Subject Area: Science
Grade Level: 3

Unit 1: Environments and Living Things

Dates: Marking period 1 September - October (Rotate with Social Studies Unit)	**Time Frame:** September- October

Overview

In this unit, students explore environments and living things. Students examine where organisms live and how living in a group helps some animals to survive. Students analyze how environments change and what happens to organisms in changing environments, including taking a look at what fossils of extinct organisms show about past environments.

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Essential Questions

- Where Do Organisms Live?
- How Does Living in a Group Help Some Animals Survive?
- How Do Environments Change?
- What Happens to Organisms in Changing Environments?
- What Do Fossils Show About Environments of Long Ago?

Enduring Understandings

- An organism is a living thing. Plants, animals, fungi, and bacteria are all organisms. Organisms must meet their needs in their environment to survive. Most organisms need food and shelter, but they all need water and warmth.
- An environment is all the living and nonliving things that surround an organism. Organisms live in environments where they can meet their needs.
- Animals that live alone do not need to share food or shelter. It is also easier to sneak up on prey when hunting.
- Living in groups is beneficial for many kinds of animals. Animals live in groups for different reasons. Animals live in groups to help with finding food or hunting, finding mates, caring for young, socialization, or to protect themselves.
- Environments can change for many different reasons. They can be natural or human caused, slow or fast.
- Many human activities change environments, such as building dams, felling trees, and mining. Engineers research how human-caused changes affect and damage the environment.
- Different species have different adaptations that help them survive in their environments.
- An environment can change in ways that affect its physical characteristics, temperature, and availability of resources.
- Species become extinct when all the organisms of one species dies. Many organisms are now extinct. Some have left fossils.
- Fossils give scientists clues about extinct organisms and environments long ago.

	● Scientists base their findings on evidence. If they find fossils that provide new and different evidence, scientists change their conclusions.

Skill and Knowledge Objectives

SWBAT:

- Learn that animals of the same kind are similar but can also vary in many ways.
- Observe and record information about different kinds of animals and animals of the same kind.
- Use observations and data to make comparisons of different animals.
- Look for patterns in animal parts to explain similarities and differences in animals.
- Use observations and evidence about plants and animals of the same kind to answer questions.

Assessments

Pre-Assessment:

- Utilize pre-assessment questions at the beginning of each
    - Lesson 1- IE - Think of what you already know about how plants and animals are similar to others of the same kind. Write questions you have.

Formative Assessment:

- After completing book reading, use “My Science Concepts” pages in the lesson book to discuss understanding on a scale from “Still Learning” to “Know It”.
    - Reflect on your understanding. Draw an X along each line.
- Exit tickets
- Thumbs up, down, sideways

Self-Reflection/Self-Assessment:

- Utilize check for understanding pages and questions in textbook at end of each lesson for lessons 1-6
    - Example - Lesson 1 - Discuss: Choose one of the four environments you learned about in this lesson: hot desert, coral reef, temperate forest, or tropical rainforest. Draw a simple picture of the environment in the box. Label it.

Summative Assessment:

- Assessment: How Are Plants and Animals Like Others of the Same Kind? (English)

Suggested modifications for assessment

- IEP / 504 / Intervention - Assess students on knowledge rather than ELA skills
    - Make graphic organizers for assessments
    - Allow students to use textbook and notes to demonstrate understanding
    - Eliminate longer sentence writing / reflections
    - Orally ask questions and orally accept assessment responses to assess knowledge
    - Provide students with choices about how they would like to demonstrate learning
- Enrichment

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- Allow students to further reflect on science topics through writing, projects, presentations
- Utilize differentiated TCI assessments to create more challenge to higher level students

Resources

- TCI Teacher Manual
- TCI Teacher Log in
- Unit 1 Overview
- TCI Interactive Student Workbooks - Unit 1
- Complete Lesson Guide
- TCI Kit Materials for Unit 1 Lessons
- https://www.nextgenscience.org/understanding-standards/understanding-standards
- Assessments Lessons 1-6
- Lesson games
- Vocabulary Cards
- Culturally Responsive Education with TCI Brings Science Alive k-8

Standards

Unit Guide for NGSS

Next Generation Science Standards
Performance Expectation
3-LS4-4 Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change. **3-LS4-3** Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. **3-LS2-1** Construct an argument that some animals form groups that help members survive. **3-LS4-1** Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.

Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information

- Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.
- Communicate scientific and/or technical information orally and/or in written formats, including various forms of media and may include tables, diagrams, and charts.
- Compare and/or combine across complex texts and/or other reliable media to support the engagement in other scientific and/or engineering practices.

Engaging in Argument from Evidence

- Construct and/or support an argument with evidence, data, and/or a model.
- Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.

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Analyzing and Interpreting Data

- Analyze and interpret data to make sense of phenomena, using logical reasoning, mathematics, and/or computation.
- Represent data in tables and/or various graphical displays (bar graphs, pictographs, and/or pie charts) to reveal patterns that indicate relationships.

Constructing Explanations and Designing Solutions

- Construct an explanation of observed relationships (e.g., the distribution of plants in the back yard).
- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem.
- Identify the evidence that supports particular points in an explanation.

Asking Questions and Defining Problems

- Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.

Developing and Using Models

- Develop and/or use a model to predict and/or describe phenomena.

Using Mathematics and Computational Thinking

- Describe, measure, estimate, and/or graph quantities such as area, volume, weight, and time to address scientific and engineering questions and problems.

Planning and Carrying Out Investigations

- Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.

Crosscutting Concepts

- Cause and Effect
- Scale, Proportion, and Quantity
- Stability and Change

Systems and System Models

- A system can be described in terms of its components and their interactions.

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change.

Scale, Proportion, and Quantity

- Natural objects and/or observable phenomena exist from the very small to the immensely large or from very short to very long time periods.

Structure and Function

- Substructures have shapes and parts that serve functions.

Stability and Change

- Some systems appear stable, but over long periods of time will eventually change.

Disciplinary Core Ideas

LS4.D: Biodiversity and Humans

- Populations live in a variety of habitats, and change in those habitats affects the organisms living there.

LS4.C: Adaptation

- For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.

LS2.D: Social Interactions and Group Behavior

- Being part of a group helps animals obtain food, defend themselves, and cope with

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changes. Groups may serve different functions and vary dramatically in size.

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

- When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die.

LS4.A: Evidence of Common Ancestry and Diversity

- Some kinds of plants and animals that once lived on Earth are no longer found anywhere.
- Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments.

ETS1.A: Defining and Delimiting Engineering Problems

- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.

ETS1.B: Developing Possible Solutions

- At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs.
- Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions.

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes consistent patterns in natural systems.

Scientific Knowledge Is Open to Revision in Light of New Evidence

- Science explanations can change based on new evidence.

Science Addresses Questions About the Natural and Material World

- Science findings are limited to what can be answered with empirical evidence.

Scientific Investigations Use a Variety of Methods

- Science investigations use a variety of methods, tools, and techniques.

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology

- Knowledge of relevant scientific concepts and research findings is important in engineering.

Complete NGSS Correlations

ELA Standards

Reading

Key Ideas and Details

- CC.3.R.I.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
- CC.3.R.I.2 Determine the main idea of a text; recount the key details and explain how they support the main idea.
- CC.3.R.I.3 Describe the relationship between a series of historical events, scientific

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ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.

Writing

Text Types and Purposes

- CC.3.W.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- CC.3.W.1 Write opinion pieces on familiar topics or texts, supporting a point of view with reasons.

Research to Build and Present Knowledge

- CC.3.W.8 Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.

Speaking and Listening

Presentation of Knowledge and Ideas

- CC.3.SL.6 Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification. (See grade 3 Language standards 1 and 3 on page 26 for specific expectations.)
- CC.3.SL.4 Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.

Math Standards

Math

MP.Model with mathematics

- CC.K-12.MP.4.Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

NJSLS Standard 8 Computer Science and Design Thinking

- 8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and

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evaluate all possible solutions to provide the best results with supporting sketches or models

NJSLS Standard 9.1, 9.2, 9.4 Career Readiness, Life Literacies, and Key Skills

- 9.1.5.CR.1: Compare various ways to give back and relate them to your strengths, interests, and other personal factors
- 9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes
- 9.4.5.CI.1: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions.

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Environments and Living Things
Unit 1- Environments and Living Things
Each lesson includes reading and activities and will take 3-4 days to complete

Lesson 1: Where Do Organisms Live?	**Lesson 2**: How Does Living in a Group Help Some Animals Survive?	**Lesson 3**: How Do Environments Change?	**Lesson 4**: What Happens to Organisms in Changing Environments	**Lesson 5**: How Do People Learn About Extinct Organisms?
Lesson 1 guide **Materials**: Print • Audio Transcript • Interactive Student Notebook • Notebook Answer Key • Picture Cards A-T • Science Journal • Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson	Lesson 2 guide **Materials**: **What You Need** • Aluminum foil, roll • Apron, vinyl • Bin, plastic, shoe box size • Forcep • Glue (SDS) • Marker, dark • Newspaper • Paper towels • Paper, construction, assorted	Lesson 3 guide **Materials**: Print • Audio Transcripts • Extension Handout • Handout: How Environments Change • Interactive Student Notebook • Notebook Answer Key • Science Journal • Spanish Handout: How Environments	Lesson 4 guide **Materials**: Print • Extension Handout • Handout A: Letter to Engineering Companies • Handout B: Replies from Engineering Companies • Handout C: Summary Evaluation of	Lesson 5 guide **Materials**: What You Need • Apron, vinyl • Gloves, safety • Pan, aluminum foil, 9 x 13” • Paper, blank • Sand, coarse (SDS) • Tape, masking • Tape, scotch Print • Audio Transcript • Interactive Student

