Course Title:	Content Area:	Grade Level:	Credit (if applicable)
Botany	Science	10-12	0.5

Course Description:

This semester-long laboratory-based science course introduces students to the characteristics and life cycles of plants. The course covers plant diversity and plant structure and function. Additionally, students will explore the importance plants have in their everyday lives, that includes food and medicine. The focus of this course is on seed plants. Greenhouse and outdoor labs (outdoor classroom and campus rain garden) will be used to conduct a variety of research products. Students will continue to develop knowledge in the core disciplinary ideas in the Life and Earth sciences described in the Next Generation Science Standards (NGSS). This will be a student centered, inquiry based class aimed at developing and refining students ability to plan and conduct investigations to answer questions about characteristics, life cycles, and structure/function of plants and ecosystem services provided by plants.

Aligned Core Resources:	Connection to the ***BPS Vision of the Graduate***
	COLLABORATION • Demonstrates ability to work effectively and respectfully with diverse teams • Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal • Assume shared responsibility for collaborative work and value the individual contributions made by each team member • Articulates thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts INFORMATION LITERACY • Use information accurately and creatively for the issue or problem at hand CONTENT MASTERY • Develop and draw from a baseline understanding of knowledge in academic disciplines from our Bristol curriculum
Additional Course Information: ***Knowledge/Skill Dependent courses/prerequisites***	**Link to *Completed Equity Audit***
	Botany Equity Audit

Standard Matrix

(BOE Approved Date)

NGSS Science Practices	Unit 1	Unit 2	Unit 3	Unit 4
Asking questions and defining problems: Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.	X	X	X	X
Developing and Using Models: Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.				X
Planning and Carrying out Investigations: Planning and carrying out investigations in 9- 12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.		X	X	
Analyzing and Interpreting Data: Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.				X
Using Mathematics and Computational Thinking: Mathematical and computational thinking in 9- 12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.				X
Constructing Explanations and Designing Solutions: Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.	X	X	X	X
Engaging in Argument from Evidence: Engaging in argument from evidence in 9– 12 progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science.				X
Obtaining, Evaluating, and Communicating Information: Obtaining, evaluating, and communicating information progresses to evaluating the validity and reliability of the claims, methods, and designs.				X

(BOE Approved Date)

Unit Links
Introduction to Botany Pollination and Growth Wide World of Plants Plants and Man

(BOE Approved Date)

Unit Title:	
Introduction to Botany	
Relevant Standards: Bold indicates priority	
Asking questions and defining problems; Constructing Explanations and Designing Solutions	
Essential Question(s):	**Enduring Understanding(s):**
• How do plants' structures and cellular components support their overall function, survival, and adaptation in various ecosystems? • What mechanisms do plants use to communicate and respond to their environment, and how do these mechanisms contribute to their survival and ecosystem services? • What are the significant benefits that plants provide to ecosystems and human society, particularly in terms of ecosystem services, medicine, and agriculture?	• Plants have specialized structures and cellular components that are intricately designed to support their overall function, survival, and adaptation in diverse ecosystems. • Plants communicate and respond to their environment through complex mechanisms that enhance their survival and contribute to the stability and health of ecosystems. • Plants provide essential benefits to ecosystems and human society, including crucial ecosystem services, medicinal resources, and agricultural productivity.
Demonstration of Learning:	**Pacing for Unit**
	11 blocks
Unit-specific Vocabulary:	
Annual, Perennial, Biennial, Evergreen, Deciduous, Biodiversity, Natural Resources, Renewable And Nonrenewable Resources, Botany, Canopy, Chlorophyll, Root, Stalk, Stem, Tissue, Petiole, Leaf Structure, Flower, Pollen, Ovary, Xylem, Phloem, Epidermis, Ecosystem Service, Biomes, Monocot, Dicot, Photosynthesis	
Anticipated misconceptions:	

(BOE Approved Date)

