**EOC Review: Nature of Science**

**Multiple Choice**

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

\_\_\_\_ 1. (EOC) Theory A is a well-established scientific theory. One hypothesis that could refute this

theory is successfully tested over many experiments. What action must be taken for

this hypothesis to pose a legitimate challenge to Theory A?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | collecting empirical data | c. | forming a question for an investigation |
| b. | publishing data for peer review | d. | turning the hypothesis into scientific law |

\_\_\_\_ 2. (EOC) A student came to class wanting to know if material from outer space was responsible for putting organisms on Earth. The teacher explained that this was **not** a scientific question because

|  |  |  |  |
| --- | --- | --- | --- |
| a. | it was not true. | c. | it was the best explanation. |
| b. | it could not be tested. | d. | it had already been proven to be wrong. |

\_\_\_\_ 3. (EOC) A company that produces pesticides conducts an experiment to test the effectiveness of their newest product. The scientist involved in the development of the pesticide is the one who will interpret the results. Why is this a problem?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | The pesticide could be made better  during the process. | c. | The scientist will not know how to make accurate observations. |
| b. | The results could be shared with a  competing company. | d. | The scientist may misinterpret the  results because he knows what should happen. |

\_\_\_\_ 4. (EOC) A hypothesis and a theory are related because

|  |  |  |  |
| --- | --- | --- | --- |
| a. | a theory is always used to develop a  hypothesis. | c. | the data collected when a hypothesis is tested can support a theory. |
| b. | they are both developed in the absence of observations. | d. | an experiment is done before the  formation of both a hypothesis and a  theory. |

\_\_\_\_ 5. (EOC) The data in the table below were collected forthree plants that were fertilized at the

beginning of an experiment.

**Height of Fertilized Plants (cm)**

|  |  |  |  |
| --- | --- | --- | --- |
| Day | Plant 1 | Plant 2 | Plant 3 |
| 1 | 10 | 12 | 10 |
| 2 | 20 | 20 | 15 |
| 3 | 29 | 33 | 31 |
| 4 | 39 | 41 | 41 |

What was the total growth of Plant 2 over the 13-day experiment?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | 26 | c. | 29 |
| b. | 27 | d. | 41 |

\_\_\_\_ 6. (EOC) Which field of biology has the fewest educational requirements?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | lab technician | c. | genetics researcher |
| b. | college professor | d. | biomedical engineer |

\_\_\_\_ 7. (EOC) A biology class conducted an experiment using five plants. The first plant received only water. The remaining plants received varying amounts of a liquid fertilizer added to their

water. The class wanted to know which plant would show the greatest amount of growth.

What is the control in this experiment?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | using two plants | c. | measuring plant growth |
| b. | giving one plant water | d. | giving one plant water with fertilizer |

\_\_\_\_ 8. (EOC) Ultrasound sonograms are used to provide images of unborn babies rather than x-ray photographs, because sonograms

|  |  |  |  |
| --- | --- | --- | --- |
| a. | provide clearer skeletal images. | c. | require much simpler technology. |
| b. | have the ability to record sound. | d. | do not produce harmful radiation. |

\_\_\_\_ 9. (EOC) Geneticists have learned that segments of DNA can be removed and replaced with different segments of DNA. What development can arise as a result of this knowledge?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | animals that can inherit acquired traits | c. | crops that can avoid passing genetic  traits to offspring |
| b. | crops that have more desirable genetic traits | d. | animals that can convert acquired traits into genetic ones |

\_\_\_\_ 10. (EOC) An archeological dig site is **most** likely the working environment of which kind of

biologist?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | ecologist | c. | paleontologist |
| b. | geneticist | d. | molecular biologist |

\_\_\_\_ 11. (EOC) What technology provides the **best** way to show the appearance of viruses?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | radio telescope | c. | ultrasound imaging |
| b. | x-ray photography | d. | electron microscope |

\_\_\_\_ 12. (EOC) There is a current controversy involving whether the United States government should drill for oil on a national wildlife refuge in Alaska. The opposing sides of this controversy can be described as

|  |  |  |  |
| --- | --- | --- | --- |
| a. | fossil-fuel power versus nuclear power. | c. | renewable-resource use versus  nonrenewable-resource use. |
| b. | economic benefit versus ecological  benefit. | d. | cheap, but weak, energy source versus expensive, but powerful, energy source. |

