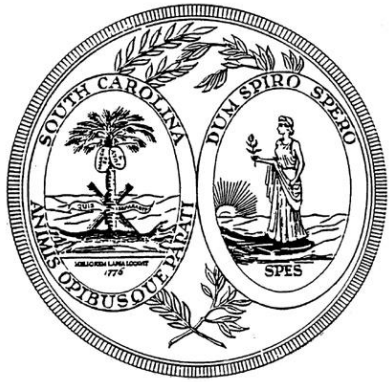
South Carolina Academic Standards and Performance Indicators for Science 2014



Instructional Unit Resource
6th Grade

South Carolina Academic Standards and Performance Indicators for Science 2014
Sixth Grade Science Instructional Unit Resource

As support for implementing the *South Carolina Academic Standards and Performance Indicators for Science 2014*, the standards for Sixth Grade have been grouped into possible units. In the Overview of Units below, the titles for those possible units are listed in columns. Refer to the Overview document to note these unit titles and how Standards, Conceptual Understandings, Performance Indicators, Science and Engineering Practices, and Crosscutting Concepts align. Following the Overview of Units, an Instructional Unit document is provided that delivers guidance and possible resources in teaching our new *South Carolina Academic Standards and Performance Indicators for Science 2014*. The purpose of this document is to provide guidance as to how all the standards in this grade may be grouped into units and how those units might look. Since this document is merely guidance, districts should implement the standards in a manner that addresses the district curriculum and the needs of students. This document is a living document and instructional leaders from around the state will continuously update and expand these resource documents. These documents will be released throughout the 2016-2017 school year with the intentionality of staying ahead of instruction. Teachers should also note that links to the Standards document, A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas, the SEP Support Document, and the Support Document 2.0 are embedded throughout the Instructional Unit format for reference.

Acknowledgments

Jean Baptiste Massieu, famous deaf educator, made a statement that is now considered a French proverb. “Gratitude is the memory of the heart. Indeed, appreciation comes when you feel grateful from the depths of your heart. The head keeps an account of all the benefits you received and gave. But the heart records the feelings of appreciation, humility, and generosity that one feels when someone showers you with kindness.” It is with sincere appreciation that we humbly acknowledge the dedication, hard work and generosity of time provided by teachers and instructional leaders across the state that have made and are continuing to make the Instructional Unit Resources possible.

Grade 6 Overview of Units

Unit 1		Unit 2		Unit 3		Unit 4	
EARTH SCIENCE: EARTH'S WEATHER AND CLIMATE		PHYSICAL SCIENCE: ENERGY TRANSFER AND CONSERVATION		LIFE SCIENCE DIVERSITY OF LIFE – CLASSIFICATION AND ANIMALS		LIFE SCIENCE: DIVERSITY OF LIFE- PROTISTS, FUNGI AND PLANTS	
Standard		**Standard**		**Standard**		**Standard**	
6.E.2		6.P.3		6.L.4		6.L.5	
Conceptual Understanding		**Conceptual Understanding**		**Conceptual Understanding**		**Conceptual Understanding**	
6.E.2A	6.E.2B	6.P.3A	6.P.3B	6.L.4A	6.L.4B	6.L.5A	6.L.5B
Performance Indicators		**Performance Indicators**		**Performance Indicators**		**Performance Indicators**	
6.E.2A.1 6.E.2A.2 6.E.2A.3	6.E.2B.1 6.E.2B.2 6.E.2B.3 6.E.2B.4	6.P.3A.1 6.P.3A.2 6.P.3A.3 6.P.3A.4 6.P.3A.5 6.P.3A.6	6.P.3B.1 6.P.3B.2	6.L.4A.1 6.L.4A.2	6.L.4B.1 6.L.4B.2 6.L.4B.3 6.L.4B.4 6.L.4B.5	6.L.5A.1 6.L.5A.2	6.L.5B.1 6.L.5B.2 6.L.5B.3 6.L.5B.4 6.L.5B.5
***Science and Engineering Practices**		***Science and Engineering Practices**		***Science and Engineering Practices**		***Science and Engineering Practices**	
6.S.1A.2 6.S.1A.4 6.S.1A.6 6.S.1A.7		6.S.1A.1 6.S.1A.2 6.S.1A.3 6.S.1A.4 6.S.1A.6 6.S.1B.1		6.S.1A.2 6.S.1A.4 6.S.1A.6 6.S.1A.8		6.S.1A.2 6.S.1A.3 6.S.1A.4 6.S.1A.6	
***CrossCutting Concepts**		***CrossCutting Concepts**		***CrossCutting Concepts**		***CrossCutting Concepts**	
1, 2, 4, 5, 7		1, 2, 3, 4, 5, 7		1, 2, 5, 6, 7		1, 2, 3, 4, 5, 6, 7	