1. **Misconception: Plants do not perform respiration; they only perform photosynthesis.**
    - **Clarification:** Plants perform both photosynthesis and cellular respiration. Photosynthesis occurs in the chloroplasts and produces glucose and oxygen, while cellular respiration occurs in the mitochondria and uses glucose and oxygen to produce energy (ATP), carbon dioxide, and water.
2. **Misconception: Plants get their food from the soil.**
    - **Clarification:** Plants produce their own food through photosynthesis. They absorb water and minerals from the soil, but their primary source of energy is glucose, which they make from carbon dioxide and water using sunlight.
3. **Misconception: Only leaves are involved in photosynthesis.**
    - **Clarification:** While leaves are the primary sites for photosynthesis due to their high concentration of chloroplasts, other green parts of the plant, such as stems and unripe fruit, can also perform photosynthesis to a lesser extent.
4. **Misconception: Plants do not need oxygen.**
    - **Clarification:** Plants need oxygen for cellular respiration, which occurs in all living cells, including plant cells. Oxygen is necessary to break down glucose into usable energy.
5. **Misconception: All plants have flowers.**
    - **Clarification:** Not all plants produce flowers. Flowering plants (angiosperms) do, but other plants, like conifers (gymnosperms), ferns, mosses, and algae, do not produce flowers.
6. **Misconception: All plants are green.**
    - **Clarification:** While many plants are green due to chlorophyll, there are plants with other pigments that give them different colors. Some plants may have red, purple, or yellow pigments, especially in leaves, flowers, and fruits.
7. **Misconception: The sole purpose of roots is to anchor the plant.**
    - **Clarification:** Roots anchor the plant in the soil, but they also absorb water and nutrients, store food, and can sometimes perform vegetative reproduction.
8. **Misconception: Plants grow towards the light because they are "seeking" it.**
    - **Clarification:** Plants grow towards the light due to phototropism, a growth response triggered by unequal distribution of the hormone auxin, which causes cells on the shaded side of the plant to elongate more than those on the lighted side.
9. **Misconception: Photosynthesis occurs all the time in plants.**
    - **Clarification:** Photosynthesis requires light, so it primarily occurs during daylight hours. At night, plants continue to respire, using the glucose produced during the day.
10. **Misconception: All plants need the same amount of water and sunlight.**
    - **Clarification:** Different plants have different requirements for water and sunlight based on their adaptations to their native environments. Some plants thrive in full sunlight with little water, while others require shade and constant moisture.
11. **Misconception: Plants do not move.**
    - **Clarification:** While plants are rooted in place, they exhibit various types of movement such as the opening and closing of flowers, growth towards light (phototropism), and movement in response to touch (thigmotropism).
12. **Misconception: Soil is just a medium for holding plants.**
    - **Clarification:** Soil is a complex ecosystem that provides essential nutrients, water, and support for plants. It also hosts a variety of organisms that help decompose organic matter and recycle nutrients.

Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**

Representation: Clarify vocabulary and symbols	• Pre-teach vocabulary and symbols, especially in ways that promote connection to the learners' experience and prior knowledge • Provide graphic symbols with alternative text descriptions • Highlight how complex terms, expressions, or equations are composed of simpler words or symbols • Embed support for vocabulary and symbols within the text (e.g., hyperlinks or footnotes to definitions, explanations, illustrations, previous coverage, translations) • Embed support for unfamiliar references within the text (e.g., domain specific notation, lesser known properties and theorems, idioms, academic language, figurative language, mathematical language, jargon, archaic language, colloquialism, and dialect)

Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Targets:**

**The CELP guidance is to support the development of language; access to course content expectations should not change as a result of MLL status.*

I can identify features of plants and explain their importance to the overall function and survival

An EL can conduct research and evaluate and communicate findings to answer questions or solve problems.

- Level 1: I can gather information to help me label a plant diagram.
- Level 2: I can conduct individual or shared research that explains the function of a plant.
- Level 3 I can paraphrase key information regarding the function of a plant and provide diagrams to support this information.
- Level 4: I can gather and synthesize information from multiple print and digital sources that build on my knowledge of the structure and function of plants.
- Level 5: I can analyze and integrate information into a clearly organized oral or written text that explains the anchoring phenomenon of the sensitive plant.

