Cosby High School

Biology I
2019 Syllabus

Part 1: Course Information

Instructor Information

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Course Description

The goal of Biology I is to equip students with a foundational set of understanding of molecules and organisms, heredity, evolution, and ecosystems that will benefit them throughout their high school career and postsecondary journey. Biology I will help students to gain a deeper understanding of life and will help students cultivate an appreciation of life. To accomplish this goal, we will incorporate science and engineering practices and crosscutting concepts into every day skills and learning. Collaboration and individual effort will be required.

Students will be expected to work hard during class and outside of class. Meaning, while most work will be completed during class time, some work and effort will need to be completed at home. Students should take full advantage of their school educational time and should work to manage their time efficiently outside of school. This is a required course to graduate, therefore learning the concepts are not only beneficial (and fun), but necessary.

Students who struggle with science should be prepared to spend additional time outside of class completing the course requirements and learning the concepts. Please reach out to me, so I can best help you. **I am always here to help, all you have to do is ask.**

General Education/High School Pathway Area

- This is one of the three required science courses for graduation.

Textbook & Course Materials

Required Text

- McGraw-Hill Education Tennessee Glencoe Biology (provided)

Recommended Texts & Other Readings or Resources

- Provided throughout course

Course Structure

Students should be prepared for lecture, class discussion, research, readings, activities, and labs.

Online Resources

Access to the online textbook will be provided to students. Students will receive a weekly email the links to the PowerPoints and other applicable material covered in class.

Part 2: Student Learning Outcomes

LS1: From Molecules to Organisms: Structures and Processes
addresses how individual organisms are configured and how these structures function to support life, growth, behavior, and reproduction. The first core idea hinges on the unifying principle that cells are the basic unit of life.
LS1.A: Structure and Function
LS1.B: Growth and Development of Organisms
LS1.C: Organization for Matter and Energy Flow in Organisms
LS1.D: Information Processing

LS2: Ecosystems: Interactions, Energy, and Dynamics
explores organisms' interactions with each other and their physical environment. This includes how organisms obtain resources, how they change their environment, how changing environmental factors affect organisms and ecosystems, how social interactions and group behavior play out within and between species, and how these factors all combine to determine ecosystem functioning.
LS2.A: Interdependent Relationships in Ecosystems
LS2.B: Cycles of Matter and Energy Transfer in Ecosystems
LS2.C: Ecosystem Dynamics, Functioning, and Resilience
LS2.D: Social Interactions and Group Behavior

LS3: Heredity: Inheritance and Variation of Traits
across generations, focuses on the flow of genetic information between generations. This idea explains the mechanisms of genetic inheritance and describes the environmental and genetic causes of gene mutation and the alteration of gene expression.
LS3.A: Inheritance of Traits
LS3.B: Variation of Traits

LS4: Biological Evolution: Unity and Diversity
explores "changes in the traits of populations of organisms over time" [1] and the factors that account for species' unity and diversity alike.
LS4.A: Evidence of Common Ancestry and Diversity
LS4.B: Natural Selection
LS4.C: Adaptation
LS4.D: Biodiversity and Humans

BIO1.LS1: From Molecules to Organisms: Structures and Processes

1. Compare and contrast existing models, identify patterns, and use structural and functional evidence to analyze the **characteristics of life**. Engage in argument about the designation of **viruses as non- living** based on these characteristics.
2. Evaluate comparative models of various **cell types** with a focus on organic molecules that make up **cellular structures**.
3. Integrate evidence to develop a **structural model of a DNA** molecule. Using the model, develop and communicate an explanation for how DNA serves as a template for **self-replication and encodes biological information.**
4. Demonstrate how **DNA sequence** information is decoded through **transcriptional and translational** processes within the cell in order to synthesize proteins. Examine the relationship of structure and function of various types of **RNA** and the importance of this relationship in these processes.
5. Research examples that demonstrate the functional variety of **proteins** and construct an argument based on evidence for the importance of the molecular structure to its function. Plan and carry out a controlled investigation to test prediction about factors which should cause an effect on the structure and function of a **protein**.
6. Create a model for the major events of the eukaryotic cell cycle, including **mitosis**. Compare and contrast the **rates of cell division** in various eukaryotic cell types in multicellular organisms.
7. Utilize a model of a cell plasma membrane to compare the various types of **cellular transport** and test predictions about the **movement of molecules** into or out of a cell based on the homeostasis of energy and matter in cells.
8. Create a model of **photosynthesis** demonstrating the net flow of matter and energy into a cell. Use the model to explain **energy transfer** from light energy into stored chemical energy in the product.
9. Create a model of **aerobic respiration** demonstrating flow of matter and **energy** out of a cell. Use the model to explain **energy transfer mechanisms**. Compare aerobic respiration to alternative processes of glucose metabolism.

BIO1.LS2: Ecosystems: Interactions, Energy, and Dynamics

1. Analyze *mathematical* and /or computational representations of **population data** that support explanations of **factors that affect population size and carrying capacities** of populations within an ecosystem. Examine a representative ecosystem and based on interdependent relationships present, **predict population size effects** due to a given disturbance.
2. Create a model tracking carbon atoms between inorganic and organic molecules in an ecosystem. Explain **human impacts on climate** based on this model.
3. Analyze through research the **cycling of matter** in our biosphere and explain how **biogeochemical cycles** are critical for ecosystem function.
4. Analyze data demonstrating the decrease in biomass observed in each successive trophic levels. Construct an explanation considering the laws of conservation of energy and matter and represent this phenomenon in a *mathematical model* to describe the **transfer of energy and matter between trophic levels.**
5. Analyze examples of **ecological succession**, identifying and explaining the order of events responsible for the formation of a new ecosystem in response to extreme fluctuations in environmental conditions or catastrophic events.

BIO1.LS3: Heredity

1. Model chromosome progression through **meiosis and fertilization** in order to argue how the process of **sexual reproduction leads to** both genetic **similarities and variation in diploid** organisms. Compare and contrast the processes of **sexual and asexual reproduction**, identifying the **advantages and disadvantages** of each.
2. Explain how **protein formation results in phenotypic variation** and discuss how changes in DNA can lead to **somatic or germline mutations**.
3. Through **pedigree** analysis, identify **patterns of trait inheritance to predict** family member genotypes. Use mathematical thinking to predict the likelihood of various types of trait transmission.

BIO1.LS4: Biological Change: Unity and Diversity

1. Evaluate scientific data collected from analysis of **molecular sequences, fossil records, biogeography, and embryology**. Identify chronological **patterns of change** and communicate that biological **evolution is supported by multiple lines of empirical evidence** that identify **similarities inherited from a common ancestor**.
2. Using a model that demonstrates the change in allele frequencies resulting in evolution of a population over many generations, identify causative agents of change.
3. **Identify ecosystem services** and assess **the role of biodiversity** in support of these services. Analyze the **role human activities** have on disruption of these services.

BIO1.ETS2: Links Among Engineering, Technology, Science, and Society

1. Obtain, evaluate, and communicate information on how **molecular biotechnology** may be used in a variety of fields.
2. Investigate means by which **karyotypes are utilized in diagnostic medicine**.
3. Analyze **scientific and ethical arguments** to support the pros and cons of applications of a **specific biotechnology technique** such as stem cell usage, in vitro fertilization, or genetically modified organisms.

