

Classifying Matter: Elements, Compounds, and Mixtures

Elements

- Pure substance that cannot be separated into simpler substance by physical or chemical means.

Periodic Table of the Elements

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------|------|----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|----|----|------|---|-----|----|-----|------|--|--|--|--|--|--|--|--|---|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 1 | IA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | O | | | | | | | | | | | | | | | |
| 1 | H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | He | | | | | | | | | | | | | | |
| 2 | IIA | | | | | | | | | | | | | | | | | | IIIA | | IVA | VA | VIA | VIIA | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Li | Be | | | | | | | | | | | | | | | | | B | C | N | O | F | Ne | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | IIIA | | IVB | | VB | VIB | VII | VIIA | | IIB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Na | Mg | Al | Si | P | S | Cl | Ar | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | K | Ca | Sc | Ti | V | Cr | Mn | Fe | Co | Ni | Cu | Zn | Ga | Ge | As | Se | Br | Kr | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Rb | Sr | Y | Zr | Nb | Mo | Tc | Ru | Rh | Pd | Ag | Cd | In | Sn | Sb | Te | I | Xe | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 55 | 56 | 57 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Cs | Ba | *La | Hf | Ta | W | Re | Os | Ir | Pt | Au | Hg | Tl | Pb | Bi | Po | At | Rn | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | 87 | 88 | 89 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Fr | Ra | +Ac | Rf | Ha | Sg | Ns | Hs | Mt | 110 | 111 | 112 | 113 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * Lanthanide Series | | | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| + Actinide Series | | | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | Ce | Pr | Nd | Pm | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | Th | Pa | U | Np | Pu | Am | Cm | Bk | Cf | Es | Fm | Md | No | Lr | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Compounds

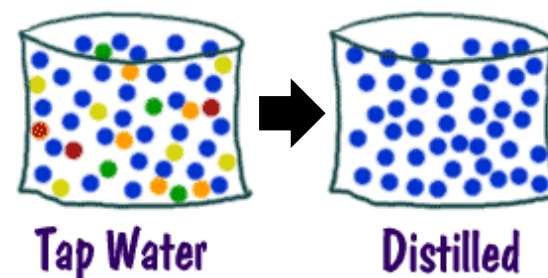
Pure substance composed of two or more *different elements* joined by *chemical bonds*.

- Made of elements in a specific ratio that is always the same
- Has a chemical formula
- Can only be separated by chemical means, not physically



Mixtures

- A combination of two or more pure substances that are not chemically combined.
- substances held together by *physical forces, not chemical*
- No chemical change takes place
- Each item retains its properties in the mixture
- They can be separated physically



Can you identify the following?

Leaders: Each Group Needs One Whiteboard and One Marker.

Review:

- An **element** contains just one type of atom.
- A **compound** contains two or more different atoms joined together.
- A **mixture** contains two or more different substances that are only physically joined together, not chemically.
 - A mixture can contain both elements and compounds.

Element, Compound, or Mixture?

Rocks



Element, Compound, or **Mixture**?

Rocks



Element, Compound, or Mixture?

Copper



Element, Compound, or Mixture?

Copper

Cu



Element, Compound, or Mixture?

Jelly Beans



Element, Compound, or **Mixture**?

Jelly Beans



Element, Compound, or Mixture?

Table Sugar



Element, **Compound**, or Mixture?

Table Sugar



Element, Compound, or Mixture?

Diamond



Element, Compound, or Mixture?

C

Diamond



Element, Compound, or Mixture?

Tea



Element, Compound, or **Mixture**?

Tea



Element, Compound, or Mixture?

Salt



Element, **Compound**, or Mixture?

NaCl

Salt



Element, Compound, or Mixture?

Neon Gas



Element, Compound, or Mixture?

Ne

Neon Gas



Element, Compound, or Mixture?

Salad



Element, Compound, or **Mixture**?

Salad



Element, Compound, or Mixture?

Pure Water



Element, **Compound**, or Mixture?



Pure Water



Element, Compound, or Mixture?

Aluminum



Element, Compound, or Mixture?

Al

Aluminum



Element, Compound, or Mixture?

Lemonade



Element, Compound, or **Mixture**?

Lemonade



Element, Compound, or Mixture?

Silver



Element, Compound, or Mixture?

