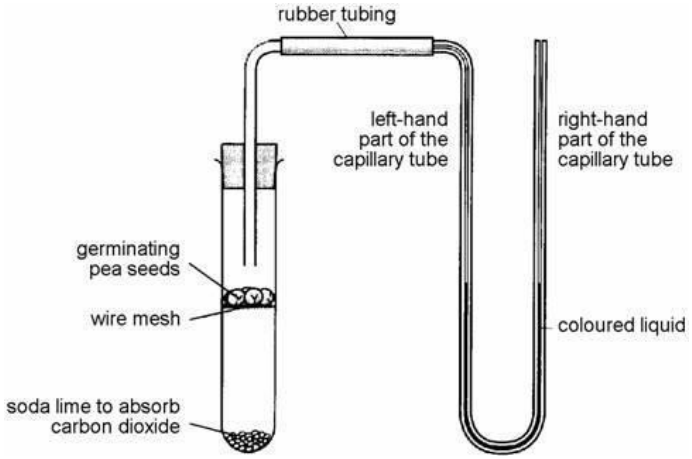
.....

(c) Why is it important that the blood supply to the brain stays constant? **[1]**

.....

Section 3: Applying core knowledge

12. The diagram shows an apparatus which can be used to investigate respiration in pea seeds. Pea seeds, which have been soaked in water to begin the process of germination, are put on the wire mesh in the test-tube.



(a) As the pea seeds respire, the level of the coloured liquid in the left-hand part of the capillary tube rises.

By referring to what is happening in the apparatus, explain why the level of the liquid changes.

.....

.....

.....

.....

.....

..... 3 marks

(b) During aerobic respiration, glucose molecules are broken down into molecules of carbon dioxide and water.

glucose + oxygen → carbon dioxide + water

Anaerobic respiration takes place in animals when oxygen is not available.
During anaerobic respiration, each glucose molecule is broken down into two molecules of lactic acid.

glucose → lactic acid

Less energy is released during anaerobic respiration than during aerobic respiration. Use the information above to suggest why.

.....

..... 1 mark

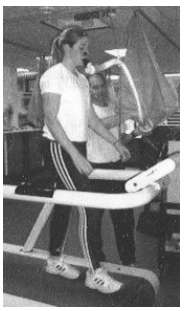
(c) Respiration takes place in parts of the cell called mitochondria.
A human sperm contains a greater concentration of mitochondria in its cytoplasm than an ovum does.
Suggest a reason for this.

.....

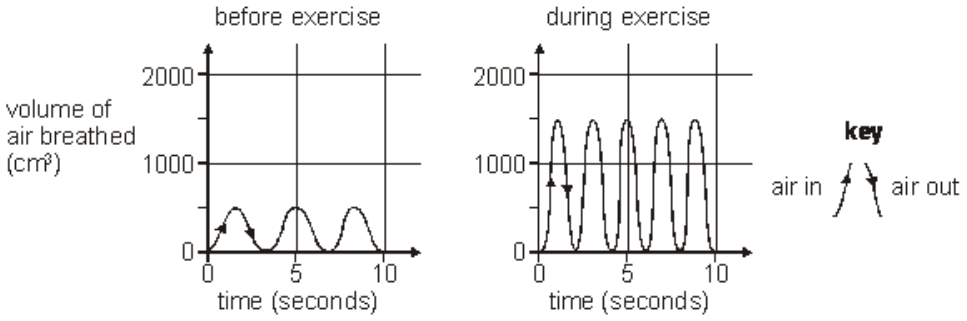
..... 1 mark

Maximum 5 marks

12. Joanne measured the volume of air she breathed in and out of her lungs. She used the machine shown in the photograph below.



The graphs represent the volume of air Joanne breathed in and out with each breath **before** and **during** exercise.



(a) During exercise Joanne breathed more air in and out of her lungs than before exercising.

(i) How much **more** air did Joanne breathe in with each breath during exercise? **[1]**

..... cm^3

(ii) Explain fully why Joanne needed to breathe in more air during exercise. **[3]**

.....

.....

.....

(b) (i) As Joanne exercised, the volume of air she breathed in and out increased. Give **one** other way Joanne's breathing changed during exercise. **[1]**

.....

.....

(ii) How does the graph show this other change? **[1]**

..... **[maximum 6 marks]**

TOTAL FOR HOMEWORK B2	26

Homework task 5: C2 Atoms and the periodic table

Section 1: Recall essential core knowledge

Question No.	Question	Answer	✓ if correct
1	What number on the periodic table tells us the total number of protons?		
2	What number on the periodic table tells us the total number of protons and neutrons?		
3	Atoms are neutrally charged. What two subatomic particles must there be the same number of?		
4	How many bonds will an element with (II) after it form?		
5	How many bonds will an element with (III) after it form?		
6	How did Mendeleev arrange the elements known at the time into a periodic table?		
7	What element did Mendeleev predict the existence and properties of before it was discovered?		
8	How are elements in the modern periodic table arranged?		
9	What are the chemical properties of group 1 elements?		
10	How does Group 1 metals reactivity changes down the group?		
		SCORE:	10

Section 2: Refreshing core knowledge

1) Draw and label an atom.

(5)

2) State what is meant by atomic number

……

…… (1)

3) Explain what is meant by relative atomic mass

……

……..

……

…… (2)

4) Explain why an atom is neutrally charged overall

……

……..

……

…… (2)

Section 3: Applying core knowledge

1) (a) Complete the table to show the relative mass of a neutron and of an electron. **(2)**

Particle	Mass
Neutron	1
Proton	
Electron	

(b) Complete the sentence by putting a cross ( ) in the box next to your answer. **(1)**

An atom has no overall charge because it contains

	A	more protons than electrons
	B	the same number of electrons and protons
	C	the same number of electrons and neutrons
	D	more neutrons than electrons

(c) The atomic number of lithium is 3. The mass number of an atom of lithium is 7. State the name and number of each of the particles in the nucleus of this atom.

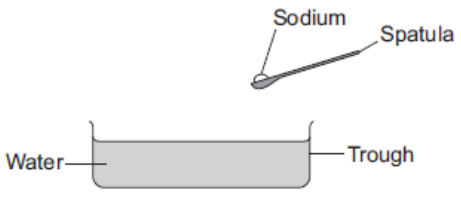
……

……..……

……

……..…… **(2)**

Figure 2



2) Figure 2 shows sodium being put into water. Describe three observations that can be seen when sodium is put into water.