** Teachers have the discretion to enhance the selected SEPs and CCCs.*

Unit Title
Life Science: Protists, Fungi, & Plants
Standard http://ed.sc.gov/scdoe/assets/file/agency/ccr/Standards-Learning/documents/South_Carolina_Academic_Standards_and_Performance_Indicators_for_Science_2014.pdf
6.L.5: The student will demonstrate an understanding of the structures, processes, and responses that allow protists, fungi, and plants to survive and reproduce.

Conceptual Understanding
6.L.5A. The Protist Kingdom is one of the most diverse groups and includes organisms that have characteristics similar to but are not classified as plants, animals, or fungi. These microorganisms live in moist environments and vary in how they obtain energy and move. The Fungi Kingdom consists of organisms that do not make their own food (heterotrophs) but obtain their nutrition through external absorption. Fungi can be grouped by their growth habit or fruiting structure and respond to changes in the environmental stimuli similar to plants.
New Academic Vocabulary **Some students may need extra support with the following academic vocabulary in order to understand what they are being asked to understand and do. Teaching these terms in an instructional context is recommended rather than teaching the words in isolation. A great time to deliver explicit instruction for the terms would be during the modeling process. Ultimately, the student should be able to use the academic vocabulary in conversation with peers and teachers. These terms are pulled from the essential knowledge portion of the Support Doc 2.0 (http://ed.sc.gov/instruction/standards-learning/science/support-documents-and-resources/) and further inquiry into the terms can be found there.**

Amoeba	Cilia	Euglena	Flagellum (Flagella)	Fungi	Gravitropism
Hyphae	Mycelium	Paramecium	Parasitic	Phototropism	Protist
Pseudopod	Saprophytic	Symbiotic	Autotroph	Asexual Reproduction	Fruiting Structures
Heterotroph	Spore	Tropism			

Performance Indicators

Text highlighted below in *orange* and *italicized/underlined* shows connections to SEP's.

6.L.5A.1 *Analyze and interpret data from observations* to compare how the structures of protists (including euglena, paramecium, and amoeba) and fungi allow them to obtain energy and explore their environments.

6.L.5A.2 *Analyze and interpret data* to describe how fungi respond to external stimuli (including temperature, light, touch, water, and gravity).

*Science and Engineering Practices

Support for the guidance, overviews of grade level progressions, and explicit details of each SEP can found in the Science and Engineering Support Doc (http://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf). It is important that teachers realize that the nine science and engineering practices are not intended to be used in isolation. Even if a performance indicator for a given standard only lists one of the practices as a performance expectation, scientists and engineers do not use these practices in isolation, but rather as part of an overall sequence of practice. When educators design the learning for their students, it is important that they see how a given performance expectation fits into the broader context of the other science and engineering practices. This will allow teachers to provide comprehensive, authentic learning experiences through which students will develop and demonstrate a deep understanding of scientific concepts.

6.S.1A.4 Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to (1) reveal patterns and construct meaning or (2) support hypotheses, explanations, claims, or designs.

6.S.1A.6 Construct explanations of phenomena using (1) primary or secondary scientific evidence and models, (2) conclusions from scientific investigations, (3) predictions based on observations and measurements, or (4) data communicated in graphs, tables, or diagrams.

*Cross Cutting Concepts (http://www.nap.edu/read/13165/chapter/8)

The link above provides support from the Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas (2012). The text in blue and *italicized/underlined* below provides a brief explanation of how the specific content ties to the CCC's.

