

Name \_\_\_\_\_

## Hot or Cold? How Temperature Affects the Speed of Chemical Reactions

### Open-Ended Response Answer Key

1. The chef would consider temperature to control the Maillard reaction, affecting the browning and flavor development in the dish. For example, they might use high heat to sear a steak and low heat to slowly caramelize onions for a rich flavor profile.
2. Temperature's influence on chemical reactions in the atmosphere, such as ozone formation and greenhouse gas reactions, plays a significant role in climate change. Understanding these reactions helps scientists develop strategies to reduce emissions and combat climate change.
3. Temperature control is crucial in pharmaceutical manufacturing to ensure the stability and effectiveness of medications. For example, vaccines often require precise temperature control during production to maintain their potency.
4. Rate equations provide valuable insights into reaction kinetics and help researchers optimize reaction conditions, select suitable catalysts, and improve efficiency in chemical processes. For example, in the production of biofuels, rate equations guide the design of efficient enzymatic reactions for ethanol production from renewable feedstocks.

