Earth and Space Science- Water and Climate

Content Area: **Science**
Course(s): **Grade 3**
Time Period: **First Trimester**
Length: **12 Weeks**
Status: **Published**

Unit Overview

Water is the most important substance on Earth. Water dominates the surface of our planet, changes the face of the land, and defines life. Weather is driven by the Sun and involves the movement of water over the earth through evaporation, condensation, precipitation, and runoff – the water cycle. Climate is determined in part by the amount of precipitation in a region and by temperature fluctuations. Human societies depend on water, and new technologies are being engineered to conserve and protect this natural resource, to provide for the needs of people around the world.

These powerful persuasive ideas are introduced to students in this unit. It provides students with experiences to explore the properties of water, the water cycle and weather, interactions between water and other earth materials, and how humans use water as a natural resource. Students engage in science and engineering practices in the context of water, weather, and climate and explore the crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; and systems and system models. They are introduced to the nature of science, how science affects everyday life, and the influence of engineering, technology, and science on society and the natural world.

STAGE 1- DESIRED RESULTS

Educational Standards

2020 New Jersey Student Learning Standards- Science

Performance Expectations

Physical Sciences

SCI.3-PS2	Motion and Stability: Forces and Interactions
SCI.3-PS2-4	Define a simple design problem that can be solved by applying scientific ideas about magnets.
SCI.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.
SCI.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.
SCI.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.

Life Sciences

SCI.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.
SCI.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.
SCI.3-LS1	From Molecules to Organisms: Structures and Processes
SCI.3-LS4	Biological Evolution: Unity and Diversity
SCI.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.
SCI.3-LS4-1	Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.
SCI.3-LS2	Ecosystems: Interactions, Energy, and Dynamics
SCI.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.
SCI.3-LS2-1	Construct an argument that some animals form groups that help members survive.
SCI.3-LS3	Heredity: Inheritance and Variation of Traits
SCI.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.
SCI.3-LS3-2	Use evidence to support the explanation that traits can be influenced by the environment.

Earth and Space Sciences

SCI.3-ESS2-1	Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.
SCI.3-ESS2-2	Obtain and combine information to describe climates in different regions of the world.
SCI.3-ESS3	Earth and Human Activity
SCI.3-ESS2	Earth's Systems
SCI.3-ESS3-1	Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.

Engineering Design

SCI.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.
SCI.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.
SCI.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.

Science and Engineering Practices

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

Cross Cutting Concepts

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

Disciplinary Core Ideas

Physical Sciences

- PS1. Matter and Its Interaction
- PS1.A: Structure and Properties of Matter

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

Life Sciences

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

Earth and Space Sciences

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

Essential Questions

Investigation 1: Water Observations

Part 1: What happens when water falls on different surfaces?

Part 2: How does water move on a slope?

Part 3: How much water can a dry sponge soak up?

Part 4: What happens outdoors when rain falls on natural materials?

Investigation 2: Hot Water, Cold Water

Part 1: How can you measure temperature accurately?

Part 2: What happens to water when it gets hot? cold?

Part 3: What happens when hot or cold water is put into room-temperature water?

Part 4: How does water change when it gets really cold?

Part 5: Where should an animal go to stay warm or to stay cool?

Investigation 3: Weather and Water

Part 1: What does the weather forecast tell us?

Part 2: What happens to wet paper towels overnight?

Part 3: How does surface area affect evaporation?

Part 4: What else affects how fast water evaporates?

Part 5: What causes moisture to form on the side of a cup?

Investigation 4: Seasons and Climate

Part 1: What are typical weather conditions in our region?

Part 2: How do we describe different climates?

Part 3: How do people deal with natural hazards such as floods?

Investigation 5: Waterworks

Part 1: What happens when water is mixed with other earth materials?

Part 2: Do soils in the schoolyard drain water at the same rate?

Part 3: What is needed to make a waterwheel system function well?

Enduring Understanding

This earth and space unit develops students' understanding of how: 1) And why Earth is constantly changing; 2) Earth's processes and human activities affect each other; and 3) To explain the structure, properties, and interactions of matter.

