

Elements, Compounds, and Mixtures

Classify each of the pictures below by placing the correct label in the blanks below:

A= Element

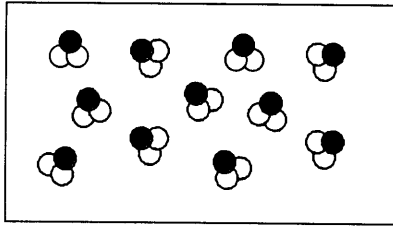
D= Mixture of compounds

B= Compound

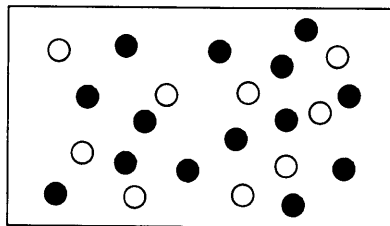
E= Mixture of elements and compounds

C= Mixture of elements

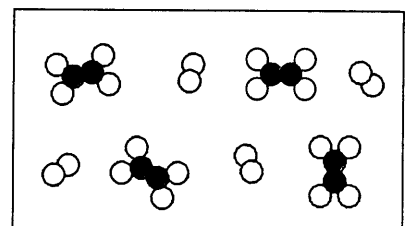
Each circle represents an atom and each different color represents a different kind of atom. If two atoms are touching then they are bonded together.



