

# Life Science- Plants and Animals

Content Area: **Science**  
 Course(s): **Grade 1**  
 Time Period: **Third Trimester**  
 Length: **12 Weeks**  
 Status: **Published**

## Unit Overview

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This unit provides experiences that develop students' understanding of how plants and animals meet their basic needs. Students observe firsthand the structures of plants and discover ways to propagate new plants from mature plants (from seeds, bulbs, roots, and stem cuttings). They observe and describe changes that occur as plants grow, and compare classroom plants to those in the schoolyard. They design terrariums (habitat systems) and provide for the needs of both plants and animals living together in the classroom.

Students explore variation in the same kind of organism, including variation between young and adults. They learn about the behaviors of parents to help their young (offspring) survive. And they explore structure and function relationships as they sort different kinds of animal and plant structures.

Throughout this unit, students engage in science and engineering practices by collecting and interpreting data to build explanations and designing and using tools to answer questions. Students gain experience that will contribute to the understanding of the crosscutting concepts of patterns; cause and effect; systems and system models; and structure and function.

## STAGE 1- DESIRED RESULTS

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### Educational Standards

#### 2020 New Jersey Student Learning Standards- Science

#### Performance Expectations

### Physical Sciences

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SCI.1-PS4-3	Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.
SCI.1-PS4-1	Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.
SCI.1-PS4-4	Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.
SCI.1-PS4	Waves and their Applications in Technologies for Information Transfer
SCI.1-PS4-2	Make observations to construct an evidence-based account that objects can be seen only when illuminated.

## Life Sciences

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SCI.1-LS3-1	Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
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.
SCI.1-LS3	Heredity: Inheritance and Variation of Traits
SCI.1-LS1	From Molecules to Organisms: Structures and Processes
SCI.1-LS1-2	Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.

## Earth and Space Sciences

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SCI.1-LS3-1	Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
SCI.1-ESS1-2	Make observations at different times of year to relate the amount of daylight to the time of year.
SCI.1-LS3	Heredity: Inheritance and Variation of Traits
SCI.1-ESS1	Earth's Place in the Universe
SCI.1-ESS1-1	Use observations of the sun, moon, and stars to describe patterns that can be predicted.

## Engineering Design

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SCI.K-2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
SCI.K-2-ETS1-2	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
SCI.K-2-ETS1-3	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

## Science and Engineering Practices

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- Practice 1: Asking Questions and Defining Problems
  - Practice 2: Developing and Using Models
  - Practice 3: Planning and Carrying Out Investigations
  - Practice 4: Analyzing and Interpreting Data
  - Practice 5: Using Mathematics and Computational Thinking
  - Practice 6: Constructing Explanations and Designing Solutions
  - Practice 7: Engaging in Argument from Evidence
  - Practice 8: Obtaining, Evaluating, and Communicating Information
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## Cross Cutting Concepts

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- Patterns
- Cause and Effect
- Scale, Proportion, and Quantity
- Systems and System Models
- Energy and Matter
- Structure and Functions
- Stability and Change

## Disciplinary Core Ideas

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### Physical Sciences

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- PS1. Matter and Its Interaction
  - PS1.A: Structure and Properties of Matter
  - PS1.B: Chemical Reactions
  - PS1.C: Nuclear Processes
- PS2. Motion and Stability: Forces of Interaction
  - PS2.A: Forces and Motion
  - PS2.B: Types of Interactions
  - PS2.C: Stability and Instability in Physical Systems
- PS3. Energy
  - PS3.A: Definitions of Energy
  - PS3.B: Conservation of Energy and Energy Transfer
  - PS3.C: Relationship Between Energy and Forces
  - PS3.D: Energy and Chemical Processes in Everyday Life
- PS4. Waves and Their Applications in Technologies for Information Transfer
  - PS4.A: Wave Properties
  - PS4.B: Electromagnetic Radiation
  - PS4.C: Information Technologies and Instrumentation

### Life Sciences

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- LS1. From Molecules to Organisms: Structure and Processes
  - LS1.A: Structure and function
  - LS1.B: Growth and development of organisms

