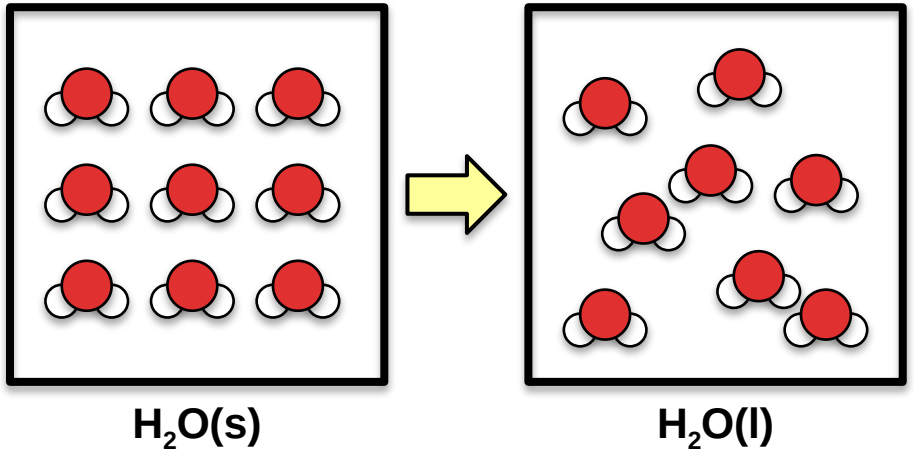
Introduction for Reactions

Essential Question

How can we tell if a new substance formed?

Physical Change

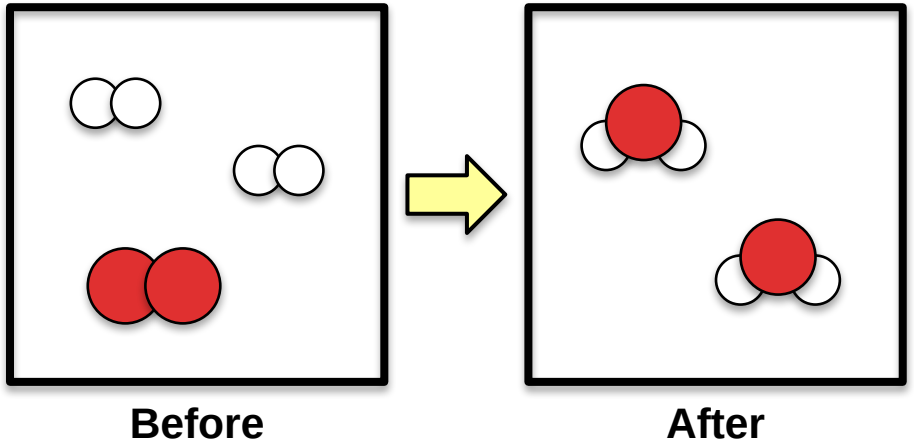
- Properties change, composition does not
- Same substance before and after
- Phase changes, mixing, separating



Melting: still H_2O molecules

Chemical Change

- New substances form
- Atoms rearrange into new combinations
- New substance = new properties



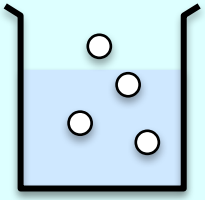
$$2H_2 + O_2 \rightarrow 2H_2O$$

Evidence of a Chemical Change

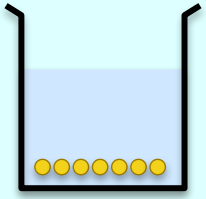
Look for these clues:



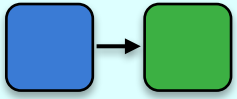
Heat or light



Gas forms



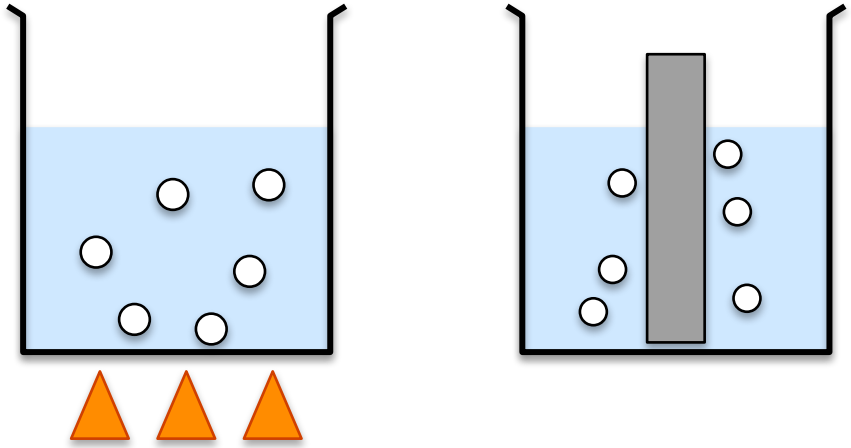
Precipitate forms



Color change

Evidence Is Not Proof

- Bubbles can come from boiling, not reacting
- Ask: did a NEW substance form?