Lesson Sequence	**Learning Target**	**Success Criteria/Assessment/ Resources**
1 Intro to Botany	I can brainstorm how and why plant react as seen in sensitive plant phenomenon I can identify features of plants and explain their importance to the overall function and survival	• I can determine the different types of plants • I can determine the basic structure of plants and flowers and build a model that exemplifies that structure and its corresponding function • I can relate the structure of a plant back to the the overall function • I can determine the structure of plant cells

	I can determine ecosystem services and other important benefits of plants, particularly in medicine and agriculture	• I can relate parts of a plant cell to photosynthetic activities • I can explain the mechanisms that are involved in plant communication • I can identify multiple ecosystem services that photosynthesis provides • I can investigate the factors that affect photosynthesis • I can identify adaptations that plants would need to have in various biomes and climates

Unit Title:	
Pollination and Growth	
Relevant Standards: Bold indicates priority	
Planning and Carrying Out Investigations; Constructing Explanations and Designing Solutions	
Essential Question(s):	**Enduring Understanding(s):**
• How do plants grow, develop, and reproduce, and what role do pollinators play in these processes? • What are the factors affecting the growth and development of plants, and how can these factors be tested and observed? • Why are pollinators declining, what are the consequences of this decline, and what solutions can be proposed to address it?	**The Interconnectedness of Plant and Pollinator Life Cycles** • Plants rely on specific mechanisms and symbiotic relationships for growth, development, and reproduction. Pollinators play a crucial role in the pollination process, which is essential for plant reproduction and biodiversity. Understanding these connections highlights the complexity and interdependence of ecosystems. **Scientific Inquiry and Experimentation** • Investigating plant growth and development requires careful observation, hypothesis formulation, and experimental testing. By examining various factors that impact plant health, students learn the importance of the scientific method in studying living organisms and ecosystems. **Impact and Mitigation of Pollinator Decline** • Pollinator populations are declining due to various environmental and anthropogenic factors, posing a significant threat to global biodiversity and food security. By identifying these factors and developing potential solutions, students recognize the importance of conservation efforts and sustainable practices in protecting pollinators and, by extension, ecosystems and human agriculture.
Demonstration of Learning:	**Pacing for Unit**
	11 blocks
Unit-specific Vocabulary:	

(BOE Approved Date)

Pollination, Pollinator, Life Cycle, Seed, Sprout, Agriculture, Biotic, Abiotic, Carrying Capacity, Population, Overpopulation, DNA, Evolution, Paleobotany

Anticipated misconceptions:

1. **Pollination is the same as fertilization.**
    - **Clarification:** Pollination is the transfer of pollen from the male part of a flower (anther) to the female part (stigma), while fertilization occurs when the pollen reaches the ovule and forms a seed. They are distinct processes within the plant reproductive cycle.
2. **All plants require insects for pollination.**
    - **Clarification:** While many plants rely on insects for pollination, others are pollinated by wind, water, birds, bats, and other animals. Some plants can even self-pollinate.
3. **Pollination only benefits plants.**
    - **Clarification:** Pollination is mutually beneficial. Pollinators, such as bees, butterflies, and birds, get nectar or pollen as a food source, while plants benefit from the transfer of pollen necessary for reproduction.
4. **Only bees are pollinators.**
    - **Clarification:** Besides bees, many other insects (e.g., butterflies, moths, flies, beetles), birds (e.g., hummingbirds), bats, and even some mammals are effective pollinators.
5. **Pollination is not important to humans.**
    - **Clarification:** Pollination is crucial for the production of fruits, vegetables, and nuts, which are important parts of the human diet. Many crops are pollinator-dependent, affecting food security and economies.
6. **All flowers are designed to attract pollinators.**
    - **Clarification:** While many flowers have evolved to attract pollinators with bright colors, scents, and nectar, some plants have flowers that are specifically adapted for wind or water pollination and may not be visually or olfactorily appealing.
7. **Pollinators are only active during the daytime.**
    - **Clarification:** While many pollinators are diurnal (active during the day), there are also nocturnal pollinators like moths and bats that play a significant role in pollination.