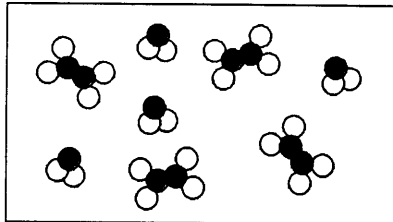
1) _____



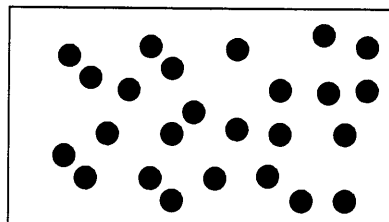
2) _____



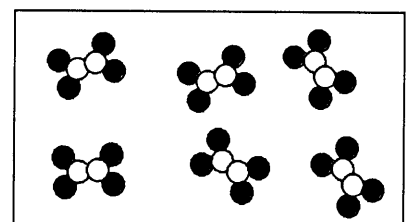
3) _____



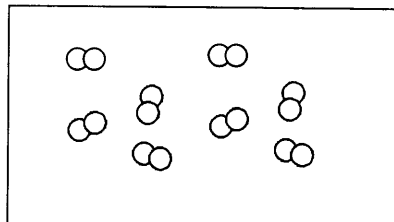
4) _____



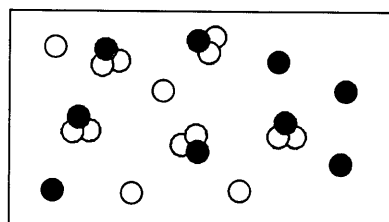
5) _____



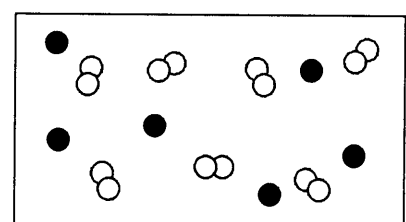
6) _____



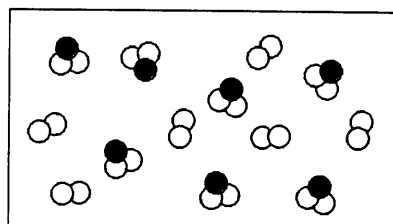
7) _____



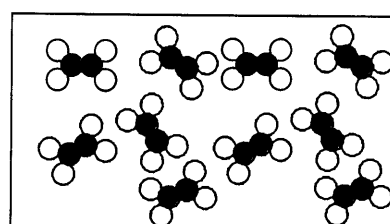
8) _____



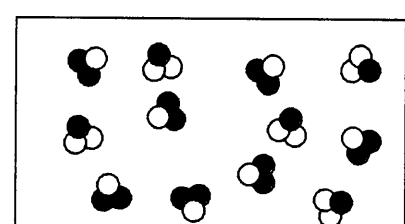
9) _____



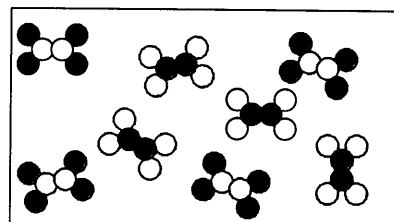
10) _____



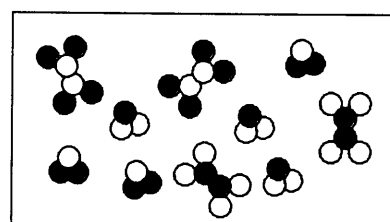
11) _____



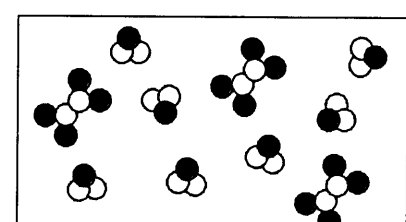
12) _____



13) _____

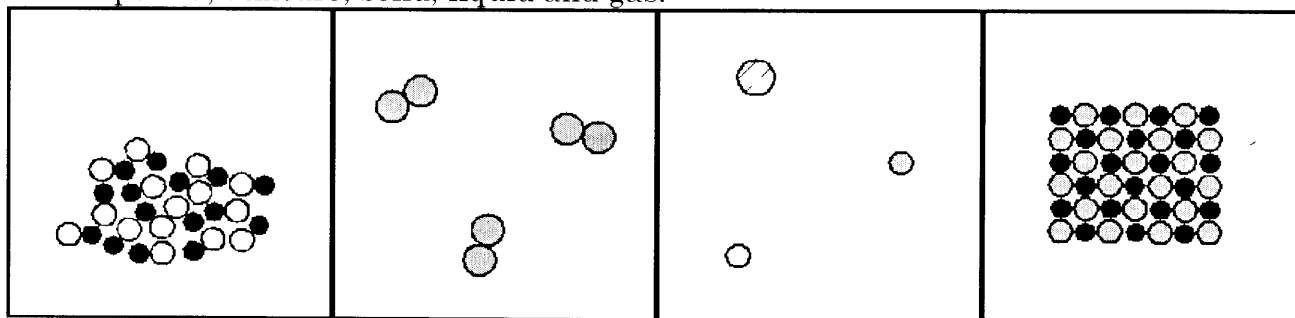


14) _____



15) _____

1. Describe the contents of each cell using the terms atoms, molecules, element, compound, mixture, solid, liquid and gas.



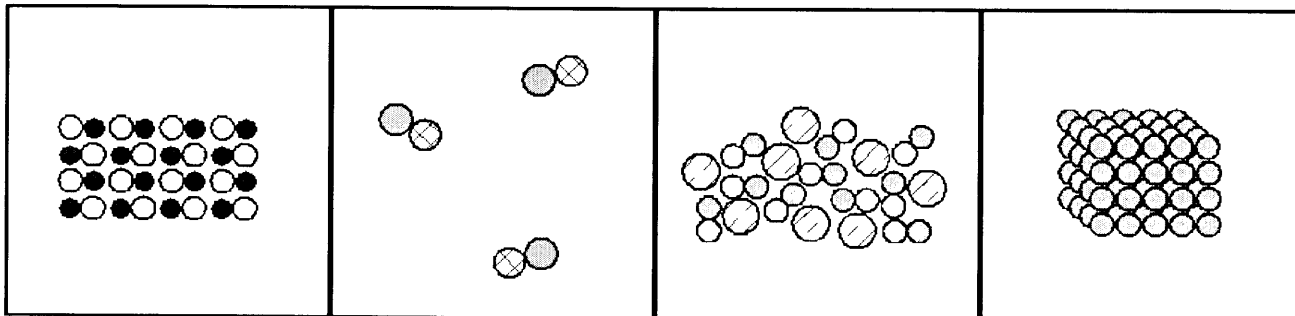
A

B

C

D

2.



