

Physical & Chemical Properties, and Physical and Chemical Changes

For each of the following, label as a physical property, physical change, chemical property or chemical change:

1. Dissolving sugar in water: *physical change*
2. Solubility of sugar in water: *physical property*
3. Boiling point of water: *physical property*
4. Boiling water: *physical change*
5. Sanding wood: *physical change*
6. Hardness of wood: *physical property*
7. Crystal structure of sugar: *physical property*
8. Mass of a sugar sample: *physical property*
9. Chemical formula of sugar ($C_6H_{12}O_6$): *chemical property*
10. Caramelizing of sugar: *chemical change*
11. Density of sugar: *physical property*
12. Melting sugar: *physical change*
13. Cooking beef: *chemical change*
14. Reaction of baking soda and vinegar: *chemical change*
15. Carbon dioxide dissolving in water: *physical change*
16. $H_2O + CO_2 \rightarrow H_2CO_3$: *chemical change*
17. Water and carbon dioxide react to form carbonic acid: *chemical change*
18. Hydrogen & oxygen form water: *chem. change*
19. $2H_2 + O_2 \rightarrow 2H_2O$: *chemical change*
20. Dry ice turns into carbon dioxide gas: *physical change*

Examples of Properties and Changes:

- **Physical Properties:** Mass, size, volume, solubility, color, hardness, crystal structure, density, boiling point, freezing point, conductivity, specific heat, viscosity.
- **Physical Changes:** Boiling, freezing, melting, evaporation, condensation, cutting, folding, tearing, breaking, dissolving.
- **Chemical Properties:** Chemical formula, flammability, reactivity, valance electron count.
- **Chemical Changes:** Chemical reactions, chemical equations, burning, rusting, corroding, spoiling, decomposing, digesting, cooking.

Possible evidence of a chemical change:

- Increase or decrease in temperature
- Generation of gas
- Change in color
- Visible flame (burning)
- Precipitate from mixed solutions

The only absolute evidence of a chemical change is the creation of a new substance.