Station 1

Identify the following as elements, compounds, heterogeneous mixtures, or homogeneous mixtures:

1. Chocolate ice cream

2. Chocolate chip cookie

3. Apple cinnamon oatmeal

4. Silver necklace

5. Table sugar ($C_{12}H_{22}O_{11}$)

6. Vanilla pudding (even though chocolate is way better)

7. Oreo cookie

8. Carbon dioxide

9. Black ink

10. Mountain Dew

11. Pure water

12. Tap water

13. Air

Draw the atoms in the following:

14. A solid element

15. A liquid compound

16. A gaseous mixture

Station 2

Identify the following as chemical or physical properties and explain why:

1. Boiling point

2. Flammability

3. Color

4. Density

5. Melting point

6. Ability to rust

7. Will react with oxygen

8. Cubic shape

9. Can dissolve in acetone

10. Bendable

11. Magnetic

Station 3

Identify the following as chemical or physical changes and explain why:

1. Slicing bread

2. Toasting bread

3. Spreading jelly and toast

4. Chewing toast (teeth part)

5. Digesting toast

6. Wood rotting

7. Shredding cheese

8. Making Kool-Aid

9. Cheap jewelry leaving green marks on your skin

Station 4

1. (Theoretically) Create a mixture using supplies in a typical kitchen. Include at least 5 components. Describe this mixture using scientific descriptions.

2. Is this mixture homogeneous or heterogeneous? Why?

3. How would you separate this mixture? Use science terms where appropriate and explain what is happening.

Station 5

1. What are the three states of matter we focus on in chemistry?

2. For each of the states of matter above, discuss the generic shape. (Is it definite? Does it change?)

3. For each of the states of matter, discuss the generic volume.

4. Are each of the states of matter compressible?

5. What names do we give each of the phase changes (going from one state of matter to another)? You should have a total of 6.

Station 6

A graduated cylinder is filled with water to a volume of 43.8 mL. A metal object with an unknown density is then placed into the graduated cylinder. The final volume in the graduated cylinder is 49.1 mL. The object has a mass of 48.29 g.

1. What is the density of the object?

2. Use the following table to identify your metal:

Substance	Density (g/mL)
Gold	19.3
Silver	10.5
Copper	8.96
Aluminum	2.70

3. Calculate the percent error for this density experiment.

Station 7

A little aluminum boat with a mass of 14.50 g has a volume of 450.00 mL. The boat is placed in a bath tub of water and carefully filled with pennies. If each penny has a mass of 2.50 g, how many pennies can be added to the boat before it sinks? The density of water is 1.00 g/mL.

This is a more challenging problem. Do not worry if you can't get the answer!

Station 1

Identify the following as elements, compounds, heterogeneous mixtures, or homogeneous mixtures:

1. Chocolate ice cream   homo

2. Chocolate chip cookie   hetero

3. Apple cinnamon oatmeal   hetero

4. Silver necklace   element

5. Table sugar ($C_{12}H_{22}O_{11}$)   cmpd

6. Vanilla pudding (even though chocolate is way better)   homo

7. Oreo cookie   hetero

8. Carbon dioxide   cmpd

9. Black ink   homo

10. Mountain Dew   homo

11. Pure water   cmpd

12. Tap water   homo

13. Air   homo

Draw the atoms in the following:

14. A solid element

15. A liquid compound

16. A gaseous mixture

Station 2

Identify the following as chemical or physical properties and explain why:

1. Boiling point   P

2. Flammability   C —

3. Color   P

4. Density   P

5. Melting point   P

6. Ability to rust   C

7. Will react with oxygen C

8. Cubic shape   P

9. Can dissolve in acetone P

10. Bendable   P

11. Magnetic   P

Station 3

Identify the following as chemical or physical changes and explain why:

1. Slicing bread P

2. Toasting bread C

3. Spreading jelly and toast P

4. Chewing toast (teeth part) P

5. Digesting toast C

6. Wood rotting C

7. Shredding cheese P

8. Making Kool-Aid P

9. Cheap jewelry leaving green marks on your skin C

Station 4

1. (Theoretically) Create a mixture using supplies in a typical kitchen. Include at least 5 components. Describe this mixture using scientific descriptions.