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

……

……… (3)

TOTAL FOR HOMEWORK C1	28

Homework task 6: P2 Energy

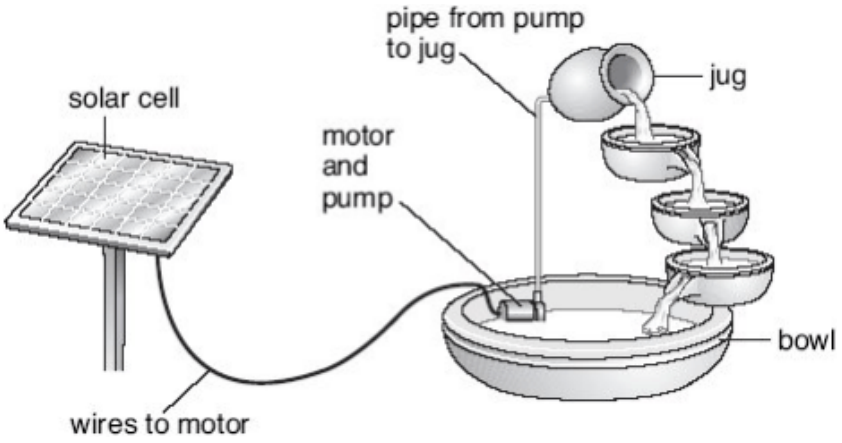
Section 1: Recall essential core knowledge

Question No.	Question	Answer	✓ if correct
1	Which measurement has the standard unit Joules (J)?		
2	Describe the relationship between work done by a force acting on an object and energy transferred.		
3	State the equation that shows the relationship between work done, force and distance moved in the direction of the force.		
4	What is the most likely explanation when it looks like energy has been lost or has disappeared?		
5	State the equation that shows the relationship between input energy, useful output energy and efficiency.		
6	How is a non-renewable energy resource different to a renewable one?		

7	State at least two non-renewable energy sources		
8	State at least three renewable energy sources		
		SCORE:	8

Section 3: Applying core knowledge

1. The drawing below shows a garden water feature. It is solar-powered. The solar cell absorbs energy from the Sun. The solar cell is connected to a motor in the bowl. The motor drives a pump. Water is pumped up to the jug and it flows back down to the bowl.



(a) Use the information above to help you to complete the following sentences. Choose words from the list.

chemical	electrical	gravitational potential	kinetic

(i) The useful energy output of the motor is to ..... energy.
1 mark

(ii) As the water flows from the jug to the bowl .....

energy is transferred to ..... energy. 2 marks

(b) Give **one** advantage and **one** disadvantage of using a solar cell to power the water feature.

advantage .....

disadvantage .....

2 marks

2. (a) The diagrams below show how much heat is lost from different parts of a house every second.

Through which part of the house above is most heat lost? .....

1 mark

(b) Part of the house below is insulated to reduce the loss of heat.

(i) Which part of the house has been insulated? .....

1 mark

(ii) Explain your answer.

.....

.....

1 mark

(c) The table below gives information about three fossil fuels that can be used to heat a house.

fuel	**physical state**	**energy released when 1g is burned (J)**	**Does the fuel produce these substances when burned?**	
			water	**sulphur dioxide**
coal	solid	25000	yes	yes
oil	liquid	42000	yes	yes
methane	gas	55000	yes	no

(i) Which fuel in the table releases the **least** energy when 1 g is burned? .....

1 mark

(ii) Methane **can** be compressed.

Which information in the table shows that methane can be compressed?

..... 1 mark

(iii) Sulphur dioxide causes acid rain.

Use the table to explain why burning methane does **not** produce acid rain.

.....

..... 1 mark

maximum 6 marks

TOTAL FOR HOMEWORK P2	26

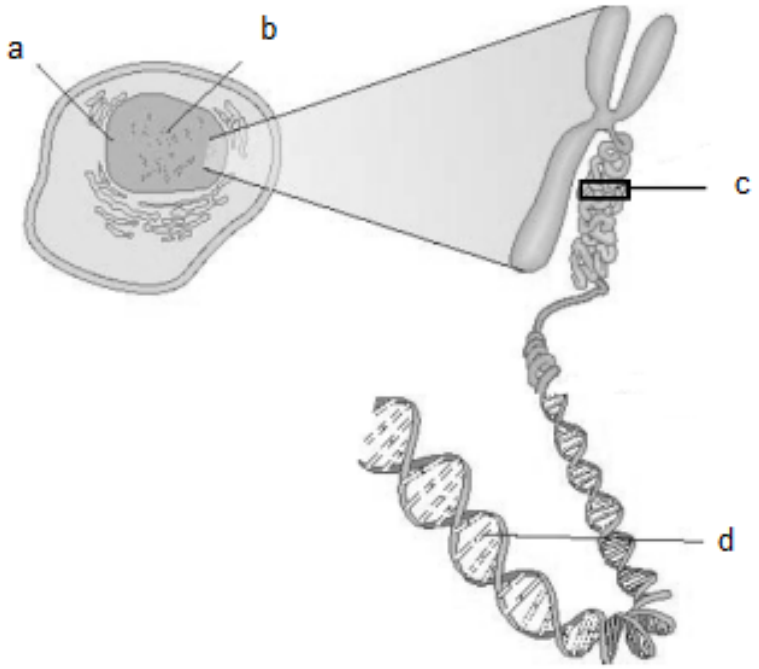
Homework task 7: B3 Genetics

Section 1: Recall essential core knowledge

Question No.	Question	Answer	✓ if correct
1	What are DNA strands stored as in the nucleus?		
2	What is the name for a section of DNA with the instructions for making a single protein?		
3	Describe the structure of DNA.		
4	How do we describe different versions of the same gene?		
5	What is variation?		
6	Name two reasons for variation within a species.		
7	What causes genetic variation?		
8	What causes environmental variation?		
9	State the sex chromosomes contained within a male and a female body cell.		
10	When is a species considered to be extinct?		
		SCORE:	10

Section 2: Refreshing core knowledge

1) Label this diagram, if it helps use some of the keywords below **(4 marks)**.



chromosome DNA adenine nucleus gene cell

2) Describe a strand of DNA **(3 marks)**

.....

.....

.....

3) State the complimentary base pairs **(2 marks)**

.....

.....

4) What bonds the complementary base pairs together? **(1 mark)**

.....

5) What is continuous variation? Give at least 2 examples. **(3 marks)**

.....

.....

6) What is discontinuous variation? Give at least 2 examples. **(3 marks)**

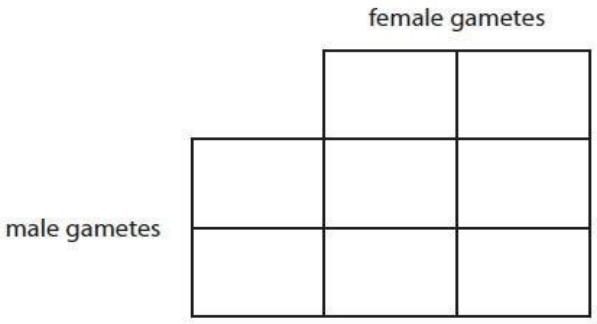
.....

.....

Section 3: Applying core knowledge

1) A female with the genotype **ee** has attached earlobes and a male with the genotype **Ee** has detached earlobes.

(i) Complete the Punnett square to show the gametes and genotypes of the offspring for this female and male. **(2)**

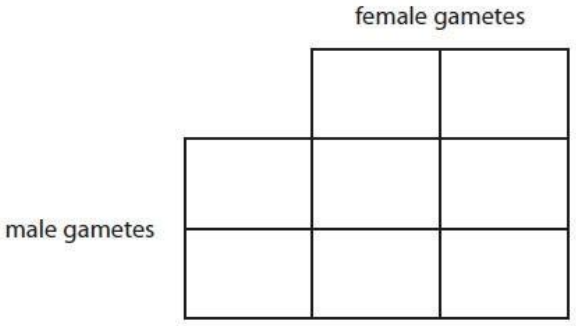


(ii) State the probability of the offspring having detached earlobes.

(1)

.....

