The two main types of cell are prokaryotic and eukaryotic.

Magnification is the size of the image divided by the size of the real object.

Chromosomes are made of DNA.

Osmosis is the movement of water molecules to a more concentrated solution across a semi-permeable membrane.

An organ is a group of different tissues working together to perform a specific job.
The three types of digestive enzymes are protease, lipase, and carbohydrase.

The three types of blood vessel are arteries, veins, and capillaries.

Coronary heart disease can be treated with stents to keep coronary arteries open or statins to reduce cholesterol.

The loss of water through stomata in the leaves is called transpiration.

A type of mosquito is the vector of malaria.
A vaccination will make a person immune to the disease.

MRSA is a strain of bacteria that is resistant to antibiotics.

Glucose and oxygen are produced by photosynthesis.

Anaerobic respiration in yeast cells is called fermentation.

Receptors are cells which detect stimuli, whereas effectors are parts of the body (e.g. muscles or glands) which produce responses to stimuli.
Hormones and Homeostasis

What are the chemical messengers produced by glands of the endocrine system?

Hormones are the chemical messengers produced by glands of the endocrine system.

16

Hormones and Reproduction

What four hormones are involved in the menstrual cycle?

The four hormones that control the menstrual cycle are follicle stimulating hormone (FSH), oestrogen, luteinising hormone (LH) and progesterone.

17

Sexual and Asexual Reproduction

What type of cell division forms gametes?

Gametes are formed by meiosis.

18

Patterns of Inheritance

What word describes having two different alleles for a gene?

Heterozygous means having two different alleles for a gene.

19

Variation and Evolution

What process is the gradual change in the inherited characteristics of a population over time?

Evolution is the gradual change in the inherited characteristics of a population over time.

20
Selective breeding is the traditional, natural process of breeding plants and animals with certain, desirable genetic features. Genetic engineering is a modern, faster way of bringing about changes in organisms. It is the artificial process of transplanting genes for a desired characteristic into an organism.

What is the classification system called in which organisms are given a two-part name made up of their genus + species?

The binomial system names organisms by their genus + species.

A population is a group of individuals of one species living in a habitat.

The top consumers in a food chain are apex predators.

Carbon dioxide and methane both contribute to global warming.

How is selective breeding different from genetic engineering?

What is a population?

What are the top consumers in a food chain called?

Name two gases that contribute to global warming.
Atoms, Elements, Compounds and Mixtures

Explain how fractional distillation can be used to separate a mixture.

Fractional distillation is used to separate components with different boiling points from a mixture. The mixture is heated gradually and each component is collected when it boils.

Atoms and the Periodic Table

If an element has different isotopes, what does this mean?

Each isotope of an element has the same number of protons but a different number of neutrons in each atom.

The Periodic Table

What are the elements in these groups of the Periodic Table known as?

a) Group 0 – the noble gases
b) Group 1 – the alkali metals
c) Group 7 – the halogens

States of Matter

Complete the table.

<table>
<thead>
<tr>
<th>State of substance</th>
<th>State symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>solid</td>
<td>(s)</td>
</tr>
<tr>
<td>...</td>
<td>(l)</td>
</tr>
<tr>
<td>...</td>
<td>(g)</td>
</tr>
<tr>
<td>(…) dissolved in water</td>
<td>(…)</td>
</tr>
</tbody>
</table>

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<th>State of substance</th>
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<tbody>
<tr>
<td>solid</td>
<td>(s)</td>
</tr>
<tr>
<td>liquid</td>
<td>(l)</td>
</tr>
<tr>
<td>gas</td>
<td>(g)</td>
</tr>
<tr>
<td>(aqueous) dissolved in water</td>
<td>(aq)</td>
</tr>
</tbody>
</table>

Ionic Compounds

Describe what happens to a metal atom and a non-metal atom when an ionic bond forms between them.

The metal atoms lose electrons to become positively charged ions. The electrons are transferred to the non-metal atoms, which gain electrons to become negatively charged ions.
The pH Scale and Salts

Why is the following reaction called a neutralisation reaction?

\[ \text{HCl(aq)} + \text{KOH(aq)} \rightarrow \text{KCl(aq)} + \text{H}_2\text{O(l)} \]

Hydrochloric acid (HCl) neutralises the alkali potassium hydroxide (KOH). The solution that remains has a pH of 7, meaning that it is neutral.