\_\_\_\_ 13. (EOC) Which is a **correct** guideline of science?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Hypotheses may or may not be testable. | c. | Scientific knowledge does not need peer review and verification before  acceptance. |
| b. | Explanations are based on observations, evidence, and testing. | d. | Understandings and/or conclusions will never change with additional empirical data. |

\_\_\_\_ 14. (EOC) A scientific study concluded that plants with red flowers are less likely to die in drought situations. Which statement about the study would be a reason for this conclusion to be biased?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | All plants received the same amount of rain water. | c. | Each plant’s growth was recorded at the same time every day. |
| b. | Many different types of plants were  tested in the study. | d. | Plants with red flowers were given morefertilizer than plants with other color flowers. |

\_\_\_\_ 15. (EOC) One problem with imposing heavy fines on businesses that do **not** meet legal or

environmental standards with their waste emissions, is that such actions may result in

|  |  |  |  |
| --- | --- | --- | --- |
| a. | political opposition from the business’ supporters. | c. | the businesses increasing their number  of employees. |
| b. | the businesses increasing their need for fossil fuels. | d. | prices of the services offered by the  businesses going down. |

\_\_\_\_ 16. (EOC) Which theory was **most** influential in the completion of the Human Genome Project?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | cell theory | c. | germ theory of disease |
| b. | theory of evolution | d. | chromosome theory of heredity |

\_\_\_\_ 17. (EOC) Biological evolution can be summarized as the change in

|  |  |  |  |
| --- | --- | --- | --- |
| a. | allele frequency in a population over time. | c. | allele frequency in a population over one generation. |
| b. | chromosome frequence in a population over time. | d. | chromosome frequency of a population in one generation. |

\_\_\_\_ 18. (EOC) A widely accepted scientific theory needs to be thoroughly revised when it is

|  |  |  |  |
| --- | --- | --- | --- |
| a. | refuted by a hypothesis. | c. | challenged by scientific data. |
| b. | supported by peer review. | d. | converted into a scientific law. |

\_\_\_\_ 19. (EOC) Which data set would be **most** appropriately represented by a line graph?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | data showing all the different uses of  timber | c. | data showing the number of students in biology class with red, blonde, and  brown hair |
| b. | data detailing the temperature of a  certain region over a three-month period | d. | data showing the number of students  who visited the doctor in the past month, broken down by age |

\_\_\_\_ 20. (EOC) The germ theory of disease has been used to develop vaccines. Which statement **best** supports this idea?

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| --- | --- | --- | --- |
| a. | Vaccines are rarely effective against the target pathogen. | c. | A vaccine can be made from compounds unrelated to the pathogen it is controlling. |
| b. | The flu vaccine is created using material from the virus that causes the flu. | d. | The vaccine for chicken pox is designedto protect an individual from related diseases. |

\_\_\_\_ 21. (EOC) Which statement is an example of a hypothesis?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | All living things are composed of cells. | c. | Based on this study, children who attend daycare have better test scores in elementary school. |
| b. | If fertilizer is given to plants, then those plants will grow faster than plants not given fertilizer. | d. | Because plants have two different  alleles, they can produce two different  types of gametes. |

\_\_\_\_ 22. (EOC) A plan to convert and burn unsold food as biological fuel can be environmentally

beneficial because it

|  |  |  |  |
| --- | --- | --- | --- |
| a. | restores wetlands. | c. | reduces air pollution. |
| b. | limits landfill use. | d. | decreases biodiversity. |

\_\_\_\_ 23. (EOC) In Calhoun County, Arkansas, a local timber company is now required to grow pine trees for 45 years before harvesting instead of the normal 20 years. This would increase

biodiversity in Calhoun County through the

|  |  |  |  |
| --- | --- | --- | --- |
| a. | reduction of pollution. | c. | elimination of extinction. |
| b. | preservation of habitats. | d. | simplification of food webs. |

\_\_\_\_ 24. (EOC) Which statement about theories is true when the theory is being discussed in general

conversation as compared to one that is considered a scientific theory?

