

***Biology for AP Courses 1st edition Zedalis Solutions
Manual***

SKU: 9781947172401-SOLUTIONS

Table of Contents – Part 1

1 The Study of Life	1
Review Questions	1
Critical Thinking Questions	4
Test Prep for AP® Courses	6
2 The Chemical Foundation of Life.....	9
Review Questions	9
Critical Thinking Questions	14
Test Prep for AP® Courses	18
Science Practice Challenge Questions	20
3 Biological Macromolecules	25
Review Questions	25
Critical Thinking Questions	34
Test Prep for AP® Courses	41
Science Practice Challenge Questions	48
4 Cell Structure	59
Review Questions	59
Critical Thinking Questions	66
Test Prep for AP® Courses	72
Science Practice Challenge Questions	77
5 Structure and Function of Plasma Membranes	86
Review Questions	86
Critical Thinking Questions	90
Test Prep for AP® Courses	96
Science Practice Challenge Questions	101

Advanced Placement Biology Instructor's Solution Manual

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6 Metabolism	106
Review Questions	106
Critical Thinking Questions	115
Test Prep for AP® Courses	122
Science Practice Challenge Questions	126
7 Cellular Respiration	137
Review Questions	137
Critical Thinking Questions	144
Test Prep for AP® Courses	150
Science Practice Challenge Questions	156
8 Photosynthesis.....	164
Review Questions	164
Critical Thinking Questions	169
Test Prep for AP® Courses	174
Science Practice Challenge Questions	180
9 Cell Communication	187
Review Questions	187
Critical Thinking Questions	192
Test Prep for AP® Courses	198
Science Practice Challenge Questions	202
10 Cell Reproduction.....	209
Review Questions	209
Critical Thinking Questions	214

Test Prep for AP® Courses	218
Science Practice Challenge Questions	226
11 Meiosis and Sexual Reproduction	230
Review Questions	230
Critical Thinking Questions	233
Test Prep for AP® Courses	238
Science Practice Challenge Questions	
12 Mendel's Experiments and Heredity	241
Review Questions	241
Critical Thinking Questions	247
Test Prep for AP® Courses	250
Science Practice Challenge Questions	255
13 Modern Understandings of Inheritance	266
Review Questions	266
Critical Thinking Questions	269
Test Prep for AP® Courses	271
Science Practice Challenge Questions	276
14 DNA Structure and Function	281
Review Questions	281
Critical Thinking Questions	291
Test Prep for AP® Courses	303
Science Practice Challenge Questions	312
15 Genes and Proteins	320
Review Questions	320
Critical Thinking Questions	326

Test Prep for AP® Courses	332
Science Practice Challenge Questions	336
16 Gene Regulation.....	346
Review Questions	346
Critical Thinking Questions	352
Test Prep for AP® Courses	359
Science Practice Challenge Questions	367
17 Biotechnology and Genomics	369
Review Questions	369
Critical Thinking Questions	376
Test Prep for AP® Courses	381
Science Practice Challenge Questions	384
18 Evolution and Origin of Species	389
Review Questions	389
Critical Thinking Questions	395
Test Prep for AP® Courses	404
Science Practice Challenge Questions	423
19 The Evolution of Populations.....	434
Review Questions	434
Critical Thinking Questions	438
Test Prep for AP® Courses	444
Science Practice Challenge Questions	452
20 Evolutionary Relationships of Life on Earth.....	459
Review Questions	459
Critical Thinking Questions	466

Test Prep for AP® Courses	469
Science Practice Challenge Questions	479
21 Viruses	486
Review Questions	486
Critical Thinking Questions	493
Test Prep for AP® Courses	498
Science Practice Challenge Questions	504
22 Prokaryotes: Bacteria and Archaea	510
Review Questions	510
Critical Thinking Questions	520
Test Prep for AP® Courses	531
Science Practice Challenge Questions	542
23 Plant Form and Physiology	553
Review Questions	553
Critical Thinking Questions	570
Test Prep for AP® Courses	582
Science Practice Challenge Questions	590
24 The Animal Body: Basic Form and Function.....	602
Review Questions	602
Critical Thinking Questions	607
Test Prep for AP® Courses	612
25 Animal Nutrition and the Digestive System.....	623
Review Questions	623
Critical Thinking Questions	631
Test Prep for AP® Courses	639
Science Practice Challenge Questions	650