2. Is this mixture homogeneous or heterogeneous? Why?

3. How would you separate this mixture? Use science terms where appropriate and explain what is happening.

① Scientific descriptions like clear, colorless

② Explain

③ terms like filtration, distillation
   Explain what is happening during each,
   don't just use the term

Station 5

1. What are the three states of matter we focus on in chemistry?

2. For each of the states of matter above, discuss the generic shape. (Is it definite? Does it change?)

3. For each of the states of matter, discuss the generic volume.

4. Are each of the states of matter compressible?

5. What names do we give each of the phase changes (going from one state of matter to another)? You should have a total of 6.

① solid   liquid   gas

② solid - definite shape, doesn't change
   liquid - indefinite shape, changes, takes shape of container
   gas - like liquid

③ solid - definite volume
   liquid - definite volume
   gas - indefinite V, expands to fit container

④ only gas is compressible
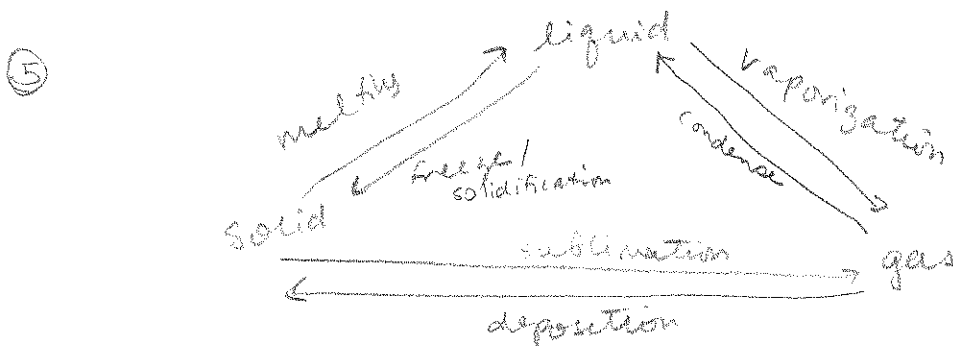
⑤

Station 6

A graduated cylinder is filled with water to a volume of 43.8 mL. A metal object with an unknown density is then placed into the graduated cylinder. The final volume in the graduated cylinder is 49.1 mL. The object has a mass of 48.29 g.

1. What is the density of the object?

2. Use the following table to identify your metal:

Substance	Density (g/mL)
Gold	19.3
Silver	10.5
Copper	8.96
Aluminum	2.70

3. Calculate the percent error for this density experiment.

① V water = 43.8 mL

V water + metal = 49.1 mL

V metal = 49.1 mL − 43.8 mL = 5.3 mL

$$d = \frac{m}{V} = \frac{48.29 \text{ g}}{5.3 \text{ mL}} = \boxed{9.1 \text{ g/mL}}$$

② closest to copper

③ % error = $\left| \dfrac{\text{Accepted} - \text{experimental}}{\text{Accepted}} \right| \cdot 100$

$$= \left| \frac{8.96 - 9.1}{8.96} \right| \cdot 100$$

$$= \frac{.1}{8.96} \cdot 100 = \boxed{1\%}$$

Station 7

A little aluminum boat with a mass of 14.50 g has a volume of 450.00 mL. The boat is placed in a bath tub of water and carefully filled with pennies. If each penny has a mass of 2.50 g, how many pennies can be added to the boat before it sinks? The density of water is 1.00 g/mL.

This is a more challenging problem. Do not worry if you can't get the answer!

boat will float if its overall density is less than 1.00 g/mL and sink when d reaches 1.00 g/mL

$$d = \frac{m}{V}$$

$$1.00 \frac{g}{mL} = \frac{m}{450.00 \, mL}$$

when m = 450.00 g then boat will sink

$$m_{boat} + m_{pennies} = 450.00 g$$

$$14.50 g + X (2.50 g) = 450.00 g$$

$$X (2.50 g) = 435.50 g$$

$$\boxed{X = 174 \text{ pennies}}$$

Any more pennies will sink the boat