MAGIC CITY ACCEPTANCE ACADEMY

Biology

Timeline	Unit/theme	Standard	Student Focused Objective	Resources/ Suggested Activities
Days: 12 August (1st - 16th)	**<u>Unit 1</u>** Building Blocks: Organic Molecules	**SC15.BIO.1** Use models to compare and contrast how the structural characteristics of carbohydrates, nucleic acids, proteins, and lipids define their function in organisms.	**Learning Targets:** ● I can use models to compare and contrast the four key organic macromolecules ● I can identify the monomers and polymers of carbohydrates, nucleic acids, proteins, and lipids. ● I can describe how atoms are used to build macromolecules. ● I can discuss how the structure of a macromolecule defines its function.	**Lab:** Macromolecules Murder Mystery **Vidoes:** Amoeba Sisters: Biomolecules **Notes/Presentations:** Chemistry of Life PPT Chemistry of Life Notes
Days: 7 August (19th - 27th)	**<u>Unit 1</u>** Building Blocks: Organic Molecules	**SC15.BIO.3** Formulate an evidence-based explanation regarding how the composition of deoxyribonucleic acid (DNA) determines the structural organization of proteins. **SC15.BIO.3a** Obtain and evaluate experiments of major scientists and	**Learning Targets:** ● I can create an accurate model of DNA using my understanding of its structure and function. ● I can use evidence from major scientists to explain the structure and organization of DNA. ● I can evaluate the contributions of major scientists in the discovery of DNA's structure. ● I can use models to describe what the central dogma is and how proteins are	**Project:** Students will work in small groups and individually to create a 3-D model of DNA's structure using materials provided in class. **Vidoes:** From DNA to protein- 3D **Notes/Presentations:** DNA and Protein Synthesis

		communicate their contributions to the development of the structure of DNA and to the development of the central dogma of molecular biology.	synthesized.	PPT DNA and Protein Synthesis Notes
Days: 5 (August 28th - Sept 10th)	**<u>Unit 1</u>** Building Blocks: Organic Molecules	**SC15.BIO.3** Formulate an evidence-based explanation regarding how the composition of deoxyribonucleic acid (DNA) determines the structural organization of proteins. **SC15.BIO.3c** Obtain information to identify errors that occur during DNA replication (e.g., deletion, insertion, translocation, substitution, inversion, frame-shift, point mutations).	**Learning Targets:** ● I can explain how errors occur in DNA replication and evaluate the implications of these errors. ● I can use models to represent the outcomes of different types of DNA replication errors. ● I can describe how the functionality of proteins is affected when errors are made in the DNA. ● I can create evidence based explanations to discuss how protein is synthesized and how errors in DNA result in changes in proteins.	**Activity:** Gene Mutation Worksheets DNA Transcription and Translation Worksheets Gene Expression PhET Simulation **Vidoes:** What happens when your DNA is damaged? **Notes/Presentations:** DNA and Protein Synthesis PPT DNA and Protein Synthesis Notes
Days: 5 (Sept. 11th - 17th)	**<u>Unit 1</u>** Building Blocks: Organic	**SC15.BIO.3** Formulate an evidence-based explanation regarding how the composition of	**Learning Targets:** ● I can conduct research on modern day biotechnology. ● I can use research findings to discuss the	**Vidoes:** The race to sequence the human genome

	Molecules	deoxyribonucleic acid (DNA) determines the structural organization of proteins. **SC15.BIO.3b** 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.	practical and ethical implications of advancements in genetic technology. ● I can evaluate the efficacy of the Human Genome Project.	**Notes/Presentations:** Biotechnology PPT Biotechnology Notes
Days: 10 (Sept. 18th - Oct. 2nd)	**<u>Unit 2</u>** Cells and their functions	**SC15.BIO.2** Obtain, evaluate, and communicate information to describe the function and diversity of organelles and structures in various types of cells (e.g., muscle	**Learning Targets:** ● I can describe the function of organelles. ● I can use my knowledge of organelles to evaluate how their function contributes to specialized cells. ● I can explain the difference between eukaryotic cells and prokaryotic cells.	**Project:** Students will create a 3-D model of a eukaryotic cell of their choice using materials provided in class. **Vidoes:**

