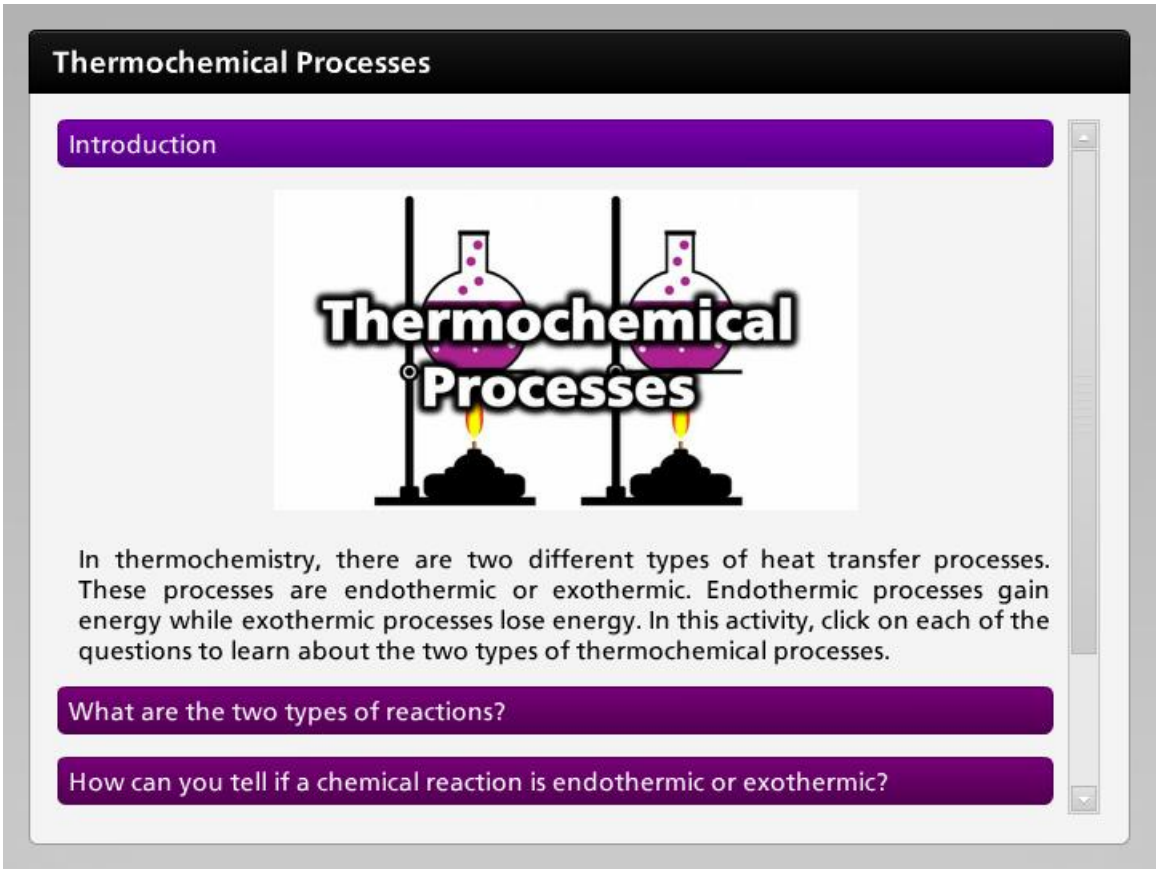
Module 8: Thermochemistry
Topic 1 Content: Thermochemical Processes Notes

Introduction



In thermochemistry, there are two different types of heat transfer processes. These processes are endothermic or exothermic. Endothermic processes gain energy while exothermic processes lose energy. In this activity, click on each of the questions to learn about the two types of thermochemical processes.

