
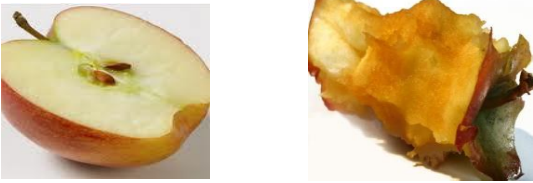



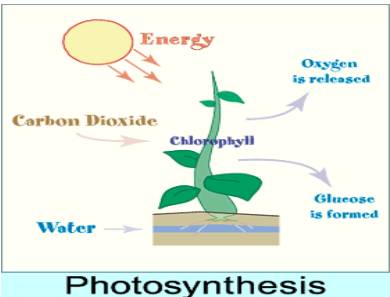


Physical vs. Chemical Changes

Directions: Categorize each of these changes as a physical change, a chemical change, or both. Use the definitions of physical change and chemical change to prove/justify your choice.

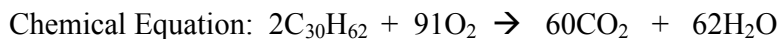
Engage:

Change	Physical change, Chemical change or both	Justify your choice
Ice melting: Ice → Water 		
Apple → Iron oxide (brown) and apple 		
Wood (+ fire) → Smoke and ash 		
Paper → paper boat 		
Water → Water vapor 		
Carbon dioxide + Water → Glucose + Oxygen 		

Explain/Explore:

Example:

1) Burning a candle: paraffin wax (fuel) + Oxygen gas → Carbon dioxide + Water



What are the reactants when a candle burns? _____
What are the products when a candle burns? _____
What type of change is this? _____
What is the evidence for this type of change? _____



Table-Evidence or proof of a chemical change or physical change:

Evidence for a Chemical Change	Evidence of a Physical Change

Now analyze the changes from the previous activity to: 1) identify the reactants and products, 2) determine if a new substance has formed and 3) support with evidence (proof) the formation of a new substance.

Change	Type of change	Reactants	Products	Evidence for change
Melting ice: Ice (+heat) → Liquid water $H_2O(\text{solid}) \rightarrow H_2O(\text{liquid})$				
Apple browning: Polyphenol oxidase + oxygen → dioxobenzene + water $C_6H_4(OH)_2 + O_2 \rightarrow C_6H_4O_2 + H_2O$				
Wood burning (cellulose): Cellulose + Oxygen → Carbon dioxide + water $C_6H_{10}O_5 + O_2 \rightarrow CO_2 + H_2O$				
Piece of Paper → Paper boat Cellulose → Cellulose $C_6H_{10}O_5 \rightarrow C_6H_{10}O_5$				
Boiling water: Water (+heat) → Water vapor $H_2O(\text{liquid}) \rightarrow H_2O(\text{gas})$				
Photosynthesis: Carbon dioxide + Water → Glucose + Oxygen $CO_2 + H_2O \rightarrow C_6H_{12}O_6 + O_2$				