- LS1.C: Growth and development of organisms
- LS1.D: Information Processing
- LS2. Ecosystems: Interactions, Energy, and Dynamics
  - LS2.A: Interdependent relationships in ecosystems
  - LS2.B: Cycles of matter and energy transfer in ecosystems
  - LS2.C: Ecosystem dynamics, functioning, and resilience
  - LS2.D: Social interactions and group behavior
- LS3. Heredity: Inheritance and Variation of Traits
  - LS3.A: Inheritance of traits
  - LS3.B: Variation of traits
- LS4. Biological Evolution: Unity and Diversity
  - LS4.A: Evidence of common ancestry and diversity
  - LS4.B: Natural selection
  - LS4.C: Adaptation
  - LS4.D: Biodiversity and humans

## **Earth and Space Sciences**

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- ESS1. Earth's Place in the Universe
  - ESS1.A: The universe and its stars
  - ESS1.B: Earth and the solar system
  - ESS1.C: The history of planet Earth
- ESS2. Earth's System
  - ESS2.A: Earth materials and systems
  - ESS2.B: Plate tectonics and large-scale system interactions
  - ESS2.C: The roles of water in Earth's surface processes
  - ESS2.D: Weather and climate
  - ESS2.E: Biogeology
- ESS3. Earth and Human Activity
  - ESS3.A: Natural resources
  - ESS3.B: Natural hazards
  - ESS3.C: Human impacts on Earth systems
  - ESS3.D: Global climate change

## **Essential Questions**

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### **Investigation 1: Grass and Grain Seeds**

**Part 1:** What happens to ryegrass and alfalfa seeds in moist soil?

**Part 2:** What happens to the grass and alfalfa plants after we mow them?

**Part 3:** How does a wheat seed grow?

**Part 4:** How different kinds of plants live in an area of the schoolyard?

### **Investigation 2: Stems**

**Part 1:** How can we make a new plant from an old one?

**Part 2:** What grows from the nodes of a potato?

**Part 3:** How do we keep our cuttings alive?

### **Investigation 3: Terrariums**

**Part 1:** What do plants need to live and grow in a terrarium?

**Part 2:** What do animals need to live in a terrarium?

**Part 3:** What structures or behaviors do plants or animals have that help them live in their habitat?

**Part 4:** How do the behaviors of squirrels help them survive the winter?

### **Investigation 4: Growth and Change**

**Part 1:** How does a bulb grow?

**Part 2:** What parts of the plant can grow new plants?

**Part 3:** How do the plants in the schoolyard compare to the plants studied in class?

What do animal parents do to help their young survive?

### **Enduring Understanding**

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This life science unit develops students' understanding of how: 1) Organisms live, grow, respond to their environment, and reproduce; 2) The characteristics of one generation are passed on to the next; 3) Individuals of the same species and even siblings have different characteristics; and 4) Engineers solve problems.

## Students will know...

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### Vocabulary

#### Investigation 1: Grass and Grain Seeds

alfalfa, blade, fertilizer, function, grain, lawn, leaf, light, mow, nutrient, observe, plant, root, ryegrass, seed, soil, sprout, stem, structure, variation, wheat

#### Investigation 2: Stems

bud, cutting, eye, node, potato, tuber

#### Investigation 3: Terrariums

behavior, desert, forest, grassland, habitat, map, map key, ocean, pond, predator, rain forest, shelter, survive, system, terrarium, tundra

#### Investigation 4: Growth and Change

bulb, carrot, garlic, offspring, onion, parent, radish, vermiculite

## Students will be able to...

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### Investigation 1: Grass and Grain Seeds

- Ask questions about ryegrass, alfalfa, and wheat plants, based on observations of seedling growth to find out more about the growth and development of these organisms.
- Develop and use a model of the wheat seed growing in a straw and use that to represent the relationship of growth over time.
- Plan and carry out investigations with seeds of different kinds (ryegrass, alfalfa, and wheat), providing them with basic needs of air, water, food, and space, and carefully observing them over time to collect data to form into evidence to answer questions about growth of observable structures and their functions in survival for these organisms. During the weeks of observations, students make predictions about the future growth and changes based on the students' prior experiences.
- Analyze and interpret data by describing observations of the plants over time, recording information using and sharing notebook entries, including writing and labeled pictures. Students use their firsthand observations and those of others in the classroom to describe the patterns displayed in the growth and development of the plants and look for both patterns and variations. Students compare predictions of the changes to the actual changes observed.
- Use mathematics and computational thinking to compare the length of root structure to stem on wheat seedlings and display the data using a bar graph.
- Construct explanations by making firsthand observations of plants and use this as evidence to answer questions about their growth of structures and the function of these structures.
- Engage in argument from evidence to support ideas about what happens to plants when they are mowed.
- Obtain, evaluate, and communicate information about plant structures and function, plant needs, and variation.