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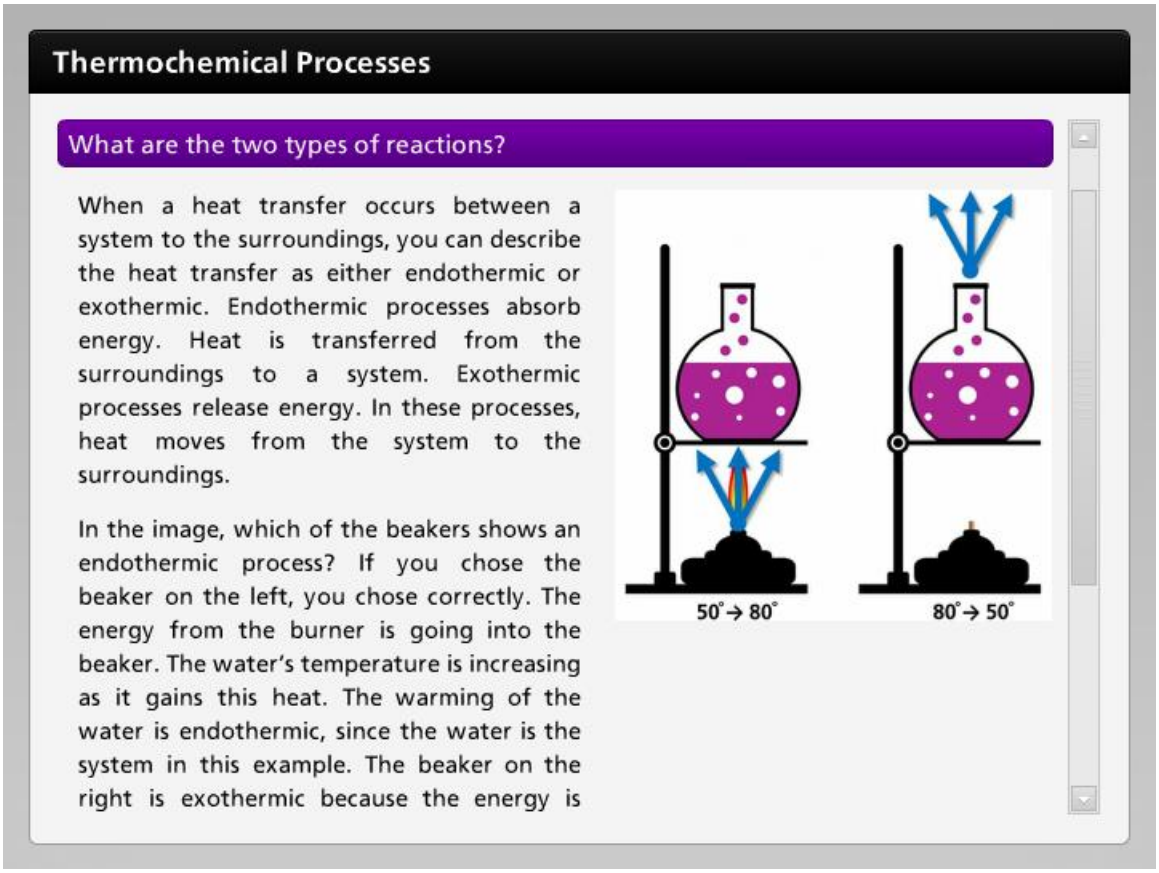
What are the two types of reactions?



When a heat transfer occurs between a system to the surroundings, you can describe the heat transfer as either endothermic or exothermic. Endothermic processes absorb energy. Heat is transferred from the surroundings to a system. Exothermic processes release energy. In these processes, heat moves from the system to the surroundings.

In the image, which of the beakers shows an endothermic process? If you chose the beaker on the left, you chose correctly. The energy from the burner is going into the beaker. The water's temperature is increasing as it gains this heat. The warming of the water is endothermic, since the water is the system in this example. The beaker on the right is exothermic because the energy is leaving the water in the beaker and escaping to the surroundings.