BIO1.LS1: From Molecules to Organisms: Structures and Processes			
BIO1.LS1.1	Compare and contrast existing models, identify patterns, and use structural and functional evidence to analyze the characteristics of life. Engage in argument about the designation of viruses as non-living based on these characteristics. **COMPONENT IDEA:** *B. Growth and Development of Organisms*	**EXPLANATION:** Students begin to develop patterns of living and non-living organisms in kindergarten and build on detailed characteristics of different classifications of living organisms throughout elementary and middle school. Biology 1 discussions introduce viral particles and viral cycles, building on student understanding of living organisms to engage in an argument regarding the classification of a viral particle as either living or non-living.	**CROSSCUTTING CONCEPT:** **Pattern** *Students recognize, classify, and record patterns in quantitative data from empirical research and mathematical representations.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Engaging in argument from evidence** *Students critically evaluate evidence supporting an argument and create written or oral arguments that invoke empirical evidence, scientific reasoning and scientific explanations.*

BIO1.LS1.2	Evaluate comparative models of various cell types with a focus on organic molecules that make up cellular structures. **COMPONENT IDEA:** *A. Structure and Function*	**EXPLANATION:** Students explicitly discuss the structure and function of major cellular organelles in seventh grade. Building on this understanding, Biology I students should shift their focus to the different types of cells found in organisms and how the role of each cell type relates to its composition and the prevalence of different organelles within that cell. An example might include the absence (or enucleation) of the nucleus in red blood cells in mammals providing for increased levels of oxygen transport in organisms or the lack of centrioles in most neurons. Varying cell types can include both prokaryotic and eukaryotic cell types	**CROSSCUTTING CONCEPT:** **Systems and System Models** *Students create and manipulate a variety of different models: physical, mathematical, computational.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Developing and using models** *Students can test the predictive abilities of their models in a real-world setting and make comparisons of two models of the same process or system.*
BIO1.LS1.3	Integrate evidence to develop a structural model of a DNA molecule. Using the model, develop and communicate an explanation for how DNA serves as a template for self-replication and encodes biological information. **COMPONENT IDEA:** *A. Structure and Function*	**EXPLANATION:** Discussions of DNA in earlier grades have been limited to discussions of genes and the role of genes in the appearance and activities of organism. Biology 1 represents a student's introduction to a molecular model of DNA as well as the organization of DNA into genes and genes subsequently into chromosomes. Students should address interactions between genes in proteins which regulate both the shape and reproduction of DNA molecules. It is important to note that not all segments of DNA are transcribed for proteins. Portions of DNA are involved in regulating the expression of genes or affect the structure of the chromosomes (replication origin, centromeres, and telomeres).	**CROSSCUTTING CONCEPT:** **Structure and Function** *Students apply patterns in structure and function to unfamiliar phenomena.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Developing and using models** *Students can test the predictive abilities of their models in a real-world setting and make comparisons of two models of the same process or system.*

BIO1.LS1.4	Demonstrate how DNA sequence information is decoded through transcriptional and translational processes within the cell in order to synthesize proteins. Examine the relationship of structure and function of various types of RNA and the importance of this relationship in these processes. **COMPONENT IDEA:** *A. Structure and Function*	**EXPLANATION:** In seventh grade, students discuss the passage of alleles from parent to offspring during sexual reproduction. Biology 1 should build on this understanding of genotypic and phenotypic relationships by establishing a connection between genotypes and the phenotypes resulting from expression of the genes. Specific examples such as pathways for melanin or lactase production can be used to relate monogentic inheritance to phenotypes. In such pathways, students can demonstrate the role of various RNA types in the production of a protein through the processes of transcription and translation.	**CROSSCUTTING CONCEPT:** **Structure and Function** *Students apply patterns in structure and function to unfamiliar phenomena.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Developing and using models** *Students can test the predictive abilities of their models in a real-world setting and make comparisons of two models of the same process or system.*
BIO1.LS1.5	Research examples that demonstrate the functional variety of proteins and construct an argument based on evidence for the importance of the molecular structure to its function. Plan and carry out a controlled investigation to test prediction about factors which should cause an effect on the structure and function of a protein. **COMPONENT IDEA:** *A. Structure and Function*	**EXPLANATION:** Focus of this standard is on the activities of proteins and the role of the structure of proteins in carrying out these activities. Students can be reminded of the concept of reversible and irreversible changes addressed in earlier physical science standards. Investigations might include the effect of amylase activity on a starch substrate as a function of varying temperature or another independent variable. Roles of proteins include cellular regulation, cell signaling, enzymatic function, and structural components	**CROSSCUTTING CONCEPT:** **Structure and Function** *Students infer the function of a component of a system based on its shape and interactions with other components.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Planning and carrying out controlled investigations** *Students plan and perform investigations to aid in the development of a predictive model for interacting variables, considering the quantity of data with respect to experimental uncertainty, and select methods for collection and analysis of data.*
BIO1.LS1.6	Create a model for the major events of the eukaryotic cell cycle, including mitosis. Compare and contrast the rates of cell division in various eukaryotic cell types in multicellular organisms. **COMPONENT IDEA:** *B. Growth and Development of Organisms*	**EXPLANATION:** Students first discuss mitosis in seventh grade, specifically focusing on the role of mitosis in creating genetically identical daughter cells. Biology 1 discussions should connect a student's understanding of gene expression and protein function with the process of mitosis to explore the differentiation of cell types from otherwise identical daughter cells. Discussions should also include varying rates of mitotic division and the relationship between these rates of division and the function of specific cell types within eukaryotic organisms. Examples may include the extremely limited use of mitosis by neurons due to their interconnectedness within neural networks or the rapid rates of mitosis with growing root tips.	**CROSSCUTTING CONCEPT:** **Pattern** *Students recognize, classify, and record patterns in quantitative data from empirical research and mathematical representations.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Developing and using models** *Students can test the predictive abilities of their models in a real-world setting and make comparisons of two models of the same process or system.*