1. Patterns: The National Research Council (2012) states that "Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them" (p. 84). *Protists are classified by their energy use and the way they move. Fungi are classified by how they use energy and how they respond to a stimulus.*

2. Cause and effect: Mechanism and explanation: The National Research Council states, "Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts" (p. 84). *Protists and fungi have specific functions which produce specific effects - for obtaining food, moving, and responding to stimuli.*

6. Structure and function: The National Research Council (2012) states, "The way in which an object or living thing is shaped and its substructure determine many of its properties and functions" (p. 84). *Protists and fungi have specialized structures with specific functions to ensure survival.*

7. Stability and change: The National Research Council states, "For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study" (p. 84). *The structures and functions of protists and fungi provide internal stability with a changing external stimulus.*

**Teachers have the discretion to enhance the selected SEP's and CCC's.*

Prior Knowledge
• 5.L.4B.1 Producers, consumers (herbivores, carnivores, omnivores), and decomposers
Subsequent Knowledge
• 7.L.3 The student will demonstrate an understanding of how the levels of organization within organisms support the essential functions of life. • H.B. 2 The student will demonstrate the understanding that the essential functions of life take place in cells or systems of cells.

Possible Instructional Strategies/Lessons

Strategies and lessons that will enable students to master the standard and/or indicator.

- 6.L.5A.1
  - Protists Intro: This video introduces students to the world of protists. Students use the video to analyze and compare the different types of protists. A follow-up could be for the students to put questions on sticky notes about protists to be placed on an anchor chart. Teams could follow up by answering the questions that were posted. This video can be found at https://www.youtube.com/watch?v=0-6dzU4gOJo.
  - What is a Protist?: This is an introductory lesson with links about protists and fungi. Students analyze and interpret informational text to describe the basic characteristics and structures of common protists and fungi. Students can draw a Venn diagram to compare fungi and protists. This resource can be found at http://www.ck12.org/book/CK-12-Life-Science-Concepts-For-Middle-School/section/6.1/.
  - Characteristics of Protists: This slideshow introduces students to the groups of protists, their structures, descriptions of how they move, and how they obtain energy. This resource can be found at http://www.biologyjunction.com/protist_fungi.ppt .
  - Protist Foldable: This foldable includes the structures of *volvox, euglena, paramecium, and amoeba.* Students use the foldable to compare structures and to analyze the functions of the structures of the four common protists. After constructing the foldable,

students could use a graphic organizer such as a Venn Diagram to compare/contrast the structures and their functions for each of the featured protists. This resource can be found at http://www.learnnc.org/lp/media/uploads/2012/05/protist_foldable_1.pdf.

- Protist Virtual Lab: Students analyze protists and their structures in a virtual lab focusing on pond water. This resource can be found at http://vsprotista.weebly.com/virtual-lab.html.
- Analyzing Pond water (local or can be purchased): This lab uses pond water to locate protists. This resource can be found at http://sciencenetlinks.com/lessons/pond-2-life-in-a-drop-of-pond-water/.
- Protist Virtual Lab2: This lab includes videos on the amoeba, paramecium, and euglena. Students collect and analyze data to construct explanations about structures and functions of protists. This resource can be found at http://labs.7bscience.com/protist-labs.html.

- 6.L.5A.2
  - Fungus Files: This is a complete curriculum with printables and an informative e-book about fungi and covers all content related to the fungi performance indicators. It provides the students the opportunity to analyze and interpret data focusing on how fungi respond to the stimulus. This resource can be found at http://www.namyco.org/fungus_files.php.
  - Fungi are Alive!: Students will use this short informational text about fungi to analyze specific information. (This site references many multi-level informational text articles with follow-up questions.) This resource can be found at http://www.k12reader.com/reading-comprehension/Gr5_Wk15_Fungi_are_Alive.pdf.
  - Fungi Activities and Labs: This is further information, activities, and labs so that students can analyze and interpret data and text pertaining to fungi structures and functions as well as how they respond to stimuli. This resource can be found at http://www.namyco.org/manual_for_teachers_and_natura.php. This lesson plan within the site offers a starting point to introduce fungi: http://www.namyco.org/lesson_plan.php.
  - Fungus Interactive Videos: Use these videos to informally assess students' mastery level of how various fungi respond to stimuli. These videos can be found at http://www.watchknowlearn.org/Category.aspx?CategoryID=2303.
  - Yeast Feast/The Fungus Among Us: This is a lab that allows students to analyze the responses yeast have to stimuli. Additional

activities and information are also included. This resource can be found at https://edis.ifas.ufl.edu/pdffiles/4H/4H31100.pdf.

