Name: _____ Period: _____

Introduction to Science

Unit 2 Workbook

Guided Notes

1. Matter is anything that takes up _____ and _____.

2. The physical state of matter and the relationship between the particles contained within it is known as _____.

3. Physical properties will _____ affected by the amount of material.

4. How particles are packed is known as _____.

5. The ability to be hammered into shape is known as _____.

6. The ability to be stretched into thin wires is known as _____.

7. The ability to transfer heat or electricity between its particles is _____.

8. Other physical properties of matter would also include:
    a. _____
    b. _____
    c. _____

9. A _____ change is what occurs in a material without changing its identity.

10. How matter acts in the presence of other material is known as _____.

11. A _____ occurs when the identity of the material changes and becomes different both in its properties and composition.

12. Chemical properties _____be affected by the amount of material.

13. A _____reaction occurs between a fuel and an oxidant, usually atmospheric oxygen, that produces oxidized material (ash) and a gaseous product (smoke).

14. A _____ is when the heat of a flame excites the electrons of metals ions, causing them to emit visible light.

15. A _____ is a substance that changes color in the presence of an acid or alkaline material.

16. Matter can be defined into two categories which are _____ and _____.

17. Mixtures can further be defined into two categories which are _____ and _____.

18. An _____ is the purest and simplest form of a substance.

19. Elements are made up of small particles called _____.

20. There are three types of elements, they are:
    a. _____
    b. _____
    c. _____

21. Atoms that do not naturally combine or bond together with other elements are known as _____.

22. Atoms that naturally bind into two atom units are known as _____.

23. Atoms that naturally bind into more than two atom units are known as _____.

24. Elements identified in ancient times used _____ in their naming.

25. Some elements are identified by _____ they were found or by _____.

26. _____ are the result of two or more atoms, from different elements, that have been chemically bonded together.

27. A _____ is the number of atoms or groups of atoms in a formula.

28. A _____ is the number as it relates to the entire group of an element.

29. In a chemical reaction _____ is a release of energy while _____ is when energy is absorbed.

30. The study of the flow of energy, especially heat energy, is known as _____.

31. Matter and energy can neither be created nor destroyed only converted from one form to another is the _____ law of thermodynamics.

32. During any energy transformation some energy becomes unusable or dispersed is the _____ law of thermodynamics.

33. No events ever repeat exactly is the focus of _____ theory.

34. The amount of heat required to raise one pound of water one degree Fahrenheit is known as the _____.

35. The amount of heat required to raise the one gram of water one degree Celsius is known as the _____.

36. Matter is composed of submicroscopic particles that are in _____.

37. A _____ definite shape and volume and is packed close together.

38. A _____has definite volume, packed close together, takes shape of container, and is difficult to compress.

39. A _____ is restricted by container in regard to shape and volume and is easy to compress.

40. Sub-atomic particles traveling at high speed, no shape or volume is known as _____.

41. A phase change from a liquid to a solid is known as _____.

42. A phase change from a solid to a liquid is known as _____.

43. A phase change from a gas to a liquid, also known as liquefaction, is commonly called _____.

44. _____ is a phase change from a solid to a gas without passing through the liquid phase.

45. _____ is a phase change from a gas to a solid without passing through the liquid phase.

46. The _____ is a point at which all three states of matter exist simultaneously.

47. Ther polarity and charges of the elements determine their ability to attract each other is called _____.

48. The _____ theory states that Particles of matter are in constant motion, the property of that matter is a result of their motion.

49. Energy _____ intermolecular forces.

50. Temperature _____ change until all inter-molecular forces have been _____.

51. Sensible heat is the amount of energy to create a _____.

52. Latent heat is the amount of energy required for _____.

53. The _____ is the temperature above which a compound cannot stay as a liquid.

54. The _____ pressure required to keep a liquid at critical temperature.

55. The point at which a compounds internal pressure exceeds atmospheric pressure so it may go into a gaseous state is known as _____.

