

**Introduction to Biology and the Scientific Method**

1. Biology is the study of: \_\_\_\_\_
2. A living thing is called a(n): \_\_\_\_\_
3. All organisms are composed of: \_\_\_\_\_
4. The smallest particle that can be identified as an element is: \_\_\_\_\_
5. A scientist noticed that in acidic pond water, some frogs developed shorter legs. This is an example of a(n):  
\_\_\_\_\_

Explain your answer: \_\_\_\_\_

6. The physician Dr. Areole Winters wanted to try to find the cause of Lyme disease. Based on her observations, Dr. Winters suggested that the deer tick might spread Lyme disease from person to person. This suggestion was a(n):  
\_\_\_\_\_

Explain your answer: \_\_\_\_\_

7. Scientific hypotheses are most often tested by the process of: \_\_\_\_\_
8. A hypothesis is: \_\_\_\_\_
9. What does a biologist study? \_\_\_\_\_
10. What is a factor that remains the same for all groups throughout the experiment? \_\_\_\_\_

**Read the following paragraph CAREFULLY, and then answer questions 11 – 14.**

Some scientists conducted an experiment in which they increased a person's hypertension in relation to the amount of Red Bull people drank each day: either one, two or three cans per day. They used appropriate constants. They also used a control group. The scientists found no significant difference in hypertension between any of the subjects. They concluded that Red Bull has no adverse effects on human health.

11. What was the independent variable? \_\_\_\_\_
12. What was the dependent variable? \_\_\_\_\_
13. What should the scientists have used for the control group? \_\_\_\_\_
14. What could *not* have been used as a constant in the investigation? \_\_\_\_\_

15. A scientist is studying whether chickens will produce more eggs when given an experimental drug. He gives 100 chickens the drug and then records their egg production. What would be a good control group? Explain your answer.

---

---

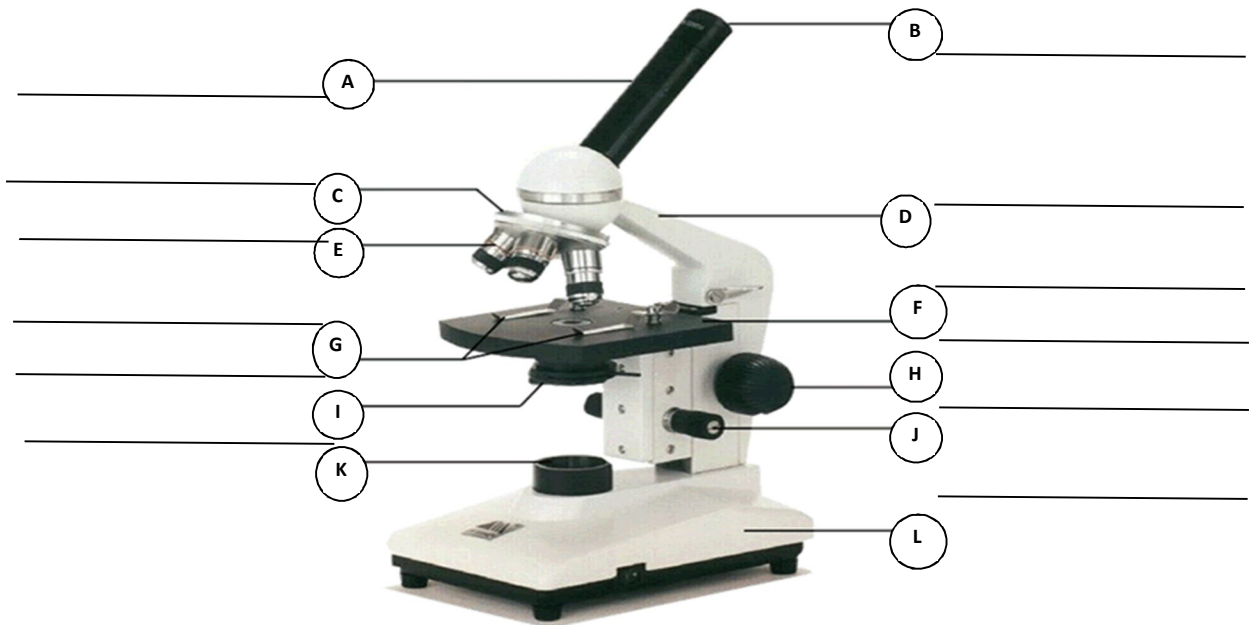
---

16. List the eight characteristics of life:

- a. \_\_\_\_\_ b. \_\_\_\_\_  
c. \_\_\_\_\_ d. \_\_\_\_\_  
e. \_\_\_\_\_ f. \_\_\_\_\_  
g. \_\_\_\_\_ h. \_\_\_\_\_