BIO1.LS1.7	Utilize a model of a cell plasma membrane to compare the various types of cellular transport and test predictions about the movement of molecules into or out of a cell based on the homeostasis of energy and matter in cells. **COMPONENT IDEA:** *A. Structure and Function*	**EXPLANATION:** Students are first introduced to the structure of the plasma membrane and an initial discussion of passive transport to maintain homeostasis in the seventh grade. Biology I discussion of passive transport is still relevant, but discussions of transport should extend to include additional types of cellular transport and how they are accomplished by proteins embedded in the plasma membranes.	**CROSSCUTTING CONCEPT:** **Systems and System Models** *Students make predictions from models taking into account assumptions and approximations.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Constructing explanations and designing solutions** *Students form explanations that incorporate sources (including models, peer reviewed publications, their own investigations), invoke scientific theories, and can evaluate the degree to which data and evidence support a given conclusion.*
BIO1.LS1.8	Create a model of photosynthesis demonstrating the net flow of matter and energy into a cell. Use the model to explain energy transfer from light energy into stored chemical energy in the product. **COMPONENT IDEA:** *C. Organization for Matter and Energy Flow in Organisms*	**EXPLANATION:** Students should address the processes used during photosynthesis to convert light energy (solar radiation) into stored chemical energy. Additionally, consider the role of photosynthesis in capturing carbon, hydrogen, and oxygen needed to produce other cellular macromolecules such as proteins and DNA necessary for growth and reproduction. The chemical reactions needed for constant reorganization of these elements to form new compounds provides a way to transfer energy between systems across all levels of organization.	**CROSSCUTTING CONCEPT:** **Energy and Matter** *Students explain the conservation of energy by discussing the transfer mechanisms between objects or fields as well as into or out of a system.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Planning and carrying out controlled investigations** *Students plan and perform investigations to aid in the development of a predictive model for interacting variables, considering the quantity of data with respect to experimental uncertainty, and select methods for collection and analysis of data.*
BIO1.LS1.9	Create a model of aerobic respiration demonstrating flow of matter and energy out of a cell. Use the model to explain energy transfer mechanisms. Compare aerobic respiration to alternative processes of glucose metabolism. **COMPONENT IDEA:** *C. Organization for Matter and Energy Flow in Organisms*	**EXPLANATION:** In addition to models that explore the major reactions of cellular respiration, students should be led to consider the way that the chemical reactions of respiration provide a way for energy and matter captured using photosynthesis to be transferred and reorganized by consumers. Cellular respiration is a set of reactions that allow for sugars to re-organized to form other macromolecules. Students should consider differences in the efficiencies of different processes of glucose metabolism. Some of the energy released by respiration is used to maintain a constant body temperature despite constant loss of thermal energy to the surroundings. Both matter and energy are conserved throughout transformations.	**CROSSCUTTING CONCEPT:** **Energy and Matter** *Students explain the conservation of energy by discussing the transfer mechanisms between objects or fields as well as into or out of a system.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Planning and carrying out controlled investigations** *Students plan and perform investigations to aid in the development of a predictive model for interacting variables, considering the quantity of data with respect to experimental uncertainty, and select methods for collection and analysis of data.*

BIO1.LS2: Ecosystems: Interactions, Energy, and Dynamics			
BIO1.LS2.1	Analyze mathematical and /or computational representations of population data that support explanations of factors that affect population size and carrying capacities of populations within an ecosystem. Examine a representative ecosystem and based on interdependent relationships present, predict population size effects due to a given disturbance. **COMPONENT IDEA:** *A. Interdependent Relationships in Ecosystems*	**EXPLANATION:** An ecosystem should be appreciated as a dynamic set of relationships among living and nonliving resources. Population size should be recognized as a balance between reproductive rates, death rates, immigration rates, and emigration rates. Biotic factors should be distinguished as a producer, consumer, or decomposer, and the necessity for each of these components to the survival of the other should be appreciated. A population's survival and growth is dependent on the resources obtained through relationships, and thus there is a continuous struggle for balance between competing factors within an ever changing ecosystem.The existence of even a single organism changes the environment in which it exits through resource consumption and waste production. Population data can be collected (logistic or exponential growth) from simulations that model ecosystem interactions and/or graphs that plot a population size versus affecting factors, such as predation, resource availability, competition, etc. Using the information collected and an understanding of population-affecting factors, students can predict the impact of a variety of disturbances such as new species introduction, population crash due to disease, abiotic resource depletion, etc.	**CROSSCUTTING CONCEPT:** **Systems and System Models** *Students make predictions from models taking into account assumptions and approximations.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Using mathematics and computational thinking** *Students can create computational or mathematical models for interactions in the natural world using unit equivalencies.*
BIO1.LS2.2	Create a model tracking carbon atoms between inorganic and organic molecules in an ecosystem. Explain human impacts on climate based on this model. **COMPONENT IDEA:** *B. Cycles of Matter and Energy Transfer in Ecosystems*	**EXPLANATION:** Students created models demonstrating carbon and oxygen between biotic and abiotic components in 7.LS2.1. Deeper understanding should include pools or stores for carbon, with models that account for the effects of changes in one pool on another. Complex models for the carbon cycle should include both carbon pools (stores) where carbon stockpiles as well as carbon fluxes, or movements between the various pools. General changes to the sizes of stores can include both sinks and sources. When a store acts as a sink, it is able to absorb more carbon than it releases. Growth of a new forest is an example of a sink. By contrast, a source releases more carbon to the surroundings than it absorbs, which can contribute to greenhouse gases. Using the model, students can construct arguments predicting the effects on one carbon pool in response to an alteration of another. For example, if fossil fuels are converted into atmospheric carbon dioxide, if photosynthesizing organisms are decreased through deforestation, etc.	**CROSSCUTTING CONCEPT:** **Systems and System Models** *Students design or define systems in order to evaluate a specific phenomenon or problem.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Developing and using models** *Student models are functioning prototypes and are able to generate data useful for both computation and problem solving.*
BIO1.LS2.3	Analyze through research the cycling of matter in our biosphere and explain how biogeochemical cycles are critical for ecosystem function. **COMPONENT IDEA:** *B. Cycles of Matter and Energy Transfer in Ecosystems*	**EXPLANATION:** Biogeochemical cycles include the movement of matter through both living and non-living systems and the transformation of elements between usable and unusable forms. Living organisms must incorporate matter from their surroundings in order to grow. Some organisms are able to fix elements directly from the atmosphere such as plants through photosynthesis, or bacteria through nitrogen fixation. Focus should be on understanding that fixation permits the production of usable forms of the elements needed to support life. Understanding of these processes is vital to successful agricultural processes which can otherwise contaminate waterways with excess nitrogen in the form of nitrates. *(Memorization of diagrams of cycles misses the intent of this standard. Instead, students should focus on understanding the roles of the various parts of each cycle.)*	**CROSSCUTTING CONCEPT:** **Energy and Matter** *Students demonstrate and explain conservation of mass and energy in systems including systems with inputs and outputs.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Developing and using models** *Students can create models for interactions of two separate systems.*

BIO1.LS2.4	Analyze data demonstrating the decrease in biomass observed in each successive trophic levels. Construct an explanation considering the laws of conservation of energy and matter and represent this phenomenon in a mathematical model to describe the transfer of energy and matter between trophic levels. **COMPONENT IDEA:** *B. Cycles of Matter and Energy Transfer in Ecosystems*	**EXPLANATION:** It should be appreciated that matter and energy are not destroyed/lost as they transfer between trophic levels. The laws of conservation are supported as organic matter and its chemical energy is transferred into inorganic matter and heat energy through respiration and decomposition. In addition, it should be recognized that energy transfer is inefficient with loss of approximately 90% at each trophic level transfer. Any set(s) of population data from an ecosystem that clearly shows the mass of all organisms represented at primary, secondary, tertiary, etc. trophic levels can be utilized to examine the phenomenon and ask probing questions of why and how. Considering the laws of conservation of energy and matter, an explanation should strive to explain how and where energy and matter transfer from the organic pools in each trophic level. A model should illustrate the "10% rule" of energy transfer and can be displayed in a pyramid model and/or simulation activity.	**CROSSCUTTING CONCEPT:** **Energy and Matter** *Students explain the conservation of energy by discussing the transfer mechanisms between objects or fields as well as into or out of a system.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Obtaining, evaluating, and communicating information** *(Observe/Evaluate) Students can critically read scientific literature, integrating, extracting, and accurately simplifying main ideas from multiple sources while maintaining accuracy and validating data whenever possible. Students can provide written and oral explanations for phenomena and multi-part systems using models, graphs, data tables, and diagrams.*

