Year 11 Foundation Combined Science Crib Sheet

BIOLOGY PAPER 1

EXAM DATE: 17th May (Morning)

Primrose Kitten Video https://www.youtube.com/watch?v=mKYQ-K23Mr4

Practicals;

1: use of a light microscope.
3: use qualitative reagents to test for a range of carbohydrates, lipids and proteins.
5: investigate the effect of light on the rate of photosynthesis of an aquatic plant such as pondweed.

List of topics in Specification order;

-Cell division
-Animal tissues, organs and organ systems
-Communicable diseases
-Photosynthesis

Topics **not assessed** in this paper:

-Osmosis
-Active transport
-Coronary heart disease: a non-communicable disease
-Uses of glucose from photosynthesis
-Respiration

Topics not listed may be assessed in low-tariff questions

CHEMISTRY PAPER 1

EXAM DATE: 27th May (Morning)

Primrose Kitten Video: https://www.youtube.com/watch?v=MpQ-3YAwNhI

Practicals;

8: preparation of a pure, dry sample of a soluble salt
9: investigate what happens when aqueous solutions are electrolysed
10: investigate the variables that affect temperature changes in reacting solutions

List of topics in Specification order;

-The periodic table
-How bonding and structure are related to the properties of substances
-Structure and bonding of carbon
-Reactivity of metals
-Reactions of acids
-Electrolysis

Topics **not assessed** in this paper:
• Not applicable

Topics not listed may be assessed in low-tariff questions

PHYSICS PAPER 1

EXAM DATE: 9th June (Afternoon)

Primrose Kitten Video: https://www.youtube.com/watch?v=xtw-Z0nllA4&feature=youtu.be

Practicals;

14: an investigation to determine the specific heat capacity of one or more materials. The investigation will involve linking the decrease of one energy store (or work done) to the increase in temperature and subsequent increase in thermal energy stored.
16: use circuit diagrams to construct appropriate circuits to investigate the I–V characteristics of a variety of circuit elements, including a filament lamp, a diode and a resistor at constant temperature.

List of topics in Specification order;

-Energy changes in a system, and the ways energy is stored before and after such changes
-National and global energy resources
-Current, potential difference and resistance
-Changes of state and the particle model
-Atoms and nuclear radiation

Topics **not assessed** in this paper:

-Domestic uses and safety
-Particle model and pressure
-Atoms and isotopes

Topics not listed may be assessed in low-tariff questions

BIOLOGY PAPER 2

EXAM DATE: 15th June (Morning)

Primrose Kitten Video https://www.youtube.com/watch?v=Uqti-xPnT-8

Practicals;

7: measure the population size of a common species in a habitat

List of topics in Specification order;

-Hormonal control in humans
-Reproduction
-Adaptations, interdependence and competition
-Organisation of an ecosystem

Topics **not assessed** in this paper:

-The human nervous system
-Hormones in human reproduction
-Contraception
-Sexual and asexual reproduction
-Meiosis
-Sex determination
-Variation
-Evolution
-Selective breeding
-Extinction
-Resistant bacteria
-Adaptations
-Biodiversity
-Land use
-Deforestation
-Global warming
-Maintaining biodiversity

Topics not listed may be assessed in low-tariff questions

CHEMISTRY PAPER 2

EXAM DATE: 20th June (Morning)

Primrose Kitten Video: https://www.youtube.com/watch?v=_HJu8WTtZJU

Practicals;

11: investigate how changes in concentration affect the rates of reactions by a method involving measuring the volume of a gas produced and a method involving a change in colour or turbidity.
12: investigate how paper chromatography can be used to separate and tell the difference between coloured substances. Students should calculate Rf values.

List of topics in Specification order;

-Rate of reaction
-Reversible reactions and dynamic equilibrium
-Carbon compounds as fuels and feedstock
-Purity, formulations and chromatography
-The composition and evolution of the Earth's atmosphere
-Common atmospheric pollutants and their sources
-Using the Earth's resources and obtaining potable water

Topic **not assessed** in this paper:
-Carbon dioxide and methane as greenhouse gases

Topics not listed may be assessed in low-tariff questions

PHYSICS PAPER 2

EXAM DATE: 23rd June (Morning)

Primrose Kitten Video: https://www.youtube.com/watch?v=X1aMXCr75Kw

Practicals;

21: investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface.

List of topics in Specification order;

-Forces and their interactions
-Describing motion along a line
-Forces, accelerations and Newton's Laws of motion
-Forces and braking
-Electromagnetic waves
-Permanent and induced magnetism, magnetic forces and fields
-The motor effect

Topic **not assessed** in this paper:

-Forces and elasticity

Topics not listed may be assessed in low-tariff questions

Command Words

Command words are the words and phrases used in exams that tell students how they should answer a question.

Balance

Students need to balance a chemical equation.

Calculate

Students should use numbers given in the question to work out the answer.

Choose

Select from a range of alternatives.

Compare

This requires the student to describe the similarities and/or differences between things, not just write about one.

Complete

Answers should be written in the space provided, for example, on a diagram, in spaces in a sentence or in a table.

Define

Specify the meaning of something.

Describe

Students may be asked to recall some facts, events or process in an accurate way.

Design

Set out how something will be done.

Determine

Use given data or information to obtain and answer.

Draw

To produce, or add to, a diagram.

Estimate

Assign an approximate value.

Evaluate

Students should use the information supplied, as well as their knowledge and understanding, to consider evidence for and against when making a judgement.

Explain

Students should make something clear, or state the reasons for something happening.

Give

Only a short answer is required, not an explanation or a description.

