

Indicators Covered for General Biology

Unit 1: Biology & You - Inquiry

5 – 7 days

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| 1.1.2 | The student designs investigations, including developing questions, gathering and analyzing data, and designing and conducting research |
| 1.1.3 | The student correctly uses the appropriate technological tools and mathematics in their own scientific investigations and practices good safety techniques with equipment. |
| 1.1.4 | The student actively engages in conducting an inquiry, formulating and revising his or her scientific explanations and models (physical, conceptual, or mathematical) using logic and evidence, and recognizing that alternative explanations and models do exist. |
| 1.1.5 | The student communicates (reports) and defends the design, results, and conclusion of his/her investigation. |
| 7.1.5 | The student understands there are many issues which involve morals, ethics, values or spiritual beliefs that go beyond what science can explain, but for which solid scientific literacy is useful. |
| 7.2.1 | The student understands scientific knowledge describes and explains the physical world. Scientific knowledge is provisional and is subject to change as new evidence becomes available. |
| 7.2.3 | The student understands scientific knowledge begins with empirical observations, which are the data (also called facts or evidence) upon which further scientific knowledge is built. |
| 7.2.3 | The student understands scientific knowledge consists of hypotheses, inferences, laws, and theories. |

Unit 2: Chemistry

10 days

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| 2A.1.1 | The student understands atoms, the fundamental organizational unit of matter, are composed of the subatomic particles proton, neutron, and electron. |
| 2A.1.2 | The student understands isotopes are atoms with the same atomic number (same number of protons) but different numbers of neutrons. The nuclei of some atoms are radioactive isotopes that spontaneously decay, releasing radioactive energy. |
| 2A.2.2 | The student understands the periodic table lists elements according to increasing atomic number. This table organizes physical and chemical trends by groups, periods, and categories. |
| 2A.2.3 | The student understands chemical bonds result when valence electrons are transferred or shared between atoms. Breaking a chemical bond requires energy whereas forming a chemical bond releases energy. Ionic compounds result from atoms transferring electrons. Molecular compounds result from atoms sharing electrons. |
| 2A.3.1 | The student understands a chemical reaction occurs when one or more substances (reactants) react to form a different chemical substance(s) (products). |

Unit 3: Cells

5 – 8 days

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| 3.1.1 | The student understands cells are composed of a variety of specialized structures that carry out specific functions. |
| 3.1.2 | The student understands cell functions involve specific chemical reactions. |
| 3.1.4 | The student understands some plant cells contain chloroplasts, which are the sites of photosynthesis. |
| 5.1.1 | The student understands technology is the application of scientific knowledge for functional purposes. |
| 5.1.3 | The student understands science advances new technologies. New technologies open new areas for scientific inquiry. |

Unit 4: Osmosis & Diffusion

7 – 10 days

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| 1.1.2 | The student designs investigations, including developing questions, gathering and analyzing data, and designing and conducting research. |
| 1.1.3 | The student correctly uses the appropriate technological tools and mathematics in their own scientific investigations and practices good safety techniques with equipment. |
| 1.1.5 | The student actively engages in communicating and defending the design, results, and conclusion of his/her investigation. |
| 3.5.4 | The student understands the structure and function of an organism serves to acquire, transform, transport, release, and eliminate the matter and energy used to sustain the organism. |
| 3.7.2 | The student understands that homeostasis is the dynamic regulation and balance of an organisms internal environment to maintain conditions suitable for survival. |

Unit 5: Photosynthesis & Respiration

10 - 14

days

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| 3.1.1 | The student understands cells are composed of a variety of specialized structures that carry out specific functions. |
| 3.1.2 | The student understands cell functions involve specific chemical reactions. |
| 3.1.4 | The student understands some plant cells contain chloroplasts, which are the sites of photosynthesis. |
| 3.4.2 | The student understands energy is received, transformed, and expended in ecosystems. |
| 3.5.1 | The student understands living systems require a continuous input of energy to maintain their chemical and physical organization. |
| 3.5.2 | The student understands the Sun is the primary source of energy for life through the process of photosynthesis. |
| 3.5.3 | The student understands food molecules contain biochemical energy, which is then available for cellular respiration. |
| 3.5.4 | The student understands the structure and function of an organism serves to acquire, transform, transport, release, and eliminate the matter and energy used to sustain the organism. |

