Pace Charter School of Hamilton

52 Lafayette Avenue

Hamilton, NJ 08610

pacecharter.com

Science: 7th Grade

The Pace Charter School of Hamilton Science Department is committed to equipping the students of Hamilton Township with scientific habits of mind and scientific skill sets. Our sincere goal is for every student of Hamilton Township to leave our halls with an increased level of scientific literacy which will enable them to evaluate competing claims in a rapidly changing society. We aspire to have science make sense to every student, and for each of them to think critically and skeptically about the world they live in. Beyond this central goal, our general intent is to prepare our students for college, technical coursework, career, and life-long interest and curiosity for the sciences.

Science is a field of human endeavor that seeks the truth about how the natural world functions via what is commonly called "the scientific method." Although there is not one single scientific method, the heart of science centers on deductive reasoning and making claims based upon evidence. To reflect these central scientific values, the question that guides our Science Department is: "How do I/we know what is really true?" As we plan curricula, lessons, and activities, our focus is on presenting relevant material, placing emphasis on students analyzing data and solving problems, and ensuring effective communication among all parties.

Pace Charter School of Hamilton's Science Program Beliefs:

- Make sense of the world with the lens of science
- Demonstrate curiosity about the natural world
- Analyze argumentative claims based on available evidence
- Practice a balance of open-mindedness and skepticism as they navigate their world
- Make progress in attaining scientific literacy
- Apply scientific concepts to solve problems in sensible and creative ways
- Design solutions to real-world problems using the integration of science, technology, engineering, and mathematics
- Use data in making decisions and drawing conclusions
- See the relevance of science to their lives
- Be proud, life-long students of science!

Pace Charter School
Grade: 7

Curriculum and Pacing Guide
Content Area: Science

Unit Title: Introduction to Living Things/ Classification	**Duration of Unit** 6 weeks
Essential Questions	• How are living things alike yet different? • Why do biologists classify organisms? • What are the levels of classification? • What are the characteristics of life? • How are organisms classified into domains and kingdoms? • How are evolution and classification related?
NJSLS Subject Area Standards/ Literacy Companion Standards (Reading & Writing)	MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways the parts of cells contribute to the function. MS-LS1-3. Use arguments supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. NJSLSA.R2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas. RI.8.1. Cite the textual evidence and make relevant connections that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text. RI.8.2. Determine a central idea of a text and analyze its development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text. SL.8.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade level topics, texts, and issues, building on others' ideas and expressing their own clearly. NJSLSA.L1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
Learning Objectives	• Students will be able to identify the needs and characteristics of living things. • Students will be able to identify and explain a stimulus and response in science. • Students will be able to identify and explain a hypothesis. • Students will learn about the 4 things organisms need to survive. • Students will be able to define and explain the classification levels of life. • Students will be able to identify and describe the different levels of classification. • Students will be able to identify the importance of taxonomic keys in classification. • Students will be able to identify the different organisms within different kingdoms • Students will be able to identify the characteristics of a virus. • Students will be able to identify bacteria.

	• Students will be able to identify the characteristics of protists (animal-like, plant-like, and fungi-like) • Students will be able to identify fungi.
Learning Activities	• Please Pass the Bread • Fishing Lure Organisms • Pine Tree Classification • Naming the Domain • Common Ancestors (Branching Tree Diagram) • Classification Acronym • How Viruses Spread • Bacteria Wanted Poster • What's in Pond Water?
Formative Assessment	• Daily Do Now questions • Informal checks for understanding • Class discussions • Classroom polls/ survey • Kahoot • BrainPOP
Alternative Assessment	• Student led labs listed above in "Learning Activities" • Group activities • Demonstrations
Summative Assessment	• Lab reports • Lesson quizzes • Chapter test
Technology Standards	• 8.1.8.IC.1: Compare the trade-offs associated with computing technologies that affect an individual's everyday activities and career options. • 8.2.8.ED.7: Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches). • 8.2.8.ITH.2: Compare how technologies have influenced society over time. • 8.2.8.ETW.4: Compare the environmental effects of two alternative technologies devised to address climate change issues and use data to justify which choice is best. • 8.2.8.EC.1: Explain ethical issues that may arise from the use of new technologies.
21st Century Life and Career Practices	• 9.1.8.CR.1: Compare and contrast the role of philanthropy, volunteer service, and charities in community development and the quality of life in a variety of cultures. • 9.1.8.CP.1: Compare prices for the same goods or services. • 9.1.8.EG.5: Interpret how changing economic and societal needs influence employment trends and future education. • 9.1.8.FP.2: Evaluate the role of emotions, attitudes, and behavior (rational and irrational) in making financial decisions. • 9.1.8.PB.5: Identify factors that affect one's goals, including peers, culture, location, and past experiences.

