

Activity 1. Learning the Elements

Locate each element name or symbol on the periodic table and complete the following table. The first one has been done for you.

Use the periodic table on page 13.

Symbol	Element Name
1. C	Carbon
2. P	
3. Si	
4.	Nitrogen
5. Zn	
6.	Iron
7. Cu	
8. O	
9.	Hydrogen
10. K	
11.	Sodium
12.	Chlorine
13. Ne	
14.	Mercury
15. Au	

Symbol	Element Name
16.	Sulfur
17. Al	
18. Ca	
19.	Uranium
20. I	
21.	Helium
22.	Cobalt
23. Ag	
24. Be	
25.	Magnesium
26. Mn	
27.	Platinum
28. W	
29. Ti	
30.	Lead

Activity 2. Classifying Matter

Classify each material below as an element, a compound, a heterogeneous mixture, or a homogeneous mixture (solution). Follow the flow chart provided on page 12 and read the information provided in the background section as a guideline. The first one has been done for you.

Material	Classification
1. Table salt	Compound
2. Block of iron	
3. Glass of cola	
4. Mercury in a thermometer	
5. Ice	
6. Vinegar and oil	
7. Copper wire	
8. Earth's atmosphere, when dusty	
9. Earth's atmosphere, when dust-free	
10. Rust	
11. Brass	
12. Aluminum foil	
13. Homogenized milk	
14. Sugar	
15. Sugar water	
16. Sandy water	
17. Neon gas in a neon sign	
18. Blood	

Separating a Mixture of Elements and Compounds Data Tables

Data Table 1. Yield

Substance	Initial Mass in Grams (Before Mixing)	Final Mass in Grams (After Separating)	Percent Yield
Iron			
Zinc			
Sand			
Sodium chloride			

Data Table 2. Observations Before Mixing

Substance	Observations of Physical Properties
Iron	
Zinc	
Sand	
Sodium chloride	

Data Table 3. Observations After Mixing

Step Number	Observations
Step 4	
Step 5	
Step 6	
Step 7	
Step 10	
Step 12	

Data Table 4. Mass

Material	Mass in Grams
Filter paper	
Filter paper plus material #3	
Material #3	
Empty 250-mL beaker	
Beaker plus material #4	
Material #4	

Questions and Calculations

1. Calculate the percent yield for the iron, zinc, sand, and sodium chloride. Show all work in the space provided below. Fill in your answers in Table 1.

Iron:

Zinc:

Sand:

Sodium chloride:

2. What errors may have occurred that would cause the yield of the materials to be less than 100%?
3. How is it possible that some of the percent yields are actually greater than 100%?

4. Using a periodic table, label each of the four starting substances as either an element or as a compound.

Substance	Element or Compound?
Iron	
Zinc	
Sand	
Sodium chloride	

5. How did you determine which substances were elements and which were compounds?
6. When the four pure starting substances were combined to form a mixture, how did their properties before mixing compare to after separation?
7. After mixing the four substances together, is it possible to recover the original materials? Why or why not?
8. What properties of the four starting substances did you use to separate out each material?

