Quick Quiz

	Answers				Marks
Topic	**Q1**	**Q2**	**Q3**	**Q4**	
8Ea	B	D	A	B	4
8Eb	A	D	C	D	4
8Ec	C	B	A	D	4
8Ed	D	C	A	B	4
8Ee	C	B	D	B	4

End of Unit Test Mark Scheme Standard (S)

Question	Part	Step	Answer	Mark scheme
1	**a**	**1st**	hot	**1 mark**
	b	**2nd**	flames	**1 mark**
	c	**3rd**	fire extinguisher	**1 mark**
2		**5th** **5th**	combustion – a reaction in which burning happens fuel – a substance that contains stored energy that can be released during burning hydrocarbon – a substance that contains only hydrogen and carbon oxidation – a reaction in which a substance combines with oxygen	**2 marks** – 2 marks for all correct; 1 mark for 2 or 3 correct; 0 marks for 1 or fewer correct
3	**ai**	**5th**	**B** increases	**1 mark**
	aii	**5th**	**A** water is being produced	**1 mark**
	aiii	**5th**	**D** cloudy	**1 mark**
	b	**6th**	The carbon dioxide from the burning fuel makes limewater turn cloudy.	**1 mark**
4	**ai**	**4th**	**A** height of candle	**1 mark**
	aii	**4th**	**D** time for candle to go out	**1 mark**
	b	**4th**	To make the test fair/So that they don't affect the dependent variable	**1 mark**
	c	**4th**	Use the same size of candle/container in each test.	**1 mark**
5	**a**	**5th**	oxygen	**1 mark**
	b	**6th**	It shows the three factors needed for a fire to burn.	**1 mark**
	c	**6th**	It cools the fire down/takes heat away from the fire.	**1 mark**
	d	**6th**	It makes the fire explode and spread.	**1 mark**
6	**a**	**6th**	magnesium oxide	**1 mark**
	b	**7th**	magnesium + oxygen → magnesium oxide	**1 mark**
	c	**6th**	**C** The mass of the products is the same as the mass of the reactants.	**1 mark**

Question	Part	Step	Answer	Mark scheme
7	ai	5th	sulfur dioxide	1 mark
	aii	5th	nitrogen oxides/NO_x gases (Do not accept 'soot particles'.)	1 mark
	b	7th 7th	Many of the gases released by fossil fuel combustion are acidic; They dissolve in the clouds and make the rain *more acidic* than normal. (Do not accept 'make the rain acidic'.)	1 mark 1 mark
	c	7th 7th	Carbon in hydrocarbon fuel reacts with oxygen from air; but there is not enough oxygen for it all to form carbon dioxide (or equivalent).	1 mark 1 mark
	d	7th 7th	Use a catalytic converter on the exhaust; because it converts carbon monoxide to carbon dioxide.	1 mark 1 mark
	e	7th 7th	It is causing an increase in the greenhouse effect; leading to global warming and climate change.	1 mark 1 mark

Final Step Calculation

Marks	Step
1-2	Below 1st
3	1st
4	2nd
5–7	3rd
8–12	4th
13–17	5th
18–22	6th
23–30	7th

End of Unit Test Mark Scheme Higher (H)

Question	Part	Step	Answer	Mark scheme
1	a	6th	**B** The temperature increases because energy is transferred from the fuel to the surroundings.	1 mark
	b	6th	**C** The limewater will turn cloudy because it reacts with carbon dioxide produced in the reaction.	1 mark
	c	6th	**A** The cobalt chloride paper will turn pink because water is produced in the reaction.	1 mark
	d	7th 7th	Soot/unburnt carbon; This is formed because there is not enough oxygen for all the fuel to burn completely.	1 mark 1 mark