## Investigations 2: Stems

- Ask questions about plant structures based on observations of plant parts to find out more about the growth and development of these organisms.
- Plan and carry out investigations with plant parts (stems, leaves, roots), to collect data to form into evidence to answer questions about growth of observable structures and their functions in survival for these organisms. During the weeks of observation, students make predictions about the future growth and changes based on the students' prior experiences.
- Analyze and interpret data by describing observations of the plants over time, recording information using and sharing notebook entries, including writing and labeled pictures. Students use their firsthand observations and those of others in the classroom to describe the patterns displayed in the growth and development of the plants and look for both patterns and variations. Students compare predictions of the changes to the actual changes observed.
- Construct explanations by making firsthand observations of plants and use this as evidence to answer questions about the growth of structures and the functions of these structures.
- Obtain, evaluate, and communicate information about plants structures and functions, plant needs, and variation.

## Investigation 3: Terrariums

- Ask questions about a system (a terrarium) to find out more about the interactions of the animals and plants in the habitat; define a simple problem that a human might have, and think about how structures or behaviors observed in organisms inspire a solution to the problem (mimicking nature).
- Develop and use models by making and using a map to monitor and communicate conditions in a terrarium.
- Plan and carry out investigations with plants and animals to find out what will happen in a terrarium over time. During the weeks of observations, students make predictions about how the terrarium might change based on students' prior experiences.
- Analyze and interpret data accrued during observations of the terrarium system over time; record information in notebook entries; (writing and labeled pictures). Students use their firsthand observations and those of others in the classroom to describe changes in the system. Students compare predictions of the changes to the actual changes observed. In addition to using firsthand data (observations), students use information from text, video, and multimedia to analyze data to answer scientific questions.
- Use mathematics and computational thinking (numerical data from a simulation) dealing with squirrel seed-caching to describe patterns in squirrel behavior.
- Construct explanations based on firsthand observations of a terrarium and use these as evidence to answer questions about growth and development of organisms. Students gather data from media to enhance understanding of how structures and behaviors help animals and plants survive.
- Obtain, evaluate, and communicate information about plant and animal structures and functions, and plant and animal needs.

## Investigation 4: Growth and Change

- Plan and carry out investigations with plant parts (bulbs, and roots), to collect data to form into evidence to answer questions about the growth of observable structures and their functions in survival for these organisms. Students make predictions about future growth and change during different stages based on the students' prior experiences.
- Analyze and interpret data by describing observations of the plants over time, recording information using and sharing notebook entries, including writing and labeled pictures. Students use their firsthand observations and those of others in the classroom to describe the patterns displayed in the growth and development of the plants and look for both patterns and variations. Students compare predictions of the changes to the actual changes observed.

- Construct explanations by making firsthand observations of plants and using this as evidence to answer questions about their growth of structures and the function of these structures.

Obtain, evaluate, and communicate information about plant structures and function, and animals and their young.

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## **STAGE 2- EVIDENCE OF LEARNING**

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### **Formative Assessment Suggestions**

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- 3- Minute Pause
- A-B-C Summaries
- Analogy Prompt
- Choral Response
- Debriefing
- Exit Card / Ticket
- Hand Signals
- Idea Spinner
- Index Card Summaries
- Inside-Outside Circle Discussion (Fishbowl)
- Journal Entry
- Misconception Check
- Observation
- One Minute Essay
- One Word Summary
- Portfolio Check
- Questions & Answers
- Quiz
- Self-Assessment
- Student Conference
- Think-Pair-Share



- Web or Concept Map

## **Authentic Assessments Suggestions**

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### **Investigation 1: Grass and Grain Seeds**

- Science notebook entries
- Performance assessment
- Investigation 1 I-check

### **Investigation 2: Stems**

- Science notebook entries
- Performance assessment
- Investigation 2 I – Check

### **Investigation 3: Terrariums**

- Science notebook entries
- Performance assessment
- Investigation 3 I-Check

### **Investigation 4: Growth and Change**

- Science notebook entries
- Performance assessment

Investigation 4 I-Check

## **Benchmark Assessments**

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Unit Post Test

## **STAGE 3- LEARNING PLAN**

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## **Instructional Map**

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Investigation 1: Grass and Grain Seeds

Investigation 2: Stems

Investigation 3: Terrariums

Investigation 4: Growth and Change

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### **Investigation 1: Grass and Grain Seeds**

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#### **Investigation 1: Part 1- Lawns**

Students plant a miniature lawn in a cup of soil- ryegrass seeds and alfalfa seeds. They draw, compare, and record the growth of the two plants over time. Students read that plants need water, air, sunlight, and space to grow.