17. The process of metabolism is which characteristic of life? \_\_\_\_\_

18. Identify all the parts of a microscope.



19. On high power, *NEVER* use the \_\_\_\_\_, because you could damage the lens or the slide.

20. The ability of a microscope to show the details of an image is: \_\_\_\_\_

21. The enlargement of the image a microscope shows you is the: \_\_\_\_\_

22. A compound light microscope that has an objective lens of 40x and an ocular lens of 10x. What is its total magnification? Show your work.

---

23. What is a factor that remains the same for all groups during the experiment? \_\_\_\_\_

24. \_\_\_\_\_ is required for all life process. Many organisms must take in food. Other organisms make their own food.

25. The one factor that can be changed in a controlled experiment. It is the factor that is tested and affects the experiment outcome. What is it called?

---

### **Biochemistry**

26. What is the substance that produces OH<sup>-</sup> ions (hydroxide ions) when dissolved in water? \_\_\_\_\_

27. What is the term for a chemical substance that neutralizes small amounts of either an acid or a base added to a solution?

---

28. Which type of reaction releases energy, many times the reaction is in the form of heat? \_\_\_\_\_

29. Which type of reaction absorbs energy, many times the reaction feels cold? \_\_\_\_\_

30. Most biological processes occur at which pH level? \_\_\_\_\_

31. All organic compounds contain which element: \_\_\_\_\_

32. This type of reaction breaks down a polymer into a monomer by adding a water molecule to “cut” the bond:

---

33. A reaction that bonds two monomers at the same time, releases two hydrogen atoms and one oxygen atom which unite to form a molecule of water is called a:

---

34. Hair, muscle, and fingernails are made primarily of: \_\_\_\_\_

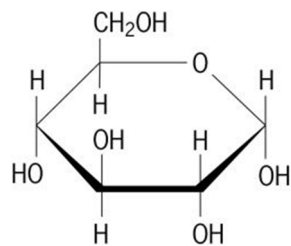
35. Glucose and fructose are examples of: \_\_\_\_\_

36. All proteins consist of: \_\_\_\_\_

37. Proteins that speed up chemical reactions are called: \_\_\_\_\_

38. A compound that stores hereditary information is: \_\_\_\_\_

39. What are some important functions of lipids? \_\_\_\_\_  
 \_\_\_\_\_
40. Glucose and fructose have the same chemical formula,  $C_6H_{12}O_6$ , but different structures. Glucose and fructose are:  
 \_\_\_\_\_
41. What is the relationship or difference between a monomer and a polymer? \_\_\_\_\_  
 \_\_\_\_\_
42. How does an enzyme influence a biological reaction? \_\_\_\_\_
43. What are the four main classes of organic compounds? \_\_\_\_\_  
 \_\_\_\_\_



44. Identify and name the **above** compound: \_\_\_\_\_
45. Why does water move from the roots to the leaves of plants? \_\_\_\_\_
46. Which are the six most common elements in living things? (know the acronym) \_\_\_\_\_  
 \_\_\_\_\_

### Cell Structures and Functions

47. What is the **general** term used for the tiny structures that perform specialized functions in cells?  
 \_\_\_\_\_
48. Which organelle controls most activities that occur in the cell? \_\_\_\_\_
49. The semifluid, watery environment inside the cell is called the: \_\_\_\_\_
50. What regulates what enters and leaves a cell and is selectively permeable? \_\_\_\_\_
51. A cell's membrane is considered to be selectively permeable. What does "selectively permeable" mean?  
 \_\_\_\_\_