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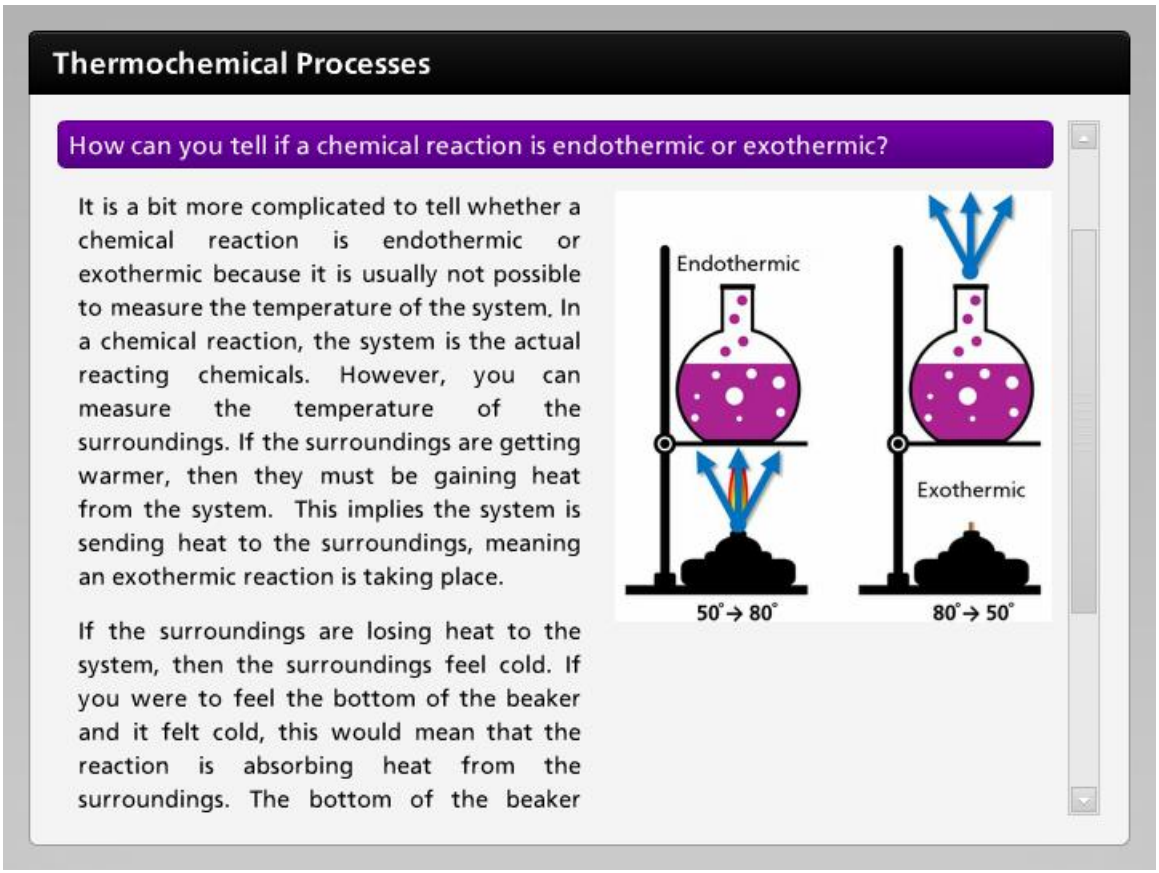