Advanced Placement Biology Instructor's Solution Manual

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26 The Nervous System	652
Review Questions	652
Critical Thinking Questions	654
Test Prep for AP® Courses	657
Science Practice Challenge Questions	668
27 Sensory Systems.....	680
Review Questions	680
Critical Thinking Questions	688
Science Practice Challenge Questions	696
28 The Endocrine System	701
Review Questions	701
Critical Thinking Questions	710
Test Prep for AP® Courses	717
Science Practice Challenge Questions	725
29 The Musculoskeletal System.....	731
Review Questions	731
Critical Thinking Questions	738
Science Practice Challenge Questions	743
30 The Respiratory System	748
Review Questions	748
Critical Thinking Questions	753
Test Prep for AP® Courses	758
Science Practice Challenge Questions	764
31 The Circulatory System	766
Review Questions	766
Critical Thinking Questions	776

Test Prep for AP® Courses	780
Science Practice Challenge Questions	785
32 Osmotic Regulation and Excretion	791
Review Questions	791
Critical Thinking Questions	798
Test Prep for AP® Courses	807
33 The Immune System	823
Review Questions	823
Critical Thinking Questions	831
Test Prep for AP® Courses	838
Science Practice Challenge Questions	848
34 Animal Reproduction and Development	852
Review Questions	852
Critical Thinking Questions	861
Test Prep for AP® Courses	869
Science Practice Challenge Questions	878

1 | THE STUDY OF LIFE

REVIEW QUESTIONS

1 What is a suggested and testable explanation for an event called?

- A Discovery
- B Hypothesis
- C Scientific method
- D Theory

Solution The solution is (B). A hypothesis is a testable explanation for an event.

2 Which branch of science is NOT considered a natural science?

- A Astronomy
- B Biology
- C Computer science
- D Physics

Solution The solution is (C). Computer science is a practical and scientific approach to computation and its application. It is not considered a natural science.

3 What is the name for the formal process through which scientific research is checked for originality, significance, and quality before being accepted into the scientific literature?

- A Publication
- B Public speaking
- C Peer review
- D Scientific method

Solution The solution is (C). Peer review is the process in which scientific papers are reviewed by experts in the scientist's field to ensure that a scientist's research is original, significant, logical, and thorough.

4 What are (i) two topics that are likely to be studied by biologists and (ii) two areas of scientific study that would fall outside the realm of biology?

- A (i) diseases affecting humans, pollution affecting species' habitat; (ii) calculating surface area of rectangular ground, functioning of planetary orbits
- B (i) calculating surface area of rectangular ground, functioning of planetary orbits; (ii) formation of metamorphic rocks, galaxy formation and evolution

- C** (i) plant responses to external stimuli, functioning of planetary orbits; (ii) formation of metamorphic rocks, galaxy formation and evolution
- D** (i) plant responses to external stimuli, study of the shape and motion of physical objects; (ii) formation of metamorphic rocks, galaxy formation and evolution

Solution The solution is (A). Diseases affecting humans and pollution affecting species are two topics that can be studied by biologists, while calculating the surface area of a rectangular plot of land and the function of planetary orbits are two topics that fall outside of the realm of biology.

5 Which statement is an example of deductive reasoning?

- A** Most swimming animals use fins; therefore, fins are an adaptation to swimming.
- B** Mitochondria are inherited from the mother; therefore, maternally inherited traits are encoded by mitochondrial DNA.
- C** Small animals lose more heat than larger animals. One would not expect to find wild mice in the North and South Poles.
- D** Water conservation is a major requirement to survive in the desert. Large leaves increase loss of water by evaporation. Therefore, desert plants should have smaller leaves.

