Appendix C

Answers to Selected End-of-Chapter *Exercises*

Chapter 1

1. a) fringe
   b) core
   c) fringe
   d) frontier/core
   e) frontier
   f) fringe

2. A hypothesis is a tentative explanation. It allows you to make predictions that can be tested. A theory is an explanation that has been repeatedly tested and has been modified to account for all observed results.

3. A scientific theory provides an explanation for reported observations. A scientific law summarizes the results of repeated observations. It indicates what happens but does not offer an explanation as to why.

4. observation → hypothesis → predictions → experiment → theory

5. A meaningful hypothesis is normally only possible after one makes numerous observations or has extensive knowledge about a particular situation. An elementary school student generally has neither.

6. a) none of these
   b) observation
   c) hypothesis
   d) none of these
   e) theory

7. E

8. a) law
   b) theory
   c) observations
   d) law
   e) theory

9. Agree. A theory is a well-tested explanation. An individual scientist can propose a hypothesis, but it must be tested by others in order to be accepted as a theory.

10. D

11. As you vary a particular quantity and look for its effect you keep all other variables the same.

12. a) Maintain a fish population that is not exposed to significant amounts of UV light.

    b) Variables include: species/gender/age/health and number of fish, feeding schedule, water temperature, acidity and aeration, aquarium cleaning schedule, type and number of any plants, size of tank and water volume, amount of visible light exposure, amount of UV light exposure.

13. pseudoscience

14. a) $y = (x^2 - a - b)^{1/2}$

    b) $y = \dfrac{1}{29 - 2x}$

15. The independent variable is age (it does not depend on your height) and should be plotted on the x-axis.

16. 312 g/in^3