(iii) What is the percentage probability of a mother with the dominant genotype EE and a father with the recessive genotype ee producing a child with attached earlobes?



Put a cross (☒) in the box next to your answer.

(1)

- ☒ **A** 0%
- ☒ **B** 25%
- ☒ **C** 75%
- ☒ **D** 100%

TOTAL FOR HOMEWORK B3	26

Homework task 8: C3 Chemical reactions & metals –part A

Section 1: Recall essential core knowledge

Question No.	Question	Answer	✓ if correct
1	How quickly reactants are used up or products are made is called the?		
2	What do we call the minimum amount of energy colliding particles have to have before a reaction will take place		
3	What has been changed if there are more reactant particles in the same volume leading to more frequent collisions and a quicker rate of reaction?		
4	What has been changed if more reactant particles are exposed and able to collide, leading to more frequent collisions and a quicker rate of reaction?		
5	What has been changed if particles move faster with more energy, leading to more frequent energetic collisions and a quicker rare of reaction?		
6	What has been added to lower the activation energy of the reaction, resulting in more collisions result in a reaction?		
7	A glowing splint will relight is a test for which gas?		
		SCORE:	7

Section 2: Refreshing core knowledge

Additional core knowledge questions (7 marks)

8	Complete the reaction: Acid + Alkali -->	
9	How can we tell when a solution is neutral?	
10	What effect does increasing concentration have on the rate of reaction?	
11	What effect does increasing pressure have on the rate of reaction?	
12	What effect does increasing surface area have on the rate of reaction?	

13	What effect does increasing temperature have on the rate of reaction?	
14	What do we call a substance that increases the rate of reaction but is not used up in the reaction?	
		SCORE: 7

1) What name is given to a substance that can increase the rate of a chemical reaction without being altered itself?	A Bunsen burner B Volumiser C Dehumidifier D Catalyst	2) What happens to the size of the particles in a chemical reaction?	A they get bigger B they get smaller C they stay the same D impossible to tell
3) Which of the following must happen for a reaction to occur?	**A** substances must change state **B** particles must collide **C** particles must get hotter **D** particles must increase in size	4) What name is given to the amount of energy particles need to have for a reaction to occur?	**A** activation energy **B** gravitational potential energy **C** catalytic energy **D** optimum energy

(4)

5) Hydrogen peroxide slowly decomposes into water and oxygen.

hydrogen peroxide → water + oxygen

(a) The reaction can be speeded up by adding manganese dioxide.

(i) What do we call a substance that speeds up a chemical reaction without being changed itself?

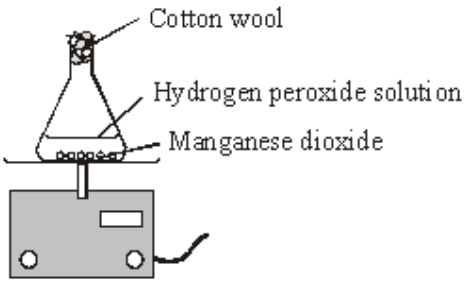
..... (1)

(ii) Give two other ways of increasing the rate of this reaction.

1 .....

2 ..... (2)

(b) The diagram shows how the rate of this reaction can be measured.
As the hydrogen peroxide decomposes, the mass of the flask and its contents decreases.



Why does this decrease in mass take place?

.....

..... (1)

Section 3: Applying core knowledge

6) A student investigates how the concentration of an acid affects the rate of reaction between hydrochloric acid and chalk.
They repeated the experiment twice more for each concentration of acid. Their results are shown in the table below.

concentration of acid (mol/dm^3)	volume of gas collected in thirty seconds (cm^3)			Average volume of gas collected in 30 seconds (cm^3)	Rate of reaction (cm^3/s)
	repeat 1	repeat 2	repeat 3		
0.10	10	13	13	12	0.4
0.40	36	41	37	39	1.3
1.00	92	99	99		

a) Calculate the values missing from the table and write them in. Use the space below to show your working:

(2)

b) What is the trend shown in the results?

..... (1)

c) Suggest at least two other changes apart from using higher concentrations of acid that could increase the rate of reaction

1. ..... 2. …… (2)

d) The symbol equation below shows the reaction that took place in the experiment. Balance this equation.

….. HCl (aq) + . ….. CaCO3 (s) → ..... H2O (l) + ….. CaCl2 (aq) + ……..CO2 (g)

TOTAL FOR HOMEWORK C3A	27

Homework task 9: C3 Chemical reactions & metals – part B

Section 1: Recall essential core knowledge

Question No.	Question	Answer	✓ if correct
1	What is thermal decomposition?		
2	What is used to extract iron from its ore?		
3	Bubbling a gas through limewater and having it go milky is a test for which gas?		
		SCORE:	3

Section 2: Refreshing core knowledge

Additional core knowledge questions

4	A possible colour change, a temperature change, production of gas and a possible change of state are all signs that what might have occurred?	
5	What element do all acids contain?	
6	What happens to the particles in a chemical reactions?	
7	What is oxidation?	
8	What is reduction?	
9	What is the formula for calcium carbonate?	
		SCORE: 6

10. Magnesium carbonate undergoes thermal decomposition to form magnesium oxide and carbon dioxide.

a) State the reactant in this reaction.

…… (1)

b) State the products of this reaction.

…… (2)

Describe how we could confirm that the gas produced was carbon dioxide.

……

……

……

…… (2)

Section 3: Applying core knowledge

11. Complete the chemical equation for them following thermal decomposition equations:

$MgCO_3 \rightarrow$ …… + ……

$CaCO_3 \rightarrow$ …… + ……..

(2)

12. Calcium nitrate solution can be made by adding solid calcium carbonate to dilute nitric acid in a beaker. The solid calcium carbonate is added until some remains at the bottom of the beaker.

a) After this reaction the liquid in the beaker is (1)

A	acidic
B	alkaline
C	neutral
D	pure water

b) Explain why the calcium carbonate is added until some solid remains at the bottom of the beaker.

(2)

……

……

c) Write the balanced equation for the reaction between calcium carbonate and nitric acid to form calcium nitrate, $Ca(NO_3)_2$.

(3)

……

Q6. Magnesium carbonate, $MgCO_3$, can be reacted with dilute sulfuric acid, H_2SO_4, to form magnesium sulfate, water and carbon dioxide. Write the word equation for this reaction.

(2)

……

Write the balanced symbol equation for this reaction.

(2)

……

Q7. Unreactive metals are found as uncombined metals in the Earth's crust. When iron oxide is heated

with carbon, iron is produced.

(i) Complete the word equation for the reaction. (1)

iron oxide + carbon → ……. + …….

