Unit 4: Plant and Animal Structures

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Department of Curriculum and Instruction

Belleville Public Schools

Curriculum Guide

Science: Grade 1

Unit 4: Plant and Animal Structures

Belleville Board of Education

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Unit Overview

Kids are born scientists. They want to know WHY: Is the sun a star? How do magnets work? It's our job to encourage their curiosity, creativity, and exploration while preparing them for careers in science, technology, engineering, and math.

Unit 4 Performace Expectations:

1-LS1-1 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

Throughout Unit 4, students will develop skills to

- describe how parts of a plant help it to survive and grow.
- explain how parts of an animal help it to survive and grow.
- relate the shape and stability of structures to their function(s).
- use evidence to describe how plants and animals process and respond to information.
- describe how human-made products are designed by applying knowledge of the natural world.
- use observations to design a solution to a human problem by mimicking how plants use their parts to survive.

Unit Vocabulary: mimic, gills, lungs, adaptation, environment

Unit Project: Explore a Favorite Animal

Lesson 1:

In Lesson 1, students explore how the external parts of plants allow them to survive and grow. Students will explore how people design solutions by mimicking how plant parts function. Finally, students will build a solution to a human problem.

Essential Question: What parts help plants live?

Can You Solve It? (Lesson 1 Engagement Question): How did the maple seed give peopl ideas to make the helicopter blades?

Hands-On Activity: Use Ideas from Plants to Design a Solution

Lesson 2:

In Lesson 2, students will mimic animal parts to construct a solution to a human problem and explore how the structure of animal parts is related to their function.

Essential Question: What body parts help animals stay safe?

Can You Solve It? (Lesson 2 Engagement Question): What ideas can you get from a hedgehog to keep something safe?

Hands-On Activity: Design a Shoe

Lesson 3:

In Lesson 3, students will explore how the body parts of animals allow them to meet their needs and explore how people design solutions to problems by mimicking animal parts. Finally, students will mimic animal body parts and function to build a solution.

Essential Question: What body parts help animals meet their needs?

Can You Solve It? (Lesson 3 Engagement Question): How can you get an idea from the giraffe to make a tool that reaches high places?

Hands-On Activity: Use Ideas from Animals

Lesson 4:

In Lesson 4, students will explore how plants and animals respond to their environments, carry out an investigation about the effects of light on plant growth, and explore how animal senses help them process information.

Essential Question: How do plants and animals respond to their environment?

Can You Explain It? (Lesson 4 Engagement Question): Why are the trees growing in unusual ways?

Hands-On Activity: Change How a Plant Grows

Online Interactive Activity: Build a Safey Helmet

Enduring Understanding

Unit 4 Performance Task: Students will define a problem and design a solution by applying the structure and function of the parts of water plants.

(Refer to Scoring Rubric TE page 213)

By the end of Lesson 1, students will be able to design a solution to a human problem by mimicking how plants use their parts to survive and grow.

By the end of Lesson 2, students will be able to design a solution to a human problem by mimicking how animals use parts of their body for protection.

By the end of Lesson 3, students will be able to design a solution to a human problem by mimicking how animals use their body parts to meet their needs.

By the end of Lesson 4, students will be able make observations to describe how behaviors of living things help them grow and survive.

Assessments

Pre-Assessment

Assessment Guide, Unit Pretest

Formative Assessment

Interactive Worktext, Apply What You Know, Lesson Check and Self Check

Summative Assessment

Assessment Guide, Interactive Worktext, Lesson Quiz and Unit Test

Online Assessment

Essential Questions

Essential Questions for Unit 4 Project:

Students can be prepared for their Unit 4 Project by asking the following questions:

- What helps you stay healthy and grow?
- What helps you stay safe?
- How do you get things you need to stay healthy and safe?

Essential Questions:

- What parts help plants live?

- How did the maple seed give people ideas to make the helicopter blades?

- What body parts help animals stay safe?

- What ideas can you get from a hedgehog to keep something safe?

- What body parts help animals meet their needs?

- How can you get an idea from the giraffe to make a tool that reaches high places?

- How do plants and animals respond to their environment?

- Why are the trees growing in unusual ways?