Students will know…

VOCABULARY

Investigation 1: Water Observations

absorb, bead, bead up, data, direction, dome, earth material, evidence, gravity, move, natural material, observation, opinion, relationship, repel, slope, surface, waterproof

Investigation 2: Hot Water, Cold Water

bulb, cold, contract, Degree Celsius °C, expand, float, freeze, hot, less dense, liquid, mass, melt, more dense, sink, solid, state, temperature, thermometer, volume

Investigation 3: Weather and Water

compass, condensation, evaporation, forecast, gas, meteorologist, meteorology, precipitation, rain gauge, surface area, water cycle, water vapor, weather, wind vane

Investigation 4: Seasons and Climate

blizzard, climate, climatologist, drought, embankment, flood, floodplain, hailstorm, hurricane, lighting, monsoon, natural hazard, season, sluice gate, tornado, typical, wetland

Investigation 5: Waterworks

blade, constraint, criteria, criterion, drainage, energy, gravel, humus, load, natural resource, nonrenewable resource, renewable resource, retain, shaft, soil, system, water retention, waterwheel

Students will be able to...

Investigation 1: Water Observations

- Develop and use models to describe interactions of water drops with materials in the designed and natural worlds.
- Plan and carry out investigations dealing with the effect of slope and the effect of drop size on the speed that water drops move.
- Analyze and interpret data to compare how water drops interact with materials, compare the movement of drops of water on a slope, and determine the amount of water a dry sponge with soak up.
- Construct explanations using evidence to describe interactions of water drops with natural and designed materials, and how drops travel on slopes.
- Engage in argument from evidence about the methods and results of collaborative investigation on how much water a dry sponge soaks up.
- Obtain, evaluate, and communicate information about the properties and distribution of water, and the human impact on water.

Investigation 2: Hot Water, Cold Water

- Ask questions about what happens to water when it gets very, very cold.
- Develop and use models to describe how a thermometer works.
- Plan and carry out investigations to determine the temperature of water, what happens to the temperature of hot and cold water when they mix, and where an animal can go to stay warm (in cold weather) or stay cool (in warm weather).
- Analyze and interpret data to compare temperatures of samples of water, to observe what happens when water gets really cold, and to find out how to keep an ice cube from melting or to prevent water from freezing (depending on the outdoor conditions).
- Construct explanations using evidence to explain observations of a model thermometer, the behavior of water at different temperatures and the behavior of ice in room-temperature water.
- Engage in argument from evidence about the reasons for using standard units to measure and report temperature.
- Obtain, evaluate, and communicate information about the properties and distribution of ice in glaciers and icebergs.

Investigation 3: Weather and Water

- Ask questions about the moisture that forms (condenses) on the outside of a cup.
- Develop and use models to describe how the processes of evaporation and condensation work.
- Plan and carry out investigations to organize weather forecasts and compare the data to observed and actual weather data, and to determine the variables involved in evaporation (surface area and temperature).
- Analyze and interpret data to compare forecast and observed weather data, to explore the cause-and-effect relationships between amount of evaporation and variables of surface area and temperature.
- Construct explanations using evidence to explain how evaporation, condensation, and precipitation are the main processes in the water cycle.
- Engage in argument from evidence concerning the processes of evaporation and condensation.
- Obtain, evaluate, and communicate information about weather instruments and how meteorologists collect data.

Investigation 4: Seasons and Climate

- Analyze and interpret data to describe the typical seasonal weather for their region in order to determine climate.
- Construct explanations using evidence to explain how climate regions are described and to compare how regions are the same and different.
- Obtain, evaluate, and communicate information about climate and ways to reduce the impact of natural hazards.

Investigation 5: Waterworks

- Ask questions that could be tested about how water and earth materials interact.
- Plan and carry out investigations to find out how water and different kinds of soil interact in classroom investigations and in the schoolyard; make observations about the functioning of waterwheels to serve as test data.
- Analyze and interpret data to compare how water moves through soil and to evaluate and refine the design of a waterwheel.
- Construct explanations using evidence to explain how the properties of different kinds of soil promote or impede drainage or to evaluate the design of a waterwheel, based on the criteria of the number of syringes of water to

lift a load 1 m. Design solutions to build a functional waterwheel.

- Engage in argument from evidence about the process described for purifying water.
- Obtain, evaluate, and communicate information about water as a natural resource generally and about specific local water resources.