	• 9.2.8.CAP.4: Explain how an individual's online behavior (e.g., social networking, photo exchanges, video postings) may impact opportunities for employment or advancement. • 9.4.8.DC.1: Analyze the resource citations in online materials for proper use. • 9.4.8.DC.8: Explain how communities use data and technology to develop measures to respond to effects of climate change (e.g., smart cities). • 9.4.8.GCA.1: Model how to navigate cultural differences with sensitivity and respect. • 9.4.8.IML.12: Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience. • 9.4.8.TL.2: Gather data and digitally represent information to communicate a real-world problem.
Interdisciplinary Connections	Mathematics: • Students will show that humans contain trillions of cells using exponents to illustrate how small cells are and how many there are in the human body o 7.NS.2.C Apply properties of operations as strategies to multiply and divide rational numbers. o 7.EE.A.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."
Instructional Materials/Resources/ Technology Resources	• Elevate Science - Life, Savvas • Google Classroom • YouTube/ other video streaming services • BrainPOP • Kahoot • Various lab materials • Compound Light Microscopes • Chromebooks (1:1) • Smart Board • Classroom speakers • FM device
Accommodations and Modifications	**504** • Provide copy of class notes • Provide preferential seating • Use a consistent daily routine • Break down tasks into manageable units • Check homework on a daily basis • Frequently check for understanding • Allow for repetition and/or clarification of directions, as needed • Allow wait time for processing before calling on student for response • Announce test with adequate prep time • Additional time to complete classroom tests/quizzes **IEP** • Provide copy of class notes • Provide preferential seating • Use a consistent daily routine • Break down tasks into manageable units

	• Check homework on a daily basis • Frequently check for understanding • Allow for repetition and/or clarification of directions, as needed • Allow wait time for processing before calling on student for response • Announce test with adequate prep time • Additional time to complete classroom tests/quizzes **ELL** No students at this time **Gifted and Talented** • Provide extension, enrichment, acceleration, and complexity in specific areas of strength • Meet the needs of various learners through flexible grouping, being sure not to depend on advanced learners to often "teach" others. • Invite students to explore different points of view on a topic and compare them • Provide exploration and extension learning opportunities • Ask students higher-level questions • Provide open-ended, creative assessments • Provide more advanced/challenging test items **At Risk:** • I&RS (Intervention & Referral Services) • Provide copy of class notes • Use a consistent daily routine • Break down tasks into manageable units • Check homework on a daily basis • Frequently check for understanding • Allow for repetition and/or clarification of directions, as needed • Allow wait time for processing before calling on student for response • Announce test with adequate prep time • Additional time to complete classroom tests/quizzes

Unit Title: Cell Theory and Processes	**Duration of Unit** 10 weeks
Essential Questions	• Who were the people who contributed to the cell theory? • What is the purpose of a microscope? • What are the three statements of the cell theory? • What are the main organelles of the cell, and what are their functions? • What are the main differences between animal and plant cells? • How are materials transported in and out of the cell • What are the key differences between active and passive transport? • How do living things get energy from the sun? • What happens during photosynthesis? • What happens during cellular respiration? • What happens during fermentation? • What are the main differences between fermentation and aerobic respiration? • Why are photosynthesis and respiration considered opposite processes • What are the functions of cell division? • What happens during the cell cycle?
Learning Objectives	• Students will be able to identify and describe the different parts and functions of the compound microscope

