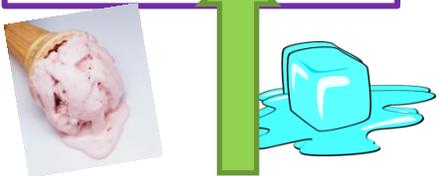


Is this a chemical change or a physical change?

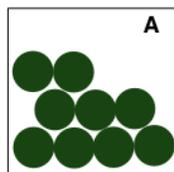
- Chemical as the products are different to the reactants
- It is chemically different from the start
- Bonds are made or broken to form the products

Physical change

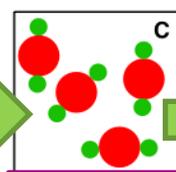
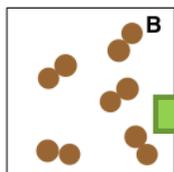
- Reversible change (can be changed back)
- No new things are made
- E.g. melting, freezing, evaporating



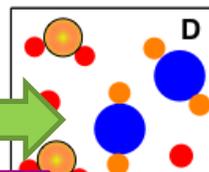
START



Element
All the same type of atom

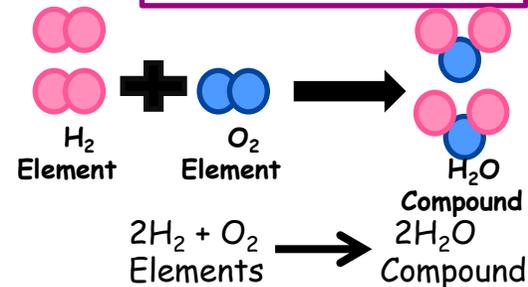


Compound
More than one type of atom chemically bonded together



Y7 Compounds

Mixture
More than one type of element or compound not chemically bound together

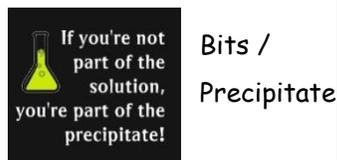


Key words:

1. **Element:** All the same type of atom
2. **Compound:** More than one type of element chemically bound together
3. **Mixture:** More than one type of element or compound not chemically joined together
4. **Reactant:** Elements or compounds before a reaction has taken place
5. **Product:** Element or compound after a reaction has taken place
6. **Reaction:** When particles collide and new products are formed
7. **Molecule:** All the same type of atom chemically bonded together
8. **Fuel:** Chemical energy store
9. **Combustion:** When a fuel reacts with oxygen heat and light are given off
10. **Exothermic reaction:** A reaction that takes in heat from the surroundings so feels cold
11. **Endothermic reaction:** A reaction that gives out heat

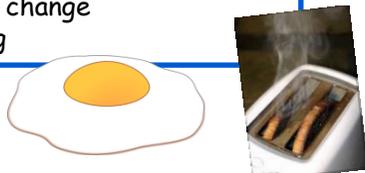
Oxide compounds contain **oxygen** atoms.
Chloride compounds contain **chlorine** atoms.
Sulphide compounds contain **sulphur** atoms.
Nitrate compounds contain **nitrogen** and **oxygen**.
Sulphate compounds contain **sulphur** and **oxygen**.

How do you know a chemical reaction has taken place?

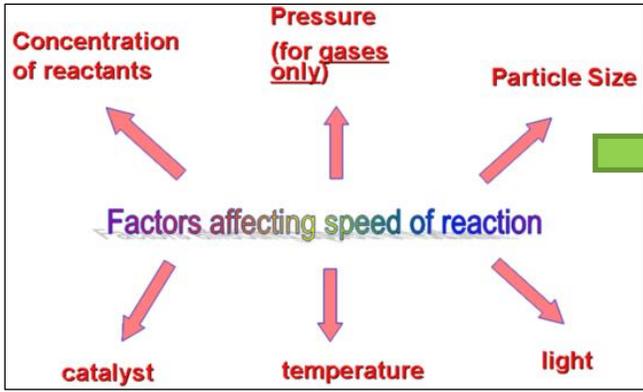


Chemical change

- Permanent change
- Can't be changed back
- New things are made
- Energy give of (heat/ light)
- Colour change
- Fizzing

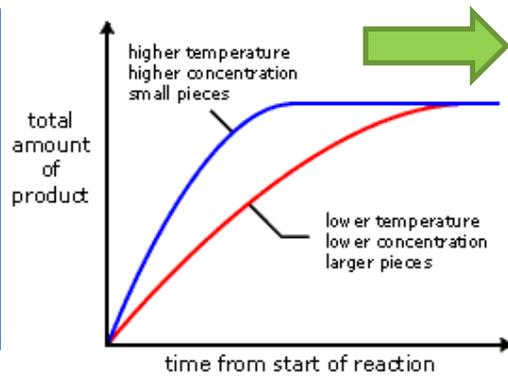


- Naming simple compounds
- Metal + oxygen = metal oxide
- E.g. magnesium + oxygen \rightarrow magnesium oxide
- $\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$



Temperature and rate of reaction

- The higher the temperature the more kinetic energy the particle have
- The more likely they will collide and react
- The quicker the rate of reaction