How/What/When/Where/Which/Who/Why

These can be used for more direct questions.

Identify

Name or otherwise characterise.

Justify

Use evidence from the information supplied to support an answer.

Label

Provide appropriate names on a diagram.

Measure

Find an item of data for a given quantity.

Name

Only a short answer is required, not an explanation or a description. Often it can be answered with a single word, phrase or sentence.

Plan

Write a method.

Plot

Mark on a graph using data given.

Predict

Give a plausible outcome.

Show

Provide structured evidence to reach a conclusion.

Sketch

Draw approximately.

Suggest

This term is used in questions where students need to apply their knowledge and understanding to a new situation.

Use

The answer must be based on the information given in the question. Unless the information given in the question is used, no marks can be given. In some cases students might be asked to use their own knowledge and understanding.

Write

Only a short answer is required, not an explanation or a description.

Subject Specific Vocabulary

Accuracy

A measurement result is considered accurate if it is judged to be close to the true value.

Calibration

Marking a scale on a measuring instrument. This involves establishing the relationship between indications of a measuring instrument and standard or reference quantity values, which must be applied. For example, placing a thermometer in melting ice to see whether it reads zero, in order to check if it has been calibrated correctly.

Data

Information, either qualitative or quantitative, that has been collected.

Error

See also uncertainty.

Measurement error

The difference between a measured value and the true value.

Anomalies

These are values in a set of results which are judged not to be part of the variation caused by random uncertainty.

Random error

These cause readings to be spread about the true value, due to results varying in an unpredictable way from one measurement to the next. Random errors are present when any measurement is made, and cannot be corrected. The effect of random errors can be reduced by making more measurements and calculating a new mean.

Systematic error

These cause readings to differ from the true value by a consistent amount each time a measurement is made. Sources of systematic error can include the environment, methods of observation or instruments used. Systematic errors cannot be dealt with by simple repeats. If a systematic error is suspected, the data collection should be repeated using a different technique or a different set of equipment, and the results compared.

Zero error

Any indication that a measuring system gives a false reading when the true value of a measured quantity is zero, eg the needle on an ammeter failing to return to zero when no current flows. A zero error may result in a systematic uncertainty.

Evidence

Data which has been shown to be valid.

Fair test

A fair test is one in which only the independent variable has been allowed to affect the dependent variable.

Hypothesis

A proposal intended to explain certain facts or observations.

Interval

The quantity between readings, eg a set of 11 readings equally spaced over a distance of 1 metre would give an interval of 10 centimetres.

Precision

Precise measurements are ones in which there is very little spread about the mean value. Precision depends only on the extent of random errors – it gives no indication of how close results are to the true value.

Prediction

A prediction is a statement suggesting what will happen in the future, based on observation, experience or a hypothesis.

Range

The maximum and minimum values of the independent or dependent variables; important in ensuring that any pattern is detected. For example a range of distances may be quoted as either: 'From 10 cm to 50 cm' or 'From 50 cm to 10 cm'.

Repeatable

A measurement is repeatable if the original experimenter repeats the investigation using same method and equipment and obtains the same results. Previously known as reliable.

Reproducible

A measurement is reproducible if the investigation is repeated by another person, or by using different equipment or techniques, and the same results are obtained. Previously known as reliable.

Resolution

This is the smallest change in the quantity being measured (input) of a measuring instrument that gives a perceptible change in the reading.

Sketch graph

A line graph, not necessarily on a grid, that shows the general shape of the relationship between two variables. It will not have any points plotted and although the axes should be labelled they may not be scaled.

True value

This is the value that would be obtained in an ideal measurement.

Uncertainty

The interval within which the true value can be expected to lie. Whenever a measurement is made, there will always be some uncertainty or doubt about the result obtained. Uncertainty can be expressed in terms of spread of values obtained. For example, a length of 56 cm ±2 cm would mean the true value could be anywhere between 54 cm and 58 cm.

Validity

Suitability of the investigative procedure to answer the question being asked. For example, an investigation to find out if the rate of a chemical reaction depended upon the concentration of one of the reactants would not be a valid procedure if the temperature of the reactants was not controlled.

Valid conclusion

A conclusion supported by valid data, obtained from an appropriate experimental design and based on sound reasoning.

Variables

These are physical, chemical or biological quantities or characteristics.

Categoric

Categoric variables have values that are labels, eg names of plants or types of material.

Continuous

Continuous variables can have values (called a quantity) that can be given a magnitude either by counting (as in the case of the number of shrimp) or by measurement (eg light intensity, flow rate etc). Previously known as discrete variable.

Control

Control variable is one which may, in addition to the independent variable, affect the outcome of the investigation and therefore has to be kept constant or at least monitored.

Dependent

Dependent variable is the variable of which the value is measured for each and every change in the independent variable.

Independent

Independent variable is the variable for which values are changed or selected by the investigator.

Required Practicals

Microscopy	Spec ref	Skills, ATs and maths skills (MS)	Content including WS	Key words and subject specific vocabulary
Use a light microscope to observe, draw and label a selection of plant and animal cells. A magnification scale must be included.	Trilogy 4.1.1.5 Synergy 4.1.3.2 Biology 4.1.1.5	AT7 – use of appropriate apparatus, techniques and magnification, including microscopes to make observations of biological specimens and produce labelled scientific drawings. **MS** Recognise and use standard form, make and use estimations, appropriate use of significant figures, make order of magnitude calculations (1b, 1d, 2a, 2h). 3d – solve equations.	Cell structures Animal and plant cells Microscopy/calculating magnification Specialisation of cells How microscopes have changed over time and increased our understanding **WS** 1.1, 1.2, 4.4, 4.5	Resolution Magnification Mitochondria Ribosomes Eukaryotic Prokaryotic Accuracy Measurement error – would this be random or systematic if humans read it incorrectly?