	• Students will be able to define the term "cell" and explain what the cell theory is • Students will be able to identify the different parts of the cell. • Students will be able to identify the ways in which cells respond and move through their environment. • Students will learn how energy is released from food and the chemical process that forms plant matter (from air and water). • Students will be able to identify how organisms obtain and use matter and energy they need to live and grow • Students will understand that animals and plants alike generally need to take in air and water, animals must take in food, and plants need light and minerals. • Students will be able to understand that plants acquire their material for growth chiefly from air and water and process matter they have formed to maintain their internal conditions (e.g., at night). • Students will be able to understand that food of almost any kind of animal can be traced back to plants.
Learning Activities	• Animal Cell Organelles • Plant Cell Organelles • Observing Onion Cells • Cell city • Interpreting nutrition labels • Macromolecule mystery lab • Leaf diagram • Fermentation vs Aerobic Respiration venn diagram • Connecting photosynthesis and respiration • Cell cycle lab • Drawing the steps of mitosis
Formative Assessment	• Daily Do Now questions • Informal checks for understanding • Class discussions • Classroom polls/ survey • Kahoot • BrainPOP
Alternative Assessment	• Student led labs listed above in "Learning Activities" • Group activities • Demonstrations
Summative Assessment	• Lab reports • Lesson quizzes • Chapter test

Technology Standards	• 8.1.8.IC.1: Compare the trade-offs associated with computing technologies that affect an individual's everyday activities and career options. • 8.2.8.ED.7: Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches). • 8.2.8.ITH.2: Compare how technologies have influenced society over time. • 8.2.8.ETW.4: Compare the environmental effects of two alternative technologies devised to address climate change issues and use data to justify which choice is best. • 8.2.8.EC.1: Explain ethical issues that may arise from the use of new technologies.
21st Century Life and Career Practices	• 9.1.8.CR.1: Compare and contrast the role of philanthropy, volunteer service, and charities in community development and the quality of life in a variety of cultures. • 9.1.8.CP.1: Compare prices for the same goods or services. • 9.1.8.EG.5: Interpret how changing economic and societal needs influence employment trends and future education. • 9.1.8.FP.2: Evaluate the role of emotions, attitudes, and behavior (rational and irrational) in making financial decisions. • 9.1.8.PB.5: Identify factors that affect one's goals, including peers, culture, location, and past experiences. • 9.2.8.CAP.4: Explain how an individual's online behavior (e.g., social networking, photo exchanges, video postings) may impact opportunities for employment or advancement. • 9.4.8.DC.1: Analyze the resource citations in online materials for proper use. • 9.4.8.DC.8: Explain how communities use data and technology to develop measures to respond to effects of climate change (e.g., smart cities). • 9.4.8.GCA.1: Model how to navigate cultural differences with sensitivity and respect. • 9.4.8.IML.12: Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience. • 9.4.8.TL.2: Gather data and digitally represent information to communicate a real-world problem.
Interdisciplinary Connections	Mathematics: • Students will use subscripts and coefficients to count the number of atoms on both sides of the photosynthesis equation to help them understand that carbon dioxide and water are being transformed into glucose and oxygen • Students will use subscripts and coefficients to count the number of atoms on both sides of the cellular respiration equation to help them understand that glucose and oxygen are transformed into energy, carbon dioxide, and water ○ 7.EE.B.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a

	woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.
Instructional Materials/Resources/ Technology Resources	• Elevate Science - Life, Savvas • Google Classroom • YouTube/ other video streaming services • BrainPOP • Kahoot • Various lab materials • Compound Light Microscopes • Chromebooks (1:1) • Smart Board • Classroom speakers • FM device
Accommodations and Modifications	**504** • Provide copy of class notes • Provide preferential seating • Use a consistent daily routine • Break down tasks into manageable units • Check homework on a daily basis • Frequently check for understanding • Allow for repetition and/or clarification of directions, as needed • Allow wait time for processing before calling on student for response • Announce test with adequate prep time • Additional time to complete classroom tests/quizzes **IEP** • Provide copy of class notes • Provide preferential seating • Use a consistent daily routine • Break down tasks into manageable units • Check homework on a daily basis • Frequently check for understanding • Allow for repetition and/or clarification of directions, as needed • Allow wait time for processing before calling on student for response • Announce test with adequate prep time • Additional time to complete classroom tests/quizzes **ELL** No students at this time **Gifted and Talented** • Provide extension, enrichment, acceleration, and complexity in specific areas of strength • Meet the needs of various learners through flexible grouping, being sure not to depend on advanced learners to often "teach" others. • Invite students to explore different points of view on a topic and compare them • Provide exploration and extension learning opportunities • Ask students higher-level questions • Provide open-ended, creative assessments • Provide more advanced/challenging test items **At Risk:** • I&RS (Intervention & Referral Services)