$H_2O(g)$

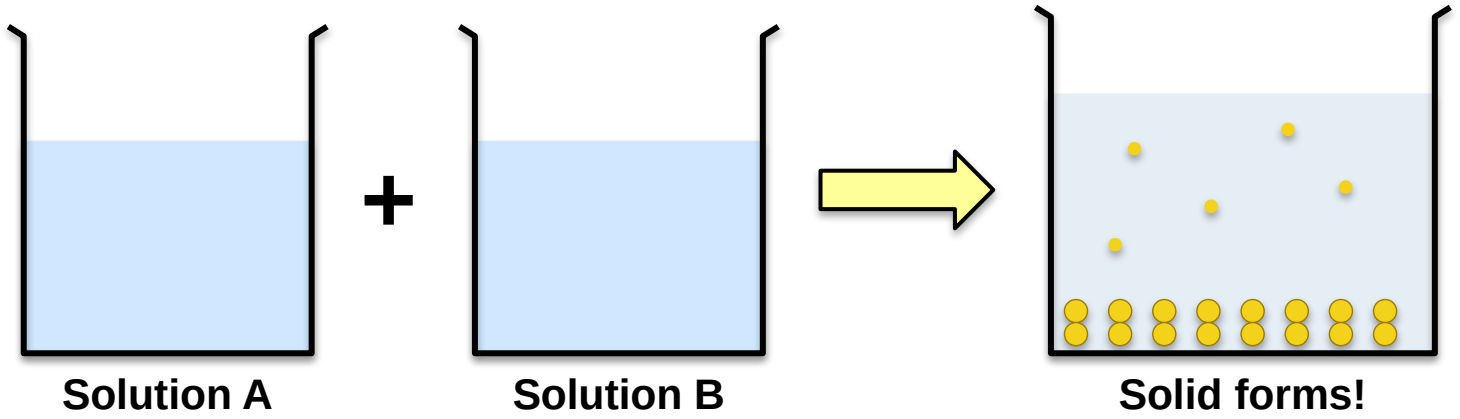
Physical

$H_2(g)$

Chemical

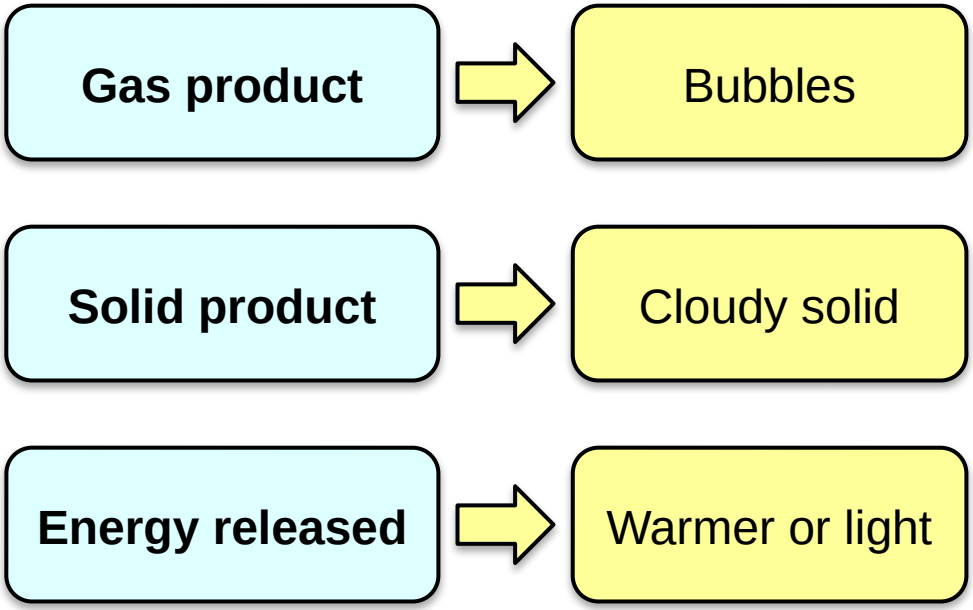
Forming a Precipitate

- Precipitate: a solid that forms when two solutions mix
- Mixture turns cloudy, then solid settles



Predicting What You Will See

- Know the products?
- Predict what you will observe



Example: Physical or Chemical?

Classify each change as physical or chemical.

(a) ice melting

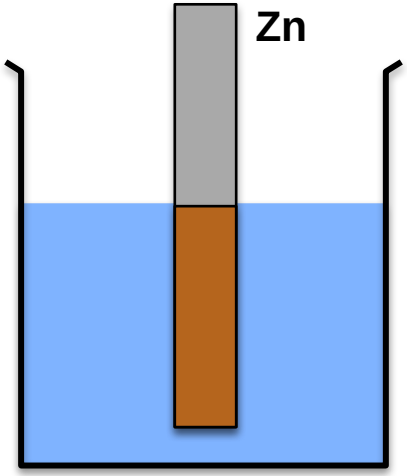
(b) iron rusting

(c) sugar dissolving in water

(d) wood burning

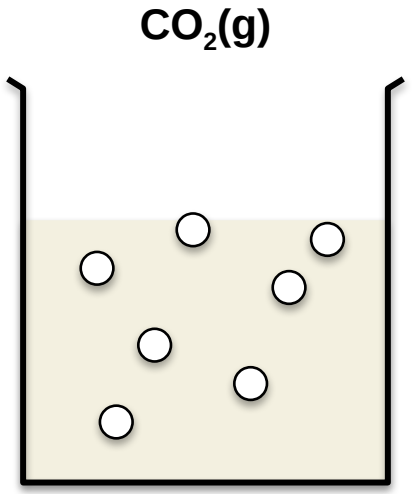
Example: Zinc in Copper(II) Sulfate

A strip of zinc is placed in blue copper(II) sulfate solution. The blue color fades and a reddish-brown solid forms on the zinc. Is this a physical or chemical change? Give two pieces of evidence.



Example: Predict an Observation

Baking soda is added to vinegar. One product is carbon dioxide gas. Predict one observation, and explain why it is evidence of a chemical change.



Introduction for Reactions

Big Ideas

- Physical change: same substance
- Chemical change: new substances
- Evidence: heat, light, gas, solid, color
- Confirm a new substance formed