Unit 6: Mitosis

5 – 7 days

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| 1.1.4 | The student actively engages in conducting an inquiry, formulating and revising his or her scientific explanations and models (physical, conceptual, or mathematical) using logic and evidence, and recognizing that alternative explanations and models exist. |
| 3.1.1 | The student understands cells are composed of a variety of specialized structures that carry out specific functions. |
| 3.1.3 | The student understands cells function and replicate as a result of information stored in deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) molecules. |
| 3.1.5 | The student understands cells can differentiate, thereby enabling complex multicellular organisms to form. |
| 3.2.1 | The student understands living organisms contain DNA or RNA as their genetic material, which provides the instructions that specify the characteristics of organisms |
| 3.2.2 | The student understands organisms usually have a characteristic number of chromosomes; one pair of these may determine the sex of individuals. |

Unit 7: Meiosis

5 - 7 days

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| 3.1.1 | The student understands cells are composed of a variety of specialized structures that carry out specific functions. |
| 3.1.5 | The student understands cells can differentiate, thereby enabling complex multicellular organisms to form. |
| 3.2.1 | The student understands living organisms contain DNA or RNA as their genetic material, which provides the instructions that specify the characteristics of organisms |
| 3.2.2 | The student understands organisms usually have a characteristic number of chromosomes; one pair of these may determine the sex of individuals. |
| 3.2.3 | The student understands hereditary information is contained in genes, located in the chromosomes of each cell. |
| 3.2.4 | The student understands gametes carry the genetic information to the next generation. |

Unit 8: Genetics – Mendel & Heredity

5 – 7 days

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| 3.2.1 | The student understands living organisms contain DNA or RNA as their genetic material, which provides the instructions that specify the characteristics of organisms. |
| 3.2.2 | The student understands organisms usually have a characteristic number of chromosomes; one pair of these may determine the sex of individuals |
| 3.2.3 | The student understands hereditary information is contained in genes, located in the chromosomes of each cell. |

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| 3.2.4 | The student understands gametes carry the genetic information to the next generation |
| 3.2.5 | The student understands expressed mutations occur in DNA at very low rates. |

Unit 9: Genetics – DNA Structure & Function

5 days

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| 3.2.2 | The student understands organisms usually have a characteristic number of chromosomes; one pair of these may determine the sex of individuals |
| 3.2.3 | The student understands hereditary information is contained in genes, located in the chromosomes of each cell. |
| 3.2.4 | The student understands gametes carry the genetic information to the next generation |
| 3.2.5 | The student understands expressed mutations occur in DNA at very low rate |

Unit 10: Genetics – Protein Synthesis

5 days

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| 3.2.1 | The student understands living organisms contain DNA or RNA as their genetic material, which provides the instructions that specify the characteristics of organisms. |
| 3.2.5 | The student understands expressed mutations occur in DNA at very low rates. |

Unit 11: Biotechnology

5 – 7 days

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| 5.1.1 | The student understands technology is the application of scientific knowledge for functional purposes. |
| 5.1.3 | The student understands science advances new technologies. New technologies open new areas for scientific inquiry. |
| 6.5.1 | The student understands how societal concerns and challenges can determine the rate of advancement in science and technology. Science and technology provides society with options of what we are capable of doing, not necessarily what we should do. |
| 7.1.1 | The student demonstrates an understanding of science as both vocation and avocation. |
| 7.1.2 | The student explains how science uses peer review, replication of methods, and norms of honesty. |
| 7.1.3 | The student recognizes the universality of basic science concepts and the influence of personal and cultural beliefs that embed science in society. |
| 7.1.5 | The student understands there are many issues which involve morals, ethics, values or spiritual beliefs that go beyond what science can explain, but for which solid scientific literacy is useful. |
| 7.1.6 | The student recognizes society's role in supporting topics of research and determining institutions where research is conducted. |

Unit 12: Theory of Evolution & History of Life

4

days

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| 3.3.1 | The student understands biological evolution, descent with modification, is a scientific explanation for the history of the diversification of organisms from common ancestors. |
| 3.3.2 | The student understands populations of organisms may adapt to environmental challenges and changes as a result of natural selection, genetic drift, and various mechanisms of genetic change. |
| 3.3.3 | The student understands biological evolution is used to explain the earth's present day biodiversity: the number, variety and variability of organisms. |
| 3.3.4 | The student understands organisms vary widely within and between populations. Variation allows for natural selection to occur. |
| 3.3.5 | The student understands that the primary mechanism of variation is natural selection. |
| 3.3.6 | The student understands biological evolution is used as a broad, unifying theoretical framework for biology. |
| 4.4.2 | The student understands the current scientific explanation of the origin and structure of the universe. |