52. Which organelle aids in protection and support of plants cells? \_\_\_\_\_
53. These organelles are the sites of protein synthesis. They can be found attached to the endoplasmic reticulum or free-floating in the cytoplasm:  
\_\_\_\_\_
54. These organelles provide energy for the cell and are called the cell's "powerhouse": \_\_\_\_\_
55. These organelles are found in plant cells and some prokaryotic cells. They contain the green pigment chlorophyll and are the site of photosynthesis:  
\_\_\_\_\_
56. These organelles store water, waste materials, or food particles in plant cells. (They are not usually found in animal cells):  
\_\_\_\_\_
57. This organelle allows macrophages (white blood cells) in the immune system to engulf (eat) and *digest* foreign substances in our body, such as bacteria and viruses:  
\_\_\_\_\_
58. The esophagus has cells with tiny hair-like structures that help move food to the stomach. What are these hair-like structures called?  
\_\_\_\_\_
59. Which organelles are only found only in plants cells? \_\_\_\_\_
60. Per the Cell Theory; cells can only arise from? \_\_\_\_\_
61. The nucleus contains which organelle(s)? \_\_\_\_\_
62. This is an extensive membrane system throughout the cell that is the cell's internal transport system. It can be either "smooth" or "rough":  
\_\_\_\_\_
63. Which organelles do Prokaryotic cells have? \_\_\_\_\_
64. An organism consisting of more than one cell is considered to be a(n): \_\_\_\_\_
65. List organelle(s) in a eukaryote cell that have their own DNA: \_\_\_\_\_
66. Which types of cells have the most structures in common? Prokaryote, Eukaryote or bacteria.  
\_\_\_\_\_