(ii) Describe why the reaction below is not possible.

magnesium oxide + carbon → magnesium + carbon dioxide

……

……

……

…… (2)

TOTAL FOR HOMEWORK C3B	27

Homework task 10: P3 Waves

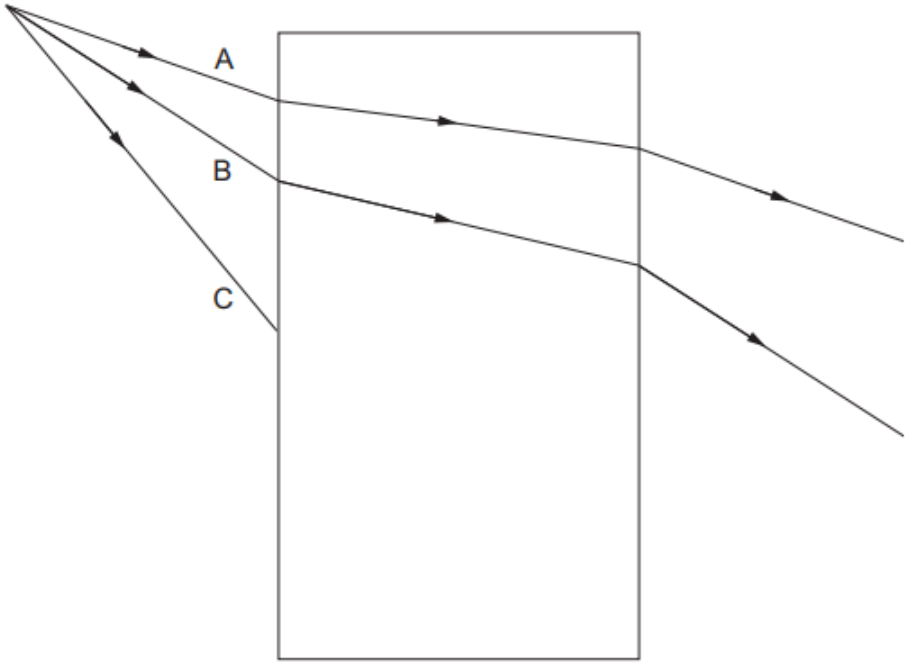
Section 1: Recall essential core knowledge

Question No.	Question	Answer	✓ if correct
1	What does refraction mean?		
2	Describe the relationship between the incident and reflected angles when light rays enter a denser material		
3	Describe the relationship between the incident and reflected angles when light rays enter a less dense material		
4	How do convex lenses help fix eyesight problems?		
5	How do concave lenses help fix eyesight problems?		
6	How is white light split by a prism?		
7	What features of light waves are the same as each other?		
8	What features of light waves are different from each other?		
		SCORE:	8

Section 2: Refreshing core knowledge

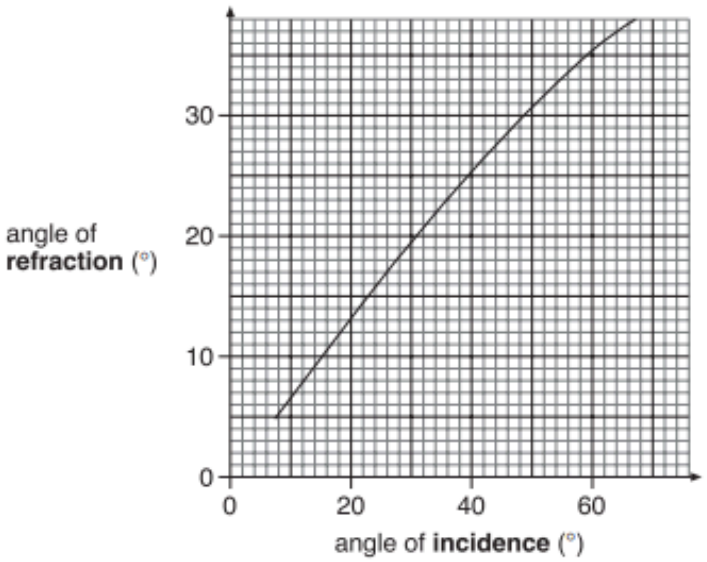
9. The diagram below shows the completed paths that light travels as they enter and leave a denser medium.

Complete the path that the light ray labelled C would take. Use a ruler. (3)



Section 3: Applying core knowledge

10.



Use the graph to answer the questions below.

(i) When the angle of **refraction** is 20°, what is the angle of **incidence**?

_____°

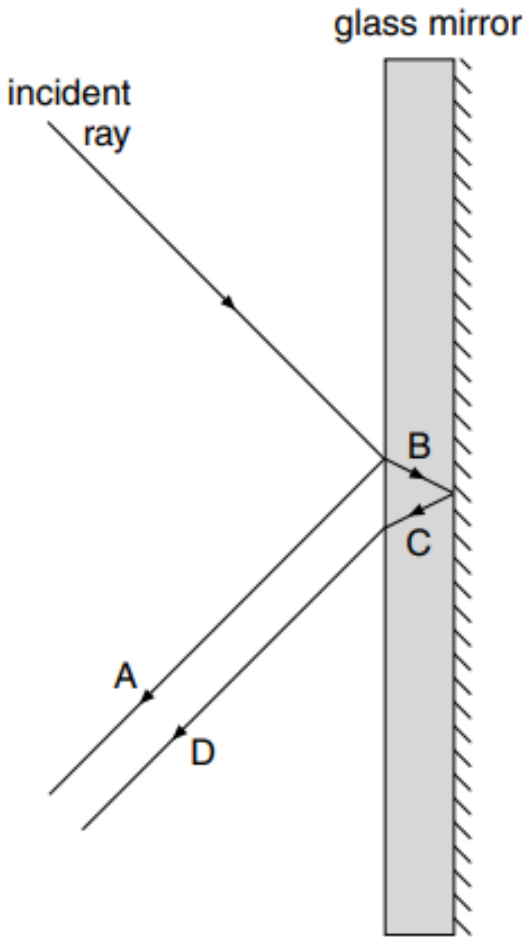
(ii) What conclusion could James draw from his graph?
Complete the sentence below.

When light passes from air into glass, the angle of **incidence** is

always _____ the angle of **refraction**.

(iii) does this show a linear or non-linear relationship? (3)

11. The diagram shows a ray of light hitting the surface of a mirror made from thick glass.
The incident ray is both reflected and refracted.



(a) (i) Give the letters of the **two** reflected rays.

(2)

_____ and _____

(ii) Give the letter of **one** refracted ray.

(1)

_____

(b) The incident ray is brighter than ray A.
Give **one** reason for this.

2)

_____

_____

TOTAL FOR HOMEWORK P3	19

Homework task 11: B4 Plants and ecosystems

Section 1: Recall essential core knowledge

Question No.	Question	Answer	✓ if correct
1	Which gas do plants use to make their food?		
2	Plants convert light energy into _____ energy		
3	What factors affect the rate of photosynthesis?		
4	Which part of the plant absorbs water?		
5	How are roots adapted for the uptake of water and minerals?		
6	What word describes "The variety of species in an area."?		
7	How could we measure the difference in plant distribution from a shaded area to an area in full light?		
8	What is the name given to animals in a food web?		
9	What is the name given to plants in a food web?		
10	What do the arrows represent in a food web?		
11	All organisms in an ecosystem depend upon each other. What do we call this?		
		SCORE:	11

Section 2: Refreshing core knowledge

11. What is the word equation for photosynthesis? (2 marks)

.....

.....

12. State 2 factors which affect the rate of photosynthesis: (2 marks)

.....

.....

13. Which structure transports water around the plant? Describe this structure: (2 marks)

.....

.....

14. Which structure transports sucrose around the plant? Describe this structure: (2 marks)

.....

.....