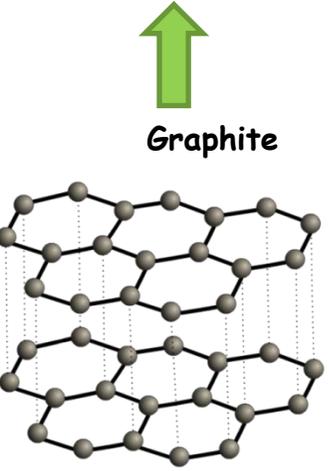
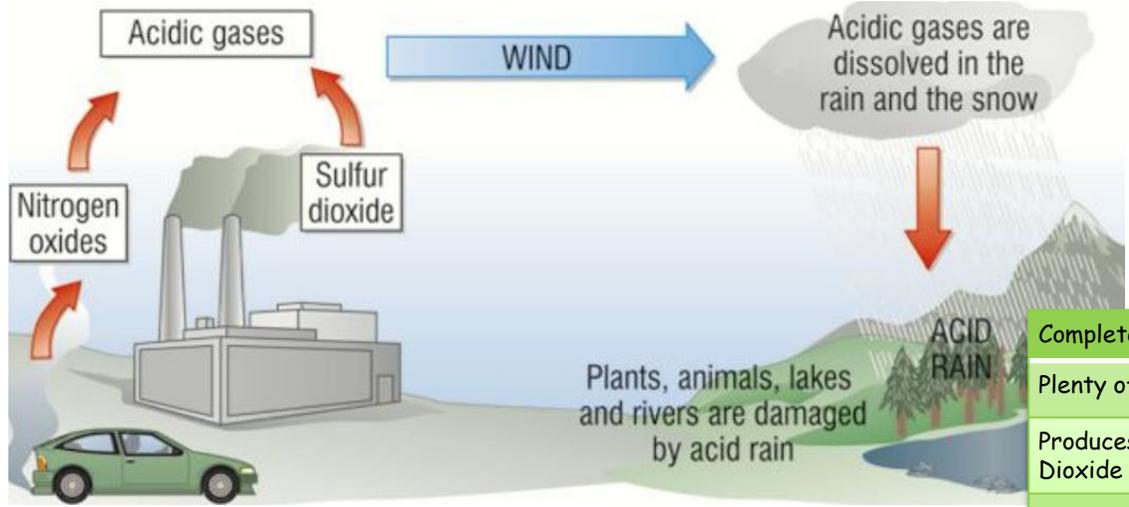
Small particles	Larger particles
Large surface area, therefore a higher frequency of collisions happen between reactants, more successful collisions, meaning a faster rate of reaction	Smaller surface area, therefore a lower frequency of collisions happen between reactants, there will be fewer successful collisions, meaning a slower rate of reaction.

What is combustion?
Combustion is when a fuel is burnt in oxygen to release energy.

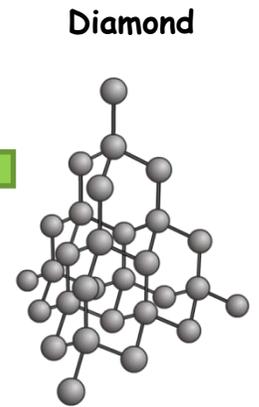
Complete Combustion	Incomplete Combustion
Plenty of oxygen	Limited supply of oxygen
Produces Carbon Dioxide (CO ₂)	Produces Carbon Monoxide (CO)
Produces water	

Acid Rain

- Factories and cars release nitrogen oxides and sulphur dioxide
- This reacts with the air to make acidic gases
- Wind causes the acidic gases to move
- Acidic gases are dissolved in the rain and the snow
- When it rains we get acid rain
- This damages plants, animals, lakes and rivers



It is much softer than diamond because the carb on atoms are only bonded to 3 others by strong covalent bonds in layers. The layers are held together by weak forces which are easily broken. This allows the layers to slide over one another. Because each carbon atom only forms 3 covalent bonds with others there are free electrons. These electrons can flow through the structure allowing graphite to conduct electricity.



Very hard and strong with a high melting point because each carbon has four strong covalent bonds to other carbon atoms. To break these a large amount of energy is needed. Does not conduct electricity because all the electrons are used to form covalent bonds with other carbon atoms. Without free electrons diamond cannot conduct electricity.

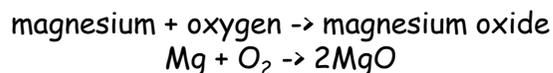
Conservation of Mass

The principle of conservation of mass states that in a chemical reaction, the total mass of the reactants must equal the total mass of the products.



$$140\text{g} + 80\text{g} \rightarrow 220\text{g}$$

When we burn magnesium in air magnesium reacts with oxygen.



When I burn a fuel the mass at the end has decreased from the start, why does this happen?

- As one of the products is carbon dioxide which is a gas it is lost into the atmosphere

Exothermic reaction

- Gives off heat e.g. hand warmers
- More energy is used to make new bonds than break the old bonds = energy is given out so feels hot
- When the new bonds are made the energy is released as heat to the surroundings



Endothermic reaction

- Takes heat in so feel cold e.g. ice pack
- More energy is used to break the bonds than to make the new bonds = energy is taken in so feels cold
- The energy is taken in from the surroundings to break the bonds so it feels cold



- When we burn fuels or food we can measure the amount of energy transferred.
- This can be done by burning it and the energy that is released is transferred to water.
- We can measure how much the temperature increases by and calculate how much energy has been transferred to the water
- You must weigh the mass of water before the experiment

Year 7 Compounds

1. Explain the difference between an element, compound and mixture
2. How do you know a chemical reaction has taken place?
3. What is a physical change in a reaction?
4. What is a chemical change in a reaction?
5. What factors affect the speed of a reaction?
6. Explain how temperature affect the rate of a reaction
7. What is complete combustion?
8. What is incomplete combustion?
9. How could you test for the products of combustion?
10. Describe how acid rain forms
11. What is conservation of mass?
12. If a fuel is burnt in air explain why the mass might go down?
13. Describe the structure of diamond
14. Describe the structure of graphite
15. Explain the difference between an exothermic and an endothermic reaction
16. Give an example of an exothermic reaction
17. Give an example of endothermic reaction