Food tests	Spec ref	Skills, ATs and maths skills (MS)	Content including WS	Key words and subject specific vocabulary
Use qualitative reagents to test for a range of carbohydrates, lipids and proteins. To include: Benedict's test for sugars; iodine test for starch; and Biuret reagent for protein.	Trilogy 4.2.2.1 Synergy 4.2.1.5 Biology 4.2.2.1	AT2 – safe use of appropriate heating devices and techniques including the use of a Bunsen burner and a water bath.	Food tests, indicator and colour change Carbohydrates – sugars and starch Why you need a water bath **WS** 2.3, 2.4	Indicator Reagent Iodine Benedict's solution Starch Biuret Spotting tile Water bath Pipette Lipids

Photosynthesis	Spec ref	Skills, ATs and maths skills (MS)	Content including WS	Key words and subject specific vocabulary
Investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed.	Trilogy 4.4.1.2 Synergy 4.2.2.6 Biology 4.4.1.2	AT1 – use of appropriate apparatus to make and record a range of measurements accurately, including time and volume of a gas. AT3 – use of appropriate apparatus and techniques for the observation and measurement of biological changes and/or processes. AT4 – safe and ethical use of living organisms (plants or animals) to measure physiological functions and responses to the environment. AT5 – measurement of rates of reaction by a variety of methods including the production of gas. **MS** Measure and calculate rates using data from graphs	Photosynthesis: What it is, where it occurs, word equation, products and what they are used for Rate of photosynthesis: effects of variables on rate of photosynthesis How rate is limited (HT) Interpreting graphs of limiting factors (1 factor only FT more than 1 HT) Application to greenhouses Inversesquare law and light intensity (HT) Balanced symbol equations (HT) Use of glucose from photosynthesis Safety of using ethanol	Photosynthesis Respiration Cellulose Protein synthesis Nitrate ions Phloem Prediction Range Continuous variable Control, dependent, independent
			Linking ideas – translocation and structure of phloem is adapted to its functions in the plant **WS** 3.1, 3.3, 3.7	

Field investigations	Spec ref	Skills, ATs and maths skills (MS)	Content including WS	Key words and subject specific vocabulary
Measure the population size of a common species in a habitat. Use sampling techniques to investigate the effect of a factor on the distribution of this species.	Trilogy 4.7.2.1 Synergy 4.4.2.4 Biology 4.7.2.1	AT1 – use of appropriate apparatus to make and record a range of measurements accurately including length and area. AT 4 – safe and ethical use of a living organism (plants or animals) to measure physiological functions and responses to the environment. AT 6 – application of appropriate sampling techniques to investigate the distribution and abundance of organisms in an ecosystem via direct use in the field. **MS** Understand the principles of sampling as applied to scientific data (2d) Mean, mode and median (2f) Scatter diagrams (2g) Calculate areas (5c)	Levels of organisation in an ecosystem Feeding relationships – food chains and webs Predator and prey relationships How to measure the size of a population (always poorly answered) How to ensure sampling is random Interdependence and competition How to carry out a line transect Factors affecting communities – abiotic and biotic **WS** 2.5, 3.6	Transects Quadrats Species Ecosystems Habitats Population Community Producers and consumers Predator and prey Stable community Abiotic factor Biotic factor Biodiversity

Making salts	Spec ref	Skills, ATs and maths skills (MS)	Content including WS	Key words and subject specific vocabulary
Preparation of a pure, dry sample of a soluble salt from an insoluble oxide or carbonate, using a Bunsen burner to heat dilute acid and a water bath or electric heater to evaporate the solution.	Trilogy 5.4.2.3 Synergy 4.7.3.2 Chemistry 4.4.2.3	AT2 – safe use of appropriate heating devices and techniques including the use of a Bunsen burner and water bath or electric heater. AT4 – safe use of a range of equipment to purify and/or separate a chemical mixture including evaporation, filtration and crystallisation. AT6 – safe use and careful handling of gases, liquids and solids, including careful mixing of reagents under controlled conditions, using appropriate apparatus to explore chemical changes and/or products.	Acids and alkalis Reactions of acids with metals and metal carbonates – word equations pH scale and neutralisation Making soluble salts from metals , metal oxides, hydroxides and carbonates Processes – filtration and crystallisation Weak and strong acids (HT) **WS** 2.3, 2.4	Acid Base Alkali Salt Soluble Insoluble Neutralisation Reactants Filtration Crystallisation

Electrolysis	Spec ref	Skills, ATs and maths skills (MS)	Content including WS	Key words and subject specific vocabulary
Investigate what happens when aqueous solutions are electrolysed using inert electrodes. This should be an investigation involving developing a hypothesis.	Trilogy 5.4.3.4 Synergy 4.7.5.3 Chemistry 4.4.3.4	AT3 – use of appropriate apparatus and techniques for conducting and monitoring chemical reactions including appropriate reagents and/or techniques for the measurement of pH in different situations. AT7 – use of appropriate apparatus and techniques to draw, set up and use electrochemical cells for separation and production of elements and compounds.	Process of electrolysis What is formed at each electrode and why Electrolysis of aqueous solutions Half equations (HT) Test for gases Oxidation and reduction in electrolysis Why we use electrolysis **WS** 1.4, 2.1, 2.2	Reagent Electolysis Ions Electrolytes Electrodes Anode Cathode Ionic componds Molten state Oxidation Reduction Types of variables