		cells having a large amount of mitochondria, plasmids in bacteria, chloroplasts in plant cells).	• I can discuss the Cell Theory and the major scientist who contributed to its discovery.	Introduction to Cells: The Grand Cell Tour **Notes/Presentations:** Introduction to Cells PPT Intro to Cells Notes
Days: 15 (Oct. 3rd - Oct. 24th)	**<u>Unit 2</u>** Cells and their functions	**SC15.BIO.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. **SC15.BIO.5a** 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.	**Learning Targets:** • I can compare and contrast positive and negative feedback loops. • I can evaluate and explain how feedback loops are used to maintain homeostasis. • I can conduct investigations to explore the properties of water. • I can explain how active and passive transport operate in the cell.	**Labs:** Egg Osmosis Lab **Vidoes:** Homeostasis and Negative/Positive Feedback **Notes/Presentations:** Introduction to Cells PPT Intro to Cells Notes
Days: 15 (Oct.	**<u>Unit 2</u>** Cells and	**SC15.BIO.6** Analyze and interpret data from	**Learning Targets:** • I can compare and contrast photosynthesis	**Vidoes:** Photosynthesis and Cellular

25th - Nov. 15th	their functions	investigations to explain the role of products and reactants of photosynthesis and cellular respiration in the cycling of matter and the flow of energy. **SC15.BIO.6a** Plan and carry out investigations to explain the interactions among pigments, absorption of light, and reflection of light.	and cellular respiration. ● I can explain the chemical reaction of photosynthesis. ● I can explain the chemical of cellular respiration. ● I can use models to demonstrate how energy flows through the processes of photosynthesis and cellular respiration.	Respiration **Notes/Presentation:** Cellular Energy PPT Cellular Energy Notes
Days: 10 (Nov. 18th - Dec. 6th)	**<u>Unit 2</u>** Cells and their functions	**SC15.BIO.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).	**Learning Targets:** ● I can explain the cell cycle and describe each of its phases. ● I can develop models to demonstrate how cells can grow abnormally. ● I can compare and contrast the phases of mitosis and meiosis. ● I can evaluate the products of mitosis. ● I can explain how uncontrolled cell growth can result in the creation of tumors.	**Extra Materials:** Cell Growth and Division PPT Cell Growth and Division Notes
7 Flex Days	Units 1-3	Standards: 1, 2, 3, 4, 5, and 6	Flex days will consist of initial introductions, lab safety, reviews, and exams.	
Days: 20	**<u>Unit 3</u>**	**SC15.BIO.11** Analyze and	**Learning Targets:**	**Lab:**

(Jan. 9th - Feb. 7th)	Heredity	interpret data collected from probability calculations to explain the variation of expressed traits within a population. **SC15.BIO.11a** Use mathematics and computation to predict phenotypic and genotypic ratios and percentages by constructing Punnett squares, including using both homozygous and heterozygous allele pairs. **SC15.BIO.11b** Develop and use models to demonstrate codominance, incomplete dominance, and Mendel's laws of segregation and independent assortment. **SC15.BIO.11c** Analyze and interpret data (e.g., pedigree charts, family and population studies) regarding Mendelian and	• I can collect and interpret data using Punnett Squares. • I can explain how genes are independently assorted and discuss its importance. • I can describe the relationship between phenotypes and genotypes. • I can create pedigree charts to show how traits and disorders are passed between generations. • I can use mathematics to create phenotypic and genotypic ratios and percentages. • I can use models to evaluate different types of dominance i.e. codominance, incomplete dominance, and complete dominance. • I can research and discuss different types of genetic disorders and their significance.	Bumble Bee Lab Worksheet Bumble Bee Lab Presentation Bumble Bee Additional Materials **Videos:** How Mendel's pea plants helped us understand genetics Inherited Genetic Disorders **Notes/Presentations:** Intro to Genetics PPT Intro to Genetics Notes