Solution The solution is (D). Water conservation is a major requirement to survive in the desert. On plants, broad, thin leaves lose more water to evaporation than smaller, thicker leaves. Therefore, desert plants should have smaller leaves. The answer best demonstrates how a general principle or law is used to forecast specific results.

6 Why are viruses NOT considered living?

- A** Viruses are not made of cells.
- B** Viruses do not have genetic material.
- C** Viruses have DNA and RNA.
- D** Viruses are obligate parasites and require a host.

Solution The solution is (A). Viruses are not made up of cells. They are made up of DNA or RNA surrounded by a protein coat. Biologists characterize living organisms as being composed of cells.

7 The presence of a membrane-enclosed nucleus is a characteristic of what?

- A** Bacteria
- B** Eukaryotic cells
- C** All living organisms
- D** Prokaryotic cells

Solution The solution is (B). Unlike prokaryotic cells, eukaryotic cells contain a membrane-bound nucleus.

8 What is a group of individuals of the same species living in the same area called?

- A** A community
- B** An ecosystem
- C** A family
- D** A population

Solution The solution is (D). A population is a group of individuals that belong to the same species, live in a particular geographical area, and have the capability to interbreed.

9 Which sequence represents the hierarchy of biological organization from the most inclusive to the least complex level?

- A** Biosphere, ecosystem, community, population, organism
- B** Organelle, tissue, biosphere, ecosystem, population
- C** Organism, organ, tissue, organelle, molecule
- D** Organism, community, biosphere, molecule, tissue, organ

Solution The solution is (A). The biosphere is the highest level, which is the most inclusive, and the organism is the lowest level and least inclusive in the given hierarchy.

10 Where in a phylogenetic tree would you expect to find the organism that had evolved most recently?

- A** At the base
- B** At the nodes
- C** At the branch tips
- D** Within the branches

Solution The solution is (C). The "tips" of the tree branches represent the recently evolved taxa.

11 What is a characteristic that is NOT present in all living things?

- A** Homeostasis and regulation
- B** Metabolism
- C** Nucleus containing DNA
- D** Reproduction

Solution The solution is (C). A nucleus containing DNA is not present in all living organisms.

CRITICAL THINKING QUESTIONS

12 Is mathematics a natural science? Explain your reasoning.

- A** No, it is not a natural science because it is not used in the study of the natural world.
- B** No, it is not a natural science. Mathematics focuses on understanding mathematical relations and calculations, which is useful in natural sciences but which is distinct.
- C** Yes, it is a natural science. Mathematics deals with verifying the experimental data.
- D** Yes, it is a natural science. It uses chemical and physical measurements.

Solution The solution is (B). No, it is not a natural science. Mathematics does not involve measuring aspects of the natural world.

13 Although the scientific method is used by most of the sciences, it can also be applied to everyday situations. A situation is given below. Using the scientific method try to arrange the given steps in the correct order. Situation:

1. If the car doesn't start the problem might be in the battery.
2. Car doesn't start.
3. After changing the battery. Car starts working.
4. The car should start after charging the battery or changing the battery.
5. The car doesn't start because the battery is dead.
6. The car doesn't start even after charging the battery, the battery must have stopped working.

- A** 1, 2, 3, 4, 5, 6
- B** 2, 1, 3, 4, 5, 6
- C** 2, 1, 5, 4, 6, 3
- D** 2, 1, 5, 6, 3, 4

Solution The solution is (C). 2, 1, 5, 4, 6, 3 is the correct sequence of the situation given.

14 Read questions 1 through 4.

Question 1. Is macaroni and cheese tastier than broccoli soup?

Question 2. Are hummingbirds attracted to the color red?

Question 3. Is the moon made out of green cheese?

Question 4. Is plagiarism dishonest?

Which questions lend themselves to investigation using scientific methods? In other words, is the hypothesis falsifiable (can be proven false)?