LESSON 105

CLASSWORK

Over the Hill
Reversing Reactions

Name _____

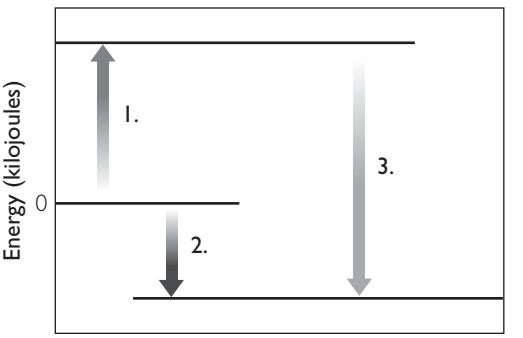
Date _____ Period _____

Purpose

To examine the energy exchanges during forward and reverse reactions.

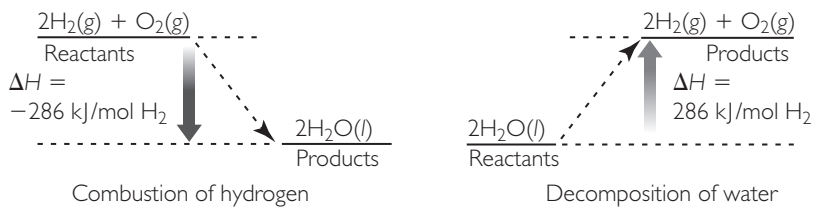
Analysis

1. Examine the energy diagram. Label the arrows with what they represent.
2. What would you expect to observe if you carried out this reaction?



3. Label the part of the diagram that represents the heat of reaction ΔH. Label the part that represents heat measured using a calorimeter *Heat*.
4. Could this diagram represent a combustion reaction? Why or why not?

Refer to the two diagrams below to answer Questions 5–9.



5. How does this energy diagram differ from those in Lesson 11?

6. Consider the combustion of hydrogen.
   a. Is energy required to make the combustion of hydrogen happen? Use evidence from the demonstration to explain your thinking.

   b. Do you think the reaction feels hot or cold? Explain.

7. Consider the decomposition of water.

a. How is the decomposition of water related to the combustion of hydrogen?

b. Overall, is energy required or released during the decomposition of water? Explain your thinking.

c. Will the reaction feel hot or cold? Explain.

8. Explain why one of the two heats of reaction has a positive sign and the other has a negative sign.

9. Energy is conserved whenever you reverse a reaction. Use the diagrams to explain what this means. Fill in the blanks in the diagram and answer Questions 10–12.

Reaction 1: Combustion of methane

$CH_4(g) + 2O_2(g) \longrightarrow CO_2(g) + 2H_2O(l)$

Reaction 2: Formation of methane

$CO_2(g) + 2H_2O(l) \longrightarrow CH_4(g) + 2O_2(g)$

10. The heat of reaction for the combustion of methane is −891 kJ/mol. What is the heat of reaction for the formation of methane from carbon dioxide and liquid water?

11. Can you tell if a reaction is exothermic or endothermic simply by looking at its energy diagram? Explain.

12. Making Sense Can every reaction be reversed? Explain your reasoning. Think about energy diagrams in forming your answer.