Observing a Chemical Reaction

Data Table 5. Observations

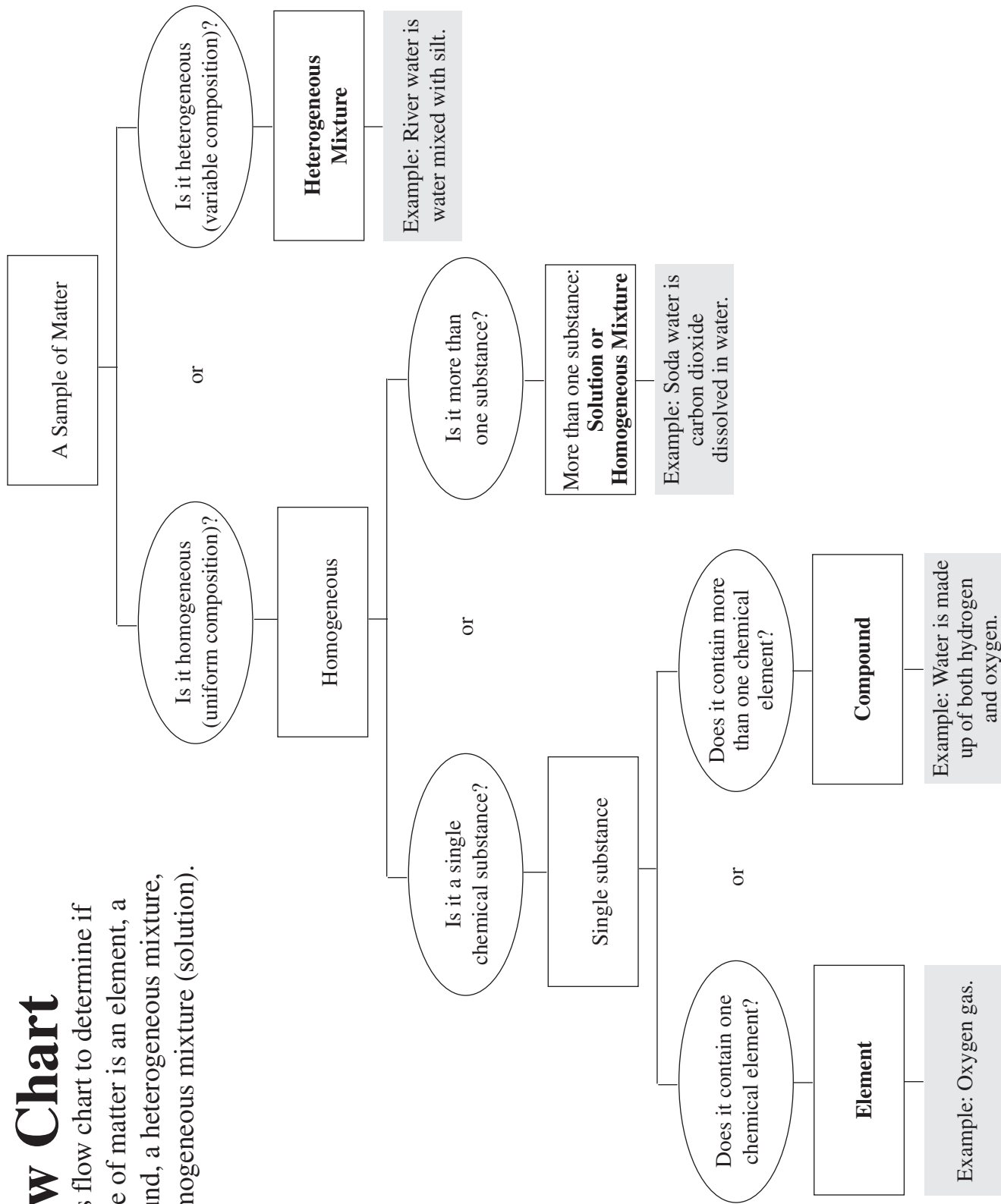
Step Number	Material	Observations (Include mass where appropriate)	Element, Compound, Heterogeneous Mixture, or Solution
Step 1	Aluminum foil		
Step 2 and 3	Copper(II) chloride		
Step 4	Water		
Step 5	Copper(II) chloride and water		
Step 6	Copper(II) chloride, water, and aluminum foil (immedi- ately)		
Step 7	Copper(II) chloride, water, and aluminum foil (after react- ing)		

Questions/Results

1. Write the balanced chemical equation for the reaction between aluminum foil and copper(II) chloride.
2. What evidence do you have that a chemical reaction did indeed occur? Be specific.
3. After mixing, is it possible to recover the original reactants (aluminum foil and copper(II) chloride) by physical means? Why or why not?
4. How might it be possible to separate a chemical compound into its component parts? Explain.

Flow Chart

Use this flow chart to determine if a sample of matter is an element, a compound, a heterogeneous mixture, or a homogeneous mixture (solution).



The Periodic Table of the Elements

1	1 H 1.008											2 He 4.003						
	IA	IIA	IIIB	IVB	VB	VIB	VII B	VIII B	IB	IIB	IIIA	IVA	VA	VIA	VIIA	VIIIA		
2	3 Li 6.941	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
3	11 Na 22.99	12 Mg 24.31											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
4	19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.87	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.38	31 Ga 69.72	32 Ge 72.64	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
5	37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.96	43 Tc (98)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3
6	55 Cs 132.9	56 Ba 137.3	57-71 La-Lu ★	72 Hf 178.5	73 Ta 180.9	74 W 183.8	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)
7	87 Fr (223)	88 Ra (226)	89-103 Ac-Lr #	104 Rf (267)	105 Db (268)	106 Sg (271)	107 Bh (272)	108 Hs (270)	109 Mt (276)	110 Ds (281)	111 Rg (280)	112 Cn (285)	113 Uut (284)	114 Uuq (289)	115 Uup (288)	116 Uuh (293)	117 Uus (294)	118 Uuo (294)
	57 La 138.9	58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm (145)	62 Sm 150.4	63 Eu 152.0	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0			
	89 Ac (227)	90 Th 232.0	91 Pa 231.0	92 U 238.0	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)			

FLINN
SCIENTIFIC, INC.

"Your Safer Source for Science Supplies"

P.O. Box 219 • Batavia, IL 60510
(800) 452-1261 • Fax (866) 452-1436

Web Site: www.flinnsci.com • E-mail: flinn@flinnsci.com