

Name: _____ Period: _____

Biology: 1st Semester Final Review

Scientific Method, Tools of Science

1. List the steps of the scientific method in order: **Stating the Problem, Forming a Hypothesis, Setting Up a Controlled Experiment, Recording and Analyzing Data, Drawing a conclusion.**
2. The use of the five senses to gather data is called: **Observations**
3. A possible explanation for a set of observations or a prediction for the outcome of an experiment is called: **Hypothesis**
4. The written record of measurements from a scientific experiment is called: **Data**
5. A test of a hypothesis is called: **Experiment**
6. A **conclusion** uses the results of an experiment to support or reject a hypothesis.
7. The condition that is being tested/manipulated in the experiment is called the **independent** variable, and the variable that responds to the changes/the variable that is measured as data is called the **dependent** variable.
8. The things that stay the same in all of the groups and are not changed are the **control variables (constants)**.
9. The group that receives the independent variable is the **experimental** group, and the group that it is compared to the one that does not receive the independent variable is the **control** group.
10. Which variable do you put on the y-axis? **dependent variable.**
11. What is the difference between a hypothesis and a theory? **A hypothesis is a prediction of an outcome. A theory is a hypothesis that has been well tested and supported through observations and results**
12. **Temperature should be on x-axis and gill cover opening and closing per minute on y**

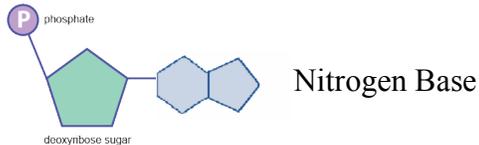
Chemistry

13. The three particles that make up an atom are **Protons, Electrons, and Neutrons**
14. **Electrons** have negative charge, **Protons** have positive charge, **Neutrons** have no charge.
15. An atom with neutral charge has equal numbers of **Protons and Electrons**
16. Which particles are found in the nucleus of the atom? **Neutrons and Protons**
17. Which particle is found outside the nucleus of the atom? **Electrons**
18. The atomic number of an element tells you the number of **Protons** in each atom of that element.
- 19 The atomic mass is the number of **Protons** plus **Neutrons**
20. Atoms of the same element with different numbers of electrons are called **ions**
21. Atoms of the same element with different numbers of neutrons are called **Isotopes**
22. An atom that gains one electron has a charge of **-1** An atom that loses two electrons has a charge of **+2**.
23. A substance with $\text{pH} < 7$ is called a (an) **Acid**
24. A substance with $\text{pH} > 7$ is called a (an) **Base**
25. A substance with $\text{pH} = 7$ is called **Neutral**
26. The process that changes one set of chemicals into a different set of chemicals is called a **Chemical Reaction**
Circle the *reactants* in the equation below. Underline the **products** in the equation below.
$$2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$$
27. Is the equation above balanced? **Yes** Explain. **The equation is balanced if there is the same number of each atom of each element of each side of the equation.**
28. **Enzymes** speed up reactions in living things by lowering the **Activation Energy**.
29. What factors affect how well an enzyme works? **pH (Acid or Base), Inhibitor Molecules, Co-enzymes, Temperature, Concentration of substrate**

30. Complete the chart below:

Macromolecule	Building Blocks	Functions	Examples
Carbohydrate	Sugar	Energy Used in everyday life	Glucose, Ribose, Sucrose Anything that ends in “-ose”
Protein	Amino Acids	Structure, makes up what we are	Skin, Hair, Bones, Nails, etc.
Lipid	Glycerol and Fatty Acids	Long term energy storage	Fats, Cholesterol
Nucleic Acid	Nucleotides	Store Genetic Information	DNA, RNA

31. In the space below, draw a nucleotide and label the 3 parts.



Living Things/ Levels of Organization

32. Put the following levels of organization in order from smallest (1) to largest (10):

biosphere organism cell population tissue organ
system molecule ecosystem community organ

1 Molecule	2 Cell	3 Tissue	4 Organ	5 Organ System
6 Organism	7 Population	8 Community	9 Ecosystem	10 Biosphere

33. The smallest functional unit of living things is a **Cell**

34. A group of atoms is a **Molecule**

35. A group of cells working together is an **tissue** A group of organs working together is an **Organ System**

36. A group of the same type of organism living in the same place at the same time is a **Population**

37. All of the populations living in an area are called a **Community**.

38. The entire part of Earth in which living things are found is called the **Biosphere**

39. List the eight characteristics of living things:

- a. Made of Cells
- b. Can Reproduce
- c. Can Grow and Develop
- d. maintain stable internal environment (homeostasis)
- e. Based on the universal genetic code (DNA)
- f. Evolve
- g. Obtain and Use Materials and energy
- h. Respond to stimuli

