

## Recitation Worksheet One

Name:

Key

UGA ID:

### Textbook:

Chemistry & Chemical Reactivity

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### Instructions:

- This recitation worksheet covers Ch. 1.1-1.6.
- Please enter your first and last name as it appears on the eLC roster (do not use a nickname that is not reflected in eLC).
- Your UGA myID is a combination of letters and numbers (example: Dr. Seivert's MyID is mds73312). **Do not use your 81x number.**
- Your completed worksheet has to be submitted to **Gradescope**. You have multiple options for submission:
  - You may use an app to annotate the worksheet by placing your answers in the answer boxes and showing your work when appropriate. Afterward, submit the worksheet to Gradescope. You will not need to upload anything to eLC.
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  - If you do not have access to a printer, you may type your answers directly into the worksheet PDF and then submit it to Gradescope. Write your work on separate sheets of paper, convert them to a PDF, and upload to the appropriate dropbox on eLC.
  - There is a Gradescope app available for both iOS and Android devices that allows you to scan and submit your printed work, or you can submit your fillable PDF directly.
- The following criteria **must** be met to be eligible for full credit:
  - You must make sure the pages are in the correct order and have the same layout as the original worksheet when submitting to Gradescope regardless of your submission type.
  - Answers must be written in the corresponding answer boxes.
  - You must show your work when appropriate.
- This worksheet is due no later than **9:00 AM on the Saturday of the recitation week.**
- A periodic table is attached to the end of this worksheet.  
Please keep this attached to your worksheet when submitting to Gradescope.

1. Label the following statements as either (A) qualitative or (B) quantitative. You only need to write the corresponding letter ("A" or "B") in the boxes below.

A

This recitation worksheet took a long time to complete.

B

This recitation worksheet took 50 minutes to complete.

A

The University of Georgia is a very large school.

2. A graduate student goes to the lab to perform a synthesis reaction. Previously, they found performing this reaction at 500 °C for 6 hours resulted in some, but not optimal success. Afterward, they predict running the reaction 500 °C for 12 hours (i.e. a longer period of time) will result in a more successful experiment. Which of the following best describes the student's prediction?

C

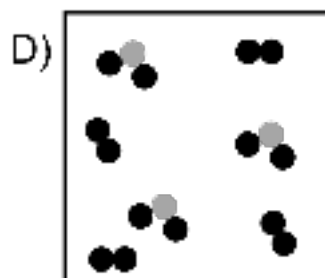
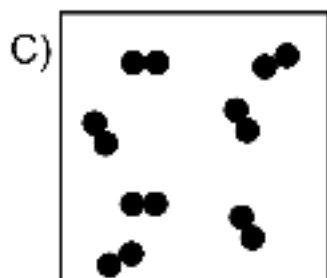
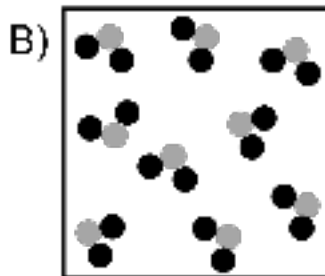
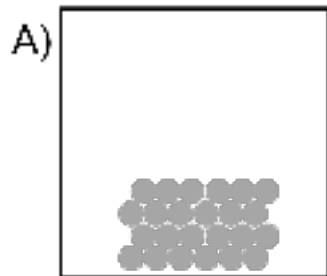
- A. Theory
- B. Law
- ☒ C. Hypothesis
- D. Observation
- E. None of the above

3. The state of matter for an object that has a definite volume but not a definite shape is a...

B

- A. Gas
- ☒ B. Liquid
- C. Solid
- D. Plasma

4. Match the images to the corresponding state of matter.



I. Pure solid:

A

II. Gaseous element:

C

III. Homogeneous gaseous mixture:

D

IV. Gaseous compound:

B

5. Determine whether the following are (A) pure substances or (B) mixtures. You only need to write the corresponding letter ("A" or "B") in the boxes below.

(a) potato salad	B	(d) carbon monoxide gas	A
(b) salt water	B	(e) iron rod	A
(c) liquid mercury	A	(f) slightly rusted iron bar	B

6. Determine whether the following are (A) homogeneous mixtures, (B) heterogeneous mixtures, (C) elements, or (D) compounds. You only need to write the corresponding letter ("A", "B", "C", or "D") in the boxes below.

