Unit 4: Plant Structure and Function

Content Area: **Science**
Course(s): **Sample Course**
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Title Section

Department of Curriculum and Instruction

Belleville Public Schools

Curriculum Guide

Science Grade 4

Unit 4: Plant Structure and Function

Belleville Board of Education

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Unit Overview

Unit four provides detailed information about the structure and function of plants. The content within the unit focuses on exploring the functions of internal and external plant structures. Internal and external plant structures aid in growth, survival, behavior and reproduction. Different plant structures work together as a system.

(Reference HMH Science Dimensions, Unit 4)

Enduring Understanding

- Different parts of plants serve different purposes.
- Different plants have different types of structures.
- The structures function in ways that enable the plants to survive.
- Plants have certain behaviors that help them to grow and survive.
- Plants have to absorb sunlight, make food, grow, and survive.
- Internal plant structures help plants reproduce.
- Plants produce pollen.
- Plants are pollinated by animals, insects, wind, and self-pollination.
- When a plant reproduces, it makes another plant.
- Not all plants produce flowers to reproduce.
- Seed dispersal helps prevent overcrowding and competition for space, light, and other resources.

Essential Questions

- **How do plant parts help plants survive?**
- **How do plant parts differ for different plants?**
- **What conditions do plants need to survive?**
- **How do plants produce?**
- **What is the process of fertilization for plants?**
- **How are plants pollinated?**
- **How do plants without flowers reproduce?**
- **How do seeds disperse?**

Exit Skills

By the end of Grade 4, Science Unit 4, the student should be able to:

- Ask questions and define problems
- Construct explanations and design solutions
- Define and delimit engineering problems
- Develop possible solutions
- Optimize the design solution
- Analyze the influence of science, engineering, and technology on society and the natural world

New Jersey Student Learning Standards (NJSLS-S)

4-LS1-1	Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Interdisciplinary Connections

Connections to Math:

- **MP.2:** Reason abstractly and quantitatively.
- View "linked" standards below

Connections to English Language Arts:

- View "linked" standards below

LA.RI.4.7	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
LA.RI.4.8	Explain how an author uses reasons and evidence to support particular points in a text.
LA.RI.4.9	Integrate and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) information from two texts on the same topic in order to write or speak about the subject knowledgeably.
LA.W.4.1	Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
MA.4.G.A.3	Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

Learning Objectives

In Unit 4, students will demonstrate the ability to:

HMH Science Dimensions, Unit 4 - Lesson 1:

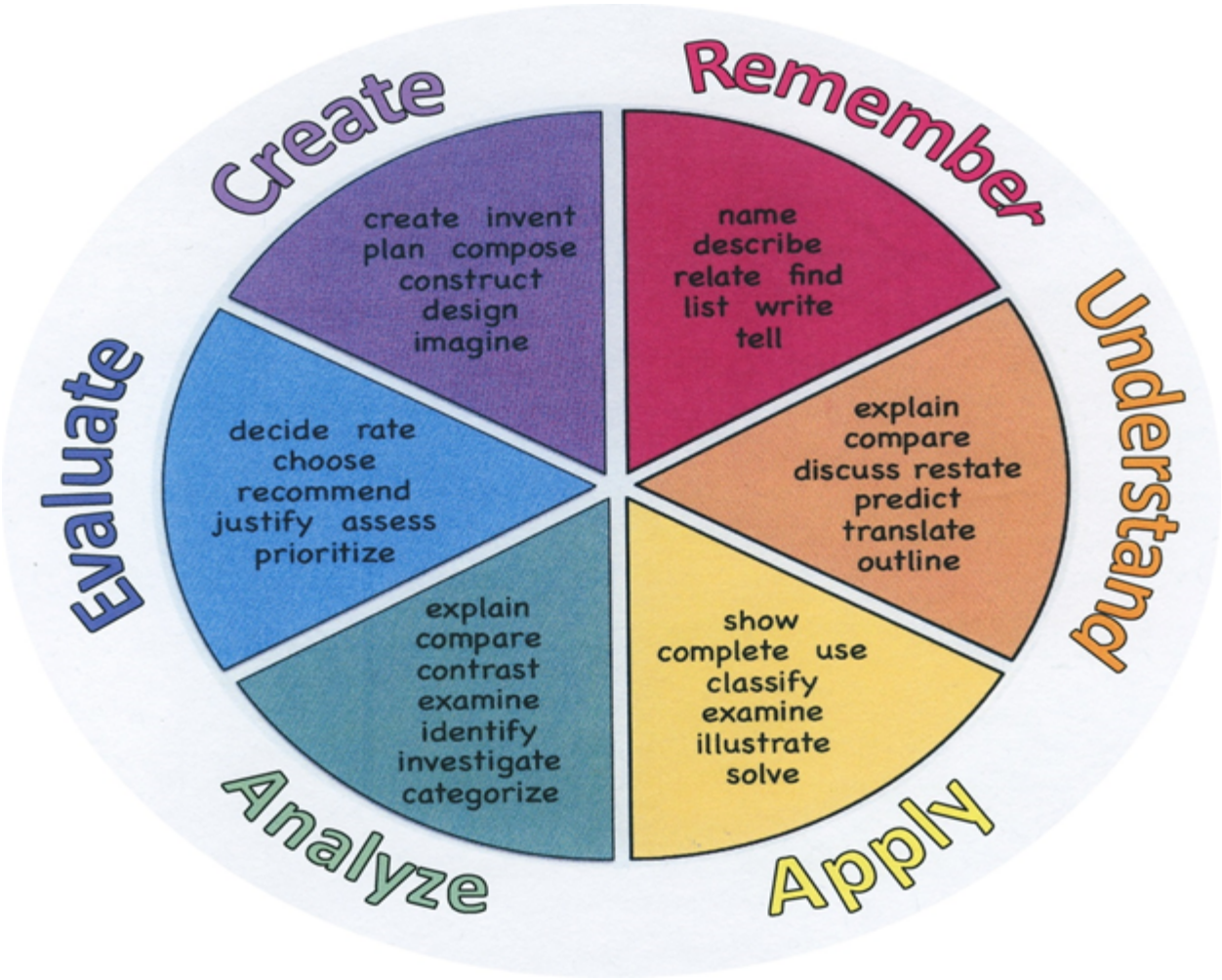
- **Construct** an argument that plant parts are used for survival, growth, reproduction, and behavior
- **Support** arguement with evidence about the function and structure of plant parts
- **Asses** the purpose of different plant parts