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| --- | --- | --- | --- |
| a. | A general conversation theory is a guess or a hunch. | c. | A general conversation theory is a set of universal statements that explains some aspect of the natural world. |
| b. | A general conversation theory is held  with a high degree of confidence. | d. | A general conversation theory is  supported by enough physical evidence to make its abandonment unlikely. |

\_\_\_\_ 25. (EOC) In the 19th century, scientists observed that plants and animals were composed of

cells, and from this derived the cell theory. Today, cell biologists are making many new

discoveries about cells at the molecular level. What technology do both groups have in

common?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | the telescope | c. | the microscope |
| b. | sonic imaging | d. | x-ray photography |

\_\_\_\_ 26. (EOC) Scientists who research ways to make more effective fertilizer are applying knowledge from what pure-science concept?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | nitrogen cycle | c. | natural selection |
| b. | trait inheritance | d. | ecological competition |

\_\_\_\_ 27. (EOC) A scientific experiment is conducted to determine the effects of different levels of

caffeine on exercise performance. In this experiment, what are the levels of caffeine?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | the control | c. | the dependent variable |
| b. | the summary statistic | d. | the independent variable |

\_\_\_\_ 28. (EOC) Why is it important for a research company to evaluate its long-range plans concerning resource use and waste disposal?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | so that others will be able to repeat the company’s experiments | c. | so that the company is assured of its  technologies being wise investments |
| b. | so that any related research is guaranteed to be published | d. | so that the technologies used will have a minimum environmental impact |

\_\_\_\_ 29. (EOC) A biology class learns that a larger local highway system is planned, and it wants to

predict the effect on local wildflowers along the planned route. When should the flower

samples be counted?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | just after construction | c. | one year before construction |
| b. | during the construction | d. | before and after construction |

\_\_\_\_ 30. (EOC) What **most** likely resulted from advancements in DNA technology?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | genetic screening for disease | c. | relating structural similarities between organisms |
| b. | discovery of different blood types | d. | studying phenotypic traits between organisms |

\_\_\_\_ 31. (EOC) Which statement best describes how cell theory relates to a stem cell’s ability to change into specialized cell types?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Metabolism occurs in cells. | c. | Stem cells result from viral infections of healthy cells. |
| b. | Some organisms are unicellular. | d. | All cells in an organism have the same hereditary material. |

\_\_\_\_ 32. (EOC) MRSA, an antibiotic-resistant strain of bacteria, has recently become a problem in

some schools. How can the germ theory of disease **best** help schools contain an outbreak?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | by giving all students preventative  antibiotics | c. | by informing the public about the  symptoms of the infection |
| b. | by keeping all students home until the  bacteria disappear | d. | by disinfecting all surfaces daily and  having students wash hands regularly |

\_\_\_\_ 33. (EOC) A centrifuge is an effective tool for accomplishing which goal in the lab?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | separating blood plasma from blood  cells | c. | isolating a soluble impurity in a sample  of drinking water |
| b. | determining the molecular mass of a  substance | d. | measuring the heat released during a  biochemical reaction |

\_\_\_\_ 34. (EOC) The Internet offers many possibilities for science. What is the **most** effective way for

scientists to use the Internet?

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| --- | --- | --- | --- |
| a. | allowing students to give them feedback on their research | c. | staying current with new findings in the scientific community |
| b. | allowing the public to alter research  results to suit their needs | d. | using other scientists’ findings to fill in the weak points to their research |

\_\_\_\_ 35. (EOC) Which is the **best** description of a scientific law?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | a statement that identifies a specific  opinion | c. | a statement that explains why events will sometimes occur |
| b. | a statement that describes a pattern  observed in nature | d. | a statement that provides a clear  prediction that can be tested through  observation |

\_\_\_\_ 36. (EOC) Which statement **best** describes what happened after Darwin developed his theory

of evolution?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | It was made into a law. | c. | It was reviewed by peers for verification. |
| b. | It was automatically approved as fact. | d. | It was voted on by scientists to be  accepted or rejected. |

\_\_\_\_ 37. (EOC) A student is performing an investigation of the effects of fire on pine seedlings in a forest. The student conducts a study of ten plots that are burned annually. What is an appropriate control for this experiment?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | ten plowed plots | c. | ten unburned plots |
| b. | ten cleared plots | d. | ten herbicide-treated plots |