BIO1.LS2.5	Analyze examples of ecological succession, identifying and explaining the order of events responsible for the formation of a new ecosystem in response to extreme fluctuations in environmental conditions or catastrophic events. **COMPONENT IDEA:** *C. Ecosystem Dynamics, Functioning, and Resilience*	**EXPLANATION:** Since first grade, discussions about ecosystem have involved relatively stable ecosystems, limiting disturbances to the impact of introduced species on these stable ecosystems. Under stable conditions, ecosystems remain in a condition of dynamic equilibrium. Catastrophic events can destroy entire ecosystems. This destruction can include the loss of soils in the creation of new habitat. Students can research primary succession examples such as a glacial retreat in Alaska, volcanism in Hawaii, or wetland development in Florida everglades, and secondary succession examples such as the conversion of natural areas to agricultural land before subsequent abandonment, forest fire devastation, or other natural disaster events. The order of events might include movement from pioneer species through several communities to the climax community.	**CROSSCUTTING CONCEPT:** **Stability and Change** *Students provide examples and explanations for sudden and gradual changes.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Constructing explanations and designing solutions** *Students form explanations that incorporate sources (including models, peer reviewed publications, their own investigations), invoke scientific theories, and can evaluate the degree to which data and evidence support a given conclusion.*

BIO1.LS3: Heredity			
BIO1.LS3.1	Model chromosome progression through meiosis and fertilization in order to argue how the process of sexual reproduction leads to both genetic similarities and variation in diploid organisms. Compare and contrast the processes of sexual and asexual reproduction, identifying the advantages and disadvantages of each. **COMPONENT IDEA:** *B. Variation of Traits*	**EXPLANATION:** In 7.LS2.8, students develop an understanding that organisms grow from a single cell to a potentially complex multicellular organism through mitosis. It is critical to note that meiosis is introduced in 7.LS3.2 with the sole purpose to focus on the resulting daughter cells. Meiosis related content is categorized under LS3. While meiosis can be viewed as a unique form of cell division that provides a mechanism that results in offspring with a genotype unique unto itself. It should be recognized that mutations are the primary source of variation created through asexual reproduction by mitosis or binary fission and that mutations are passed to sexually reproduced offspring only when they are present in gametes. Attention should be drawn to the idea that population diversity must be advantageous considering the disadvantages of sexual reproduction (partner requirement and increased energy requirement). Meiosis and fertilization can be modeled with diagrams, 3D models, animations, etc. An emphasis should be placed on events that lead to genetic differences (mutations, crossing over, and random segregation) as well as events that generate similarities in parent and offspring (DNA replication and transmission). Similarities and differences in sexual and asexual reproductive strategies can be compiled and analyzed by students through the use of comparative models previously used (BIO1.LS1.5) and/or other resources (text, video, etc). These models may further be used to demonstrate how chromosomal-based diseases such as Trisomy 21 (Down syndrome) occur and/or how sterile hybrids, such as mules or seedless watermelons, cannot effectively complete meiosis due to non-homologous chromosomes from different parent species.	**CROSSCUTTING CONCEPT:** **Cause and Effect** *Students use cause and effect models at one scale to make predictions about the behavior of systems at different scales.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Developing and using models** *Students can test the predictive abilities of their models in a real-world setting and make comparisons of two models of the same process or system.*

BIO1.LS3.2	Explain how protein formation results in phenotypic variation and discuss how changes in DNA can lead to somatic or germline mutations. **COMPONENT IDEA:** *A. Inheritance of Traits*	**EXPLANATION:** The general idea that genes create proteins and that these proteins determine the function and appearance of cells and organisms has been established in 7.LS3. In BIO1.LS1.4 the mechanism by which proteins are produced from genes is explored. This standard is designed to complete the connection between genotypes, protein synthesis, and resulting phenotypes by examining concrete examples. It should become clear that recessive traits occur when neither diploid copy of a gene produces a functional protein. Students could research the cause of specific and relatively simple examples of monogenic traits using a variety of level-appropriate resources (text, video, lecture, etc.) in order to elucidate the gene-protein-phenotype link. Classic examples could include but are not limited to: brown/blue base eye color due to melanin protein; PTC tasting due to a taste receptor on tongue cells; sickle cell anemia due to hemoglobin protein; PKU due to the enzyme that breaks down the amino acid phenylalanine; Hemophilia due to a clotting factor protein; ABO blood type due to an enzyme that attaches carbohydrates A, B, or nothing to the red blood cell. Students should recognize that phenotypic variation arises not only from genotypic variation, but also from gene expression variation, the latter of which can often be the result of environmental influences. For example: temperature regulates sex organ development in some fish species or fur color expression in some rabbit species; light regulates butterfly wing development; exercise increases muscle protein expression, isolation rearing in social animals alters brain gene expression; etc.	**CROSSCUTTING CONCEPT:** **Cause and Effect** *Students use cause and effect models at one scale to make predictions about the behavior of systems at different scales.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Constructing explanations and designing solutions** *Students form explanations that incorporate sources (including models, peer reviewed publications, their own investigations), invoke scientific theories, and can evaluate the degree to which data and evidence support a given conclusion.*

BIO1.LS3.3	Through pedigree analysis, identify patterns of trait inheritance to predict family member genotypes. Use mathematical thinking to predict the likelihood of various types of trait transmission. **COMPONENT IDEA:** *B. Variation of Traits*	**EXPLANATION:** In 7.LS3, students utilized Punnet squares to make predictions about allele combinations passed to offspring. Their predictions were limited to monohybrid crosses. While gene sequencing has permitted examination of the actual genetic information underlying a particular trait, that is a new process. Early models of investigating inheritance were dependent on pedigrees and the analysis of the appearance of phenotypes across generations. Modes of inheritance should include autosomal and sex-linked genes that are dominant/recessive, codominant, or incompletely dominant. Students can practice deductive reasoning using a basic set of criteria (including successive generation transmission and male/female ratio) in order to predict a mode of inheritance for a trait, define alleles for the trait, and assign genotypes to the family members of a given pedigree. Students can also practice using probability-based mathematics to predict offspring genotypes and phenotypes based on a given parental set.	**CROSSCUTTING CONCEPT:** **Pattern** *Students recognize, classify, and record patterns in quantitative data from empirical research and mathematical representations.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Constructing explanations and designing solutions** *Students form explanations that incorporate sources (including models, peer reviewed publications, their own investigations), invoke scientific theories, and can evaluate the degree to which data and evidence support a given conclusion.*