		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.		
Days: 5 (Feb. 10 - 14th)	**<u>Unit 3</u>** Heredity	**SC15.BIO.12** Develop and use a model to analyze the structure of chromosomes and how new genetic combinations occur through the process of meiosis. **SC15.BIO.12a** Analyze data to draw conclusions about genetic disorders caused by errors in meiosis (e.g., Down syndrome, Turner syndrome).	**Learning Targets:** ● I can use models to analyze the structure of Chromosomes. ● I can describe how genetic combinations occur during meiosis. ● I can evaluate the implications of genetic eros that occur during meiosis. ● I can interpret data regarding the inheritance and prevalence of genetic disorders.	**Project:** Students will work in groups or individually to create a presentation over the genetic disorder of their choosing. **Notes/Presentations:** Intro to Genetics PPT Intro to Genetics Notes
Days: 5 (Feb. 24th - Feb. 28th)	**<u>Unit 4</u>** Adaptations, natural selection, and evolution	**SC15.BIO.14** Analyze and interpret data to evaluate adaptations resulting from natural and artificial	**Learning Targets:** **1.** Identify and explain examples of adaptations resulting from natural selection,	**Videos:** Amoeba Sisters Videos **Curriculum:** Kesler Science, LLC.

		selection that may cause changes in populations over time (e.g., antibiotic-resistant bacteria, beak types, peppered moths, pest-resistant crops).	such as changes in beak types or the development of antibiotic-resistant bacteria. 2. Analyze and interpret data related to artificial selection, such as pest-resistant crops, to understand how human intervention can influence the traits of populations over time. 3. Compare and contrast the effects of natural and artificial selection on populations, using examples like peppered moths and antibiotic-resistant bacteria, to evaluate how each process leads to changes in genetic diversity. **4.** Evaluate how environmental pressures, such as the presence of antibiotics or changes in climate, can drive the selection of advantageous traits and impact the survival of organisms in a population.	It's Not Rocket Science
Days: 5 (March 3rd - 7th)	**<u>Unit 4</u>** Adaptations, natural selection, and evolution	**SC15.BIO.15** Engage in argument from evidence (e.g., mathematical models such as distribution graphs) to explain how the diversity	**Learning Targets:** 1. Use evidence from distribution graphs to explain how overpopulation affects the diversity of organisms in an ecosystem. 2. Construct and defend an argument about	**Videos:** Amoeba Sisters Videos **Curriculum:** Kesler Science, LLC. It's Not Rocket Science

		of organisms is affected by overpopulation of species, variation due to genetic mutations, and competition for limited resources.	how genetic mutations contribute to variation within a population and its impact on species diversity. 3. Analyze the role of competition for limited resources in shaping the genetic diversity of organisms within a population. 4. Evaluate how overpopulation, genetic variation, and resource competition interact to influence the survival and adaptation of species over time.	
Days: 10 (March 10th - 14th)	**<u>Unit 4</u>** Adaptations, natural selection, and evolution	**SC15.BIO.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). **SC15.BIO.13a** Engage in argument to justify the	**Learning Targets** 1. Identify and explain the major levels of taxonomy (e.g., kingdom, phylum, class) and how organisms are classified based on physical characteristics. 2. Use a dichotomous key to classify organisms and communicate the process of identifying organisms based on observable traits. 3. Explain the system of binomial nomenclature and its importance in the consistent identification and classification of	**Videos:** Amoeba Sisters Videos **Curriculum:** Kesler Science, LLC. It's Not Rocket Science

		grouping of viruses in a category separate from living things.	species. 4. Engage in an evidence-based argument to justify why viruses are classified separately from living organisms, considering their unique characteristics.	
Days: 5 (March 17th - 21st)	**<u>Unit 4</u>** Adaptations, natural selection, and evolution	**SC15.BIO.16** Analyze scientific evidence (e.g., DNA, fossil records, cladograms, biogeography) to support hypotheses of common ancestry and biological evolution.	**Learning Targets:** 1. Analyze DNA evidence to support hypotheses of common ancestry and explain how genetic similarities and differences can indicate evolutionary relationships. 2. Interpret fossil records to trace the evolutionary history of species and support hypotheses of common ancestry over time. 3. Use cladograms to evaluate evolutionary relationships between species and explain how shared characteristics reflect common ancestry. 4. Examine biogeographical patterns to support the theory of biological evolution and explain how the distribution of species provides evidence for common ancestry.	**Videos:** Amoeba Sisters Videos **Curriculum:** Kesler Science, LLC. It's Not Rocket Science

