Cells – the Building Blocks of Life

Name the three cell structures that are found in plant cells, but not in animal cells.

Eating, Drinking and Breathing

What is gestation?

Give three ways in which alveoli are adapted for gas exchange.

Describe what happens to someone when they suffer from an asthma attack.

Getting the Energy your Body Needs

What is meant by the term antagonistic pair?

The vacuole, cell wall and chloroplast are three cell structures found in plant cells, but not animal cells.

Gestation is the process of the embryo developing in the uterus.

Alveoli are adapted for gas exchange by having:
- thin, moist walls
- a good blood supply
- a large surface area.

When someone has an asthma attack the bronchioles narrow, which reduces the space for air to enter. Less air inside the lungs means less oxygen is absorbed into the blood, leaving the sufferer gasping for breath.

An antagonistic pair is when one muscle contracts and the other relaxes.
What is the word equation for **aerobic respiration**?

The word equation for **aerobic respiration** is:

\[
\text{glucose} + \text{oxygen} \rightarrow \text{carbon dioxide} + \text{water} + \text{energy}
\]

What is needed for **photosynthesis** to take place?

Carbon dioxide, water, light and chlorophyll are needed for **photosynthesis** to take place.

What does the term **bioaccumulation** mean?

**Bioaccumulation** describes the build-up of toxic materials in the organisms that are at the top of the food chain.

Name the scientists who deduced and then published the **structure of DNA** in 1952.

The scientists who deduced the **structure of DNA** were James Watson and Francis Crick.

Explain the purpose of a **gene bank**.

A **gene bank** stores seeds and cells from as many organisms as possible. This is to ensure that no genes are lost due to extinction. The genes may be helpful in the future to provide medicines or food.
If an adult body cell of a wolf contains 78 *chromosomes*, how many chromosomes will be in a wolf’s sperm cell?

The number of *chromosomes* in a wolf’s sperm cell will be 39. Adult body cells have two pairs of every chromosome, so $78 \div 2 = 39$.

What are the three different types of *microbes* that can cause disease?

The three different types of *microbes* that can cause disease are:
- bacteria
- viruses
- fungi.

Drugs can be divided into four main groups. What are these groups?

The four main groups of *drugs* are:
- painkillers
- depressants
- stimulants
- hallucinogens.

What is meant when a chemist says that a substance is *pure*?

A substance is *pure* when it only contains one type of atom or compound.

What is the *law of conservation of mass*?

The *law of conservation of mass* states that in any physical change or chemical reaction, the mass after the change will be the same as the mass before the change.
In a reaction, magnesium reacts with oxygen to form what **compound**?

The **compound** formed in the reaction between magnesium and oxygen is magnesium oxide.

How many **atoms** are in a molecule of maltose, $C_{12}H_{22}O_{11}$?

There are 45 **atoms** in a molecule of maltose. 

$$\text{(12 \times C)} + \text{(22 \times H)} + \text{(11 \times O)}$$

What name is given to a **reaction** that produces **heat energy**?

A reaction that produces heat energy is called an **exothermic reaction**.

When a **hydrocarbon fuel** is burned in excess oxygen, what gas is produced as a product?

When a **hydrocarbon fuel** is burned in the presence of excess oxygen, carbon dioxide gas is produced.

What **products** are formed when an acid reacts with a metal?

The **products** salt and hydrogen are formed when an acid reacts with a metal.
What happens in a displacement reaction?

In a displacement reaction, the metal that is in a compound is displaced by another metal that is higher up in the reactivity series.

What is the chemical reason why carbon displaces iron from its ore?

Iron is lower in the reactivity series than carbon, so carbon displaces it.

In pottery, what has to happen to clay in order to make a ceramic?

A ceramic is made by heating the clay at a high temperature in an oven / kiln.

What are the three main rock types?

The three main rock types are:
- igneous
- sedimentary
- metamorphic.

According to scientists, what is the main cause of the increased carbon dioxide levels on our planet today?

The increased carbon dioxide levels are due to human activity, mainly burning fossil fuels.
Using our Earth Sustainably

**Forces and their Effects**

Explain why carbon dioxide causes **climate change**.

Carbon dioxide causes **climate change** because it is a greenhouse gas. The more carbon dioxide, the more energy from the sun is trapped. This causes temperatures to rise and unpredictable changes to weather patterns.

For an object to speed up or slow down, what has to happen to the **forces** acting on that object?

The **forces** on the object must become unbalanced. If the forward force is greater, the object will speed up. If the force in the opposite direction to movement is greater, then the object will slow down.

A boy weighing 80 N is sitting at the end of a seesaw, 2 m from the pivot. What is the **moment**?

The **moment** is 160 Nm. 
Moment = Force × Distance from pivot

How does **Hooke's Law** apply to a spring?

**Hooke's Law** states that the stretch of the spring will be directly proportional to the force applied to it.

What is the formula used to calculate **speed**?

**Speed** = \( \frac{\text{Distance}}{\text{Time}} \)
In physics, what is meant by the term work?

Work is only done when a force has acted on an object and that object has changed.

What would happen if two magnets with the same poles were brought together?

The poles are the same, so the magnets would repel.

What is the formula for pressure?

Pressure = \frac{\text{Force}}{\text{Area}}

What is the formula for weight?

Weight = \text{Mass} \times \text{Gravitational Field Strength}

Why are shadows of objects longer at noon in winter in Northern latitudes?

Shadows are longer at noon in winter in Northern latitudes because the sun appears lower in the sky, so the light shines on the object from a smaller angle.
What do we mean when we say that a wave has a frequency?

The frequency of a wave is the number of waves per second, measured in Hz.

What makes a parallel circuit different to a series circuit?

A parallel circuit has branches through which the current is divided, whereas a series circuit has only one route for the current to flow.

What is the formula for resistance?

\[
\text{Resistance} = \frac{\text{Voltage}}{\text{Current}}
\]

Give three ways in which an electromagnet can be made more powerful.

- increasing the number of coils in the wire
- increasing the current
- adding a core made from a magnetic material, e.g. iron.

State the Law of Reflection.

The Law of Reflection is:

The angle of incidence = The angle of reflection