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Acknowledgements

The Elementary Science Grade 2 Curriculum was developed for the Neptune Township Elementary Schools through the efforts of Joseph Woerner, Elementary Environmental Science teacher, in coordination with the curriculum committee, comprised of Heba Abdo, Ed.D., Supervisor of STEM, and Sally Millaway, Ed.D., Director for Curriculum, Instruction and Assessment.

Mr. Woerner is to be commended for his dedication in creating detailed learning plans that align with the New Jersey Model Science Curriculum. These learning plans contain student-centered, inquiry-based activities that meet the requirements of the NJ Student Learning Standards for Science and the New Jersey Student Learning Standards for Mathematics and English Language Arts. It is our hope that this guide will serve as a valuable resource for the staff members who teach this course and that they will feel free to make recommendations for its continued improvement.
NEPTUNE TOWNSHIP SCHOOL DISTRICT

DISTRICT MISSION STATEMENT

The primary mission of the Neptune Township School District is to prepare students for a life-long learning process in a complex and diverse world. It is with high expectations that our schools foster:

• A strong foundation in academic and modern technologies.

• A positive and varied approach to teaching and learning.

• An emphasis on critical thinking skills and problem-solving techniques.

• A respect for and an appreciation of our world, its resources, and its people.

• A sense of responsibility, good citizenship, and accountability.

• An involvement by the parents and the community in the learning process.
Neptune Township School District

Educational Outcome Goals

The students in the Neptune Township schools will become life-long learners and will:

- Become fluent readers, writers, speakers, listeners, and viewers with comprehension and critical thinking skills.
- Acquire the mathematical skills, understandings, and attitudes that are needed to be successful in their careers and everyday life.
- Understand fundamental scientific principles, develop critical thinking skills, and demonstrate safe practices, skepticism, and open-mindedness when collecting, analyzing, and interpreting information.
- Become technologically literate.
- Demonstrate proficiency in all New Jersey Student Learning Standards (NJSLS).
- Develop the ability to understand their world and to have an appreciation for the heritage of America with a high degree of literacy in civics, history, economics and geography.
- Develop a respect for different cultures and demonstrate trustworthiness, responsibility, fairness, caring, and citizenship.
- Become culturally literate by being aware of the historical, societal, and multicultural aspects and implications of the arts.
- Demonstrate skills in decision-making, goal setting, and effective communication, with a focus on character development.
- Understand and practice the skills of family living, health, wellness and safety for their physical, mental, emotional, and social development.
- Develop consumer, family, and life skills necessary to be a functioning member of society.
- Develop the ability to be creative, inventive decision-makers with skills in communicating ideas, thoughts and feelings.
- Develop career awareness and essential technical and workplace readiness skills, which are significant to many aspects of life and work.
# PACING GUIDE

<table>
<thead>
<tr>
<th>Unit Name</th>
<th>Number of Weeks</th>
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<tbody>
<tr>
<td>Life Science: Plant and Animal Survival</td>
<td>13</td>
</tr>
<tr>
<td>Physical Science: Materials and Their Uses</td>
<td>13</td>
</tr>
<tr>
<td>Earth Science: Earth’s Surface</td>
<td>13</td>
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</table>
## Grade 2 Science

### Unit 1: Life Science - Plant and Animal Survival

**Duration:** First Trimester – 13 Weeks

<table>
<thead>
<tr>
<th>NJ Student Learning Standards for Science</th>
</tr>
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<tbody>
<tr>
<td>Students who demonstrate understanding can:</td>
</tr>
<tr>
<td>2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.]</td>
</tr>
<tr>
<td>2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.</td>
</tr>
<tr>
<td>2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats. [Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats.] [Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats.]</td>
</tr>
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</table>

### Science and Engineering Practices

<table>
<thead>
<tr>
<th>Planning and Carrying Out Investigations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.</td>
</tr>
<tr>
<td>□ Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-PS1-1)</td>
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<thead>
<tr>
<th>Developing and Using Models</th>
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<tbody>
<tr>
<td>Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.</td>
</tr>
<tr>
<td>□ Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2)</td>
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<thead>
<tr>
<th>Disciplinary Core Ideas</th>
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<tbody>
<tr>
<td>□ Plants depend on water and light to grow. (2-LS2-1)</td>
</tr>
<tr>
<td>□ Plants depend on animals for pollination or to move their seeds around. (2-LS2-2)</td>
</tr>
<tr>
<td>ETS1.B: Developing Possible Solutions</td>
</tr>
<tr>
<td>□ Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people. (secondary to 2-LS2-2)</td>
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<tr>
<th>Crosscutting Concepts</th>
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<tbody>
<tr>
<td>Cause and Effect</td>
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<tr>
<td>□ Events have causes that generate observable patterns. (2-LS2-1)</td>
</tr>
<tr>
<td>Structure and Function</td>
</tr>
<tr>
<td>□ The shape and stability of structures of natural and designed objects are related to their function(s). (2-LS2-2)</td>
</tr>
<tr>
<td>Interdisciplinary Standards</td>
</tr>
<tr>
<td>-----------------------------</td>
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<tr>
<td><strong>NJSLS: ELA</strong></td>
</tr>
<tr>
<td>Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-LS2-1) <strong>W.2.7</strong></td>
</tr>
<tr>
<td>Recall information from experiences or gather information from provided sources to answer a question. (2-LS2-1),(K-2-ETS1-1) <strong>W.2.8</strong></td>
</tr>
<tr>
<td>Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (2-LS2-2) <strong>SL.2.5</strong></td>
</tr>
<tr>
<td>With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1) <strong>W.2.6</strong></td>
</tr>
<tr>
<td>Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1) <strong>RI.2.1</strong></td>
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<tr>
<th>Technology Integration</th>
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<tbody>
<tr>
<td><strong>8.1 Educational Technology:</strong></td>
</tr>
<tr>
<td>All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge.</td>
</tr>
<tr>
<td>- Teacher TCI Website</td>
</tr>
<tr>
<td>- SMART board</td>
</tr>
<tr>
<td><strong>8.2 Technology Integration, Engineering, Design and Computational Thinking – Programming</strong></td>
</tr>
<tr>
<td>All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.</td>
</tr>
<tr>
<td>- Use design thinking to create a model that mimics the function of a plant or animal.</td>
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</table>
INTEGRATED SOCIAL AND EMOTIONAL LEARNING COMPETENCIES

The following social and emotional competencies are integrated in this curriculum document:

Self-Awareness
- Recognize one’s own feelings and thoughts
- Recognize the impact of one’s feelings and thoughts on one’s own behavior
- Recognize one’s personal traits, strengths and limitations
- Recognize the importance of self-confidence in handling daily tasks and challenges

Self-Management
- Understand and practice strategies for managing one’s own emotions, thoughts and behaviors
- Recognize the skills needed to establish and achieve personal and educational goals
- Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one’s goals

Social Awareness
- Recognize and identify the thoughts, feelings, and perspectives of others
- Demonstrate an awareness of the differences among individuals, groups, and others’ cultural backgrounds
- Demonstrate an understanding of the need for mutual respect when viewpoints differ
- Demonstrate an awareness of the expectations for social interactions in a variety of setting

Responsible Decision Making
- Develop, implement and model effective problem solving and critical thinking skills
- Identify the consequences associated with one’s action in order to make constructive choices
- Evaluate personal, ethical, safety and civic impact of decisions

Relationship Skills
- Establish and maintain healthy relationships
- Utilize positive communication and social skills to interact effectively with others
- Identify ways to resist inappropriate social pressure
- Demonstrate the ability to present and resolve interpersonal conflicts in constructive ways
- Identify who, when, where, or how to seek help for oneself or others when needed
In this unit plan, the following 21st Century Life and Careers skills are addressed:

<table>
<thead>
<tr>
<th>Check ALL that apply – 21st Century Themes</th>
<th>Indicate whether these skills are:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>E – encouraged</td>
</tr>
<tr>
<td></td>
<td>T – taught</td>
</tr>
<tr>
<td></td>
<td>A – assessed</td>
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</tbody>
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<thead>
<tr>
<th><strong>Career Ready Practices</strong></th>
<th><strong>P1.</strong> Act as a responsible and contributing citizen and employee.</th>
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<tbody>
<tr>
<td>Income and Careers</td>
<td>P2. Apply appropriate academic and technical skills.</td>
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<tr>
<td>Money Management</td>
<td>P3. Attend to personal health and financial well-being.</td>
</tr>
<tr>
<td>Credit and Debt Management</td>
<td>ETA P4. Communicate clearly and effectively and with reason.</td>
</tr>
<tr>
<td>Planning, Saving, and Investing</td>
<td>P5. Consider the environmental, social and economic impacts of decisions.</td>
</tr>
<tr>
<td>Becoming a Critical Consumer</td>
<td>ETA P6. Demonstrate creativity and innovation.</td>
</tr>
<tr>
<td>Insuring and Protecting</td>
<td>ETA P8. Utilize critical thinking to make sense of problems and persevere in solving them.</td>
</tr>
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<thead>
<tr>
<th><strong>Career Awareness, Exploration, and Preparation</strong></th>
<th><strong>P9.</strong> Model integrity, ethical leadership and effective management.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X Career Awareness</td>
<td>P10. Plan education and career paths aligned to personal goals.</td>
</tr>
<tr>
<td>Career Exploration</td>
<td>P11. Use technology to enhance productivity.</td>
</tr>
<tr>
<td>Career Preparation</td>
<td>P12. Work productively in teams while using cultural global competence.</td>
</tr>
</tbody>
</table>
Science Learning Plan
Grade: 2
Unit 1: Plant and Animal Survival
Duration: First Trimester - 13 weeks/12 Lessons

What Do Plants and Animals Need to Survive - 3 Lessons (TCI Unit 1, Lesson 2)

Lesson 1: Planning the Investigation (seeds need to be planted 2 weeks prior to starting this activity)
- **Objective** – SWBAT plan and conduct an investigation to determine if plants need sunlight and water to grow.
- **NJSLS-S – 2-LS2-1**
- **Opening** – Opening slide and questions (slide 9)
- **Activities** – Observing Phenomena (slide 10)

Investigation Introduction (slide 13)
Step 1: Planning (slide 14-16/ISN pg. 2)
- **Closure** – Check Your Plan (slide 17)
- **Differentiation** – Advanced Learners: Students are provided with art supplies to draw a mountain top. Once the mountain is drawn, the students are asked to draw plants and animals that would live on the mountaintop. This activity will allow students to understand that the environment of a mountaintop meets the needs of only select species.

Lesson 2: Carrying out the Investigation
- **Objective** - SWBAT plan and conduct an investigation to determine if plants need sunlight and water to grow.
- **NJSLS-S – 2-LS2-1**
- **Opening** – What are you changing in your experiment? What are you keeping the same?
- **Activities** – Step 2: Carrying out the Investigation (slide 18-19/ISN pg. 3 top only)
- **Closure** – Show What You Know (slide 27/ISN pg. 6)
- **Differentiation** – Some students may be confused by the investigation procedure since students have an option of testing either water OR light. Although it's important for most students to make this choice as they assist you in collaboratively planning the investigation, you may wish to directly assign certain students to either water or light. Instead of having students fill in number 1 in their Interactive Student Notebooks, use the Notebook Answer Key to provide a completed version.

Modify Show What You Know: If students have never seen a Venn diagram, teach how one works using a simple example that connects to students, such as comparing the teacher and one of the students. You can have students shade the plant circle yellow and the animal circle blue, likely making a shade of green in the overlapping center. It may be easier for students to understand the concept that the middle means "both" since the colors mix together. Write the words from the Word Bank on small pieces of paper. Students can move them around in the Venn diagram before finalizing their choices and copying or gluing the words into the diagram.
Lesson 3: Making Observations *(1 week after lesson 2 is complete)*
- **Objective** – SWBAT plan and conduct an investigation to determine if plants need sunlight and water to grow.
- **NJSLS-S** – 2-LS2-1
- **Opening** – Draw your plant at the end of the experiment (slide 19/ISN pg. 3 bottom only)
- **Activities** – Step 3: Sharing Results (slide 20)
- Step 4: Planning Another Investigation (slide 21–23/Our Marigold Experiment)
- **Closure** – Making Sense of Phenomena (slide 24)
- **Differentiation** – Reading Further: A Honeybee Mystery; students can read all Students Readings, associated Interactive Tutorials, and ISN Reading Notes pages; play Lesson Game; review Vocabulary Cards.

How Do Plants and Animals Depend on Each Other – 4 Lessons (TCI Unit 1, Lesson 3)

Lesson 4: Pollinator Problems
- **Objective** – SWBAT develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.
- **NJSLS-S** – 2-LS2-2
- **Opening** – Introduction slide and questions (slide 9)
- **Activities** – Observing Phenomena (slide 10)
- Investigation Introduction (slide 12)
- **Step 1: Defining the Problem** (slide 13 -15)
- **Closure** – Step 2: Designing a Solution (slide 16)
- **Differentiation** – Introduce the Petri Dish Model Before Students Design Their Hand Pollinators - students begin designing their pollinators in Step 2, skip ahead to the Presentation slide in Step 3 that explains how the petri dish with sand is similar to and different from a flower with pollen. Make sure students are comfortable with why this is a useful model (even though it’s not perfect) and why scientists use models. Having this information beforehand will help put their designs in context.

Lesson 5: Building a Hand Pollinator
- **Objective** – SWBAT develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.
- **NJSLS-S** – 2-LS2-2
- **Opening** – Review materials covered in Step 2 (slide 16)
- **Activities** – Create a Hand Pollinator and Draw Your Design (slide 17/ISN pg. 5)
- **Closure** – Show the class the dish with the sand and discuss how the dish could be used to test pollination (slide 18)
- **Differentiation** – Build and Model a Hand Pollinator - build your own hand pollinator. Keep it simple so that students can improve it, or better yet, give it an obvious flaw so students can see an example of something that doesn't work very well
Lesson 6: Testing the Pollinator
- **Objective** – SWBAT develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.
- **NJSLS-S – 2-LS2-2**
- **Opening** – Sand and Flower Questions (slide 18/ISN pg. 6)
- **Activities** – Step 3: Testing the Design (slide 19 – 21)
  
  *Step 4: Sharing the Solution (slide 23/ISN pg. 8) – time permitting*
- **Closure** – Comparing Design Differences (slide 24)
- **Differentiation** – Reading Further: Piggyback Ride on a Crab; students can read all Students Readings, associated Interactive Tutorials, and ISN Reading Notes pages; play Lesson Game; review Vocabulary Cards.

Lesson 7: Pollinator Design Review
- **Objective** – SWBAT develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.
- **NJSLS-S – 2-LS2-2**
- **Opening** – Talk about Hand Pollinators (slide 25)
- **Activities** – Making Sense of Phenomenon (slide 26 -27)
  
  *Show What You Know (slide 28/ISN pg. 8)*
- **Closure** – Vocabulary (slide 29)
- **Differentiation** – Humans are animals too. Ask students to list out and draw the resources they receive from their family and friends. Prompt students to consider where they get water, food, and shelter from. This activity will give the student an experience observing and characterizing resources within their own habitats.

Why Do Plants and Animals Live in Some Places and Not Others – 5 Lessons (TCI Unit 1, Lesson 4, 5, 6)

Lesson 8: Habitat Hopping Part I
- **Objective** – SWBAT make observations of plants and animals to compare the diversity of life in different habitats.
- **NJSLS-S – 2-LS4-1**
- **Opening** – Introduction slide and questions (slide 7)
- **Activities** – Observing Phenomena (slide 8)
  
  *Introduction to Habitat Hopping (slide 10) – hats optional*

  *Step 1: Polar Habitat (slide 11 – 14/ISN pg. 6)*

  *Step 2: Rainforest Habitat (slide 15 – 18/ISN pg. 6)*

  *Closure* – As a class, discuss 1 major difference between the rainforest and polar habitat (temperature or amount of available water).