Resources

- Background information about Protists - student-friendly: http://www.kidsbiology.com/biology_basics/five_kingdoms_life/protist3.php
- Fun facts and review about Protists: http://easyscienceforkids.com/protists/
- Protist & Fungi games and review: http://www.sciencestudysource.com/Pages/SciProtnFungich7.html
- Complete fungi curriculum: http://www.namyco.org/docs/fungus_files_brochure_new.pdf http://www.namyco.org/lesson_plan.php
- Fungi Reading: This is a kid-friendly article about fungi. Great for guided reading as informational text. http://www.kidsdiscover.com/teacherresources/fungi/

Sample Formative Assessment Tasks/Questions

Additional sample formative assessment tasks/questions for grade bands are located at the end of each of the SEP Support Doc. (http://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf).

- 6.L.5A.1
  - Students will create 3-D models of euglena, paramecium, and amoeba using craft-type objects based upon their observations of real or virtual protists. The focus will be to analyze the basic structures that allow each organism to obtain energy and explore their environments and to construct explanations of how protists move and obtain energy. Each model should also include a description card which contains the following information: scientific name, structures for movement, and how movement occurs. They must also include information about the Protist Kingdom: What are the characteristics, and where do they live?
  - In order for students to construct information on how protists respond to their environments, have them research a harmful protist. In the format of a poster or infographic, they are to include the scientific name, how it is harmful (cause & effect), as well as how the protist can be contracted. Finally they should include a public service announcement warning people of how they can avoid contracting the protist. Use this video from "Monsters Within Me" as a springboard: http://www.animalplanet.com/tv-shows/monsters-inside-me/videos/the-eye-eating-parasite/.

- 6.L.5A.2
    - Students create a poster or infographic which should include the following information: basic structures of fungi, classification of fungi, and harmful/beneficial fungi. By doing so, they will demonstrate how the structures of various fungi allow them to respond to stimuli and how these responses harm or benefit living things as a result.

    - In order to construct explanations based on data analysis, students design an experiment to determine how fungi respond to a stimulus. For example, they could investigate if the amount of light or the temperature determines the growth rate of fungi. This could either be used as a formative or summative assessment as well as a formal lab investigation. Depending on the learning levels of the students, the report could be done as a template (see link) or as an independent study. http://www.nbexcellence.org/faculty/lawtonl/Microsoft%20Word%20-%20Lab%20Report%20Format%20&%20Rubric%2009-10.pdf

Unit Title
Life Science: Protists, Fungi, & Plants
Standard http://ed.sc.gov/scdoe/assets/file/agency/ccr/Standards-Learning/documents/South_Carolina_Academic_Standards_and_Performance_Indicators_for_Science_2014.pdf
6.L.5: The student will demonstrate an understanding of the structures, processes, and responses that allow protists, fungi, and plants to survive and reproduce.

Conceptual Understanding
6.L.5B. The Plant Kingdom consists of organisms that primarily make their own food (autotrophs) and are commonly classified based on internal structures that function in the transport of food and water. Plants have structural and behavioral adaptations that increase the chances of reproduction and survival in changing environments.
New Academic Vocabulary **Some students may need extra support with the following academic vocabulary in order to understand what they are being asked to understand and do. Teaching these terms in an instructional context is recommended rather than teaching the words in isolation. A great time to deliver explicit instruction for the terms would be during the modeling process. Ultimately, the student should be able to use the academic vocabulary in conversation with peers and teachers. These terms are pulled from the essential knowledge portion of the Support Doc 2.0 (http://ed.sc.gov/instruction/standards-learning/science/support-documents-and-resources/) and further inquiry into the terms can be found there.**

Anther	Cone	Dicot	Dormant	Embryo	Fibrous Root
Germination	Glucose	Gravitropism	Guard Cells	Hydrotropism	Monocot
Nonvascular	Ovary	Ovule	Photosynthesis	Phloen	Pistil
Respiration	Sexual	Spore	Stamen	Stigma	Style
Taproot	Thigmotropism	Transpiration	Tropism	Vascular	Xylem

Performance Indicators

Text highlighted below in *orange* and *italicized/underlined* shows connections to SEP's.