Differentiation through *Universal Design for Learning*

UDL Indicator	**Teacher Actions:**
Engagement: Optimize relevance, value, and authenticity	• Vary activities and sources of information so that they can be: ○ Personalized and contextualized to learners' lives ○ Culturally relevant and responsive ○ Socially relevant ○ Age and ability appropriate ○ Appropriate for different racial, cultural,

	ethnic, and gender groups • Design activities so that learning outcomes are authentic, communicate to real audiences, and reflect a purpose that is clear to the participants • Provide tasks that allow for active participation, exploration and experimentation • Invite personal response, evaluation and self-reflection to content and activities • Include activities that foster the use of imagination to solve novel and relevant problems, or make sense of complex ideas in creative ways

Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Targets:**

**The CELP guidance is to support the development of language; access to course content expectations should not change as a result of MLL status.*
I can identify features of plants and explain how and why plants are pollinated.

An EL can construct meaning from oral presentations and literary and informational text through grade-appropriate listening, reading, and viewing.
- Level 1: I can identify key words that relate to pollination.
- Level 2: I can explain how key words relate to pollination. .
- Level 3 I can summarize the process of pollination using the structures of a flower.
- Level 4: I can explain in detail the process of pollination and how it leads to the survival of other living things.
- Level 5: I can create a solution that addresses the causes of pollinator decline.

Lesson Sequence	**Learning Target**	**Success Criteria/Assessment/ Resources**
2 Pollination and Growth	I can identify and explain how and why plants are pollinated	• I can explain how plants grow and develop. • I can make observations on plant growth using germinated seeds. • I can devise a way to test factors impacting plant growth and development and hypothesize why. • I can review peer work and construct feedback. • I can communicate their findings to an audience through various media. • I can compare and contrast various evolutionary strategies plants use to promote pollination. • I can identify symbiotic relationships between pollinators and plants. • I can explain why pollinators are declining • I can determine the factors that affect pollinator decline • I can develop a solution to a factor that is contributing to pollinator decline

(BOE Approved Date)

Unit Title:	
Wide World of Plants	
Relevant Standards: Bold indicates priority	
Planning and Carrying Out Investigations, Constructing Explanations and Designing Solutions	
Essential Question(s):	**Enduring Understanding(s):**
• How do evolutionary connections among plants help us understand their adaptations and survival mechanisms? • What roles do classification systems and anatomical features play in the organization and understanding of the Plantae Kingdom? • How can we use our understanding of plant life cycles, adaptations, and ecosystem roles to promote conservation and raise public awareness?	**Evolution and Adaptation:** • Plants have evolved diverse characteristics and adaptations that enhance their survival in various environments. By studying evolutionary connections, we can understand how different plants are related and how their specific features help them thrive. **Classification and Organization:** • The classification system within the Plantae Kingdom helps organize the vast diversity of plant life. Understanding this system, along with the anatomical similarities and differences among plants, provides a structured way to study and appreciate plant diversity. **Conservation and Ecosystem Roles:** • Plants play crucial roles in ecosystems, offering numerous services such as oxygen production, habitat provision, and nutrient cycling. Recognizing the life cycles, adaptations, and ecological roles of plants helps highlight the importance of conservation efforts and raises public awareness about the threats plants face and the need for their protection.
Demonstration of Learning:	**Pacing for Unit**
	11 blocks
Unit-specific Vocabulary:	
Kingdom, Classification, Autotroph, Multicellular, Eukaryotic, Vascular, Non Vascular, Gymnosperms, Angiosperms, Sexual Reproduction, Sporophyte, Gametophyte, Hybridization, Polyploidy, Herbology, Biomes/Ecosystems	
Anticipated misconceptions:	

(BOE Approved Date)