Guide **Activities**: **Essential Question** *Where do organisms live?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** You will learn about four different environments: hot desert, coral reef, temperate forest, and tropical rainforest. With a partner, you will match organisms to the environments they would best survive in. [75 min] **Making Sense of the Phenomenon** Finally, you will write clues about	colors • Ruler • Scissors • Water, tap **Print** • Interactive Student Notebook • Notebook Answer Key • Science Journal • Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Essential Question** *How does living in a group help some animals survive?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min]	Change • Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Essential Question** *How do environments change?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** You will examine pictures that show changes to environments. Then, in pairs, you will create an act-it-out about one environmental change, and the rest of the class	Overpass Designs • Interactive Student Notebook • Notebook Answer Key • Science Journal • Spanish Handout A: Letter to Engineering Companies • Spanish Handout B: Replies from Engineering Companies • Spanish Handout C: Summary Evaluation of Overpass Designs • Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Essential Question** *What happens to organisms in a changing*	Notebook • Notebook Answer Key • Picture Cards A–I • Science Journal • Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Essential Question** *How do people learn about extinct organisms?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** You will act as paleontologists

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a mystery organism that can be used to determine the type of environment the organism would live in. [10-15 min] **Video Lesson Extension**: Super Simple Science- Island Animals: The Galapagos Islands have many interesting organisms. What organisms are in your local environment?	**Investigation** You will model how living in a school of fish can protect a fish from predators. You will gather evidence to construct an explanation. You will be able to explain the importance of living in groups for an animal's survival. [90 min] **Making Sense of the Phenomenon** Finally, you will make an argument for why one animal lives alone while another lives in a group. [10-15 min] **Video Lesson Extension:** Super Simple Science- Bats That Eat Blood: Bats are very helpful to humans in many ways. Where are bats located in your state?	will guess which change you are demonstrating. [130 min] **Making Sense of the Phenomenon** Finally, you will examine pictures of different environments and explain what caused the change to each environment. [10-15 min] **Video Lesson Extension**: Super Simple Science- Hero of the Environment:This scientist helps to protect ocean environments. What changes can you make to help protect the environment where you live?	*environment?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Student Text** You will read how organisms have adaptations that help them survive in their environments. When the environments change, the organisms must change their behaviors, move to a new location, or die. **Investigation** You will analyze data so that you are able to recommend a design for a new animal crossing in your state park. [60 min]	and uncover fossils of plants and animals that lived on Earth millions of years ago. You will then categorize the fossils according to your findings. [75 min] **Making Sense of the Phenomenon** Finally you will read an incomplete conversation between a scientist and student. You will fill in the blanks to explain how we can know about extinct species. [10-15 min] **Video Lesson Extension**: Super Simple Science - Everybody Loves T-Rex: Most people know of Tyrannosaurus Rex, making this dinosaur a popular choice. Which dinosaurs are very similar to or very different than T. Rex?

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			Making Sense of the Phenomenon Finally you will draw an organism, explain how it is adapted to its environment, and explain how it would adapt to a changing environment. [10-15 min] **Video Lesson Extension:** Super Simple Science- Road Safety for Wildlife:Roads cut through environments where animals live, making it dangerous for them to cross. How can humans design roads with animals in mind?	
Lesson 6: What Do Fossils Show About Environments of Long Ago? **Materials**: Lesson 6 guide **Print** ● Handout A: Dinosaur Grouping Cards ● Handout				

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B: Dinosaur Fossils ● Interactive Student Notebook ● Notebook Answer Key ● Science Journal ● Spanish Handout A: Dinosaur Grouping Cards ● Spanish Handout B: Dinosaur Fossils ● Spanish: Interactive Student Notebook ● Spanish: Science Journal ● Super Simple Science ● Lesson Guide **Activities**: **Essential Question** *What do fossils show about environments of long ago?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be				

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able to explain by the end of the lesson. [5-10 min] **Investigation** You will look at pictures of dinosaur teeth. You will use these pictures to predict what the dinosaur ate and present your findings to the class. You will then think about other features that can be used to learn about the environment a dinosaur lived in. [120 min] **Making Sense of the Phenomenon** Finally you will cite evidence from fossil pictures to decide what an extinct organism may have eaten and where it may have lived. [10-15 min] **Video Lesson Extension**: Super Simple Science - Dino Droppings Tyrannosaurus Rex had strong				

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jaws and lots of sharp teeth, probably to tear into meat. What kind of teeth do you think a plant-eating or fish-eating dinosaur would have?				

Differentiate Instruction by:
http://www.sde.com/Timely-Topics/DI-Assessment-Intervention

Differentiate Instruction, depending on needs (students with an IEP, MLL/ELL Students; Students At Risk; Gifted Students)

1. **ELA/ELD Connections**

Support students who need additional guidance and structure with reading, writing, or vocabulary development with ELA/ELD Connections. Make these toolkits available to your students as an independent tutorial, for class instruction, or for use with peer tutoring. Learn more about **Strategies for Integrating Language Arts.**

- **ELA/ELD Connections: Reading Skills**
- **ELA/ELD Connections: Writing Skills**
- **ELA/ELD Connections: Speaking and Listening Toolkit**
- **ELA/ELD Connections: Vocabulary Skills**

Suggestions for how to use these pages are provided at point-of-use throughout the Lesson Guides.

2. **Differentiating Instruction**

Lesson Guides include step-by-step suggestions for meeting the needs of English Learners, students below grade level in reading and writing, special education students, and advanced learners within the context of whole class instruction and with minimal modifications needed on the teacher's part. For more support, see **Best Practices for Differentiating Instruction.**

3. **Reading Support**

The Student Text and Interactive Student Notebook has built-in support for emerging to advanced readers. Learn more about **Literacy in Science.**

- **Reading Support Buttons** allow students to change the text reading level, highlight main ideas, or use text-to-speech audio.
- **Considerate Text** has a single-column layout, section titles, and subheads that

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divide content into meaningful and manageable chunks, carefully structured paragraphs with topic sentences and supporting details, images that are carefully chosen to support the text, and captions that incorporate main ideas. Learn more about **Considerate Text features.**

- **Vocabulary** is introduced in the Introduction and then defined in-line to support reading fluency. Glossary assists students with essential terms.
- **Lesson Summaries** succinctly review main concepts.
- **The graphically organized notebook** helps students record and remember what they read.

Writing Accommodations

- Use highlighted handwriting paper to help with writing legibility
- Use flat marbles for multisensory finger spacing
- Use a sentence stem and have the student complete the stem
- Use a visual writing checklist so the student knows what is expected next in the lesson

Presentation Accommodations

- Use alternate texts at lower readability level
- Work with fewer items per page or line and/or materials in a larger print size
- Use magnification device, screen reader, or Braille / Nemeth Code
- Use audio amplification device (e.g., hearing aid(s), auditory trainer, sound-field system (which may require teacher use of microphone)
- Be given a written list of instructions
- Be given an outline of a lesson
- Be given a copy of the teacher's notes
- Be given an example to assist in preparing for assessments
- Use visual presentations of verbal material, such as word webs and visual organizers
- Use manipulatives to teach or demonstrate concepts

Response Accommodations

- Use sign language, a communication device, Braille, other technology, or native language other than English
- Dictate answers to a scribe
- Capture responses on an audio recorder
- Use a spelling dictionary or electronic spell-checker
- Use a word processor to type notes or give responses in class

Setting Accommodations

- Work or take a test in a different setting, such as a quiet room with few distractions
- Sit where he learns best (for example, near the teacher & away from distractions)
- Use special lighting or acoustics
- Take a test in small group setting
- Use sensory tools such as an exercise band that can be looped around a chair’s legs (so fidgety kids can kick it and quietly get their energy out)
- Use noise buffers such as headphones, earphones, or earplugs

Timing Accommodations

- Take more time to complete a task or a test
- Have extra time to process oral information and directions
- Take frequent breaks, such as after completing a task

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Scheduling Accommodations

- Take more time to complete a project
- Take a test in several timed sessions or over several days
- Take sections of a test in a different order
- Take a test at a specific time of day

Organization Skills Accommodations

- Use an alarm to help with time management
- Mark texts with a highlighter

Assignment Modifications

- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum Modifications

- Learn different material (such as continuing to work on the core skill such as an opening sentence, 3 detailed reasons and a closing sentence, whole others move ahead to an extension concept/skill)
- Get graded or assessed using a different standard than the one for classmate

<u>Further differentiation for Lesson 1:</u>

English Learners: Provide Scripts for Videos In Step 1 of the investigation, students listen to descriptions of four different environments. These same scripts are provided in the Interactive Student Notebook prompts for the investigation. Use them to help students build their reading skills and practice fluency. First, have students listen to the audio track without reading the script. Then have them read the script on their own. Then have them follow along with the script as the audio plays. Finally, have pairs practice reading the scripts to each other.
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Students with Special Needs
Modify the Investigation Procedure
This lesson was designed to facilitate a high number of student-to-student interactions as pairs and groups discuss how organisms meet their needs in different environments. But there are many different ways to utilize the 4 environment and 16 organism placards! Use one of the suggestions below if you feel that it would make the activity run more smoothly with your particular students:
Instead of passing out the organisms (Placards E-T) to pairs, post them on the walls around the classroom. Review the four types of environments with students and show them that each environment has one page for notes in the Interactive Student Notebook. Then have students circulate around the room, looking for at least two organisms (ideally one plant and one animal) that would best survive in each of the four environments. Students should write or draw the organisms in the boxes in their notebooks.
After reviewing the four types of environments, project Placard A: Horned Lizard. As a class, analyze the image and read the text. Then have pairs decide in which environment the lizard could best meet its needs. Constantly encourage students to give evidence to back up their claims. Then have students write the name of or draw the lizard in number 1 of their notebooks (the Hot Desert page). Repeat this process for Placards E-H and M-P, but mix up the order in which you project the placards. This will allow you to cut the number of placards in half while still allowing students to analyze a decent variety of organisms.