(a) potato salad	B	(d) carbon monoxide gas	D
(b) salt water	A	(e) iron rod	C
(c) liquid mercury	C	(f) slightly rusted iron bar	B

7. Which of the following best describe chlorine gas? Select any that apply and answer using capital letters with no spaces (e.g. ABCDE).

ACEF



- ☒ A. It is a pure substance
- ☐ B. It is a mixture
- ☒ C. It is an element
- ☐ D. It is monatomic
- ☒ E. It is diatomic
- ☒ F. It is a molecule
- ☐ G. It is a compound

8. From the chemical decomposition of an unknown solid, one obtains a gas and a new solid, both of which are pure substances. From just this information it can be said, without a doubt, that:

D

- A. one of the products is an element
- B. neither product is an element
- C. both products are elements
- ☒ D. the original solid is not an element
- E. the original solid is a mixture

9. A student goes to the lab and *dissolves* a solid sample in a beaker of water. Not long after, they realize they needed that solid for another experiment. What method would be best in separating the mixture and ultimately isolating the solid?

C

if not dissolved, filtration better

- A. Filtration
- B. Chromatography
- ☒ C. Distillation
- D. A combination of filtration and chromatography
- E. None of the above

10. Write the chemical symbols for the elements provided below.

Hint: case matters in chemical symbols. For example, the chemical symbol for germanium is "Ge" not "GE".

(a) phosphorus →

P

(c) platinum →

Pt

(b) potassium →

K

(d) palladium →

Pd

11. The fact that all samples of the compound calcium carbonate are made up of approximately 40% calcium, 12% carbon, and 48% oxygen is an illustration of the Law of:

A

- ☒ A. Constant Composition (or Definite Proportions)
- B. Conservation of Matter (or Mass)
- C. the Jungle
- D. Multiple Proportions
- E. Transmutation

12. Which of the two compounds below illustrate the law of multiple proportions when paired? Write the two letters for the answer in capital letters with no spaces (e.g. FG).

DE

- A.  $\text{NH}_3$
- B.  $\text{CO}_2$
- C.  $\text{H}_2\text{O}$
- ☒ D.  $\text{N}_2\text{O}_4$
- ☒ E.  $\text{N}_2\text{O}$

13. The four liquids below are poured into the same vessel. After a period of time, which liquid would be at the bottom of the vessel, assuming when mixed they all remain separated from each other?

D

- A. Pentane ( $d = 0.621 \text{ g/mL}$ )
- B. Toluene ( $d = 0.867 \text{ g/mL}$ )
- C. Ethanol ( $d = 0.789 \text{ g/mL}$ )
- ☒ D. Water ( $d = 1.00 \text{ g/mL}$ )

↳ largest density

14. Which of the following are *intensive* properties? Select any that apply and answer using capital letters with no spaces (e.g. ABCDE).

ADEF

- ☒ A. boiling point
- ☐ B. mass
- ☐ C. volume
- ☒ D. color
- ☒ E. density
- ☒ F. temperature

15. Which of the following are *extensive* properties? Select any that apply and answer using capital letters with no spaces (e.g. ABCDE).

BC

- ☐ A. boiling point
- ☒ B. mass
- ☒ C. volume
- ☐ D. color
- ☐ E. density
- ☐ F. temperature

16. The statements below describe some physical and chemical properties of sucrose (table sugar). Choose the chemical properties. Select any that apply and answer using capital letters with no spaces (e.g. ABCDE).

BD

- ☐ A. It is a colorless solid.
- ☒ B. It chars or blackens when heated gently.
- ☐ C. Its density is 1.6 g/mL.
- ☒ D. It ignites and burns with a yellow flame when heated strongly.
- ☐ E. It is usually in the form of small crystals although it can occur as a powder.