Exit Skills

By the end of Grade 1, Science Unit 4, the students should be able to:

- explain how nature helps people solve problems

- offer a reasonable explanation about how the maple see gave people the idea for the helicopter blades

- explain that a hedgehog's spines keep it safe

- identify an idea to keep something safe that has a structure and function similar to a hedgehog's spine
- describe the problem their idea could help solve
- effectively communicate how people use the ideas they get from animals to solve problems
- explain how people use animal's structures as models for human-made structures with similar functions
- identify a plant's needs for sunlight and water
- describe how trees respond to their environment
- explain the cause and effect relationship that results in trees having unusual growth patterns

New Jersey Student Learning Standards (NJSLS-S)

SCI.1-LS1-1	Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

Interdisciplinary Connections

Lesson 1:

Connections to Math

1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

Connections to English Language Arts

W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions).

R.1.1 Ask and answer questions about key details in a text.

Lesson 2:

Connections to Math

1.MD.A.2 Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object (length and unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.

Connections to English Language Arts

W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions).

Lesson 3:

Connections to Math

1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

Connections to English Language Arts

W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions).

Lesson 4:

Connections to Math

MP.4 Model with mathematics.

1.MD.A.2 Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.

Connections to English Language Arts

W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions).

MA.K-12.4	Model with mathematics.
LA.RI.1.1	Ask and answer questions about key details in a text.
MA.1.MD.A.2	Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.
MA.1.MD.C.4	Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.
LA.W.1.7	Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions).

Learning Objectives

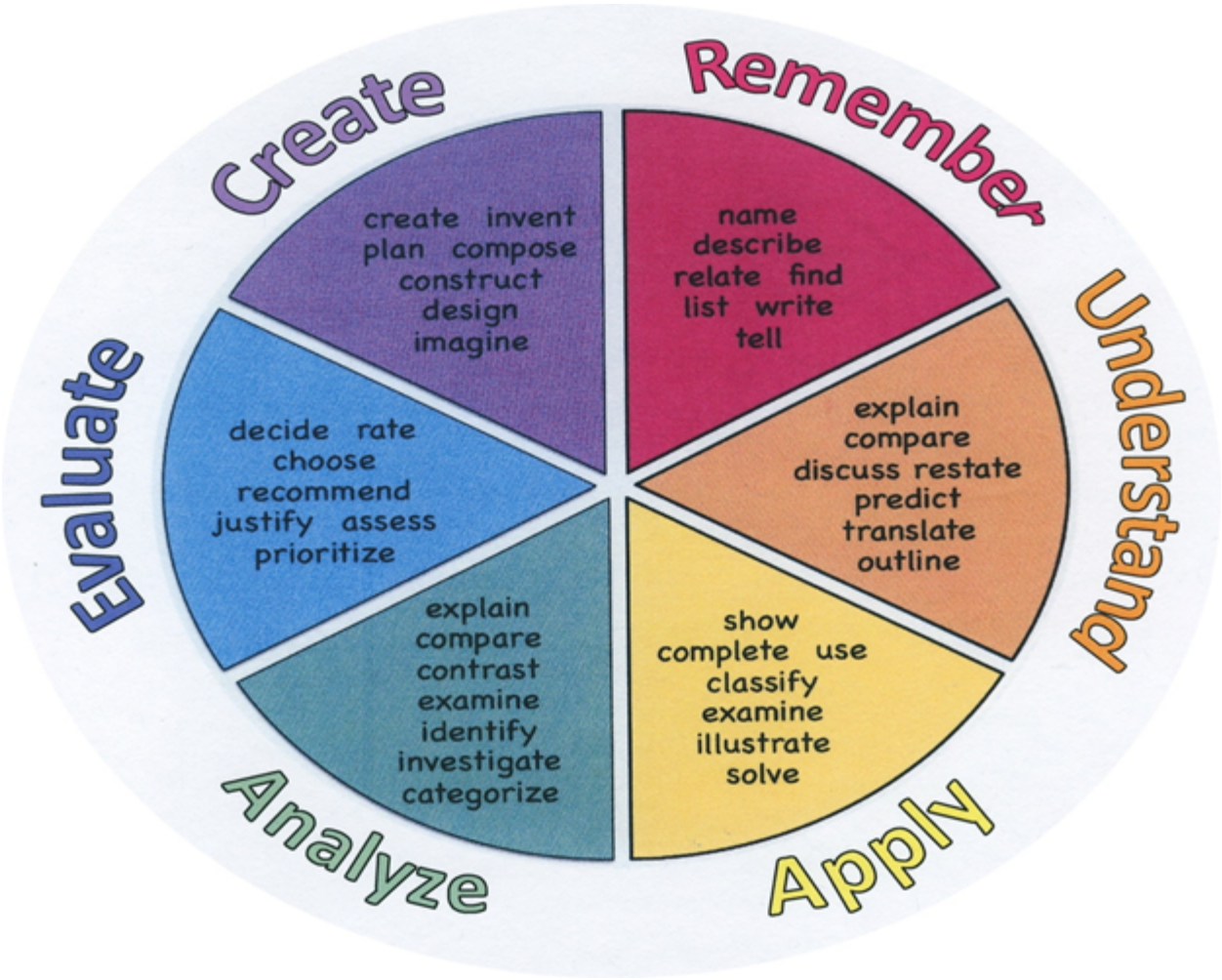
Effective Learning Objectives Used in Lesson Planning:

- SWDAT design a solution to a human problem by mimicking how plants use their parts o survive and grow
- SWDAT use an idea from a plant to design and build something that would help keep them cool

- SWDAT use a design process to solve their problem
- SWDAT design a solution to a human problem by mimicking how animals use parts of their body for protection
- SWDAT identify a problem related to keeping feet safe and use ideas about animals body parts to develop a solution to a problem
- SWDAT design a solution to a human problem by mimicking how animals use their body parts to meet their needs
- SWDAT use an idea from an animal to design and build a tool that would help them pick up food
- SWDAT make observations to describe how behaviors of living things help them grow and survive
- SWDAT make observations from an investigation to construct an evidence-based account for a plant's growth pattern

Action Verbs: Below are examples of action verbs associated with each level of the Revised Bloom's Taxonomy.

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

Vocabulary Game- Make a Match

Hands-On Activities: Use Ideas from Plants to Design a Solution, Design a Shoe, Use Ideas from Animals, & Change How a Plant Grows

Interactive Activity: Build a Safety Helmet

Unit Project

Take It Further

- Plants We Eat
- New Body Parts for Animals
- Hear Like a Bat
- Insects in Winter

Evidence of Student Learning - Checking for Understanding (CFU)

In addition to the assessments provided with the Houghton Mifflin Harcourt Science Series, teachers may use different formative and informative assessments to guide their instruction. Below is a checklist of possible assessment strategies to be used to check for understanding in Science.

- Admit Tickets
- Anticipation Guide
- Common benchmarks
- Compare & Contrast
- Create a Multimedia Poster
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Fist- to-Five or Thumb-Ometer
- Illustration
- Journals
- KWL Chart
- Newspaper Headline

- Outline
- Question Stems
- Quickwrite
- Quizzes
- Red Light, Green Light
- Self- assessments
- Socratic Seminar
- Study Guide
- Teacher Observation Checklist
- Think, Pair, Share
- Think, Write, Pair, Share
- Top 10 List
- Unit tests

Primary Resources & Materials

HMH Science Dimensions Text

Professional Development Video

Equipment Kits (includes consumable and non-consumable materials)

Safety Kits

The Science and Engineering Practices Online Handbook

Science and Engineering Leveled Readers (On Level, Extra Support, Enrichment)

HMH Player app

Home Letters (Online)