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Advanced Learners
Students create a journal about their last year. They identify multiple sources of shelter, food, water and space that they have accessed/used. Students consider what each resource provides, and how the loss of each resource would impact their life.

Differentiate Instruction, depending on individual student needs (Students with a 504) **by:**
Presentation Accommodations

- Listen to audio recordings instead of reading text
- Work with fewer items per page or line and/or materials in a larger print size
- Use audio amplification device
- Be given a written list of instructions
- Be given a copy of the teacher's notes
- Be given a study guide to assist in preparing for assessments

Response Accommodations

- Use sign language,
- Use a word processor to type notes or give responses in class
- Use a calculator or table of "math facts"

Setting Accommodations

- Work or take an assessment in a different setting
- Take a test in a small group setting
- Use sensory tools such as an exercise band
- Use noise buffers such as headphones, earphones, or earplugs

Timing Accommodations

- Have extra time to process oral information and directions
- Take frequent breaks, such as after completing a task

Scheduling Accommodations

- Take more time to complete a project
- Take sections of a test in a different order

Organization Skills Accommodations

- Use an alarm to help with time management
- Mark texts with a highlighter
- Have help coordinating assignments in a book or planner
- Receive study skills instruction

Assignment Modifications

- Complete fewer or different tasks
- Write shorter responses
- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum Modifications

- Get graded or assessed using a different standard than the one for classmates

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Subject Area: Science
Grade Level: 3

Unit 2: Forces and Motion

Dates: Marking period 2 January (Rotate with Social Studies Unit)	**Time Frame:** 1 month

Overview

In this unit, students explore forces and motion. They find out what happens when forces are balanced or unbalanced, how to predict patterns of motion, and what magnetic and electric forces do. Students examine the swing ride and other carnival phenomena as they investigate how forces affect the motion of objects in a carnival game. Using their knowledge of forces and motion, students will implement magnets to design a new carnival game.

Essential Questions	**Enduring Understandings**
● What happens when forces are balanced or unbalanced? ● How can you predict patterns of motion? ● What can magnetic forces do? ● What can electric forces do?	● Each force acts on one particular object and has both strength and a direction. ● An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. ● Forces that do not sum to zero can cause changes in the object's speed or direction of motion. ● Each force acts on one particular object and has both strength and a direction. ● An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. ● Forces that do not sum to zero can cause changes in the object's speed or direction of motion. ● The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. ● Electric and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other. ● Electric, and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other.

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Skill and Knowledge Objectives

SWBAT:

Lesson 1

- Observe images and describe the position of an object using directions, such as right and left as well as the location of other objects to describe the position of the object.

- Understand that a force that acts on an object has strength and direction and that objects can exert forces on each other.
- Describe ways forces can cause an object speed up, slow down, or change direction.

Lesson 2

- Understand that a force acting on an object has both strength and direction and an object remains still when balanced forces act upon it, and an object moves when forces are unbalanced.
- Observe balanced and unbalanced forces through videos, a simulation, and explore these forces by setting up spring scales and a pulley system.
- Conduct trials, collect and analyze data, identify cause-and-effect relationships, and make claims supported by evidence.

Lesson 3

- Observe motion and use patterns of change to make predictions.
- Observe and make quantitative measurements patterns of motion.
- Analyze results and predict future motion based on patterns observed.
- Analyze data in order to provide evidence for an explanation.

Lesson 4

- Understand that electric and magnetic forces between objects do not require the objects to be in contact.
- Investigate magnetic forces and come up with and answer cause-and-effect questions about bar magnets and electromagnets.
- Use their understanding of how magnetic interactions impact two objects to design and build a jewelry box latch.

Lesson 5

- Learn that magnetic forces between objects do not require the objects to be in contact.
- Observe with an electroscope that electric forces between objects do not require the objects be in contact.
- Come up with good questions that can be answered by investigating.
- Recognize that many good science questions investigate a cause-and-effect relationship.
- Gather evidence in an investigation to use as data to answer questions about electric forces.

Assessments

Pre-Assessment:

- Unit Pre-assessment: Anchoring Phenomenon
    - Thing about the unit's Anchoring Phenomenon: A swing ride spins slow and then fast. The faster the ride spins, the higher the riders swing. Complete the chart: List what you know about this unit's phenomenon. Write what you wonder about this phenomenon
    - Pre-asses with the lesson opener questions in the science journal. IE - Lesson 1 - Discuss: Have you ever played catch? How do you throw a ball to make it go far? Think of what you already know about forces. Write questions you have.

Formative Assessment:

- After completing book reading, use "My Science Concepts" pages in the lesson book to

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discuss understanding on a scale from “Still Learning” to “Know It”.
    - Reflect on your understanding. Draw an X along each line.
- Exit tickets
- Thumbs up, down, sideways

Self-Reflection/Self-Assessment:

- Utilize check for understanding pages and questions in textbook at end of each lesson for lessons 1-5
    - Example - Lesson 1 - The ball is rolling toward this soccer player. How will the ball’s motion change if she kicks the ball? Why? Use these terms in your answer: force, push, speed, and direction.

Summative Assessment:

- Utilize Lesson Assessments in each lesson for lessons 1-5
- Unit Closers
    - Performance Assessment: Testing Carnival Games
    - Performance Assessment: Designing the Plenty-O-Fish Game

Suggested modifications for assessment

- IEP / 504 / Intervention - Assess students on knowledge rather than ELA skills
    - Make graphic organizers for assessments
    - Allow students to use textbook and notes to demonstrate understanding
    - Eliminate longer sentence writing / reflections
    - Orally ask questions and orally accept assessment responses to assess knowledge
    - Provide students with choices about how they would like to demonstrate learning
- Enrichment
    - Allow students to further reflect on science topics through writing, projects, presentations
    - Utilize differentiated TCI assessments to create more challenge to higher level students

Resources

- TCI Teacher Manual
- TCI Teacher Log in
- TCI Interactive Student Workbooks - Unit 2 Forces and Motion
- Complete Lesson Guide Slideshows for Lessons 1 - 5
- TCI Kit Materials for Unit 2 Lessons
- https://www.nextgenscience.org/understanding-standards/understanding-standards
- Assessments Lessons 1-5
- Lesson games
- Vocabulary Cards
- Culturally Responsive Education with TCI Brings Science Alive k-8

Standards

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Performance Expectation

3-PS2-2 Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. **3-5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. **3-PS2-4** Define a simple design problem that can be solved by applying scientific ideas about magnets. **3-PS2-3** Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. **3-5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. **3-5-ETS1-1** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. **3-PS2-1** Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

Science and Engineering Practices

Engaging in Argument from Evidence

- Use data to evaluate claims about cause and effect.
- Construct and/or support an argument with evidence, data, and/or a model.

Planning and Carrying Out Investigations

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.
- Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
- Evaluate appropriate methods and/or tools for collecting data.

Constructing Explanations and Designing Solutions

- Use evidence (e.g., measurements, observations, patterns) to construct or support an explanation or design a solution to a problem.

Analyzing and Interpreting Data

- Represent data in tables and/or various graphical displays (bar graphs, pictographs, and/or pie charts) to reveal patterns that indicate relationships.
- Compare and contrast data collected by different groups in order to discuss similarities and differences in their findings.
- Analyze and interpret data to make sense of phenomena, using logical reasoning, mathematics, and/or computation.

Asking Questions and Defining Problems

- Define a simple design problem that can be solved through the development of an

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object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.
- Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.

Crosscutting Concepts
Patterns

- Patterns of change can be used to make predictions.

Scale, Proportion, and Quantity

- Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change.

Systems and System Models

- A system can be described in terms of its components and their interactions.

Disciplinary Core Ideas
ETS1.B: Developing Possible Solutions

- Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.
- At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs.
- Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions.

PS2.A: Forces and Motion

- The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it.
- Each force acts on one particular object and has both strength and a direction. An

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object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion.

PS2.B: Types of Interactions

- Electric and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other.
- Objects in contact exert forces on each other.

ETS1.A: Defining and Delimiting Engineering Problems

- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.

Connections to Nature of Science
Science Knowledge Is Based on Empirical Evidence

- Science findings are based on recognizing patterns.

Scientific Investigations Use a Variety of Methods

- Science investigations use a variety of methods, tools, and techniques.

Complete NGSS Correlations

ELA Standards

Reading
Key Ideas and Details

- CC.3.R.I.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.

Integration of Knowledge and Ideas

- CC.3.R.I.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).

Fluency

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- CC.3.R.F.4 Read with sufficient accuracy and fluency to support comprehension.

Writing

Research to Build and Present Knowledge

- CC.3.W.8 Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.
- CC.3.W.7 Conduct short research projects that build knowledge about a topic.

Speaking and Listening

Comprehension and Collaboration

- CC.3.SL.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.
- CC.3.SL.3 Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.

Math Standards

Math

MP.Use appropriate tools strategically

- CC.K-12.MP.5.Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

MP.Reason abstractly and quantitatively

- CC.K-12.MP.2.Mathematically proficient students make sense of the quantities and their relationships in problem situations. Students bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their

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referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

NJSLS Standard 8 Computer Science and Design Thinking

- 8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models

NJSLS Standard 9.1, 9.2, 9.4 Career Readiness, Life Literacies, and Key Skills

- 9.1.5.CR.1: Compare various ways to give back and relate them to your strengths, interests, and other personal factors
- 9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes
- 9.4.5.CI.1: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions.

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Forces and Motion

Unit 2- Forces and Motion

Each lesson includes reading and activities and will take 3-4 days to complete

Lesson 1: What Do Forces Do?