Silver

Ag



Element, Compound, or Mixture?

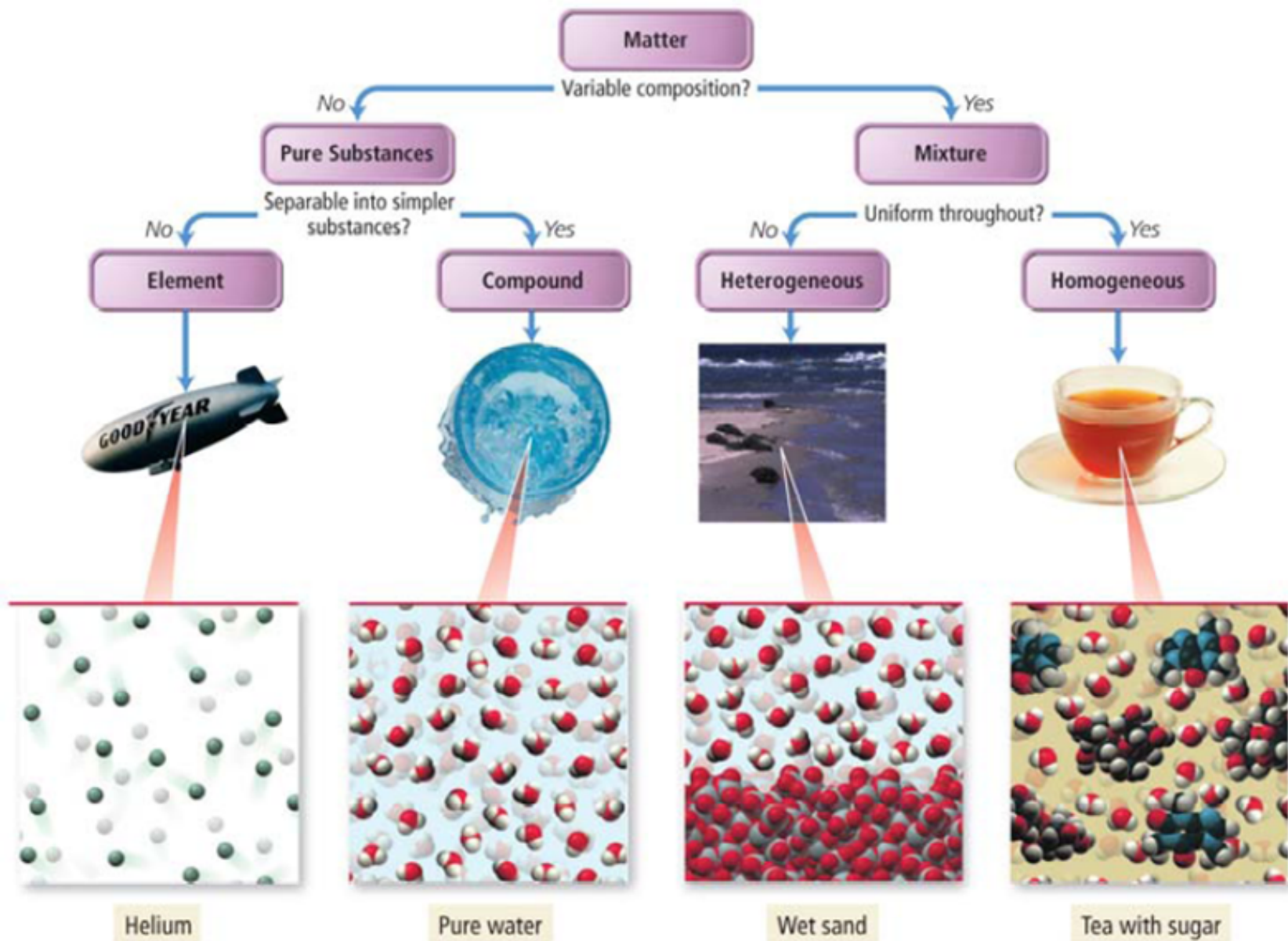
Sand



Element, Compound, or **Mixture**?

Sand





Notes

- Detailed notes are located at:

<http://www.middleschoolscience.com/elements-compounds-mixtures-notes-isn.pdf>

- Flow Chart:

<http://www.middleschoolscience.com/matter-flow-chart-isn.pdf>