Ancillary Resources

Safety in Science Rules

Online Resources

Technology Infusion

www.hmhco.com/classroom/classroom-solutions/digital-and-mobile-learning/ed

3D Evaluation Rubric

Computer-Based Assessments

HMH Field Trips

Online Videos and Animations

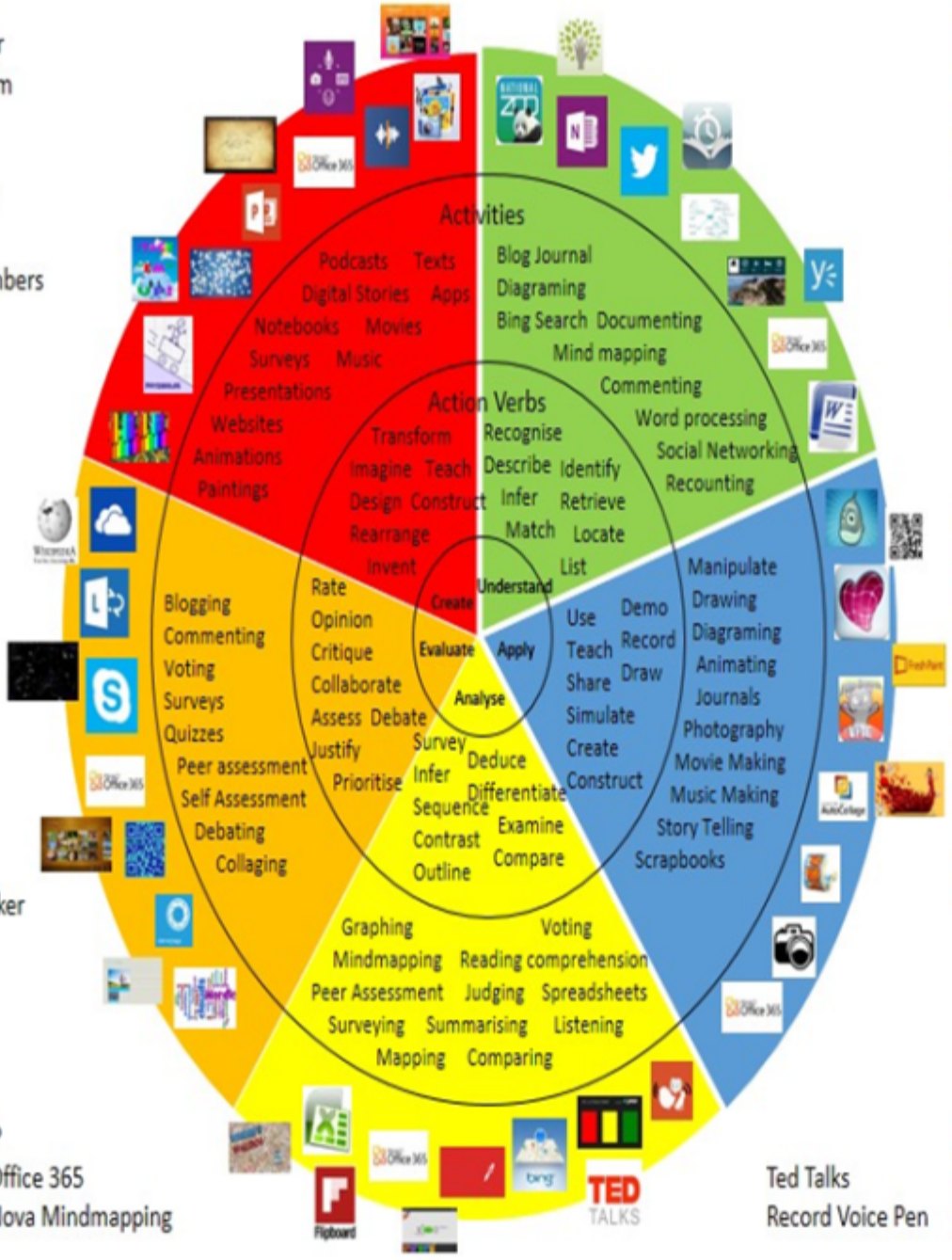
Online access to Science and Engineering Leveled Readers (includes On Level, Extra Support, and Enrichment)

Online Glossary

Win 8.1 Apps/Tools Pedagogy Wheel

Podcasts
Photostory 3
Kid Story Builder
Music Maker Jam
Paint A Story
Office 365
MS PowerPoint
Stack 'Em Up
NqSquared Numbers
Physamajig
Xylophone 8

Wikipedia
Skydrive
Lync
SkyMap
Skype
Office 365
Puzzle Touch
Easy QR
Memorylage
Life Moments
Word Cloud Maker



Where's Waldo?
MS Excel
Flipboard
Office 365
Nova Mindmapping

Ted Talks
Record Voice Pen

Originally taken from http://www.coetail.com/vzimmer/files/2013/02/iPadagogy-Wheel.001.jpg
And adapted for Windows 8.1 devices by Charlotte Beckhurst @CharBeckhurst

Alignment to 21st Century Skills & Technology

- English Language Arts; Communication and Collaboration
- Mathematics; Critical Thinking and Problem Solving
- Science and Scientific Inquiry (Next Generation); Critical Thinking and Problem Solving
- Social Studies, including American History, World History, Geography, Government and Civics, and Economics; Information Literacy
- World languages; Information Literacy
- Technology; Life and Career Skills
- Visual and Performing Arts; Creativity and Innovation

21st Century Skills/Interdisciplinary Themes

Connection to Engineering and Design: Defining and Delimiting Engineering Problems

Encourage students to think about how engineers might look to nature to solve human problems.