1. **Misconception:** Plants are simple and uninteresting organisms.
    - **Clarification:** While plants may appear less dynamic than animals, they are incredibly diverse and complex. They have evolved intricate mechanisms for growth, reproduction, and defense. Studying plants reveals their fascinating adaptations and their crucial roles in ecosystems.
2. **Misconception:** All plants serve the same purpose in ecosystems.
    - **Clarification:** Plants have diverse ecological roles, from primary producers to habitat providers, pollinators, and nutrient recyclers. Each plant species has unique traits and functions within its ecosystem, contributing to the overall biodiversity and functioning of the environment.
3. **Misconception:** Plants are entirely separate from animals in terms of evolutionary history.
    - **Clarification:** Plants and animals share a common ancestor and have co-evolved over millions of years. Understanding the evolutionary connections between plants and animals helps us appreciate their shared biological processes and adaptations.
4. **Misconception:** Plants are passive entities that do not respond to their environment.
    - **Clarification:** Plants exhibit sophisticated responses to environmental cues, such as light, water, temperature, and soil nutrients. They can adjust their growth, development, and metabolism to optimize their chances of survival and reproduction. These responses include movements, such as tropisms, and chemical signaling pathways.
5. **Misconception:** Plants are not affected by human activities or environmental changes.
    - **Clarification:** Plants are sensitive to changes in their environment, including pollution, habitat loss, climate change, and invasive species. Human activities have significant impacts on plant populations and ecosystems, leading to biodiversity loss and ecosystem degradation. Understanding these impacts is crucial for effective conservation and sustainable management of plant resources.

Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Action and Expression: Vary the methods for response and navigation	• Provide alternatives in the requirements for rate, timing, speed, and range of motor action required to interact with instructional materials, physical manipulatives, and technologies • Provide alternatives for physically responding or indicating selections (e.g., alternatives to marking with pen and pencil, alternatives to mouse control) • Provide alternatives for physically interacting with materials by hand, voice, single switch, joystick, keyboard, or adapted keyboard

Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Targets:**

**The CELP guidance is to support the development of language; access to course content expectations should not change as a result of MLL status.*

I can identify the different types of plants by summarizing how the classification system within the Plantae Kingdom (and all the others) works.

(BOE Approved Date)

An EL can conduct research and evaluate and communicate findings to answer questions or solve problems.

- Level 1: with prompting and support I can gather information to help classify different plants in the plant kingdom.
- Level 2:. I can record some data and information that supports the classification system of one plant.
- Level 3: I can paraphrase key information in a flowchart to explain why various plants are members of a specific classification.
- Level 4: I can evaluate the reliability of each source of information that helps to summarize the classification system in the plant kingdom.
- Level 5: I can analyze and integrate information into a clearly organized oral or written text that addresses why and how plants have evolved into what they are today.

Lesson Sequence	**Learning Target**	**Success Criteria/Assessment/ Resources**
3 Wide World of Plants	• I can hypothesize how or why the world's scariest plants evolved and match them to more familiar plants to determine evolutionary connections through creation of a model • I can identify the different types of plants by summarizing how the classification system within the Plantae Kingdom (and all the others) works.	• I can compare and contrast the anatomical similarities and differences of various organisms found within the Plantae Kingdom by creating a model. • I can hypothesize how their different characteristics aid in their survival. • I can discuss the characteristics and organization of the Plantae Kingdom and identify the importance of each tier. • I can apply my knowledge of new vocabulary to plants found within the local environment • I can collaborate to construct a visual display of the examples of plants found in the plant kingdom . • I can compare and contrast different plant species • I can explain how a plant's structure relates to its function. • I can devise most creative way to showcase and share my creation with an audience • I can provide feedback to peers after reviewing each other's projects. • I can include plants found in initial phenomenon to my handbook • I can investigate a specific type of plant to identify the stages of its life cycle, adaptations to its environment, and ecosystem services this plant provides. • I can identify threats to this type of plant due to natural or anthropogenic reasons. • I can propose a plan to encourage conservation of this type of plant to persuade the public and create awareness. • I can revise my original model using all of the new learning acquired throughout the unit

Unit Title:

Plants and Man

Relevant Standards: Bold indicates priority

Developing And Using Models; Analyzing And Interpreting Data; Using Mathematical And Computational Thinking, Constructing Explanations And Designing Solutions, Engaging In Argument From Evidence; Obtaining, Evaluating, And Communicating Information

