

Matter and Mixtures

Matter

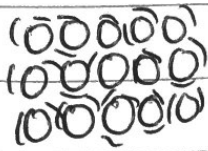
Anything that has mass and volume. All matter is made of particles too small to be seen.

Matter	Not Matter
sun	electricity ✓
fire	magnetism ✓
soil	heat ✓
air	gravity ✓
Smoke	temperature ✓
Ketchup	sound ✓
butter	sunlight. ✓
ocean	wind ✓
water	
paper	
dust	
cat	
(dissolved) sugar	
batteries	

21
Total

Solids

- definite shape/
volume



- particles are very close to one another (dense) and vibrate.

- particles stay in the same place.

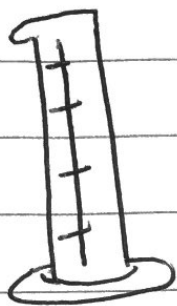
Volume of Solids

Volume of a solid with straight sides can be solved by measuring with a ruler and calculating:

$$\text{height} \times \text{width} \times \text{length}$$

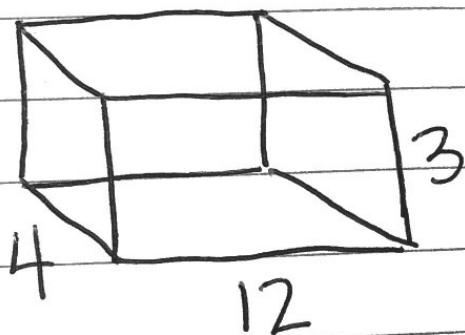
Volume of Solids

The volume of an irregularly shaped solid can be determined by water displacement in a graduated cylinder.



Example Problems

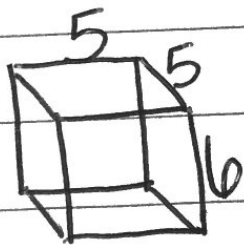
①



$$4 \times 12 \times 3 =$$
$$V$$

$$48 \times 3 = 144$$

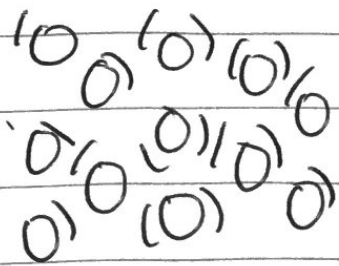
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$$5 \times 5 \times 6 = 325$$
$$V$$
$$25 \times 6$$

$$\begin{array}{r} 325 \\ \times 6 \\ \hline 1950 \end{array}$$

Liquids



- Shape changes according to the shape of their containers.

- particles are also close to one another.

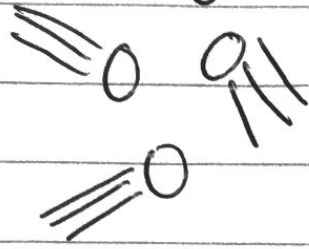
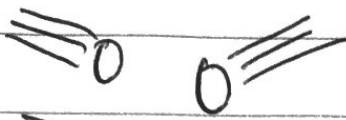
- definite volume

- particles are able to move apart from each other and flow from place to place.

Volume

of liquids The volume of a liquid can be measured using a beaker, graduated cylinder or graduated syringe.

Gases



- no definite shape or volume.

- take the shape and volume of their containers, filling the space available.

- particles easily move far apart from each other.

- particles spread out through the available space.

Mixtures and Solutions

Mixtures

Made of 2 or more substances that are mixed together AND can be separated.

Mixture: Examples

Solid Mixtures:

- trail mix
- chef salad
- a bucket of gravel and sand.

Solid/Liquid:

- vegetable soup
- cereal/milk

Liquid Mixtures:

- oil and vinegar salad dressing.



Mixture
Examples

Liquids and gases:
- Carbonated
Soft drinks (cola)

Mixtures

The substances
in a mixture
do NOT permanently
change in the
mixture.

All substances
keep their properties.

Solutions

A special type
of mixture in
which one
substance is
dissolved evenly
into another
substance.