Content:

- Seeds are alive and grow into new plants. Seeds need water to begin growth.
- Plants need water, air, nutrients, and space to grow.

#### **Investigation 1: Part 2- Mowing the Lawns**

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After the two kinds of plants have grown tall, students cut the lawn plants to simulate mowing. They observe and make drawings of what happens to the two kinds of plants.

Content:

- Not all plants grow alike. There are variations in structures that serve the same function.
- Some plants die if they are cut near the ground, while others continue to live.

#### **Investigation 1: Part 3- Wheat**

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Students plant seeds of an important grain: wheat. The wheat is carefully positioned in transparent straws with pieces of paper towel to provide support and water to the seeds. Students observe what happens to the plants and record changes by drawing pictures and making bar graphs.

Content:

- Wheat and other cereals that we eat come from seeds called grains.

- Seeds are alive and grow into new plants. Seeds need water to begin growth.
- Plants have different structures that function in growth and survival. Plant roots take in water and nutrients, and leaves make food from sunlight.

### **Investigation 1: Part 4- Variations in Plants and Animals**

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Students explore the diversity of plants living in an area of the schoolyard. They work in pairs to collect leaf samples from a variety of plants. The class sorts the collected leaves by kind to come up with the number of different plants sampled. They look for differences between types of plants and variation in leaves of one kind of plant. They use media to look at variation in animals.

Content:

- Not all plants grow alike. There are variations in structures that serve the same function.
- Individuals of the same kind look similar but also vary in many ways (variation).

### **Investigation 2: Stems**

#### **Investigation 2: Part 1- Rooting Stem Cuttings**

Students try to make new plants from the stems of mature plants. Each student works with a part of a plant- a stem, a leaf, or a stem and leaf. They put the parts into water and observe them over time. Students draw and describe in words what they observe.

Content:

- Roots and leaves develop on stems at nodes.
- Plants are living organisms that need water, air, nutrients, light, and space to grow.

#### **Investigation 2: Part 2- Spuds**

Students cut white potatoes (modified stems) into pieces and plant them in soil. After 2-3 weeks, students observe the results and discuss the role of potato eyes in producing new plants.

Content:

- New plants can grow from the stems of mature plants.
- Potatoes are underground stems; potato eyes are nodes where buds grow.

### **Investigation 2: Part 3- New Plants from Cutting**

Students select the cuttings that show promise for developing into new plants and plant them in soil.

Content:

- New plants can grow from the stems of mature plants.

Plants are living organisms that need water, air, nutrients, light, and space to grow.

### **Investigation 3: Terrariums**

#### **Investigation 3: Part 1- Setting Up Terrariums**

Students build a terrarium with soil and the seeds and plant cuttings from Investigations 1 and 2. They construct a map showing the location of the seeds and plants. Students review what plants need to live, and read about what animals need.

Content:

- Plants and animals need food, water, air, and space; plants need sunlight to make food.
- A terrarium is a model habitat where plants and animals live in soil.
- A habitat is a place where plants and animals live. It provides what a plant or animal needs to live.

#### **Investigation 3: Part 2- Animals in the Terrarium**

Students care for the terrarium and record changes they observe over time. They add food, water, shelter, and small animals such as isopods and snails collected from the schoolyard. Students review the concept of habitat, and read about different habitats around the world.

Content:

- Plants and animals need food, water, air, and space.
- Plants need water, air, space, and sunlight to make food.
- There are many different habitats around the world.
- Many changes take place in a terrarium habitat over time.
- A terrarium is a system of parts that work together.

### **Investigation 3: Part 3- Habitat Match**

Students match plants and animal cards to various habitats. They learn that plants and animals have structures and behaviors that help them live in their habitat. They review the needs of living things and see how habitats provide for these needs. Students view a video that shows the differences between desert and rain forest habitats.

Content:

- A habitat is a place where plants and animals live. It provides what a plant or animal needs to live.
- Plants and animals have structures and behaviors that help them survive in different habitats.
- Habitats can be wet, dry, cold, or hot. Different plants and animals are able to survive in each different habitat.