STAGE 2- EVIDENCE OF LEARNING

Formative Assessment Suggestions

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

Authentic Assessments Suggestions

Investigation 1: Water Observations

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

Investigation 2: Hot Water, Cold Water

- Science notebook entries
- Performance assessment
- Response sheet
- Investigation 2 I-check

Investigation 3: Weather and Water

- Science notebook entries
- Performance assessment
- Response sheet
- Investigation 3 I-check

Investigation 4: Seasons and Climate

- Science notebook entries
- Investigation 4 I-check

Investigation 5: Waterworks

- Science notebook entries
- Performance assessment

Response sheet

Benchmark Assessments

Unit Post Teste

STAGE 3- LEARNING PLAN

Instructional Map

Investigation 1: Water Observations

Investigation 2: Hot Water, Cold Water

Investigation 3: Weather and Water

Investigation 4: Seasons and Climate

Investigation 5: Waterworks

Investigation 1: Water Observations

Investigation 1: Part 1 – Drops of Water

Students conduct investigations to observe the properties of water, an important earth material. They compare how water drops interact with four materials: paper towel, wax paper, aluminum foil, and writing paper. Students observe that water soaks into absorbent materials and forms dome-shaped beads on waterproof materials.

Content:

- Water forms beads on waterproof materials and soaks into absorbent materials.

Investigation 1: Part 2 – Water on a Slope

Students use droppers to make water domes and observe the domes' behavior on a sloped surface. During a series of investigations, students observe that water domes always move downhill, and that size and angle of slope affect the speed at which domes move down a slope.

Content:

- Water moves downhill.
- Large water domes move faster down a slope than smaller domes.

- The steeper the slope of a surface the faster a water dome moves.

Investigation 1: Part 3 – Soaking Sponges

Students are challenged to measure how much water a dry sponge can soak up. This can be determined by measuring mass, volume, or both. Students develop their own procedures to answer this question.

Content:

- Water forms beads on waterproof materials and soaks into absorbent materials.

Investigation 1: Part 4 – Water in Nature

Students go outdoors to collect small samples of natural materials, including living and dead plant material and earth materials. They put drops of water on the materials to simulate rain and observe what happens.

Content:

- Water forms beads on waterproof materials and soaks into absorbent materials.

Investigation 2: Hot Water, Cold Water

Investigation 2: Part 1 – Measuring Temperature

Students compare the temperature of three cups of water, using their fingers as gauges. They realize that a standard is needed, as well as a more accurate device to measure temperature. Students are introduced to the tool used for measuring temperature, the thermometer.

Content:

- Temperature is a measure of how hot matter is.
- The metric unit for temperature is the degree Celsius (°C).
- Water freezes at 0°C and boils at 100°C.
- Thermometers measure temperature.

Investigation 2: Part 2 – Build a Thermometer

Students build a thermometer and conduct investigations to find out what happens when the thermometer is placed first in hot water and then in cold water. They learn that water expands when it is heated and contracts when it is cooled.

Content:

- Water expands when heated and contracts when cooled.

Investigation 2: Part 3 – Sinking and Floating Water

After observing that some objects sink in water and some float, students are given an operational definition: objects float if they are less dense than water; objects sink if they are more dense. Students lower a vial of hot water and then a vial of cold water into a cup of room-temperature water. They observe that the less-dense water rises (floats), and the more-dense cold water sinks.

Content:

- A material that floats in water is less dense than the water; a material that sinks is more dense.
- Cold water is more dense than warm water.

Investigation 2: Part 4 – Water as Ice

Students freeze water in vials and in syringes to observe that water expands when it freezes. They observe that a volume of liquid water has a greater mass than an equal volume of ice. They predict the behavior of ice in water, and explain the observation that ice floats in liquid water because ice is less dense than water.

Content:

- Water expands when it freezes.
- Ice is less dense than liquid water.

Investigation 2: Part 5 – Ice Outdoors

Students place one ice cube in the sunshine, place a second ice cube in the shade, and bury the third ice cube. They monitor the ice cubes and, by extension, determine the best place for an animal to go to stay warm and to stay cool. Students compare above-ground melting to underground melting. In cold-weather locations (temperatures below freezing), students do an alternative activity with water to determine how an animal can keep from freezing.