<u>Lesson 1 guide</u>

Materials:

- Extension Handout
- Interactive Student Notebook
- Notebook Answer Key
- Science Journal
- Spanish: Interactive Student Notebook
- Spanish: Science Journal
- Super Simple Science
- Lesson Guide

Activities:

Essential Question

What do forces do?

Observing Phenomena

We will start by analyzing a photo. Then you'll be introduced to the lesson

Lesson 2: What Happens When Forces Are Balanced or Unbalanced?

<u>Lesson 2 guide</u>

Materials:

What You Need

- Hook, s-shaped
- Pulley, with table clamp
- Spring scale, 100g/1N
- String
- Tape, masking
- Washer, metal, 3/4"

Print

- Interactive Student Notebook
- Notebook Answer Key
- Science Journal
- Spanish: Interactive Student Notebook
- Spanish: Science Journal
- Super Simple Science
- Lesson Guide

Lesson 3: How Can You Predict Patterns of Motion?

<u>Lesson 3 guide</u>

Materials:

- Ball, hi-bounce, 1"
- Bowl, plastic, 6 qt
- Marker, assorted colors
- Meter stick, folding
- Paper clip, large
- Ruler
- Spring toy
- Stopwatch
- String
- Tape, scotch
- Washer, metal, 3/4"

Print

- Extension Handout
- Handout: Alex's Results
- Interactive Student Notebook
- Notebook Answer Key
- Science Journal
- Spanish Handout: Alex's Results

Lesson 4: What Can Magnetic Forces Do?

<u>Lesson 4 guide</u>

Materials:

What You Need

- Battery holder, size D
- Battery, size D
- Box, cardboard (7" x 5" x 4")
- Glue (SDS)
- Magnet, bar (pair)
- Nail
- Paper clip, large
- Tape, scotch
- Washer, metal, 3/16"
- Wire cutter
- Wire, spool

Print

- Handout: Letter from the El Dorado Jewelry Store
- Interactive Student Notebook
- Notebook Answer Key
- Science Journal
- Spanish Handout:

Lesson 5: What Can Electric Forces Do?

<u>Lesson 5 guide</u>

Materials:

What You Need

- Aluminum foil, roll
- Balloon
- Clay, modeling, 4 colors
- Cloth, wool
- Container, plastic, 16 oz
- Lid, plastic
- Scissors
- Wire cutter
- Wire, spool

Print

- Extension Handout
- Handout: Examples of Scientific Questions to Investigate
- Interactive Student Notebook
- Notebook Answer Key
- Science Journal

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phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** You will observe images and videos and discuss position, motion, and forces. In part one, you will describe the position and motion of objects. In part two, you will identify the forces acting on the object and how they change the object's motion. [60 min] **Making Sense of the Phenomenon** Finally, you will ask and answer questions about forces and motion. [10-15 min] **Video Lesson Extension**: <u>Super Simple Science-</u> Fair Forces: Carnival games at fairs look easy, but to	**Activities**: **Essential Question** What happens when forces are balanced or unbalanced? **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** You will observe balanced and unbalanced forces through videos, a simulation, and an experimental set-up using a pulley system. [90 min]Making Sense of the **Phenomenon** Finally, you will predict how an object will move depending on whether the forces acting on it are balanced or unbalanced. [10-15 min] **Video Lesson Extension:** <u>Super Simple Science-</u> "5,4,3,2,1 Lift Off": A rocket	• Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Essential Question** *How can you predict patterns of motion?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** You will work in groups to observe and measure patterns of motion. You will then use the patterns you observed to make predictions about future	Letter from the El Dorado Jewelry Store • Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Essential Question** *What can magnetic forces do?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** You will make electromagnets and investigate magnetic forces. Then, you will read and	• Spanish Handout: Examples of Scientific Questions to Investigate • Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Essential Question** *What can electric forces do?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** You will build

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win, you have to apply a force that has just the right strength and direction. How can you make your own carnival game?	pushes upward with a force that is greater than gravity, so it moves upward toward space. What forces can you apply to a paper rocket to move it farther?	motion. [90 min] **Making Sense of the Phenomenon** Finally, you will describe how objects move in a pattern to write captions for three different pictures. [10-15 min] **Video Lesson Extension**: Super Simple Science- 'Round and 'Round They Go:	interpret a letter to design a magnetic latch. [40 min] **Making Sense of the Phenomenon** Finally, you will describe magnetic forces and design a solution for a door that must be kept open. [10-15 min] **Video Lesson Extension:** Super Simple Science- Floating Trains: An attractive magnetic force makes this train float around its rails. How many things can you find in your home and community that use magnets?	electroscopes and then use them to investigate static electricity. [90 min] **Making Sense of the Phenomenon** Finally, you will research and take notes on electric and magnetic forces. [10-15 min] **Video Lesson Extension**: Super Simple Science - Electricity In Nature: The gas particles in this ball are electrically charged causing them to glow and spark. What happens when you electrically charge other objects with static electricity?

Differentiate Instruction by:
http://www.sde.com/Timely-Topics/DI-Assessment-Intervention

Differentiate Instruction, depending on needs (students with an IEP, MLL/ELL Students; Students At Risk; Gifted Students)

1. **ELA/ELD Connections**

Support students who need additional guidance and structure with reading, writing, or vocabulary development with ELA/ELD Connections. Make these toolkits available to your students as an independent tutorial, for class instruction, or for use with peer tutoring.

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Learn more about **Strategies for Integrating Language Arts.**

- **ELA/ELD Connections: Reading Skills**
- **ELA/ELD Connections: Writing Skills**
- **ELA/ELD Connections: Speaking and Listening Toolkit**
- **ELA/ELD Connections: Vocabulary Skills**

Suggestions for how to use these pages are provided at point-of-use throughout the Lesson Guides.

2. **<u>Differentiating Instruction</u>**

Lesson Guides include step-by-step suggestions for meeting the needs of English Learners, students below grade level in reading and writing, special education students, and advanced learners within the context of whole class instruction and with minimal modifications needed on the teacher's part. For more support, see **Best Practices for Differentiating Instruction.**

3. **Reading Support**

The Student Text and Interactive Student Notebook has built-in support for emerging to advanced readers. Learn more about **Literacy in Science.**

- **Reading Support Buttons** allow students to change the text reading level, highlight main ideas, or use text-to-speech audio.
- **Considerate Text** has a single-column layout, section titles, and subheads that divide content into meaningful and manageable chunks, carefully structured paragraphs with topic sentences and supporting details, images that are carefully chosen to support the text, and captions that incorporate main ideas. Learn more about **Considerate Text features.**
- **Vocabulary** is introduced in the Introduction and then defined in-line to support reading fluency. Glossary assists students with essential terms.
- **Lesson Summaries** succinctly review main concepts.
- **The graphically organized notebook** helps students record and remember what they read.

Writing Accommodations

- Use highlighted handwriting paper to help with writing legibility
- Use flat marbles for multisensory finger spacing
- Use a sentence stem and have the student complete the stem
- Use a visual writing checklist so the student knows what is expected next in the lesson

Presentation Accommodations

- Use alternate texts at lower readability level
- Work with fewer items per page or line and/or materials in a larger print size
- Use magnification device, screen reader, or Braille / Nemeth Code
- Use audio amplification device (e.g., hearing aid(s), auditory trainer, sound-field system (which may require teacher use of microphone)
- Be given a written list of instructions
- Be given an outline of a lesson

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- Be given a copy of the teacher's notes
- Be given an example to assist in preparing for assessments
- Use visual presentations of verbal material, such as word webs and visual organizers
- Use manipulatives to teach or demonstrate concepts

Response Accommodations

- Use sign language, a communication device, Braille, other technology, or native language other than English
- Dictate answers to a scribe
- Capture responses on an audio recorder
- Use a spelling dictionary or electronic spell-checker
- Use a word processor to type notes or give responses in class

Setting Accommodations

- Work or take a test in a different setting, such as a quiet room with few distractions
- Sit where he learns best (for example, near the teacher & away from distractions)
- Use special lighting or acoustics
- Take a test in small group setting
- Use sensory tools such as an exercise band that can be looped around a chair's legs (so fidgety kids can kick it and quietly get their energy out)
- Use noise buffers such as headphones, earphones, or earplugs

Timing Accommodations

- Take more time to complete a task or a test
- Have extra time to process oral information and directions
- Take frequent breaks, such as after completing a task

Scheduling Accommodations

- Take more time to complete a project
- Take a test in several timed sessions or over several days
- Take sections of a test in a different order
- Take a test at a specific time of day

Organization Skills Accommodations

- Use an alarm to help with time management
- Mark texts with a highlighter

Assignment Modifications

- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum Modifications

- Learn different material
- Get graded or assessed using a different standard than the one for classmate

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Differentiate Instruction, depending on individual student needs (Students with a 504) **by:**
Presentation Accommodations

- Listen to audio recordings instead of reading text
- Work with fewer items per page or line and/or materials in a larger print size
- Use audio amplification device
- Be given a written list of instructions
- Be given a copy of the teacher's notes

- Be given a study guide to assist in preparing for assessments

Response Accommodations

- Use sign language,
- Use a word processor to type notes or give responses in class
- Use a calculator or table of “math facts”

Setting Accommodations

- Work or take an assessment in a different setting
- Take a test in a small group setting
- Use sensory tools such as an exercise band
- Use noise buffers such as headphones, earphones, or earplugs

Timing Accommodations

- Have extra time to process oral information and directions
- Take frequent breaks, such as after completing a task

Scheduling Accommodations

- Take more time to complete a project
- Take sections of a test in a different order

Organization Skills Accommodations

- Use an alarm to help with time management
- Mark texts with a highlighter
- Have help coordinating assignments in a book or planner
- Receive study skills instruction

Assignment Modifications

- Complete fewer or different tasks
- Write shorter responses
- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum Modifications

- Get graded or assessed using a different standard than the one for classmates

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Subject Area: Science
Grade Level: 3

Unit 3: Weather and Climate

Dates: Marking period 3 March- April (Rotate with Social Studies Unit)	**Time Frame:** March-April

Overview

This unit is divided into two parts. In the first part of the unit, students examine what makes weather and how it is predicted, and compare how temperature, wind, rain, and snow are measured. Next, students explore weather and climate in different places and determine how weather and climate are related. In the second part of the unit, students find out about extreme weather, how it affects people, and how people can reduce extreme weather damage. Students use graphs to predict weather conditions during a particular season and review design solutions

that reduce the impacts of weather-related hazards. Students design a house that can withstand a snowstorm.