40. List two abiotic factors: **Temperature, soil, rocks, sun, wind**

41. List two biotic factors: **Flowers, Trees, Bacteria, Humans, Mammals, Birds, Fish**

Food Webs

42. Organisms that make their own food are called **Autotrophs or Producers**

43. The process by which some organisms use the energy from sunlight to make food is called **Photosynthesis**

44. Organisms that must eat food are called **Heterotrophs or Consumers**

45. Organisms that eat only producers are called **Herbivores**

46. Organisms that eat only consumers are called **Carnivores**

47. Organisms that eat both producers and consumers are called **Omnivores**

48. Organisms that break down dead organisms are called **Decomposers**

49. a. When one organism catches and eats another organism it is called **Predation**

b. An insect pollinates a flower, benefiting both the flower and the insect. This relationship is called **Mutualism**.

c. A barnacle living on a whale is an example of **Commensalism** because the barnacle benefits and the whale isn't affected.

d. Mistletoe growing on a spruce tree, using the spruce tree's water and nutrients is an example of **Parasitism**.

50. The location where an organism lives is called its **Habitat**. An organism's **Niche** includes what it eats, what eats it, how it reproduces, where it lives, and all of the resources that it needs to live.

51. The main source energy for life on Earth is **Sunlight**

52. What type of organisms is always found at the bottom of a food web? **Producer (Autotroph)**

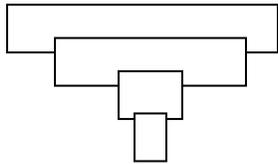
53. Draw a food chain in the space below.

Sunflower → Mouse → Snake → Hawk

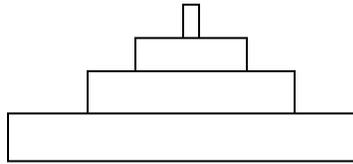
54. The levels in a food web or food chain are called **Trophic** levels. How much energy is transferred from one level to the next? **10%** What happens to the rest of the energy? **Lost as heat to the environment**

55. The amount of living tissue found at each trophic level in an ecosystem is called **Biomass**

Both pyramids represent the same ecosystem.



Pyramid of numbers



Biomass Pyramid

56. According to the pyramids, which trophic level includes the largest number of organisms in this ecosystem?

A. producers B. 1st level consumers C. 2nd level consumers D. 3rd level consumers E. decomposers

57. Based on the pyramids, what can you conclude about the average size of the producers in this ecosystem?

A. they are large B. **they are small** C. cannot tell

58. What type of ecosystem could these pyramids represent **Ocean**. Explain. **Lots of small producers such as plankton, with some herbivores and omnivores eating them, with very few large predators at the top.**

Populations

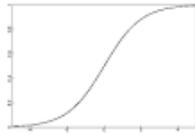
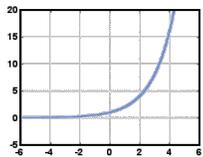
59. The entire area in which a population is found is called its **geographic distribution**. The number of individual organisms living in a defined area is population **population density**.

60. When birth rate < death rate, a population's size will **Decrease**

61. Organisms move away from an area in **emigration**. This causes the population size to **Decrease**

62. Organisms move into an area in **immigration**. This causes the population's size to **Increase**.

63. Sketch graphs of exponential growth and logistic growth on the graphs below.



64. Label the carrying capacity on the appropriate graph above.

65. Which of the 2 graphs you drew above could be used to show human population growth over the last 500 years? **Expon**

Biomes/ Nutrient Cycles/ Human Impacts

66. Match the descriptions on the right with the correct biomes on the left.

C desert

B tundra

D temperate deciduous forest

E boreal forest

A. tropical rainforest

F grassland

A. warm, tropical temperatures, high rainfall, lots of species

B. low temperatures, little precipitation, high winds

C. variable temperatures, little precipitation, sandy soils

D. trees that lose their leaves, mild temperatures, moderate precipitation

E. trees with needle-like leaves, precipitation mostly snow, low temps

F. frequent fires, includes North American prairie, grazing animals

67. The average temperature and rainfall over a long period of time is called **Climate** Daily temperature and precipitation is called **weather**.

68. Water that falls to the Earth as rain or snow is called **Precipitation**

69. Water changes from gas (water vapor) to liquid during **Condensation**.

70. Water changes from liquid to gas (water vapor) during **Evaporation**.

71. Water that collects underground is called **Ground water**

72. Water that runs along the surface of the Earth is called **Runoff**

73. **Nitrogen** must be changed into a different form before plants can use it.