Section 3: Applying core knowledge

15. (a) Scientists studied the animals and plants in a large wood, over a period of time. One food chain in the wood is shown below.

oak trees → winter moth caterpillars → great tits → sparrowhawks

Insecticide was sprayed onto fields near the wood. Some of the insecticide was blown into the wood by the wind.

(i) In the food chain above, the sparrowhawks contained the highest concentration of insecticide.
Explain why.

.....

.....

.....

2 marks

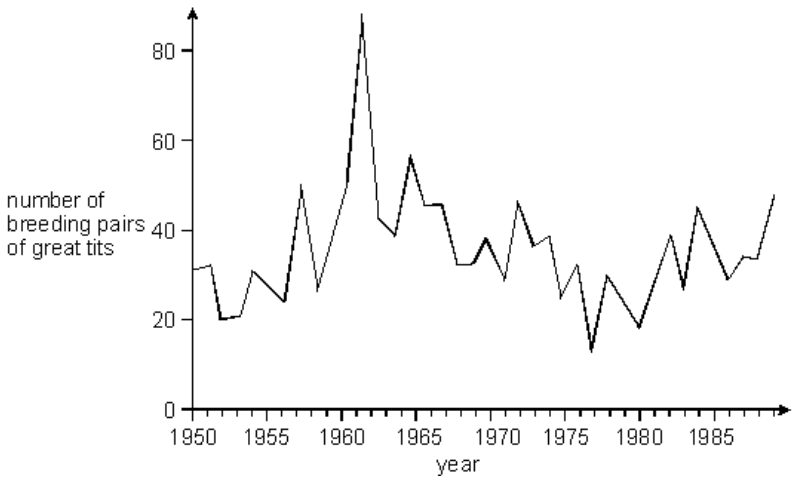
(ii) The use of insecticides could cause the population of sparrowhawks to decrease.
Give **one** other reason why the population of sparrowhawks might decrease.

.....

.....

1 mark

(b) The graph shows how the number of pairs of great tits changed in the wood over a period of time.



(i) Use the graph to suggest the year when there were probably fewest sparrowhawks in the wood.

..... 1 mark

What is the evidence from the graph for your answer?

.....

.....

1 mark

(ii) Explain the reasoning for the answer you have given in part (b) (i).

.....

.....

1 mark

TOTAL FOR HOMEWORK B4	25

Homework task 12: C4 Earth and space

Section 1: Recall essential core knowledge

Question No.	Question	Answer	✓ if correct
1	Collecting, cleaning, processing materials so that they can be used again is better known as what?		
2	Bricks, plates, cups, tiles, and electrical power line insulators are made from what type of material?		
3	The typical characteristics, hard, brittle, stiff, solid at room temperature, easily broken and electrically insulating, are common to what group of materials.		
4	Why do ceramics have such high melting points		
5	What group of materials are made from chains of identical molecules repeated over and over again?		
6	The typical characteristics, malleable, stretchy, solid at room temperature, easy to shape, easy to mould, electrically and thermally insulating and made from hydrocarbon molecules are common to what group of material?		
7	What type of material is described as, a mixture of materials with properties that are a combination of those that make it up?		
8	The typical characteristics, hard, ductile, shiny, solid at room temperature, good conductors, sonorous and dense, are common to what group of materials?		
9	What is the most widely accepted theory about the beginning of the universe?		
		SCORE:	9

Section 2: Refreshing core knowledge

1. Describe a ceramic substance and give 3 examples of ceramic objects. (4)

……

……

……

……

……

……

2. Describe a polymer substance and give 3 examples of polymer objects. (4)

……

……

……

……

……

……

Section 3: Applying core knowledge

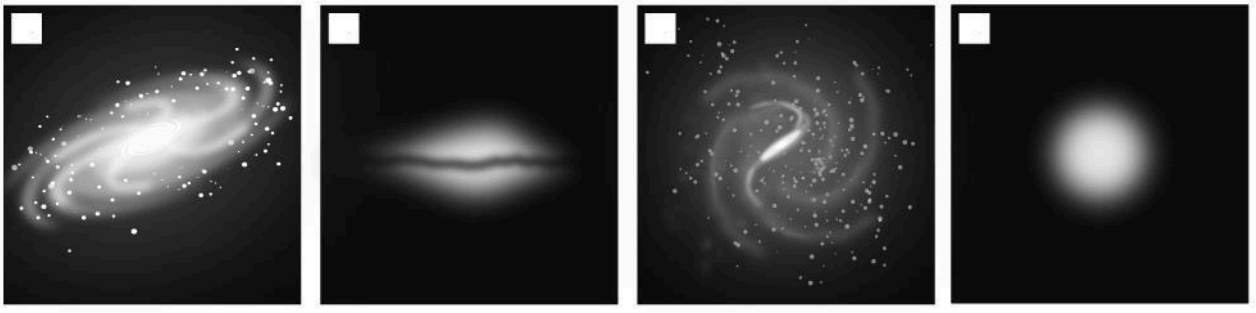
Q1. What is:

a. a constellation _____ (1)

b. a galaxy _____ (1)

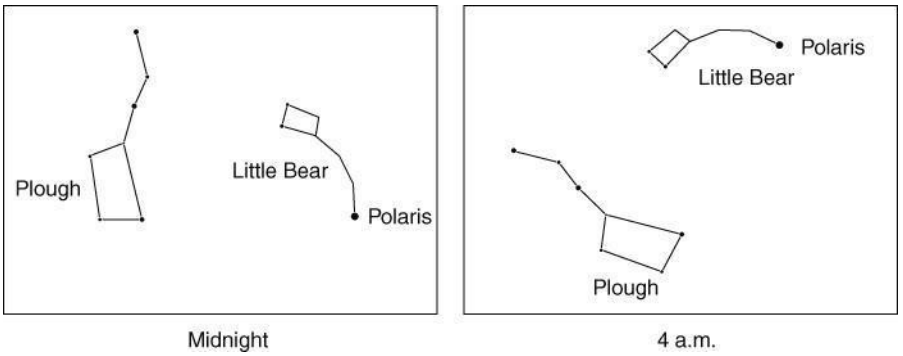
c. the Universe? _____ (1)

1. Which of these is the shape of our galaxy? Tick (✔) *one* box. (1)



2. What is our galaxy called? _____ (1)

3. Danny observed the sky at midnight and at 4 am. When he looked to the north, this is what he saw.



Explain why the constellations were in different places for his two observations.