Temperature changes	Spec ref	Skills, ATs and maths skills (MS)	Content including WS	Key words and subject specific vocabulary
Investigate the variables that affect temperature changes in reacting solutions, (eg acid plus metals, acid plus carbonates, neutralisations, displacement of metals).	Trilogy 5.5.1.1 Synergy 4.7.3.3 Chemistry 4.5.1.1	AT1 – use of appropriate apparatus to make and record a range of measurements accurately, including mass, temperature and volume of liquids. AT5 – making and recording appropriate observations during chemical reactions including changes in temperature. AT6 – safe and careful handling of gases, liquids and solids including careful mixing of reagents under controlled conditions, using appropriate apparatus to explore chemical changes and/or products. **MS** Significant figures (2a) Means (2b) Plotting graphs (4c)	Exo and endothermic reactions Everyday examples Energy transfer during a chemical reaction Energy is conserved in chemical reactions Identify examples Reaction profiles Bonds breaking and forming (HT) Calculate energy transferred (HT) **WS** 2.6, 2.7, 3.1	Exothermic Endothermic Carbonates Neutralisation Displacement Activation energy Reaction profiles Resolution Accuracy Precision Repeatability Reproducible

Rates of reaction	Spec ref	Skills, ATs and maths skills (MS)	Content including WS	Key words and subject specific vocabulary
Investigate how changes in concentration affect the rates of reactions by a method involving measuring the volume of a gas produced and a method involving a change in colour or turbidity. This should be an investigation involving developing a hypothesis.	Trilogy 5.6.1.2 Synergy 4.7.4.3 Chemistry 4.6.1.2	AT1 – use of appropriate apparatus to make and record a range of measurements accurately, including mass, time, temperature and volumes of liquids and gases. AT3 – use of appropriate apparatus and techniques for conducting and monitoring chemical reactions. AT5 - making and recording appropriate observations during chemical reactions including the measurement of rates of reaction by a variety of methods such as production of gas and colour change. AT6 – safe and careful handling of liquids and solids, including careful mixing of reagents under controlled conditions, using appropriate apparatus to explore chemical changes. **MS** Percentages and percentage change (1c). Means (2b). Draw and use the slope of a tangent to a curve as a measure of rate of reaction (4e).	Factors that affect rates of reactions: • Concentration • Pressure • surface area • temperature • catalyst Calculating rates of reactions and units (g/s or cm3/s) Analysis of results from the reactants Quantity of reactants in terms of moles Collision theory – understanding, predicting and explaining the effects of changes in variables on rate **WS** 2.2, 2.3, 3.6, 3.7	Concentration Surface area Catalyst Collision theory Activation energy Types of errors Random error Systematic error Zero error

Chromatography	Spec ref	Skills, ATs and maths skills (MS)	Content including WS	Key words and subject specific vocabulary
Investigate how paper chromatography can be used to separate and tell the difference between coloured substances. Students should calculate Rf values.	Trilogy 5.8.1.3 Synergy 4.2.2.4 Chemistry 4.8.1.3	AT4 – safe use of a range of equipment to purify and/or separate chemical mixtures including chromatography. **MS** Significant figures (2a). Substitute numerical values into algebraic equations using appropriate units for physical quantities (3c).	What a pure substance is and how melting and boiling point are used to distinguish it from a mixture. Look at relevant data Formulations – what one is, how they are made, types of this that are formulations – interpret info to identify them Chromatography – what its used for, explain how it works, what the different phases mean Calculate Rf value and what it means Effect of using different solvents on Rf values What is a pure substance Interpreting chromatograms **WS** 2.2, 3.5, 4.6	Pure Formulations Stationary phase Mobile phase Solvent Chromatogram

Specific heat capacity	Spec ref	Skills, ATs and maths skills (MS)	Content including WS	Key words and subject specific vocabulary
An investigation to determine the specific heat capacity of one or more materials. The investigation will involve linking the decrease of one energy store (or work done) to the increase in temperature and subsequent increase in thermal energy stored.	Trilogy 6.1.1.3 6.3.2.2 Synergy 4.1.1.4 Physics 4.1.1.3 4.3.2.2	AT1 – use of appropriate apparatus to make and record measurements of mass, time and temperature accurately. AT5 – use in a safe manner appropriate apparatus to measure energy changes/transfers and associated values such as work done. **MS** Recognise and use decimals (1a). Use an appropriate number of significant figures (2a). Find arithmetic means (2b). y=mx+c represents a linear relationship (4b).	Calculate the amount of energy stored or released in a system Change in thermal energy = mass × specific heat capacity × temperature change Thermal energy measured in joules Definition of specific heat capacity	A system Joules Work done/energy transfer Specific heat capacity Power
		Plot variables (4c). Determine the slope and intercept of a linear graph (4d).	Different ways to calculate power: $\text{Power} = \frac{\text{energy transferred}}{\text{time}}$ $\text{Power} = \frac{\text{work done}}{\text{time}}$ Definition of work done (energy transfer) Conservation and dissipation of energy Calculate gradients from a graph **WS** 2.3, 2.4, 2.7	

