

Year 9 Science Chemistry

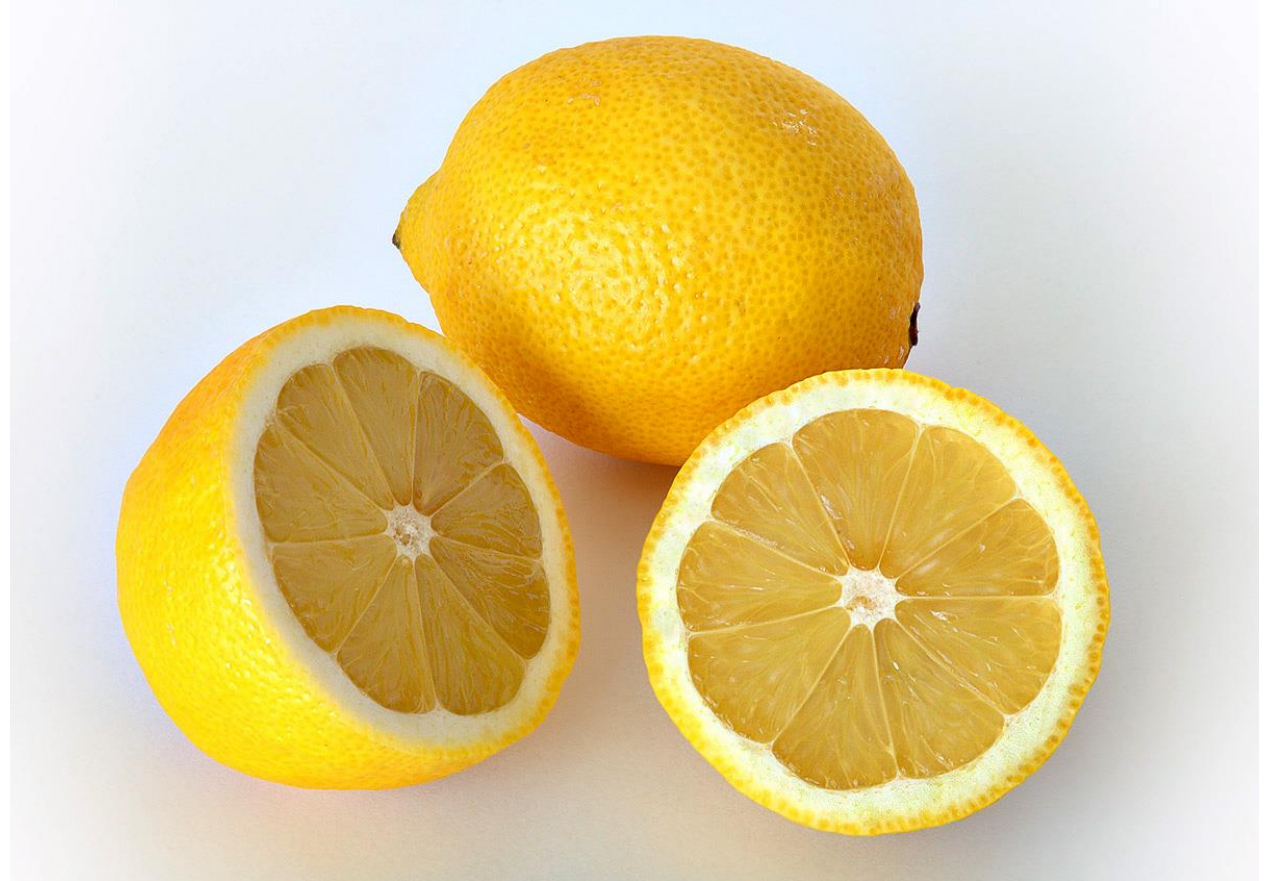
Week 4, Lesson 1

Learning Intention:

- Review balancing chemical equations
- Investigate acids and bases and the pH scale

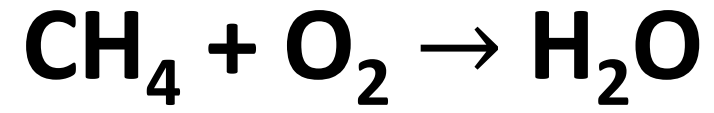
Success Criteria:

- Balance chemical equations
- Define properties of acids and bases
- Understand the purpose of the pH scale