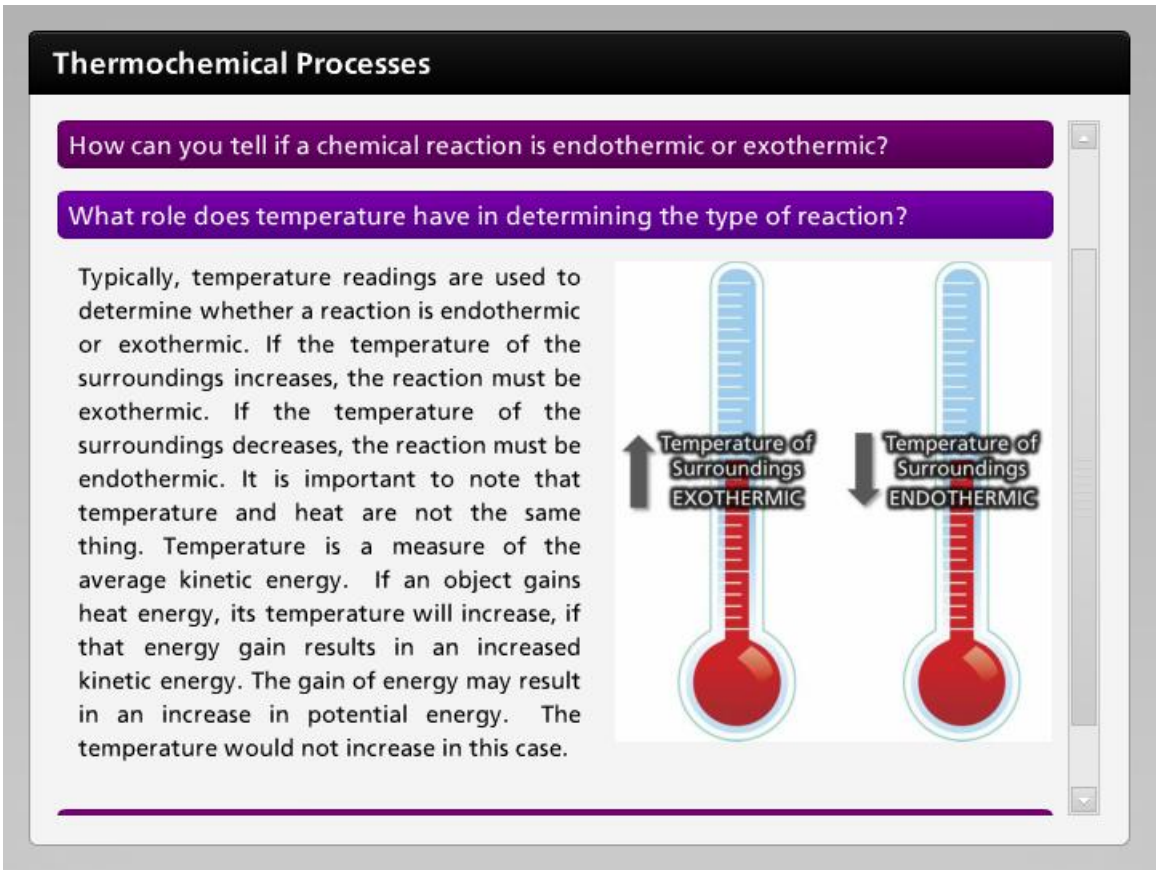
How can you tell if a chemical reaction is endothermic or exothermic?