HMH Science Dimensions, Unit 4 - Lesson 2:

- **Compare and Contrast** the process of pollination and fertilization in both flowering and non-flowering plants
- **Support** argument with evidence about the function and structure of plant parts
- **Determine** the importance of seed dispersal

Below are examples of action verbs associated with each level of the Revised Bloom's Taxonomy. These are useful in writing learning objectives, assignment objectives and exam questions.

Remember	Understand	Apply	Analyze	Evaluate	Create
Choose	Classify	Choose	Categorize	Appraise	Combine
Describe	Defend	Dramatize	Classify	Judge	Compose
Define	Demonstrate	Explain	Compare	Criticize	Construct
Label	Distinguish	Generalize	Differentiate	Defend	Design
List	Explain	Judge	Distinguish	Compare	Develop
Locate	Express	Organize	Identify	Assess	Formulate
Match	Extend	Paint	Infer	Conclude	Hypothesize
Memorize	Give Examples	Prepare	Point out	Contrast	Invent
Name	Illustrate	Produce	Select	Critique	Make
Omit	Indicate	Select	Subdivide	Determine	Originate
Recite	Interrelate	Show	Survey	Grade	Organize
Select	Interpret	Sketch	Arrange	Justify	Plan
State	Infer	Solve	Breakdown	Measure	Produce
Count	Match	Use	Combine	Rank	Role Play
Draw	Paraphrase	Add	Detect	Rate	Drive
Outline	Represent	Calculate	Diagram	Support	Devise
Point	Restate	Change	Discriminate	Test	Generate
Quote	Rewrite	Classify	Illustrate		Integrate
Recall	Select	Complete	Outline		Prescribe
Recognize	Show	Compute	Point out		Propose
Repeat	Summarize	Discover	Separate		Reconstruct
Reproduce	Tell	Divide			Revise
	Translate	Examine			Rewrite
	Associate	Graph			Transform
	Compute	Interpolate			
	Convert	Manipulate			
	Discuss	Modify			
	Estimate	Operate			
	Extrapolate	Subtract			
	Generalize				
	Predict				



Suggested Activities & Best Practices

HMH Science Dimensions, Unit 4 - Lesson 1:

- **Engage:** "Can You Explain It?" lesson
- **Explore/Explain:** "Plant Dissection" and "What's Inside?," and "Can Plants Move?" lessons and hands-on activity (Exploration 1, 2, & 3)
- **Elaborate:** "Discover More" extension activity
- **Evaluate:** "Lesson Check" and "Lesson Roundup" assessments (formative/summative)

HMH Science Dimensions, Unit 4 - Lesson 2:

- **Engage:** "Can You Explain It?" lesson
- **Explore/Explain:** "Why Do Plants Have Flowers?," "What If Plants Don't Produce Flowers?," and "On the Move" lessons and hands-on activity (Exploration 1, 2, & 3)
- **Elaborate:** "Discover More" extension activity

- **Evaluate:** "Lesson Check" and "Lesson Roundup" assessments (formative/summative)

HMH Science Dimensions, Unit 4 - Performance Task (Flower Parts):

- **Define Task**
- **Research**
- **Make A Plan**
- **Dissect and Illustrate**
- **Communicate**

HMH Science Dimensions, Unit 4 - Unit Project (Plant and Animal Partnerships):

- **Research and Plan**
- **Analyze Results**
- **Claims, Evidence, and Reasoning**

Evidence of Student Learning - Checking for Understanding (CFU)

- Admit Tickets
- Anticipation Guide
- Compare & Contrast
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Fist- to-Five or Thumb-Ometer
- KWL Chart
- Outline
- Question Stems
- Quickwrite
- Quizzes

- Red Light, Green Light
- Self- assessments
- Study Guide
- Teacher Observation Checklist
- Think, Pair, Share
- Think, Write, Pair, Share
- Unit tests

Primary Resources & Materials

Houghton Mifflin Harcourt- HMH Science Dimensions, 2018

Ancillary Resources

Science Weekly, Scholastic News, NewsELA, YouTube/TeacherTube, National Geographics Kids, Science Channel

Technology Infusion

SMARTboard, PowerPoint, Prezi, Social Media, relevant YouTube/TeacherTube videos, HMH Science Dimensions Digital Component, Laptops, WebQuests, Kahoot, Quia

Alignment to 21st Century Skills & Technology

Key SUBJECTS AND 21st CENTURY THEMES

Mastery of key subjects and 21st century themes is essential for all students in the 21st century.

