**Key Stage 4 Science. Lesson 5**

**Exothermic and endothermic reactions**

**Look online at-https://www.bbc.co.uk/bitesize/articles/zr6mkty**

**Learn-** Learn about the reactions of metals with acids, water and oxygen.

**Energy during a chemical reaction**

Energy is **conserved** in chemical reactions, so the total amount of energy in the universe at the end of a reaction is the **same** as it was before the reaction.

When a chemical reaction happens, energy is transferred **to** or **from** the surroundings.

**Exothermic reactions**

When energy is transferred **to the surroundings,** this is called an **exothermic** reaction. The temperature of the surroundings **increases**.

Examples of exothermic reactions include:-

* combustion reactions
* most neutralisation reactions
* respiration

Everyday uses of exothermic reactions include self-heating cans and hand warmers.

I find it easier to remember that the prefix ex- means out. For example exhale and exit.

**Endothermic reactions**

When energy is taken in **from the surroundings,** this is called an **endothermic** reaction. The temperature of the surroundings **decreases**.

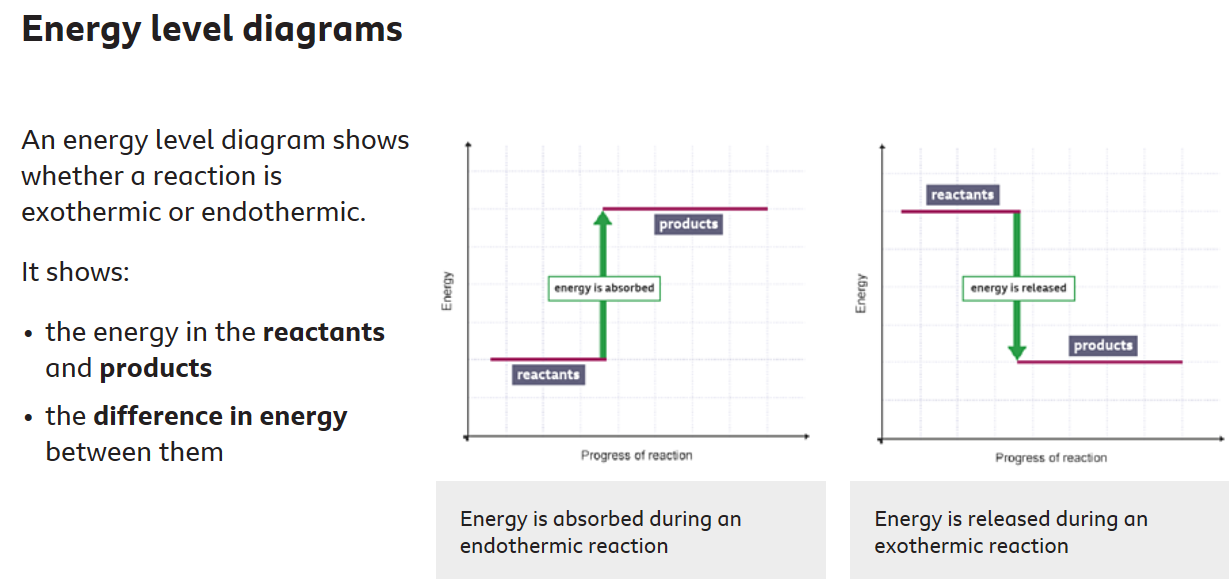
Examples of endothermic reactions include:

* thermal decomposition reactions
* photosynthesis.

Everyday uses of endothermic reactions include instant ice packs which can be used to treat sports injuries. I find it helps to remember endothermic reactions take in energy, same as an endoscope is camera that enters into the body.

**Activity 1-**

Complete the worksheet on exothermic and endothermic reactions.



**Explaining energy changes**

Energy is transferred when bonds are **broken** or are **formed.**

During a chemical reaction:

* bonds in the **reactants** are broken
* new bonds are made in the **products**

The difference between the energy needed to break bonds and the energy released when new bonds are made determines the type of reaction.

A reaction is:

* **exothermic** if **more** heat energy is released in making bonds in the **products** than is taken in when breaking bonds in the **reactants**
* **endothermic** if **less** heat energy is released in making bonds in the **products** than is taken in when breaking bonds in the **reactants**

**Activity 2- Quick Quiz. Circle the correct answers**

**1. What happens to energy during a chemical reaction?**

**a. INCREASES b. DECREASES c. STAYS THE SAME**

**2. Which type of reaction absorbs ebnergy from the surroundings?**

**a. EXOTHERMIC b. ENDOTHERMIC**

**3. What happens to the temperature during an exothermic reaction? a INCREASES b. DECREASES c. STAYS THE SAME**

**4. Which of the below is an ENDOTHERMIC reaction**

**a. NEUTRALISATION b. PHOTOSYNTHESIS c. COMBUSTION**

**5. In an ENDOTHERMIC reaction is the energy of the PRODUCTS higher or lower than the energy of the REACTANTS**

**a. HIGHER b. LOWER**

**Activity 3- Complete the Activity 3 worksheet with the GCSE exam style question**