6.L.5B.1 *Construct explanations* of how the internal structures of vascular and nonvascular plants transport food and water.

6.L.5B.2 *Analyze and interpret data* to explain how the processes of photosynthesis, respiration, and transpiration work together to meet the needs of plants.

6.L.5B.3 *Develop and use models* to compare structural adaptations and processes that flowering plants use for defense, survival, and reproduction.

6.L.5B.4 *Plan and conduct controlled scientific investigations* to determine how changes in environmental factors (such as air, water, light, minerals, or space) affect the growth and development of a flowering plant.

6.L.5B.5 *Analyze and interpret data* to describe how plants respond to external stimuli (including temperature, light, touch, water, and gravity).

***Science and Engineering Practices**

Support for the guidance, overviews of grade level progressions, and explicit details of each SEP can found in the Science and Engineering Support Doc (http://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf). It is important that teachers realize that the nine science and engineering practices are not intended to be used in isolation. Even if a performance indicator for a given standard only lists one of the practices as a performance expectation, scientists and engineers do not use these practices in isolation, but rather as part of an overall sequence of practice. When educators design the learning for their students, it is important that they see how a given performance expectation fits into the broader context of the other science and engineering practices. This will allow teachers to provide comprehensive, authentic learning experiences through which students will develop and demonstrate a deep understanding of scientific concepts.

6.S.1A.2 Develop, use, and refine models to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others.

6.S.1A.3 Plan and conduct controlled scientific investigations to answer questions, test hypotheses, and develop explanations: (1) formulate scientific questions and testable hypotheses; (2) identify materials, procedures, and variables; (3) select and use appropriate tools or instruments to collect qualitative and quantitative data; and (4) record and represent data in an appropriate form. Use appropriate safety procedures.

6.S.1A.4 Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to (1) reveal patterns and construct meaning or (2) support hypotheses, explanations, claims, or designs.

6.S.1A.6 Construct explanations of phenomena using (1) primary or secondary scientific evidence and models, (2) conclusions from scientific investigations, (3) predictions based on observations and measurements, or (4) data communicated in graphs, tables, or diagrams.

***Cross Cutting Concepts** **(http://www.nap.edu/read/13165/chapter/8)**

The link above provides support from the Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas (2012) The text in blue and *italicized/underlined* below provides a brief explanation of how the specific content ties to the CCC's.

1. Patterns: The National Research Council (2012) states that "Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them" (p. 84). *Within the plant kingdom, plants can be further classified and organized according to their structures (ex: vascular and nonvascular).*

2. Cause and effect: Mechanism and explanation: The National Research Council states, "Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts" (p. 84). *Plant growth and responses occur in response to external stimuli (tropisms, factors affecting growth).*

3. Scale, proportion, and quantity: The National Research Council states, "In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance" (p. 84). *Plant growth is influenced by the availability of environmental factors (water, sunlight, minerals, space).*

4. Systems and system models: The National Research Council states that this includes "defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering" (p. 84). *Plants are a system of study involving external inputs (sunlight, water, CO_2) and outputs (CO_2, O_2, glucose) that interact with their external environments.*

5. Energy and matter: The National Research Council states that this includes "Flows, cycles, and conservation. Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations"(p. 84). *Solar energy is transformed within plants through photosynthesis.*

6. Structure and function: The National Research Council (2012) states, "The way in which an object or living thing is shaped and its substructure

determine many of its properties and functions" (p. 84). *The reproductive, defense, and nutrient transport structures of plants allow for the responses and processes necessary for their survival.*

7. Stability and change: The National Research Council states, "For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study"(p. 84). *Plants must respond (through tropisms) to changes in their external environments in order to maintain balance (homeostasis) in order to survive.*

