

## PROPERTIES OF MATTER

**A. Observations:** things that happen which are noticed with your senses  
 scientists use instruments to help magnify the senses: rulers, microscopes, telescopes, balances, calipers, etc.

**B. Properties:** features that a certain substance/object/thing has  
 gives information on what it is made of and how it will behave

### C. States of Matter

1. solid state -- rubber, iron, ice, chalk
2. liquid state -- alcohol, gasoline, oil, water
3. gas state -- air, natural gas, carbon dioxide, steam

### D. Physical Properties of Each State:

PROPERTY	SOLID	LIQUID	GAS
shape	fixed	same as container (indefinite)	same as container (indefinite)
volume	definite	definite	fills entire container (indefinite)
ability to flow	no	yes	yes
can be compressed	very slightly	very slightly	yes
volume change with heating	very small	small	large

### E. Describing Matter

1. Intensive Properties: properties that do not depend on the amount of matter  
 examples -- colour, odour, density, melting point
2. Extensive Properties: properties that do depend on the amount of matter  
 examples -- mass and volume

### F. How to Describe Matter

1. Physical State: solid, liquid, gas.
2. Colour: green, blue, yellow, black, reddish-brown, etc.
3. Odour: odourless, flowery, spicy, nauseating, etc.
4. Clarity: clear, cloudy, opaque.
5. Lustre: shiny, dull.
6. Form: regular (crystalline), irregular (amorphous)
7. Texture: how does it feel? fine, coarse, smooth, waxy, etc.
8. Hardness: can it be scratched easily? scale from 1-10 (e.g. talcum powder-1, diamond-10)
9. Brittleness: can it break apart or shatter easily? brittle or flexible
10. Malleability: can it be bent and folded into different shapes? malleable or non-malleable
11. Ductility: can it be stretched out into a long wire? ductile or non-ductile
12. Viscosity: can the substance flow? viscous or non-viscous

**G. Chemical Properties** properties of a substance that we observe when it reacts or does not react with other substances

example -- iron rusts in moist air, gold does not  
 -- hydrogen burns in oxygen, but nitrogen does not  
 -- zinc reacts with acid, but glass does not