Welcome to the Magic of Matter!

Let’s put on our scientist goggles and discover the secret rules of everything around us!

Everything around us takes up space.

Matter

Magic Word: Matter.
If it takes up space, it's matter!

Materials

metals | plastics | ceramics | glass | fabrics

Substances: Elements

pure gold

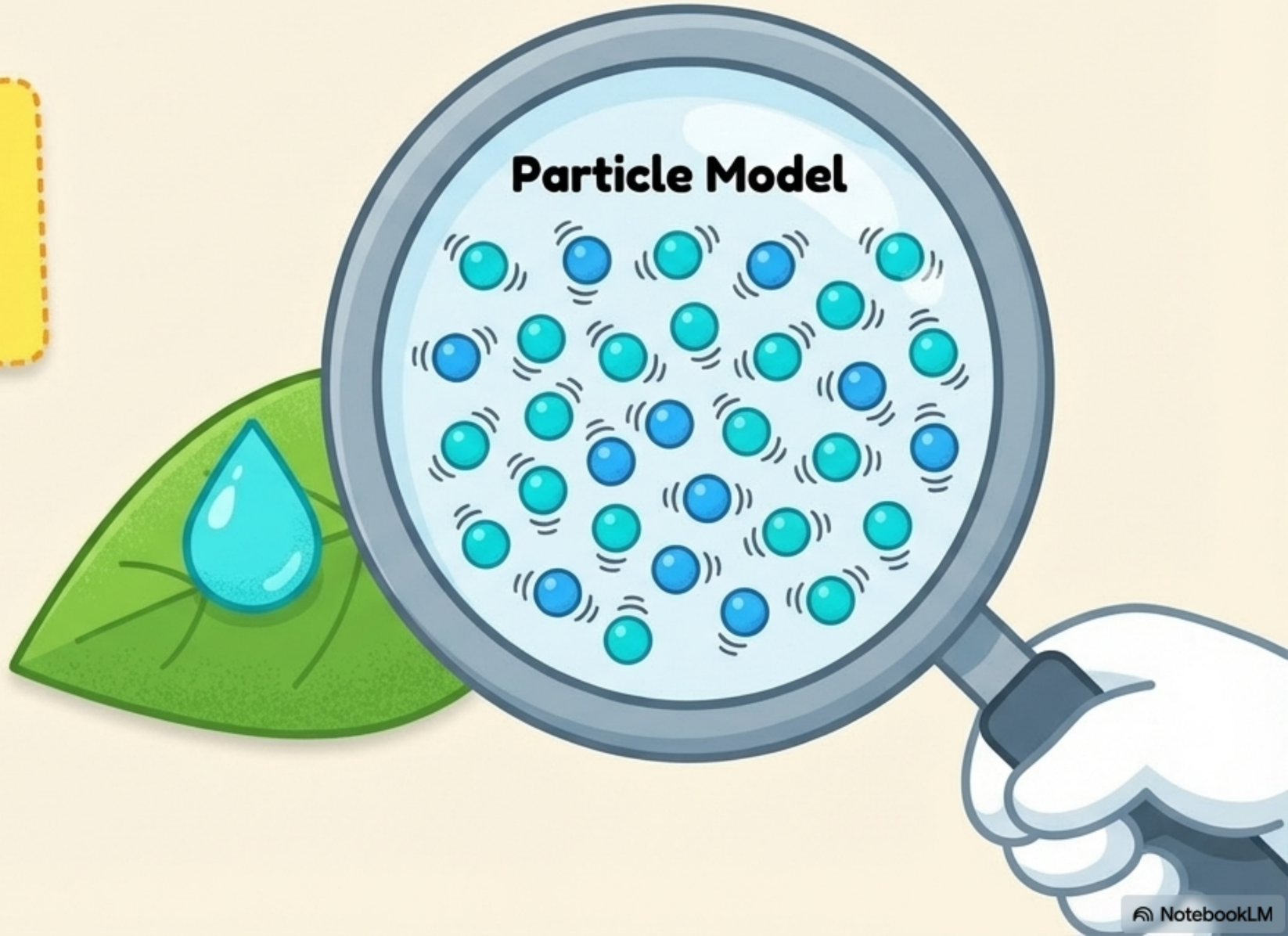
Substances: Compounds

Hydrogen + Oxygen

Put on your microscopic lenses and let's zoom in!