56. Crystals are _____ and _____ arrangement of particles due to electrical charges.

57. Amorphous Solids have a _____ arrangement of particles.

58. Attractive forces of glass will _____ the attractive forces of liquids.

59. Surface tension is the _____ at the surface of the liquid.

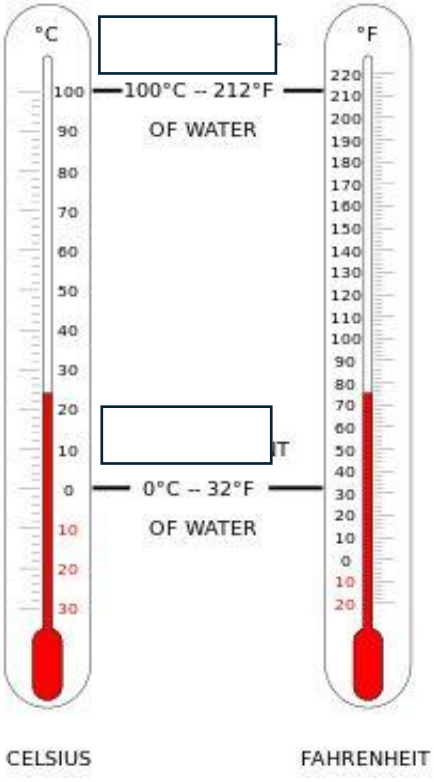
Response Section

The Second Law of Thermodynamics states that "every system left to itself will tend toward maximum disorder or entropy". Explain the implications of this as it relates to Darwin's theory of evolution (minimum three paragraphs).

Application Section

1. **Identify whether the following action is a physical change (P) or chemical change (C).**
    a. _____ boiling water
    b. _____ breaking a glass
    c. _____ change in a chemical indicator solution
    d. _____ chopping wood
    e. _____ combustion (burning) of wood
    f. _____ crushing a can
    g. _____ dissolving sugar or salt in water
    h. _____ explosion of fireworks
    i. _____ flame test
    j. _____ melting an ice cube
    k. _____ metabolism of food in the body
    l. _____ milk going sour
    m. _____ mixing baking soda and vinegar to produce carbon dioxide gas
    n. _____ rusting of iron
    o. _____ shredding paper

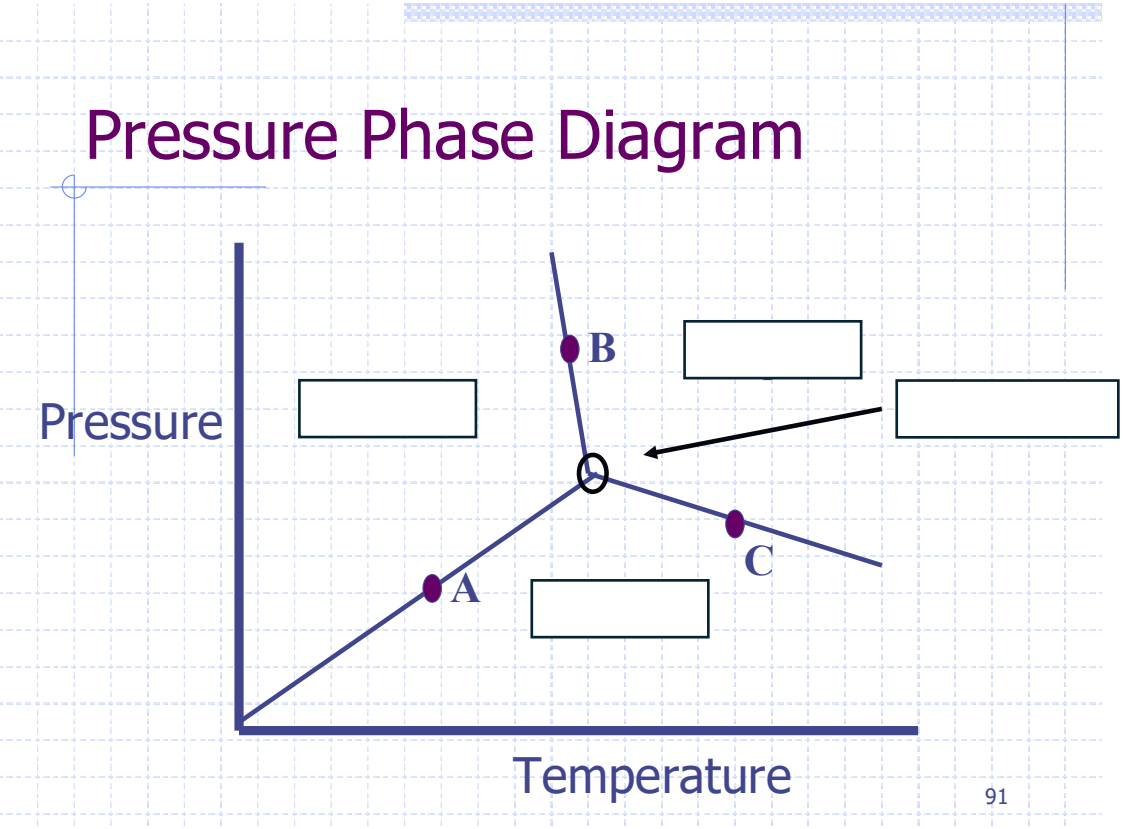
2. **Identify on this scale the boiling point and freezing point of water**