I–V characteristics	Spec ref	Skills, ATs and maths skills (MS)	Content including WS	Key words and subject specific vocabulary
Use circuit diagrams to construct appropriate circuits to investigate the I-V characteristics of a variety of circuit elements including a filament lamp, a diode and a resistor at constant temperature.	Trilogy 6.2.1.4 Synergy 4.7.2.2 Physics 4.2.1.4	AT6 – use appropriate apparatus to measure current and potential difference and to explore the characteristics of a variety of circuit elements. AT7 – use circuit diagrams to construct and check series and parallel circuits including a variety of common circuit elements. **MS** Use a scatter diagram to identify a correlation (2g). y=mx+c represents a linear relationship (4b). Plot variables (4c).	Names of components where resistance is not constant as current changes Relationship between the resistance of common components as current changes Use of LDRs Drawing circuit diagrams using correct symbols Interpreting the graphs representing these relationships (linear or non-linear), relating the curves to their function and properties **WS** 3.5	Ohmic conductor Diodes Thermistors LDRs Filament lamp

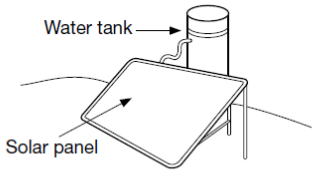
Radiation and absorption	Spec ref	Skills, ATs and maths skills (MS)	Content including WS	Key words and subject specific vocabulary
Investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface.	Trilogy 6.6.2.2 Synergy 4.1.4.3 Physics 4.6.2.2	AT1 – use appropriate apparatus to make and record a range of measurements accurately including temperature. AT4 – make observations of the effects of the interaction of electromagnetic waves with matter.	What are electromagnetic waves? Types and examples of electromagnetic waves and how they are grouped by frequency and wavelength Properties, uses and application of electromagnetic waves Investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface Different substances may absorb, transmit, refract or reflect electromagnetic waves in ways that vary with wavelength (HT)	Absorption Reflection Radiation

Quality of Written Communication Mark Scheme

	Level 1: Basic 1-2 Marks	Level 2: Clear 3-4 Marks	Level 3: Detailed 5-6 Marks
Knowledge	• Knowledge of basic information	• Knowledge of accurate information	• Knowledge of accurate information appropriately contextualised
Understanding	• Simple understanding	• Clear understanding	• Detailed understanding, supported by relevant evidence and examples
Organisation	• The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail	• The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given	• Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately
Spelling, punctuation & grammar	• The spelling, punctuation and grammar are very weak.	• There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.	• The answer shows almost faultless spelling, punctuation and grammar.

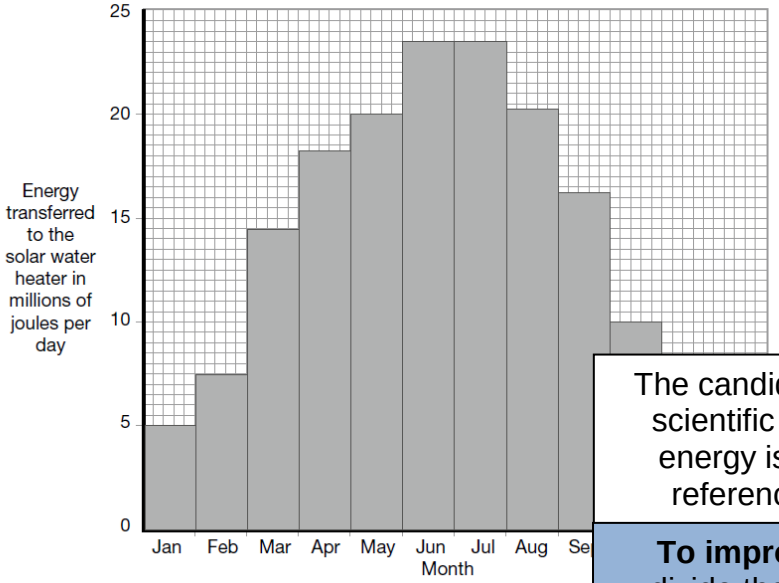
Quality of Written Communication
Example - 1 Mark

The picture shows one type of solar water heater. Water from t
pumped through copper pipes inside the solar panel where the
energy from the Sun.



Each day the average Europe
of hot water. It takes 16 800
this mass of water to the cor

The bar chart shows how the
transferred to the water heat
throughout the year.



*In this question you will be assessed on using good English, orga
clearly and using specialist terms where appropriate.*

The water in the tank could be heated by using an electric imme

Outline the advantages and disadvantages of using solar energy
than using an electric immersion heater.

There is very little in this answer, suggesting that Level 1 is the most likely area to find any marks.

To improve:
Use the information given in the question to inform / support the answer.

There is practically no use of specialist terms.

To improve:
Include as many relevant specialist terms as possible, such as renewable energy source, fuel, pollution, carbon dioxide.

because

The solar heater is best ~~because~~ it does not cost anything to run like an imersion heater wher you have to pay for the ~~electric~~ and it does not ~~damage~~ the ~~atmosfere~~.

electricity

damage atmosphere

1/6

The candidate has referred to two of the scientific points in the mark scheme – energy is free and pollution – but the reference to pollution is very weak.

To improve: In this type of question, divide the answer space into two then write 'Advantages' on the top line and 'Disadvantages' half way down the space. This will ensure that they address both parts of the question.

The spelling, punctuation and grammar are very weak

There is no structure to the answer.

To improve: Use paragraphs and full sentences.

Quality of Written Communication Example - 2 Marks

In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.

There are millions of plastic bags in use. After use most of these plastic bags are buried in landfill sites. The amount sent to landfill could be reduced if the plastic bags:

- could be reused
- could be recycled by melting and making them into new plastic products
- could be burned to release energy.

Use the information above and your knowledge and understanding to give the positive and negative environmental impacts of using these methods to reduce the amount of plastic bags sent to landfill.