74. Animals breathe in **Oxygen** and breathe out **Carbon Dioxide**

75. Plants take in **Carbon Dioxide** and release **Oxygen**

76. Burning fossil fuels affects the **Carbon** cycle.

77. Cutting down trees **Increases** the amount of carbon dioxide in the atmosphere.

78. List three processes that release CO₂ into the atmosphere: **Volcanoes , Cellular Respiration (Animals breathing), and Burning fossil Fuels (driving cars)**

79. Which atmospheric gas must be changed into a different form before plants can use it? **Nitrogen**
 What is the name of the process in which it is changed? **Nitrogen Fixation** Where does this process take place? **Nitrogen fixation occurs when nitrogen fixing bacteria (found on plant roots in the soil) use the N in the atmosphere for cellular processes in which the chemical reaction results in solid N being deposited in the soil therefore becoming available for plant use. In other words: Bacteria use atmospheric Nitrogen turning it into solid nitrogen in the soil.**
80. The **Ozone** layer protects us from harmful UV rays from the sun. It is being destroyed by **CFCs (found in products such as hair spray and old refrigerators).**
81. **Greenhouse** gases trap heat in the atmosphere, causing the Earth's average temperatures to rise. This process is called **Greenhouse Effect** How would life on Earth be different if this process didn't occur at all? **_____ The earth would not be able to retain heat, causing the entire planet to remain in a frozen state.**
82. What are humans doing to make it worse? **Burning Fossil Fuels**
83. Acid rain is caused by **Humans burning materials in factories releasing particles into the atmosphere, then they combine with water molecules in the atmosphere lowering the pH of water from neutral to Acidic**
84. Breaking ecosystems into smaller and smaller pieces is called **Habitat Fragmentation** It is caused by **Deforestation.**
85. The accumulation of toxic substances such as DDT in living things is called **_____**. This has the greatest effect on organisms in which trophic level? **Top Carnivores**
86. **Suburban Sprawling** is caused by humans moving farther and farther out from major cities.
87. Loss of forests is called **Deforestation** It causes soil **Errosion** habitat **Fragmentation** and global **Warming**

Cells

88. The invention of **microscopes** led to the discovery of cells.
89. Complete the chart below comparing prokaryotic cells and eukaryotic cells.

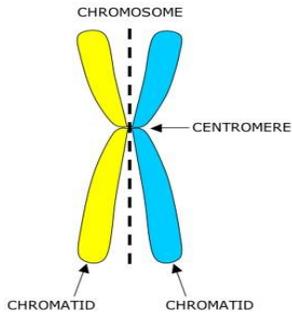
	Nucleus?	Cell wall?	Uni- or multicellular?	Examples
Prokaryote	No	Sometimes	Unicellular	Bacteria
Eukaryote	Yes	Plants	Multicellular and unicellular	Humans, animals, plants

90. List three cell structure differences between plant and animal cells. **Plants have Vacuoles, Cell Walls, and Chloroplasts.**
91. List three organelles involved in the synthesis, modification, and distribution of proteins in a cell. **Endoplasmic Reticulum, Golgi Apparatus and Ribosomes.**
List the cell organelle that
92. contains DNA **Nucleus**
93. uses energy from sun to make sugars **Chloroplast**
94. breaks down toxic substances **Lysosomes**
95. regulates what enters and leaves the cell **Cell Membrane**
96. releases energy from food **Mitochondrion**
97. organizes the spindle during mitosis **Centrioles**
98. makes the ribosomes **Nucleolus**
99. In diffusion, molecules move from an area of **High Concentration** to an area of **Low Concentration.** Diffusion of water is called **Osmosis.**
100. The cell membrane is called semi-permeable because **it will let some molecules in and out, but not let other molecules in and out.**
101. Diffusion of molecules through a special protein channel is called **Facilitated Diffusion.**
102. Moving molecules such as hydrogen ions through a special channel from an area of low concentration to an area of high concentration is called **Active Transport** because it requires **Energy**
103. The solid substance that is dissolved in a solution is called **solute** The liquid it is dissolved in is called **solvent**
104. When a cell is placed in fresh water, water will move **into** the cell, eventually causing the cell to **swell or explode.** When a cell is placed in salt water, water will move **out of** the cell, eventually causing the cell to **shrivel.**
105. Salt placed on grass and other plants causes cells to **lose** water.
106. Cells can engulf large food particles during a process called **endocytosis** They release particles in a process called **Exocytosis**
107. As a cell grows, its **volume** gets larger faster than its **Surface Area**
108. As a result, large cells face two problems:
- DNA Overload: Not Enough DNA to control whats going on in the cell because it is too big**
 - Diffusion: Cannot exchange (get) gasses and nutrients fast enough.**

109. The cell cycle is divided into two main phases: **Interphase and Mitosis**. During which phase does the cell grow and prepare to divide? **Interphase**

110. What is the process of cell splitting called? **cytokinesis**

111. Draw a chromosome. Label the sister chromatids and the centromere.



During which phase of mitosis

112. does the spindle form? **Prophase**

115. do the chromosomes line up at the middle? **Metaphase**

113. do chromosomes condense? **Prophase**

116. do two new nuclei form? **Telophase**

114. do the chromatids separate? **Anaphase**

117. does the cytoplasm split? **Cytokinesis**

118. If a cell contains 12 chromosomes, how many chromosomes will each of its daughter cells contain after it divides? **12 Chromosomes**

119. Cell growth is normally regulated by a.) contact with **other cells** (hint: think of cells in a Petri dish) and b.) chemicals called **cyclins**.

120. Cancer is a disorder in which some cells **continue to divide uncontrollably**.