Magic Word: Particles.

These are the tiny, invisible building blocks that make up all substances.



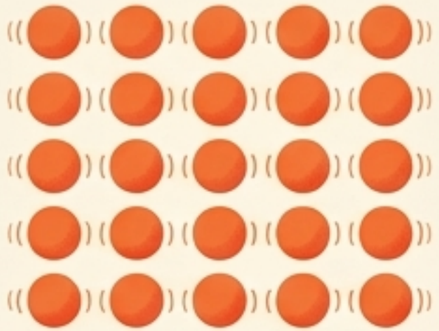
Each substance is made up of unique particles. They are always moving!

Meet the three families of matter.

Matter is found in three different states: Solid, Liquid, and Gas.

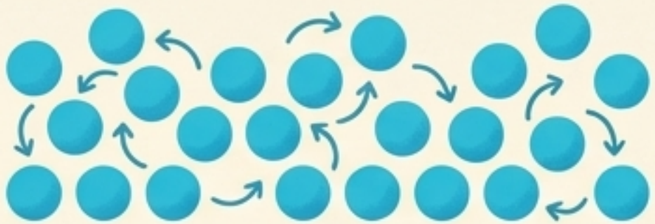
Solids

Particle View



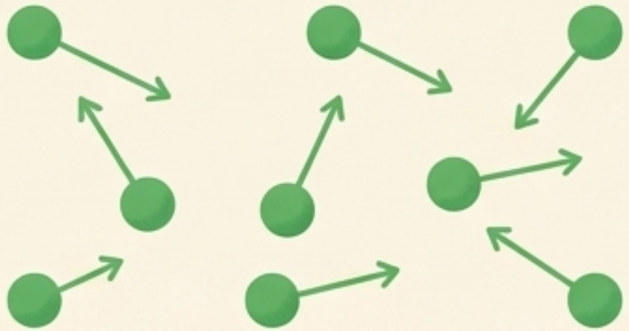
Liquids

Particle View



Gases

Particle View



Solids and liquids behave by completely different rules.

Even though solid particles are locked in place, they are still vibrating!

- Packed closely!
- Arranged in order!
- Cannot move from place to place!

- Fills the container!
- Arranged randomly!
- Cannot be squashed!

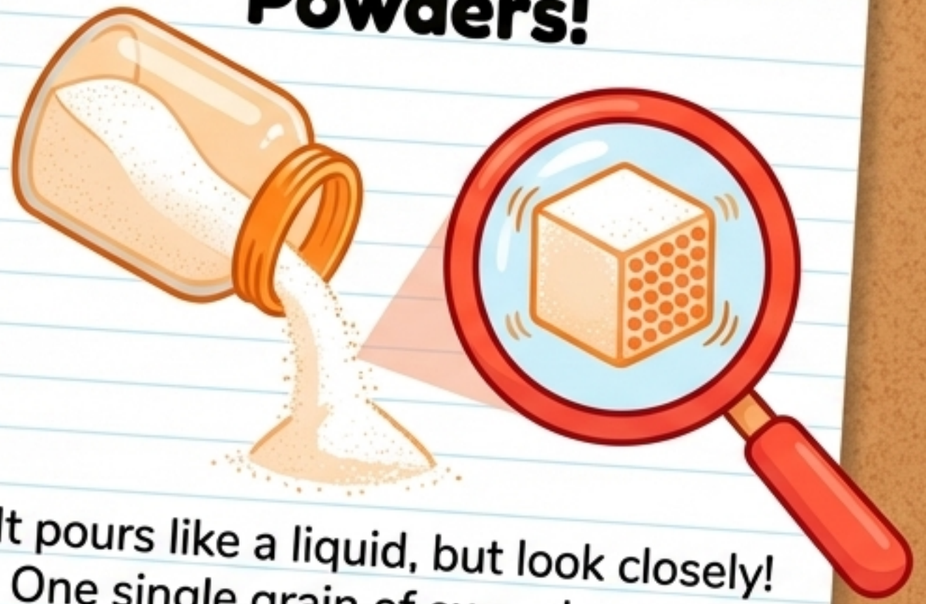
Tricky matter tries to break the rules!