Question	Part	Step	Answer	Mark scheme
2	a	7th 7th	hydrocarbon + oxygen → carbon dioxide + water	**2 marks –** 1 mark for reactants; 1 mark for products
	b	6th	Any suitable answer with appropriate explanation, e.g. ● if oxygen concentration in container drops too low because oxygen is needed for the reaction. ● carbon dioxide gas excludes oxygen from the flame.	**1 mark** for answer with good explanation.
	ci cii	5th 5th 5th 5th	Any two variables that could affect time of burning, with suitable explanation of why it might affect burning time and suggestion of how it should be controlled, e.g. ● Volume of container because different volumes contain different amounts of oxygen and more oxygen means flame could burn for longer. ● Control by using identical container in each test. ● Length of time candle has been alight before covering because flame also melts wax, making it easier for it to move up the wick and burn. ● Make sure candles have been burning for same time or have same-sized pool of melted wax before covering.	**4 marks** –for each variable: **1 mark** for explanation **1 mark** for suggestion
	d	8th 8th	Phlogiston theory: Scientists thought that things burnt because they contained phlogiston; Oxygen theory: We now know that substances need oxygen present so they can burn.	**1 mark** **1 mark**
3	a	6th	**A** magnesium oxide	**1 mark**
	b	7th 7th	The difference in mass of 3.2g between the magnesium metal reactant and the magnesium oxide product is the mass of the oxygen that reacted with the magnesium; This is because atoms are not created or destroyed in the reaction, just rearranged.	**1 mark** **1 mark**
4	a i ii	7th 7th	Sulfur impurities in fossil fuels react with oxygen when the fuel is burnt to form sulfur dioxide; Nitrogen reacts with oxygen at the high temperature in a vehicle engine to form nitrogen oxides.	**1 mark** **1 mark**
	b	6th	These gases make rain more acidic than normal/cause acid rain. (Do not accept: 'make the rain acidic')	**1 mark**
	c	7th	The gases dissolve in water droplets in clouds and fall as acid rain, which damages the environment and living organisms.	**1 mark**

Question	Part	Step	Answer	Mark scheme
	d	**7th**	Any suitable method supported by an appropriate explanation. For example: ● reducing the amount of fossil fuel burnt by using nuclear fuel/renewable forms of energy to generate electricity, because these produce little or no carbon dioxide ● reducing the amount that we use our cars, or changing their fuel so that we burn less petrol or diesel, because that will mean less carbon dioxide is released.	**1 mark** only if supported by an appropriate explanation.
5	**a**	**6th**	The graph shows that the extent of ice has decreased between 1979 and 2010 by 1.4 million square kilometres, at a rate of about 0.05 million square kilometres a year.	**1 mark** only if numerical calculation included.
	b	**7th** **7th**	Human activity, such as the burning of fossil fuels, is increasing the amount of carbon dioxide in the atmosphere. Increased carbon dioxide is causing global warming which will result in more ice melting.	**1 mark** **1 mark**

Final Step Calculation

Marks	Step
1–5	Below 5th
6–9	5th
10–14	6th
15–18	7th
19–25	8th

Quick Check answers

Topic	Step	Answers
8Ea	**4th–5th**	Steam – Transfers energy from combustion to the engine in an external combustion engine. Hydrocarbon – A compound that is formed only from hydrogen and carbon atoms. Reactants – Substances that react together in a chemical reaction. Pollutant – Substance that causes damage to the environment and the organisms that live in it. Combustion – The scientific word for burning. Cobalt chloride – A substance that changes colour from blue to pink when water is added. Water – The substance produced when hydrogen reacts with oxygen. Products – The substances formed in a chemical reaction. Fossil fuel – A fuel that was formed from the bodies of organisms that died millions of years ago, such as coal and oil. Limewater – A test for carbon dioxide, as it turns cloudy when the gas is bubbled through it. Hydrogen – A gas that combusts explosively with oxygen if there is a spark or flame. Fuel – A substance that contains stored energy that can usefully be transferred to make things happen.