Covalent Compounds

Describe what happens when one chlorine atom forms a bond with another chlorine atom.

An electron from each atom is shared so that each atom has a complete outer shell of electrons.

Metals and Special Materials

The atoms within polymer molecules are held together by strong covalent bonds. The intermolecular forces between the large polymer molecules are also quite strong.

Metals and Special Materials

Explain why most polymers are solid at room temperature.

Mass is conserved. In a chemical reaction, no atoms are made or lost.

Conservation of Mass

Why do chemical symbol equations always need to be balanced?

Mass is conserved. In a chemical reaction, no atoms are made or lost.

Conservation of Mass

Use these words to complete the sentences that follow. (Use each word once only.)

together loses gains

In oxidation reactions, a substance often gains oxygen. In reduction reactions, a substance often loses oxygen. Oxidation and reduction always occur together.

Reactivity of Metals

In oxidation reactions, a substance often gains oxygen. In reduction reactions, a substance often loses oxygen. Oxidation and reduction always occur together.

Reactivity of Metals

Oxidation and reduction always occur together.

GCSE AQA Revision Combined Science
Rate of Reaction

A sample of solid calcium carbonate is divided precisely into two equal masses. One half is a single solid piece, which is then reacted with an acid. The other half is broken into small pieces and reacted with a fresh sample of the same acid. Which half will react faster, and why?

Electrolysis

Electrolysis requires a lot of heat and electrical energy.

Exothermic and Endothermic Reactions

What is the difference between endothermic and exothermic reactions?

The half that is broken into small pieces will react faster. This is because small pieces have a large surface area in relation to their volume. More solid particles are exposed to contact with acid particles, so there are more collisions and a faster reaction.

Choose the correct phrase from this list to complete the sentence that follows.

Choose the correct general formula for alkanes from the following list.

C\textsubscript{n}H\textsubscript{2n+2}

C\textsubscript{2n}H\textsubscript{n}

C\textsubscript{n}H\textsubscript{2n}

C\textsubscript{n}H\textsubscript{2n+2}

When a reversible reaction takes place in a closed system, an equilibrium is achieved when the rate of the backward reaction is exactly the same as the rate of the forward reaction.
What are the two main methods of cracking hydrocarbons?

The two main methods of cracking hydrocarbons are steam cracking and catalytic cracking.

Complete the following table that describes tests for different gases.

<table>
<thead>
<tr>
<th>Gas</th>
<th>Test for gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide</td>
<td>Turns limewater cloudy</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>Burns with a squeaky pop</td>
</tr>
<tr>
<td>Oxygen</td>
<td>Relights a glowing splint</td>
</tr>
<tr>
<td>Chlorine</td>
<td>Turns damp indicator paper white</td>
</tr>
</tbody>
</table>

Describe the effects that the evolution of plants had on the Earth's atmosphere.

Plants use carbon dioxide and water to produce oxygen in the reaction called photosynthesis. As more plants evolved, the amount of oxygen in the atmosphere increased. Eventually the levels of oxygen were enough for land-based animals that breathed oxygen from the air to evolve.

What is the carbon footprint?

The carbon footprint of a product, service or event is the total amount of carbon dioxide and other greenhouse gases that are emitted over its full life cycle.

Why can’t we release our waste water directly into the environment?

Waste water can contain toxic chemicals, harmful microorganisms and other organic matter. All these things can cause pollution and affect plants and animals, including humans.
Define the spring constant and write an equation for calculating it.

The spring constant is a measure of how easy it is to stretch or compress a spring.

\[
\text{spring constant} = \frac{\text{force}}{\text{extension}}
\]

A force is a vector quantity. What does this mean?

A vector quantity, such as force, has a direction as well as a magnitude.

A typical speed for a person walking is 1.5 m/s. 2.5 m/s would be running. 0.5 m/s would be very slow walking.

A typical speed for a person walking is 1.5 m/s.