Essential Questions	Enduring Understandings
● What makes weather? ● How is temperature measured? ● How is wind measured? ● How are rain and snow measured? ● How is weather predicted? ● How are weather and climate related? ● How does extreme weather affect people? ● How can people reduce extreme weather damage?	● Weather is the condition of the lowest atmospheric layer at a certain time and place. ● Weather is defined by many variables including air temperature, wind, and the amount of water in the air. ● The sun causes changes in temperature, which drives wind. ● Air moves from cool areas to warmer areas. ● Wind is measured by speed and direction. ● Scientists record weather data and use data to predict weather. ● Scientists research and analyze historical rainfall data for their region, then make predictions based on the data. ● Extreme weather affects people. People can mitigate damage from extreme weather by planning ahead.

Skill and Knowledge Objectives

SWBAT:

- Observe weather and record observations
- Describe how the weather changed
- Measure temperature and predict weather
- Analyze data, find patterns, and predict weather
- Measure wind speed for several days, and graph their data
- Build a rain gauge and measure rainfall for five days
- Analyze weather data and use the data to predict weather in the coming year
- Evaluate lightning rod and levee designs to keep their city safe from extreme storms.

Assessments

Pre-Assessment:

- Utilize pre-assessment questions at the beginning of each lesson: Observing Phenomena
    - Example: Lesson 1 - Discuss: What are the different types of weather that you have experienced? Think of what you already know about the different types of weather. Write questions you have.

Formative Assessment:

- After completing book reading, use “My Science Concepts” pages in the lesson book to discuss understanding on a scale from “Still Learning” to “Know It”.
    - Reflect on your understanding. Draw an X along each line.

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- Utilize “Check for Understanding” in each lesson’s workbook
- Exit tickets
- Thumbs up, down, sideways

Self-Reflection/Self-Assessment:

- Utilize “Check for Understanding” pages and questions in textbook at end of each lesson
    - Example: Lesson 1 - Check for Understanding: Show What You Know- Weather changes in a location all the time. Record the weather where you live once during the day and once at night. Write the date when you recorded the weather. Draw a picture of the weather during the day. Draw a picture of the weather at night. Describe how the weather changed. Use these terms in your description: weather, temperature, wind, and humidity

Summative Assessment:

- Utilize Lesson Assessments in each lesson for lessons 1-5
- Performance Assessment: Graphing Weather Data
- Performance Assessment:Evaluating Roof Designs

Suggested modifications for assessment

- IEP / 504 / Intervention - Assess students on knowledge rather than ELA skills
    - Make graphic organizers for assessments
    - Allow students to use textbook and notes to demonstrate understanding
    - Eliminate longer sentence writing / reflections
    - Orally ask questions and orally accept assessment responses to assess knowledge
    - Provide students with choices about how they would like to demonstrate learning
- Enrichment
    - Allow students to further reflect on science topics through writing, projects, presentations
    - Utilize differentiated TCI assessments to create more challenge to higher level students

Resources

- TCI Teacher Manual
- TCI Teacher Log in
- TCI Interactive Student Workbooks - Unit 3- Weather and Climate
- Complete Lesson Guides Slideshows for Lesson 1-8
- TCI Kit Materials for Unit 3 Lessons
- https://www.nextgenscience.org/understanding-standards/understanding-standards
- Assessments Lessons 1-8
- Lesson Games
- Vocabulary Cards
- Culturally Responsive Education with TCI Brings Science Alive k-8

Standards

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Next Generation Science Standards

Performance Expectation

3-ESS2-1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. **3-ESS2-2** Obtain and combine information to describe climates in different regions of the world. **3-ESS3-1** Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. **3-5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. **3-5-ETS1-1** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. **3-5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Science and Engineering Practices

Analyzing and Interpreting Data

- Represent data in tables and/or various graphical displays (bar graphs, pictographs, and/or pie charts) to reveal patterns that indicate relationships.

Obtaining, Evaluating, and Communicating Information

- Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.
- Read and comprehend grade-appropriate complex texts and/or other reliable media to summarize and obtain scientific and technical ideas and describe how they are supported by evidence.
- Communicate scientific and/or technical information orally and/or in written formats, including various forms of media and may include tables, diagrams, and charts.

Engaging in Argument from Evidence

- Construct and/or support an argument with evidence, data, and/or a model.
- Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.

Using Mathematics and Computational Thinking

- Organize simple data sets to reveal patterns that suggest relationships.
- Describe, measure, estimate, and/or graph quantities such as area, volume, weight, and time to address scientific and engineering questions and problems.

Constructing Explanations and Designing Solutions

- Construct an explanation of observed relationships (e.g., the distribution of plants in the

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back yard).
- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem.
- Apply scientific ideas to solve design problems.
- Use evidence (e.g., measurements, observations, patterns) to construct or support an explanation or design a solution to a problem.

Asking Questions and Defining Problems

- Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.

Planning and Carrying Out Investigations

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.
- Evaluate appropriate methods and/or tools for collecting data.

Crosscutting Concepts

Patterns

- Patterns of change can be used to make predictions.

Stability and Change

- Change is measured in terms of differences over time and may occur at different rates.

Scale, Proportion, and Quantity

- Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change.

Structure and Function

- Substructures have shapes and parts that serve functions.

Disciplinary Core Ideas

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ESS2.D: Weather and Climate

- Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next.
- Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years.

ESS3.B: Natural Hazards

- A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts.

ETS1.A: Defining and Delimiting Engineering Problems

- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.

ETS1.B: Developing Possible Solutions

- At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs.
- Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions.

Connections to Nature of Science
Science Is a Human Endeavor

- Science affects everyday life.

Complete NGSS Correlations

ELA Standards

Reading
Key Ideas and Details

- CC.3.R.I.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.

Writing
Research to Build and Present Knowledge

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- CC.3.W.7 Conduct short research projects that build knowledge about a topic.

Text Types and Purposes

- CC.3.W.1 Write opinion pieces on familiar topics or texts, supporting a point of view with reasons.

Math Standards

Math

MP.Use appropriate tools strategically

- CC.K-12.MP.5.Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

MP.Reason abstractly and quantitatively

- CC.K-12.MP.2.Mathematically proficient students make sense of the quantities and their relationships in problem situations. Students bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

MP.Model with mathematics

- CC.K-12.MP.4.Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades,

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this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

MD.Represent and interpret data

- CC.3.MD.3.Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.

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Weather and Climate
Unit 3- Weather and Climate
Each lesson includes reading and activities and will take 3-4 days to complete

Lesson 1: What makes weather?	**Lesson 2**: How is Temperature Measured?	**Lesson 3**: How is Wind Measured?	**Lesson 4**: How Are Rain and Snow Measured?	**Lesson 5**: How is Weather Predicted?
Lesson 1 guide	Lesson 2 guide	Lesson 3 guide	Lesson 4 guide	Lesson 5 guide
Materials: What You Need ● Fan, electric ● Flashlight ● Paper, white **Print** ● Extension Handout ● Interactive Student Notebook ● Notebook Answer Key ● Science	**Materials**: What You Need ● Meter stick ● Thermometer **Print** ● Handout: Temperature Data ● Interactive Student Notebook ● Notebook	**Materials**: What You Need ● Anemometer ● Cardboard, corrugated, 5 cm x 30 cm ● Cup, paper ● Fan, electric ● Glue (SDS) ● Knife, utility ● Marker, dark ● Pencil ● Ruler	**Materials**: What You Need ● Bottle, plastic ● Marker, dark ● Rain gauge ● Ruler ● Scissors ● Tape ● Water **Print** ● Handout: Rainfall Data	**Materials**: What You Need ● Anemometer ● Rain gauge ● Thermometer ● Yarn **Print** ● Extension Handout ● Interactive Student Notebook

Journal • Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Essential Question** *What makes weather?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** You and a partner will act as movie makers. You will watch videos to observe weather in different movie locations. Then you will create a movie scene about experiencing weather in one of those locations. [80	Answer Key • Science Journal • Spanish Handout: Temperature Data • Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Essential Question** *How is temperature measured?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** You will use thermometers to record the temperature for several days and analyze your data.	• Scissors • Stapler • Yarn **Print** • Interactive Student Notebook • Notebook Answer Key • Science Journal • Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Essential Question** *How is wind measured?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Student Text** You will read how the sun heats	• Interactive Student Notebook • Notebook Answer Key • Science Journal • Spanish Handout: Rainfall Data • Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Essential Question** *How are rain and snow measured?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** You will build rain gauges to measure rainfall for five days. You'll graph the	• Notebook Answer Key • Picture Cards A-L • Science Journal • Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Essential Question** *How is weather predicted?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** In Part 1 of this investigation, you will work in groups to design and build a weather station. In Part 2, you will work in groups to analyze weather