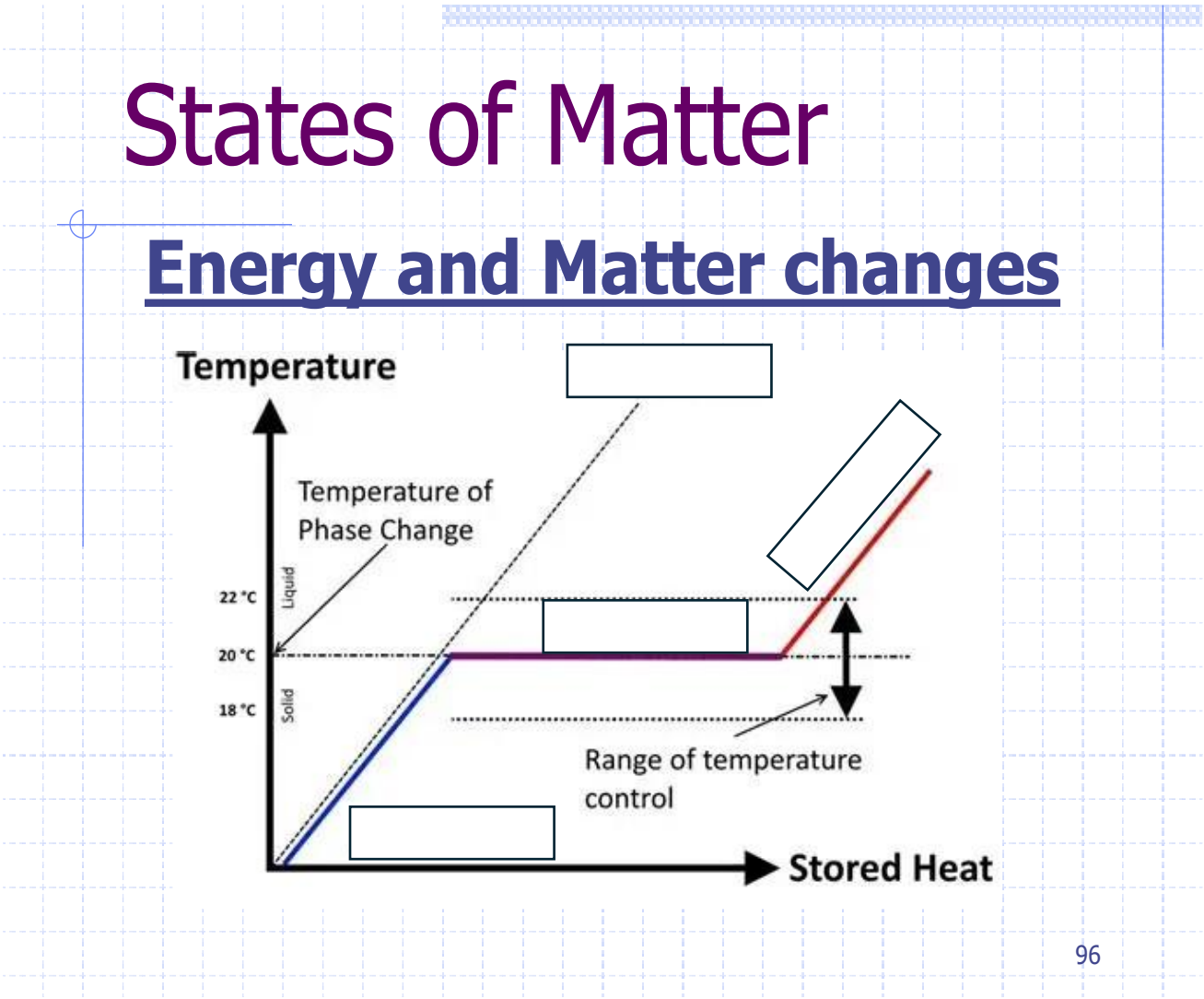
3. **Match the following:**

Diatomic _____	a. Absorb energy
Container attraction _____	b. Argon
Exothermic _____	c. Gold
Endothermic _____	d. Hydrogen
Heterogeneous _____	e. Lemonade
Homogeneous _____	f. Meniscus
Mixture _____	g. Oil and vinegar
Monatomic _____	h. Release energy
Plasma _____	i. Salt and water
Polyatomic _____	j. Sulfur
Pure substance _____	k. Welding arcs

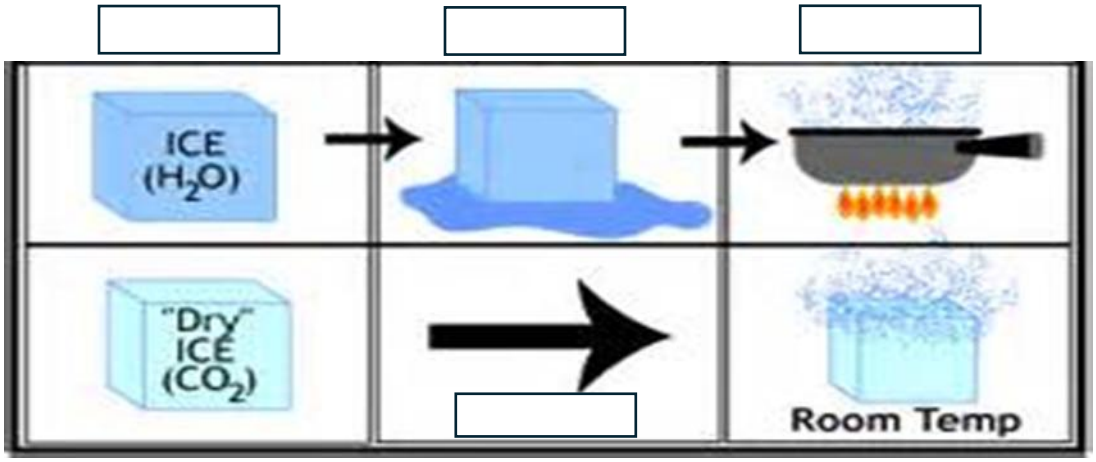
4. **On the pressure phase diagram identify where the following states of matter would be located (solid, liquid, gas, triple point)**



5. **On the Energy and Matter chart below identify the locations where <u>latent</u> and <u>sensible</u> heat would occur.**



6. **Identify the following phases below (solid, liquid, gas, sublimation)**



Convert the temperatures from Celsius to Kelvin.

Example: Convert 28 °C to K.

