

Temperature and the Rate of a Chemical Reaction

- Objective
- To be able to identify and control variables to design an experiment to see if *temperature affects the rate of a chemical reaction.*

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- Objective
- To be able to explain, on the molecular level, why the *temperature* of the *reactants* affects the speed of the reaction.

Demonstration

- One glow stick was warmed and the other cooled. Once the glow sticks were started, there was a noticeable difference in their brightness.
- How can you tell whether the chemical reaction is happening faster or slower in each glow stick?
- The warm glow stick is brighter
The cool glow stick is not as bright.



Demonstration

- Some people place glow sticks in the freezer to make them last longer. Why do you think that this works?
- The chemical reaction that happens in a light stick is slower when cold.
- Do you think that starting with warmer reactants increases the rate of the other chemical reactions? Why or why not?
- It is reasonable to think that temperature will affect the rate of other reactions because it affected this one.

Activity

- Question to Investigate:
- Does the temperature of the reactants affect the rate of the chemical reaction?
- 15 minutes

Explain it with Atoms & Molecules

- Does the temperature of the reactants affect the rate of the chemical reaction?
- How do you know?
- The reaction happened much faster in the warmed cup than in the cool cup.

Explain it with Atoms & Molecules

- On the molecular level, why do you think the warmed solutions react faster than the cold solution?
- For reactant molecules to react, they need to contact other reactant molecules with enough energy for certain atoms to come apart & recombine to make the products.

Key Concepts

- Reactants must be moving fast enough and hit each other hard enough for a *chemical reaction* to take place.
- Increasing the *temperature* increases the average speed of the *reactant* molecules.

Key Concepts

- As more molecules move faster, the number of molecules moving fast enough to react *increases*, which results in faster *formation* of *products*.