There is no structure to the answer.

To improve:
Use paragraphs and full sentences.

The candidate has referred to very few of the scientific points in the mark scheme.

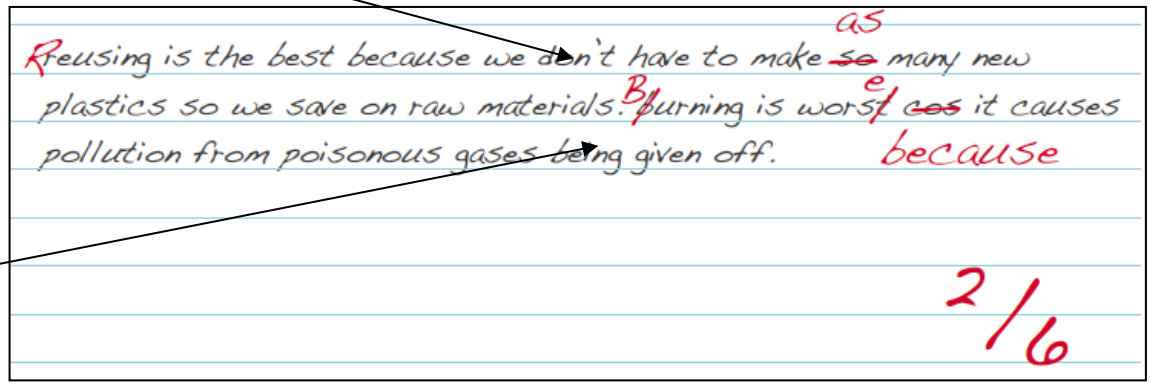
There is practically no use of specialist terms.

To improve:
Include as many relevant specialist terms as possible, such as renewable energy source, fuel, pollution, carbon dioxide.

There is very little in this answer, although an attempt has been made and an advantage and a disadvantage have been given.

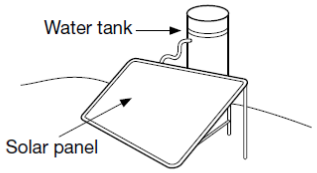
To improve:
In this type of question, divide the answer space into three then write 'Reusing' on the top line, 'Recycling' one third of the way down the space and 'Burning' two thirds of the way down the space. This will ensure that they address all three parts of the question.
Remember to give advantages and disadvantages for each process.

The spelling, punctuation and grammar are very weak



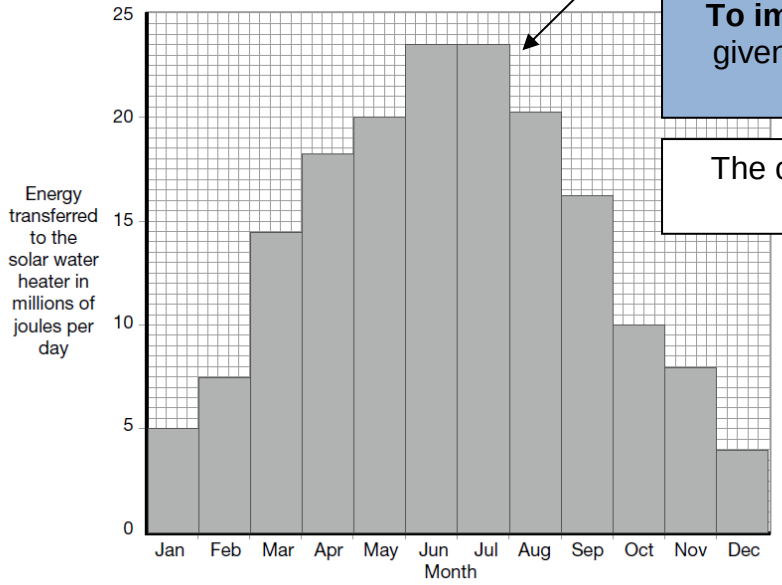
Quality of Written Communication Example - 3 Marks

The picture shows one type of solar water heater. Water from the tank is
pumped through copper pipes inside the solar panel where the water is
energy from the Sun.



Each day the average European family
of hot water. It takes 16 800 000 J of e
this mass of water to the correct tempe

The bar chart shows how the amount
transferred to the water heater varies
throughout the year.



In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.

The water in the tank could be heated by using an electric immersion h

Outline the advantages and disadvantages of using solar energy to hea
than using an electric immersion heater.

This is a Level 2 answer, but there is not enough in it to award top Level 2. It is therefore awarded 3 marks.

The candidate has attempted to use the information supplied to inform their answer, and there is some reference to the graph. However, this is incomplete and rather weak.

To improve: Use the information given in the question to **inform / support** the answer

Some technical terms are used (such as fuel and pollution), but the Sun does not qualify.

To improve: Include as many relevant specialist terms as possible, such as renewable energy source, fuel, pollution, carbon dioxide.

The candidate has some knowledge of the subject, and has referred to several of the scientific points in the mark scheme.

The solar heater is the best because it dosn't use fuel and that means that it dosn't cause polution. Energy from the sun is free.

It dosn't work at night so if you have run out of hot water you will have to use the imersion heater.

On the graph, the solar heater only heats the water in the summer.

3/6

There are a number of errors in spelling and punctuation.

The answer has some structure to it – advantages and disadvantages are given, and are separated.