Put on your thinking caps: Is slime a solid or a liquid?

Play Slime!

It takes the shape of its container like a liquid, but doesn't always take up the same amount of space. Can it be compressed? Yes!

Powders!

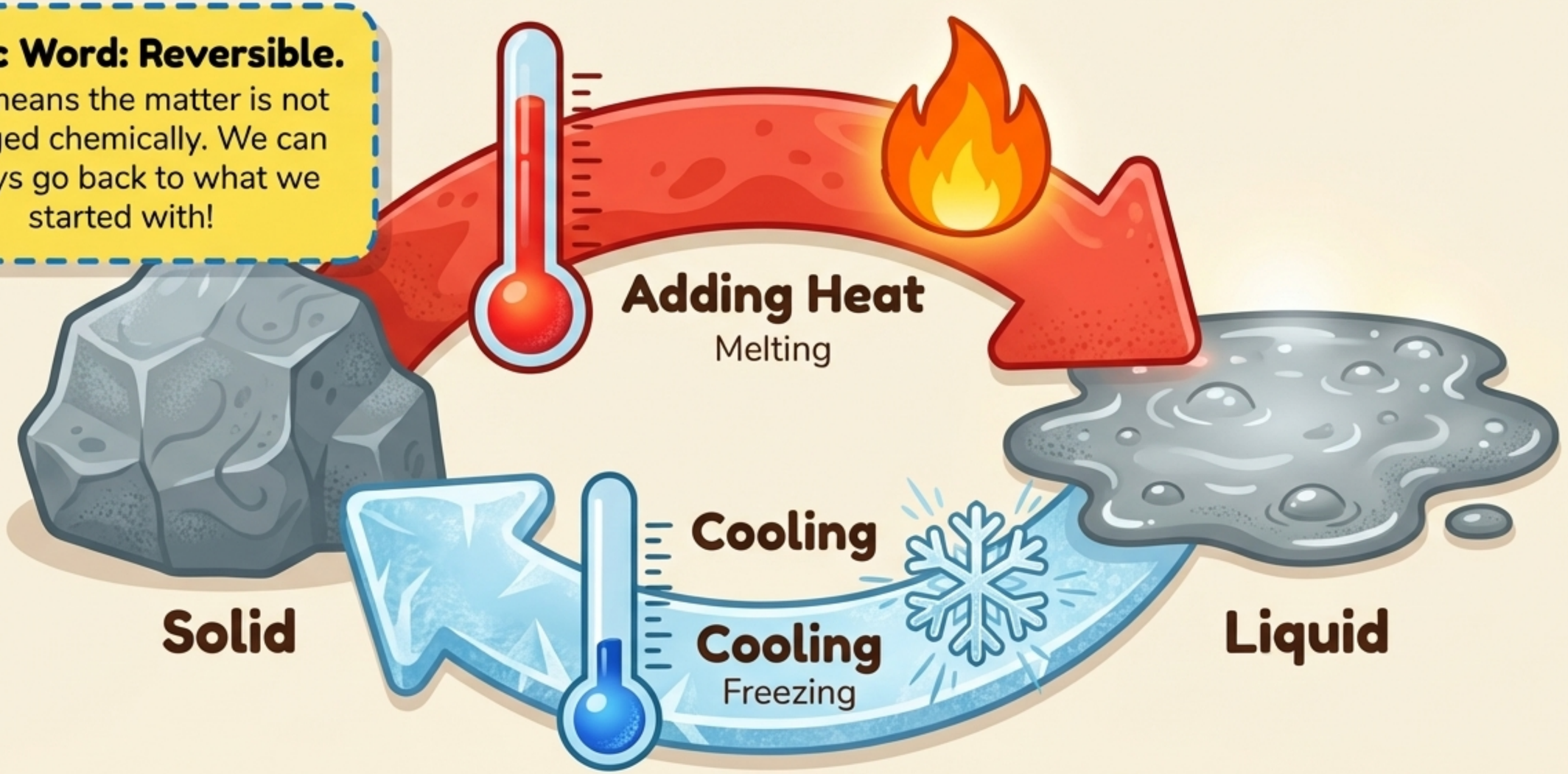


It pours like a liquid, but look closely! One single grain of sugar keeps its shape. Powders are just crushed solids.