  *Differentiation* – Bring Home the Main Concept of Habitats - before completing the investigation, students read in the text about various types of habitats that can be described as hot/cold, wet/dry, and freshwater/saltwater. Have the class discuss how these descriptions relate to the place where you live. (You can have students think about the trip to SummerWood during Lesson 1.) Then, as students "visit" three
different habitats, continuously relate them back to your local area. Ask, How is this similar/different to the place we live? Would these animals be able to live in our area? Why or why not? You can also have students from other countries make comparisons to some of the habitats in those places.

Lesson 9: Habitat Hopping Part II
- **Objective** – SWBAT make observations of plants and animals to compare the diversity of life in different habitats.
- **NJSLS-S** – 2-LS4-1
- **Opening** – Review Habitat Hopping from lesson 8.
- **Activities** – Step 3: Desert Habitat (slide 19 – 22/ ISN pg. 6) Step 4: Comparing Habitats (slide 23-24/ISN pg. 7) Making Sense of Phenomena (slide 25 -26)
- **Closure** – Show What You Know (slide 27/ISN pg. 8)
- **Differentiation** – Support the Reading Notes - read section 1, Habitats, in the Student Text together (students can follow along in their books or online in their subscriptions). As a class, look at the Reading Notes assignment, which asks students to classify whether each plant or animal lives on land, in water, or both. Discuss three colors that might be appropriate for "land," "water," and "both" and have students highlight or circle the word in the instructions in that color. Then, instead of having students write the words in every blank, you can allow some students to simply circle each picture with the appropriate color. Repeat this process for the remaining sections of Text and Reading Notes.

For Advanced Learners - students build a model habitat. They are responsible for describing the climate and resources available. They then model what types of animal can live there and what types cannot. This activity helps students make observations about what characteristics allow an organism to survive in a specific place.

Lesson 10: Deserts
- **Objective** – SWBAT make observations of plants and animals to compare the diversity of life in different habitats.
- **NJSLS-S** – 2-LS4-1
- **Opening** – Introduction slide and questions (slide 6)
- **Closure** – Show What You Know (slide 23/ ISN pg. 6)
- **Differentiation** – Discuss Desert Organisms Before the Game – before the Desert Challenge! jeopardy-style games, pass out the handouts showing various desert plants and animals. Spend time discussing the characteristics of desert organisms and making comparisons between them. This will set students up for success during the game. Minimize Writing During the Game - although it’s good practice to write the names of the organisms in their notebooks during the games, you could have students number or
letter the organisms on the handout, and then simply record the appropriate
number/letter in their notebooks. Remember that the purpose of the lesson is not for
students to memorize every single example organism on the handout; the purpose is for
students to learn that there are a diversity of living things in a desert habitat and to
compare them.
Focus on What's Important - do not allow students to randomly yell out answers during the
game. The goal is for all students to make a good guess as to the answers in the game,
and then hold a discussion of the answers afterward. If it takes some students too long
to write the names of the plants and animals, you can have them skip the recording or
copy another group member's answers later.
For Advanced Learners - students model a terrarium that would allow a desert lizard to
survive in the classroom. Students have to draw and list what components make the
terrarium able to support the needs of the lizard.

**Lesson 11: Rainforests Part I**
- **Objective** – SWBAT make observations of plants and animals to compare the diversity
  of life in different habitats.
- **NJSLS-S** – 2-LS4-1
- **Opening** – Introduction slide and questions (slide 6)
- **Activities** – Observing Phenomena (slide 7)
- **Investigation Introduction: Rainforest Trek** (slide 9)

**Step 1: Planning Your Trip** (slide 10 & 12-13)
*Notebook notes (slide 11) – optional*

**Step 2: Visiting the Rainforest Stops 1 & 2** (slide 14-16) – *notebook notes optional*
- **Closure** – What other plants and animals do you expect to see in the Rainforest?
- **Differentiation** – Shorten the Virtual Rainforest Trip - show only 4-5 of the videos to
cut the trip in half. (Students will still get a decent experience by showing only the
Introduction and Stops 1, 5, 7, and 9.) Alternatively, show all the videos, but have
students focus on either plants OR animals the first time. Then show the videos again.
Support Note Taking During the Trip - some students may have difficulty taking notes
while on the trek. Print a copy of the Interactive Student Notebook pages and take
notes on them as students orally make their observations. Then you can provide your
notes to students; have them review your notes, highlighting their 3 favorite organisms
from the trip.

**Lesson 12: Rainforest Part II**
- **Objective** – SWBAT make observations of plants and animals to compare the diversity
  of life in different habitats.
- **NJSLS-S** – 2-LS4-1
- **Opening** – What makes a rain forest different from a desert?
**Activities** – Step 2: Visiting the Rainforest Stops 3-10 (slide 17-24) – *notebook notes
optional*

Making Sense of Phenomena (slide 28-29)
- **Closure** – Show What You Know (slide 30/ISN pg. 10?)
Differentiation – Scaffold the Writing Assignment- in Step 3 (this is an optional part of the lesson), students write a blog about what they observed during their trip to the rainforest. Provide support as you would for any other type of writing assignment, such as having students brainstorm what they want to write about, organize and plan their writing, write a draft, and peer edit. If you are not able to build the writing assignment into your English Language Arts time, you could replace it by having students draw and annotate images of organisms they saw in the rainforest.

For Advanced Learners - students research a species that lives in the rainforest. Through their research, students are able to write a short story about a day in the life of this species. They describe what the animal does, eats, how it moves around and what other species it interacts with. This provides students with experience in characterizing the parts of an animal and its behaviors.

Reading Further: Disappearing Pandas, A Colony of Leaf Cutters, Desert Rat; students can read all Students Readings, associated Interactive Tutorials, and ISN Reading Notes pages; play Lesson Game; review Vocabulary Cards.

Optional Lessons:
TCI Unit 1, Lesson 7 – How Do Plants and Animals Survive in a Pond?

Lessons Used in SummerWood:
TCI Unit 1, Lesson 1 – What Kind of Living Things Are There?

TCI Unit 1, Lesson 8: How Do Plants and Animals Survive in the Ocean?
Grade 2 Science
Unit 2: Physical Science – Materials and Their Uses
Duration: Second Trimester – 13 Weeks

NJ Student Learning Standards for Science

Students who demonstrate understanding can:

2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. [Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.]

2-PS1-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. [Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.] [Assessment Boundary: Assessment of quantitative measurements is limited to length.]

2-PS1-3. Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. [Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.]

2-PS1-4. Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. [Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.]

<table>
<thead>
<tr>
<th>Science and Engineering Practices</th>
<th>Disciplinary Core Ideas</th>
<th>Crosscutting Concepts</th>
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<tbody>
<tr>
<td>Planning and Carrying Out Investigations</td>
<td>2-PS1A: Structure and Properties of Matter</td>
<td>Patterns</td>
</tr>
<tr>
<td>Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.</td>
<td>□ Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)</td>
<td>□ Patterns in the natural and human designed world can be observed. (2-PS1-1)</td>
</tr>
<tr>
<td>□ Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-PS1-1)</td>
<td>□ Different properties are suited to different purposes. (2-PS1-2),(2-PS1-3)</td>
<td>□ Cause and Effect</td>
</tr>
<tr>
<td>Analyzing and Interpreting Data</td>
<td>□ A great variety of objects can be built up from a small set of pieces. (2-PS1-3)</td>
<td>□ Events have causes that generate observable patterns. (2-PS1-4)</td>
</tr>
<tr>
<td>Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.</td>
<td>PS1b: Chemical Reactions</td>
<td>□ Simple tests can be designed to gather evidence to support or refute student ideas about causes. (2-PS1-2)</td>
</tr>
<tr>
<td>□ Analyze data from tests of an object or tool to determine if it works as intended. (2-PS1-2)</td>
<td>□ Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4)</td>
<td>Energy and Matter</td>
</tr>
<tr>
<td>Constructing Explanations and Designing Solutions</td>
<td></td>
<td>□ Objects may break into smaller pieces and be put together into larger pieces, or change shapes. (2-PS1-3)</td>
</tr>
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<td>Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.</td>
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<td>Connections to Engineering, Technology, and Applications of Science</td>
</tr>
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<td>□ Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (2-PS1-3)</td>
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<td>Influence of Engineering, Technology, and Science, on Society and the Natural World</td>
</tr>
<tr>
<td>Engaging in Argument from Evidence</td>
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<td>□ Every human-made product is designed by applying some knowledge of the natural world and is built by using natural materials. (2-PS1-2)</td>
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<tr>
<td>Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).</td>
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<tr>
<td>□ Construct an argument with evidence to support a claim. (2-PS1-4)</td>
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### Interdisciplinary Standards