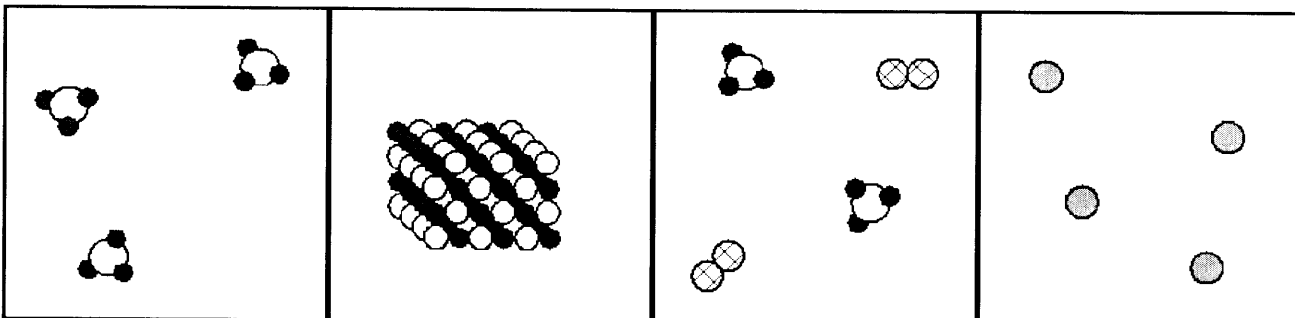
A

B

C

D

3.



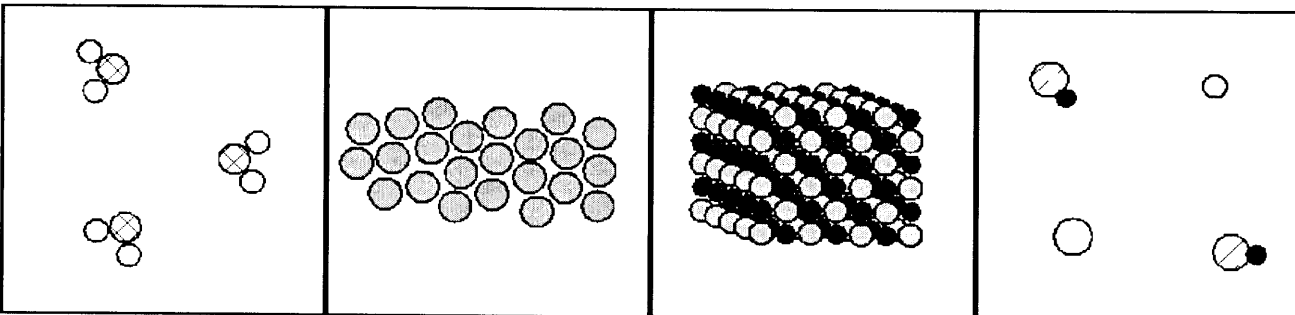
A

B

C

D

4.



A

B

C

D

CLASSIFYING SUBSTANCES BY COMPOSITION

Classify each of the substances in the table below as:

an element, *E*

a compound, *C*

a solution, *S* or

a mixture, *M*

In each case, explain the reason for your choice.

Substance	Description
air	clear, colourless gas with a single phase and variable composition
sugar	small, white crystals composed of carbon, hydrogen, and oxygen
fertilizer	small solid granules of varying colours
sulphur	yellow powder that melts at 113°C
bluestone (copper sulphate)	blue crystals of fixed composition that give off water when heated
tea	clear yellow-brown liquid
granite rock	black and white speckled solid
baking soda	white powder that cannot be separated by physical means
steel wool	long strands of a shiny grey solid that does not break down when heated gently
milk	white opaque liquid
copper	shiny red-brown solid that melts at 1083°C
lye (sodium hydroxide)	white flakes that contain 57.5% sodium, 40.0% oxygen, and 2.5% hydrogen by mass
oxygen	clear, colourless gas
ketchup	thick red, opaque liquid
plastic wrap	clear, colourless solid that decomposes when heated

