1. Biology—Respiration

Aerobic Respiration is the process of releasing energy from oxygen and glucose. This process takes place in the mitochondria.

Anaerobic respiration is the incomplete break down of glucose which releases ***less energy*** and a toxic substance called lactic acid. Anaerobic respiration takes place when there is not enough oxygen present for aerobic respiration. Such as; during intense exercise.

The general word equations for both processes are:

Aerobic Respiration:	Anaerobic Respiration:
Glucose + Oxygen → Carbon Dioxide + Water	Glucose → Lactic Acid

In both types of respiration they both release energy from glucose but ***aerobic respiration releases more*** energy than anaerobic respiration. The **lactic acid that is produced in anaerobic respiration is harmful to our bodies and can cause muscle cramp.** The lactic acid is broken down by oxygen during a recovery period, known as **oxygen debt**.

Rate of respiration and exercise

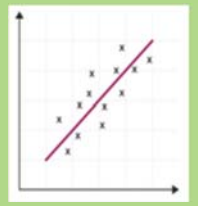
When a person exercises they need more energy so a faster rate of respiration is needed. This means:

- Breathing increases to get more oxygen into the blood stream through the lungs.
- Heart rate increases to pump oxygen and glucose round the body to get the cells.

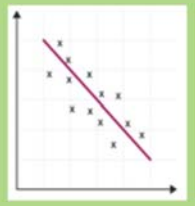
Experiment Key Words:

1. Accuracy— how close the results are to the **true value**
2. Precision— how close the results are to **each other**
3. Reliability— when the experiment is **repeated** the results will be similar

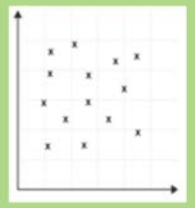
Graph Trends:



Positive Correlation



Negative Correlation

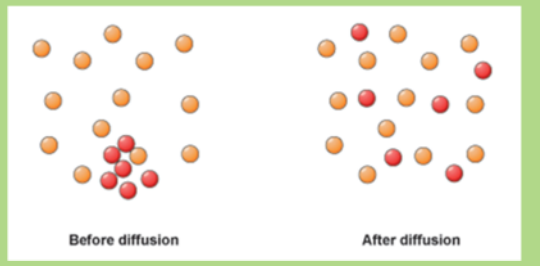


No Correlation

2. Biology—Movement of Substances by Diffusion

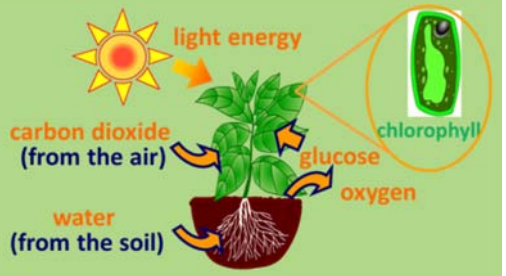
Diffusion

Important substances such as oxygen, glucose, carbon dioxide and other waste products need to move in and out of our cells, so they can carry out different functions. Diffusion is the ***movement of particles*** from an area of ***high*** concentration to an area of ***low*** concentration.



3. Biology—Photosynthesis

Plants must make their own glucose using light by a process called photosynthesis. This process takes place in the chlorophyll which is found in the chloroplast in the green parts of plant cells.

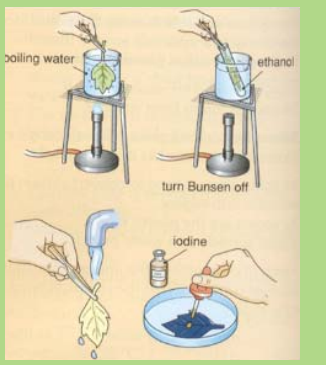


The general word equation for this process is:

Carbon Dioxide + Water → Glucose + Oxygen

Testing leaves for starch:

Leaves that test positive for starch show that they have been carrying out photosynthesis. This can be done by heating the leaf and soaking in ethanol to remove the green pigments. The leaf is gently sensed and iodine is added. If the leaf turns blue-black starch is present.