**Teachers have the discretion to enhance the selected SEP's and CCC's.*

Prior Knowledge

- 4.L.5A.1 Physical characteristics of plants (flowering and non-flowering) and animals (vertebrates and invertebrates)
- 4.L.5A.2 Life cycle of plants
- 4.L.5B.2 Structural adaptations of plants (roots, stems, leaves, flowers, fruit, and seeds)
- 5.L.4A.1 Ecosystems (terrestrial and aquatic), biotic and abiotic factors
- 5.L.4B.1 Producers, consumers (herbivores, carnivores, omnivores), and decomposers

Subsequent Knowledge

- 7.E.5 The student will demonstrate an understanding of how organisms interact with and respond to the biotic and abiotic components of their environments.
- H.B.3 The student will demonstrate the understanding that all essential processes within organisms require energy which in most ecosystems is ultimately derived from the Sun and transferred into chemical energy by the photosynthetic organisms in that ecosystem.
- H.B.6 The student will demonstrate an understanding that ecosystems are complex, interactive systems that include both biological communities and physical components of the environment.

Possible Instructional Strategies/Lessons

Strategies and lessons that will enable students to master the standard and/or indicator.

- 6.L.5.B1
  - Moss Lab: Students will construct explanations about the structures and their functions in a lab setting to determine how non-vascular plants transport water and nutrients. http://www.education.com/science-fair/article/water-and-mosses/
  - Colored Carnations and Celery: Students will observe the transport of colored water up through the xylem of a stalk of celery or carnation to construct explanations on how vascular plants transport water and nutrients. http://classroom.hiddenvilla.org/curriculum/curriculum-for-your-school-garden/fifth-grade/colored-carnations-and-celery

- Xylem and Phloem: Students will use this informational text on xylem and phloem to construct explanations about each structure's function within vascular plants. http://www.k12reader.com/worksheet/xylem-and-phloem/view/

- 6.L.5.B2
  - Everything Breathes: Students will observe the transport of gasses in elodea through this exploration to construct explanations about the components of respiration and photosynthesis. http://classroom.hiddenvilla.org/curriculum/curriculum-for-your-school-garden/fifth-grade/everything-breathes

  - Science Up Close: Photosynthesis: In this animation, students will observe the process of photosynthesis. Students can complete a graphic organizer/flow chart illustrating the sequence of steps involved in photosynthesis to construct explanations about the inputs and outputs of each process. http://www.harcourtschool.com/activity/science_up_close/512/deploy/interface.html

  - Transpiration: With this animation, students will analyze the process of transpiration in order to construct explanations about the role in the survival processes of plants. http://www.sciencemag.org/site/feature/misc/webfeat/vis2005/show/transpiration.swf

- 6.L.5.B3
  - 9 Plant Defense Mechanisms: Using this website (Botanical Barbarity), students will create a graphic organizer in order to develop and use models to list and provide an example of 9 defense structures. https://www.britannica.com/list/9-plant-defense-mechanisms

  - Parts of a Flower: This is an interactive activity where students use a model to identify the structures and functions of a flower. http://www.bbc.co.uk/schools/scienceclips/ages/9_10/life_cycles_fs.shtml

  - Plant Structure and Function: This video identifies and classifies flowering plant structures as male or female and explains the role of pollinators. Students can complete an illustration or label a provided diagram to identify each structure in order to make and use models about the structure and functions of flowering plants. Students then construct a summary paragraph explaining how flowering plant reproduction occurs, using all content vocabulary (stamen, anther, pollen, pistil, stigma, ovary, ovule). https://www.youtube.com/watch?v=7G9Jozhr7H0

- The Plant Game: Students will make and use models in order to explain the structures and functions as they compete to "grow" their plants in a graduated cylinder with the most flowers. Student choices and chance through dice rolls determine the success of the plant. https://blogs.cornell.edu/cibt/labs-activities/labs/plant-game/

- Plant Model: Students will make and use 2D or 3D models illustrating, labeling, and comparing how each plant has structures and processes for defense, survival, and reproduction. Students can use real or created plant examples.