BIO1.LS4: Biological Change: Unity and Diversity			
BIO1.LS4.1	Evaluate scientific data collected from analysis of molecular sequences, fossil records, biogeography, and embryology. Identify chronological patterns of change and communicate that biological evolution is supported by multiple lines of empirical evidence that identify similarities inherited from a common ancestor. **COMPONENT IDEA:** *A. Evidence of Common Ancestry*	**EXPLANATION:** In earlier grades, students have discussed the origin of fossils, the fossil record, and comparative anatomy. BIO1.LS3 delves into the molecular basis for the phenotype of an organism. That new understanding provides a foundation for discussions about the significance of similarities between the genomes of extinct and extant organisms. Similarities in genomes provide a rationale for common amino acid sequences. Well-documented examples for data analysis could include but are not limited to the following: Molecular data demonstrating that all life shares the same genetic code; comparative DNA and protein sequence data demonstrating conservation of ubiquitous genes/proteins such as ribosomal protein, cytochrome c, etc.; fossil records demonstrating that major life forms currently on earth were not present in the past and major past life forms are not currently present; transitional fossil records that demonstrate anatomical changes over time showing radiation from fish to tetrapods, reptile (dinosaur) to birds, synapsids to mammals, land mammals to aquatic mammals, horse lineage, etc; biogeographical data demonstrating that species in close geographical proximity (regardless of habitat differences) resemble more than species in more similar habitats of distant proximity such as the Galapagos island species that most closely resemble their nearest neighbors in South America; embryological data demonstrating shared anatomical structures among the embryos of organism groups such as gill slits and tail display in all vertebrate embryos.	**CROSSCUTTING CONCEPT:** **Stability and Change** *Students provide examples and explanations for sudden and gradual changes.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Engaging in argument from evidence** *Students critically evaluate evidence supporting an argument and create written or oral arguments that invoke empirical evidence, scientific reasoning and scientific explanations.*
BIO1.LS4.2	Using a model that demonstrates the change in allele frequencies resulting in evolution of a population over many generations, identify causative agents of change. **COMPONENT IDEA:** *A. Evidence of Common Ancestry*	**EXPLANATION:** Requirements for natural selection (variation, inheritance and competition) should be recognized that with each generation there are random modifications, only some of which may enhance reproductive success within the given environment, allowing for persistence into the next generation. Repetition of this process over many generations leads to the non-random accumulation of adaptive traits in a given environmental setting. Students should investigate the mechanism by which isolation (reproductive isolation, geographical isolation, temporal isolation) can lead to evolutionary change. Other agents of change may include genetic drift (population bottlenecks, founder effect and sampling error). Predict observations that would be observed in accordance with this phenomenon. A simulation could be used that exhibits random variation introductions through mutations or gene flow and genetically-based trait transmission through generations in order to investigate causative agents of change such as a natural disaster or isolation that results in random modification of the population (genetic drift) or altered climate, resources, competitors, etc. that result in nonrandom accumulation of adaptive traits (natural selection). Students can analyze a variety of common examples of adaptations such as bird beak adaptations, insect mimicry, antibacterial-resistant strains of bacteria, etc. and explain the factors that led to an accumulation of a particular trait in a population. This explanation can be extended to also explain how natural selection mechanisms can result in the observation of non-beneficial traits such as species overspecialization (i.e. the cheetah, panda bear, koala) that increases probability of going extinct, suboptimal traits (i.e. vertebrate eye structure that causes blind spots) ,or vestigial traits (i.e. eye structures in cave fish). (Hardy-Weinberg equation may be used for enrichment, but is beyond the scope of BIO1.)	**CROSSCUTTING CONCEPT:** **Cause and Effect** *Students use and evaluate empirical evidence to classify causation vs. correlation.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Developing and using models** *Students plan and perform investigations to aid in the development of a predictive model for interacting variables, considering the quantity of data with respect to experimental uncertainty, and select methods for collection and analysis of data.*
BIO1.LS4.3	Identify ecosystem services and assess the role of biodiversity in support of these services. Analyze the role human activities have on disruption of these services. **COMPONENT IDEA:** *D. Biodiversity and Humans*	**EXPLANATION:** Biodiversity is first mentioned in 6.LS4.1. The relationship between levels of biodiversity and the fitness of an ecosystem are explicitly discussed as well. Discussing human activities draws this conversation to a larger scale. The loss of biodiversity or species has the same impact globally as it would at ecosystem levels. Natural selection is expedited by significant changes to ecosystems. Without deliberate efforts, human development causing habitat loss can be the significant change wiping out ecosystems. Students should appreciate that biodiversity increases with preservation of evolutionary lineages (decreased extinction rates) and in a feed-forward mechanism, biodiversity promotes ecosystem stability, which decreases extinction rates and enhances biodiversity. Students can investigate the various levels of biodiversity (genetic, species, ecosystem) required to provide services such as food, medicine, water purification, pollination, etc. and maintain ecosystem stability through climate stabilization, waste decomposition, maintenance of interdependent relationships, etc. Analysis of human activities may include habitat fragmentation, introduction of non-native or invasive species, overharvesting, pollution, eutrophication, and climate change.	**CROSSCUTTING CONCEPT:** **Scale, Proportion, and Quantity** *Students use cause and effect models at one scale to make predictions about the behavior of systems at different scales.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Asking questions (for science) and defining problems (for engineering)** *Questions about arguments and interpretations should elicit further elaboration or investigation.*

BIO1.ETS2: Links Among Engineering, Technology, Science, and Society			
BIO1.ETS2.1	Obtain, evaluate, and communicate information on how molecular biotechnology may be used in a variety of fields. **COMPONENT IDEA:** *A. Interdependence of Science, Technology, Engineering, and Math*	**EXPLANATION:** The goal is to help students appreciate that the basic science knowledge being studied can be manipulated and used to design useful tools for further scientific investigations, medical treatments, agricultural yields, etc. A detailed understanding of any technical procedures is not expected, but rather a "big picture" view of concepts the technology utilizes and the applications the technology is being used for. These technologies may be best investigated along with the standards from LS1 From Molecules to Organisms: Structure and Functions, as the students are learning about DNA and protein. Comparative DNA and protein sequence analysis is also a large part of current phylogenic research and could accompany LS4 Biological Change: Unity and Diversity. Students may also consider the pros and cons of biotechnical applications. Investigation of techniques utilized could come from field trips to witness the use of these techniques in practice, lab exercises, virtual labs, simulation activities, interviews with professionals, etc. Molecular techniques could include: PCR, electrophoresis, restriction enzyme digestion of DNA, DNA sequencing, plasmid-based transformation, transfection, etc. These techniques are used in fields of medicine, agriculture, biomedical engineering, forensic science, etc.	**CROSSCUTTING CONCEPT:** **Cause and Effect** *Students use cause and effect models at one scale to make predictions about the behavior of systems at different scales.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Obtaining, evaluating, and communicating information** *(Observe/Evaluate) Students can critically read scientific literature, integrating, extracting, and accurately simplifying main ideas from multiple sources while maintaining accuracy and validating data whenever possible. Students can provide written and oral explanations for phenomena and multi-part systems using models, graphs, data tables, and diagrams.*
BIO1.ETS2.2	Investigate means by which karyotypes are utilized in diagnostic medicine. **COMPONENT IDEA:** *B. Influence of Engineering, Technology, and Science on Society and the Natural World*	**EXPLANATION:** Engineers incorporate growing scientific knowledge in order to increase benefits to humans and decrease cost and risks. Karyotyping technology and its use in medical diagnosis can complement the standards from LS3: Hereditary: Inheritance, and Variation of Traits, as the students are learning about chromosomal organization of genomic information that determines one's phenotype. Analyze a large set of karyotypes to identify common patterns. Identify variations from the most commonly observed patterns and correlate them with patient phenotypes to propose a cause and effect relationship, discussing limitations of correlative data interpretation.	**CROSSCUTTING CONCEPT:** **Pattern** *Students recognize, classify, and record patterns in quantitative data from empirical research and mathematical representations.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Developing and using models** *Students can test the predictive abilities of their models in a real-world setting and make comparisons of two models of the same process or system.*
BIO1.ETS2.3	Analyze scientific and ethical arguments to support the pros and cons of applications of a specific biotechnology technique such as stem cell usage, in vitro fertilization, or genetically modified organisms. **COMPONENT IDEA:** *B. Influence of Engineering, Technology, and Science on Society and the Natural World*	**EXPLANATION:** The utilization of new technologies in any field of science is dependent on both economic and social factors. In addition to evaluating these factors, scientists must also consider long-term consequences that may not be initially apparent. The emphasis should be on the construction of a rationale argument that supports a position on the use of an application with ethical and social impact. Students should begin to appreciate the differences in ethical values that exist, and recognize that discussion of these values is imperative as knowledge and technology continue to advance, even when resolutions of differences can be rare. After investigation of a specific biotechnology application, students can write a position paper and/or participate in a classroom debate.	**CROSSCUTTING CONCEPT:** **Cause and Effect** *Students use and evaluate empirical evidence to classify causation vs. correlation.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Engaging in argument from evidence** *Students critically evaluate evidence supporting an argument and create written or oral arguments that invoke empirical evidence, scientific reasoning and scientific explanations.*

