

Scientific Method, Tools of Science

- List the steps of the scientific method in order: _____

- The use of the five senses to gather data is called: _____.
- A possible explanation for a set of observations or a prediction for the outcome of an experiment is called: _____.
- The written record of measurements from a scientific experiment is called: _____.
- A test of a hypothesis is called: _____.
- A _____ uses the results of an experiment to support or reject a hypothesis.
- The thing that stays the same in a scientific experiment is called the _____. The thing that changes is the _____.
- What is the difference between a hypothesis and a theory? _____

- Match the units below with the measurements that they are used for:
_____ meter A. length
_____ liter B. mass
_____ gram C. temperature
_____ °C D. volume
- Circle the metric units in the list below.
grams kilometers pounds ounces
 °C °F miles inches
milliliters centimeters kilograms yards

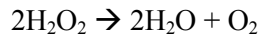
Chemistry

- The three particles that make up an atom are _____, _____, _____.
- _____ have negative charge.
- _____ have positive charge.
- _____ have no charge.
- An atom with neutral charge has equal numbers of _____ and _____.
- Which particles are found in the nucleus of the atom? _____ and _____.
- Which particle is found outside the nucleus of the atom? _____.
- The atomic number of an element tells you the number of _____ in each atom of that element.
- The atomic mass is the number of _____ plus _____.
- Atoms of the same element with different numbers of electrons are called _____.
- Atoms of the same element with different numbers of neutrons are called _____.
- An atom that gains one electron has a charge of _____. An atom that loses two electrons has a charge of _____.
Atoms that share electrons form a(n) _____ bond. A(n) _____ bond forms when electrons are transferred from one atom to another.
- A substance with $\text{pH} < 7$ is called a (an) _____.
- A substance with $\text{pH} > 7$ is called a (an) _____.

26. A substance with pH = 7 is called _____.

27. The process that changes one set of chemicals into a different set of chemicals is called a _____.

28. Circle the reactants in the equation below. Underline the products in the equation below.



29. Is the equation above balanced? _____ Explain. _____.

30. _____ speed up reactions in living things by lowering the _____.

31. What factors affect how well an enzyme works?

a. _____

c. _____

b. _____

d. _____

32. Complete the chart below:

Macromolecule	Building Blocks	Functions	Examples
Carbohydrate			
Protein			
Lipid			
Nucleic Acid			

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

Living Things/ Levels of Organization

34. 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	2	3	4	5
6	7	8	9	10

35. The smallest functional unit of living things is a _____.

36. A group of atoms is a _____.

37. A group of cells working together is an _____. A group of organs working together is an _____.

38. A group of the same type of organism living in the same place at the same time is a _____.

39. All of the populations living in an area are called a _____.

40. The entire part of Earth in which living things are found is called the _____.

41. List the eight characteristics of living things:

- | | |
|----------|----------|
| a. _____ | e. _____ |
| b. _____ | f. _____ |
| c. _____ | g. _____ |
| d. _____ | h. _____ |

42. List two abiotic factors: _____ and _____.

43. List two biotic factors: _____ and _____.

Food Webs

44. Organisms that make their own food are called _____ or _____.

45. The process by which some organisms use the energy from sunlight to make food is called _____.

46. Organisms that must eat food are called _____ or _____.

47. Organisms that eat only producers are called _____.

48. Organisms that eat only consumers are called _____.

49. Organisms that eat both producers and consumers are called _____.

50. Organisms that break down dead organisms are called _____.

51. a. When one organism catches and eats another organism it is called _____.

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

c. A barnacle living on a whale is an example of _____ 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 _____.

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

53. The main source energy for life on Earth is _____.

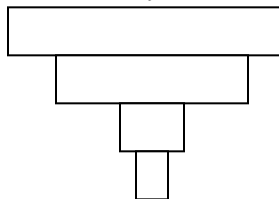
54. What type of organisms is always found at the bottom of a food web? _____.

55. Draw a food chain in the space below.

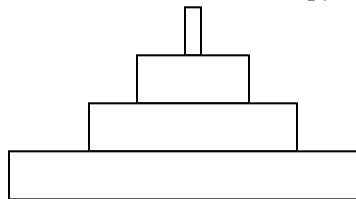
56. The levels in a food web or food chain are called _____ levels. How much energy is transferred from one level to the next? _____ What happens to the rest of the energy? _____

57. The amount of living tissue found at each trophic level in an ecosystem is called _____.

Questions 58-60 refer to the ecological pyramids shown below. Both pyramids represent the same ecosystem.