Unit 13: Classification

7 – 8 days

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| 3.7.1 | The student understands differences in structure and function among organisms and can identify the characteristics of relevant life forms. |
| 3.7.2 | The student understands taxonomy is the systematic way in which organisms are placed into a hierarchical classification system, according to their physical and genetic characteristics and their evolutionary history. |

Unit 14: Populations

5 – 7 days

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| 3.4.3 | The student understands the distribution and abundance of organisms and populations in ecosystems are limited by the carrying capacity. |
| 3.4.4 | The student understands organisms cooperate and compete in complex, interdependence relationships. |
| 6.3.1 | The student understands natural resources from the lithosphere and ecosystems are required to sustain human populations. |

Unit 15: Ecosystems

5 – 7 days

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| 3.4.1 | The student understands atoms and molecules on the Earth cycle among the living and nonliving components of the biosphere. |
| 3.4.2 | The student understands energy is received, transformed and expended in ecosystems. |

Unit 16: Communities

5 – 7 days

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| 3.4.4 | The student understands organisms cooperate and compete in complex, interdependence relationships. |
| 3.4.5 | The student understands human beings live within and impact ecosystems. |

Unit 17: Kingdoms of Life

7 days

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|-------|---|
| 3.7.1 | The student understands differences in structure and function among organisms and can identify the characteristics of relevant life forms |
| 3.7.5 | The student understands taxonomy is the systematic way in which organisms are placed into a hierarchical classification system, according to their physical and genetic characteristics and their evolutionary history. |

Unit 18: Viruses & Bacteria

7 days

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| 1.1.2 | The student designs investigations, including developing questions, gathering and analyzing data, and designing and conducting research. |
| 1.1.3 | The student correctly uses the appropriate technological tools and mathematics in their own scientific investigations and practices good safety techniques with equipment. |
| 1.1.4 | The student actively engages in conducting an inquiry, formulating and revising his or her scientific explanations and models (physical, conceptual, or mathematical) using logic and evidence, and recognizing that alternative explanations and models exist. |
| 1.1.5 | The student communicates (reports) and defends the design, results, and conclusion of his/her investigation. |
| 3.1.1 | The student understands cells are composed of a variety of specialized structures that carry out specific functions. |
| 3.2.1 | The student understands living organisms contain DNA or RNA as their genetic material, which provides the instructions that specify the characteristics of organisms. |
| 3.4.4 | The student understands organisms cooperate and compete in complex, interdependence relationships. |
| 3.7.1 | The student understands differences in structure and function among organisms and can identify the characteristics of relevant life forms. |
| 6.1.3 | The student understands informed personal choices concerning fitness and health involve an understanding of chemistry and biology. |

Unit 19: Protists

5 – 7 days

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| 3.4.4 | The student understands organisms cooperate and compete in complex, interdependence relationships. |
| 3.7.1 | The student understands differences in structure and function among organisms and can identify the characteristics of relevant life forms. |

Unit 20: Fungi

5 – 7 days

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| 3.4.4 | The student understands organisms cooperate and compete in complex, interdependence relationships. |
| 3.7.1 | The student understands differences in structure and function among organisms and can identify the characteristics of relevant life forms. |

Unit 21: Introduction to Plants

5 – 7 days

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| 3.1.4 | The student understands some plant cells contain chloroplasts, which are the sites of photosynthesis. |
| 3.7.1 | The student understands differences in structure and function among organisms and can identify the characteristics of relevant life forms. |

Unit 22: Plant Structure & Function

5 – 7 days

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| 3.1.4 | The student understands some plant cells contain chloroplasts, which are the sites of photosynthesis. |
| 3.5.2 | The student understands the sun is the primary source of energy for life through the process of photosynthesis. |
| 3.7.1 | The student understands differences in structure and function among organisms and can identify the characteristics of relevant life forms. |

Unit 23: Introduction to Animals

5 – 7 days

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| 3.6.1 | The student understands animals have behavioral responses to internal changes and to external stimuli. |
| 3.6.2 | The student understands most multicellular animals have nervous systems that underlie behavior. |
| 3.7.1 | The student understands differences in structure and function among organisms and can identify the characteristics of relevant life forms. |
| 3.7.2 | The student understands that homeostasis is the dynamic regulation and balance of an organisms internal environment to maintain conditions suitable for survival. |
| 3.7.4 | The student understands that in complex organisms there is a division of labor into specific body systems. |