$K = C + 273$

$= 28 + 273 \quad = 301$

1) 40 °C = _____ K

2) 82 °C = _____ K

3) 63 °C = _____ K

4) 34 °C = _____ K

5) −25 °C = _____ K

6) 91 °C = _____ K

7) 59 °C = _____ K

8) −48 °C = _____ K

9) 114 °C = _____ K

10) 66 °C = _____ K

11) −7 °C = _____ K

12) 110 °C = _____ K

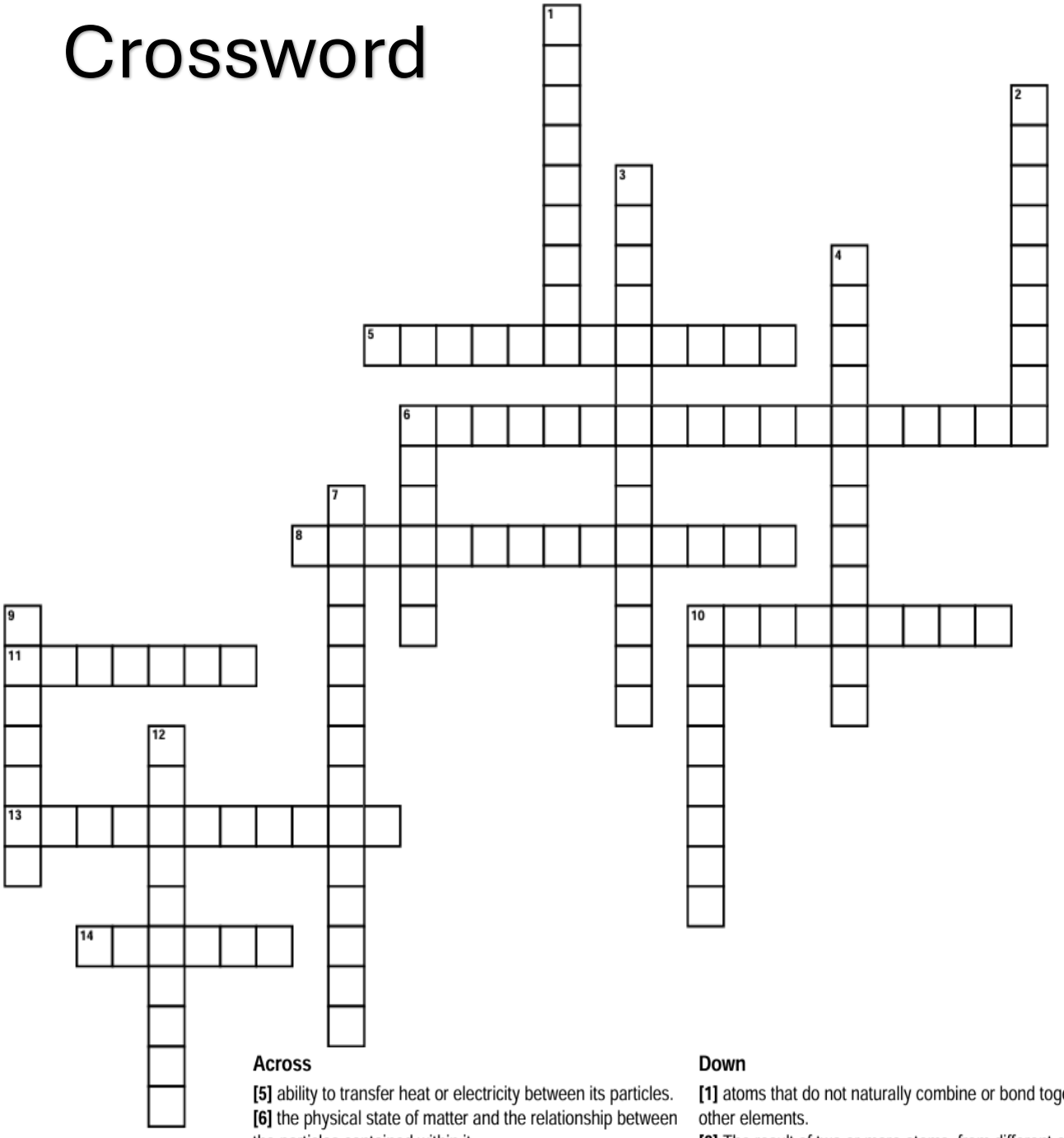
13) Neville set the temperature of the thermostat to 21 °C. Convert the given temperature to Kelvin.