_____

_____ (1)

4. Write these objects in order of size, start with the smallest: star, planet, Universe, galaxy.

_____ (1)

5. Write down *two* differences between a star and a planet.

a. _____ (1)

b. _____ (1)

TOTAL FOR HOMEWORK C4	26

Homework task 13: P4 Electricity and magnetism

Section 1: Recall essential core knowledge

Question No.	Question	Answer	✓ if correct
1	What is the unit for resistance?		
2	Explain what causes electrical resistance in a wire		
3	Recall the equation for calculating potential difference using resistance		
4	Explain what happens to resistance as the wire becomes hotter		
5	State three factors which can affect resistance		
6	What unit do we measure power in?		
7	How are energy resources used in electrical power generation?		
8	How does a simple dynamo work?		
		SCORE:	8

Section 2: Refreshing core knowledge

9. Use the words below to fill in the blanks: (8)

An electric current is the _____ of _____ through a conductor. In an electric circuit the charge is carried by _____. The electrons can transfer _____ to components such as a _____ .In a circuit we measure this as the _____. It is this easy-to-use transfer of energy that makes electric circuits so _____.

flow, energy, voltage, useful, electrons, charge, bulb

Section 3: Applying core knowledge

The box below shows three different versions of the formula relating voltage, current and resistance. Use the HEIST technique to answer the questions which follow. A mark will be awarded for each step.

voltage = current x resistance
$\text{current} = \frac{\text{voltage}}{\text{resistance}}$
$\text{resistance} = \frac{\text{voltage}}{\text{current}}$

10. A 2 metre long piece of wire has a resistance of 2 Ω. What would its resistance be if it was 4 metres long? Explain your answer. (2)

11. Another wire is the same length and made of the same material, but it is thicker. Suggest what its resistance might be and explain your answer. (2)

12. Complete this table by filling in the missing values. (3)

Space for your working

13. The

	Voltage (V)	Current (A)	Resistance (Ω)
a	12		6
b		10	5
c	6		3

of an of the results in the table above are part investigation into the resistances different metals. Samala says that material tested in part **c** has the lowest resistance. What information about the investigation would you need to know to say whether or not Samala is correct?
(2)

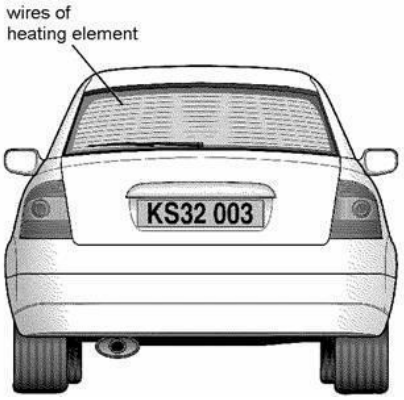
14. A current of 0.1 A flows through a material when the voltage across it is 5000 V.

    a. Use the HEIST technique to calculate the resistance of the material.
    (2)

    b. Is this material a metal? (1)

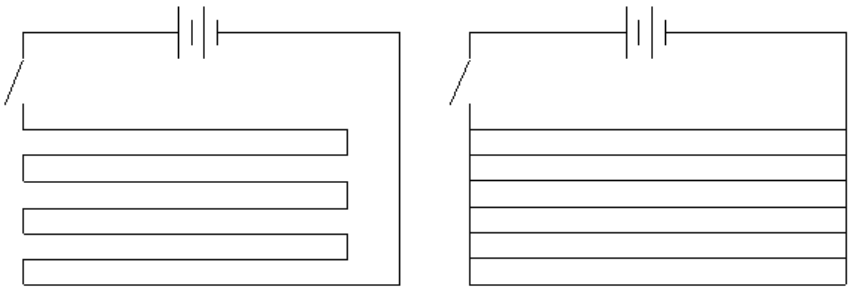
    c. Explain your answer. (2)

15. The back window of this car contains a heating element.



The heating element is part of an electrical circuit connected to the battery of the car.

The diagrams below show **two** ways of connecting the circuit of a heating element.



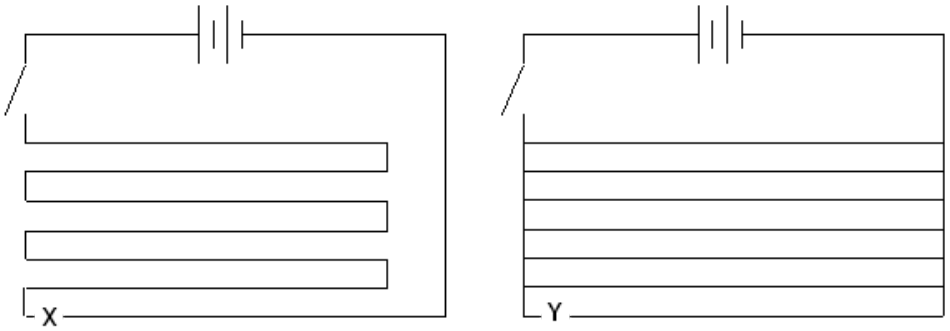
circuit A circuit B

(a) Give the name of each type of circuit:

circuit A .....

circuit B ..... (1)

(b) A wire gets broken at point X on circuit A and at point Y on circuit B.



circuit A circuit B

When the switch is closed, how does the broken wire affect the heating element in:

(i) circuit A? .....

.....

(1)

(ii) circuit B? .....

.....

(1)

(c) In very cold weather, ice may form on the back window of the car.
When the heating element is switched on, the ice will disappear and the surface of the window will become clear and dry.

(i) Fill the gap below to show the energy transfer that takes place.

When the heater is switched on, ... energy is transferred from the wires to the ice.

(1)

(ii) As the window becomes clear and dry, physical changes take place in the ice.
Fill the gaps below to show the physical changes which take place.

from ..... to ..... to .....

(1)

Maximum 5 marks

TOTAL FOR HOMEWORK P4	35

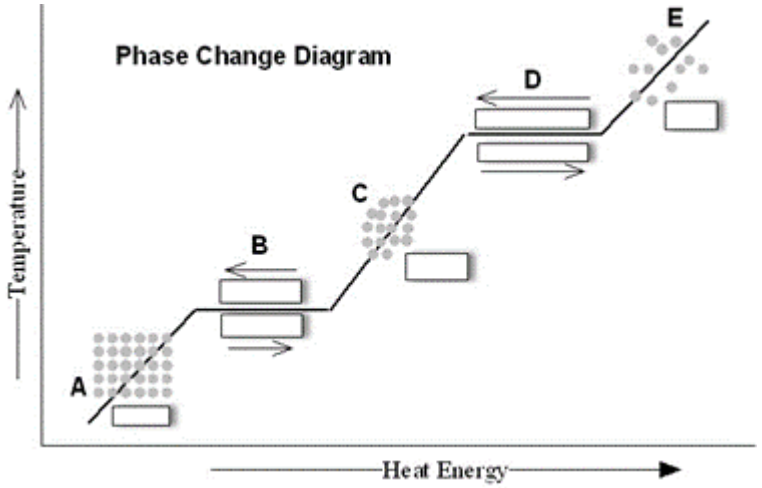
Core knowledge questions and answers

B1 Cells and body systems

1	What do we call diseases that cannot be passed from person to person e.g. are caused by genes or lifestyle?	Non-communicable
2	What are some of the consequences of not getting a balanced diet?	Starvation, obesity and deficiency diseases.
3	Name some examples of lifestyle diseases	Cardiovascular disease, lung cancer, liver disease, type 2 diabetes, obesity
4	What is the formula for calculating BMI (body mass index)?	BMI = mass/height^2
5	What do we call diseases that are passed from person to person because they are caused by a pathogen?	Communicable
6	What is a microorganism?	A living thing too small to see without a microscope
7	What are the four types of microorganism that can cause disease?	Bacteria, viruses, fungi and protists
8	How can we calculate the actual size of a microorganism under the microscope?	Actual size = image size/magnification
9	What do we call a microorganism that causes a disease?	Pathogen
10	What are the human body's physical barriers to infection?	Mucus, cilia, skin
11	What are the human body's chemical barriers to infection?	lysozyme in tears and hydrochloric acid in stomach
12	Which body system responds to infection and fights disease?	The immune system
13	Name the white blood cells that produce antibodies and recognise pathogens.	Lymphocytes
14	How can we safely become immune to a disease without becoming infected by the pathogen that causes it?	By immunisation with a vaccine

