Test Bank for Exploring Biology in the Laboratory 3rd Edition by Pendarvis

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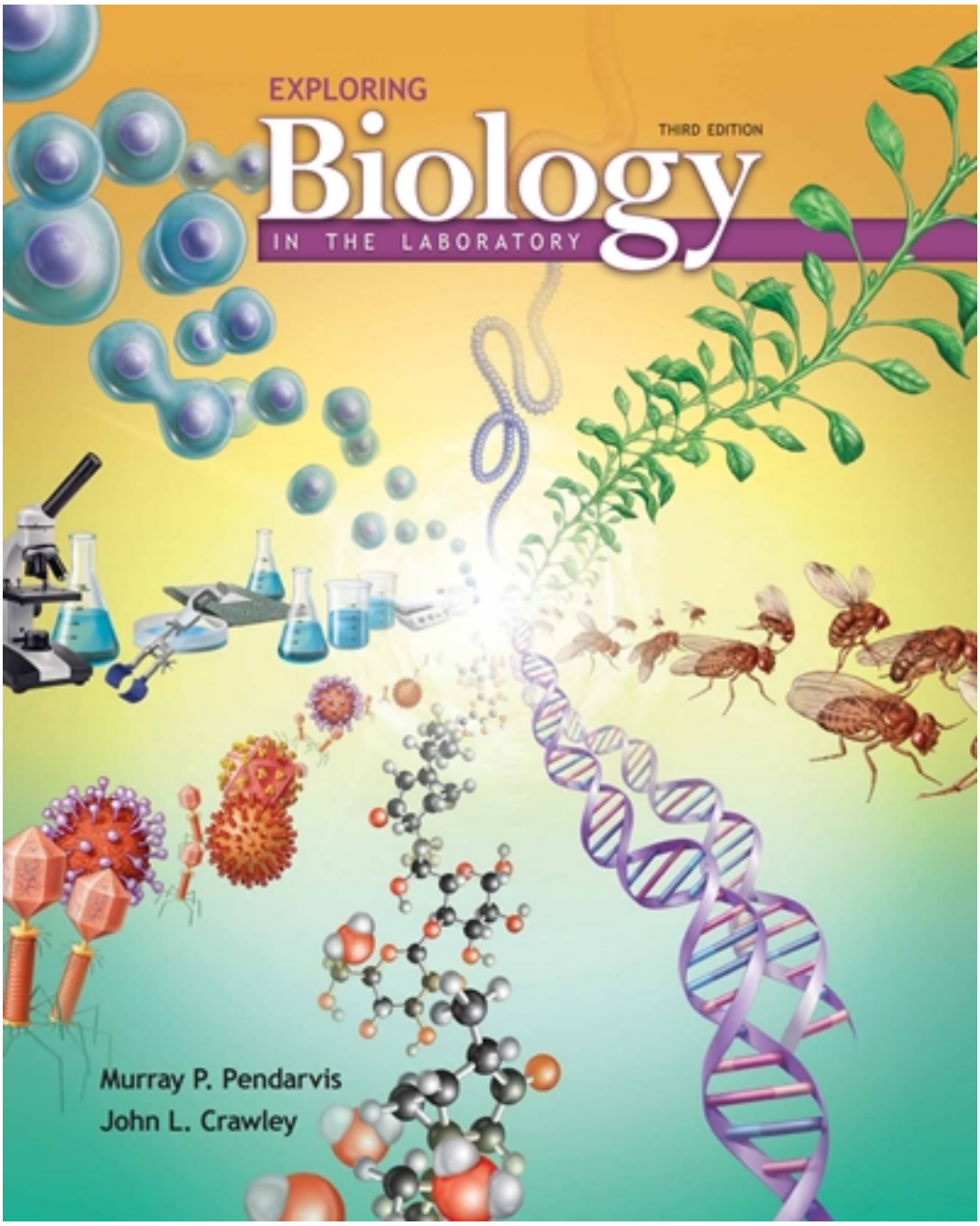