Word Search Puzzle

N N T C O N D E N S A T I O N I P T R T A N C E B
I N P U R E S U B S T A N C E R O Y A S E N C O T
T E C B T T C D Y D M D O M A I L N S Y C O G G U
M N S C N E I N L I M A I H M L Y P H O I G C N E
N T T X O A A O O N C H E M I C A L C H A N G E P
N R H O E M S O N S A E O R E L T H I E I I M E A
G O P D S X P I I U C G E H X E O S M R S Z M S X
L P M A I M E O T D P N R U O U M E R I O E G C T
N Y L B T A E E U G M A U C T E I M E I I E U I I
I P Y D U I T E Y N E H O C H E C A H A C R C M G
S P T P A I X O A I D C O O E H B L T S N F O A N
U R X C M N E D M L C L E M R R P L O O I T E N I
O C T A O U S D C I T A E A M P N E D O M T F Y T
E O G H L D I U A O C C I T I T U A N A Y U F D L
N O N O N I U C M B T I N T C I N B E A M R I O E
E D Y M R M O T N C T S O E D Y T I S N E D C M M
G T C O D R N I O D T Y O R E O Y L P P P Y I R T
O Y I G T E B L E C T H R S E U I I R I L L E E U
R M M E D T M I M N G P I U I E T T O O E T N H E
E C O N D U C T I V I T Y E A N E Y I T I H T T T
T D T E L R I Y H R T M S U B S C R I P T N T M E
E N A O Y S A I E U P T I M I X T U R E R E U P E
H R N U E E H D N I X C M N P D L M I E G E G H E
E N O S R T T G S U B L I M A T I O N R I O I N E
I E M G L T M E B E I M H D E P O S I T I O N L C

Boiling
Chemical change
Coefficient
Compound
Condensation
Conductivity
Density
Deposition
Diatomic
Ductility
Endothermic
Entropy
Exothermic
Freezing
Heterogeneous
Homogeneous
Malleability
Matter
Melting
Mixture
Monatomic
Physical change
Plasma
Polyatomic
Pure substance
Sublimation
Subscript
Thermodynamics

Crossword



Across

[5] ability to transfer heat or electricity between its particles.
[6] the physical state of matter and the relationship between the particles contained within it.
[8] Change that occurs in a material without changing its identity.
[10] ability to be stretched into thin wires.
[11] the purest and simplest form of a substance is known as an element.
[13] point at which all three states of matter exist simultaneously.
[14] anything that takes up space and mass.

Down

[1] atoms that do not naturally combine or bond together with other elements.
[2] The result of two or more atoms, from different elements, that have been chemically bonded together.
[3] identity of the material changes and becomes different both in its properties and composition.
[4] ability to be hammered into shape
[6] sub-atomic particles traveling at high speed, no shape or volume.
[7] Study of the flow of energy, especially heat energy.
[9] how particles are packed.
[10] atoms that naturally bind into two atom units.
[12] atoms that naturally bind into more than two atom units.

Open Note Review

Multiple Choices

1. _____Which term describes the ability of a material to be drawn into wires?
    a. Malleability
    b. Ductility
    c. Wireability
    d. Conductivity

2. _____How many atoms of oxygen are there in **five** molecules in this formula $C_{17}H_{20}O_4S$?
    a. 9
    b. 20
    c. 10
    d. 6

3. _____Italian salad dressing (oil and vinegar) is an example of a/an
    a. Homogeneous mixture
    b. Element
    c. Compound
    d. Heterogeneous mixture

4. _____The freezing point of water is
    a. -32º C
    b. 0 K
    c. 0º C
    d. -32º F
    e. 0º F

5. _____The phase change from gas to liquid is known as
    a. Freezing
    b. Condensation
    c. Melting
    d. Sublimation

