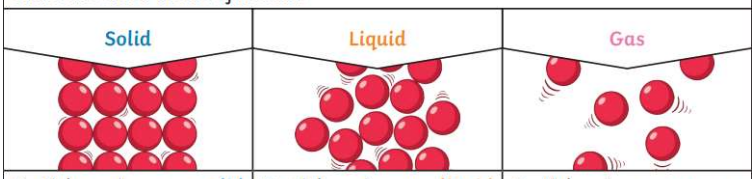
Making New Substances Knowledge Organiser

Key vocabulary	
Materials	The substance that something is made out of, e.g. wood, plastic, metal.
Melting	The process of heating a solid until it changes into a liquid.
Freezing	When a liquid cools and turns into a solid
Evaporating	When a liquid turns into a gas or vapour.
Condensing	When a gas, such as water vapour, cools and turns into a liquid.
Matter	A physical substance which occupies space.
Mass	A quantity of matter measured in kg.
React	The process of transformation from one set of substances to another.
Irreversible	Not able to be undone or altered.
Solution	a mixture that contains two or more substances combined evenly
Insoluble	a substance that will not dissolve

There are three states of matter.



Solid	Liquid	Gas
Particles in a solid are close together and cannot move. They can only vibrate.	Particles in a liquid are close together but can move around each other easily.	Particles in a gas are spread out and can move around very quickly in all directions.

Physical Changes

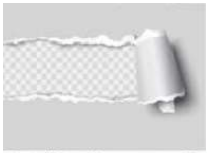
Physical changes take place when a substance changes form or arrangement. They are often reversible.

Examples:

1. Changing state
2. When two substances are mixed When a substance or material is broken apart.


Mixing substances with water


Ice melting


Breaking glass or tearing up paper

Chemical Changes

Chemical change is when a change takes place and a new substance is formed. They are often not reversible.

Examples:

1. When something is burned
2. When food is cooked
3. When metal rusts

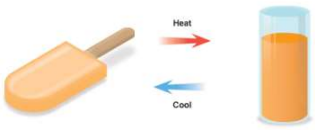

Match is burned


A burger is cooked


Iron rusts

Reversible changes

Reversible changes such as mixing and dissolving can be reversed.



Irreversible changes

Irreversible changes often result in a new product being made from the old materials.(reactants). For example, burning wood produces ash and this cannot be turned back into wood

Chemical and physical changes

Similarities	Differences
• Both cause a change in appearance • Amount of matter does not change for both	• Chemical creates to a new material, physical does not • Chemical is hard to reverse, physical is easy to reverse

Repeatable		To repeat method and get the same results
Reproducible		Another person completes the same method and gets the same results

Type of variable	How to identify
Independent variable	The thing that you change
Dependent variable	The thing you observe to see how it is affected
Control variables	The things you have to keep the same to make sure it is a fair test

When a scientist makes a conclusion, they must make sure:

1. Their results support their conclusion (evidence)
2. They have checked for any mistakes in their results
3. Their results are repeatable and reproducible