**Extra Practice Questions: these questions will not be graded.**

1. Which of the following pairs of compounds can be used to illustrate the law of multiple proportions?

D

- A.  $\text{NH}_4$  and  $\text{NH}_4\text{Cl}$
- B.  $\text{ZnO}_2$  and  $\text{ZnCl}_2$
- C.  $\text{H}_2\text{O}$  and  $\text{HCl}$
- ☒ D.  $\text{NO}$  and  $\text{NO}_2$
- E.  $\text{CH}_4$  and  $\text{CO}_2$

2. The following statement is a demonstration of which fundamental chemical law?  
The mass percent of elements in a given compound for a 1.0 g sample, a 100. g sample, and a 1,000.0 g sample of the compound are the same.

B

- A. Law of conservation of mass
- ☒ B. Law of constant composition (or definite proportions)
- C. Law of multiple proportions
- D. More than one fundamental law describes the statement

3. Which of the following processes are best described as a chemical change? Select any that apply and answer with capital letters and no spaces (e.g. ABCDE).

CD

- A. Cutting paper
- B. Grinding wheat into flour
- ☒ C. Baking a cake
- ☒ D. A nail rusting
- E. Adding creamer to coffee

1

1 <b>H</b> 1.01
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3 <b>Li</b> 6.94	4 <b>Be</b> 9.01
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11 <b>Na</b> 22.99	12 <b>Mg</b> 24.31
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19 <b>K</b> 39.10	20 <b>Ca</b> 40.08	21 <b>Sc</b> 44.96
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37 <b>Rb</b> 85.47	38 <b>Sr</b> 87.62	39 <b>Y</b> 88.91
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37 <b>Cs</b> 132.91	56 <b>Ba</b> 137.33
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87 <b>Fr</b> [223]	88 <b>Ra</b> [226]
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18

2 <b>He</b> 4.00
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5 <b>B</b> 10.81	6 <b>C</b> 12.01	7 <b>N</b> 14.01	8 <b>O</b> 16.00	9 <b>F</b> 19.00	10 <b>Ne</b> 20.18
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13 <b>Al</b> 26.98	14 <b>Si</b> 28.09	15 <b>P</b> 30.97	16 <b>S</b> 32.06	17 <b>Cl</b> 35.45	18 <b>Ar</b> 39.95
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31 <b>Ga</b> 69.72	32 <b>Ge</b> 72.63	33 <b>As</b> 74.92	34 <b>Se</b> 78.97	35 <b>Br</b> 79.90	36 <b>Kr</b> 83.80
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49 <b>In</b> 114.82	50 <b>Sn</b> 118.71	51 <b>Sb</b> 121.76	52 <b>Te</b> 127.60	53 <b>I</b> 126.90	54 <b>Xe</b> 131.29
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81 <b>Tl</b> 204.38	82 <b>Pb</b> 207.2	83 <b>Bi</b> 208.98	84 <b>Po</b> [209]	85 <b>At</b> [210]	86 <b>Rn</b> [222]
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113 <b>Nh</b> [286]	114 <b>Fl</b> [290]	115 <b>Mc</b> [290]	116 <b>Lv</b> [293]	117 <b>Ts</b> [294]	118 <b>Og</b> [294]
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# Periodic Table of the Elements

57 <b>La</b> 138.91	58 <b>Ce</b> 140.12	59 <b>Pr</b> 140.91	60 <b>Nd</b> 144.24	61 <b>Pm</b> [145]	62 <b>Sm</b> 150.36	63 <b>Eu</b> 151.96	64 <b>Gd</b> 157.25	65 <b>Tb</b> 158.93	66 <b>Dy</b> 162.50	67 <b>Ho</b> 164.93	68 <b>Er</b> 167.26	69 <b>Tm</b> 168.93	70 <b>Yb</b> 173.05	71 <b>Lu</b> 174.97
89 <b>Ac</b> [227]	90 <b>Th</b> 232.04	91 <b>Pa</b> 231.04	92 <b>U</b> 238.03	93 <b>Np</b> [237]	94 <b>Pu</b> [244]	95 <b>Am</b> [243]	96 <b>Cm</b> [247]	97 <b>Bk</b> [247]	98 <b>Cf</b> [251]	99 <b>Es</b> [252]	100 <b>Fm</b> [257]	101 <b>Md</b> [258]	102 <b>No</b> [259]	103 <b>Lr</b> [262]