

Making Youth Employable Through Skill Development Manglam City, Govindpura, Kalwar Road, Jhotwara, JAIPUR

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$D = m/V (g/cm^3)$

- Mass usually expressed in grams
- Volume usually expressed in cm³ or liters, etc.



DENSITY

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Density = amount of matter per unit volume
Density is the <u>ratio</u> of mass to volume
If the volume stays the same and the mass increases . . . the density will increase
If the mass stays the same and the volume increases . . . The density will decrease



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What would take up more space??? A kilogram of feathers.... or a kilogram of steel??





Density is the measure of the compactness" of a material

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How close the atoms or molecules are to each other

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- More than "heaviness" density includes how much space an object takes up!!
- All substances have density including liquids, solids, and gases





"Compactness"







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How much kinetic energy do the molecules have??

- The greater the kinetic energy
-the greater the volume
 ... and the less dense that gas is!!
- Therefore, cold air is more dense than warm air



Low pressure weather system means warmer air tends to rise, High pressure systems indicate a colder more dense air mass that will...... SINK!!!

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LIQUIDS

The more dissolved solids in a solution, the more dense (such as ocean water)

Cold water in lakes tend to sink

Denser layers to less dense layers....



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What would happen????

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Mercury density = 13600kg/m³
 Lead density = 11340kg/m³

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Lead floats on liquid mercury!







Solids

Ice vs. water.....





SOLIDS

Ice is less dense than water (which is why lakes and ponds have a thin layer of ice covering in winter, with water underneath)

Various rocks, woods, metals have a characteristic density specific to that piece of matter

Wouldn't't you like to have a bunch of THIS dense material?

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Factors affecting Density

Temperature









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Factors affecting Density

Dissolved solids – in liquids

Concentration and kind of substances







Relative Density

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- The density of a material or substance, relative to another substance
- **Expressed** in a ratio: water = 1g/cc

- Water is the substance to which we generally compare other substances
- Also known as SPECIFIC GRAVITY



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- How are Submarines like fish....
- The swim bladder in bony fish control their relative density in order to rise or dive in the water....buoyancy



- When air is added to the swim bladder, by diffusion through the blood vessels in the bladder walls, the fish becomes less dense overall
- when air is removed fish become more dense
- By changing the volume of air in the bladder, the fish's density can be made equal to that of the surrounding water at a given depth.



Absolute DENSITY

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- The density of a material in its closest "packed form"
- For water: Absolute Density = 1000kg/m³
 - at 4°C and 1 at m(pressure)

✤ in other words, the greatest density of water is at 4^oC



DETERMINING DENSITY

- Regular Shapes mass, then determine the volume by <u>formula</u>
- ✤ EX: cubes, cylinders, spheres, cones, etc.

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 Irregular shapes – mass, then measure displacement of a liquid (usually water) by that irregularly shaped object



- 1. Use a graduated cylinder
- 2. Add water to a predetermined level record.

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- 3. Gently drop in the irregularly shaped object.
- 4. Read the graduated cylinder record.
- 5. Subtract the first water level from the second this is the volume



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Density Table

SUBSTANCE	DENSITY (G/CM ³
AIR	0.0013
WOOD (OAK)	0.85
WATER	1.00
ICE	0.93
ALUMINUM	2.7
LEAD	11.3
GOLD	19.3
ETHANOL	0.94
METHANOL	0.79

SINK or FLOAT In Water (D = 1.0 g/mL) Float Float Float Sink Sink Sink Float **Float**





The End

