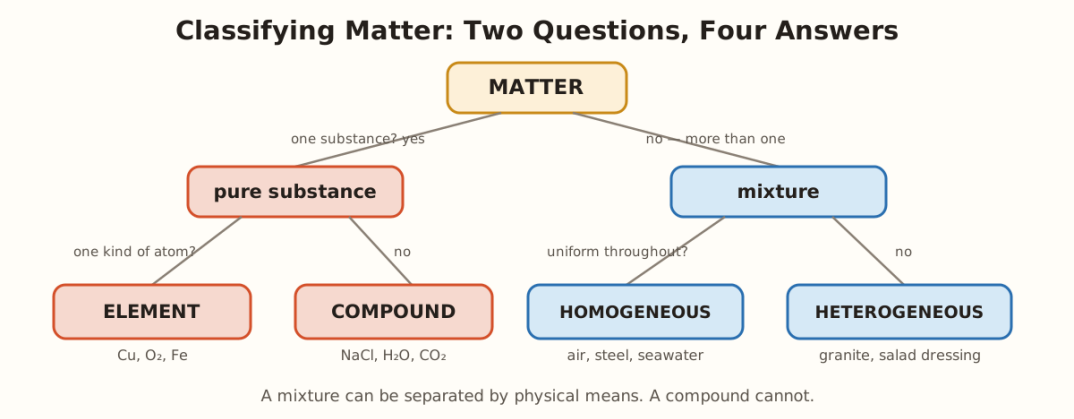
Classifying Matter Worksheet

Grade 11 Chemistry · elements, compounds, mixtures and changes

Name: _____ Date: _____ Score: / 28



Before you start: use the tree above. Ask whether the sample is one substance first, and only then ask the second question. For each answer, give the reason you took that branch — the reason is the mark.

Part A · classify the sample, and say why

#	Sample	Classification	Reason
1	Copper wire		
2	Table salt, NaCl		
3	Filtered seawater		
4	Italian salad dressing		
5	Oxygen gas, O_2		
6	Stainless steel		
7	Sand and iron filings		
8	Distilled water		
9	Air in this room		
10	Granite		
11	Carbon dioxide, CO_2		
12	Milk		

Part B · physical or chemical change?

#	Change	Type	Evidence
13	Ice melting in a glass		

#	Change	Type	Evidence
14	Iron rusting on a gate		
15	Sugar dissolving in tea		
16	Magnesium burning with a bright flame		
17	Copper wire being drawn thinner		
18	Baking soda fizzing in vinegar		
19	Water boiling into steam		
20	Milk turning sour		
21	Salt dissolving, then the water evaporating		
22	A cut apple going brown		

Part C · how would you separate it?

#	Mixture	Method	Property it exploits
23	Sand from water		
24	Salt from seawater		
25	Iron filings from sand		
26	Ethanol from water		
27	Dyes in a felt-tip pen		
28	Cream from milk		

Answer Key

Classifying Matter · Grade 11 Chemistry

Part A

#	Sample	Classification	Why
1	Copper wire	**element**	one substance → pure; one kind of atom → element
2	Table salt, NaCl	**compound**	one substance → pure; more than one kind of atom, chemically combined → compound
3	Filtered seawater	**homogeneous mixture (solution)**	more than one substance → mixture; uniform throughout → homogeneous
4	Italian salad dressing	**heterogeneous mixture**	more than one substance → mixture; visibly different regions → heterogeneous
5	Oxygen gas, O_2	**element**	one substance → pure; one kind of atom → element
6	Stainless steel	**homogeneous mixture (solution)**	more than one substance → mixture; uniform throughout → homogeneous
7	Sand and iron filings	**heterogeneous mixture**	more than one substance → mixture; visibly different regions → heterogeneous
8	Distilled water	**compound**	one substance → pure; more than one kind of atom, chemically combined → compound
9	Air in this room	**homogeneous mixture (solution)**	more than one substance → mixture; uniform throughout → homogeneous
10	Granite	**heterogeneous mixture**	more than one substance → mixture; visibly different regions → heterogeneous
11	Carbon dioxide, CO_2	**compound**	one substance → pure; more than one kind of atom, chemically combined → compound
12	Milk	**heterogeneous mixture**	more than one substance → mixture; visibly different regions → heterogeneous

Part B

#	Change	Type	Evidence
13	Ice melting in a glass	**physical**	Same substance throughout; only the arrangement of the molecules changes.
14	Iron rusting on a gate	**chemical**	A new substance with new properties forms; the change cannot be undone by warming or cooling.
15	Sugar dissolving in tea	**physical**	The sugar molecules are still sugar; evaporating the water returns them.

#	Change	Type	Evidence
16	Magnesium burning with a bright flame	**chemical**	Light and heat released and a white solid formed where a grey metal was.
17	Copper wire being drawn thinner	**physical**	Shape changes, substance does not.
18	Baking soda fizzing in vinegar	**chemical**	A gas is produced that was not present in either reactant.
19	Water boiling into steam	**physical**	Still water; condensing it gives the liquid back unchanged.
20	Milk turning sour	**chemical**	New substances form with a new smell and taste, and it cannot be reversed.
21	Salt dissolving, then the water evaporating	**physical**	The salt reappears unchanged, so nothing new was made.
22	A cut apple going brown	**chemical**	Reaction with oxygen produces new coloured compounds.

Part C

#	Mixture	Method	Property
23	Sand from water	**filtration**	the sand does not dissolve, so it stays on the paper
24	Salt from seawater	**evaporation**	the water leaves as vapour and the dissolved solid is left behind
25	Iron filings from sand	**magnetism**	only one component is attracted to a magnet
26	Ethanol from water	**fractional distillation**	the two liquids boil at different temperatures
27	Dyes in a felt-tip pen	**paper chromatography**	the components travel different distances up the paper
28	Cream from milk	**centrifugation**	spinning separates components of different density