\_\_\_\_ 38. (EOC) Patients with a specific medical condition have been provided with a new device that

helps them manage their condition. The patients will be required to participate in a

survey regarding the usefulness of these devices. How can the manufacturer be certain

that no bias enters into the surveys?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | by paying the patients for their  participation | c. | by having a second, independent party conduct the survey |
| b. | by waiting until the survey is completed to sell the device | d. | by providing a toll-free number in case there are questions about the devices |

\_\_\_\_ 39. (EOC) Which statement **best** describes the mapping of the human genome?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | It has rejected the basic premise of cell theory. | c. | It has rejected the basic premise of the chromosome theory of heredity. |
| b. | It is built on a foundation reaching back to the germ theory of disease. | d. | It is built on a foundation reaching back to the chromosome theory of heredity. |

\_\_\_\_ 40. (EOC) How would the development of hybrid cars minimize the effects of human population

growth on the environment?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | by increasing noise pollution | c. | by decreasing dependence on fossil fuels |
| b. | by increasing smog pollution | d. | by decreasing the number of people on highways |

\_\_\_\_ 41. (EOC) The table below presents the results of an experiment testing the number of hours it took for several flowers to bloom.

|  |  |
| --- | --- |
| Flower | Hours |
| 1 | 24 |
| 2 | 28 |
| 3 | 27 |
| 4 | 24 |
| 5 | 30 |
| 6 | 29 |

What is the mode of these data?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | 24.0 | c. | 27.5 |
| b. | 27.0 | d. | 30.0 |

\_\_\_\_ 42. (EOC) Which technological advance has increased the exchange of scientific knowledge the **most** around the world?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | the Intenet | c. | the laptop computer |
| b. | the microscope | d. | the handheld calculator |

\_\_\_\_ 43. 43. (EOC) Which theory proposes that pathogenic microorganisms can invade other organisms and initiate an immune response?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | cell theory | c. | germ theory |
| b. | gene theory | d. | unifying theory |

\_\_\_\_ 44. (EOC) Gene therapy is the insertion of genes into cells to replace a defective gene in order to cure a disease or condition. Gene therapy is possible due to work done on developing

which of the following theories?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | cell theory | c. | evolutionary theory |
| b. | germ theory | d. | chromosome theory |

\_\_\_\_ 45. (EOC) Which science term represents a testable explanation of a natural phenomenon?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | law | c. | analysis |
| b. | theory | d. | inference |

\_\_\_\_ 46. (EOC) Under which condition might the theory of evolution be modified?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Additional empirical data shows natural selection occurring today. | c. | Peer review of Darwin’s earliest studies is published in a new journal. |
| b. | Scientists find data collected by a  scientist who lived before Darwin. | d. | Other studies on natural selection show new evidence about how it works. |

\_\_\_\_ 47. (EOC) People once believed that maggots were created from spoiled meat. Then, a scientist

hypothesized that flies laid eggs, which produced maggots on the meat. To test his

idea, he left pieces of meat out in covered and uncovered jars. What is the dependent

variable in his experiment?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | the type of meat | c. | the number of flies |
| b. | the size of jars | d. | the presence of maggots |

\_\_\_\_ 48. (EOC) During a lab investigation, a container is heated on a hot plate. Which is the safest way to check to see if the container is cool enough to be picked up?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Unplug the hot plate using tongs. | c. | Splash cold water on the container  before handling. |
| b. | Use the wafting technique to sense  temperature. | d. | Hold the back of one hand close to the container to sense the heat. |

\_\_\_\_ 49. (EOC) Which describes the difference between pure science and applied science?

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| --- | --- | --- | --- |
| a. | Pure science attempts to solve practical problems. | c. | Engineering would be an example of  pure science. |
| b. | Applied science attempts to solve  practical problems. | d. | Basic cell research would be an example of applied science. |

\_\_\_\_ 50. (EOC) Why is it important to design experiments that can be reproduced?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | to manipulate the data | c. | to control all of the variables |
| b. | to produce favorable results | d. | to ensure reliability of the conclusions |

\_\_\_\_ 51. (EOC) Which technology allows scientists to track bird migration patterns through Arkansas?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | clipping bird wings | c. | distributing bird-hunting licenses |
| b. | Capturing and banding birds | d. | following bird flocks with helicopters or airplanes |