Connection to Physical Science: Information Technologies and Instrumentation

Ask students how they learn about their environment.

- 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

Collaboration (Build on Prior Knowledge, Small Groups, Think, Pair, Share, Partners)

Claims, Evidence, and Reasoning

People in Science & Engineering (Janine Benyus)

Careers in Science & Engineering (Bioengineer and Forest Ranger)

- Civic Literacy
- Environmental Literacy
- Financial, Economic, Business and Entrepreneurial Literacy
- Global Awareness
- Health Literacy

Differentiation

Lesson Vocabulary (mimic)

Leveled Readers (On Level, Extra Support, Enrichment)

Reinforce Vocabulary- To help students remember the vocabulary word, have them take turns mimicking a partner's behavior and use the word in a sentence. Remind students to look for the highlighted word as they proceed through the lesson.

RTI/ Extra Support- Supply students with plants for hands-on discovery. Provide examples of different plant parts. Allow students to explore each part and encourage them to use descriptive words for each part.

Extension- Students who want to find out more can do research on plants in different environments.

ELL- Point out labels, pictures, captions, and headings throughout the lesson. Discuss real-life connections to content, and provide hands-on examples of materials when possible.

(ELL support resources include a glossary in English and Leveled Readers in Spanish and English)

Differentiations:

- Small group instruction
- Small group assignments
- Extra time to complete assignments
- Pairing oral instruction with visuals
- Repeat directions
- Use manipulatives
- Center-based instruction
- Token economy

- Study guides
- Teacher reads assessments allowed
- Scheduled breaks
- Rephrase written directions
- Multisensory approaches
- Additional time
- Preview vocabulary
- Preview content & concepts
- Story guides
- Behavior management plan
- Highlight text
- Student(s) work with assigned partner
- Visual presentation
- Assistive technology
- Auditory presentations
- Large print edition
- Dictation to scribe
- Small group setting

Hi-Prep Differentiations:

- Alternative formative and summative assessments
- Choice boards
- Games and tournaments
- Group investigations
- Guided Reading
- Independent research and projects
- Interest groups
- Learning contracts
- Leveled rubrics
- Literature circles
- Multiple intelligence options
- Multiple texts
- Personal agendas
- Project-based learning
- Problem-based learning
- Stations/centers
- Think-Tac-Toes
- Tiered activities/assignments
- Tiered products
- Varying organizers for instructions

Lo-Prep Differentiations

- Choice of books or activities
- Cubing activities
- Exploration by interest
- Flexible grouping
- Goal setting with students
- Jigsaw
- Mini workshops to re-teach or extend skills
- Open-ended activities
- Think-Pair-Share

- Reading buddies
- Varied journal prompts
- 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
- assistive technology

- behavior management plan
- Center-Based Instruction
- 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
- multi-sensory presentation
- 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
- teacher initiated weekly assignment sheet
- 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 computer word processing spell check and grammar check features
- using true/false, matching, or fill in the blank tests in lieu of essay tests

Sample Lesson

Unit Name: Plant and Animal Structures

NGSS: 1-LS1-1 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs

Interdisciplinary Connection: Math- Show data in a graph

Statement of Objective: SWDAT design a solution to a human problem by mimicking how plants use their parts to survive and grow: SWDAT identify parts of flowering plants and construct explanations of how the parts help plants survive, grow, and meet their needs

Anticipatory Set/Do Now: Define vocabulary (mimic). Show Lesson Video. Discuss as a class what students saw in the video and plants they see everyday.

Learning Activity: Read aloud pages 140-142, ask guided questions; Show students "Plant Parts" Diagram and discuss the functions of each part. Draw a Plant Diagram and have students label each plant part.

Student Assessment/CFU's: Students will circle the part where seeds are made and put an "X" on the part that hold the plant; Students will vote and graph their favorite plant part and Complete "Apply What You Know" in Evidence Notebook

Materials: Lesson video, SMART TV and/or SMART Board, Plant Diagram, Labels for diagram

21st Century Themes and Skills: Communication and Collaboration; Information Literacy

Differentiation/Modifications: Lesson video, use multiple pictures to illustration each plant part, model tallying data on a graph, visuals of diagram and graph

Integration of Technology: Lesson video; have students explore online to find out more about the parts of a plant