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min] **Making Sense of the Phenomenon** Finally, you will analyze temperature data and make predictions about weather. [10-15 min] **Video Lesson Extension**: Super Simple Science: People rely on weather scientists to give the right weather information. Some call them heroes! Who are some weather scientists you rely on? What tools do they use to help them do their jobs?	[190 min] **Making Sense of the Phenomenon** Finally you will analyze temperature data and make predictions about weather. [10-15 min] **Video Lesson Extension:** Super Simple Science: Heat waves and cold snaps. Both are extreme. How hot or cold is the weather where you live?	Earth's surface unevenly, which causes wind. Scientists measure wind to help predict weather. **Investigation** You will build anemometers to measure wind speed for several days and then analyze your data. [80 min] **Making Sense of the Phenomenon** Finally, you will describe predictable wind patterns. [10-15 min] **Video Lesson Extension**: Super Simple Science: Cities have different weather than the surrounding countryside. In what ways are they different?	daily rainfall in your area and then make predictions based on data. [70 min] **Making Sense of the Phenomenon** Finally you will analyze rainfall data to make predictions about weather. [10-15 min] **Video Lesson Extension:** Super SImple Science The Atacama Desert is the driest place on Earth. Years can go by without any rainfall. What are some other places with extreme weather?	data. You will use the data to predict weather for the following year. [155 min] **Making Sense of the Phenomenon** Finally, you will analyze rainfall data to make predictions about weather. [10-15 min] **Video Lesson Extension**: Super Simple Science Long ago, people once predicted weather by looking for changes in animals. What are some behaviors of animals in different kinds of weather? Let's explore.
Lesson 6: How Are Weather and Climate Related? Lesson 6 guide **Materials**: **Print** ● Extension Handout ● Handout: Tour	**Lesson 7**: How Does Extreme Weather Affect People? Lesson 7 guide **Materials**: Print ● Interactive Student Notebook	**Lesson 8**: How Can People Reduce Extreme Weather Damage? Lesson 8 guide **Materials**: Print ● Extension Handout ● Handout:		

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Locations • Interactive Student Notebook • Notebook Answer Key • Picture Cards A-H • Science Journal • Spanish Handout: Tour Locations • Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Essential Question** *How are weather and climate related?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min]	• Notebook Answer Key • Science Journal • Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities** **Essential Question** *How does extreme weather affect people?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** You will act as storm chasers. You will watch videos of extreme weather and identify what type of extreme weather is shown. Then you will	Gulf Coast City Bulletin: Levees • Handout: Gulf Coast City Bulletin: Lightning Rods • Handout: Levee Design Solutions • Handout: Lightning Rod Design Solutions • Interactive Student Notebook • Notebook Answer Key • Science Journal • Spanish Handouts • Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Essential Question** *How can people reduce extreme weather damage?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the		

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Student Text You will read about how weather data is used to create climate data. You will also read about different types of climate around the world. **Investigation** Your class will go on a world tour. You will gather information on the climate of one location to lead the class at this tour stop. [60 min] **Making Sense of the Phenomenon** Finally, you will get information from books, the Internet, or your own experiences to complete a table on different climates. [10-15 min] **Video Lesson Extension**: Super Simple Science: In New England wild turkeys disappeared for more than a hundred years. Later, they returned. What happened?	examine images to find out the effects of extreme weather. [45 min] **Making Sense of the Phenomenon** Finally, you will write an e-mail to someone with advice on how to stay safe from tornadoes. [10-15 min] **Video Lesson Extension:**Super SImple Science: Weather beacons use flashing lights in code to tell the weather forecast. How would you design a weather beacon?	lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** You will determine the criteria and constraints of lightning rod and levee designs. Then you will vote on a lightning rod design and a levee design. [80 min] **Making Sense of the Phenomenon** Finally, you will evaluate two designs for tornado shelters and use evidence to explain which one best meets the criteria. [10-15 min] **Video Lesson Extension**: Super Simple Science: Weather can start wildfires. Engineers can help reduce storm damage. What solutions did you design that can help keep people safe?		

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Differentiate Instruction by:

Differentiate Instruction, depending on individual student needs (students with an IEP, 504, or Intervention Plan; ELL Students; Students At Risk; Gifted Students)

1. **ELA/ELD Connections**

Support students who need additional guidance and structure with reading, writing, or vocabulary development with ELA/ELD Connections. Make these toolkits available to your students as an independent tutorial, for class instruction, or for use with peer tutoring. Learn more about **Strategies for Integrating Language Arts.**

- **ELA/ELD Connections: Reading Skills**
- **ELA/ELD Connections: Writing Skills**
- **ELA/ELD Connections: Speaking and Listening Toolkit**
- **ELA/ELD Connections: Vocabulary Skills**

Suggestions for how to use these pages are provided at point-of-use throughout the Lesson Guides.

2. **<u>Differentiating Instruction</u>**

Lesson Guides include step-by-step suggestions for meeting the needs of English Learners, students below grade level in reading and writing, special education students, and advanced learners within the context of whole class instruction and with minimal modifications needed on the teacher's part. For more support, see **Best Practices for Differentiating Instruction.**

3. **Reading Support**

The Student Text and Interactive Student Notebook has built-in support for emerging to advanced readers. Learn more about **Literacy in Science.**

- **Reading Support Buttons** allow students to change the text reading level, highlight main ideas, or use text-to-speech audio.
- **Considerate Text** has a single-column layout, section titles, and subheads that divide content into meaningful and manageable chunks, carefully structured paragraphs with topic sentences and supporting details, images that are carefully chosen to support the text, and captions that incorporate main ideas. Learn more about **Considerate Text features.**
- **Vocabulary** is introduced in the Introduction and then defined in-line to support reading fluency. Glossary assists students with essential terms.
- **Lesson Summaries** succinctly review main concepts.
- **The graphically organized notebook** helps students record and remember what they read.

Writing Accommodations

- Use highlighted handwriting paper to help with writing legibility
- Use flat marbles for multisensory finger spacing
- Use a sentence stem and have the student complete the stem
- Use a visual writing checklist so the student knows what is expected next in the lesson

Presentation Accommodations

- Use alternate texts at lower readability level
- Work with fewer items per page or line and/or materials in a larger print size
- Use magnification device, screen reader, or Braille / Nemeth Code

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- Use audio amplification device (e.g., hearing aid(s), auditory trainer, sound-field system (which may require teacher use of microphone)
- Be given a written list of instructions
- Be given an outline of a lesson
- Be given a copy of the teacher's notes
- Be given an example to assist in preparing for assessments
- Use visual presentations of verbal material, such as word webs and visual organizers
- Use manipulatives to teach or demonstrate concepts

Response Accommodations

- Use sign language, a communication device, Braille, other technology, or native language other than English
- Dictate answers to a scribe
- Capture responses on an audio recorder
- Use a spelling dictionary or electronic spell-checker
- Use a word processor to type notes or give responses in class

Setting Accommodations

- Work or take a test in a different setting, such as a quiet room with few distractions
- Sit where he learns best (for example, near the teacher & away from distractions)
- Use special lighting or acoustics
- Take a test in small group setting
- Use sensory tools such as an exercise band that can be looped around a chair's legs (so fidgety kids can kick it and quietly get their energy out)
- Use noise buffers such as headphones, earphones, or earplugs

Timing Accommodations

- Take more time to complete a task or a test
- Have extra time to process oral information and directions
- Take frequent breaks, such as after completing a task

Scheduling Accommodations

- Take more time to complete a project
- Take a test in several timed sessions or over several days
- Take sections of a test in a different order
- Take a test at a specific time of day

Organization Skills Accommodations

- Use an alarm to help with time management
- Mark texts with a highlighter

Assignment Modifications

- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum Modifications

- Learn different material (such as continuing to work on the core skill such as an opening sentence, 3 detailed reasons and a closing sentence, whole others move ahead to an extension concept/skill)
- Get graded or assessed using a different standard than the one for classmate

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Differentiate Instruction, depending on individual student needs (Students with a 504) **by:**

Presentation Accommodations

- Listen to audio recordings instead of reading text

- Work with fewer items per page or line and/or materials in a larger print size
- Use audio amplification device
- Be given a written list of instructions
- Be given a copy of the teacher's notes
- Be given a study guide to assist in preparing for assessments

Response Accommodations

- Use sign language,
- Use a word processor to type notes or give responses in class
- Use a calculator or table of "math facts"

Setting Accommodations

- Work or take an assessment in a different setting
- Take a test in a small group setting
- Use sensory tools such as an exercise band
- Use noise buffers such as headphones, earphones, or earplugs

Timing Accommodations

- Have extra time to process oral information and directions
- Take frequent breaks, such as after completing a task

Scheduling Accommodations

- Take more time to complete a project
- Take sections of a test in a different order

Organization Skills Accommodations

- Use an alarm to help with time management
- Mark texts with a highlighter
- Have help coordinating assignments in a book or planner
- Receive study skills instruction

Assignment Modifications

- Complete fewer or different tasks
- Write shorter responses
- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum Modifications

- Get graded or assessed using a different standard than the one for classmates

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Subject Area: Science **Grade Level:** 3	
Unit 4: Life Cycles and Traits	
Dates: Marking period 4 June (Rotate with Social Studies Unit)	**Time Frame:** June

Overview

In this unit, students explore the traits of diverse organisms and how those traits are affected by both inheritance and the environment. This unit is split into two parts: traits and survival of

species, and life cycles of plants and animals. First, students take a look at traits to understand inherited traits and how the environment can affect traits. Students also explore the survival abilities of certain species. Next, students examine the life cycles of plants, vertebrates, and invertebrates. Based on what they know about life cycles and traits, students report in their findings for an article and infographic.