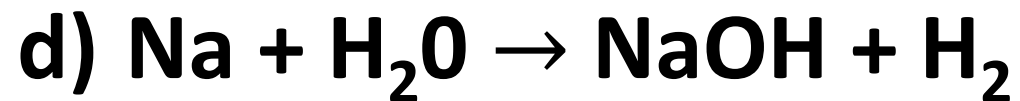
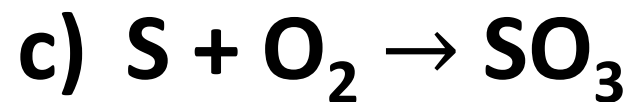
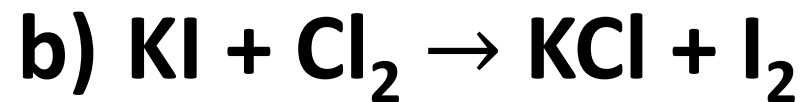
Review: We Do:

Balance the following chemical equation:

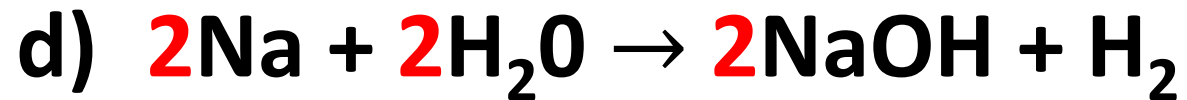
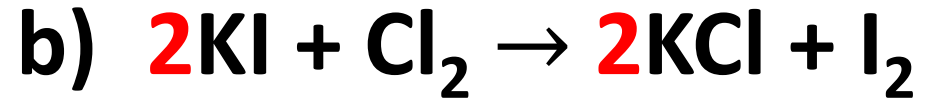
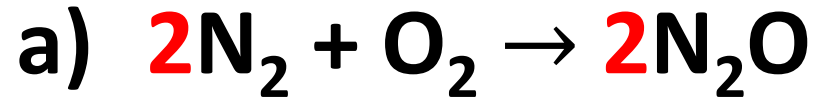


Review: You Do:

Balance the following chemical equations:



Answers:



Acids and Bases

Acids and bases are all around us.



We use them in cooking, cleaning, farming and medicine.

Can you think of any acids?

Can you think of any bases?



Acids

An acid is a substance that releases **hydrogen ions (H^+)** into an aqueous solution (water).

Common examples of acids include **hydrochloric acid** (which is found in your stomach) and **acetic acid** (which is found in vinegar).



Properties of Acids

- Acids are **corrosive** - *this means they will burn our skin*
- Acids have a **sour taste** - *think of lemon juice*
- React with some **metals** to produce **hydrogen gas** and a **salt**
- Conduct **electricity**
- Can be **neutralized by bases**, producing water and a salt
- Turn **blue litmus paper red**



Strength of Acids

The acids we work with in the school laboratory are not pure substances.

They are solutions – meaning the **acid has been mixed with water**.

When acids are mixed with water they release **hydrogen ions (H^+)**.

The **strength of an acid** depends on how many of these **hydrogen ions are released**.

Nitric acid, hydrochloric acid and sulfuric acid are examples of **strong acids**.

Acetic acid (vinegar) and carbonic acid (found in soft drinks) are examples of **weak acids**.



Copy and complete:

1. An acid is a substance that releases _____ ions (H^+) into an aqueous solution (water).
2. Acids are _____ meaning they will burn our skin.
3. Acids react with some metals to form _____ gas and a salt.
4. Common examples of acids include _____ acid which is found in your stomach and _____ acid which is found in vinegar.

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Bases

A base is a substance that releases **hydroxide ions (OH^-)**.

If a base can be dissolved in water it is known as an **alkali**.

The solution it forms is called an **alkaline solution**.

Common examples of bases include **sodium hydroxide** which is used in soap **ammonia** which is used for household cleaning.



Properties of Bases

- Bases are **caustic** – *meaning they can burn your skin*
- Bases have a soapy, slimy feel
- Bases have a **bitter taste**
- Bases conduct **electricity**
- Bases are **neutralized by acids**, producing water and a salt
- Turn **red litmus paper blue**



Copy and complete:

1. A base is a substance that releases _____ ions (OH^-).
2. Bases that dissolve in water produce _____ solutions.
3. Bases are _____ meaning they will burn our skin.
4. Common examples of bases include _____ hydroxide which is found in soap and _____ which is used for household cleaning.