Key subjects include:

- English, reading or language arts
- Mathematics
- Science

21st Century Skills/Interdisciplinary Themes

- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy
- Information Literacy
- Life and Career Skills
- Media Literacy

21st Century Skills

- Environmental Literacy
- Global Awareness
- Health Literacy

Differentiation

Differentiations:

- Small group instruction
- Small group assignments
- Extra time to complete assignments
- Repeat directions
- Use manipulatives
- Center-based instruction
- Study guides
- Teacher reads assessments allowed
- Scheduled breaks
- Rephrase written directions
- Additional time
- Preview vocabulary
- Preview content & concepts
- Behavior management plan
- Highlight text
- Student(s) work with assigned partner
- Small group setting

Hi-Prep Differentiations:

- Alternative formative and summative assessments
- Choice boards
- Games
- Independent research and projects
- Learning contracts
- Leveled rubrics
- Multiple intelligence options
- Multiple texts
- Project-based learning
- Problem-based learning
- Stations/centers
- Think-Tac-Toes
- Tiered activities/assignments
- Tiered products
- Varying organizers for instructions

Lo-Prep Differentiations

- Flexible grouping
- Goal setting with students
- Jigsaw
- Mini workshops to re-teach or extend skills
- Open-ended activities
- Think-Pair-Share
- Varied supplemental materials

Intervention Strategies

- allowing students to correct errors (looking for understanding)
- teaching key aspects of a topic. Eliminate nonessential information
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning
- allowing students to select from given choices
- allowing the use of note cards or open-book during testing
- collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test.
- decreasing the amount of workpresented or required
- having peers take notes or providing a copy of the teacher's notes
- marking students' correct and acceptable work, not the mistakes

- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using true/false, matching, or fill in the blank tests in lieu of essay tests
- using videos, illustrations, pictures, and drawings to explain or clarify

Special Education Learning

- printed copy of board work/notes provided
- additional time for skill mastery
- behavior management plan
- check work frequently for understanding
- computer or electronic device utilizes
- extended time on tests/ quizzes
- have student repeat directions to check for understanding
- highlighted text visual presentation
- modified assignment format
- modified test content
- modified test format
- modified test length
- multiple test sessions
- preferential seating
- preview of content, concepts, and vocabulary
- reduced/shortened reading assignments
- Reduced/shortened written assignments
- secure attention before giving instruction/directions
- shortened assignments
- student working with an assigned partner
- Use open book, study guides, test prototypes

English Language Learning (ELL)

- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarif
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning;
- allowing students to correct errors (looking for understanding)
- allowing the use of note cards or open-book during testing
- decreasing the amount of workpresented or required
- having peers take notes or providing a copy of the teacher's notes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using true/false, matching, or fill in the blank tests in lieu of essay tests

Sample Lesson

Unit Name: Plant Structure and Function

NJSLS: ESS3.A

Interdisciplinary Connection: Math, Language Arts

Statement of Objective: SWDAT assess the importance of plant parts by writing an opinion piece using evidence to support a claim.

Anticipatory Set/Do Now: Create a "KWL" chart to activate students' prior knowledge on plants.

Learning Activity: Use student responses to discover what students already know and would like to learn about plant parts. Extend knowledge by engaging in "Can You Explain It?" activity on page 233. Turn to a partner to discuss why the plants in the pictures bend in the directions that they do. In whole group, share student responses to discuss how this behavior helps the plant grow and survive. Read pages 235-238 to learn about the function of different plant parts. During reading, stop to complete the "T-Chart" on page 234 to distinguish between each plant part and how it helps the plant survive. After reading, in cooperative learning groups, students will complete the "Functions of Plant Parts" activity for guided instruction to apply acquired knowledge. For independent practice students will create an opinion writing piece about the most important part of a plant. In whole group, read and analyze prompt to determine the responsibility of the writer. Model using graphic organizer to make a claim and support the claim with three pieces of evidence from the text. Model thinking aloud to ensure each fact supports the claim. Allot students time to complete writing task. Teacher will provide additional support as needed. The activity will be used as a formative assessment to design future lessons.

Student Assessment/CFU's: See linked CFU's

Materials: Workbook, Pencils, Erasers, Markers, HMH Science Dimensions Online Component

21st Century Themes and Skills: See linked 21st Century Themes and Skills

Differentiation/Modifications: See linked Differentiation/Modification

Integration of Technology: HMH Science Dimensions Online Component