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<thead>
<tr>
<th>NJSLS: ELA</th>
<th>NJSLS: Math</th>
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<tr>
<td>Describe how reasons support specific points the author makes in a text. (2-PS1-2) <strong>RI.2.8</strong></td>
<td>Reason abstractly and quantitatively. (2-PS1-2), (K-2-ETS1-3) <strong>MP.2</strong></td>
</tr>
<tr>
<td>With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-3) <strong>W.2.6</strong></td>
<td>Model with mathematics. (2-PS1-1),(2-PS1-2, (K-2-ETS1-3)) <strong>MP.4</strong></td>
</tr>
<tr>
<td>Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-PS1-1),(2-PS1-2) <strong>W.2.7</strong></td>
<td>Use appropriate tools strategically. (2-PS1-2), (K-2-ETS1-3) <strong>MP.5</strong></td>
</tr>
<tr>
<td>Recall information from experiences or gather information from provided sources to answer a question. (2-PS1-1),(2-PS1-2),(K-2-ETS1-3) <strong>W.2.8</strong></td>
<td>Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (2-PS1-1),(2-PS1-2), (K-2-ETS1-3) <strong>2.MD.D.10</strong></td>
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### Technology Integration

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<thead>
<tr>
<th>X 8.1 Educational Technology:</th>
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<tbody>
<tr>
<td>All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge.</td>
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<tr>
<td>- Teacher TCI Website</td>
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<td>- SMART board</td>
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<tr>
<th>X 8.2 Technology Integration, Engineering, Design and Computational Thinking – Programming</th>
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<td>All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.</td>
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INTEGRATED SOCIAL AND EMOTIONAL LEARNING COMPETENCIES

The following social and emotional competencies are integrated in this curriculum document:

Self-Awareness
- Recognize one’s own feelings and thoughts
- Recognize the impact of one’s feelings and thoughts on one’s own behavior
- Recognize one’s personal traits, strengths and limitations
- Recognize the importance of self-confidence in handling daily tasks and challenges

Self-Management
- Understand and practice strategies for managing one’s own emotions, thoughts and behaviors
- Recognize the skills needed to establish and achieve personal and educational goals
- Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one’s goals

Social Awareness
- Recognize and identify the thoughts, feelings, and perspectives of others
- Demonstrate an awareness of the differences among individuals, groups, and others’ cultural backgrounds
- Demonstrate an understanding of the need for mutual respect when viewpoints differ
- Demonstrate an awareness of the expectations for social interactions in a variety of setting

Responsible Decision Making
- Develop, implement and model effective problem solving and critical thinking skills
- Identify the consequences associated with one’s action in order to make constructive choices
- Evaluate personal, ethical, safety and civic impact of decisions

Relationship Skills
- Establish and maintain healthy relationships
- Utilize positive communication and social skills to interact effectively with others
- Identify ways to resist inappropriate social pressure
- Demonstrate the ability to present and resolve interpersonal conflicts in constructive ways
- Identify who, when, where, or how to seek help for oneself or others when needed
In this unit plan, the following 21st Century Life and Careers skills are addressed:

<table>
<thead>
<tr>
<th>Check ALL that apply –</th>
<th>Indicate whether these skills are:</th>
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<tbody>
<tr>
<td><strong>21st Century Themes</strong></td>
<td>• E – encouraged</td>
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<td>• T – taught</td>
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<td>• A – assessed</td>
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<th>Career Ready Practices</th>
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<td>9.1 Personal Financial Literacy</td>
<td>P1. Act as a responsible and contributing citizen and employee.</td>
</tr>
<tr>
<td>Income and Careers</td>
<td>P2. Apply appropriate academic and technical skills.</td>
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<tr>
<td>Money Management</td>
<td>P3. Attend to personal health and financial well-being.</td>
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<tr>
<td>Credit and Debt Management</td>
<td>ET P4. Communicate clearly and effectively and with reason.</td>
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<tr>
<td>Planning, Saving, and Investing</td>
<td>P5. Consider the environmental, social and economic impacts of decisions.</td>
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<tr>
<td>Becoming a Critical Consumer</td>
<td>ET P6. Demonstrate creativity and innovation.</td>
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<tr>
<td>Insuring and Protecting</td>
<td>ET P8. Utilize critical thinking to make sense of problems and persevere in solving them.</td>
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<tr>
<td>9.2 Career Awareness, Exploration, and Preparation</td>
<td>P9. Model integrity, ethical leadership and effective management.</td>
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<td>X Career Awareness</td>
<td>P10. Plan education and career paths aligned to personal goals.</td>
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<tr>
<td>Career Exploration</td>
<td>P11. Use technology to enhance productivity.</td>
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<tr>
<td>Career Preparation</td>
<td>P12. Work productively in teams while using cultural global competence.</td>
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What is Everything Made Of? – 4 Lessons (TCI Unit 2, Lesson 1)

**Lesson 1: Introducing Kinds of Materials**
- **Objective** – SWBAT plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
- **NJSLS-S** – 2-PS1-1
- **Opening** – Introduction Slide and Questions (slide 10)
- **Activities** – Observing Phenomena (slide 11 -12)

**Investigation Introduction (slide 13)**
**Introducing Step 1: Describing Materials (slide 14)**
- **Closure** – Practice describing the white board and the classroom wall.
- **Differentiation** – Focus on Key Vocabulary - obviously the terms *materials, properties,* and *classify* are very important in this unit. Use repetition to help students learn these concepts. Read the Student Text together as a class. Then, throughout the week, have students point out various materials that they see in and out of the classroom. Keep a running list of these materials on chart paper or the board. Then introduce two simple contrasting properties, such as hard and soft. Have students classify the materials on your class list as either hard or soft. (You can also create a "neither" or "not sure" list for things that don't fit easily into the two categories). Then reread the Student Text together and use the presentation to complete the in-class investigation.

**Lesson 2: Describing and Classifying Materials**
- **Objective** – SWBAT plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
- **NJSLS-S** – 2-PS1-1
- **Opening** – Step 1: Describing Materials (slide 14)
- **Activities** – Step 2: Classifying Materials (slide 15 -17/ISN pg. 5)
- **Closure** – Discuss if all the student groups used the same new way to classify their materials. Why or why not?
- **Differentiation** – Model How to Classify Materials - during Step 2 of the investigation, groups choose a property and sort the 10 materials based on whether they have the property or not. Explicitly model this process using Slide 15 in the Presentation. Use the pen tool to write a property on the left side, such as Yellow. Call up students to drag and drop all the yellow objects to the left side, each time saying, "This material has the property of being yellow." Drag the remaining objects to the right side, each time saying, "This materials does NOT have the property of being yellow." Then have groups choose a different property and begin classifying the materials on their own.
Lesson 3: Playing 21 Questions
- **Objective** – SWBAT plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
- **NJSLS-S – 2-PS1-1**
- **Opening** – Introduce 21 Questions (slide 18)
- **Activities** – Play 21 Questions for as long as time permits (slide 19)
- **Closure** – What materials were easiest to guess? Hardest? Why?
- **Differentiation** – Reading Further: Milk from the Rubber Tree; students can read all Students Readings, associated Interactive Tutorials, and ISN Reading Notes pages; play Lesson Game; review Vocabulary Cards.

