Unit 1 Worksheet: Scientific Method, Introduction to Biology, & Water

Matching – Use each answer one time.

1. controlled test to check a hypothesis
2. group of cells working together
3. internal harmony or equilibrium
4. process by which plants convert sun’s energy to a usable form
5. trigger that produces a response in an organism
6. only characteristic of life that is not essential to organism itself
7. smallest working unit of life
8. the condition that is being changed by the experimenter
9. testable explanation of a problem
10. benchmark for comparison, setup used to test the effect of an unknown factor
11. chemical changes in an organism; breakdown of food to provide energy
12. the condition being observed or measured in an experiment
13. system of asking questions, developing explanations, & testing those explanations
14. changes that occur in an organism over time
15. any living thing

II. Choose the correct answer(s).

16. Hydrogen has an atomic number of 1 and in its most common form, may be described as H. There is another form of hydrogen used to study the replication of DNA in a cell known as H-3. In which of the following way(s) is an atom of H-3 different from an atom of H-1?

Please note: there may be more than one correct answer!

a. number of protons  b. number of neutrons  c. number of electrons  d. atomic number  e. atomic mass  f. There are no differences.

17. Hydrogen-1 and hydrogen-3 are known as ______.

a. molecules  b. isotopes  c. compounds  d. isomers

III. Write the word that is defined or described.

18. Atom ______ The smallest particle of an element that has the characteristics of that element
19. Nucleus ______ The center of an atom, made up of protons and neutrons
20. Protons ______ Positively charged particles
21. Neutrons ______ Particles that have no charge
22. Electrons ______ Negatively charged particles that move rapidly about the nucleus
IV. Identify each of the italicized items as either a manipulated (independent) or responding (dependent) variable.

The amount of starch formed in a plant leaf for varying times of exposure to light.
23. Responding 24. Manipulated

The number of living bacterial cells after they are exposed to different amounts of radiation

V. Read each of the following statements. If it is a testable hypothesis write yes. If it is not a testable hypothesis write no and explain why.
27. Breathing rate will increase when a person exercises. Yes
28. Cats make better pets than dogs. Not a specific testable hypothesis. Opinion
29. There is life in other solar systems. Possibly one day
30. It is wrong to steal. No - value judgment (morality)

VI. Use the following information to answer the questions:

31. 15 How many electrons does phosphorus have?
32. 32 What is the atomic mass of sulfur?
33. 8 A radioactive isotope of carbon has the mass number 14. How many neutrons are there?
34. 16 How many protons does sulfur have?
35. 8 How many neutrons does oxygen contain?

VII. Complete the following table by checking the correct column(s).

<table>
<thead>
<tr>
<th>Description</th>
<th>Ionic Bond</th>
<th>Covalent Bond</th>
</tr>
</thead>
<tbody>
<tr>
<td>36. Found in NaCl</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>37. Strong and stable bond</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>38. Attractive force between two ions of opposite charge</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>39. Forms a compound</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>40. Is usually crystalline at room temperature</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>41. Is formed when atoms share electrons</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>42. Found in most compounds that make up living organisms</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>43. Found in water</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>44. Involves electrons of an atom</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>45. Has a higher melting point</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>46. Results in the formation of a molecule</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>
VIII. Give the characteristic of life being described.
47. Respond to stimulus  Ima Mustang squinted when moving from a darkened theater into bright sunlight.
48. Development  A caterpillar eventually turns into a butterfly.
49. Evolve/adapt  As a group, bacteria have become more and more resistant to antibiotics.
50. Cells + Organization  As Sally was looking at cork under the microscope she noticed several small chambers.
51. Growth/Response/Etc...  Two weeks after falling off his bike, JJ’s scraped knee was finally healed.
52. Energy (reproduction)  Out on the greenbelt Craig observed a mamma bird feeding worms to her baby birds.

IX. Fill in the blank
53. What type of bond holds the hydrogen and the oxygen together in a water molecule? Covalent
54. What is the charge on the oxygen end of the water molecule? -(partially) What is the charge on the hydrogen end? +(partially)
55. Hydrogen peroxide has 2 hydrogen and 2 oxygen atoms, what would its formula be? H2O2 What is the formula for carbon dioxide? CO2
56. What weak force binds the water molecule to another water molecule? Hydrogen bond/Cohesion This creates surface tension which allows some insects to walk on water.
57. If the crystalline NaCl (salt) has been dissolved in water, which end of the water molecule would bond to the (+)Na oxygen and which end of the water molecule would bond to the (-) Cl hydrogen?

X. Match the description to the physical property of water
a. Good solvent
b. Capillary action
c. High specific heat
d. High heat of fusion
e. High surface tension
f. High heat of vaporization
g. Expansion on freezing

B 57. The movement of water up a tiny tube due to polarity of glass and water.
G 58. The crystalline structure of water takes up more space than the same molecules did in the liquid state so it is less dense and will float.
E 59. Hydrogen bonds hold water molecule together so that the water’s surface acts like a membrane.
F 60. It takes a lot of heat energy to evaporate water.
C 61. Water can absorb a lot of heat energy without having its temperature increase by very much.
D 62. It takes longer for lakes and streams to freeze.
B 63. Helps blood mover through capillaries.
F 64. Water molecules on the surface of the skin (sweat) carry away a lot of body heat when they evaporate.
A 65. Blood is mostly water and many substances such as salts, sugars, & proteins will dissolve in water.
A 66. Dissolves oxygen so that fish are able to extract oxygen to breath.