Test Bank

Chapter 1 The Starting Point: Understanding the Scientific Method

1. Short answer: Describe characteristics and the role of different members of the termite society.

   ANS:
   The vast majority of members in a termite colony are wingless, sterile, and blind workers. They are milky white in color and possess hard-chewing mouth parts. Workers look after the eggs and nymphs, feed the soldiers and reproductive forms, build and maintain the colony, and forage for food. The workers are responsible for the telltale signs of termite damage. Soldiers are also wingless, sterile, and blind. This caste has a milky-white body with a yellowish-brown head and prominent mandibles. Soldiers defend the colony, mostly from ants. The reproductives, also called the royal caste, consist of the king and queen. Their only function is to reproduce. The royal caste is dark brown in color and has functional eyes. The queen seems to be striped because the segments of her abdomen are distended. Swarming termites are called alates or swarmers. They are winged reproductives that eventually establish new nests.

   PTS: 1 REF: Ex. 1.1 Check Your Understanding
   TOP: Chapter 1 Assessment

2. Short answer: Termites use pheromones for communication. Give several alternate examples for the use of pheromones.

   ANS:
   Specific pheromones are used in mating, producing an alarm, keeping nymphs from forming reproductive castes, and establishing a trail. Termites use the trail hormones when they are attempting to lure other termites to follow them to a food source or other region of interest.

   PTS: 1 REF: Ex. 1.1 Check Your Understanding
   TOP: Chapter 1 Assessment

3. Short answer: Restate your hypothesis. Was your hypothesis rejected or accepted? Why?

   ANS:
   This answer will vary. The majority of students will state, “As the temperature decreases, the breathing rate of goldfish will decrease.”

   PTS: 1 REF: Ex. 1.2 Check Your Understanding
   TOP: Chapter 1 Assessment

4. Short answer: Discuss how your group’s results compared with the results of the entire class.

   ANS:
   This answer will vary.

   PTS: 1 REF: Ex. 1.2 Check Your Understanding
   TOP: Chapter 1 Assessment

5. Short answer: Discuss how the theme of the goldfish experiment can apply to the natural world and the care of aquatic animals.

   ANS:
   The basic scheme could be applied to how fish respond to changes of temperature in the natural world. It could also be applied to the transport of goldfish from distributors.

   PTS: 1 REF: Ex. 1.2 Check Your Understanding
   TOP: Chapter 1 Assessment

6. Short answer: List some possible sources of error in this experiment.

   ANS:
   Misreading the thermometer, not accurately counting the goldfish breaths, and not allowing sufficient time between trials.

   PTS: 1 REF: Ex. 1.2 Check Your Understanding
   TOP: Chapter 1 Assessment

7. Define osmosis.
   a. The diffusion of water across a semipermeable membrane from regions of lesser concentration to regions of greater concentration.
   b. The diffusion of water across a semipermeable membrane from regions of greater concentration to regions of lesser concentration.
   c. The random movement of molecules from regions of greater concentration to regions of lesser concentration.
   d. The process by which carrier proteins carry specific molecules across the cell membrane.
   e. The process by which hydrostatic pressure forces molecules through a cell membrane.

   ANS: B PTS: 1 REF: Ex. 1.3 Check Your Understanding
   TOP: Chapter 1 Assessment

8. Fill in the blank: In a typical solution, the _____ is the dissolving medium and the _____ is the substance dissolved.

   To receive points, you must separate your answers with a comma and a space (e.g., first answer, second answer).

   ANS: solvent, solute

   PTS: 1 REF: Ex. 1.3 Check Your Understanding
   TOP: Chapter 1 Assessment

9. Define isotonic solution.
   a. There is a higher concentration of solute relative to the inside of the gummy bear.
   b. The amount of solute in the gummy bear is equal to the amount of solute in the solution.

c. There is a lower concentration of solute relative to the inside of the gummy bear.
d. None of the above.