67. List all the components of the “Cell Theory”: \_\_\_\_\_

\_\_\_\_\_

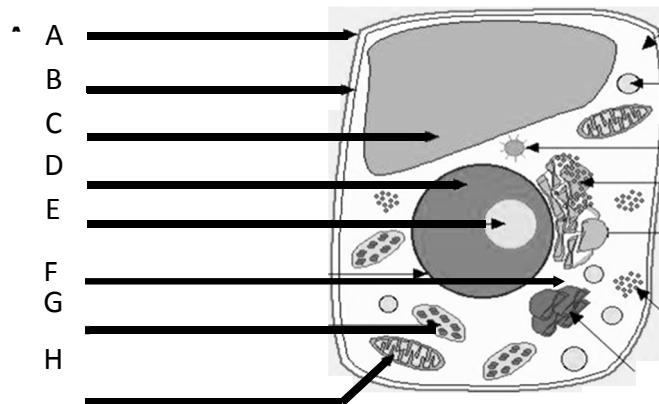
\_\_\_\_\_

\_\_\_\_\_

68. What does the “Endosymbiotic Theory” attempt to explain? \_\_\_\_\_

\_\_\_\_\_

**Label all the organelles on the following diagram.**



**Cell Transport**

69. The diffusion of water molecules through a cell membrane is called: \_\_\_\_\_

70. Diffusion and osmosis are examples of which of type of transport: \_\_\_\_\_

71. The difference in concentrations of a substance between two areas is called a: \_\_\_\_\_

72. The movement of molecules in response to a concentration gradient is called: \_\_\_\_\_

73. If a cell was in a hypotonic solution, which way would the water move? \_\_\_\_\_

74. Explain what Endocytosis is: \_\_\_\_\_

75. If a cell were in a hypertonic solution, which way would the water would move? \_\_\_\_\_

76. Explain what exocytosis is: \_\_\_\_\_

77. This form of movement across a membrane requires energy: \_\_\_\_\_

78. If a cell were in isotonic solution where would the water move? \_\_\_\_\_

79. Most of the time, the environment plant cells live in a(n): \_\_\_\_\_

80. This is the movement of particles from an area of high concentration of solute to an area of low concentration.

---

**Bacteria and Viruses**

81. List the organelle(s) found in a virus? \_\_\_\_\_

---

82. All bacteria can be classified as which type of organism? \_\_\_\_\_

83. Which organelles can be found in every bacterial cell? \_\_\_\_\_

84. List the similarities between human body cells and bacterial cells: \_\_\_\_\_

---

---

---

85. Describe viruses and how they function: \_\_\_\_\_

---

---

---

86. What is the term for the protein coat around a virus's genetic material? \_\_\_\_\_

87. List the bacterial infections you learned about, they are in your notes: \_\_\_\_\_

---

---

---

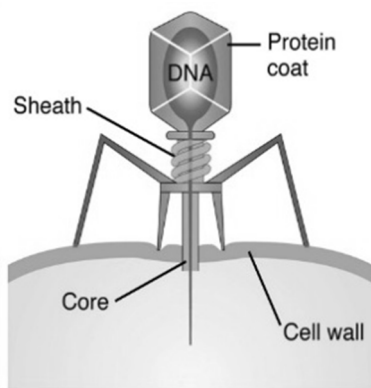
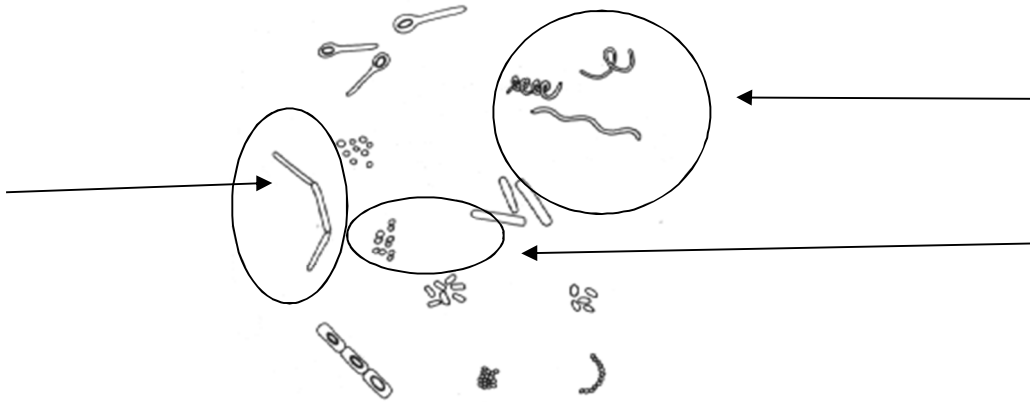
88. What is the type of viral reproductive cycle that results in immediate invasion of the cell and an active infection?

---

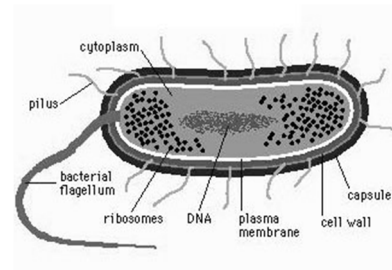
89. What is the type of viral reproductive cycle in which the virus remains dormant inside the host cell for an extended period?

---

90. Label all three of the bacterial shapes and arrangements circled below.



**Diagram A**



**Diagram B**

91. **Diagram A** represents a: \_\_\_\_\_

92. **Diagram B** represents a: \_\_\_\_\_

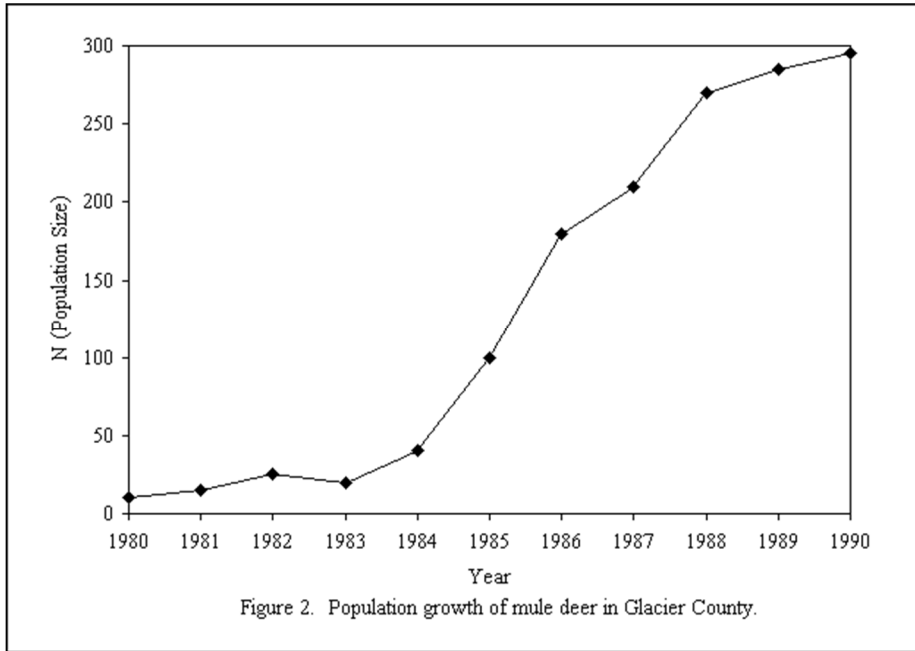
93. Which of the above diagrams can contain DNA and/or RNA? \_\_\_\_\_

94. Which of the above diagrams can invade our body's cells and cause serious and sometimes fatal infections?

\_\_\_\_\_



**Biological Graph and Data Interpretation**



95. What should the title of the above graph be? \_\_\_\_\_

96. What is the independent variable? \_\_\_\_\_

97. What is the dependent variable? \_\_\_\_\_

98. Write two questions and answers about the data displayed on the graph: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_