Science 10 Name:

Factors that Affect the Rate of a Chemical Reaction

Reference: text book p. 272 – 277 + power-point

<table>
<tr><td colspan="2">Definition of reaction rate</td></tr>
<tr><td>Factor</td><td>Procedure</td></tr>
<tr><td rowspan="2">1. increasing temperature</td><td>1. Set up 2 X 250 mL beakers – one with 100 mL warm water and one with 100 mL of cold water. Make sure you control the amount of water in each beaker.
2. Add 1 alka seltzer tablet to each beaker. Make sure these go into each beaker at the same time. (Another controlled variable).
3. Time each reaction until the tablet has completely dissolved.
4. Compare the time it takes for the chemical reaction to be completed in each temperature bath.</td></tr>
<tr><td>Conclusion 1
How does increasing the temperature of a chemical reaction affect the rate of the chemical reaction?

Explanation:</td></tr>
<tr><td></td><td></td></tr>
<tr><td>2. increasing the surface area of the reactants</td><td>1. Set up 2 X 250 mL beakers – each with 100 mL of water. Make sure you control the temperature of water in each beaker.
2. Use the mortar and pestle to grind 1 alka seltzer tablet into smaller pieces. Keep the other alka seltzer tablet as a whole tablet.
3. Add 1 alka seltzer tablet to each beaker. Make sure these go into each beaker at the same time. (Another controlled variable).
4. Time each reaction until the tablet has completely dissolved.
5. Compare the time it takes for the chemical reaction to be completed with a whole tablet vs. a tablet that has increased surface area (ground up)</td></tr>
<tr><td></td><td>Conclusion 2
How does increasing the surface area of the reactants affect the rate of a chemical reaction?

Explanation:</td></tr>
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3. increasing the concentration of reactants	1. Set up 2 X 250 mL beakers – each with 100 mL of water. Make sure you control the temperature of water in each beaker. 2. Add 1 alka seltzer tablet to one beaker and 2 alka seltzer tablets to the other beaker. Make sure these go into each beaker at the same time. (Another controlled variable). 3. Compare the amount of product produced – 1 alka seltzer tablet (reactant) vs. 2 alka seltzer tablets (increased reactant)
	Conclusion 3 How does increasing the concentration of reactants affect the amount of product formed in a chemical reaction? Explanation:
4. adding a catalyst to a chemical reaction	Watch the demo: Elephant's toothpaste 1. 1 tsp of KI in 25 mL of water in a large Erlenmeyer Flask 2. add 2 drops of food coloring + some dish soap 3. pour a small amount of 30% hydrogen peroxide into the Erlenmeyer Flask The reaction is a decomposition reaction: $2H_2O_2 \rightarrow 2H_2O + O_2$ KI acts as a catalyst (catalyst is unchanged and re-used) in a reaction. The catalyst allows the reaction to occur at a lower temperature.
	Conclusion 4 How does adding a catalyst to a chemical reaction affect the rate of a chemical reaction? Describe what an enzyme does in a chemical reaction?
5. catalytic converters	Read p. 277 and describe what a catalytic converter does in a car.