Days: 7 (March 31st - April 8th)	**<u>Unit 5</u>** Populations	**SC15.BIO.7** Develop and use models to illustrate examples of ecological hierarchy levels, including biosphere, biome, ecosystem, community, population, and organism.	**Learning Targets:** 1. Develop and use models to illustrate the different levels of ecological hierarchy, including the biosphere, biome, ecosystem, community, population, and organism. 2. Explain the relationships between the levels of ecological hierarchy, and describe how each level contributes to the functioning of the overall ecosystem. 3. Identify examples of each ecological hierarchy level (biosphere, biome, ecosystem, community, population, organism) and use models to demonstrate how organisms interact within these levels. 4. Analyze and interpret models of ecological systems to explain how changes at one level (e.g., population or community) can impact other levels within the ecological hierarchy.	**Videos:** Amoeba Sisters Videos **Curriculum:** Kesler Science, LLC. It's Not Rocket Science
Days: 8 (April 9th - April 25th)	**<u>Unit 5</u>** Populations	**SC15.BIO.8** Develop and use models to describe the cycling of matter (e.g., carbon, nitrogen, water) and flow of energy (e.g.,	**Learning Targets:** 1. Develop and use models to illustrate the cycling of matter (e.g., carbon, nitrogen, water) through ecosystems, highlighting the	**Videos:** Amoeba Sisters Videos **Curriculum:** Kesler Science, LLC.

		food chains, food webs, biomass pyramids, ten percent law) between abiotic and biotic factors in ecosystems.	interactions between abiotic and biotic factors. 2. Explain how energy flows through ecosystems using models of food chains, food webs, and biomass pyramids, and describe the transfer of energy between trophic levels. **3.** Apply the ten percent law to explain how energy decreases as it moves up trophic levels in a food chain or food web, and use models to demonstrate this energy transfer. 4. Analyze models of nutrient cycling (e.g., carbon and nitrogen cycles) to describe how matter is recycled and reused by both biotic and abiotic components of an ecosystem.	It's Not Rocket Science
Days: 7 (April 28th - May 7th)	**<u>Unit 5</u>** Populations	**SC15.BIO.9** Use mathematical comparisons and visual representations to support or refute explanations of factors that affect population growth (e.g., exponential, linear, logistic).	**Learning Target:** 1. Use mathematical models, such as exponential and logistic growth equations, to describe and compare how different factors influence population growth over time. 2. Interpret and create visual representations,	**Videos:** Amoeba Sisters Videos **Curriculum:** Kesler Science, LLC. It's Not Rocket Science

			such as graphs and charts, to illustrate the different patterns of population growth (exponential, linear, and logistic). 3. Apply mathematical comparisons to analyze how factors like resource availability, competition, and predation can affect the rate of population growth in an ecosystem. **4.** Use mathematical data and visual models to evaluate and support or refute hypotheses about population growth trends in different environmental contexts (e.g., limited vs. unlimited resources).	
Days: 7 (May 8th - 16th)	**<u>Unit 5</u>** Populations	**SC15.BIO.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.*	**Learning Target:** 1. Construct an explanation of how density-dependent factors (e.g., competition, predation, disease) and density-independent factors (e.g., natural disasters, climate change) influence ecological succession and population dynamics. 2. Design a real-world solution to mitigate the	**Videos:** Amoeba Sisters Videos **Curriculum:** Kesler Science, LLC. It's Not Rocket Science

			effects of density-dependent and density-independent factors on ecosystems, considering how these factors alter community structure and biodiversity. 3. Analyze the impact of changing environmental conditions on ecological succession and propose strategies to restore or manage ecosystems impacted by these changes. **4.** Use evidence from case studies or simulations to explain how ecological succession progresses in response to both density-dependent and density-independent factors, and evaluate potential human interventions to address these changes.	

8 Flex Days	All Units	All standards	Flex days will consist of reviews, and exams.	