

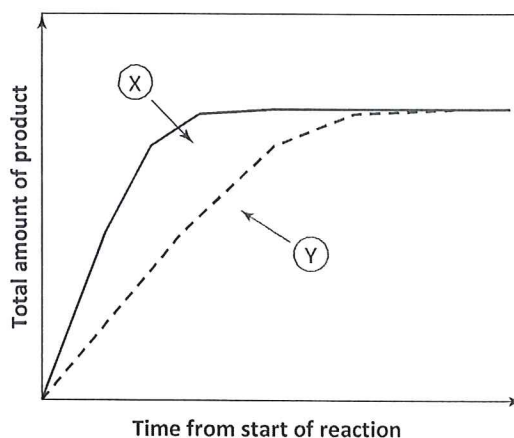
Factors Affecting the Rate of Reactions (Honors Chemistry)

Indicate whether each of the following would increase or decrease the rate of reaction. (Write I or D)

a. Add heat	I	f. lower temperature	D
b. Remove heat	D	g. raise temperature	I
c. Add a catalyst	I	h. decrease surface area	D
d. Dilute a solution	D	i. Increase concentration	I
e. Remove an enzyme	D	j. grind reactant into powder	I

Rate of reaction and changing conditions

The graph to the right shows the differences in the rate of reaction at different temperatures, concentrations, surface area, and the presence or absence of a catalyst. A steeper line represents a greater rate of reaction. Indicate which line (X or Y) each of the following are associated with.

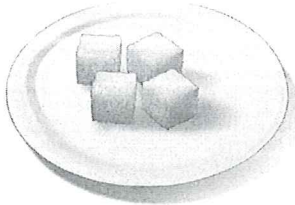

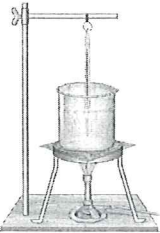

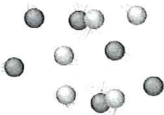
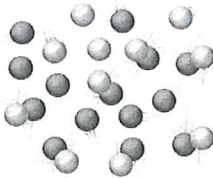


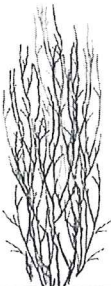



a. Lower Concentration	Y	e. lower temperature	Y
b. Higher Concentration	X	f. higher temperature	X
c. Catalyst Present	X	g. Small Pieces (Large Surface area)	X
d. Catalyst Absent	Y	h. Large Pieces (Small Surface area)	Y

Which of the four factors affecting reaction rate is most important in each of the following examples? Choose from concentration, temperature, surface area, and catalyst.

- Raw carrots are cut into thin slices for cooking. Surface area
- Protein is broken down in the stomach by the enzyme pepsin. catalyst
- A woolly mammoth is found, perfectly preserved, near the Arctic. temperature
- More bubbles appear when a concentrated solution of hydrochloric acid is added to a magnesium strip than when a dilute solution of the acid is added. Concentration

Identify which situation would have a higher reaction rate. Then state the factor that affected the rate of reaction in each situation.

	Situation X	Situation Y	Situation with a higher reaction rate (X or Y)	Factor affecting the rate of reaction
(a)	<p>1 g of sugar (cubes)</p> 	<p>1 g of sugar (grains)</p> 	Y	Larger surface area
(b)	<p>50 °C</p> 	<p>0 °C</p> 	X	Higher temperature
(c)	<p>low number of particles = few collisions</p> 	<p>high number of particles = more collisions</p> 	Y	Higher Concentration
(d)	<p>enzyme added</p> 	<p>no enzyme added</p> 	X	Catalyst
(e)	<p>twigs</p> 	<p>logs</p> 	X	Larger surface area

Factors affecting the rate of chemical reactions

Match the Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.

Term	Descriptor
1. <u>D</u> catalyst	A. a measure of how much area of an object is exposed
2. <u>C</u> temperature	B. the amount of substance dissolved in a given volume of solution
3. <u>A</u> surface area	C. a measure of the average kinetic energy of all the particles in a sample of matter
4. <u>B</u> concentration	D. a substance that speeds up the rate of a chemical reaction without being used up itself or changed
5. <u>E</u> rate of reaction	E. a measure of how quickly products form, or given amounts of reactants react, in a chemical reaction
6. <u>F</u> Catalytic Converter	F. a stainless steel pollution-control device that converts poisonous gases from the vehicle's exhaust into less harmful substances

7. When you walk through a crowded hallway at school, you are more likely to bump into another person. To which of the following factors that affect rate of reaction is this analogy referring?

- A. catalyst C. surface area
 B. temperature D. concentration

8. Which of the following are true about how temperature affects the rate of reaction?

I.	heating causes the particles of the reactants to move more quickly
II.	lowering the temperature will raise the energy level of the particles
III.	increasing the temperature results in more collisions between the particles

A. I and II only

B. I and III only

C. II and III only

D. I, II, and III

9. Increasing which of the following will increase the frequency of collisions?

I.	temperature
II.	surface area
III.	concentration

A. I and II only

B. I and III only

C. II and III only

D. I, II, and III

10. Which of the following will lower the rate of reaction?

A. adding an enzyme to the reaction

B. decreasing the temperature from 40°C to 10°C

C. breaking a chunk of calcium up into smaller pieces

D. increasing the amount of solute dissolved in a solution