8Eb	**3rd** **5th** **7th** **5th** **4th** **5th** **5th**	Zinc is a metal. When zinc is heated strongly in air it reacts with oxygen to form zinc oxide. The word equation for the reaction is: zinc + oxygen → zinc oxide This kind of reaction is called oxidation. The mass of product formed is 0.8 grams more than the mass of zinc at the start. This difference is the mass of oxygen that reacted with the zinc. We know this because the law of conservation of mass states that the mass of the reactants is the same as the mass of the products in a chemical reaction.
8Ec	**3rd** **7th** **4th** **5th** **5th** **6th** **5th** **3rd**	Any suitable questions that display understanding of fire hazards and how they can be controlled. For example: **1** What is the scientific word for burning? **2** What kind of change occurs when a chemical reaction gives out energy that causes heating? **3** Which three factors are needed for a fire? **4** How could you stop a large forest fire? **5** Which kind of extinguisher could be used to put out a fire near the ground? **6** What would happen if you put water on to a chip pan fire? **7** Why does a fire blanket help to put out a fire? **8** What does the hazard symbol that just shows flames on it mean?
8Ec WS	**4th** **4th** **4th–5th** **5th**	**1** height of candle **2** time before candle goes out **3** Any variable that might affect the candle, with a description of how it could be controlled, such as: ● size of container/use same size of container ● type of candle/use same type of candle ● shape of container/use same shape of container ● length of time candle was burning before container placed over it/use same time for each candle ● length of candle wick/trim candle wicks to same length before lighting **4** So we can be certain that any change which happens in the dependent variable has been caused by change in the independent variable.
8Ed	**5th–6th** **6th–7th**	**1** Carbon dioxide/global warming/both vehicle exhausts and power station emissions; Carbon monoxide/causes poisoning/vehicle exhausts; Soot particles/damages breathing system and can trigger asthma/vehicle exhausts; Sulfur dioxide/dissolves in clouds to form acid rain/power station emissions (and vehicle exhausts if using fuel that has not had sulfur impurities removed); Nitrogen oxides/dissolve in clouds to form acid rain/power station emissions and vehicle exhausts. **2** **a** Catalytic converter changes carbon monoxide and nitrogen oxides into less-polluting gases. Soot filters remove soot particles. **b** Scrubbing of power station gases removes sulfur dioxide.

Topic	Step	Answers
8Ee	**6th–8th**	Any suitable sentences that use one of the words or phrases and display understanding of carbon dioxide and global warming. For example: **1** The Earth's surface temperature varies over time because electric cars don't burn fossil fuels in their engines. The Earth's surface temperature varies over time and in the past this has happened naturally. **2** The greenhouse effect is a natural effect caused by gas such as carbon dioxide in the atmosphere transferring energy back to the Earth. The greenhouse effect is a natural effect caused by gas; however, the effect is being increased as more carbon dioxide is released into the air from human activity. **3** The carbon dioxide concentration in the air is increasing because human activities are releasing large amounts of the gas. The carbon dioxide concentration in the air is increasing which is leading to increased global warming and climate change. **4** Climate change is a result of global warming which could cause greater storms, but we can't be certain of this. Climate change is a result of global warming and this could result in more droughts, floods and storms. **5** Carbon dioxide emissions can be controlled by setting targets for countries so that they have to reduce the amount they release into the air. Carbon dioxide emissions can be controlled by setting targets for countries but it may be difficult for countries to achieve those targets if they don't have the right resources. **6** We could reduce carbon dioxide emissions by replacing petrol cars with electric cars because electric cars don't burn fossil fuels in their engines. We could reduce carbon dioxide emissions by replacing petrol cars with electric cars but carbon dioxide is released when fossil fuel power stations generate electricity, so this may not reduce carbon dioxide emissions by very much.
8Ee Lit		**1** Who: 'Dr Jackson is a climatologist'. What: 'the effects of global warming'. **2** What: 'global warming melts the ice', where: 'over the poles'. What: 'gases will be released into the atmosphere', where: 'wet forest soils and cool ocean water'. **3** How or why: 'when the ice has melted…more rapidly', 'these gases will be released…more rapidly.'