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Unit Title: Human Body Systems	**Duration of Unit** 4 weeks
Essential Questions	• How do groups of cells form tissues, organs, and other subsystems in the body? • How do the structures of organs relate to their function? • How do organs interact to perform all of the tasks necessary for growth and survival? • What are the biological molecules the human body needs to survive? • How does your body break down food into materials it can use? • How do your body systems process food? • How are materials like oxygen transported in the body? • How does the body respond to stimuli from the environment?
NJSLS Subject Area Standards/ Literacy Companion Standards (Reading & Writing)	MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells MS-LS1-2.Develop and use a model to describe the function of a cell as a whole and ways the parts of cells contribute to the function. MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. MS-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. NJSLSA.R2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas. RI.8.1. Cite the textual evidence and make relevant connections that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text. RI.8.2. Determine a central idea of a text and analyze its development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text. SL.8.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade level topics, texts, and issues, building on others' ideas and expressing their own clearly. NJSLSA.L1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
Learning Objectives	• Students will be able to identify and define systems in the human body

	• Students can explain how the function of organs enhances their function • Students can describe the basic functions of the circulatory, digestive, nervous, and respiratory systems • Students can describe the way the systems in the human body work together
Learning Activities	• Mapping the human body • Modeling organ systems • Digestions Lab • Skeletal System Lab • Nervous System investigation • Test your reflexes - external stimulus lab • Maintaining homeostasis - investigating how the organ systems work together
Formative Assessment	• Daily Do Now questions • Informal checks for understanding • Class discussions • Classroom polls/ survey • Kahoot • BrainPOP
Alternative Assessment	• Student led labs listed above in "Learning Activities" • Group activities • Demonstrations/Hands on Activities
Summative Assessment	• Lab reports • Lesson quizzes • Chapter test
Technology Standards	• 8.1.8.IC.1: Compare the trade-offs associated with computing technologies that affect an individual's everyday activities and career options. • 8.2.8.ED.7: Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches). • 8.2.8.ITH.2: Compare how technologies have influenced society over time. • 8.2.8.ETW.4: Compare the environmental effects of two alternative technologies devised to address climate change issues and use data to justify which choice is best. • 8.2.8.EC.1: Explain ethical issues that may arise from the use of new technologies.
21st Century Life and Career Practices	• 9.1.8.CR.1: Compare and contrast the role of philanthropy, volunteer service, and charities in community development and the quality of life in a variety of cultures. • 9.1.8.CP.1: Compare prices for the same goods or services. • 9.1.8.EG.5: Interpret how changing economic and societal needs influence employment trends and future education. • 9.1.8.FP.2: Evaluate the role of emotions, attitudes, and behavior (rational and irrational) in making financial decisions. • 9.1.8.PB.5: Identify factors that affect one's goals, including peers, culture, location, and past experiences.

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Interdisciplinary Connections	Math: In lab activities students will use mathematical skills to measure items needed in the experiment or demonstration • 7EE.A.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
Instructional Materials/Resources/ Technology Resources	• Elevate Science - Life, Savvas • Google Classroom • YouTube/ other video streaming services • BrainPOP • Kahoot • Various lab materials • Compound Light Microscopes • Chromebooks (1:1) • Smart Board • Classroom speakers • FM device
Accommodations and Modifications	**504** • Provide copy of class notes • Provide preferential seating • Use a consistent daily routine • Break down tasks into manageable units • Check homework on a daily basis • Frequently check for understanding • Allow for repetition and/or clarification of directions, as needed • Allow wait time for processing before calling on student for response • Announce test with adequate prep time • Additional time to complete classroom tests/quizzes **IEP** • Provide copy of class notes • Provide preferential seating • Use a consistent daily routine • Break down tasks into manageable units • Check homework on a daily basis • Frequently check for understanding • Allow for repetition and/or clarification of directions, as needed • Allow wait time for processing before calling on student for response • Announce test with adequate prep time • Additional time to complete classroom tests/quizzes **ELL** No students at this time