Lesson 4: Reviewing Materials
- **Objective** – SWBAT plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
- **NJSLS-S – 2-PS1-1**
- **Opening** – Lesson Wrap-up (slide 20 – 21)
- **Activities** – Show What You Know (slide 22 -23/ ISN pg. 6)
- **Closure** – Vocabulary (slide 24)
- **Differentiation** – Make the Reading Notes More Concrete - for the Reading Notes (all sections), students describe properties of various materials and classify objects based on their properties. Consider bringing in physical objects that match those in the Reading Notes so students can use real objects in making their assessments instead of only pictures. Also, note that all of the black/white pictures in the print Interactive Student Notebook can be found in full color in the online version of the notebook in the Student Subscription.

How Can Materials Be Reused? – 4 Lessons (TCI Unit2, Lesson 4)

Lesson 5: Introducing the Reuse of Materials
- **Objective** – SWBAT make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.
- **NJSLS-S – 2-PS1-3**
- **Opening** – Introduction Slide and Questions (slide 9)
- **Activities** – Observing Phenomena (slide 10)
  - Investigation Introduction (slide 11-12)
  - Step 1: Creating Extreme Designs (13)
- **Closure** – Preview the stations for tomorrow’s activity (slide 14)
- **Differentiation** – Change the Focus from "Extreme" Designs to "Different" Designs - the goal of creating extreme designs is simply to get students more engaged and give them a goal. However, it's completely fine if some students only create designs that are different from the original. The key takeaway is that objects can be broken apart into different pieces and put together into different shapes.
  - Allow Students to Dictate Answers - students can dictate their answers to you or
another adult when describing their designs in number 2 in the notebook Investigation prompts.

**Lesson 6: Creating Designs**
- **Objective** – SWBAT make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.
- **NJSLS-S** – 2-PS1-3
- **Opening** – Review and complete Step 1: Creating Extreme Designs (slide 14)
- **Activities** – Step 2: Sharing Designs (slide 15)
- **Step 3: Creating More Extreme Designs** (slide 16)
- **Closure** – Review all of your designs with your partner
- **Differentiation** – Simplify the Investigation - if any of the original designs on Placards A-F are too difficult for certain students, you can simplify them. You can also reduce the number of stations that some students are required to complete. There are six stations, but as long as students do 3-4 stations, they should get sufficient practice with the science concepts.

Have Students Take Photos of Their Extreme Designs - so that students can better remember their favorite "extreme" design that they created and draw it in their Interactive Student Notebooks, have them take photos of each extreme design they make at each station. You might want to turn their photos into a slideshow to share with parents.

More Extreme Design – instead of having students only make their design extreme in one aspect such as height or length, have students attempt first to make an extreme design that is extreme in height, and then extreme in length. Have students discuss how reusing the materials can allow for different extreme designs.

**Lesson 7: Comparing Designs**
- **Objective** – SWBAT make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.
- **NJSLS-S** – 2-PS1-3
- **Opening** – Introduce Step 4: Comparing Designs (slide 17/ISN pg. 4)
- **Activities** – Step 4: Comparing Designs (slide 18/ ISN pg. 5)
- **Closure** – Lesson Wrap-up (slide 19)
- **Differentiation** – Reusing and Recycling - how does recycling work? Lead students in a discussion to describe how what they learned about materials applies to recycling bottles and cans. When bottles and cans are recycled, they are crushed and heated before being remolded. You may choose to have this discussion after Lesson 6, when they have learned about heating, cooling, and reversible and irreversible changes.
Lesson 8: Reviewing Extreme Designs
- **Objective** – SWBAT make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.
- **NJSLS-S** – 2-PS1-3
- **Opening** – Making Sense of Phenomena (slide 20)
- **Activities** – Show What You Know (slide 21 – 22/ISN pg. 6)
- **Closure** – Vocabulary (slide 23)
- **Differentiation** – Reading Further: Big Shapes from Small Bricks; students can read all Students Readings, associated Interactive Tutorials, and ISN Reading Notes pages; play Lesson Game; review Vocabulary Cards.

What Happens When Materials are Heated and Cooled? – 4 Lessons (TCI Unit 2, Lesson 6)

Lesson 9: Introduction to Heating and Cooling Materials
- **Objective** – SWBAT construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.
- **NJSLS-S** – 2-PS1-4
- **Opening** – Introduction Slide and Questions (slide 6)
- **Activities** – Observing Phenomena (slide 7)

**Investigation Introduction** (slide 8-9)
Introduce Step 1: Observing Changes from Heating (slide 10 – 12)
- **Closure** – Ask students to brainstorm other changes in materials they have observed due to heating.
- **Differentiation** – Reading Further: From Bean to Bar; students can read all Students Readings, associated Interactive Tutorials, and ISN Reading Notes pages; play Lesson Game; review Vocabulary Cards.

Lesson 10: Heating Materials
- **Objective** – SWBAT construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.
- **NJSLS-S** – 2-PS1-4
- **Opening** – Begin Step 1- Heating Water (slide 12/ ISN pg. 5-6)
- **Activities** – Complete Step 1 (slide 13 – 16/ISN pg. 5-6)
- **Closure** – Introduce Step 2: Observing Changes from Cooling (slide 17)
- **Differentiation** – Show Fewer Videos - reduce the number of "Chef's Kitchen" videos (step 1), or only have students take notes for a few of the videos and provide them notes for the other videos.

Lesson 11: Cooling Materials
- **Objective** – SWBAT construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.
- **NJSLS-S** – 2-PS1-4
• **Opening** – Talk to students about their experience with putting items in a freezer (expanding/exploding can of soda as an example of what happens).

• **Activities** – Step 2: Observing Changes from Cooling (slide 17 – 19/ ISN pg.7)
  Step 3: Discovering Causes (slide 19 – 22)

• **Closure** – Why can the plastic be recycled but not the wood? The energy in the wood is released when it is burned as heat and light and cannot be put back.

• **Differentiation** – Create Mixed Ability Groups - assign students to groups of 3 so that there are a variety of writing and speaking levels in the group. This will allow students to help each other while making and recording observations and participating in class discussions about the videos.

**Lesson 12: Reviewing Heated and Cooled Materials**

• **Objective** – SWBAT construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.

• **NJSLS-S** – 2-PS1-4

• **Opening** – Lesson Wrap-up (slide 23 -24)

• **Activities** – Show What You Know (slide 25/ISN pg.8)

• **Closure** – Vocabulary (slide 26)

• **Differentiation** – Give a Word Bank - for the Investigation prompts, Section 3 of the Reading Notes, and the Show What You Know, provide a word bank of terms that students should use in their answers. You can pull some terms from the Notebook Answer Key and/or have the class brainstorm terms together.

**Optional Lessons:**

*TCI Unit 2, Lesson 2 – How Are Liquids and Solids Different?*

*TCI Unit 2, Lesson 5 – What Happens When Materials Are Mixed?*

*TCI Unit 2, Lesson 3 – How Are Materials Used for Different Purposes?* (the standard covered in this lesson, 2-PS1-2, will be covered by the STEM program)
Grade 2 Science
Unit 3: Earth Science – Earth’s Surface
Duration: Third Trimester – 13 Weeks/12 Lessons

NJ Student Learning Standards for Science

Students who demonstrate understanding can:

2-ESS1-1. Make observations from media to construct an evidence-based account that Earth events can occur quickly or slowly. [Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.]

[Assessment Boundary: Assessment does not include quantitative measurements of timescales.]

2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.* [Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.]

2-ESS2-2. Develop a model to represent the shapes and kinds of land and bodies of water in an area. [Assessment Boundary: Assessment does not include quantitative scaling in models.]