It is a bit more complicated to tell whether a chemical reaction is endothermic or exothermic because it is usually not possible to measure the temperature of the system. In a chemical reaction, the system is the actual reacting chemicals. However, you can measure the temperature of the surroundings. If the surroundings are getting warmer, then they must be gaining heat from the system. This implies the system is sending heat to the surroundings, meaning an exothermic reaction is taking place.

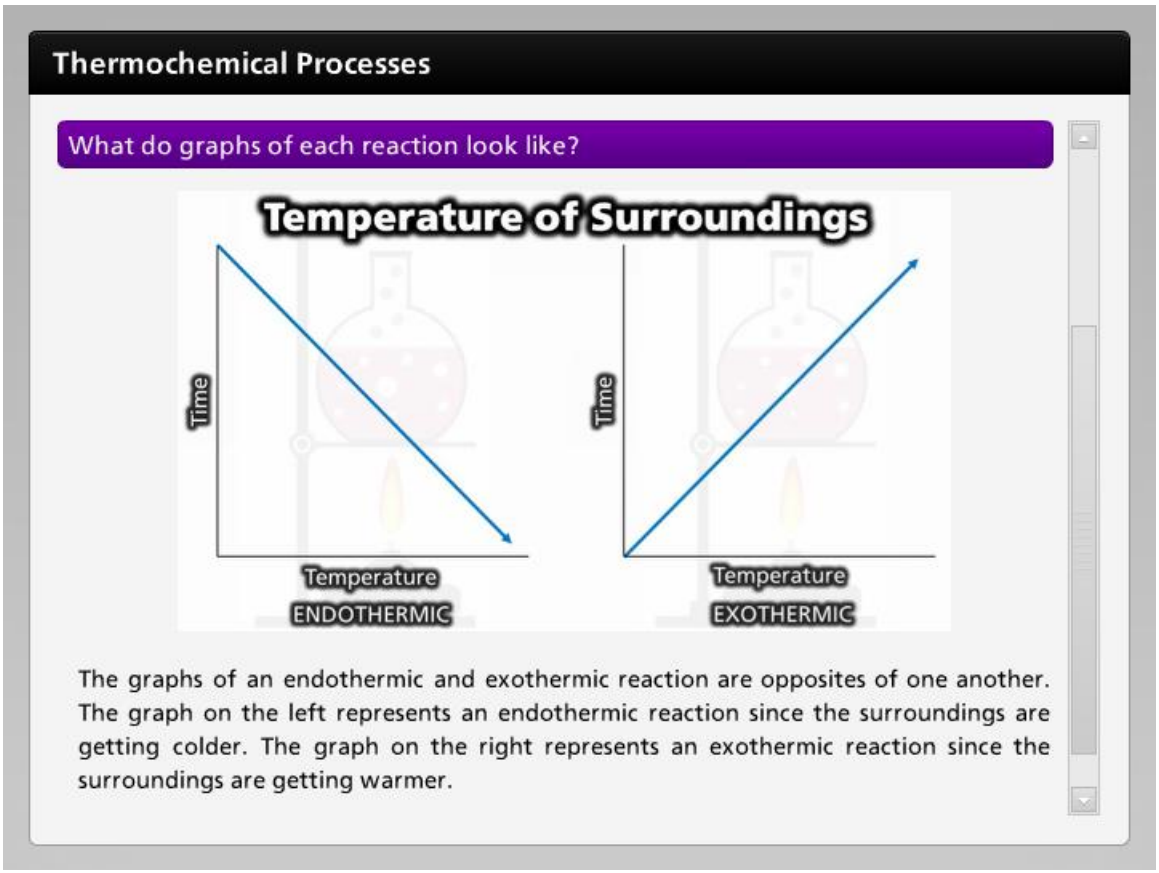
If the surroundings are losing heat to the system, then the surroundings feel cold. If you were to feel the bottom of the beaker and it felt cold, this would mean that the reaction is absorbing heat from the surroundings. The bottom of the beaker being cold indicates an endothermic reaction. If it were exothermic, the beaker would feel hot.

What role does temperature have in determining the type of reaction?



Typically, temperature readings are used to determine whether a reaction is endothermic or exothermic. If the temperature of the surroundings increases, the reaction must be exothermic. If the temperature of the surroundings decreases, the reaction must be endothermic. It is important to note that temperature and heat are not the same thing. Temperature is a measure of the average kinetic energy. If an object gains heat energy, its temperature will increase, if that energy gain results in an increased kinetic energy. The gain of energy may result in an increase in potential energy. The temperature would not increase in this case.

What do graphs of each reaction look like?



The graphs of an endothermic and exothermic reaction are opposites of one another. The graph on the left represents an endothermic reaction since the surroundings are getting colder. The graph on the right represents an exothermic reaction since the surroundings are getting warmer.