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4. Common examples of bases include **sodium** hydroxide which is found in soap and **ammonia** which is used for household cleaning.

The pH Scale

We use pH to measure the concentration of hydrogen ions (H^+) in a solution.

Remember that in an **acidic solution** there are more hydrogen ions (H^+) than hydroxide ions (OH^-).

In a **basic, or alkaline, solution** there are more hydroxide ions (OH^-) than hydrogen ions (H^+).

Pure water is **neutral** (neither acidic or basic).

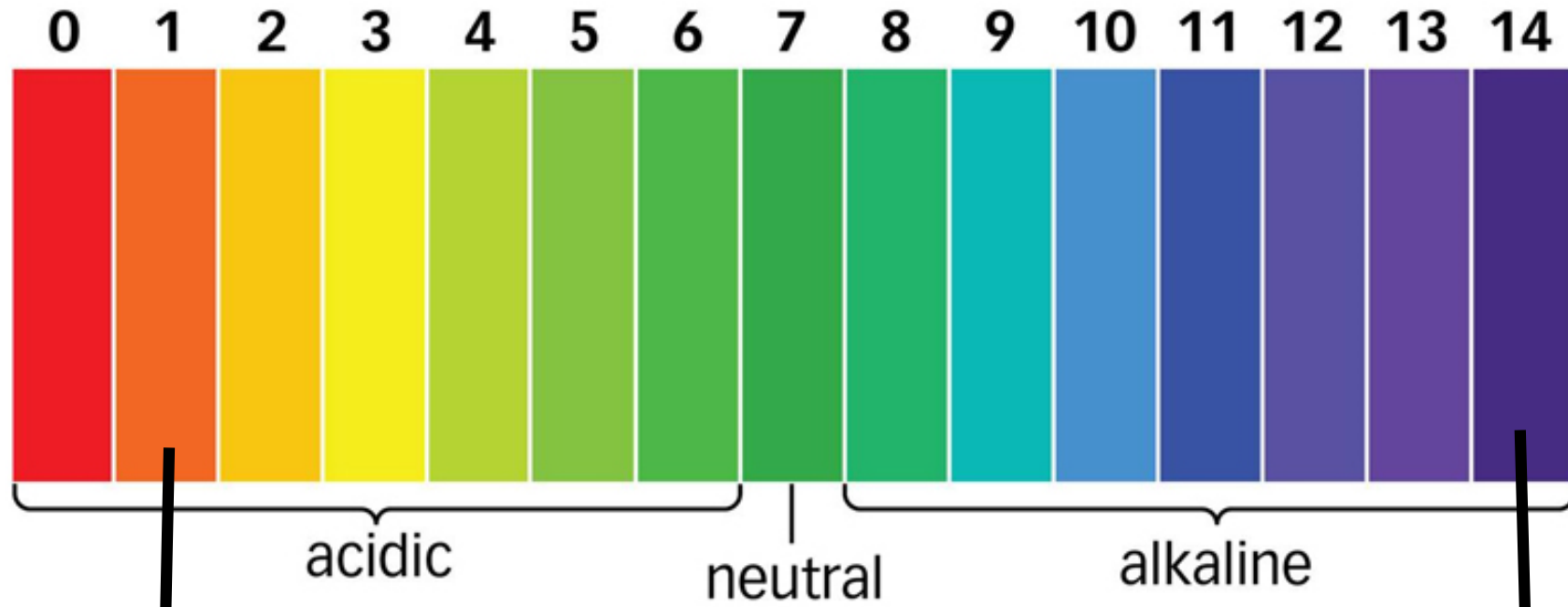
It has an equal number of hydrogen and hydroxide ions.

Pure water has a **pH of 7**. It is in the middle of the pH scale.

Acidic solutions have a pH **below 7** (1 being the most acidic).

Basic, or alkaline, solutions have a pH **above 7** (14 being the most basic).

The pH Scale



**Sulfuric acid
(car battery acid)**

Pure water



**Sodium hydroxide
(found in soap)**

Measuring pH

We use indicators that **change colour** to determine the pH of a solution.

We can use **blue litmus paper** which **turns red** when dipped in an acidic solution.

We can use **red litmus paper** which **turns blue** when dipped in a basic solution.

We can also use **universal indicator** which changes colour depending on the pH of a solution.