ANS: B PTS: 1 REF: Ex. 1.3 Check Your Understanding
TOP: Chapter 1 Assessment

10. Define hypotonic solution.
a. There is a higher concentration of solute relative to the inside of the gummy bear.
b. The amount of solute in the gummy bear is equal to the amount of solute in the solution.
c. There is a lower concentration of solute relative to the inside of the gummy bear.
d. None of the above.

ANS: C PTS: 1 REF: Ex. 1.3 Check Your Understanding
TOP: Chapter 1 Assessment

11. Define hypertonic solution.
a. There is a higher concentration of solute relative to the inside of the gummy bear.
b. The amount of solute in the gummy bear is equal to the amount of solute in the solution.
c. There is a lower concentration of solute relative to the inside of the gummy bear.
d. None of the above.

ANS: A PTS: 1 REF: Ex. 1.3 Check Your Understanding
TOP: Chapter 1 Assessment

12. Identify the independent and dependent variables in this activity.
a. Independent variable: change in gummy bear. Dependent variable: size of gummy bear.
b. Independent variable: size of gummy bear. Dependent variable: change in gummy bear.
c. Independent variable: change in gummy bear. Dependent variable: solution.
d. Independent variable: solution. Dependent variable: change in gummy bear.

ANS: D PTS: 1 REF: Ex. 1.3 Check Your Understanding
TOP: Chapter 1 Assessment

13. Which are control variables from this activity? Select all that apply.
a. Temperature.
b. Change in gummy bear.
c. Size of gummy bear.
d. Solution.
e. Water source.

ANS: A, C, E PTS: 1 REF: Ex. 1.3 Check Your Understanding
TOP: Chapter 1 Assessment

14. As the result of the experiment, was the gummy bear placed in tap water in an isotonic, hypotonic, or hypertonic solution? How do you know?
a. Isotonic. There were no notable changes.
b. It decreased in size and mass.

c. It increased in size and mass.
d. None of the above.

ANS: A PTS: 1 REF: Ex. 1.3 Check Your Understanding
TOP: Chapter 1 Assessment

15. What happened to the volume and mass of the gummy bears placed in a hypotonic solution?
a. Isotonic. There were no notable changes.
b. It decreased in size and mass.
c. It increased in size and mass.
d. None of the above.

ANS: C PTS: 1 REF: Ex. 1.3 Check Your Understanding
TOP: Chapter 1 Assessment

16. What happened to the volume and mass of the gummy bears placed in a hypertonic solution?
a. Isotonic. There were no notable changes.
b. It decreased in size and mass.
c. It increased in size and mass.
d. None of the above.

ANS: B PTS: 1 REF: Ex. 1.3 Check Your Understanding
TOP: Chapter 1 Assessment

Match the color and consistency of the gummy bears with the solution in which they were placed.
a. Tap water
b. Salt water
c. Distilled water

17. Gummy bear became less dense and lighter in color.
18. Gummy bear became more dense and darker in color.
19. No major changes.

17. ANS: C PTS: 1 REF: Ex. 1.3 Check Your Understanding
TOP: Chapter 1 Assessment
18. ANS: B PTS: 1 REF: Ex. 1.3 Check Your Understanding
TOP: Chapter 1 Assessment
19. ANS: A PTS: 1 REF: Ex. 1.3 Check Your Understanding
TOP: Chapter 1 Assessment
20. Describe the characteristics of science.
a. Science is based upon observations that incorporate our senses, or instruments that extend our senses, to interpret natural phenomena.
b. Science is a search for irregularities.
c. After observations have been recorded about irregularities in nature, scientists must process information.
d. Science is a self-correcting process in which previously existing concepts can be expanded, modified, or replaced if necessary.
e. Both a and c are correct.

f. Both a and d are correct.

ANS: F PTS: 1 REF: Chapter 1 Review
TOP: Chapter 1 Assessment

21. Short answer: Why is science considered a unified endeavor?

ANS:
Science is an organized body of knowledge that attempts to describe how the universe works.