2-ESS2-3. Obtain information to identify where water is found on Earth and that it can be solid or liquid.

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<td>Developing and Using Models</td>
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<td>Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.</td>
<td>ESS1.C: The History of Planet Earth</td>
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<tr>
<td>□ Develop a model to represent patterns in the natural world. (2-ESS2-2)</td>
<td>□ Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe. (2-ESS1-1)</td>
<td>Patterns</td>
</tr>
<tr>
<td>□ Develop a model to represent patterns in the natural world. (2-ESS2-2)</td>
<td>ESS2.A: Earth Materials and Systems</td>
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<tr>
<td>Constructing Explanations and Designing Solutions</td>
<td>□ Wind and water can change the shape of the land. (2-ESS2-1)</td>
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<td>Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.</td>
<td>ESS2.B: Plate Tectonics and Large-Scale System Interactions</td>
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<td>□ Compare multiple solutions to a problem. (2-ESS2-1)</td>
<td>□ Maps show where things are located. One can map the shapes and kinds of land and water in any area. (2-ESS2-2)</td>
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<tr>
<td>Obtaining, Evaluating, and Communicating Information</td>
<td>ESS2.C: The Roles of Water in Earth’s Surface Processes</td>
<td></td>
</tr>
<tr>
<td>Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.</td>
<td>□ Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (2-ESS2-3)</td>
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<td>□ Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question. (2-ESS2-3)</td>
<td>ETS1.C: Optimizing the Design Solution</td>
<td></td>
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<tr>
<td>□ Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (secondary to 2-ESS2-1)</td>
<td>Patterns</td>
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<td>□ Patterns in the natural world can be observed. (2-ESS2-2),(2-ESS2-3)</td>
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<td>Stability and Change</td>
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<td>□ Things may change slowly or rapidly. (2-ESS2-1)</td>
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<td>Influence of Engineering, Technology, and Science on Society and the Natural World</td>
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<td>□ Developing and using technology has impacts on the natural world. (2-ESS2-1)</td>
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<td>Connections to Nature of Science</td>
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<td>Science Addresses Questions About the Natural and Material World</td>
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<td>□ Scientists study the natural and material world. (2-ESS2-1)</td>
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<td>Reason abstractly and quantitatively. (2-ESS2-2) <strong>MP.2</strong></td>
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<td>Recall information from experiences or gather information from provided sources to answer a question. (2-ESS2-3) <strong>W.2.8</strong></td>
<td>Model with mathematics. (2-ESS2-2) <strong>MP.4</strong></td>
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<td>Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (2-ESS2-2) <strong>SL.2.5</strong></td>
<td>Read and write numbers to 1000 using base-ten numerals, number names, and expanded form. (2-ESS2-2) <strong>2.NBT.A.3</strong></td>
</tr>
<tr>
<td></td>
<td>Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem. (2-ESS2-1) <strong>2.MD.B.5</strong></td>
</tr>
</tbody>
</table>

### Technology Integration

**X** 8.1 Educational Technology:
All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge.

- Teacher TCI Website
- SMART board

**X** 8.2 Technology Integration, Engineering, Design and Computational Thinking – Programming
All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

- Use design thinking to create a model of land formations.
INTEGRATED SOCIAL AND EMOTIONAL LEARNING COMPETENCIES

The following social and emotional competencies are integrated in this curriculum document:

Self-Awareness
- Recognize one’s own feelings and thoughts
- Recognize the impact of one’s feelings and thoughts on one’s own behavior
- Recognize one’s personal traits, strengths and limitations
- Recognize the importance of self-confidence in handling daily tasks and challenges

Self-Management
- Understand and practice strategies for managing one’s own emotions, thoughts and behaviors
- Recognize the skills needed to establish and achieve personal and educational goals
- Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one’s goals

Social Awareness
- Recognize and identify the thoughts, feelings, and perspectives of others
- Demonstrate an awareness of the differences among individuals, groups, and others’ cultural backgrounds
- Demonstrate an understanding of the need for mutual respect when viewpoints differ
- Demonstrate an awareness of the expectations for social interactions in a variety of setting

Responsible Decision Making
- Develop, implement and model effective problem solving and critical thinking skills
- Identify the consequences associated with one’s action in order to make constructive choices
- Evaluate personal, ethical, safety and civic impact of decisions

Relationship Skills
- Establish and maintain healthy relationships
- Utilize positive communication and social skills to interact effectively with others
- Identify ways to resist inappropriate social pressure
- Demonstrate the ability to present and resolve interpersonal conflicts in constructive ways
- Identify who, when, where, or how to seek help for oneself or others when needed
In this unit plan, the following 21st Century Life and Careers skills are addressed:

<table>
<thead>
<tr>
<th>Check ALL that apply – 21st Century Themes</th>
<th>Indicate whether these skills are:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• E – encouraged</td>
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<td>• T – taught</td>
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<td>• A – assessed</td>
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</tbody>
</table>

**Career Ready Practices**

<table>
<thead>
<tr>
<th>9.1 Personal Financial Literacy</th>
<th>P1. Act as a responsible and contributing citizen and employee.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income and Careers</td>
<td>P2. Apply appropriate academic and technical skills.</td>
</tr>
<tr>
<td>Money Management</td>
<td>P3. Attend to personal health and financial well-being.</td>
</tr>
<tr>
<td>Credit and Debt Management</td>
<td>ETA P4. Communicate clearly and effectively and with reason.</td>
</tr>
<tr>
<td>Planning, Saving, and Investing</td>
<td>P5. Consider the environmental, social and economic impacts of decisions.</td>
</tr>
<tr>
<td>Becoming a Critical Consumer</td>
<td>ETA P6. Demonstrate creativity and innovation.</td>
</tr>
<tr>
<td>Insuring and Protecting</td>
<td>ETA P8. Utilize critical thinking to make sense of problems and persevere in solving them.</td>
</tr>
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<thead>
<tr>
<th>9.2 Career Awareness, Exploration, and Preparation</th>
<th>P9. Model integrity, ethical leadership and effective management.</th>
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<tbody>
<tr>
<td>X Career Awareness</td>
<td>P10. Plan education and career paths aligned to personal goals.</td>
</tr>
<tr>
<td>Career Exploration</td>
<td>P11. Use technology to enhance productivity.</td>
</tr>
<tr>
<td>Career Preparation</td>
<td>P12. Work productively in teams while using cultural global competence.</td>
</tr>
</tbody>
</table>
## Science Learning Plan
### Grade: 2
### Unit 3: Earth’s Surface
### Duration: Third Trimester 13 weeks/12 Lessons

### What is on the Earth’s Surface? - 4 Lessons (TCI Unit 3, Lesson 1)

**Lesson 1: Introduction to Earth’s Surface**
- **Objective** – SWBAT develop a model to represent the shapes and kinds of land and bodies of water in an area.
- SWBAT obtain information to identify where water is found on Earth and that it can be solid or liquid.
- **NJSLS-S – 2-ESS2-2, 2-ESS2-3**
- **Opening** – Introduction Slide and Questions (slide 7)
- **Activities** – Observing Phenomena (slide 8)

**Investigation Introduction (slide 9)**

**Step 1: Finding Places on Earth (slide 10 – 11/ISN pg. 2)**
- **Closure** – Introduce “Find the Place” Game (slide 12)
- **Differentiation** – Reading Further: Puzzling Planet; students can read all Students Readings, associated Interactive Tutorials, and ISN Reading Notes pages; play Lesson Game; review Vocabulary Cards.

**Lesson 2: Find the Place on Earth**
- **Objective** – SWBAT develop a model to represent the shapes and kinds of land and bodies of water in an area.
- SWBAT obtain information to identify where water is found on Earth and that it can be solid or liquid.
- **NJSLS-S – 2-ESS2-2, 2-ESS2-3**
- **Opening** – Explain “Find the Place” game (slide 12)
- **Activities** – Play “Find the Place” (slide 13)

**Complete question #2 on student sheet (slide 14/ISN pg. 2)**
- **Closure** – Introduce Step 2: Making a Model of Earth (slide 15)
- **Differentiation** – Place Students in Mixed Ability Pairs - some students may struggle with molding the clay so it will help to have bodily-kinesthetic students spread throughout the classroom. As needed, have students work in groups of 3 or individually. Assure students that the “land” on their globes doesn’t need to be perfect, but they should aim to model it as realistically as they can. The most important takeaway is that there is far more water on Earth than land.