\_\_\_\_ 52. (EOC) What could cause a scientific theory to be changed?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | data analysis on the most recent  investigation | c. | a presentation of current thoughts by  leading scientists |
| b. | discovery of flaws in the original data  collection | d. | a documentary produced and distributed by a scientific organization |

\_\_\_\_ 53. (EOC) Which technology was specifically developed to lessen the effects of human population growth on the environment?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | hybrid cars | c. | stem cell research |
| b. | medical forensics | d. | digital video and television |

\_\_\_\_ 54. (EOC) Laboratory instructions require students to assemble a measuring device containing

many small parts and springs. Which piece of safety equipment would be required in this

investigation?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | apron | c. | lab coat |
| b. | gloves | d. | safety glasses |

\_\_\_\_ 55. Which is **not** a component of the cell theory?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | All living things are made of cells. | c. | All cells have nuclei. |
| b. | Cells are the basic units of organisms. | d. | Cells come only from existing cells. |

\_\_\_\_ 56. The theory that states that genes are located on chromosomes and that each gene occupies a specific place on a chromosome is

|  |  |  |  |
| --- | --- | --- | --- |
| a. | cell theory | c. | chromosome theory of heredity |
| b. | theory of evolution | d. | germ theory of disease |

\_\_\_\_ 57. The set of criteria used to establish that a particular infectious agent causes a disease is based off of

|  |  |  |  |
| --- | --- | --- | --- |
| a. | the chromosome theory of heredity | c. | the theory of evolution |
| b. | the germ theory of disease | d. | the cell theory |

\_\_\_\_ 58. The study of biochemical and molecular interactions within living cells is called

|  |  |  |  |
| --- | --- | --- | --- |
| a. | molecular genetics | c. | paleontology |
| b. | molecular biology | d. | evolutionary biology |

\_\_\_\_ 59. The branch of genetics that deals with the expression of genes by studying the DNA sequences of chromosomes

|  |  |  |  |
| --- | --- | --- | --- |
| a. | molecular genetics | c. | ecology |
| b. | molecular biology | d. | cell biology |

**EOC Review: Nature of Science**

**Answer Section**

**MULTIPLE CHOICE**

1. ANS: B PTS: 1

2. ANS: B PTS: 1

3. ANS: D PTS: 1

4. ANS: C PTS: 1

5. ANS: C PTS: 1

6. ANS: A PTS: 1

7. ANS: B PTS: 1

8. ANS: D PTS: 1

9. ANS: B PTS: 1

10. ANS: C PTS: 1

11. ANS: D PTS: 1

12. ANS: B PTS: 1

13. ANS: B PTS: 1

14. ANS: D PTS: 1

15. ANS: A PTS: 1

16. ANS: D PTS: 1

17. ANS: A PTS: 1

18. ANS: C PTS: 1

19. ANS: B PTS: 1

20. ANS: B PTS: 1

21. ANS: B PTS: 1

22. ANS: B PTS: 1

23. ANS: B PTS: 1

24. ANS: A PTS: 1

25. ANS: C PTS: 1

26. ANS: A PTS: 1

27. ANS: D PTS: 1

28. ANS: D PTS: 1

29. ANS: D PTS: 1

30. ANS: A PTS: 1

31. ANS: D PTS: 1

32. ANS: D PTS: 1

33. ANS: A PTS: 1

34. ANS: C PTS: 1

35. ANS: B PTS: 1

36. ANS: C PTS: 1

37. ANS: C PTS: 1

38. ANS: C PTS: 1

39. ANS: D PTS: 1

40. ANS: C PTS: 1

41. ANS: A PTS: 1

42. ANS: A PTS: 1

43. ANS: C PTS: 1

44. ANS: D PTS: 1

45. ANS: B PTS: 1

46. ANS: D PTS: 1

47. ANS: D PTS: 1

48. ANS: D PTS: 1

49. ANS: B PTS: 1

50. ANS: D PTS: 1

51. ANS: B PTS: 1

52. ANS: B PTS: 1

53. ANS: A PTS: 1

54. ANS: D PTS: 1

55. ANS: C PTS: 1

56. ANS: C PTS: 1

57. ANS: B PTS: 1

58. ANS: B PTS: 1

59. ANS: A PTS: 1