### **Investigation 3: Part 4- Squirrel Behavior**

Students engage in a simulation activity to investigate the food-storage strategies of two kinds of animals-red squirrels and gray squirrels.

Content:

- Plants' and animals' habitats have features and behaviors that help them survive.
- Animals have sensory structures that provide them with information about their surroundings.
- Individuals of the same kind look similar but can vary in many ways.
- Engineers learn from nature in order to solve human problems.

### **Investigation 4 Growth and Change**

#### **Investigation 4: Part 1- Planting Bulbs**

Students observe garlic or onion bulbs and plant them in a cup with a bit of cotton to hold them in place. They observe the emergence of the roots and the shoot.

Content:

- Plant bulbs are alive and grow new structures when provided with water.

#### **Investigation 4: Part 2- Planting Roots**

Students investigate plants with edible roots- carrots and radishes. After observing the parts-leaves, stems, and roots-students cut the plants into three or four parts and plant them in vermiculite to see if they will produce new plants. After observing the changes for 2-3 weeks, students draw conclusions about the likelihood of producing new plants from parts that are usually found underground.

Content:

- Some parts of plant roots will grow into new plants if they are provided with water. Other parts will not.

#### **Investigation 4: Part 3- Plant and Animal Growth**

Students adopt schoolyard plants to observe throughout the school year. They document their observations in their notebook and discuss the living and nonliving things in the plants' habitat. Students read and observe media about animals and their young. They discuss the patterns of behavior of parents and young that help the young to survive.

Content:

- Plants grow and change. Plants can produce new plants in many ways.
- Adult animals can have young (offspring) and the young resemble their parents.
- In many kinds of animals, parents and the offspring engage in behaviors that help offspring survive.

### **Modifications/Differentiation of Instruction**

#### Differentiation Strategies for Special Education Students

- Remove unnecessary material, words, etc., that can distract from the content
- Use of off-grade level materials
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Time allowed
- Level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in “chunks”
- Varied texts and supplementary materials
- Use technology, if available and appropriate
- Varied homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language.
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Ability to work at their own pace
- Present ideas using auditory, visual, kinesthetic, & tactile means
- Provide graphic organizers and/or highlighted materials
- Strategy and flexible groups based on formative assessment
- Differentiated checklists and rubrics, if available and appropriate

### Differentiation Strategies for Gifted and Talented Students

- Increase the level of complexity
- Decrease scaffolding
- Variety of finished products
- Allow for greater independence
- Learning stations, interest groups
- Varied texts and supplementary materials
- Use of technology
- Flexibility in assignments
- Varied questioning strategies
- Encourage research
- Strategy and flexible groups based on formative assessment or student choice
- Acceleration within a unit of study
- Exposure to more advanced or complex concepts, abstractions, and materials
- Encourage students to move through content areas at their own pace
- After mastery of a unit, provide students with more advanced learning activities, not more of the same activity

- Present information using a thematic, broad-based, and integrative content, rather than just single-subject areas

### Differentiated Strategies for ELL Students

- Remove unnecessary materials, words, etc., that can distract from the content
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Gradually increase the level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in “chunks”
- Varied texts and supplementary materials, including visuals
- Use technology, if available and appropriate
- Differentiate homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language.
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Allow students to work at their own pace
- Presenting ideas through auditory, visual, kinesthetic, & tactile means
- Role play
- Provide graphic organizers, highlighted materials
- Strategy and flexible groups based on formative assessment

### Differentiation Strategies for At Risk Students

- Remove unnecessary materials, words, etc., that can distract from the content
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Gradually increase the level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in “chunks”
- Varied texts and supplementary materials
- Use technology, if available and appropriate
- Differentiate homework and products
- Varied questioning strategies
- Provide background knowledge



- Define key vocabulary, multiple-meaning words, and figurative language
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Presenting ideas through auditory, visual, kinesthetic, & tactile means
- Provide graphic organizers and/or highlighted materials
- Strategy and flexible groups based on formative assessment

## **504 Plans**

Students can qualify for 504 plans if they have physical or mental impairments that affect or limit any of their abilities to:

- walk, breathe, eat, or sleep
- communicate, see, hear, or speak
- read, concentrate, think, or learn
- stand, bend, lift, or work

Examples of accommodations in 504 plans include:

- preferential seating
- extended time on tests and assignments
- reduced homework or classwork
- verbal, visual, or technology aids
- modified textbooks or audio-video materials
- behavior management support
- adjusted class schedules or grading
- verbal testing
- excused lateness, absence, or missed classwork
- pre-approved nurse's office visits and accompaniment to visits
- occupational or physical therapy

## **Modification Strategies**

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- Extended Time
- Frequent Breaks

- Highlighted Text
- Interactive Notebook
- Modified Test
- Oral Directions
- Peer Tutoring
- Preferential Seating
- Re-Direct
- Repeated Drill / Practice
- Shortened Assignments
- Teacher Notes
- Tutorials
- Use of Additional Reference Material
- Use of Audio Resources

## **High Preparation Differentiation**

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- Alternative Assessments
- Choice Boards
- Games and Tournaments
- Group Investigations
- Guided Reading
- Independent Research / Project
- Interest Groups
- Learning Contracts
- Leveled Rubrics
- Literature Circles
- Menu Assignments
- Multiple Intelligence Options
- Multiple Texts
- Personal Agendas
- Project Based Learning (PBL)
- Stations / Centers
- Think-Tac-Toe
- Tiered Activities / Assignments
- Varying Graphic Organizers

## **Low Preparation Differentiation**

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- Choice of Book / Activity
- Cubing Activities
- Exploration by Interest (using interest inventories)
- Flexible Grouping
- Goal Setting With Student
- Homework Options
- Jigsaw
- Mini Workshops to Extend Skills
- Mini Workshops to Re-teach
- Open-ended Activities
- Think-Pair-Share by Interest
- Think-Pair-Share by Learning Style
- Think-Pair-Share by Learning Style
- Think-Pair-Share by Readiness
- Use of Collaboration
- Use of Reading Buddies
- Varied Journal Prompts
- Varied Product Choice
- Varied Supplemental Materials
- Work Alone / Together

## **Horizontal Integration- Interdisciplinary Connections**

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### New Jersey Student Learning Standards for Mathematics

N-Q.A. Reason quantitatively and use units to solve problems.

1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays
2. Define appropriate quantities for the purpose of descriptive modeling.
3. Choose the level of accuracy appropriate to limitations on measurement when reporting quantities.

N-CN.A. Perform arithmetic operations with complex numbers.

1. Know there is a complex number.
2. Use the commutative, associative, and distributive properties.

A-SSE.A. Interpret the structure of expressions

1. Interpret expressions that represent a quantity in terms of its context.

A-SSE.B. Write expressions in equivalent forms to solve problems.

1. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

F-IF.A. Understand the concept of a function and use functional notation.

1. Understand that a function from one set to another set.

F-IF.B Interpret functions that arise in applications in terms of the context.

F-IF.C. Analyze functions using different representations

S-ID.A. Summarize, represent, and interpret data on a single count or measurement variable

1. Represent data with plots on a real number line.

S-ID.B. Summarize, represent, and interpret data on two categorical and quantitative variables.

S-ID.C. Interpret linear models.

S-IC.A. Understand and evaluate random processes underlying statistical experiments.

S-IC.B. Make inferences and justify conclusions from surveys, experiments, and observational studies.

English Language Arts Standards – Grade 1

RF 4: Read text with purpose and understanding.

RI 1: Ask and answer questions about key details.

RI 2: Identify main topic and retell key details.

RI 3: Describe the connection between two ideas.

RI 4: Ask and answer questions about unknown words.

RI 5: Identify the front cover, back cover, and title page of a book.

RI 7: Describe the relationship between illustrations and the text.

RI 8: Identify the reasons an author gives to support points.

RI 9: Identify similarities in and differences between text on the same topic.

RI 10: Actively engage in group reading activities with purpose and understanding.

SL 1: Participate in collaborative conversations.

SL 2: Ask and answer questions about key details and request clarification.

SL 3: Ask and answer questions to seek help, information, or to clarify.

SL 4: Describe with details.

W 5: Strengthen writing.

W 8: Gather information to answer a question.

