

Answer Key

CHAPTER 3 TEST A

1. d
2. b
3. d
4. c
5. a
6. c
7. a
8. b
9. c
10. a
11. equation 2
12. 2
13. NH_4 and NO_3
14. equation 3
15. by adding a coefficient of 2 in front of H_2O
16. exothermic
17. A, D
18. B, C
19. **Extended Response Rubric**

6 points for a response that correctly describes how three of the listed factors affect the rate of a chemical reaction

Sample: Concentration describes the number of particles in a given volume. As the concentration of the reactants increases, there are more particles to collide and react with one another. This can increase the reaction rate.

Surface area of the reactants can also affect the reaction rate. Increased surface area means that more of the surface of the reactant is exposed. As surface area increases, the rate of the reaction increases as well.

Temperature affects the rate of a reaction by affecting how fast reactant particles move. Higher temperatures, due to the addition of energy, cause the reactant particles to move faster. This results in more reactant collisions and a faster reaction rate.

Answers may also include: Catalysts are substances that increase the rate of a reaction without being consumed by the reaction. For example, enzymes act as catalysts by increasing the rate of many reactions in living things. At the end of the reaction, these enzymes remain unchanged.

5 points: correctly describes how two factors affect the rate of a chemical reaction and partially describes the effect of a third factor

4 points: correctly describes how two factors affect the rate of a chemical reaction

3 points: correctly describes how one factor affects the rate of a chemical reaction and partially describes the effect of a second factor

2 points: correctly describes how one factor affects the rate of a chemical reaction

1 point: partially describes how one factor affects the rate of a chemical reaction

20. **Extended Response Rubric**

6 points for a response that correctly describes Lavoisier's mercury experiment and explains how he came to the idea of conservation of mass

Sample: Lavoisier recorded the mass of a piece of mercury. He then put the mercury in a jar and sealed the jar. He recorded the total mass of the mercury plus the jar plus the air in the jar. He heated the mercury and measured the mass again. The mass of the mercury had increased. But the total mass of mercury plus jar plus air was the same. Lavoisier noticed that a candle would no longer stay lit in the jar. He concluded that something in the air had combined with the mercury. That explained why the mercury had gained mass. So he concluded that total mass is always conserved in a chemical reaction.

5 points: correctly describes Lavoisier's experiment and partially explains how he came to the idea of conservation of mass

4 points: correctly describes Lavoisier's experiment

3 points: partially describes Lavoisier's experiment and correctly explains how he came to the idea of conservation of mass

2 points: partially describes Lavoisier's experiment and partially explains how he came to the idea of conservation of mass

1 point: partially describes Lavoisier's experiment or partially explains how he came to the idea of conservation of mass