True/False

6. The amount of energy contained in the particles of a given substance determines its physical state. _____

7. The first law of thermodynamics deals with the loss of usable energy during any energy transformation. _____

8. The Calorie is the amount of heat energy needed to raise the temperature of 1 gram of water 1 degree Centigrade. _____

Matching

A. Physical Change B. Chemical Change

9. The rotting of a tree stump_____
10. Cutting a diamond_____
11. Mowing the grass _____
12. Evaporation of alcohol_____
13. Burning a log in the fireplace_____
14. Forming copper into a wire_____
15. Rusting of a nail_____
16. Digesting a ham-and-cheese sandwich

Matching (each used only once)

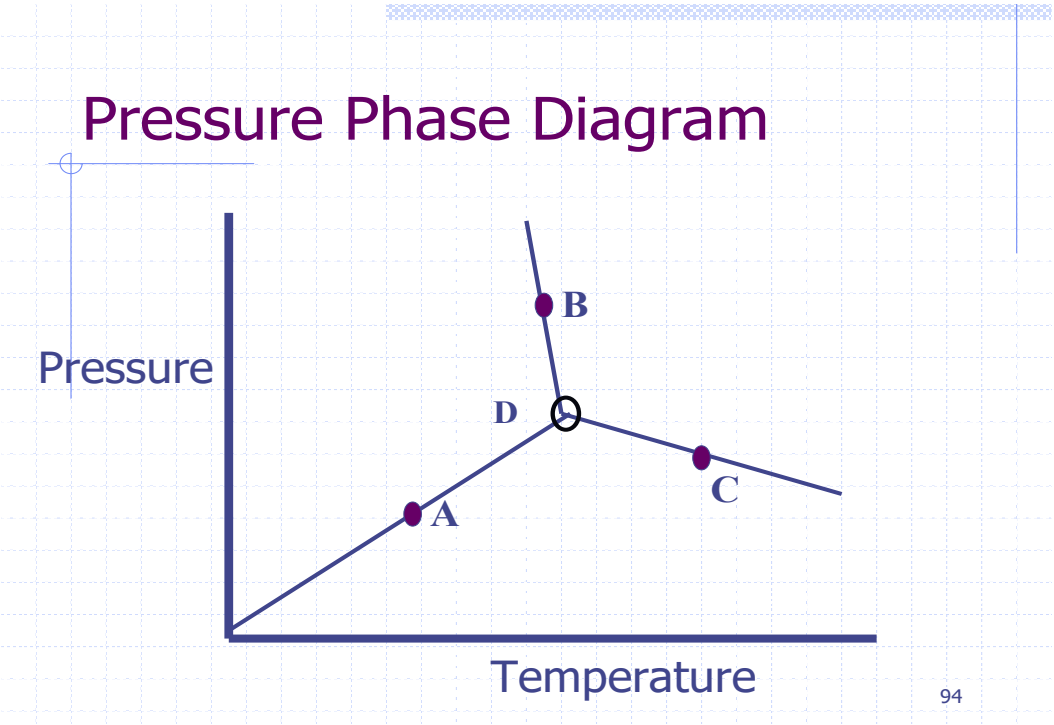
A. Compound
B. Diatomic element
C. Heterogeneous mixture
D. Homogeneous mixture
E. Monatomic element
F. Polyatomic element

17. Gold, Au _____
18. Oxygen, O_2 _____
19. Ozone, O_3 _____
20. Water, H_2O _____
21. Salt and water _____
22. Oil and Vinegar_____

Matching

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

23. Has a definite volume but no definite shape_____
24. Has both a definite volume and a definite shape_____
25. Takes on the shape but NOT necessarily the size of its container_____
26. Retains its own shape and size_____
27. Takes on shape and size of its container_____
28. Movement of electrons_____
29. Has neither a definite volume nor definite shape_____
30. Sub-atomic particles traveling at high speed, no shape or volume_____



31. Identify the Triple Point. _____
32. Identify the Boiling Point. _____
33. Identify the Sublimation Point. _____
34. Identify the Melting Point._____