Temperature is the key to shape-shifting matter.

Changes of state are just physical changes.

Magic Word: Reversible.
This means the matter is not changed chemically. We can always go back to what we started with!

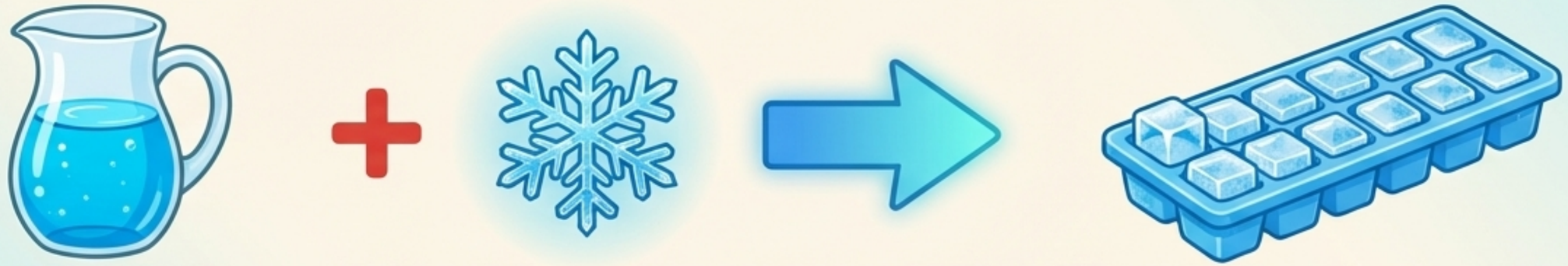


Watch solids and liquids trade places.

Top Path: Melting: Adding heat turns a solid soft and liquid.

Heat makes solid particles vibrate faster until they break free and flow.

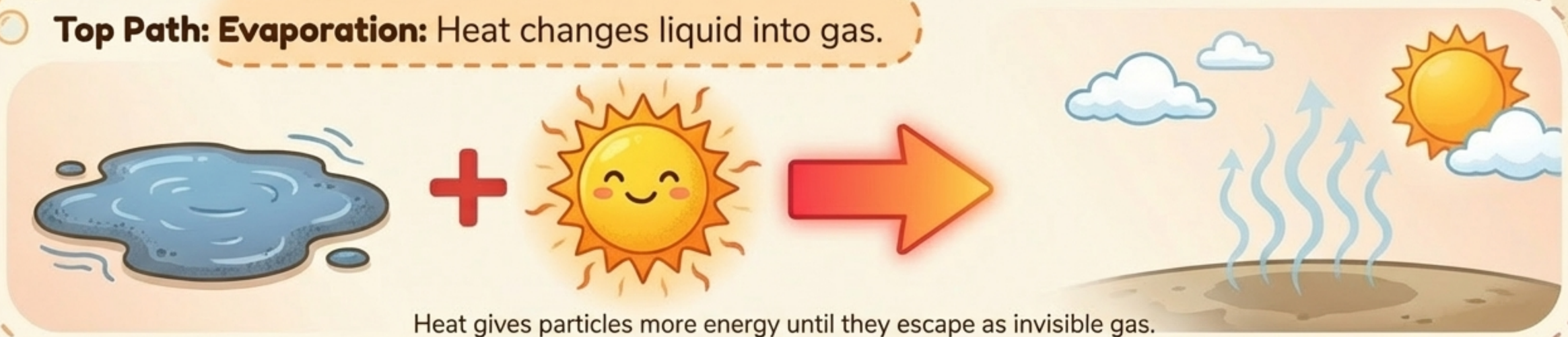
Bottom Path: Freezing: Cooling a liquid turns it back into a solid. Freezing isn't just for ice!