Curricular Competencies

Each block will challenge students to think critically. Science is a body of knowledge consisting of theories that explain data. Science is also a set of practices that use analysis and argumentation to establish, extend, and refine knowledge. Biology is split into 4 Life Sciences Units. Each block is aligned with the TN Department of Education's standards and approaches to instruction which include Science and Engineering Practices and Crosscutting Concepts.

Science and Engineering Practices (SEPs)

- Asking questions and defining problems
- Developing and using models
- Planning and carrying out controlled investigations
- Analyzing and interpreting data
- Using mathematics and computations thinking
- Constructing explanations and designing solutions
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

Crosscutting Concepts (CCCs)

- Pattern
- Cause & Effect
- Scale, Proportion, & Quantity
- Systems & System Models
- Energy & Matter
- Structure & Function
- Stability & Change

Life Sciences

- Unit 1: From molecules to organisms: Structures and processes
- Unit 2: Heredity: Inheritance and variation of traits
- Unit 3: Biological evolution: Unity and diversity Earth and Space Sciences
- Unit 4: Ecosystems: Interactions, energy, and dynamics

For more information on TDOE Science Documents please see the following links.

- Tennessee Academic Standards for Science
- TN Science Standards Implementation Guide
- TN Science Standards Reference

You will meet the objectives listed above through a combination of the following activities in this course:

- Attending class lecture
- Completing class activities
- Participating in class discussion

Part 3: Topic Outline/Schedule

Week	Topic	Reading/ Resources	Activities	Assessments / Exams
WK 1	Molecules and organisms - Chemistry in biology; methods of science - Characteristics of life - Macromolecule - Proteins - DNA Structure	Characteristics of life https://docs.google.com/presentation/d/1rcJu4P5kuq-sSVd7cYcZok6ybc3GrG-3P1bXSGtBx2o/edit?usp=sharing Macromolecules https://docs.google.com/presentation/d/1pF703-HTpk1HjK2FyQ-rSsCJukL9xY6kXc-rATTBTcs/edit?usp=sharing Proteins https://docs.google.com/presentation/d/1_4RvVYkcpd4o90ZVcfY7c5AzIKydG7jcOgHUP0RRh5g/edit?usp=sharing DNA Part 1 https://docs.google.com/presentation/d/1JRZSL1Jn2QH-z1v7H3J4hjp5l-hvAek6XyE2HjcsS0A/edit?usp=sharing DNA Part 2 (replication and central dogma) https://docs.google.com/presentation/d/1qto6muw7JsVwhu51ZfB9vteX7p_2c8NKcw91zw80XjE/edit?usp=sharing	Skit / Poem / Rap / Acronym of Characteristics of Life DNA Origami	Assessment 1
WK 2	Molecules and organisms - DNA; replication and central dogma; RNA types and roles - Cell Discovery and Plasma Membrane - Cell organelles - Cellular Transport - Energy and	Cell discovery and cell organelles https://drive.google.com/file/d/16Iyecioxu60IwHEo2AYaYJ66QgiUHzNA/view?usp=sharing Organelles https://drive.google.com/file/d/1L6J8FKeYAxFl5ING5ci0iKghLzWu7luY/view?usp=sharing Cellular Transport https://drive.google.com/file/d/17Tn4-BgKIvjorxBeXJTOIZozaxH6VvuY/view?usp=sharing	Cell Organelle Presentation Cell Model Cellular Transport Worksheet	Assessment 2

	Metabolism; How Cells Harvest Energy			
WK 3	Molecules and organisms - Photosynthesis - Krebs Cycle & Electron Transport; Compare Aerobic Respiration to Alternative; Energy Transfer	Cellular Respiration https://drive.google.com/file/d/1N9zj6D0ukcpgLyZB-h65BqX7n1nhpnJQ/view?usp=sharing How Organisms Obtain Energy https://drive.google.com/file/d/1etirtuFroKk5AzjB35Io10foIolTW0Ps/view?usp=sharing Photosynthesis https://drive.google.com/file/d/15v-rhvEy_3J3gJHrlEq1sS6rcPi7LlOm/view?usp=sharing	Jigsaw Activity Study guides Completed	Assessment 3
WK 4	Molecules and organisms - Cell Communication; Rates of Cell Division - Cell Growth - Mitosis & Cytokinesis - Cell Cycle Regulation	Mitosis https://docs.google.com/presentation/d/11V-lhohGnhWRaXhU8XeMUwZys8k8vjooErNSAdmInN4/edit?usp=sharing Cellular Growth https://docs.google.com/presentation/d/1DSNKbfhq47FNqCZb74PkB73NUeU1dFqVVHzh6-cd3hE/edit?usp=sharing	Diagram Concept Map	Assessment 4
WK 5	Molecules and organisms - Review for Unit Exam	https://drive.google.com/file/d/1YvOLPKlhc1uPiXxVLVXOQPKQQVZmlqim/view?usp=sharing https://drive.google.com/file/d/1nz70ROVDveAAcy1Oc1H7YA4X8leVd365/view?usp=sharing https://drive.google.com/file/d/11j9Qs29YLHfHMeDlaDbvX	Punnett Square Activities	Exam 1

		SFENpd5gJi7/view?usp=sharing		
WK 6	Heredity - Sexual Reproduction vs. Asexual - Meiosis - Variation in diploid organisms	https://learn.genetics.utah.edu/content/addiction/pi/ http://meiosis.geniverse.concord.org/#meiosis/challenge2 http://media.hhmi.org/biointeractive/click/elephants/dna/one-case-solved.html *https://drive.google.com/drive/folders/14LmCtRLR3Venu1wQHqotvkMO3WiHV69u?usp=sharing*	Research	
WK 7	Heredity - Patterns of Inheritance - Gene linkage - Predicting Transmission	https://learn.genetics.utah.edu/content/science/gmfoods/ https://learn.genetics.utah.edu/content/genetherapy/doctor/	Interactives	Assessment 5
WK 8	Heredity - Interactives - Punnett Squares - Pedigrees - Biotechnology	http://time.com/5406699/dog-cancer-3d-printed-skull/?xid=tcoshare https://www.khanacademy.org/science/biology/biotech-dna-technology/intro-to-biotech-tutorial/a/intro-to-biotechnology http://www.biotechnology.amgen.com/biotechnology-explained.html	Virtual Lab	Assessment 6
WK 9	Heredity - Debate scenarios	https://lsintspl3.wgbh.org/en-us/lesson/cygc12-sci-splgen/9 https://www.youtube.com/watch?v=jAhjPd4uNFY&feature=youtu.be	Debate	
WK 10	Heredity			
WK 11	Heredity			Exam 2
WK 12	Evolution - The Origin of Life - Natural Selection - Evidence of Evolution - Shaping Evolutionary Theory	Darwin's Theory of Evolution by Natural Selection https://docs.google.com/presentation/d/1QWM5f8nHboyMaSQrgQ-dnMIbFqOFV8c7YCoq1S7mFa0/edit?usp=sharing Evidence of Evolution https://docs.google.com/presentation/d/1gtvOD8-3LhSSNGZIxLykbnSnHz0RQEnxYen3EPgOM2k/edit?usp=sharing Shaping Evolutionary Theory https://docs.google.com/presentation/d/1F0ETqpnHNXHZqR7JLi7u-JFTpU-r1zys4tpeXv5PSf0/edit?usp=sharing	Skit Drawing Debate Worksheets	Assessment 7
WK 13	Evolution - Causative agents	Organisms and Their Relationships	Virtual Lab Newspaper Lab	Exam 3