	Gifted and Talented • Provide extension, enrichment, acceleration, and complexity in specific areas of strength • Meet the needs of various learners through flexible grouping, being sure not to depend on advanced learners to often "teach" others. • Invite students to explore different points of view on a topic and compare them • Provide exploration and extension learning opportunities • Ask students higher-level questions • Provide open-ended, creative assessments • Provide more advanced/challenging test items **At Risk:** • I&RS (Intervention & Referral Services) • Provide copy of class notes • Use a consistent daily routine • Break down tasks into manageable units • Check homework on a daily basis • Frequently check for understanding • Allow for repetition and/or clarification of directions, as needed • Allow wait time for processing before calling on student for response • Announce test with adequate prep time • Additional time to complete classroom tests/quizzes

Unit Title: **Natural Selection and Change over time**	**Duration of Unit** 6 weeks
Essential Questions	• What is a scientific theory? • What is natural selection and who proposed it? • Why was the theory of evolution controversial? Is it still controversial today? • What evidence supports the theory of evolution? • What is the role of mutations and genetics in natural selection? • How do structures like fossils support the theory of evolution? • How does early embryonic development help support the theory of natural selection? • How can we compare structures in different organisms to support the theory of evolution? • How does artificial selection differ from natural selection? • Why is variation important to the process of evolution?
NJSLS Subject Area Standards/ Literacy Companion Standards (Reading & Writing)	MS-LS4-1. Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. MS-LS4-2. Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships. MS-LS4-3. Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy. MS-LS4-4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.

	MS-LS4-5. Gather and synthesize information about technologies that have changed the way humans influence the inheritance of desired traits in organisms. MS-LS4-6. Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. NJSLSA.R2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas. RI.8.1. Cite the textual evidence and make relevant connections that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text. RI.8.2. Determine a central idea of a text and analyze its development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text. SL.8.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade level topics, texts, and issues, building on others' ideas and expressing their own clearly. NJSLSA.L1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
Learning Objectives	• Students understand scientific theory • Students can explain the importance of variation to evolution • Understand that natural selection is one of several processes that can bring about change • Students can identify anatomical similarities and differences in organisms and use them to explain evolutionary relationships • Students can identify environmental factors that would contribute to evolution through natural selection • Students can infer the relatedness of organism based on factors like anatomical structures, embryonic development, and patterns in the fossil record • Students can identify key differences between micro and macro evolution • Students can identify the various means in which genetic material can move from one species to another • Students can explain the differences between natural and artificial selection • Students can explain the different rates at which evolution may occur
Learning Activities	• Evolution Guided Webquest • Observing changes in the fossil record • Comparing homologous, analogous, and vestigial structures • Charles Darwin guided reading • Understanding artificial selection through dog breeding • Understanding rate of change • Megapode Extinction lab • Evolution Survival Game
Formative Assessment	• Daily Do Now questions • Informal checks for understanding

	• Class discussions • Classroom polls/ survey • Kahoot • BrainPOP • Group activities • Demonstrations
Summative Assessment	• Lab reports • Lesson quizzes • Chapter test
Technology Standards	• 8.1.8.IC.1: Compare the trade-offs associated with computing technologies that affect an individual's everyday activities and career options. • 8.2.8.ED.7: Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches). • 8.2.8.ITH.2: Compare how technologies have influenced society over time. • 8.2.8.ETW.4: Compare the environmental effects of two alternative technologies devised to address climate change issues and use data to justify which choice is best. • 8.2.8.EC.1: Explain ethical issues that may arise from the use of new technologies.
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Interdisciplinary Connections	Social Studies: • Students learn about the historical, social, and religious impact the theory of natural selection had on society. They will study the controversy surrounding teaching evolution in public school and the ways it clashed with religious teachings (Diversity/Inclusion)

