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**GUIDED STUDY WORKSHEET CHAPTER 1: The Study of Life**

1. Biology is \_The study of life, and so far, life is restricted to the planet Earth.

2. What is the scientific method is a method of research with defined steps that include experiments and careful observation.

3. A suggested explanation for an event, which can be tested, is called a(n):scientific method.

4. A tested and confirmed explanation for observed phenomena is called a(n): scientific theory.

5. Science may also be defined as fields of study that attempt to comprehend the nature of the universe.

6. What is the definition of natural sciences and what do they include? Natural science includes fields of science related to the physical world and it phenomena and processes.

***Scientific Reasoning***

7. Science and society are the driving forces for the development of science.

8. Inductive reasoning uses related observations to arrive at a general conclusion.

9. Deductive reasoning is the type of logic used in formal logic - based science.

10. Deductive reasoning uses a general principle or law to forecast specific results.

11. In deductive reasoning, the pattern of thinking moves in the opposite direction.

12. What is the goal of descriptive science? To understand the characteristics, properties and behaviors of a phenomenon.

13. What is the goal of hypothesis-based science? This goal is to use hypotheses as a foundation for experiments and studies, guiding researchers toward answers of insights about the world around us.

***The Scientific Method***

14. What scientist first documented the scientific method? Sir Frances Bacon.

15. The process starts with an observation which leads to a question.

16. What is the typical format of a prediction? If…then…

17. A valid hypothesis must be testable and should also be falsifiable meaning that experimental results can disprove it.

18. What distinguishes sciences from non-sciences? The testing of a hypothesis.

19. Any part of the experiment that can vary or change is called the variable.

20. What is the control group? A control group contains every feature that an experimental except it is not given the manipulation that the researcher hypothesizes.

21. Does rejecting one hypothesis mean that the other hypothesis is accepted. no

22. Deduction proceeds from the general to the particular.

23. What type of reasoning has occurred when scientists reach a general conclusion from a number of specific observations? Inductive reasoning

24. Decide if each of the following is an example of inductive (I) or deductive reasoning (D)  
 \_deductive All flying birds and insects have wings. Birds and insects flap their wings as they move through the air. Therefore, wings enable flight.

\_inductive Insects generally survive mild winters better than harsh ones. Therefore, insect pests will become more problematic if global temperatures increase.

Deductive Chromosomes, the carriers of DNA, separate into daughter cells during cell division. Therefore, each daughter cell will have the same chromosome set as the mother cell.

Inductive Animals as diverse as humans, insects, and wolves all exhibit social behavior. Therefore, social behavior must have an evolutionary advantage.

***Two Types of Science: Basic Science and Applied Science***

25. Scientists continually draw inferences and make generalizations looking for patterns in their research.

26. What is the goal of “basic science”, also known as pure science? It seeks to expand knowledge regardless of the short-term application of that knowledge.

27. What is the goal of “applied science?” To use science to solve real world problems.

28. What was the Human Genome Project? And when was it completed? A study in which researchers analyzed and mapped each human chromosome to determine the precise sequence of DNA subunits and each gene’s exact location. It was completed in 2003.

29. What is serendipity? This means by a fortunate accident or lucky surprise.

30. Scientists publish their research in peer-reviewed manuscripts which present their results in scientific journals.

31. A concise summary at the beginning of the scientific paper is called the abstract.

32. What other sections are included in a scientific paper (IMRaD)? Describe these sections. The introduction starts with a brief, but broad, background information about what is known in the field. The materials and methods section includes a complete and accurate description of the substances the researchers use. Then you have the results section which narrates the findings without any further interpretation. And then the discussion section. Where the researchers interpret the results and then finally the conclusion which summarizes the importance of the findings.

**Chapter 1.2: Themes and Concepts of Biology**

33. From the beginning biology has wrestled with three questions:

1- What are the shared properties that make something alive?

2- How do we find meaningful levels of organization in its structure?

3- How do we organize the different kinds of organisms so that we can better understand them?

34. Organisms share several key characteristics. List these 8 things and explain each.

Order-the organization of cells

Sensitivity or response to the environment-how they respond to stimuli

Reproduction- the ability to create another like oneself

Adaptation- the ability to change to survive

Growth and development-instruction provided by ones genes

Regulation/homeostasis-the ability to coordinate internal function

Energy processing- the ability to turn something into food

Evolution-the ability to change

35. What is homeostasis? The ability of an organism to maintain constant internal conditions

36. All organisms require energy for their metabolic processes.

37. What is the smallest and most fundamental unit of matter? Atom

38. What is the difference between a prokaryote and a eukaryote? Prokaryote lack organelles and a nuclei whereas eukaryote have these.

38. What is the true source of the diversity of life. Evolution

39. What is a phylogenetic tree? A diagram that show the evolutionary relationships among various biological species based on similarities and differences

40. Carl Woese proposed that life on earth evolved along three lineages, or domains. What are they?

Bacteria, archaea, and Eukarya

Woese used archaea rather than genetic relationships, and constructed his tree from universally distributor comparative gene sequencing.