## 2020 New Jersey Student Learning Standards- Computer Science and Design Thinking

### Computer Science and Design Thinking Practices

CSDT.K-12.CSDTP1	Fostering an Inclusive Computing and Design Culture
CSDT.K-12.CSDTP2	Collaborating Around Computing and Design
CSDT.K-12.CSDTP3	Recognizing and Defining Computational Problems
CSDT.K-12.CSDTP4	Developing and Using Abstractions
CSDT.K-12.CSDTP5	Creating Computational Artifacts
CSDT.K-12.CSDTP6	Testing and Refining Computational Artifacts
CSDT.K-12.CSDTP7	Communicating About Computing and Design

### 8.2 Design Thinking

8.2.2.ED.1: Communicate the function of a product or device.
8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process
8.2.2.ED.3: Select and use appropriate tools and materials to build a product using the design process.
8.2.2.ED.4: Identify constraints and their role in the engineering design process.
8.2.2.ITH.1: Identify products that are designed to meet human wants or needs.
8.2.2.ITH.2: Explain the purpose of a product and its value.
8.2.2.ITH.3: Identify how technology impacts or improves life.
8.2.2.ITH.4: Identify how various tools reduce work and improve daily tasks.

8.2.2.ITH.5: Design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution.
8.2.2.NT.1: Model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together.  8.2.2.NT.2: Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.
8.2.2.ETW.1: Classify products as resulting from nature or produced as a result of technology.  8.2.2.ETW.2: Identify the natural resources needed to create a product.  8.2.2.ETW.3: Describe or model the system used for recycling technology.  8.2.2.ETW.4: Explain how the disposal of or reusing a product affects the local and global environment.
8.2.2.EC.1: Identify and compare technology used in different schools, communities, regions, and parts of the world.

**2020 New Jersey Student Learning Standards- Career Readiness, Life Literacies, and Key Skills  
Career Readiness, Life Literacies, and Key Skills Practices**

CRP.K-12.CRP1	Act as responsible and contributing community members and employee.
CRP.K-12.CRP2	Attend to financial well-being.
CRP.K-12.CRP3	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP4	Demonstrate creativity and innovation.
CRP.K-12.CRP5	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP6	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP7	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP8	Use technology to enhance productivity, increase collaboration and communicate effectively.
CRP.K-12.CRP9	Work productively in teams while using cultural/global competence.

## 9.2 Career Awareness and Planning

9.1.2.CAP.1: Make a list of different types of jobs and describe the skills associated with each job.

## 9.4 Life Literacies and Key Skills

9.4.2.CI.1: Demonstrate openness to new ideas and perspectives.

9.4.2.CI.2: Demonstrate originality and inventiveness in work.

9.4.2.CT.1: Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem.

9.4.2.CT.2: Identify possible approaches and resources to execute a plan.

9.4.2.CT.3: Use a variety of types of thinking to solve problems.

9.4.2.DC.1: Explain differences between ownership and sharing of information.

9.4.2.DC.2: Explain the importance of respecting digital content of others.

9.4.2.DC.3: Explain how to be safe online and follow safe practices when using the internet.

9.4.2.DC.4: Compare information that should be kept private to information that might be made public.

9.4.2.DC.5: Explain what a digital footprint is and how it is created.

9.4.2.DC.6: Identify respectful and responsible ways to communicate in digital environments.

9.4.2.DC.7: Describe actions peers can take to positively impact climate change.

9.4.2.IML.1: Identify a simple search term to find information in a search engine or digital resource.

9.4.2.IML.2: Represent data in a visual format to tell a story about the data.

9.4.2.IML.3: Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults.

9.4.2.IML.4: Compare and contrast the way information is shared in a variety of contexts.

9.4.2.TL.1: Identify the basic features of a digital tool and explain the purpose of the tool.

9.4.2.TL.2: Create a document using a word processing application.

9.4.2.TL.3: Enter information into a spreadsheet and sort the information.

9.4.2.TL.4: Navigate a virtual space to build context and describe the visual content.

9.4.2.TL.5: Describe the difference between real and virtual experiences.

9.4.2.TL.6: Illustrate and communicate ideas and stories using multiple digital tools.

9.4.2.TL.7: Describe the benefits of collaborating with others to complete digital tasks or develop digital artifacts.

### **Vertical Integration- Discipline Mapping**

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LS1: Kindergarten: Trees and Weather; Animals Two by Two

Grade 2: Insects and Plants

Grade 3: Structures of Life

Grade 4: Environments

Grade 5: Living Systems

Grade 6: Diversity of Life

Grade 8: Human Systems Interactions

LS3: Grade 3: Structures of Life

Grade 8: Heredity and Adaptations

### **Additional Materials**

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Visit [Fossweb.com](http://Fossweb.com) for list of websites and additional readings.