13. Classify the following as pure substances or as mixtures:

air	gasoline	grain alcohol
water	sugar	gold
mercury	oxygen	salt water

14. Classify the following as heterogeneous or as homogeneous:

sand & salt mixture	hydrogen	iron
salt water	unfiltered air	iron with rust
pure water	an apple	nitric acid
tossed salad	granite	wood

15. Classify the following as an element, a compound, a solution, or a heterogeneous mixture:

aluminum	raisin bread
carbon dioxide	water
sugar and water	sulfur
sulfuric acid	mercury
an orange	water & instant coffee
a pencil	carbon particles & sugar
nitrogen	air
gasoline	grain alcohol

INSTRUCTIONS: Write **E** in the blank if the material is *heterogeneous* or **O** if it is *homogeneous*.

- | | | | |
|--------------------------------|-------|-------------------------------|-------|
| 1. Wood | _____ | 6. Dirt | _____ |
| 2. Freshly-brewed black coffee | _____ | 7. Sausage-and-mushroom pizza | _____ |
| 3. Water | _____ | 8. Air | _____ |
| 4. Lucky Charms [®] | _____ | 9. Milk | _____ |
| 5. Salt | _____ | 10. Gold | _____ |

INSTRUCTIONS: Classify each of the following as an *element* [**E**], a *compound* [**C**], or a *mixture* [**M**].

- | | | | |
|------------------------|-------|----------------------------|-------|
| 11. Gold | _____ | 16. Air | _____ |
| 12. Water | _____ | 17. Carbon dioxide | _____ |
| 13. Seawater | _____ | 18. Silver | _____ |
| 14. Sugar | _____ | 19. Ice | _____ |
| 15. A chocolate sundae | _____ | 20. A Big Mac [®] | _____ |

INSTRUCTIONS: Classify each of the following properties of matter as *physical* [**P**] or *chemical* [**C**].

- | | | | |
|------------------------------|-------|------------------------------------|-------|
| 21. Color | _____ | 26. Reacts violently with chlorine | _____ |
| 22. Density | _____ | 27. Good conductor of heat | _____ |
| 23. Burns easily (flammable) | _____ | 28. Dissolves readily in water | _____ |
| 24. Not affected by acids | _____ | 29. Melts at 145 °C | _____ |
| 25. Boils at 450 °C | _____ | 30. Malleable | _____ |

INSTRUCTIONS: Classify each of the following changes in matter as *physical* [**P**] or *chemical* [**C**].

- | | | | |
|---------------------------------|-------|--------------------------------|-------|
| 31. Grinding chalk into powder | _____ | 36. Burning gasoline | _____ |
| 32. Dissolving salt in water | _____ | 37. Hammering gold into foil | _____ |
| 33. Dissolving zinc in acid | _____ | 38. Melting ice | _____ |
| 34. Tearing a piece of paper | _____ | 39. Digesting food | _____ |
| 35. Stretching copper into wire | _____ | 40. Making hydrogen from water | _____ |

INSTRUCTIONS: Classify each of the following as an *intensive property* [**I**] or an *extensive property* [**E**].

- | | | | |
|-------------------|-------|------------|-------|
| 41. Mass | _____ | 46. Color | _____ |
| 42. Density | _____ | 47. Volume | _____ |
| 43. Melting point | _____ | 48. Length | _____ |

Physical and Chemical Changes

Place a check in the appropriate column:

Change	Physical Change	Chemical Change
Salt dissolves in water.		
Hydrochloric acid reacts with magnesium to produce hydrogen gas.		
A piece of copper is cut in half.		
A sugar cube is ground up.		
Water is heated and changed to steam.		
Iron rusts.		
Ethyl alcohol evaporates.		
Ice melts.		
Milk sours (goes bad).		
Sugar dissolves in water.		
Sodium and potassium react violently with water.		
Pancakes cook on a griddle.		
Grass grows on a lawn.		
A tire is inflated with air.		
Food is digested in the stomach.		
Water is absorbed by a paper towel.		
Ethyl alcohol boils at 79°C.		
Paper burns.		
Water freezes at 0°C.		
Fireworks explode.		
Alka-Seltzer gives off carbon dioxide when added to water.		
Clouds form in the sky.		