Essential Questions	**Enduring Understandings**
● Why do baby animals look like their parents but not like another type of animals' parents? ● Why do offspring look similar to their parents? ● How does the environment affect traits? ● How are traits affected by both inheritance and the environment? ● Why do some members of a species survive and not others? ● What are the life cycle of plants? ● What are the life cycles of animals with backbones? ● What are the life cycles of animals without backbones?	● Different animal and plant species exist ● Species have traits and produce offspring ● Animals and plants pass on traits ● Offspring are similar to their parents ● Offspring can be different from their parents ● Offspring do not always look identical to their parents. ● Plants and animals of a species can have traits that are not the same as their parents. Some traits are inherited, some are not. ● An organism can gain or lose traits during its lifetime. A plant might turn from green to brown. A human might get taller and stronger. ● The environment affects an organism's traits. ● A learned behavior is a trait that an organism is not born knowing. It learns from its environment and changes its behavior. ● In both plants and animals, traits are passed onto offspring through genes. ● Many characteristics of organisms are affected by both their genes and their environment. ● Camouflage is one trait that helps animals survive. ● Scientists conduct many trials (rounds) of an experiment to find evidence for a pattern. Conducting only one or two rounds can lead to an incorrect explanation. ● A life span is how long an organism typically lives. Some plants live for longer than others. ● Many adult plants produce seeds. ● A life cycle describes the pattern of change that a species goes through in its life. ● Animals with backbones are grouped together as vertebrates. Vertebrates include mammals, birds, fish, reptiles, and amphibians. ● Most baby mammals grow and develop inside their mother's body. The mother then gives birth. Offspring are born, then grow into adults. ● Birds lay eggs and so do many kinds of reptiles and fish. Offspring hatch from the eggs, grow, reproduce, and eventually die. ● An amphibian's life cycle would include metamorphosis, or a large change in body shape, like a tadpole developing legs as it becomes an adult frog. ● Butterflies, dragonflies, and lobsters all go through metamorphosis. Butterflies start as eggs. Next, they hatch

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	into larvae (also called caterpillars). Then, they turn into pupae (also called a chrysalis). Finally, they emerge as adult butterflies able to mate and reproduce. Eventually, butterflies die. ● Life cycles have different details. However, they always have birth, growth, reproduction, and death stages.

Skill and Knowledge Objectives

SWBAT:

- Students make sense of phenomena using logical reasoning when they analyze a set of images to identify offspring and compare similarities and differences in traits among species.
- Students observe that some trees lose their leaves while others stay green as they examine how some characteristics of organisms are influenced by both their inheritance and their environment.
- Students use evidence to explain how differences in a trait can help an individual organism survive and reproduce. They explain why white squirrels are rare.
- Students discover that some plants, like the tomato plant, form fruits with seeds inside as they find out about the growth and development of organisms.
- Students observe patterns to analyze and select visuals to enhance their presentations on the life cycle of a specific animal.
- Students observe live butterflies to examine patterns of change and then predict, and research, the life cycle of a moth.

Assessments

Pre-Assessment:

- Utilize pre-assessment questions at the beginning of each lesson
    - Example- Lesson 1 - Think of what you already know about how offspring look like their parents. Write what questions you have.

Formative Assessment:

- After completing book reading, use “My Science Concepts” pages in the lesson book to discuss understanding on a scale from “Still Learning” to “Know It”.
    - Reflect on your understanding. Draw an X along each line.
- Exit tickets
- Thumbs up, down, sideways

Self-Reflection/Self-Assessment:

- Utilize “Check for Understanding” pages and questions in textbook at end of each lesson
    - Example: Lesson 1 - Check for Understanding: Show What You Know- Explain how you predicted which image is the offspring. Use these terms in your answer: species, trait, and inherited.

Summative Assessment:

- Utilize Lesson Assessments in each lesson for lessons 1-7
- Unit Closers

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- Performance Assessment: Writing for Science Monthly
- Performance Assessment: Creating Infographics on Life Cycles

Suggested modifications for assessment

- IEP / 504 / Intervention - Assess students on knowledge rather than ELA skills
  - Make graphic organizers for assessments
  - Allow students to use textbook and notes to demonstrate understanding
  - Eliminate longer sentence writing / reflections
  - Orally ask questions and orally accept assessment responses to assess knowledge
  - Provide students with choices about how they would like to demonstrate learning
- Enrichment
  - Allow students to further reflect on science topics through writing, projects, presentations
  - Utilize differentiated TCI assessments to create more challenge to higher level students

Resources

- TCI Teacher Manual
- TCI Teacher Log in
- TCI Interactive Student Workbooks - Unit 4 - Life Cycles and Traits
- Complete Lesson Guide
- TCI Kit Materials for Unit 4 Lessons
- https://www.nextgenscience.org/understanding-standards/understanding-standards
- Assessments Lessons 1-7
- Lesson games
- Vocabulary Cards
- Culturally Responsive Education with TCI Brings Science Alive k-8

Standards

Next Generation Science Standards
Performance Expectation
3-LS4-2 Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. **3-LS3-1** Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. **3-LS3-2** Use evidence to support the explanation that traits can be influenced by the environment. **3-LS1-1** Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

Science and Engineering Practices
Constructing Explanations and Designing Solutions

- Use evidence (e.g., measurements, observations, patterns) to construct or support an

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explanation or design a solution to a problem.

Analyzing and Interpreting Data

- Compare and contrast data collected by different groups in order to discuss similarities and differences in their findings.
- Analyze and interpret data to make sense of phenomena, using logical reasoning, mathematics, and/or computation.
- Represent data in tables and/or various graphical displays (bar graphs, pictographs, and/or pie charts) to reveal patterns that indicate relationships.

Developing and Using Models

- Develop and/or use models to describe and/or predict phenomena.
- Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution.
- Identify limitations of models.

Obtaining, Evaluating, and Communicating Information

- Communicate scientific and/or technical information orally and/or in written formats, including various forms of media and may include tables, diagrams, and charts.
- Combine information in written text with that contained in corresponding tables, diagrams, and/or charts to support the engagement in other scientific and/or engineering practices.

Crosscutting Concepts
Structure and Function

- Substructures have shapes and parts that serve functions.

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change.

Patterns

- Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena and designed products.
- Patterns of change can be used to make predictions.
- Patterns can be used as evidence to support an explanation.

Disciplinary Core Ideas
LS4.B: Natural Selection

- Sometimes the differences in characteristics between individuals of the same species provide

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advantages in surviving, finding mates, and reproducing.

LS3.A: Inheritance of Traits

- Many characteristics of organisms are inherited from their parents.
- Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment.

LS3.B: Variation of Traits

- Different organisms vary in how they look and function because they have different inherited information.
- The environment also affects the traits that an organism develops.

LS1.B: Growth and Development of Organisms

- Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles.

Connections to Nature of Science
Science Knowledge Is Based on Empirical Evidence

- Science findings are based on recognizing patterns.

Complete NGSS Correlations

ELA Standards
Reading
Key Ideas and Details

- CC.3.R.I.2 Determine the main idea of a text; recount the key details and explain how they support the main idea.
- CC.3.R.I.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.

Integration of Knowledge and Ideas

- CC.3.R.I.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).

Writing
Text Types and Purposes

- CC.3.W.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- CC.3.W.3 Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.

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Research to Build and Present Knowledge

- CC.3.W.8 Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.
- CC.3.W.7 Conduct short research projects that build knowledge about a topic.

Speaking and Listening

Comprehension and Collaboration

- CC.3.SL.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

Presentation of Knowledge and Ideas

- CC.3.SL.5 Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details.

NJSLS Standard 8 Computer Science and Design Thinking

- 8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models

NJSLS Standard 9.1, 9.2, 9.4 Career Readiness, Life Literacies, and Key Skills

- 9.1.5.CR.1: Compare various ways to give back and relate them to your strengths, interests, and other personal factors
- 9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes
- 9.4.5.CI.1: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions.

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Life Cycles and Traits
Unit 4- Life Cycles and Traits
Each lesson includes reading and activities and will take 3-4 days to complete

Lesson 1: Why	**Lesson 2**: How	**Lesson 3**: How	**Lesson 4**:Why	**Lesson 5**: What

Do Offspring Look Similar to Their Parents? Lesson 1 Guide **Materials**: • Handout A: Sorting Mammals • Handout B: Sorting Plants • Handout C: Sorting Invertebrates • Interactive Student Notebook • Notebook Answer Key • Science Journal • Spanish Handout A: Sorting Mammals • Spanish Handout B: Sorting Plants • Spanish Handout C: Sorting Invertebrates • Spanish: Interactive Student Notebook	Does the Environment Affect Traits? Lesson 2 Guide **Materials** • Interactive Student Notebook • Notebook Answer Key • Science Journal • Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Essential Question** *How does the environment affect traits?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain	Are Traits Affected by Both Inheritance and the Environment? Lesson 3 Guide **Materials**: • Handout: Puzzle Pieces • Interactive Student Notebook • Notebook Answer Key • Science Journal • Spanish Handout: Puzzle Pieces • Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Essential Question** *How are traits affected by both inheritance and the environment?* **Observing Phenomena** We will start by analyzing a photo. Then	Do Some Members of a Species Survive and Not Others? Lesson 4 Guide **Materials**: • Bin, plastic, shoe box size • Newspaper • Paper, butcher, black • Paper, butcher, white • Paper, construction, black • Paper, construction, white • Scissors • Stopwatch **Print** • Extension Handout • Handout: Moth Template • Interactive Student Notebook • Notebook Answer Key • Science Journal • Spanish Handout: Moth Template	Are the Life Cycles of Plants? Lesson 5 Guide **Materials**: • Cup, plastic • Seeds, sunflower **Print** • Handout: Sunflower Life Cycle Stages • Interactive Student Notebook • Notebook Answer Key • Science Journal • Spanish Handout: Sunflower Life Cycle Stages • Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Essential Question**