Cooling slows down liquid particles until they lock into a solid pattern.

Watch liquids and gases perform disappearing acts.

Top Path: Evaporation: Heat changes liquid into gas.



Heat gives particles more energy until they escape as invisible gas.

Bottom Path: Condensation: Cold changes gas back into liquid.

Cold takes energy away, slowing particles down until they clump together as liquid.

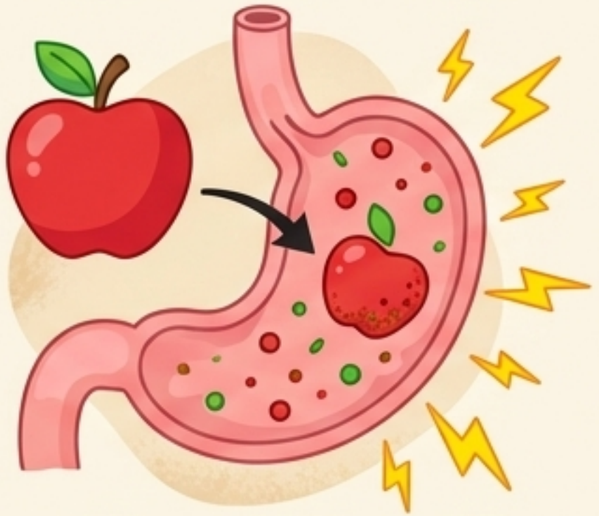
Some changes cross the point of no return.

When you digest food, your body turns it into energy. You can't turn that energy back into an apple!

Caution: Transformation!

Baking Soda Volcano

Fizzy Bath Bomb



Digestion

Magic Words: Chemical Reaction & Irreversible.

The particles are completely rearranged to make a brand new product. We cannot reverse it!

Mixing chemicals helps us build brand new things.

These new products have completely different properties than what they started with!

Building a Hard Cast

Plaster of Paris (gypsum) + **Water** = **Hard Cast**

Creating Plastic Bottles

Oil + **Chemical Reaction** = **Plastic**

The Scientist's Dictionary.

Keep these magic words in your science toolkit!

Matter

Takes up space.

Particle

Tiny building block.

Element

Pure substance (gold).

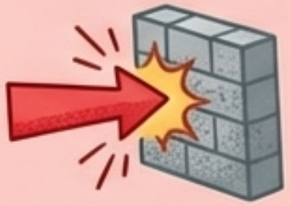
Compound

Mixed elements (water).

Reversible

Can go back (ice to water).

Irreversible



Stuck forever (baking a cake).

Product

The new thing made in a reaction.

Grab your pencils for a pop quiz!

Can you find the missing words?

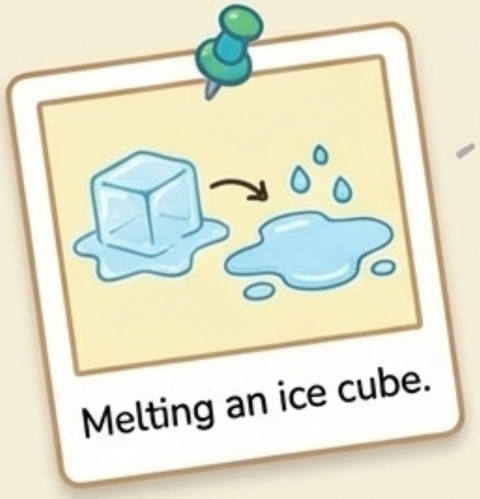
Word Bank

freeze | motion | reverse | solid | melt | particle

1. This is a material with a fixed shape. It does not flow: _____
2. Melting is the _____ of freezing.
3. The smallest part of a substance is known as a _____
4. When a solid chocolate is heated, it will _____
5. To change a liquid into a solid, you need to _____ it.
6. Particles are always in constant _____

Put on your detective hat!

Which bucket do these changes belong in? Point to the correct answer!



Melting an ice cube.

Mixing milk to make plastic.

Condensation on a cold mirror.

Fantastic investigating, scientists!

You've unlocked the secrets of solids, liquids, and gases. Keep observing the world around you, because science is everywhere!