	of change - Evolution and Genetics - Biodiversity and Human Impact - Ecosystem services	https://docs.google.com/presentation/d/19hg5YGEvloiXc1cwsTTX2-cGFPSrAfgoAEtiPGQGOfg/edit?usp=sharing Biodiversity https://docs.google.com/presentation/d/1MGzzOR01mpQMHDhtobJQ5r_RH87FjZkQgNMJtH-SF4c/edit?usp=sharing Threats to Biodiversity https://docs.google.com/presentation/d/1rD6ELxGn1yoRucy2_1-4HY4ZWDTVnNrk40nmD5ovRBI/edit?usp=sharing Conserving Biodiversity https://docs.google.com/presentation/d/1NjAZ5hpT3OpAWwfj45IhMWiXGrDyDqpKk7pFYERxORY/edit?usp=sharing	Succession Activity	
WK 14	Ecosystems - Autotrophs/Heterotrophs/Trophic level/Food chains - Cycling of Matter - Community Succession - Human impact on Climate based on Carbon Model	https://docs.google.com/presentation/d/1xxJe8ufvQjQLVD9ODc1D9ut2W15FsLYI8snDQEHP0kI/edit?usp=sharing	Virtual Lab	Assessment 8
WK 15	Ecosystems - Population dynamics - Biodiversity - Threats to Biodiversity - Sustainable use, conversation		Wolves in the Wild	
WK 16		Writing Enhancing Websites https://www.smart-words.org/linking-words/transition-words.html https://hls.harvard.edu/dept/opia/job-search-toolkit/action-verbs/ Databases https://www.jstor.org/ https://www.ncbi.nlm.nih.gov/pubmed/		Exam 4
WK 17	Review for Cumulative Exam			

	and EOC			
WK 18	Review for Cumulative Exam and EOC			EOC Cumulative Exam

***Note about calendar/schedule:** This is a rough draft, the course will adapt accordingly to snow days, the school calendar, and as students require additional time to master a topic. This schedule includes most assessments, exams, and reviews for EOC. Students will be notified of any changes to the schedule.

Part 4: Grading Policy

Graded Course Activities

Assignments for details about each assignment listed below.

1st 9 Weeks	
Points	**Description**
5 pts	WK1 Assignments and Participation (20%)
5 pts	WK 1 Team Work (10%)
10 pts	DNA Homework (20%)
100 pts	Assessment 1 (20%)
5 pts	WK 2 Assignments and Participation (20%)
5 pts	WK 2 Team Work (10%)
100 pts	Assessment 2 (20%)
10 pts	WK 3 Assignments and Participation (20%) - Jigsaw Activity
5 pts	WK 3 Team Work (10%)
10 pts	WK3 blog post (20%)
100 pts	Assessment 3 (20%)
10 Pts	p.257 1-8 (20%)
5 pts	WK 4Assignments and Participation (20%)
5 pts	WK 4 Team Work (10%)
5 pts	WK 5Assignments and Participation (20%)
10 pts	Exam 1 review
100 pts	Exam 1 (25%)
10 pts	Exam Corrections (20%)
5 pts	WK 6 Assignments and Participation (20%)
5 pts	WK 6 Team Work (10%)
10 pts	Meiosis Homework (20%)
5 pts	WK 7 Assignments and Participation (20%)
5 pts	WK 7 Team Work (10%)
30 pts	Karyotypes in Diagnostic Medicine Paper (20%)
5 pts	WK 8 Assignments and Participation (20%)
5 pts	WK 8 Team Work (10%)
10 pts	Virtual Lab (20%)
5 pts	WK 9 Assignments and Participation (20%)
5 pts	WK 9 Team Work (10%)
5 pts	Debate (20%)
2nd 9 Weeks	
Points	**Description**
5 pts	WK10 Assignments and Participation (20%)

5 pts	WK 10 Team Work (10%)
5 pts	WK11 Assignments and Participation (20%)
5 pts	WK 11 Team Work (10%)
100 pts	Exam Two (25%)
30 pts	WK 12 Assignments and Participation (20%) - Evolution Debate
5 pts	WK 12 Team Work (10%)
20 pts	WK 13 Assignments and Participation (20%) - Ant Simulation and Newspaper Lab - Bug + Definitions
5 pts	WK 13 Team Work (10%)
100 pts	Exam Three (25%)
10 pts	WK 14 Assignments and Participation (20%) - Paper on extinction
5 pts	WK 14 Team Work (10%)
10 pts	WK 15 Assignments and Participation (20%) - Ecological succession activity - Oil Lab
5 pts	WK 15 Team Work (10%)
30 pts	WK 16 Assignments and Participation (20%) - Wolves Activity
5 pts	WK 16 Team Work (10%)
100 pts	Exam Four (25%)
20 pts	WK 17 Review
50 pts	HeLa Paper
50 pts	Final Review Project
15 % of grade	EOC
100 pts	Cumulative Final

Late Work Policy

Be sure to pay close attention to deadlines—there will be no make up assignments or quizzes, or late work accepted without a serious and compelling reason and instructor approval.

Viewing Grades in ASPEN (optional)

Points you receive for graded activities will be posted to the ASPEN Grade Book. Click on the My Grades link on the left navigation to view your points.

Your instructor will update the online grades each week. After a grading session has been complete—typically 3 days following the completion of an activity. You will see a visual indication of new grades posted on your ASPEN home page under the link to this course.

Assessments

(20% total, 8 assessments): Assessments will be a quiz like format that are purposed to help students prepare for the exam.

Exams

(25% total, 4 Unit exams + 1 cumulative exam): Student's mastery of course material will be assessed through scheduled exams. Each unit exam will include some cumulative questions over selected material. There will be one cumulative exam at the end of the semester. If an exam is missed, the student must meet with the instructor.

Letter Grade Assignment

Final grades assigned for this course will be based on the percentage of total points earned category, assigned as follows:

Cosby's Biology I Breakdown

Gradebook Categories and Corresponding Percentages	
Category	**Percentage**
Unit Exams (4) + Cumulative Exam	25 %
Unit Assessments (8)	20 %
Projects	10 %
Team Work	10 %
Assessments + Participation + Notebook	20 %
EOC	15%

Tennessee Uniform Grading Policy

Local school systems shall use the following uniform grading system for students enrolled in grades nine through twelve (9-12). Students' grades shall be reported for the purposes of application for post-secondary financial assistance administered by the Tennessee Student Assistance Corporation using the uniform grading system.