**Lesson 3: Making a Model of Earth’s Surface**
- **Objective** – SWBAT develop a model to represent the shapes and kinds of land and bodies of water in an area.
- SWBAT obtain information to identify where water is found on Earth and that it can be solid or liquid.
- **NJSLS-S – 2-ESS2-2, 2-ESS2-3**
Lesson 4: Reviewing Models of the Earth’s Surface

- **Objective** – SWBAT develop a model to represent the shapes and kinds of land and bodies of water in an area. SWBAT obtain information to identify where water is found on Earth and that it can be solid or liquid.
- **NJSLS-S** – 2-ESS2-2, 2-ESS2-3
- **Opening** – Lesson Wrap-up (slide 19)
- **Activities** – Making Sense of Phenomenon (slide 20)
- **Closure** – Vocabulary (slide 22)
- **Differentiation** – Support Show What You Know - provide, or have the class brainstorm, a variety of sentence starters that students can use when writing the Processing assignment. You can post these somewhere in the room for students to use throughout the unit.

What Kinds of Land and Water Are Found on Earth? – 2 Lessons (TCI Unit 3, Lesson 2)

Lesson 5: Playing Land and Water Lotto

- **Objective** – SWBAT obtain information to identify where water is found on Earth and that it can be solid or liquid.
- **NJSLS-S** – 2-ESS2-3
- **Opening** – Introduction Slide and Questions (slide 6)
- **Activities** – Investigation Introduction (slide 8)

Step 1: Playing the Game (slide 9 – 11/Handout A: Lotto Board) – play round 2 & 3 if time permits (slide 12 – 13)
- **Closure** – Review games results
- **Differentiation** – Restructure the Game - the goal of the game in Step 1 is for students to grapple with each land and water image and try to figure out with their partner what type of landform they’re seeing. Encourage students to give evidence to each other by saying why they think the image is one landform or another. If you find, however, that after Round 1 very few students are figuring out the correct landforms, you can go back to the Student Text and Reading Notes to review the definitions before playing Rounds 2 and 3. (There are different images used in each round.)

Lesson 6: Review Land and Water on Earth
- **Objective** – SWBAT obtain information to identify where water is found on Earth and that it can be solid or liquid.
- **NJSSLS-S – 2-ESS2-3**
- **Opening** – Sketch pictures of each land and water area (slide 14/ISN pg. 5)
- **Activities** – Lesson Wrap-Up (slide 20)
  - Show What You Know (slide 22/ ISN pg. 6)
- **Closure** – Vocabulary (slide 23)
- **Differentiation** – Create an Illustrated Dictionary - have students create an illustrated dictionary of the various land and water features taught in the lesson. You may want to have them create large posters with their partner that you can then put up around the room. While reading the Student Text and completing their notebook assignments, students can connect the photos and diagrams to their posters. Alternatively, students could create illustrated dictionaries on their own so they can have all the terms in one place.

Reading Further: A Long River Journey; students can read all Students Readings, associated Interactive Tutorials, and ISN Reading Notes pages; play Lesson Game; review Vocabulary Cards.

**How Do Maps Show Land and Water – 2 Lessons (TCI Unit 3, Lesson 3)**

**Lesson 7: Introducing Maps**
- **Objective** – SWBAT develop a model to represent the shapes and kinds of land and bodies of water in an area.
- **NJSSLS-S – 2-ESS2-2**
- **Opening** – Introduction Slide and Questions (slide 6)
- **Activities** – Investigation Introduction (slide 8)
- **Step 1: Understanding Maps** (slide 9 – 10/ISN pg. 4)
  - **Closure** – Complete #1 on student sheet (slide 10/ISN pg. 4)
  - **Differentiation** - Write Directions - have students use the map in Section 2 of Student Readings to write the relative directions between the locations. For example, “Eugene is Northwest of Crater Lake.” Have students mention these places at least once: Crater Lake, Eugene, Medford, Mount Hood, Portland, Salem, and Snake River.

**Lesson 8: Following Directions On Maps**
- **Objective** – SWBAT develop a model to represent the shapes and kinds of land and bodies of water in an area.
- **NJSSLS-S – 2-ESS2-2**
- **Opening** – Introduce Step 2: Following Directions on a Map (slide 11)
- **Activities** – Step 2: Following Directions on a Map (slide 11 -12/ISN pg. 5)
  - **Lesson Wrap-up** (slide 17)
  - **Closure** – Show What You Know (slide 19 /ISN pg. 8) & Vocabulary (slide 20)
  - **Differentiation** – Allow Students to Use Pictures When Giving Directions - in Step 2 when students are giving directions to each other to find the "X" on the map, you can allow some students to use pictures or arrows, instead of words, to describe the
directions to their partner. When students share out as a group, you can help them convert any pictures they used into words.

Reading Further: Racing with a Map; students can read all Students Readings, associated Interactive Tutorials, and ISN Reading Notes pages; play Lesson Game; review Vocabulary Cards.

**How Can Problems Caused by Wind and Water Be Solved – 4 Lessons (TCU Unit 3, Lesson 7)**

**Lesson 9: Defining the Problem**
- **Objective** – SWBAT compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.
- **NJSLS-S – 2-ESS2-1**
- **Opening** – Introduction Slide and Questions (slide 9)
- **Activities** – Observing Phenomena (slide 10)

Investigation Introduction (slide 12)
Introduce Step 1: Defining the Problem (slide 13-14)
- **Closure** – Discuss any questions the students may have about making the model
- **Differentiation** – Thoughtfully Assign Groups and Roles - review the Presentation slides to get a sense for the engineering activity. Create groups that include students with a variety of different personalities and skills. For projects that involve teamwork and creativity, like this one, it’s best to have mixed-ability groups.

**Lesson 10: Designing a Solution**
- **Objective** – SWBAT compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.
- **NJSLS-S – 2-ESS2-1**
- **Opening** – Complete Step 1 by making the model (slide 15)
- **Activities** – Step 2: Designing a Solution (slide 16 – 17/ISN pg. 5)
- **Closure** – Review Designs with each group
- **Differentiation** – Allow Groups to Test and Revise Their Designs Earlier - in the investigation, students build their designs and then see all 6 class designs tested before they revise their own design. This is so that they will have additional ideas and test results that they can incorporate into their revised design. However, it may frustrate some students to have to see all 6 designs before they can “fix” their own. You could allow groups to test their own designs first and make changes before presenting to the class.

**Lesson 11: Testing & Comparing the Designs**
- **Objective** – SWBAT compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.
- **NJSLS-S – 2-ESS2-1**
- **Opening** – Introduce Step 3: Testing the Designs (slide 18)
- **Activities** – Create and Test the Designs (slide 18 – 19/ISN pg. 6)

Step 4: Comparing the Designs (slide 20)
- **Closure** – Improve Your Design (slide 21/ISN pg. 7)
- **Differentiation** – Paraphrase Presentations Before Recording Notes - during the testing, students record notes about the different designs other groups present. Before writing in their notebooks, have students describe to a partner the design they just saw. To help develop fluency, they could paraphrase what the group said about their design. Then have their partner describe the design to them. Have a few students share with the class, and then allow all students to record their notes.

**Lesson 12: Reviewing**
- **Objective** – SWBAT compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.
- **NJSLS-S** – 2-ESS2-1
- **Opening** – Lesson Wrap-Up (slide 22)
- **Activities** – Making Sense of Phenomenon (slide 23)
- Show What You Know (slide 24 - 25/ISN pg. 8)
- **Closure** – Vocabulary (slide 26)
- **Differentiation** – For Advanced Learners: design a windbreak by using the picture in Section 4 to motivate students to design a windbreak that stops sand from obstructing the road. Instruct them to draw a picture of their windbreak and explain how it halts sand.