Essential Question(s):	**Enduring Understanding(s):**
• How have plants shaped human history and society? • What roles do plants play in addressing societal challenges and human well-being? • How can we effectively manage the relationship between plants and society?	• Plants are integral to human history and societal development. • Plants contribute significantly to human well-being and offer solutions to societal challenges. • Effective management of the relationship between plants and society is essential for sustainability.
Demonstration of Learning:	**Pacing for Unit**
	11 blocks

Unit-specific Vocabulary:

Impact, Herbology, Phytomedicine, Naturopath, Horticulture, Medicinal, Bryologist, Pteridologist, Forestry, Plant Scientists, Plant Physiology, Extracts, Tincture, Hybridization, GMO, Ethnobotany

Anticipated misconceptions:

1. **Misconception:** Plants are passive organisms that exist solely for human use.
    - **Clarification:** While plants are often utilized by humans for food, medicine, and various other purposes, they are dynamic organisms with complex interactions and responses to their environment. They play essential roles in ecosystems, contributing to biodiversity, soil health, and ecosystem stability.
2. **Misconception:** Human activities have only negative impacts on plants and their ecosystems.
    - **Clarification:** While certain human activities, such as deforestation and pollution, can have detrimental effects on plants and their habitats, humans also play a crucial role in conservation efforts and the sustainable management of plant resources. Additionally, many plants have adapted to thrive in human-altered environments.
3. **Misconception:** All plants are harmless and beneficial to humans.
    - **Clarification:** While many plants indeed provide valuable resources such as food, medicine, and oxygen, some plants can be harmful or even toxic to humans and other organisms. Understanding plant toxicity and proper handling is essential for human safety.
4. **Misconception:** Plants have a limited role in human history and societal development.
    - **Clarification:** Plants have played a central role in human history and societal development,

shaping cultures, economies, and civilizations. From the agricultural revolution to the discovery of medicinal plants, humans have relied on plants for survival and advancement.

5. **Misconception:** Plants are static and unchanging organisms.
    - **Clarification:** Plants exhibit a wide range of behaviors and responses to their environment, including growth, reproduction, and defense mechanisms. They can adapt to changing environmental conditions over time through processes such as evolution and acclimatization.

Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Representation: Activate or supply background knowledge	• Anchor instruction by linking to and activating relevant prior knowledge (e.g., using visual imagery, concept anchoring, or concept mastery routines) • Use advanced organizers (e.g., KWL methods, concept maps) • Pre-teach critical prerequisite concepts through demonstration or models • Bridge concepts with relevant analogies and metaphors • Make explicit cross-curricular connections (e.g., teaching literacy strategies in the social studies classroom)

Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Targets:**

**The CELP guidance is to support the development of language; access to course content expectations should not change as a result of MLL status.*

I can identify ways plants historically played a central role in the lives and social development of humans

An EL can conduct research and evaluate and communicate findings to answer questions or solve problems.

- Level 1: I can gather information regarding a plant that is important in my life.
- Level 2: I can gather information regarding plants that are important in one of the branches of horticulture.
- Level 3: I can create an oral or written presentation that addresses the importance of plants in society and why it is central to human life.
- Level 4: I can create an oral or written presentation that addresses the ways in which plants have led to the development and enhancement of human life.
- Level 5: I can develop a business that addresses the horticultural benefits of a group of plants and how it supports various branches of society

Lesson Sequence	**Learning Target**	**Success Criteria/Assessment/ Resources**

4 Plants and Man	I can identify ways plants historically played a central role in the lives and social development of humans	• I can analyze and discuss the impact plants have had on the development of societies through historical records • I can develop a visual representation of how plants have and continue to be apart of horticultural practices • I can evaluate the impacts of plants in warfare and other detrimental practices • I can evaluate the role of plants in addressing and finding solutions to nature deficit syndrome • I can argue and validate the importance of plants in medicine using specific molecular explanations • I can practice the future role plants will play in medicine by investigating potential plant based therapies • I can explain how humans increased the efficiency of crops and how it relates to pollinators • I can investigate the causes and impacts of invasive plants • I can propose a plan to address one specific invasive plant