	o 6.3.8.CivicsPR.3: Take a position on an issue in which fundamental ideals and principles are in conflict (e.g., liberty, equality).
Instructional Materials/Resources/ Technology Resources	• Elevate Science - Life, Savvas • Google Classroom • YouTube/ other video streaming services • BrainPOP • Kahoot • Various lab materials • Compound Light Microscopes • Chromebooks (1:1) • Smart Board • Classroom speakers • FM device
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Unit Title: Genetics: The Science of Heredity	**Duration of Unit** 6 weeks
Essential Questions	• What did Mendel observe? • How do alleles affect inheritance? • How is probability related to inheritance? • What are phenotypes and genotypes? • How are most traits inherited? • How do genes and the environment interact? • How are chromosomes, genes, and inheritance related? • Who was Rosalind Franklin and what did she contribute to the study of genetics? • What happens during meiosis?
NJSLS Subject Area Standards/ Literacy Companion Standards (Reading & Writing)	MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. MS-LS3-1. Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. MS-LS3-2. Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. MS-LS4-5. Gather and synthesize information about technologies that have changed the way humans influence the inheritance of desired traits in organisms. NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. NJSLSA.R2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas. RI.8.1. Cite the textual evidence and make relevant connections that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text. RI.8.2. Determine a central idea of a text and analyze its development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text. SL.8.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade level topics, texts, and issues, building on others' ideas and expressing their own clearly. NJSLSA.L1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
Learning Objectives	• Students will be able to identify the role genetics plays in human development.

	• Students will be able to interpret and explain the expected results of both forms of reproduction. • Students will be able to identify the difference between phenotypes and genotypes. • Students will be able to describe the steps of cell division for reproduction. • Students will be able to predict the potential outcomes when crossing parents with certain traits. • Students will be able to understand how to read and create DNA strands. • Students will be able to evaluate how and why genetics are passed onto offspring. • Students will be able to research the current technology within Genetics. • Students can explain the significance of Rosalind Franklin's discovery and analyze the controversy of who actually took credit for her work • Students can compare Rosalind Franklin's situation to that of other women who did not receive the credit they should have for their scientific discoveries • Students can connect Rosalind Franklin's plight and struggle to other minority groups in science
Learning Activities	• Genetic Survey of Dominant and Recessive Traits • Mitosis and Meiosis • Drawing mitosis • Alien Genetics • SpongeBob Genetics • Monster genetics project • Starburst Lab • Franklin vs Watson and Crick debate
Formative Assessment	• Student led labs listed above in "Learning Activities" • Group activities • Demonstrations • Daily Do Now questions • Informal checks for understanding • Class discussions • Classroom polls/ survey • Kahoot • BrainPOP
Summative Assessment	• Lab reports • Lesson quizzes • Chapter test
Technology Standards	• 8.1.8.IC.1: Compare the trade-offs associated with computing technologies that affect an individual's everyday activities and career options. • 8.2.8.ED.7: Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches). • 8.2.8.ITH.2: Compare how technologies have influenced society over time.

	• 8.2.8.ETW.4: Compare the environmental effects of two alternative technologies devised to address climate change issues and use data to justify which choice is best. • 8.2.8.EC.1: Explain ethical issues that may arise from the use of new technologies.
21st Century Life and Career Practices	• 9.1.8.CR.1: Compare and contrast the role of philanthropy, volunteer service, and charities in community development and the quality of life in a variety of cultures. • 9.1.8.CP.1: Compare prices for the same goods or services. • 9.1.8.EG.5: Interpret how changing economic and societal needs influence employment trends and future education. • 9.1.8.FP.2: Evaluate the role of emotions, attitudes, and behavior (rational and irrational) in making financial decisions. • 9.1.8.PB.5: Identify factors that affect one's goals, including peers, culture, location, and past experiences. • 9.2.8.CAP.4: Explain how an individual's online behavior (e.g., social networking, photo exchanges, video postings) may impact opportunities for employment or advancement. • 9.4.8.DC.1: Analyze the resource citations in online materials for proper use. • 9.4.8.DC.8: Explain how communities use data and technology to develop measures to respond to effects of climate change (e.g., smart cities). • 9.4.8.GCA.1: Model how to navigate cultural differences with sensitivity and respect. • 9.4.8.IML.12: Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience. • 9.4.8.TL.2: Gather data and digitally represent information to communicate a real-world problem.
Interdisciplinary Connections	Health: • Students will research different genetic disorders and how certain diseases are passed on from parent to offspring because they are controlled by recessive genes. They will also include the role genetics have in making individuals more susceptible to disease based on lifestyle and environmental factors. • 2.3.8.HCDM.2: Determine the role of genetics in being susceptible to disease and health conditions and identify the types of behavior that might reduce the risk factors.
Instructional Materials/Resources/ Technology Resources	• Elevate Science - Life, Savvas • Google Classroom • YouTube/ other video streaming services • BrainPOP • Kahoot • Various lab materials • Compound Light Microscopes • Chromebooks (1:1) • Smart Board • Classroom speakers • FM device
Accommodations and Modifications	**504** • Provide copy of class notes • Provide preferential seating