Reading Further: A Special Day for Trees; students can read all Students Readings, associated Interactive Tutorials, and ISN Reading Notes pages; play Lesson Game; review Vocabulary Cards.

**Optional Lessons:**
- *TCI Unit 3, Lesson 2 - What Kinds of Land and Water are Found on Earth?* Step 2/3: Making/ Reading Books (slide 15 -19)

- *TCI Unit 3, Lesson 3 - How Do Maps Show Land and Water?* Step 3: Drawing/Using Treasure Maps (slide 13- 16)

- *TCI Unit 3, Lesson 4 – How Does Earth’s Surface Change?* (the standard covered in this lesson, 2ESS1-1, will be covered by the STEM program)

- *TCI Unit 3, Lesson 5 – How Do Earthquakes and Volcanoes Change Earth’s Surface?* (the standard covered in this lesson, 2ESS1-1, will be covered by the STEM program)

- *TCI Unit 3, Lesson 6 – How do Wind and Water Change the Land?* (the standard covered in this lesson, 2ESS1-1, will be covered by the STEM program)
ACCOMMODATIONS AND MODIFICATIONS

Below please find a list of suggestions for accommodations and modifications to meet the diverse needs of our students. Teachers should consider this a resource and understand that they are not limited to the recommendations included below.

An accommodation changes HOW a student learns; the change needed does not alter the grade-level standard. A modification changes WHAT a student learns; the change alters the grade-level expectation.

Special Education and 504 Plans

All modifications and accommodations must be specific to each individual child’s IEP (Individualized Educational Plan) or 504 Plan.

- Pre-teach or preview vocabulary
- Repeat or reword directions
- Have students repeat directions
- Use of small group instruction
- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments
- Repetition and time for additional practice
- Model skills/techniques to be mastered
- Extended time to complete task/assignment/work
- Provide a copy of class notes
- Strategic seating (with a purpose - eg. less distraction)
- Flexible seating
- Repetition and additional practice
- Use of manipulatives
- Use of assistive technology (as appropriate)
- Assign a peer buddy
- Emphasize key words or critical information by highlighting
- Use of graphic organizers
- Scaffold with prompts for sentence starters
- Check for understanding with more frequency
- Provide oral reminders and check student work during independent practice
- Chunk the assignment - broken up into smaller units, work submitted in phases
- Encourage student to proofread assignments and tests
- Provide regular home/school communication
- Teacher checks student planner
- Provide student with clear expectations in writing and grading criteria for assignments (rubrics)
Testing Accommodations:

*Students should receive all testing accommodations for Benchmark assessments that they receive for State testing.*

- **Setting:** Alternate setting for assessments, small groups, screens to block distractions
- **Presentation:** large print, test readers, use of audio, fewer questions on each page
- **Response:** answer verbally, use large block answer sheet, speech-to-text dictation, accept short answers
- Allow for retakes
- Provide study guides
- Use of reference aids such as glossary, multiplication tables, calculator
- Choice of test format (multiple-choice, essay, true-false)
- Alternate ways to evaluate (projects or oral presentations instead of written tests)
- Open-book or open-note tests

**English Language Learners:**

*All modifications and accommodations should be specific to each individual child’s LEP level as determined by the WIDA screening or ACCESS, utilizing the WIDA Can Do Descriptors.*

- Pre-teach or preview vocabulary
- Repeat or reword directions
- Have students repeat directions
- Use of small group instruction
- Scaffold language based on their Can Do Descriptors
- Alter materials and requirements according to Can Do Descriptors
- Adjust number of paragraphs or length of writing according to their Can Do Descriptor
- TPR (Total Physical Response-Sheltered Instruction strategy) Demonstrate concepts through multi sensory forms such as with body language, intonation
- Pair visual prompts with verbal presentations
- Repetition and additional practice
- Model skills and techniques to be mastered
- Native Language translation (peer, assistive technology, bilingual dictionary)
- Emphasize key words or critical information by highlighting
- Use of graphic organizers
- Scaffold with prompts for sentence starters
- Check for understanding with more frequency
- Use of self-assessment rubrics
- Increase one-on-one conferencing; frequent check ins
- Use study guide to organize materials
- Make vocabulary words available in a student created vocabulary notebook, vocabulary bank, Word Wall, or vocabulary ring
- Extended time
- Select text complexity and tiered vocabulary according to Can Do Descriptors
- Projects completed individually or with partners
- Use online dictionary that includes images for words:
http://visual.merriamwebster.com/
• Use online translator to assist students with pronunciation:

**Students at Risk of Failure:**

- Use of self-assessment rubrics for check-in
- Pair visual prompts with verbal presentations
- Ask students to restate information and/or directions
- Opportunity for repetition and additional practice
- Model skills/techniques to be mastered
- Extended time
- Provide copy of class notes
- Strategic seating with a purpose
- Provide students opportunity to make corrections and/or explain their answers
- Support organizational skills
- Check daily planner
- Encourage student to proofread work
- Assign a peer buddy
- Build on students’ strengths based on Multiple Intelligences: Linguistic (verbal); Logical (reasoning); Musical/Rhythmic; Intrapersonal Intelligence (understanding of self); Visual Spatial Intelligence; Interpersonal Intelligence (the ability to interact with others effectively); Kinesthetic (bodily); Naturalist Intelligence; and Learning Styles: Visual; Auditory; Tactile; Kinesthetic; Verbal

**High Achieving:**

Extension Activities
- Allow for student choice from a menu of differentiated outcomes; choices grouped by complexity of thinking skills; variety of options enable students to work in the mode that most interests them
- Allow students to pursue independent projects based on their individual interests
- Provide enrichment activities that include more complex material
- Allow opportunities for peer collaboration and team-teaching
- Set individual goals
- Conduct research and provide presentation of appropriate topics
- Provide students opportunity to design surveys to generate and analyze data to be used in discussion
- Allow students to move through the assignment at their own pace (as appropriate)
Strategies to Differentiate to Meet the Needs of a Diverse Learning Population

- Vocabulary Sorts—students engage with the vocabulary word by sorting into groups of similar/different rather than memorizing definitions.
- Provide “Realia” (real life objects to relate to the five senses) and ask questions relating to the senses.
- Role Play—students create or participate in role playing situations or Reader’s Theater.
- Moving Circle—an inside and outside circle partner and discuss, circles moves to new partner (Refer to Kagan Differentiated Strategies).
- Brainstorm Carousel—Large Post Its around the room, group moves in a carousel to music. Group discusses topic and responses on paper. Groups rotate twice to see comments of others. (Refer to Kagan Differentiated Strategies).
- Gallery Walk—Objects, books, or student work is displayed. Students examine artifacts and rotate.
- Chunking—chunk reading, tests, questions, homework, etc to focus on particular elements.
- Think Pair Share Write
- Think Talk Write
- Think Pair Share
- Note-taking—can be done through words, pictures, phrases, and sentences depending on level.
- KWL (Know, Want to Know, Learned)/KWHL (Know, What to Know, How Will I Learn, learned)/KWLS (Know, Want to Know, Learned, Still Want to Know)/KWLQ (Know, What to Know, Learned, Questions I Still Have) Charts
- Circle Map strategy—place the main topic in a small circle and add student ideas in a bigger circle around the topic. Students may use their native language with peers to brainstorm.
- Flexible grouping—as a whole class, a small group, or with a partner, temporary groups are created: http://www.teachhub.com/flexible-grouping-differentiated-instruction-grouping-strategy.
- Jigsaw Activities—cooperative learning in a group, each group member is responsible for becoming an “expert” on one section of the assigned material and then “teaching” it to the other members of the team: http://www.adlit.org/strategies/22371/.