PTS: 1 TOP: Chapter 1 Assessment

22. Short answer: Compare and contrast science and technology.

ANS:
Science is a tool that allows us to comprehend natural phenomena, while technology is the application of science.

PTS: 1 REF: Chapter 1 Review
TOP: Chapter 1 Assessment

23. Short answer: What did Sir Isaac Newton mean when he stated, “If I have seen a little further, it is by standing on the shoulders of giants”?

ANS:
Scientists build upon the knowledge gained from their predecessors.

PTS: 1 REF: Chapter 1 Review
TOP: Chapter 1 Assessment

24. What could be done to improve scientific attitudes and education in our nation?
a. Emphasize the three aspects of science.
b. Engage students in the wonders of science.
c. Encourage students to participate in student research.
d. All of the above are correct.

ANS: D PTS: 1 REF: Chapter 1 Review
TOP: Chapter 1 Assessment

25. Which are characteristics of a well-designed experiment? Select all that apply.
a. It includes a valid hypothesis.
b. It identifies the control, independent, and dependent variables.
c. It should include one trial.
d. It should be repeatable and testable.

ANS: A, B, D PTS: 1 REF: Chapter 1 Review
TOP: Chapter 1 Assessment

26. You are doing an experiment designed to test the effects of outboard motor oil on the growth of algae. Identify the control. Select all that might apply.
    a. Brand of outboard motor oil
    b. Concentration of outboard motor oil
    c. Temperature
    d. Species of algae
    e. Growth of algae

    ANS: A, C, D PTS: 1 REF: Chapter 1 Review
    TOP: Chapter 1 Assessment

27. You are doing an experiment designed to test the effects of outboard motor oil on the growth of algae. Identify the independent variable.
    a. Brand of outboard motor oil
    b. Concentration of outboard motor oil
    c. Temperature
    d. Species of algae
    e. Growth of algae

    ANS: B PTS: 1 REF: Chapter 1 Review
    TOP: Chapter 1 Assessment

28. You are doing an experiment designed to test the effects of outboard motor oil on the growth of algae. Identify the dependent variable.
    a. Brand of outboard motor oil
    b. Concentration of outboard motor oil
    c. Temperature
    d. Species of algae
    e. Growth of algae

    ANS: E PTS: 1 REF: Chapter 1 Review
    TOP: Chapter 1 Assessment

29. Short answer: You are doing an experiment designed to test the effects of outboard motor oil on the growth of algae. What is an appropriate simple hypothesis?

    ANS:
    As the concentration of outboard motor oil increases, the growth rate of algae will decrease.

    PTS: 1 TOP: Chapter 1 Assessment

30. Short answer: The term *theory* is often used in everyday life, yet the scientific method involves the formulation of hypotheses. Describe how the term *theory* is misused in everyday life.

    ANS:
    In common vernacular, the statement, “Oh, it’s just a theory,” suggests that something is nothing more than a guess. In science, theories are not guesses. They stand on their own accord and represent the current well-supported explanation of some aspect of the natural world.

PTS: 1 REF: Chapter 1 Review
TOP: Chapter 1 Assessment

31. Short answer: Why is there no room for superstition and mysticism in science?

ANS:
Superstition and mysticism result in misunderstanding, prejudice, and a disregard for logical explanations.

PTS: 1 REF: Chapter 1 Review
TOP: Chapter 1 Assessment

32. Short answer: Why is a fundamental knowledge of biology necessary for all people?

ANS:
Learned citizens must be able to understand basic principles of biology to be wise voters and function in society.

PTS: 1 REF: Chapter 1 Review
TOP: Chapter 1 Assessment

33. Which of the following is NOT one of the fundamental characteristics of science?
a. Involves processing information.
b. Is based on observations that incorporate the senses.
c. Involves a search for irregularities.
d. Is an ongoing, active process.