What is a typical speed for a person walking? Choose from: 2.5 m/s  1.5 m/s  0.5 m/s

What is the purpose of a life cycle assessment?

A life cycle assessment provides a way of comparing different products to see which cause least damage to the environment, over their whole lifetime.

We can use this equation to summarise Newton's Second Law:

\[
\text{force} = \text{mass} \times \text{acceleration}
\]

Which equation is used to summarise Newton's Second Law?
What can you say about the forces on an object that is falling at its terminal velocity?

In the equation $E_e = \frac{1}{2} ke^2$ for calculating the elastic potential energy stored in a stretched spring, what does $k$ represent and what is its unit?

Complete this sentence correctly. On a very cold day, a hut with thin metal walls will cool down very quickly because of the metal’s … low thermal conductivity … high thermal conductivity.

What is the relationship between wave speed, wave frequency and wavelength?

Light travels across a boundary from a material of high refractive index into air. Describe its change of direction.

The resistive force acting upwards equals the weight acting downwards. The forces are balanced and there is no resultant force on the object.

$k$ is the spring constant of the spring, which is a measure of its stiffness:

force applied to spring = $k \times$ extension

The unit of $k$ is N/m.

On a very cold day, a hut with thin metal walls will cool down very quickly because of the metal’s high thermal conductivity. The higher the thermal conductivity of a material, the higher the rate of energy transfer by conduction through the material.

Wave speed = frequency $\times$ wavelength

The light changes direction (is refracted) away from the normal (the perpendicular to the boundary) – unless the light is travelling perpendicular to the boundary, in which case it will continue straight.
Which type of electromagnetic radiation correctly fills the gap in these sentences? In an energy efficient lamp, .......... waves are produced by the gas inside when an electric current passes. These waves are absorbed by the coating on the lamp, which then gives off visible light.

In an energy efficient lamp, ultraviolet (UV) waves are produced by the gas inside when an electric current passes. These waves are absorbed by the coating on the lamp, which then gives off visible light.

What is the equation relating the potential difference across, the current through and the resistance of a component in a circuit?

Potential difference \( = \text{current} \times \text{resistance} \)

State the behaviour of an LDR in a circuit when the light intensity falling on it decreases.

An LDR is a light-dependent resistor. Its electrical resistance increases when the light intensity decreases.

State the equation for calculating the electrical power \( P \) of a device of resistance \( R \), when the current through it is \( I \), and state the unit of power.

Power \( P = I^2 R \)
The unit of power is the watt, W (equivalent to J/s).

State the colours of the wires in the cable of a domestic appliance: the live wire, the neutral wire and the earth wire.

Live wire: brown
Neutral wire: blue
Earth wire: green and yellow (stripes)
True or false?

If all of the electrical energy supplied to an efficient kettle is used to heat the water, this equation determines the change in temperature of the water, $\Delta \theta$. $I V t = m c \Delta \theta$

Which of these sentence endings makes the statement correct?

A magnetic material brought close to a magnet … … is always attracted to the N pole of the magnet. … is attracted to the nearest pole of the magnet.

What is the difference between the specific heat capacity and the specific latent heat of a material?

Choose the correct word to complete this sentence.

Isotopes of an element contain the same number of … … neutrons … protons

Complete the gaps in the sentences. Choose from: greater smaller more less

Beta radiation has a … ionising power than alpha radiation and so is … penetrating and has a … range in air.

A beta source a few metres away from you is therefore likely to be … dangerous than an alpha source at that distance.

Specific heat capacity is the energy needed to raise the temperature of 1 kg of the material by 1 °C, with no change of state. Specific latent heat is the energy needed to change the state of 1 kg of the material, with no change in temperature.

Isotopes of an element contain the same number of protons. They have different numbers of neutrons.

Beta radiation has a smaller ionising power than alpha radiation and so is more penetrating and has a greater range in air. A beta source a few metres away from you is therefore likely to be more dangerous than an alpha source at that distance.
State **two** definitions of radioactive **half-life**.

1. The **half-life** is the (average) time taken for half of the radioactive nuclei in a sample to **decay**.
2. The **half-life** is the time taken for the **activity** (or count rate) of a radioactive sample to fall to half its original value.