**Graphs of Endothermic and Exothermic Reactions**

Breaking bonds requires energy to be absorbed.

When bonds form, energy is released.

Chemical reactions must absorb energy to break the bonds of the reactants and release energy when the new bonds of the products form.

**Endothermic Reactions:**

* Are chemical changes that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ more energy than is released.
* Require a constant source of energy e.g. baking a cake
* Take the energy they absorb from the surrounding environment (air or water)
* The temperature of the surroundings \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**A + B + 500 kJ 🡪 C**

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**Exothermic Reactions:**

* Are chemical changes that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ more energy than is absorbed.
* Only need energy to start \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Continue on their own using the energy they generate themselves
* No additional energy is required once the reaction begins
* Can be used as a source of energy to start other reactions
* The energy released is absorbed by the surrounding environment (air, water, food)
* The temperature of the surroundings \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**A + B 🡪 C + 500 kJ**

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**Problem:** How much energy is involved when 1 mole of methane, CH4, is burned?

1) Write the balanced chemical equation.

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2) Sketch the Energy graph:

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3) How many grams of methane will involve 5.7 x 104 kJ of energy?

4) If 400 kJ of heat energy are released, how many grams of carbon dioxide will be produced?