Quality of Written Communication Example - 4 Marks

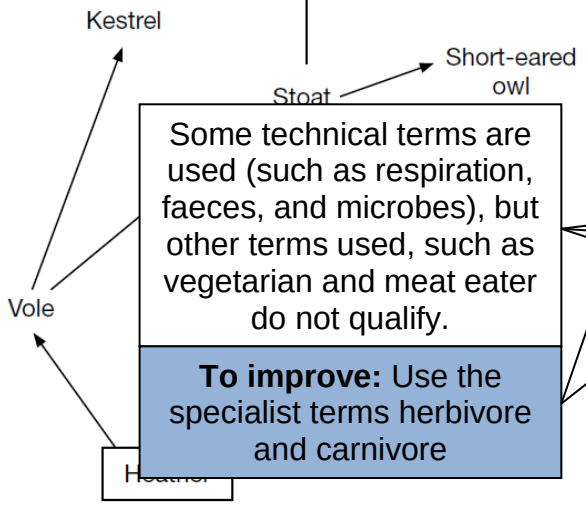
All of this demonstrates that this is a Level 2 answer, and there is enough in it to award 4 marks.

In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.

The diagram below shows a food web for some of the organisms that live o

The candidate clearly has some knowledge of the subject, and has referred to several of the scientific points in the mark scheme.

The answer has some structure to it – energy transfers are described in the correct sequence.



Some technical terms are used (such as respiration, faeces, and microbes), but other terms used, such as vegetarian and meat eater do not qualify.

To improve: Use the specialist terms herbivore and carnivore

The heather is eaten by vegetarians such as rabbits and voles. the vegetarians are eaten by meat eaters such as stoats and these are then eaten by the fox.

All of the animals respire. Respirtion produces heat energy which is lost to the surroundings.

All of the animals lose waste materials such as feces. The energy in these is used by microbes.

Animals also lose energy when they move around.

4/6

Only a small percentage of the Sun's energy captured by the
incorporated into the body tissues of the fox.
Explain, as fully as you can, what happens to the rest of the e
the heather.

There are a number of errors in spelling and punctuation – the first paragraph is not punctuated and the second paragraph has a sentence beginning with a lower case letter. Respiration and faeces are misspelt.

Quality of Written Communication Example - 5 Marks

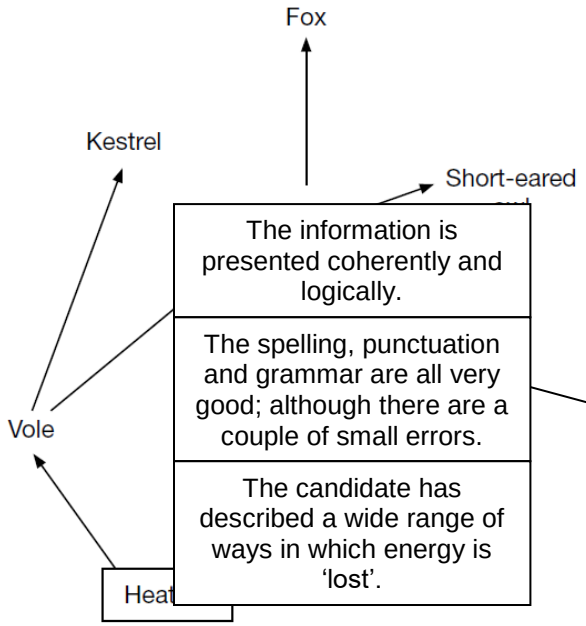
clear from reading through this answer that the candidate has sound knowledge and understanding of the subject area.

This is clearly a Level 3 answer. However, the candidate has not mentioned the point given in the mark scheme as essential to ensure that full marks may be awarded ('respiration releases energy'), so only 5 marks are awarded.

The energy transfers are presented in the correct sequence, beginning with the heather and finishing with the kestrel and fox.

In this question you will be assessed on using good English, organising info clearly and using specialist terms where appropriate.

The diagram below shows a food web for some of the organisms that live on moorland.



The information is presented coherently and logically.

The spelling, punctuation and grammar are all very good; although there are a couple of small errors.

The candidate has described a wide range of ways in which energy is 'lost'.

Only a small percentage of the Sun's energy captured by the heather is eventually incorporated into the body tissues of the fox.
Explain, as fully as you can, what happens to the rest of the energy captured by

answer contains a wide range of specialist terms (such as producer, vore, carnivore, respiration, faeces, bacteria, organic, carbohydrate, environment, energy transfer), used correctly.

The heather is a producer. Light energy captured by the heather is converted into carbohydrates, which are then converted into a wide range of organic compounds. Some of the carbohydrates are used in respiration by the heather. Some of the energy is transferred to the environment.

Heather is eaten by herbivores such as rabbits. However, these herbivores do not eat all the heather. Some of it eventually dies and the organic compounds in the cells are broken down and absorbed by micro-organisms such as bacteria. The bacteria use some of the organic compounds in respiration, transferring energy to the environment.

The herbivores cannot digest all parts of the heather, so some of the organic compounds pass out of the herbivores bodies in the faeces. Herbivores respire, and some of the energy is used for growth and some is used in locomotion. Much of the energy is transferred to the environment as heat. Thus only a small proportion of the energy that the herbivores obtain from the heather is transferred to the carnivores such as kestrels and foxes.

5/6

Quality of Written Communication Example - 6 Marks

In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.

There are millions of plastic bags in use. After use most of these plastic bags are buried in landfill sites. The amount sent to landfill could be reduced if the plastic bags:
- could be reused
- could be recycled by melting and making them into new plastic products
- could be burned to release energy.

Use the information above and your knowledge and understanding to give the positive and negative environmental impacts of using these methods to reduce the amount of plastic bags sent to landfill.