They are mixed
so completely
that they →

Solutions cannot be distinguished (seen) as separate substances.

They CAN be separated back into separate substances.

Solution
Examples

- Sun tea
- drink mix
- Salt water
- Sugar water
- medicine tablet dissolved in water.

Chemical Changes When 2 or more different substances are mixed together, sometimes the new substance has different → 5.

Chemical properties,
changes

BUT

The total
amount (mass)
of the
substances stays
the same.

For example,
combining
ingredients to
make pancakes.

Matter can neither
be created or
destroyed. Only
changed in form.

The Total
Mass
Before $=$ The
Total
Mass
After

Solution Concentration

Solvents
and
SoluteS

The substance
in a solution
that has
the greatest
amount is the
solvent.

The substance
in a solution
that has the
least amount is
the solute.

solvent - usually
liquid

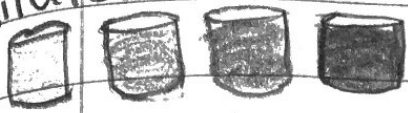
solute - usually
solid

Concentration The relationship
of solute to
solvent.



Concentration The more

diluted



concentrated

Solute a solution has the more concentrated it is.

To make a solution more concentrated:
+ add more solute

To make a solution less concentrated,
+ add more solvent.

Rate of Dissolving The given time it takes for different amounts of solutes to dissolve in solvents. 55

Rate of Dissolving Factors

Temperature

If the temperature increases, the solute will dissolve faster.

Particle Size

If the particle sizes are smaller, more of the solute will dissolve faster.

Stirring

If the solution is stirred, more of the solute will dissolve faster.

PROCESSES USED TO SEPARATE MIXTURES

Process	Filtration
Types of matter	separate solids from a liquid.
Materials used	Filter paper, Funnel
Real-life example	Used in water treatment plants to produce clean drinking water.

PROCESSES USED TO SEPARATE MIXTURES

Process	Evaporation
Types of matter	Solid particles in a liquid.
Materials used	Heat / mixture in a cup
Real-life example	Sea water is evaporated for salt

PROCESSES USED TO SEPARATE MIXTURES

Process	Sifting
Types of matter	Solids only
Materials used	A screen
Real-life example	Cooks use screens to sift flour when baking

PROCESSES USED TO SEPARATE MIXTURES

Magnetic attraction

magnetic material (mainly solids)

Magnet

Cow magnets keep cows from digesting wire.

PROCESSES USED TO SEPARATE MIXTURES

Flotation

Solids and liquids

Something to stir with
a spoon or net to skim off the solids

Water purification plants

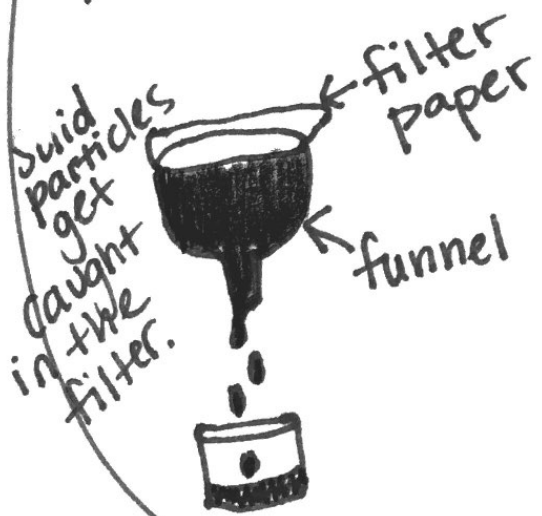
PROCESSES USED TO SEPARATE MIXTURES

Process	Chromatography
Types of matter	liquids
Materials used	filter paper, a solvent, 2-3 drops of solution, copper beaver
Real-life example	Scientists identify substances in a solution

Sifting

Filtration

* uses a filter and funnel
Separates solids from liquids.



separate mixtures
catch larger solid particles.

* uses a screen
* separates solids from solids.