C1 Particle theory

15	Describe the forces of attraction in a solid.	Strong
16	Describe the forces of attraction in a liquid	Moderate
17	Describe the forces of attraction in a gas	Weak
18	Changing a solid to liquid is called…….	Melting
19	Changing a liquid to gas is called…….	Boiling
20	Changing a liquid to solid is called ……..	Freezing
21	Changing a gas to liquid is called……..	Condensing

22	Changing a solid to a gas is called	Subliming
23	Which changes of state involve energy being transferred to the particles from the surroundings?	Melting and boiling
24	Which changes of state involve energy being transferred to the surroundings from the particles?	Freezing and condensing
		
25	Label A in the diagram above	A – Solid
26	Label B in the diagram above	B – Melting/Freezing
27	Label C in the diagram above	C – Liquid
28	Label D in the diagram above	D –Boiling/Condensing
29	Label E in the diagram above	E – Gas
30	What do we call the temperature when a substance change from a liquid to a gas?	Boiling point
31	How does the boiling point change when impurities are present and give a useful example of this? e.g. salt in water to boil vegetables	It increases
32	How does the melting point change when impurities are present and give a useful example of this? e.g. salt on the road is the temperature if expected to be below $0^{o}C$	It decreases
33	How does the solubility of a solute changes as the temperature of the solution increases?	Increases

P1 Forces and motion

34	If a system of motion is in equilibrium what can be said of the forces.	They are balanced
35	What effect does an unbalanced force have on motion of an object?	It will accelerate
36	What is the name given to a turning force?	A moment
37	How are moments calculated?	Force x Perpendicular distance
38	What is a pivot?	The point around which something turns
39	What instrument can be used to measure force?	Newton meter
40	What is the unit for moments?	Nm

41	How can the motion of an object be described if the forces acting upon it are balanced?	It will either be at rest or moving at a constant speed.
42	How do you use a distance-time graph to find the speed of an object?	In a distance-time graph, the gradient of the line is equal to the speed of the object.
43	How do you find the gradient of a line?	Select two points on the line and calculate the change in distance and change in time between two points. Use the formula Gradient= rise/run (speed = distance/time)
44	What does the gradient (slope) of a distance-time graph tell you?	The speed of an object. The steeper the line the faster the object is moving
45	What does a curved line on a distance-time graph mean?	It means that the object's speed is changing. This is called acceleration or deceleration.
46	What is a free body diagram?	A diagram that shows the forces acting on an object
47	What happens if the resultant force on an object is zero?	• a stationary object stays stationary • a moving object continues to move at the same velocity (at the same speed and in the same direction)
48	What is Newton's first law of motion?	An object remains in the same state of motion unless a resultant force acts on it.
49	State Hooke's law	Extension of an elastic material is directly proportional to the load applied.
50	What is meant by elastic deformation?	A material/object will return to its original shape after experiencing a force that causes its shape to change.
51	What is meant by plastic deformation?	A material/object will not return to its original shape after experiencing a force that causes its shape to change.

B2 Respiration

53	What is the symbol equation for aerobic respiration?	$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$ + energy
54	What is <u>Anaerobic respiration</u> in humans	<u>Respiration without oxygen</u>. <u>e.g. glucose -> lactic acid + energy</u>
55	What is <u>Anaerobic respiration</u> in microorganisms e.g. yeast	This reaction can be used in <u>fermentation</u> to make ethanol (alcohol). E.e. glucose -> carbon dioxide + ethanol + energy

56	Why do we breathe faster during exercise?	During exercise there is a greater rate of respiration in our cells. We use the oxygen in our blood more quickly and this needs to be replaced so our muscles can carry on working. Breathing faster moves more oxygen into our lungs.
57	Name 3 effects of exercise on our bodies	Increased heart rate Increased breathing rate Sweating
58	What is EPOC?	Excess Postexercise Oxygen Consumption
59	Name a non-communicable disease that can affect your lungs	Asthma
60	Name a lifestyle choice that can affect your lungs	Smoking
61	How does aerobic respiration compare to anaerobic respiration?	Aerobic respiration happens in the mitochondria and releases more energy
62	Name a type of cell that will have high numbers of mitochondria due to its energy requirements	Muscle / nerve / sperm

P2 Energy

63	Which measurement has the standard unit Joules (J)?	Energy
64	How many Joules (J) are in 1 kilojoule (1 kJ)?	1000 (Joules per kilojoule)
65	Describe the relationship between work done by a force acting on an object and energy transferred.	They are the same
66	State the equation that shows the relationship between work done, force and distance moved in the direction of the force.	$E = F \times d$ *accept* work done (J) = force (N) x distance moved in the direction of the force (m)
67	Which measurement is a way of describing how good a machine or appliance is at transferring the energy supplied to it to useful energy.	Efficiency
68	What is the most likely explanation when it looks like energy has been lost or has disappeared?	Some energy has been transferred to the thermal energy store of the surroundings *accept* dissipated as thermal energy/heat
69	State the equation that shows the relationship between input energy, useful output energy and efficiency.	Efficiency = useful output energy ÷ total input energy
70	Draw an energy transfer diagram for a motor bike which transfers 10,000 J of chemical energy into 6000 J of kinetic energy and 4000 J of thermal energy.	Picture

71	How is a non-renewable energy resource different to a renewable one?	(non-renewable resources are) used up faster than they are produced so will run out.
72	State at least two non-renewable energy sources	(Any two from...) • Oil • Natural gas • Coal • Nuclear fuel (*accept* nuclear fission *or* nuclear fusion) *accept* Fossil fuels
73	State at least three renewable energy sources	(Any three from...) • Solar power • Wind (turbines) • Biofuel • Hydroelectricity • Geothermal • Tidal power

B3 Genetics

74	What are DNA strands stored as in the nucleus?	Chromosomes
75	What is the name for a section of DNA with the instructions for making a single protein?	A gene
76	Describe the structure of DNA.	DNA has 2 strands coiled up to form a double helix
77	How do we describe different versions of the same gene?	Alleles
78	What is variation?	All individuals in a population differ slightly from one another.
79	Name two reasons for variation within a species.	Genetic variation and environmental variation.
80	What causes genetic variation?	Sexual reproduction and mutation of DNA.
81	What causes environmental variation?	Characteristics acquired from an organism's environment.
82	What defines data for discontinuous variation?	The data can only take a limited set of values (e.g. colour, sex)
83	State the sex chromosomes contained within a male and a female body cell.	Male = XY. Female = XX.
84	When is a species considered to be extinct?	When there are no living organisms of that species left.