Biomass Pyramid



Pyramid of Numbers

58. 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

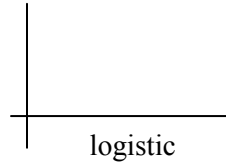
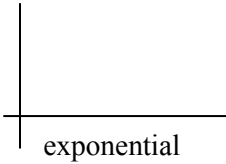
59. Based on the pyramids, what can you conclude about the average size of the producers in this ecosystem?

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

60. What type of ecosystem could these pyramids represent? _____ Explain. _____

Populations

61. The entire area in which a population is found is called its _____. The number of individual organisms living in a defined area is population _____.
62. When birth rate < death rate, a population's size will _____.
- Organisms move away from an area in _____. This causes the population's size to _____.
- Organisms move into an area in _____. This causes the population's size to _____.
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 two graphs you drew above could be used to depict human population growth over the last 500 years?
_____.

Biomes/ Nutrient Cycles/ Human Impacts

66. Match the descriptions on the right with the correct biomes on the left.
- | | |
|----------------------------------|---|
| _____ desert | A. warm, tropical temperatures, high rainfall, lots of species |
| _____ tundra | B. low temperatures, little precipitation, high winds |
| _____ temperate deciduous forest | C. variable temperatures, little precipitation, sandy soils |
| _____ boreal forest | D. trees that lose their leaves, mild temperatures, moderate precipitation |
| _____ tropical rainforest | E. trees with needle-like leaves, precipitation mostly snow, low temperatures |
| _____ grassland | F. frequent fires, includes North American prairie, grazing animals |

67. The average temperature and rainfall over a long period of time is called _____. Daily temperature and precipitation is called _____.
68. Water that falls to the Earth as rain or snow is called _____.
69. Water changes from gas (water vapor) to liquid during _____.
70. Water changes from liquid to gas (water vapor) during _____.
71. Water that collects underground is called _____.
72. Water that runs along the surface of the Earth is called _____.
73. _____ must be changed into a different form before plants can use it.
74. Animals breathe in _____ and breathe out _____.
75. Plants take in _____ and release _____.
76. Burning fossil fuels affects the _____ cycle.
77. Cutting down trees _____ the amount of carbon dioxide in the atmosphere.
78. List three processes that release CO₂ into the atmosphere: _____, _____, and _____.
79. Which atmospheric gas must be changed into a different form before plants can use it? _____.
What is the name of the process in which it is changed? _____ Where does this process take place? _____.
80. The _____ layer protects us from harmful UV rays from the sun. It is being destroyed by _____.
81. _____ gases trap heat in the atmosphere, causing the Earth's average temperatures to rise. This process is called _____. How would life on Earth be different if this process didn't occur at all? _____ What are humans doing to make it worse? _____.
82. Acid rain is caused by _____.

83. Breaking ecosystems into smaller and smaller pieces is called _____. It is caused by _____.
84. The accumulation of toxic substances such as DDT in living things is called _____. This has the greatest effect on organisms in which trophic level? _____.
85. _____ is caused by humans moving farther and farther out from major cities.
86. Loss of forests is called _____. It causes soil _____, habitat _____, and global _____.

Cells

87. The invention of _____ led to the discovery of cells.

88. Which two parts of the microscope magnify objects?

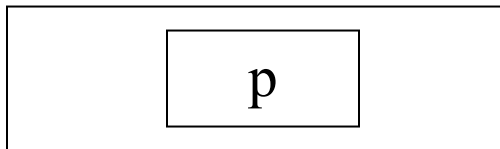
_____ and _____

89. Which part of the microscope moves the stage and objective lenses farther apart? _____

90. Which part of the microscope adjusts the amount of light that shines through your specimen? _____

91. Which part of the microscope is used to adjust the focus when you are using the high or medium objectives? _____

92. A slide of the letter 'p' is placed on the microscope as shown in the diagram below. How would it appear when the slide is viewed through the microscope?



93. Objects appear largest when viewed under _____ power. The field of view is largest under _____ power.

94. How do you calculate the total magnification of the microscope? _____

95. If the diameter of the field of view is 4 mm at low power and 8 cells fit across your field of view, how long is each cell? _____