ANS: C PTS: 1 DIF: Easy
TOP: Chapter 1 Supplemental

34. If you wanted to learn about the composition of the universe, you would study _____.
a. chemistry
b. biology
c. zoology
d. meteorology

ANS: A PTS: 1 DIF: Easy
TOP: Chapter 1 Supplemental

35. Physiology is the study of _____, hematology is the study of _____, and histology is the study of _____.
a. structure, blood, tissues
b. function, blood, tissues
c. function, tissues, blood
d. structure, tissues, blood

ANS: B PTS: 1 DIF: Easy
TOP: Chapter 1 Supplemental

36. Which of the following traits is indicative of an unscientific attitude?
    a. Persistence.
    b. Superstition.
    c. Open-mindedness.
    d. Curiosity.

    ANS: B PTS: 1 DIF: Easy
    TOP: Chapter 1 Supplemental

37. Which of the following is a scientific concept?
    a. DNA synthesis.
    b. Observation.
    c. Classification.
    d. All of the above.

    ANS: A PTS: 1 DIF: Easy
    TOP: Chapter 1 Supplemental

38. Determining the quantitative relationships among data involves which of the following scientific processes?
    a. Classifying.
    b. Inferring.
    c. Measuring.
    d. Using numbers.

    ANS: D PTS: 1 DIF: Easy
    TOP: Chapter 1 Supplemental

39. The fundamental core of scientific content knowledge consists of _____.
    a. concepts
    b. generalizations
    c. facts
    d. all of the above

    ANS: D PTS: 1 DIF: Easy
    TOP: Chapter 1 Supplemental

40. A useful hypothesis is _____.
    a. an operational definition
    b. an analysis of test results
    c. a testable statement
    d. an observation

    ANS: C PTS: 1 DIF: Easy
    TOP: Chapter 1 Supplemental

41. A(n) _____ hypothesis states that there is no relationship between an independent and dependent variable.
    a. unsupported
    b. positive
    c. alternate

d. null

ANS: D PTS: 1 DIF: Easy
TOP: Chapter 1 Supplemental

42. The scientific method includes all of the following EXCEPT _____.
a. theories
b. observation
c. predictions
d. hypotheses

ANS: A PTS: 1 DIF: Easy
TOP: Chapter 1 Supplemental

43. In an experiment, which of the following variables is used as a baseline for comparison?
a. Control.
b. Dependent.
c. Independent.
d. Responding.

ANS: A PTS: 1 DIF: Easy
TOP: Chapter 1 Supplemental

44. A theory is _____.
a. the same thing as a hypothesis
b. an idea unconfirmed by evidence
c. an idea on which experts in the field agree
d. nothing more than an educated guess

ANS: C PTS: 1 DIF: Easy
TOP: Chapter 1 Supplemental

45. In conducting an experiment, a scientist follows a process of scientific inquiry that includes which of the following?
a. Communicating.
b. Inferring.
c. Predicting.
d. All of the above.

ANS: D PTS: 1 DIF: Easy
TOP: Chapter 1 Supplemental

46. The fact that we no longer believe the earth is flat attests to the fact that science is a(n) _____ process.
a. unpredictable
b. self-correcting
c. mystical
d. contradictory

ANS: B PTS: 1 DIF: Medium
TOP: Chapter 1 Supplemental

47. Your study data show that teenage drivers cause 30% more car accidents than adults over the age of 25, so you _____ that high schools need better driver education programs.
    a. infer
    b. predict
    c. rationalize
    d. hypothesize

    ANS: A PTS: 1 DIF: Medium
    TOP: Chapter 1 Supplemental

48. When you say that the earth orbits the sun, you are _____.
    a. refuting a long-held belief
    b. explaining a scientific concept
    c. making a generalization
    d. stating a scientific fact

    ANS: D PTS: 1 DIF: Medium
    TOP: Chapter 1 Supplemental

49. What steps do investigators take before forming a hypothesis?
    a. Collect information.
    b. Use prior knowledge.
    c. Draw conclusions.
    d. All of the above.
    e. A and B only.