Grade	How Much You Have Learned	Percent Range
A	Mastery	93 – 100
B	Proficiency	85 – 92
C	Progressing towards expectations	75 – 84
D	Not demonstrating understanding or lack of effort	70 – 74
F	Concepts not learned, failing work	0 – 69

Part 5: Course Policies

Attendance

Attendance is not only required, but also necessary to ensure the paced learning of every student. It is understandable for absences to occur for various reasons from doctor's appointments to family emergencies; however, when a student is absent, they are responsible for the material covered in the class and related assignments. Students should request their work via email or written request handed to the instructor immediately before or after their absence.

Collaboration

Students must be willing to share their thoughts, opinions, and questions. Most class blocks have a discussion component and all students are expected to participate. Student must learn the value of different perspectives and work together to increase knowledge. Students must model thoughtful conversation. As team work is 10% of the student's final grade, it is important students be a contributing member of the group. Additionally, participation in class activities will periodically be taken and noted in ASPEN.

Critical Thinking

Students of all ability levels will be asked to perform on high levels. Students will be challenged to grow in their thinking. Students should be open to thinking critically and use their insights to move the conversation forward and to ask questions.

Email

Email is the best way to contact me regarding classroom questions. If you do not have access to email, please write down your question or concern and hand it in to me. Please plan ahead and ask questions early so that instructors may respond in a timely manner. Updated parent/guardian contact information should be provided to the instructor.

Inquiry

Many of the questions asked as students learn and discuss concepts are centered around investigations. Students must advocate for their own learning by making inquiry a daily habit, as every good scientist does.

Innovation

As students learn and discuss, they should embrace the creation of new ideas, original thoughts, and unexplored possibilities. Students should be aware of their own biases and work to broaden their perspectives. When completing assignments and working in groups, students are encouraged to be innovative, look at the world around them, ask questions, discover problems, and develop solutions.

Grade Posting

Official grades are located in ASPEN. Grades are routinely updated in ASPEN and can be viewed by students and parents. Parents should be aware that notifications can be set up through ASPEN. Report Cards will be issued twice a semester – 9th and 18th weeks. Progress reports will be issued twice a semester – 4½ and 13½ weeks.

Late Work

Each assignment completion date will be written on the board. No late submission will be accepted for credit, unless a written agreement has been signed by the instructor on a new completion date. For late assignment agreements, up to 5 points may be deducted for every late day. Students must keep up with their assignments as this will help prepare for exams and may be a part of the student's notebook. There *will not* be an opportunity to submit late work at the end of the course.

Build Rapport

If you find that you have any trouble keeping up with assignments or other aspects of the course, make sure you let your instructor know as early as possible. As you will find, building rapport and effective relationships are key to becoming an effective professional. Make sure that you are proactive in informing your instructor when difficulties arise during the semester so that they can help you find a solution.

Makeup Work

If students are absent for any reason—excused or unexcused—students are responsible for making contact with their instructor. Please send an email or meet with the instructor as soon as you know that you will be missing class. Any assignment or project that is due on the day a student is absent is due the day the student returns to school. All makeup work of an excused absence, according to CCBOE's attendance policy, must be submitted within **three days** of the missed class unless otherwise specified by the instructor. Missed assessments and exams must be made up. If you have any questions, please see me for help.

Extra Credit

Extra credit will NOT be extended to individual students. On rare occasions, extra credit will be given to the entire class, so every student will have the same opportunity to earn extra credit.

Professionalism

Students should be on time and ready to learn every day. Students should be prepared to learn with all assigned readings and materials completed *before* class. Students should release themselves from any distractions *before* they come to class. When addressing peers, school leadership, classroom guests, or instructors, students should speak with respect, patience, and consideration.

Complete Assignments

Assignments must be submitted by the given deadline or special permission must be requested from instructor *before the due date*. Extensions will not be given beyond the next assignment except under extreme circumstances. All assignments must be completed by the assignment due date and time. Late or missing assignments will affect the student's grade.

Incomplete Policy

Under emergency/special circumstances, students may petition for an incomplete grade. An incomplete will only be assigned if student provides adequate reasoning and a written agreement is signed by the teacher and student. All incomplete course assignments must be completed within the signed agreed upon time.

Academic Dishonesty Policy

1. Academic dishonesty includes such things as cheating, inventing false information or citations, plagiarism and helping someone else commit an act of academic dishonesty. It usually involves an attempt by a student to show possession of a level of knowledge or skill that he/she does not possess.

2. Course instructors have the initial responsibility for detecting and dealing with academic dishonesty. Instructors who believe that an act of academic dishonesty has occurred are obligated to discuss the matter with the student(s) involved. Instructors should possess reasonable evidence of academic dishonesty. However, if circumstances prevent consultation with student(s), instructors may take whatever action (subject to student appeal) they deem appropriate.

3. Instructors who are convinced by the evidence that a student is guilty of academic dishonesty shall assign an appropriate academic penalty. If the instructors believe that the academic dishonesty reflects on the student's academic performance or the academic integrity in a course, the student's grade should be adversely affected. Suggested guidelines for appropriate actions are: an oral reprimand in cases where there is reasonable doubt that the student knew his/her action constituted academic dishonesty; a failing grade on the particular paper, project or examination where the act of dishonesty was unpremeditated, or where there were significant mitigating circumstances; a failing grade in the course where the dishonesty was premeditated or planned. The instructors will file incident reports with the Principal or their designees. These reports shall include a description of the alleged incident of academic dishonesty, any relevant documentation, and any recommendations for action that he/she deems appropriate.

Student Testing Code of Ethics and Security

It is important for you as a student to know that the following guidelines are to be strictly followed. This year the TNReady EOC test will count at least 15% of your final semester grade. Your work on this test is very important and it deserves your best effort.
I understand that during testing on the days of the assessment, I am responsible for:

- Not having any electronic devices on me or in my purse/backpack/pockets
    - Including but not limited to cell phones, smart phones, smart watches, etc. **during testing or during breaks.**
    - Best practice is for students to leave devices at home or in their lockers on the day of testing.
    - If I am caught with a device during testing or during breaks, my test may be nullified, resulting in a zero as at least 15% of my semester grade, and any school level disciplinary action as deemed appropriate by the administration.
- Trying my best on the test
    - If I do not attempt to test (I give **no answers or randomly answer** questions) my test score may be nullified, resulting in a zero as at least 15% of my semester grade, and any school level disciplinary action as deemed appropriate by the administration.
    - The testing administrators and proctors in the testing environment will determine if no answers or random answering is taking place.
    - I will focus and put forth effort on the test .
- Being honest and not cheating
    - If I am caught cheating (taking pictures of the test, writing down and passing answers, talking to other students, looking on other computers, using software outside the testing platform), my test may be nullified, resulting in a zero as at least 15% of my semester grade, and any school level

disciplinary action as deemed appropriate by the administration.

Important Note: Any form of academic dishonesty, including cheating and plagiarism, may be reported to the office of student affairs.

Course policies are subject to change. It is the student’s responsibility to check for corrections or updates to the syllabus. Any changes will be posted in the classroom.