

CHAPTER 9	Endothermic and Exothermic Reactions Quiz Answer Key	BLM 9.1.3A
ANSWER KEY		

1. (a) The energy that is released in an exothermic reaction results from the difference between the energy absorbed when reactant bonds break and the energy released when product bonds form. In an exothermic reaction, the energy that is required to break bonds is less than the energy that is released to form bonds. The energy that is released is absorbed by the surroundings.
- (b) The energy that is absorbed by an endothermic reaction comes from the surroundings. Energy is required by the reaction because the energy that is required to break bonds is greater than the energy that is released to form bonds.

2.

Description of chemical reaction	Endothermic or exothermic?	Explanation
A piece of paper is ignited and burns with a bright flame.	exothermic	Heat and light are emitted.
Pentaborane (a colourless liquid), $B_5H_9$ , reacts violently with oxygen gas to form solid diborane, $B_2O_3$ , and water, typically bursting into flame and often exploding.	exothermic	Bursting into flame and explosion are both energy emissions.
Pure iron metal is formed and carbon dioxide is released when iron(III) oxide ore is heated to a very high temperature in the presence of solid carbon.	endothermic	High temperatures are required to form the new substances.
Sodium hydroxide solution and hydrochloric acid solution are mixed. The temperature of the mixture increases.	exothermic	Heat is emitted.
Mixing ammonium thiocyanate and barium hydroxide octahydrate in a beaker causes water on the outside of the beaker to freeze.	endothermic	Heat is absorbed from the surroundings.
The high temperature in an oven causes baking soda (sodium hydrogencarbonate) to break down into carbon dioxide, water, and sodium carbonate.	endothermic	Heat is absorbed from the surroundings to cause the reaction to occur.

3. The initial spark is an endothermic requirement, but the overall reaction is exothermic since heat and light are the end products. Many exothermic reactions (such as combustion reactions) require some initial energy input in order to proceed.