

Chemthink Tutorial – Particulate Nature of Matter

Name: _____

Period _____

1. All matter is made of _____.

Section I – Solids, Elements, Atoms

2. If you were able to magnify a penny down to the atomic level, what two observations could you make about the atoms?
- a.
 - b.
3. How do you know if something is an **element**?
- a. What element is the outside of a penny made of?
 - b. Bonus question: What element is the inside of a penny made of?
4. The penny is considered a **solid**. What properties do solids have at the atomic level?
5. Why is this part of the penny also considered a **pure substance**?

Section II – Liquids, Compounds, Molecules

6. Water is considered a **molecule**. How is this different than an atom?
- a. What atoms is each water molecule made of?
7. Write the chemical formula for water: _____
- a. In this formula, what do the element symbols identify?

b. What do the subscripts indicate?

8. Water is considered a **compound**. Explain why.

9. Water is also considered a **liquid**. How is the motion of the water molecules different than that of the solid penny atoms?

a. How is the state of matter of water indicated in its formula?

10. Would you consider water to be a pure substance? Explain your reasoning.

Section III - Gases

11. Why is this gas considered a molecule?

12. List the three molecules found in this sample and identify each as an element or compound.

Chemical Formula	Name	Element or Compound?

13. Compare the movement of this gas to the liquid and solid you saw previously.

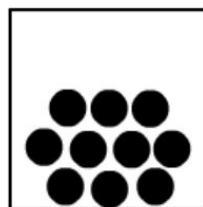
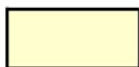
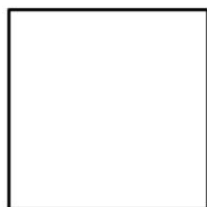
14. This gas is a mixture. What is a mixture?

a. How do you know the individual molecules aren't chemically bonded?

b. How would this gas be written chemically?

Section IV – Review and Practice

15. Label these as liquid, gas, or solid.



16. Create each of these using the sample atoms and molecules to the right.



pure substance
and an element



mixture of an
element and a
compound

