

Name _____
Period _____

Describing Matter

Physical and Chemical Properties

A Property is used to describe matter. All matter has definite properties.
There are two distinct types of properties: Physical and Chemical

Physical Properties

- An Observed quality of a substance
- Does not change the substance
- Size of sample does not matter
- Examples include: size (volume, mass), shape, color, smell, texture

Common Physical Properties:

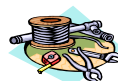
State– the physical form of a substance.



Malleability– ability of a substance to be hammered into thin sheets.



Ductility– ability of a substance to be drawn into a thin wire



Thermal conductivity– Ability of a substance to transfer heat.

Density– Mass per unit of volume

Boiling/melting points– temperatures where substances change phase.

Chemical Properties

- A description of how a substance reacts with other substances
- Observation is impossible without *chemical change* taking place
- Deals with atomic or molecular structure of substance.
- Examples include reactivity, flammability and oxidation.

Flammability is a chemical property because it cannot be observed without changing the substance.



Reactivity– the ability for 1 substance to react with another. Not observable without chemical change taking place
i.e. Hydrogen reacts with Oxygen to form Water (H₂O)



Oxidation when a substance reacts with oxygen to form rust

Physical CHANGES

Changes that a substance undergoes without changing the chemical makeup of the substance.

Examples of physical changes:

Melting
Crushing
Boiling
Freezing
Mixing
Bending
Hammering

REVERSIBLE?

Physical changes are *mostly* easily reversed.
For example: Melted water can be frozen again.

Chemical Changes

Changes a substance undergoes that changes it into an entirely new substance with new properties.

Examples of Chemical Changes

Rusting of metal
Any chemical reaction
i.e Oxygen + Hydrogen > water
Sodium + Chlorine > table salt
Copper + Water + Carbon Dioxide > Copper carbonate
Soured Milk Bacteria have chemically changed the substance

REVERSIBLE?

Chemical changes cannot be undone.
For example: Burned wood that has been transformed to carbon cannot be wood again.

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Determine what each example describes: Physical Property (PP), Physical Change (PC), Chemical Property (CP), Chemical Change (CC)

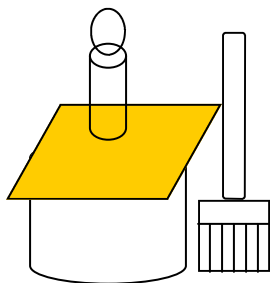
1. A hammer bending a nail. _____
2. Paper burning. _____
3. Clear water. _____
4. The density of Gold (Au) is 19.3g/cm³ _____
5. Fender on a bike turns brown and crusty _____
6. Wood can ignite and burn _____.
7. Iron (Fe) does not react with oil or gas. _____
8. Iron rods are turned into molten steel _____
9. Hydrogen reacts with Oxygen and a small explosion occurs. Moisture is left behind. _____
10. Mom bakes a cake. _____
11. Iron (Fe) will react with Oxygen (O) _____
12. A student tears a paper in half _____
13. The cylinder can hold 100mL _____
14. Rubbing alcohol is flammable _____
15. The sugar is a white powder _____
16. I crushed the can _____
17. The boiling point of water is 100°C _____

A Characteristic Property is a physical or chemical property that is used to Identify a substance!
Use the following characteristic properties to identify the element. The properties will be found in one of the first ten elements on the periodic table.

1. b.p. = 1342°C _____
2. Symbol is F _____
3. Density 2.31g/cm³ _____
4. m.p. = -195.79°C _____
5. Atomic number 10 _____
6. Atomic mass(weight) 9.012182 amu _____

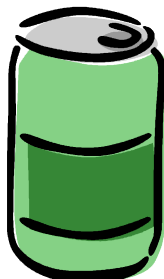
List three Clues that indicates a Chemical change may have taken place.

Describe the difference between whether a physical change or a chemical change has taken place in terms of the matter that is involved.



Describe exactly what happened in the demo on the right. Use the terms Inertia and Mass.

Describe *inertia* and how it applied to the Demo with the plates and tablecloth.



List 3 physical properties of this can.

If this can is crushed how does its Density change?