This is a top Level 3 answer, satisfying all of the criteria for 6 marks.

It is clear from reading through this answer that the candidate has sound knowledge and understanding of the subject area, covering a wide range of the points in the mark scheme.

The information is presented coherently and logically.

The spelling, punctuation and grammar are exemplary.

The answer contains a wide range of specialist terms correctly used, such as raw materials, fuel, carbon dioxide, atmosphere, combustion, greenhouse effect, toxic, generate.

The candidate has referred clearly to all three methods, and to both positive and negative effects on the environment.

Reusing the plastic bags

Reusing the plastic bags reduces the amount of raw materials needed to produce plastics. It also reduces the amount of fuel used in the manufacture of plastics. Burning less fuel will reduce the amount of carbon dioxide released into the atmosphere. However, when the bag splits it may be dumped in a landfill.

Recycling the plastic bags

Recycling plastic bags also reduces the amount of raw materials used to produce plastics and the amount of fuel used in the manufacture of plastics. However, the recycling process requires energy from the combustion of fuel, and the carbon dioxide produced will enhance the greenhouse effect.

Burning the plastic bags

Burning the plastic bags releases carbon dioxide into the atmosphere, enhancing the greenhouse effect. The combustion may also release toxic gases. However, the energy released could be used to generate electricity, reducing the amount of fuel used.

6/6

Quality of Written Communication
How to get the marks

In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.

Rock salt is a mixture containing salt (sodium chloride) that we get from the Earth.

To get pure salt from rock salt we need to separate the pure salt from the other substances in the mixture.

Describe how you would obtain pure salt from rock salt in the laboratory. You should include in your answer the apparatus that you would use.

Spelling, punctuation & grammar:
You should ensure:
- All words are spelled correctly.
- Punctuation is used correctly.
- Sentences and paragraphs follow grammatical conventions.

Knowledge & understanding:
Include as many relevant specialist terms as possible, such as mortar & pestle, dissolve, filter, filtrate and evaporate

Organisation:
In this type of question, divide the answer space into two then write 'Apparatus' on the top line, 'Method' one third of the way down the space. This will ensure that you address all parts of the question. Remember your method should be able to be followed by another person.

0 marks	Level 1 (1–2 marks)	Level 2 (3–4 marks)	Level 3 (5–6 marks)
No relevant content	There is a brief description of the laboratory procedure for obtaining a sample of pure salt from rock salt. The answer would not necessarily allow the procedure to be completed successfully by another person.	There is a description of the laboratory procedure for obtaining a sample of pure salt from rock salt that could be followed by another person. The answer **must** mention that the rock salt is mixed with water.	There is a clear, detailed description of the laboratory procedure for obtaining a sample of pure salt from rock salt that could easily be followed by another person. The answer **must** mention that the rock salt is mixed with water.
Examples of points made in the response could include: • crush the rock salt; • with a mortar and pestle; • mix the crushed rock with water; • in a beaker • stir and warm to dissolve the salt; • filter the mixture to remove the undissolved solids; • using filter paper and funnel; • put the filtrate into an evaporating dish; • warm using Bunsen burner, tripod and gauze; • to evaporate to dryness			

Quality of Written Communication Examiner's comments

In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.

Limestone contains calcium carbonate.
There is a large deposit of limestone under an area of natural beauty.
A company wants to quarry this limestone and build a kiln near to the quarry to make cement.

Area of natural beauty

A quarry

Explosives will be used to extract the limestone out of the ground.

Heavy machinery will be used to lift and crush the limestone.

Lorries will be used to transport the limestone to the kiln to make cement.

The lorries and the heavy machinery will use diesel fuel.

Quarrying limestone and making cement will have an impact on everything near the area.

Describe the positive and the negative impacts of quarrying limestone and making cement.

This was the first of the new six mark questions including quality of written communication. This was marked holistically, the answer linked to three levels on a best fit basis. The number of positive impacts and negative impacts was taken into account, as was the detail given in each one. A good answer would cover both the positive impacts and negative impacts of quarrying limestone and making cement. The answer should be written as continuous prose. Bullet points are acceptable, however, each point should be written as a complete sentence. No credit is given for simply repeating things that are given in the stem to the question. The spelling, punctuation and grammar, together with the use of specialist terms, are also considered before a final mark is awarded. Most students were able to give at least one positive impact and one negative impact of quarrying in this area. However, although descriptions were often clear, many lacked the necessary detail to achieve marks at the highest level. Vague comments, such as 'this is bad for the environment' or 'this causes a lot of pollution' are not creditworthy. Where reference is made to visual, noise or atmospheric pollution, students must clearly describe the source of this pollution to gain any credit. Not surprisingly, few students scored full marks, but equally very few failed to score.

0 marks	Level 1 (1–2 marks)	Level 2 (3–4 marks)	Level 3 (5–6 marks)
No relevant content	There is a simple description of a positive **and / or** a negative impact caused by the plan to quarry limestone and / or make cement.	There is a clear description of both a positive **and** a negative impact caused by the plan to quarry limestone and / or make cement.	There is a detailed description of both positive impacts **and** negative impacts caused by the plan to quarry limestone and / or make cement.

examples of the chemistry points made in the response

Positive impacts:

Limestone / cement is used for building; Limestone needed for industrial processes; Company landscapes / provides recreation facilities in the quarry after use; Provides employment; Improves local economy; Improved transport links

Negative impacts:

Destruction of habitats; Fewer plants / trees to absorb carbon dioxide; Example of visual pollution; Example of noise pollution; Example of atmospheric pollution; More traffic