

Name _____

Speed It Up: How Heat and Pressure Change Chemical Reactions



Have you ever watched a cake rise in the oven or seen a glow stick light up faster when bent? These are examples of chemical changes. But did you know that heat and pressure can actually change how fast those reactions happen?

Chemical changes happen when molecules break apart and join in new ways. Some reactions happen quickly, like fireworks exploding. Others take more time, like a rusty nail. Scientists have discovered that two things can really speed up a chemical change: temperature and pressure.

Let's start with temperature. When something is heated, its particles move faster. The faster they move, the more likely they are to bump into each other and react. That's why bread rises more quickly in a warm oven than on a cool counter. The heat gives energy to the ingredients and makes the reaction speed up.

Pressure is a little trickier. It mostly affects reactions involving gases. When pressure is increased, gas particles are squeezed closer together. This means they're more likely to collide and cause a chemical reaction. It's like being in a crowded room—there's a better chance of bumping into someone. That's why soda stays fizzy in a sealed can. The pressure keeps the bubbles (gas) in. When you open it, the pressure drops and the gas escapes, starting a change.

Scientists and engineers use this knowledge all the time. In factories, they often raise the temperature or pressure to speed up reactions and make products faster. But they have to be careful. Too much heat or pressure can be dangerous or make the reaction go out of control.

Everyday life shows us these ideas too. A glow stick works faster in hot water. Baking cookies is quicker in a hot oven. Even our bodies use heat—when we have a fever, some reactions in our cells go faster to help us fight germs.

So next time you see something changing, think about this: is it happening faster because it's hot or under pressure? You might just be seeing science in action!