85	Complete the reaction: Acid + Alkali -->	Salt + water
86	How can we tell when a solution is neutral?	The pH will be 7
87	How quickly reactants are used up or products are made is called the?	Rate of reaction
88	What is the equation for calculating the mean rate of reaction?	Mean rate = change in quantity of product or reactant ÷ time taken
89	What is the unit for rate of reaction in a reaction involving a change in mass?	g/s
90	What is the unit for rate of reaction in a reaction involving a change in volume?	cm^3/s
91	What do we call the minimum amount of energy colliding particles have to have before a reaction will take place	Activation energy
92	What effect does increasing concentration have on the rate of reaction?	Increases
93	What has been changed if there are more reactant particles in the same volume leading to more frequent collisions and a quicker rate of reaction?	Concentration has increased
94	What effect does increasing pressure have on the rate of reaction?	Increases
95	What effect does increasing surface area have on the rate of reaction?	Increases
96	What has been changed if more reactant particles are exposed and able to collide, leading to more frequent collisions and a quicker rate of reaction?	Surface area has increased
97	What effect does increasing temperature have on the rate of reaction?	Increases
98	What has been changed if particles move faster with more energy, leading to more frequent energetic collisions and a quicker rare of reaction?	Temperature has increased
99	What do we call a substance that increases the rate of reaction but is not used up in the reaction?	Catalyst
100	What has been added to lower the activation energy of the reaction, resulting in more collisions result in a reaction?	Catalyst
101	A glowing splint will relight is a test for which gas?	Oxygen.
102	A possible colour change, a temperature change, production of a gas and a possible change of state are all signs that what might have occurred?	A chemical change
103	What element do all acids contain?	Hydrogen

103	What happens to the particles in a chemical reaction?	The atoms in the reactants rearrange to form new molecules
104	What is oxidation?	The addition of oxygen
105	What is reduction?	The removal of oxygen
106	What is the formula for calcium carbonate?	$CaCO_3$
107	What is thermal decomposition?	Chemical decomposition due to heat
108	What is used to extract iron from its ore?	Carbon
109	Bubbling a gas through limewater and having it go milky is a test for which gas?	Carbon dioxide

P3 Waves

110	What is an angle of incidence?	Angle between the normal and the incident ray.
111	What is a normal line	An imaginary line at right angles to the boundary between two surfaces. All angles are measured to this line.
112	What is a refracted ray?	A light ray that changes direction at a surface or boundary
113	What does refraction mean?	When a wave changes speed and sometimes direction upon entering a denser or less dense medium
114	Describe the relationship between the incident and reflected angles when light rays enter a denser material	The light ray slows down and changes direction towards the normal.
115	Describe the relationship between the incident and reflected angles when light rays enter a less dense material	The light ray speeds up and changes direction away from the normal
116	How does the eye work?	Light from a source is collected by the eye. The eye transfers chemical signals in rods and cones into electrical signals which travel to the optic nerve to the brain where an image is formed.
117	How do convex lenses help fix eyesight problems?	They refract light so that it converges before hitting the eye, focusing it on the retina
118	How do concave lenses help fix eyesight problems?	They refract light so that it disperses before hitting the eye, focusing it on the retina

119	How is white light split by a prism?	Red light is slowed down least by glass and is refracted least. Violet light is slowed down most by glass and is refracted most. As a result, the coloured light spreads out to form a spectrum of white light.
120	What are the colours of light in the visible spectrum? (start with the lowest frequency)	Red, Orange, Yellow, Green, Blue, Indigo, Violet
121	Explain how rainbows form	White light from the sun is refracted through water droplets that act like prisms, dispersing light into different colours
122	What features of light waves are the same as each other?	They are all transverse, They all travel at the same speed in a vacuum
123	What features of light waves are different from each other?	They have different wavelengths, they have different frequencies, they travel at different speeds through a medium

B4 Plants and ecosystems

124	Which gas do plants use to make their food?	Carbon dioxide
125	Plants and animals release carbon dioxide in which process?	Respiration
126	Plants convert light energy into _____ energy	Chemical energy
127	What is the process of gases moving into and out of plants called?	Diffusion
128	What factors affect the rate of photosynthesis?	Light, carbon dioxide, water
129	Which part of the plant absorbs water?	The roots
130	How are roots adapted for the uptake of water and minerals?	They have root hairs which increases the roots surface area
131	What is an ecosystem?	An area in which all the living and non-living factors form a stable relationship.
132	What word describes "All the different organisms living and interacting with one another in a particular area."?	Community
133	What word describes "A group of one species living in the same area."?	A population
134	What word describes "The variety of species in an area."?	Biodiversity
135	How is energy transferred in food webs?	By consumers eating producers/prey
136	How could we measure the difference in plant distribution from a shaded area to an area in full light?	Use a quadrat and a belt transect

137	What is the name given to animals in a food web?	Consumers
138	What is the name given to plants in a food web?	Producers
139	What do the arrows represent in a food web?	Energy transfer
140	Name the vessel used to transport water around the plant:	Xylem vessels
141	Name the vessel used to transport sugar around the plant:	Phloem vessels
142	All organisms in an ecosystem depend upon each other. What do we call this?	Interdependence

C4 Earth and space

143	Collecting, cleaning, processing materials so that they can be used again is better known as what?	Recycling
144	Bricks, plates, cups, tiles, and electrical power line insulators are made from what type of material?	Ceramics
145	The typical characteristics, hard, brittle, stiff, solid at room temperature, easily broken and electrically insulating, are common to what group of materials.	Ceramics
146	Why do ceramics have such high melting points	Strong bonds in their molecules need a lot of energy to break
147	Wool, cotton and rubber are all natural examples of which group of materials?	Natural polymers
148	Polyethene, PVC, styrene are all synthetic examples of which group of materials?	Synthetic polymers
149	What group of materials are made from chains of identical molecules repeated over and over again?	Polymers
150	The typical characteristics, malleable, stretchy, solid at room temperature, easy to shape, easy to mould, electrically and thermally insulating and made from hydrocarbon molecules are common to what group of material?	Polymers
151	Reinforced concrete, fibreglass, Kevlar, are all examples of what group of materials?	Composites
152	What type of material is described as, a mixture of materials with properties that are a combination of those that make it up?	Composites
153	The typical characteristics, hard, ductile, shiny, solid at room temperature, good conductors, sonorous and dense, are common to what group of materials?	Metals
154	What are stars formed from?	Nebulae / clouds of gas and dust

155	What happens to stars which are much bigger than our Sun	They explode in a supernova and will become a neutron star or a black hole.
156	What is the most widely accepted theory about the beginning of the universe?	The Big Bang
157	What type of star is our Sun	A red giant
158	What will happen to our Sun	It will become a white dwarf
159	Write 0.0005 in standard form?	5×10^{-4}
160	What is 135,000 in standard form?	1.35×10^{5}

P4 Electricity and magnetism

161	What is the unit for resistance?	Ohms (Ω)
162	Explain what causes electrical resistance in a wire	Electrons collide with metal ions inside the wire
163	Recall the equation for calculating potential difference using resistance	Potential difference = current x resistance
164	Explain what happens to resistance as the wire becomes hotter	As the wire becomes hotter, the metal ions vibrate more. This causes an increase of collisions with the flowing electrons, and decreases the rate of electron flow. This is a decrease in current.
165	State three factors which can affect resistance	Length of wire, thickness of wire, type of metal, temperature of wire.
166	What unit do we measure power in?	Watts (W)
167	How are energy resources used in electrical power generation?	The energy they provide is converted into electrical energy in a generator.
168	How does a simple dynamo work?	A current is induced by moving a conductor through an electrical field.
169	How can you calculate power using the energy transferred in an object and the time it is used for?	Power = Energy transferred/time taken P = E / t
170	How can you calculate power using current and voltage?	Power = Current x voltage P = I x V