	• Use a consistent daily routine • Break down tasks into manageable units • Check homework on a daily basis • Frequently check for understanding • Allow for repetition and/or clarification of directions, as needed • Allow wait time for processing before calling on student for response • Announce test with adequate prep time • Additional time to complete classroom tests/quizzes **IEP** • Provide copy of class notes • Provide preferential seating • Use a consistent daily routine • Break down tasks into manageable units • Check homework on a daily basis • Frequently check for understanding • Allow for repetition and/or clarification of directions, as needed • Allow wait time for processing before calling on student for response • Announce test with adequate prep time • Additional time to complete classroom tests/quizzes **ELL** No students at this time **Gifted and Talented** • Provide extension, enrichment, acceleration, and complexity in specific areas of strength • Meet the needs of various learners through flexible grouping, being sure not to depend on advanced learners to often "teach" others. • Invite students to explore different points of view on a topic and compare them • Provide exploration and extension learning opportunities • Ask students higher-level questions • Provide open-ended, creative assessments • Provide more advanced/challenging test items **At Risk:** • I&RS (Intervention & Referral Services) • Provide copy of class notes • Use a consistent daily routine • Break down tasks into manageable units • Check homework on a daily basis • Frequently check for understanding • Allow for repetition and/or clarification of directions, as needed • Allow wait time for processing before calling on student for response • Announce test with adequate prep time • Additional time to complete classroom tests/quizzes

Unit Title: Ecology and Ecosystems	**Duration of Unit** 8 weeks
Essential Questions	• How is resource availability related to population size? • How does the availability of resources affect an organism's role and interaction in an ecosystem? • What are the key differences between density dependent and density independent factors? • How is energy transferred within an ecosystem? • How is matter cycled between the biotic and abiotic parts of an ecosystem?

	● How can changes to living or nonliving parts of an ecosystem affect populations and communities? ● How does human activity impact ecosystems? ● What is biodiversity? What factors influence it? ● Why is it important to keep ecosystems healthy? ● How does damage to ecosystems affect climate change? ● How would life be different without ecosystem service?
NJSLS Subject Area Standards/ Literacy Companion Standards (Reading & Writing)	MS-LS1-6. Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services. NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. NJSLSA.R2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas. RI.8.1. Cite the textual evidence and make relevant connections that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text. RI.8.2. Determine a central idea of a text and analyze its development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text. SL.8.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade level topics, texts, and issues, building on others' ideas and expressing their own clearly. NJSLSA.L1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
Learning Objectives	● Students understand how interactions within an ecosystem affect its stability ● Students can describe the factors that shape an ecosystem ● Students can differentiate between density dependent and independent limiting factors ● Students can identify the biotic and abiotic factors in an ecosystem ● Students can explain the difference between populations, communities, and ecosystems ● Students understand how matter and energy move through ecosystems ● Understand the relationship with consumers, decomposers, and the nitrogen cycle ● Students can explain how humans have negatively impacted ecosystems ● Student can explain how the destruction of ecosystems has contributed to climate change ● Students can interpret foods and correctly identify trophic levels

	• Students can explain why there is less available energy at higher trophic levels
Learning Activities	• Limiting Factors Lab • Comparing Populations • Ecosystem Dynamics of Yellowstone • Ecological Succession Observations • Build a Food web activity • Silent Spring Excerpt and Analysis • Climate change research project • Following Water lab
Formative Assessment	• Student led labs listed above in "Learning Activities" • Group activities • Demonstrations • Daily Do Now questions • Informal checks for understanding • Class discussions • Classroom polls/ survey • Student led labs • Kahoot • BrainPOP
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Interdisciplinary Connections	Mathematics: • Students can calculate the change in a population over time based on variables such as birth rate, death rate, immigration, and emigration o 7EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. a. Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?
Instructional Materials/Resources/ Technology Resources	• Elevate Science - Life, Savvas • Google Classroom • YouTube/ other video streaming services • BrainPOP • Kahoot • Various lab materials • Compound Light Microscopes • Chromebooks (1:1) • Smart Board • Classroom speakers • FM device
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