- Flowering Plant Webquest: Students develop and use models from a variety of online resources to deepen their understanding of flowering plants. This is structured in learning stations. http://www.alvaradoschool.org/apps/pages/index.jsp?uREC_ID=151348&type=u&pREC_ID=454467

- 6.L.5.B4
  - Will it Grow?: Students will conduct experiments to determine the environmental needs of plants for growth. http://classroom.hiddenvilla.org/curriculum/curriculum-for-your-school-garden/fifth-grade/will-it-grow

  - Virtual Photosynthesis in Elodea: Students will observe the photosynthetic response of elodea to varying levels of light. Students will use the virtual counter to tabulate the oxygen production in response to light levels. http://www.reading.ac.uk/virtualexperiments/ves/preloader-photosynthesis-full.html

  - Becoming a Plant: Students will plant seeds and observe and monitor their growth. Students will then create investigations to determine the growth needs of plants. https://blogs.cornell.edu/cibt/labs-activities/labs/becoming-a-plant/

- 6.L.5.B5
  - Tropisms: Students will analyze and interpret data about plant tropisms. Stop and start the lesson and have students practice note-taking! http://study.com/academy/lesson/tropisms-phototropic-geotropic-and-thigmotropic-plant-growth.html

  - Bitesize Tropisms: Students analyze tropisms from this website. Students can check their understanding with the bitesize "Test Bites" on the third page. http://www.bbc.co.uk/schools/gcsebitesize/science/edexcel/responses_to_environment/planthormonesrev1.shtml

- Plant Germination and Growth: Students will germinate and grow plants in varying conditions to determine how environmental factors affect plant growth (light, water, touch, temperature and gravity). Students will collect and analyze their data to draw conclusions about the effect of the change in stimulus on the growth of the plant.

Resources

- Animation: Transport of Water and Sugar in Plants: This animation can be paused to demonstrate specific portions of the transport system within a sunflower plant. http://www.saps.org.uk/secondary/teaching-resources/1274
- The Great Plant Escape: This is an interactive plant site: https://extension.illinois.edu/gpe/case4/c4m1.html.
- Build A Tree: In this interactive game, students will explore the location and function of plant structures. https://www.brainpop.com/games/buildatree/
- Time Lapse Plant Growth: These time lapse videos show the germination and growth of plants. http://sci2.tv/#!/live/86
- Virtual Flower Dissection: This interactive site allows students to continue developing their flower models. http://www.glencoe.com/sites/common_assets/science/virtual_labs/LS11/LS11.html
- Jeopardy-style Review Game: https://jeopardylabs.com/play/plants-i
- Plant Structures and Adaptations Video: https://youtu.be/DGpPHrLF-5M

Sample Formative Assessment Tasks/Questions

Additional sample formative assessment tasks/questions for grade bands are located at the end of each of the SEP Support Doc. (http://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf)

- 6.L.5.B1
  - Students will create written explanations providing evidence and explanations that both vascular and nonvascular plants transport the water and nutrients necessary for survival. Student writing must include specific academic vocabulary (xylem, phloem, vascular, nonvascular) and should be written using the Claim, Evidence, Reasoning format. Students can utilize evidence from the labs in the instructional strategies recommended for this performance indicator in their writings.

- 6.L.5.B2
    - When provided with graphic models showing the inputs and outputs of photosynthesis and respiration and the process of transpiration, students will explain how these processes are interrelated and work together to meet the survival needs of plants. Students can use graphic models created while using the virtual labs in the recommended instructional strategies for this performance indicator.

- 6.L.5.B3
    - Students will create written responses describing the structures and processes of two plants (plants can be present in classroom, models created by students, or provided on image cards). Each plant's adaptations for defense, survival and reproduction should be described. A written comparison using the Claim, Evidence, Reasoning format will explain that, though each plant has different adaptations, both have the structures and processes needed for survival.

- 6.L.5.B4
    - When given a description and data from an example scenario (plant growth measurement), students will be able to identify the changes in the experimental environment that would most likely improve the growth of the plant (ex: move the plant to a location with more sunlight).

- 6.L.5.B5
    - Tropism Lab: This lab from Discovery Education could very well be used as a formative assessment on tropisms. http://www.discoveryeducation.com/teachers/free-lesson-plans/the-importance-of-tropisms.cfm

    - Tropism data analysis: Students will analyze and draw conclusions from data to determine the impact of environmental factors on the growth of plants. Students can use class data from the plant growth lab in the recommended instructional strategies for this performance indicator.

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