96. Complete the chart below comparing prokaryotic cells and eukaryotic cells.

	Nucleus?	Cell wall?	Uni- or multicellular?	Examples
Prokaryote				
Eukaryote				

97. List three cell structure differences between plant and animal cells. _____

98. List three organelles involved in the synthesis, modification, and distribution of proteins in a cell. _____

List the cell organelle that

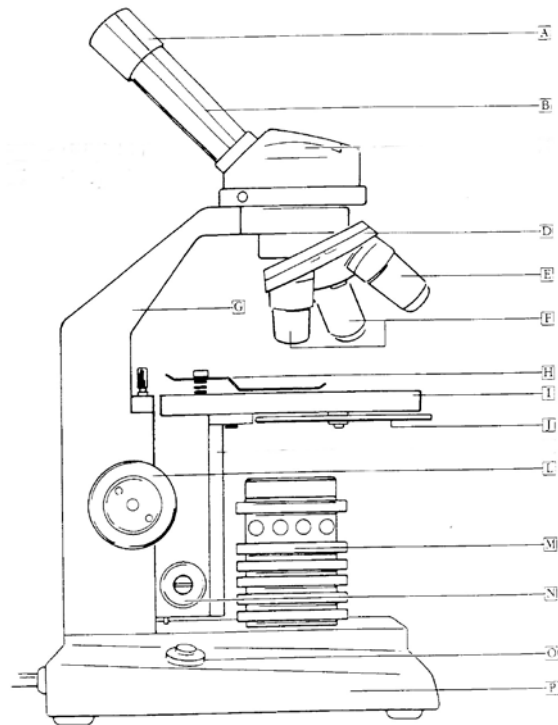
99. contains DNA _____ 100. uses energy from sun to make sugars _____

101. breaks down toxic substances _____ 102. releases energy from food _____

103. regulates what enters and leaves the cell _____

104. organizes the spindle during mitosis _____ 105. makes the ribosomes _____

106. In diffusion, molecules move from an area of _____ to an area of _____
 _____. Diffusion of water is called _____.



107. The cell membrane is called semi-permeable because _____.
108. Diffusion of molecules through a special protein channel is called _____.
109. Moving molecules such as hydrogen ions through a special channel from an area of low concentration to an area of high concentration is called _____ because it requires _____.
110. The solid substance that is dissolved in a solution is called _____. The liquid it is dissolved in is called _____.
111. When a cell is placed in fresh water, water will move _____ the cell, eventually causing the cell to _____. When a cell is placed in salt water, water will move _____ the cell, eventually causing the cell to _____.
112. Salt placed on grass and other plants causes cells to _____ water.
113. Cells can engulf large food particles during a process called _____. They release particles in a process called _____.
114. As a cell grows, its _____ gets larger faster than its _____. As a result, large cells face two problems:
 a. _____
 b. _____
115. The cell cycle is divided into two main phases: _____ and _____. During which phase does the cell grow and prepare to divide? _____
116. Draw a chromosome. Label the sister chromatids and the centromere.

During which phase of mitosis

117. does the spindle form? _____
118. do the chromosomes line up at the middle? _____
119. do chromosomes condense? _____
120. do two new nuclei form? _____
121. do the chromatids separate? _____
122. does the cytoplasm split? _____
123. If a cell contains 12 chromosomes, how many chromosomes will each of its daughter cells contain after it divides? _____
124. Cell growth is normally regulated by a.) contact with _____ (hint: think of cells in a Petri dish) and b.) chemicals called _____.
125. Cancer is a disorder in which some cells _____.
126. The structure of DNA is called a double _____. It was discovered by _____ and _____.
127. The function of DNA is to _____.
128. In DNA, _____ always pairs with T, and _____ always pairs with G, so the two strands are called _____.
129. Describe how DNA replicates: _____

During DNA replication, what happens to the two strands from the original DNA molecule? _____

130. Write the overall chemical equation for photosynthesis:

131. In which organelle does photosynthesis take place? _____

132. List the two sets of reactions that occur during photosynthesis, and the location, reactants, and products of each.

Reactions	Location	Reactants	Products

133. If carbon dioxide were removed from a plant's environment, how would that affect photosynthesis? _____

134. Why are plants green? _____

135. How is energy released from ATP? _____

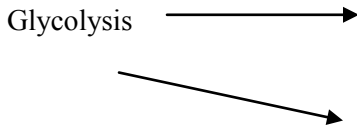
How is energy stored in ATP? _____

136. Calories measure _____.

137. The process of releasing energy from food molecules is called _____ and occurs in the _____.

138. Write the overall chemical equation for cellular respiration:

139. Draw a flow chart showing the reactions involved in breaking down food when oxygen is present and when oxygen is absent.



140. Cellular respiration reactions that require oxygen are called _____. What is the oxygen needed for?

141. What happens to the NAD⁺ produced during fermentation? _____

142. What happens to the NADH and FADH₂ produced during the Krebs cycle? _____

143. What is ATP used for? _____

144. Why do you breathe heavily after sprinting or lifting weights? _____

145. What causes your muscles to be sore after sprinting? _____