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• Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Essential Question** *Why do offspring look similar to their parents?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** You will observe traits to sort organisms by species. You will also look for inherited traits in order to match parents with their offspring. [40 min] **Making Sense of the**	by the end of the lesson. [5-10 min] **Investigation** You will analyze a series of photographs showing plants and animals, including humans, in their environments. Pairs will use visual clues in each image to explain how the organisms' traits have been changed by the environment. [30 min] **Making Sense of the Phenomenon** Finally, you will find and provide evidence to support the claim that an organism's traits can be influenced by the environment. [10-15 min] **Video Lesson Extension**: Super Simple Science- Some wild animals learn to live in cities.	you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** You will interpret flowcharts showing how plant and animal traits are influenced by both their inheritance and their environment. [45 min] **Making Sense of the Phenomenon** Finally, you will read a paragraph about tree frogs and create a flowchart that explains the influence of both inheritance and the environment on their traits. [10-15 min] **Video Lesson Extension**: Super Simple Science- A dog's traits are	• Spanish: Interactive Student Notebook • Spanish: Science Journal • Super Simple Science • Lesson Guide **Activities**: **Essential Question** *Why do some members of a species survive and not others?* **Observing Phenomena** We will start by analyzing a photograph. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** You will play a game that simulates birds hunting moths. You will gather data during the game. These data will help	*What are the life cycles of plants?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** You will use your bodies to model the birth, growth, reproduction, and death of a sunflower. [60 min] **Making Sense of the Phenomenon** Finally, you will write a story about the life of a sunflower seed. [10-15 min] **Video Lesson Extension**: Super Simple Science- Scientists climb to the high treetops to study the life cycles of plants in the

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Phenomenon Finally, you will analyze a set of images to identify offspring and compare similarities and differences in traits among species. [10-15 min] **Video Lesson Extension**: <u>Super Simple Science-</u> A lion cub has many of the same traits that its parents have. But many people believe that the cub is cuter than an adult. Are baby animals cuter?	What wild animals live near you?	determined by both its genes and the environment. What traits are important in a sled dog?	you construct an explanation for why some moths have a better chance of surviving than others. [60 min] **Making Sense of the Phenomenon** Finally, you will use evidence to explain how differences in a trait can help an individual organism survive and reproduce. [10-15 min] **Video Lesson Extension**: <u>Super Simple Science-</u> Scientists use tools that safely collect data about animals in the wild. How can you design an animal spy camera?	rainforest. What are some other places scientists go to study plants?
Lesson 6: What Are the Life Cycles of Animals with Backbones? <u>Lesson 6 Guide</u> **Materials**: ● Device to create audio	**Lesson 7**: What Are the Life Cycles of Animals Without Backbones ? <u>Lesson 7 Guide</u> **Materials**: ● Coupon, Butterfly larvae,			

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recordings **Print** ● Extension Handout ● Handout A: Vertebrate Life Cycle Descriptions ● Handout B: Vertebrate Life Cycle Images ● Interactive Student Notebook ● Notebook Answer Key ● Science Journal ● Spanish Handout A: Vertebrate Life Cycle Descriptions ● Spanish Handout B: Vertebrate Life Cycle Images ● Spanish: Interactive Student Notebook ● Spanish: Science Journal ● Super Simple Science ● Lesson Guide **Activities**: **Essential**	etc ● Gloves, disposable ● Glue (SDS) ● Magnifying glass **Print** ● Extension Handout ● Handout: Comparing Life Cycles ● Interactive Student Notebook ● Notebook Answer Key ● Science Journal ● Spanish Handout: Comparing Life Cycles ● Spanish: Interactive Student Notebook ● Spanish: Science Journal ● Super Simple Science ● Lesson Guide **Activities**: **Essential Question** *What are the life cycles of*			

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Question *What are the life cycles of animals with backbones?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** You will work in groups to write, record, and present a story about the life cycle of a specific animal. You will select visuals to enhance your presentation. [150 min] **Making Sense of the Phenomenon** Finally, you will create a new animal and predict what its life cycle might	*animals without backbones?* **Observing Phenomena** We will start by analyzing a photo. Then you'll be introduced to the lesson phenomenon, which you will be able to explain by the end of the lesson. [5-10 min] **Investigation** You will model, and then observe, the life cycle of a butterfly. You will compare this model to the life cycles of plants and animals with backbones. [185 min] **Making Sense of the Phenomenon** Finally, you will predict, and then research, the life cycle of a moth. [10-15 min] **Video Lesson Extension**: Super Simple			

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be like. [10-15 min] **Video Lesson Extension**: <u>Super Simple Science-</u> Jane Goodall discovered that chimps make and use tools like humans do. She wondered if there were other ways that chimps were like humans. She asked questions. What questions would you answer if you were a scientist?	<u>Science-</u> The immortal jellyfish is one of the millions of cool phenomena in the world. Think back to what you have learned in science. What else do you want to know about?			

Differentiate Instruction by:
<u>http://www.sde.com/Timely-Topics/DI-Assessment-Intervention</u>

Differentiate Instruction, depending on needs (students with an IEP, MLL/ELL Students; Students At Risk; Gifted Students)

1. **ELA/ELD Connections**

Support students who need additional guidance and structure with reading, writing, or vocabulary development with ELA/ELD Connections. Make these toolkits available to your students as an independent tutorial, for class instruction, or for use with peer tutoring. Learn more about **Strategies for Integrating Language Arts.**

- **ELA/ELD Connections: Reading Skills**
- **ELA/ELD Connections: Writing Skills**
- **ELA/ELD Connections: Speaking and Listening Toolkit**
- **ELA/ELD Connections: Vocabulary Skills**

Suggestions for how to use these pages are provided at point-of-use throughout the Lesson Guides.

2. **<u>Differentiating Instruction</u>**

Lesson Guides include step-by-step suggestions for meeting the needs of English Learners, students below grade level in reading and writing, special education students, and advanced learners within the context of whole class instruction and with minimal modifications needed on the teacher's part. For more support, see **Best Practices for**

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Differentiating Instruction.

3. **Reading Support**

The Student Text and Interactive Student Notebook has built-in support for emerging to advanced readers. Learn more about **Literacy in Science.**

- **Reading Support Buttons** allow students to change the text reading level, highlight main ideas, or use text-to-speech audio.
- **Considerate Text** has a single-column layout, section titles, and subheads that divide content into meaningful and manageable chunks, carefully structured paragraphs with topic sentences and supporting details, images that are carefully chosen to support the text, and captions that incorporate main ideas. Learn more about **Considerate Text features.**
- **Vocabulary** is introduced in the Introduction and then defined in-line to support reading fluency. Glossary assists students with essential terms.
- **Lesson Summaries** succinctly review main concepts.
- **The graphically organized notebook** helps students record and remember what they read.

Writing Accommodations

- Use highlighted handwriting paper to help with writing legibility
- Use flat marbles for multisensory finger spacing
- Use a sentence stem and have the student complete the stem
- Use a visual writing checklist so the student knows what is expected next in the lesson

Presentation Accommodations

- Use alternate texts at lower readability level
- Work with fewer items per page or line and/or materials in a larger print size
- Use magnification device, screen reader, or Braille / Nemeth Code
- Use audio amplification device (e.g., hearing aid(s), auditory trainer, sound-field system (which may require teacher use of microphone)
- Be given a written list of instructions
- Be given an outline of a lesson
- Be given a copy of the teacher's notes
- Be given an example to assist in preparing for assessments
- Use visual presentations of verbal material, such as word webs and visual organizers
- Use manipulatives to teach or demonstrate concepts

Response Accommodations

- Use sign language, a communication device, Braille, other technology, or native language other than English
- Dictate answers to a scribe
- Capture responses on an audio recorder
- Use a spelling dictionary or electronic spell-checker
- Use a word processor to type notes or give responses in class

Setting Accommodations

- Work or take a test in a different setting, such as a quiet room with few distractions
- Sit where he learns best (for example, near the teacher & away from distractions)

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- Use special lighting or acoustics
- Take a test in small group setting
- Use sensory tools such as an exercise band that can be looped around a chair's legs (so fidgety kids can kick it and quietly get their energy out)
- Use noise buffers such as headphones, earphones, or earplugs

Timing Accommodations

- Take more time to complete a task or a test
- Have extra time to process oral information and directions
- Take frequent breaks, such as after completing a task

Scheduling Accommodations

- Take more time to complete a project
- Take a test in several timed sessions or over several days
- Take sections of a test in a different order
- Take a test at a specific time of day

Organization Skills Accommodations

- Use an alarm to help with time management
- Mark texts with a highlighter

Assignment Modifications

- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum Modifications

- Learn different material (such as continuing to work on the core skill such as an opening sentence, 3 detailed reasons and a closing sentence, whole others move ahead to an extension concept/skill)
- Get graded or assessed using a different standard than the one for classmate

Differentiate Instruction, depending on individual student needs (Students with a 504) **by:**

Presentation Accommodations

- Listen to audio recordings instead of reading text
- Work with fewer items per page or line and/or materials in a larger print size
- Use audio amplification device
- Be given a written list of instructions
- Be given a copy of the teacher's notes
- Be given a study guide to assist in preparing for assessments

Response Accommodations

- Use sign language,
- Use a word processor to type notes or give responses in class
- Use a calculator or table of "math facts"

Setting Accommodations

- Work or take an assessment in a different setting
- Take a test in a small group setting
- Use sensory tools such as an exercise band
- Use noise buffers such as headphones, earphones, or earplugs

Timing Accommodations

- Have extra time to process oral information and directions
- Take frequent breaks, such as after completing a task

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Scheduling Accommodations

- Take more time to complete a project
- Take sections of a test in a different order

Organization Skills Accommodations

- Use an alarm to help with time management
- Mark texts with a highlighter
- Have help coordinating assignments in a book or planner
- Receive study skills instruction

Assignment Modifications

- Complete fewer or different tasks
- Write shorter responses
- Answer fewer or different test questions
- Create alternate projects or assignments

Curriculum Modifications

- Get graded or assessed using a different standard than the one for classmates

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