Name: Date: Hour:

**2.1 Study Guide: Scientific Method**

**Multiple Choice**

*Identify the choice that best completes the statement or answers the question.*

\_1. For each investigation, the scientific method

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| a. | requires that the same set of procedures be followed. |
| b. | provides a logical set of procedures. |
| c. | is abandoned if there are unexpected results. |
| d. | helps to predict the results. |

\_\_\_\_ 2. All of the following are steps in the scientific method *except*

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| --- | --- |
| a. | observing and recording data. |
| b. | forming a hypothesis. |
| c. | discarding data inconsistent with the hypothesis. |
| d. | making predictions based on a theory. |

\_\_\_\_ 3. Which of the following observations is quantitative?

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| --- | --- | --- | --- |
| a. | The liquid turns blue litmus paper red. | c. | The liquid tastes bitter. |
| b. | The liquid boils at 100C. | d. | The liquid is cloudy. |

\_\_\_\_ 4. Which of the following observations is qualitative?

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| --- | --- |
| a. | A chemical reaction was complete in 2.3 seconds. |
| b. | The solid had a mass of 23.4 grams. |
| c. | The pH of a liquid was 5. |
| d. | Salt crystals formed as the liquid evaporated. |

\_\_\_\_ 5. A statement that can be tested experimentally is a

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| --- | --- | --- | --- |
| a. | variable. | c. | generalization. |
| b. | model. | d. | hypothesis. |

\_\_\_\_ 6. A theory is best described as a

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| a. | series of experimental observations. |
| b. | generalization that explains a body of known facts or phenomena. |
| c. | scientifically proven fact. |
| d. | testable statement. |

\_\_\_\_ 7. A theory is accepted as the explanation of an observed phenomenon until

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| a. | one study contradicts the theory. |
| b. | repeated observations conflict with the theory. |
| c. | a new method is discovered. |
| d. | a leading scientist declares that it is invalid. |

\_\_\_\_ 8. Which of these statements is true of the scientific method?

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| a. | The steps may vary somewhat to suit the experiment. |
| b. | Working scientists rarely use it. |
| c. | Scientists must follow its steps exactly. |
| d. | Scientists rarely publish results of experiments. |

\_\_\_\_ 9. In an experiment, onion plants of different ages were exposed to various amounts of caffeine to determine the effect of caffeine on cell growth. Temperature, amount of water, and light were kept constant. Which of these statements about the experiment is definitely true?

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| a. | The results may not be valid because there were two variables. |
| b. | The amount of caffeine used was a control. |
| c. | Temperature, water, and light were the only variables. |
| d. | Onion plants can be used to model the effects of caffeine on living things. |

\_\_\_\_ 10. Which of these is the variable in an experiment designed to determine whether steel rusts more quickly near a lake or in a desert in one year?

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| a. | amount of rust | c. | amount of water in the air |
| b. | time of exposure | d. | mass of the steel |

\_\_\_\_ 11. Which of these terms best describes the following statement?

“A solution of the unknown compound turned litmus paper blue.”

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| --- | --- | --- | --- |
| a. | hypothesis | c. | quantitative observation |
| b. | model | d. | qualitative observation |

\_\_\_\_ 12. An experiment is designed to measure the effect of global temperature increase on ocean levels. In this experiment, if the ocean level is compared to the average ocean level over the last 100 years, then the average ocean level over the last 100 years would be considered

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | a model. | b. | a variable. | c. | the hypothesis. | d. | the control. |

**Short Answer**

13. Explain the differences between qualitative and quantitative observations.

14. How does a theory differ from a hypothesis?

15. What is a model and what is the function of models in science?