ELEMENTS OF BIOLOGY

	Student Text	Practice Book	Teacher Resource Edition Activities & Projects
1. Use models to compare and contrast how the structural characteristics of carbohydrates, nucleic acids, proteins, and lipids define their function in organisms.	28, 29, 40, 41, 42, 43, 44, 45, 46, 47, 52, 57, 61, 68, 74, 80, 84, 85, 86, 87, 120, 123, 124, 167, 169	28, 29, 40, 41, 42, 43, 44, 45, 46, 47, 52, 57, 61, 68, 74, 80, 84, 85, 86, 87, 120, 123, 124, 167, 169	Ch7, Ch8, Ch9, Ch10, Ch17, Ch18
2. Obtain, evaluate, and communicate information to describe the function and diversity of organelles and structures in various types of cells (e.g., muscle cells having a large amount of mitochondria, plasmids in bacteria, chloroplasts in plant cells).	32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 143	32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 143	Ch7, Ch8, Ch10, Ch20
3. Formulate an evidence-based explanation regarding how the composition of deoxyribonucleic acid (DNA) determines the structural organization of proteins.	38, 41, 42, 47, 61, 62, 66, 68, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 96, 120, 124, 150	38, 41, 42, 47, 61, 62, 66, 68, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 96, 120, 124, 150	Ch1, Ch15, Ch16, Ch17, Ch18
a. Obtain and evaluate experiments of major scientists and communicate their contributions to the development of the structure of DNA and to the development of the central dogma of molecular biology.	89, 91	89, 91	Ch1, Ch7, Ch15, Ch16, Ch21

b. Obtain, evaluate, and communicate information that explains how advancements in genetic technology (e.g., Human Genome Project, Encyclopedia of DNA Elements [ENCODE] project, 1000 Genomes Project) have contributed to the understanding as to how a genetic change at the DNA level may affect proteins and, in turn, influence the appearance of traits.	41, 64, 65, 66, 68, 69, 70, 71, 72, 77, 80, 83, 85, 93, 149	41, 64, 65, 66, 68, 69, 70, 71, 72, 77, 80, 83, 85, 93, 149	Ch18
c. Obtain information to identify errors that occur during DNA replication (e.g., deletion, insertion, translocation, substitution, inversion, frame-shift, point mutations).	83, 92, 106	83, 92, 106	Ch18
4. Develop and use models to explain the role of the cell cycle during growth and maintenance in multicellular organisms (e.g., normal growth and/or uncontrolled growth resulting in tumors).	35, 36, 37, 38, 40, 51, 52, 60, 62	35, 36, 37, 38, 39, 40, 60, 62	Ch7, Ch8
5. Plan and carry out investigations to explain feedback mechanisms (e.g., sweating and shivering) and cellular processes (e.g., active and passive transport) that maintain homeostasis.	167, 173		
a. Plan and carry out investigations to explain how the unique properties of water (e.g., polarity, cohesion, adhesion) are vital to maintaining homeostasis in organisms.	20, 168, 173	168, 173	
6. Analyze and interpret data from investigations to explain the role of products and reactants of photosynthesis and cellular respiration in the cycling of matter and the flow of energy.	48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62	48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62	Ch10, Ch11

a. Plan and carry out investigations to explain the interactions among pigments, absorption of light, and reflection of light.	53, 54, 55, 56, 57	53, 54, 55, 56, 57	Ch11, Ch28
7. Develop and use models to illustrate examples of ecological hierarchy levels, including biosphere, biome, ecosystem, community, population, and organism.	12, 50, 95, 110, 111, 112, 113, 114, 115, 116, 117	12, 50, 111, 112, 113, 114, 115, 116, 117	Ch1, Ch2, Ch3, Ch22, Ch23, Ch30
8. Develop and use models to describe the cycling of matter (e.g., carbon, nitrogen, water) and flow of energy (e.g., food chains, food webs, biomass pyramids, ten percent law) between abiotic and biotic factors in ecosystems.	48, 49, 50, 51, 52, 120, 121, 122, 123, 124	48, 49, 50, 51, 52, 120, 121, 122, 123, 124	Ch24
9. Use mathematical comparisons and visual representations to support or refute explanations of factors that affect population growth (e.g., exponential, linear, logistic).	110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120	110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120	Ch22
10. Construct an explanation and design a real-world solution to address changing conditions and ecological succession caused by density-dependent and/or density-independent factors.	114	114	Ch22
11. Analyze and interpret data collected from probability calculations to explain the variation of expressed traits within a population.	72, 73, 90	72, 73, 90	Ch13, Ch14
a. Use mathematics and computation to predict phenotypic and genotypic ratios and percentages by constructing Punnett squares, including using both homozygous and heterozygous allele pairs.	72, 73, 90	72, 73, 90	Ch13, Ch14, Ch20

b. Develop and use models to demonstrate codominance, incomplete dominance, and Mendel's laws of segregation and independent assortment.	69, 70, 71, 72, 73, 114	69, 70, 71, 72, 73, 114	Ch13, Ch14
c. Analyze and interpret data (e.g., pedigree charts, family and population studies) regarding Mendelian and complex genetic disorders (e.g., sickle-cell anemia, cystic fibrosis, type 2 diabetes) to determine patterns of genetic inheritance and disease risks from both genetic and environmental factors.	93	93	Ch13, Ch14, Ch18, Ch21
12. Develop and use a model to analyze the structure of chromosomes and how new genetic combinations occur through the process of meiosis. a. Analyze data to draw conclusions about genetic disorders caused by errors in meiosis (e.g., Down syndrome, Turner syndrome).	41, 42, 59, 60, 61, 79, 80, 81, 82, 83, 84, 91, 144	41, 42, 59, 60, 61, 79, 80, 81, 82, 83, 84, 91, 144	Ch12 Ch18
13. Obtain, evaluate, and communicate information to explain how organisms are classified by physical characteristics, organized into levels of taxonomy, and identified by binomial nomenclature (e.g., taxonomic classification, dichotomous keys). a. Engage in argument to justify the grouping of viruses in a category separate from living things.	94, 95, 96, 97, 98, 99, 100, 101	7, 8, 94, 95, 96, 97, 98, 99, 100, 101	Ch3
14. Analyze and interpret data to evaluate adaptations resulting from natural and artificial selection that may cause changes in populations over time (e.g., antibiotic-resistant bacteria, beak types, peppered moths, pest-resistant crops).	94, 106, 107, 108, 109, 151	94, 106, 107, 108, 109, 151	Ch13, Ch29

15. Engage in argument from evidence (e.g., mathematical models such as distribution graphs) to explain how the diversity of organisms is affected by overpopulation of species, variation due to genetic mutations, and competition for limited resources.	83, 92, 106, 114, 119	83, 92, 106, 114, 119	Ch18
16. Analyze scientific evidence (e.g., DNA, fossil records, cladograms, biogeography) to support hypotheses of common ancestry and biological evolution.	106, 107, 108, 109	106, 107, 108, 109	Ch21