If the leaf is variegated which means it contains white and green parts, only the parts that were originally green will become blue-black with iodine because only the green sections contain chlorophyll.

Science

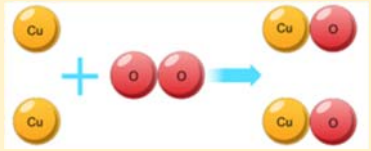
Year 8 | Term 4&5 | Trinity MAT

1. Chemistry— Chemical Equations

In chemical reactions mass is conserved. This means that the starting mass on the reactants side of the equation must be the same as the ending mass on the products side

Mass is never lost, it is just transferred from one place to another.

This also applies to the number of atoms on each side of a chemical equation. In the equation there are the same number of atoms – but they are ***arranged differently*** to make a different substance.



2. Chemistry—Chemical Reactions

Combustion is a reaction in which a fuel burns in oxygen to release carbon dioxide and water. This process also releases energy.

Oxidation is a reaction in which metals or non-metals react with oxygen to form oxides.

Thermal Decomposition is a reaction in which a metal carbonate decomposes into a metal oxide and carbon dioxide

	Word Equation	***Example***	***Symbol Equation***
Combustion	Fuel + Oxygen → Carbon Dioxide + Water	Methane + Oxygen → Carbon Dioxide + Water	$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$
Oxidation	Metal + Oxygen → Metal Oxide	Calcium + Oxygen → Calcium Oxide	$2Ca + O_2 \rightarrow 2CaO$
Thermal Decomposition	Metal Carbonate → Metal Oxide + Carbon Dioxide	Calcium Carbonate → Calcium Oxide + Carbon Dioxide	$CaCO_3 \rightarrow CaO + CO_2$

Thermal Reactions:

An **exothermic** reaction **gives out thermal energy** into the surrounds. There will be an **increase in temperature**.

An **endothermic** reaction **takes in thermal energy** from the surrounds. There will be a **decrease in temperature**.

Calculating Temperature Change:

Final Temp—Starting Temp

Heat Transfer: Occurs when objects of different temperatures are put together. Energy from the hot object is transferred to the cold object and its temperature will increase. The three methods of heat transfer are: conduction, convection and radiation.

Conduction – When a solid is heated, its particles gain thermal energy and vibrate more vigorously. The particles bump into nearby particles and make them vibrate more.

Convection – The particles in liquids and gases are free to move. Particles with a lot of thermal energy spread out and rise, as these areas become less dense.

Radiation – Hot objects transfer energy to their surroundings via a wave called **infrared radiation**. Radiation can travel through a vacuum (where there are no particles).

1. Physics—Energy Resources

Energy is conserved which means it is not created or destroyed. It is only transferred from one energy store to another.

Energy sources are either renewable: the source is naturally replenished or non-renewable: the source used up faster than it is produced.

Examples of these types of energy sources are:

- Renewable: Solar, Wind, Water, Geothermal, The Sun
- Non-Renewable: Fossil fuels, Nuclear fuels

The three main uses for energy sources are: heating, transportation and generating electricity.

Calculating percentage efficiency of energy transfers:

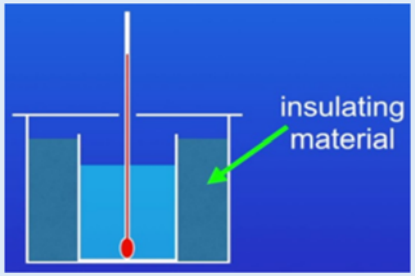
(Useful energy ÷ total energy) x 100

The use of energy has increased over time. This is due to:

- Increase in population
- Use of devices such as cars
- Use of electronics such as TVs, computers, machines

2. Physics—Heat Transfers

A conductor does allow thermal energy to pass through them. Whereas an insulator does not allow thermal energy to pass through it easily. For example; air and bubble wrap.



Maths Skills—How to calculate the:

⇒ Mean: add together all the values and divide by how many in the sample

⇒ Mode: the most frequent number

⇒ Median: put the numbers in order and find the middle value