    ANS: E PTS: 1 DIF: Medium
    TOP: Chapter 1 Supplemental

50. Which of the following is an example of technology?
    a. Conducting a laboratory experiment.
    b. Making a scientific discovery.
    c. Observing the stars through a telescope.
    d. Drilling for oil and gas.

    ANS: D PTS: 1 DIF: Medium
    TOP: Chapter 1 Supplemental

51. Which of the following is a scientific process, rather than a concept?
    a. Observation.
    b. Photosynthesis.
    c. Camouflage.
    d. DNA.

    ANS: A PTS: 1 DIF: Medium
    TOP: Chapter 1 Supplemental

52. After completing a controlled experiment, a scientist changes the dosage of an antibiotic and repeats the experiment. The change in dosage is the _____.
    a. independent variable
    b. dependent variable

c. constant
d. control

ANS: A PTS: 1 DIF: Medium
TOP: Chapter 1 Supplemental

53. The function of a hypothesis is to _____.
a. identify the dependent variable
b. provide direction for interpreting data
c. provide direction for gathering data
d. predict the likely outcome of an experiment

ANS: C PTS: 1 DIF: Medium
TOP: Chapter 1 Supplemental

54. Termites are social insects; therefore, communication is essential to their well-being. How do they communicate?
a. Use chemicals known as pheromones.
b. Use visual signals.
c. Use chemicals similar to ants.
d. A and B.

ANS: A PTS: 1 DIF: Medium
TOP: Chapter 1 Supplemental

55. The correct hypothesis for a study to measure the effectiveness of a pesticide in eradicating a specific mold infecting a crop is that if the pesticide is administered, then the mold will _____.
a. be eradicated.
b. not be eradicated.
c. get worse.
d. kill the crops.

ANS: A PTS: 1 DIF: Medium
TOP: Chapter 1 Supplemental

56. Results of a clinical trial demonstrated that an antibiotic eradicated the infection in 98% of the study subjects. Therefore, you _____.
a. construct another hypothesis
b. collect additional data
c. conclude that the antibiotic is highly effective
d. re-evaluate your results

ANS: C PTS: 1 DIF: Medium
TOP: Chapter 1 Supplemental

57. Which of the following is NOT involved in the process of interpreting data?
a. Classifying.
b. Communicating.
c. Predicting.
d. Inferring.

ANS: A PTS: 1 DIF: Hard
TOP: Chapter 1 Supplemental

58. Which of the following statements is a scientific generalization?
a. Antibodies are produced when a virus invades the body.
b. Red blood cells carry oxygen in the blood.
c. Many birds migrate south for the winter.
d. The sun rises in the east and sets in the west.

ANS: C PTS: 1 DIF: Hard
TOP: Chapter 1 Supplemental

59. You design a clinical trial with human subjects to evaluate the efficacy of an antibiotic in eradicating a bacterial infection. Which of the following would be used as the control in this study?
a. Two different dosages.
b. A placebo (inactive substance).
c. No treatment.
d. All of the above.
e. B and C only.

ANS: E PTS: 1 DIF: Hard
TOP: Chapter 1 Supplemental

60. In a clinical study to measure the effectiveness of an antibiotic, which of the following is the independent variable?
a. The number of patients enrolled in the study.
b. The antibiotic being tested.
c. The control.
d. The infection.

ANS: B PTS: 1 DIF: Hard
TOP: Chapter 1 Supplemental

61. If a study fails to produce the expected results, you would _____.
a. collect additional data
b. conclude that your hypothesis is not supported
c. continue observing and asking questions
d. conduct the study with other patients

ANS: B PTS: 1 DIF: Hard
TOP: Chapter 1 Supplemental

62. You are a public health researcher who wants to conduct a study of the prevalence of a disease in a rural village in India. To define this study operationally, you would specify the _____.
a. study population
b. drugs available to treat the disease
c. cause of the disease
d. number of people who have died from the disease

ANS: A PTS: 1 DIF: Hard
TOP: Chapter 1 Supplemental