Content:

- Ice melts when heated; water freezes when cooled.

Investigation 3: Weather and Water

Investigation 3: Part 1 – Measuring Weather

Students compare weather to data that they observe and collect to meteorologists' forecasts and historical data. Students watch a video about how meteorologists make their forecasts. They review local weather, forecasts, and records set in previous years. Students take turns collecting local weather data to compare to the forecasts and records.

Content:

- Weather is measured using observation and tools such as thermometers, wind vanes, and rain gauges.

Investigation 3: Part 2 – Evaporation

Students observe a demonstration in which two paper towels are soaked in equal amounts of water and then put in cups

on a balance. One cup is open to air, and the other is closed. A day later, the towel in the open cup is dry. Students learn that things dry because of evaporation.

Content:

- Evaporation is the process by which liquid (water) changes into gas (water vapor).

Investigation 3: Part 3 – Surface Area

Students measure equal amounts of water into four containers with different surface areas. After 4 days, students measure the amount of water remaining in each container to discover that the greater surface area exposed to air, the greater the amount of evaporation.

Content:

- The larger the surface area of a volume of water that is exposed to air, the greater the rate of evaporation.
- Moving air (wind) increases the rate of evaporation.

Investigation 3: Part 4 – Evaporation Locations

Students measure equal amounts of water into four cups, place the cups in four different locations, and monitor temperatures for 4 days. They measure the amount of water remaining in the cups to discover the warmer environments promote more evaporation.

Content:

- As temperature increases, the rate of evaporation increases.

Investigation 3: Part 5 – Condensation

Students set up cups of ice water and room-temperature water, and observe condensation on the ice-water cup. They learn that water vapor in the air condenses into a liquid on cold surfaces. They water cycle is introduced.

Content:

- Condensation is the process by which gas (water vapor) changes into liquid (water).
- Condensation occurs on a cool surface.

Evaporation and condensation contribute to the movement of water through the water cycle.

Investigation 4: Seasons and Climate

Investigation 4: Part 1 – Seasonal Weather

The class analyzes local daily weather data for 4 months of the pervious school year (January, April, July, and October). Each group works with a 2-week period in one of those 4 months to come up with a description for the weather during that period. The data categories for each day include condition, high temperature, low temperature, and precipitation. The average data for that day are also presented. Students grapple with what data to use and how to organize the data to extract meaning from them.

Content:

- Typical weather in a region often varies with seasons. High and low temperatures and amount of precipitation are the main ways to describe seasonal weather changes.

Investigation 4: Part 2 – Describing Climate

Students are introduced to climate and suggest schemes for describing world climate regions, based on their understanding of weather. They view a video to gather information on climate and compare their climate-region scheme to those of climatologists.

Content:

- The Sun's energy drives weather.
- Climate is the average or typical weather that can be expected to occur in a region of Earth's surface, based on

long-term observation and data analysis.

Investigation 4: Part 3 – Weather-Related Natural Hazards

Through video and readings, students are introduced to ways that people manage the natural hazards associated with floods. Students discuss engineering methods to deal with floods and droughts.

Content:

- Weather-related natural hazards include tornadoes, hailstorms, blizzards, lightning, floods, and drought.
- People often modify their homes and their way of life to deal with floods.
- Wetland protection and restoration is one way to prevent floods.

Investigation 5: Waterworks

Investigation 5: Part 1 – Water in Earth Materials

Students pour equal amounts of water through equal masses of two earth materials, soil and gravel. They measure the amount of water that drains through the earth materials and compare the resulting masses of soil and gravel, using a balance.

Content:

- Soil is rock particles mixed with organic material called humus.
- Soils retain more water than rock particles alone.
- Water drains more easily through some earth materials than through others.

Investigation 5: Part 2 – Water in Soils

Students test the soil in a number of locations in the schoolyard to find out how long it takes each soil to absorb equal amounts of water. Students dig small holes in the ground and fit them with perforated filter cups. They time how long it takes for 100 mL of water to drain into the soil. Students consider which soils are best for plant growth.

Content:

- Water drains more easily through some earth materials than through others.

Investigation 5: Part 3 – Waterwheels

Students are presented with an engineering challenge to design and construct simple waterwheels. They use water to power their waterwheels to lift or pull objects. Students consider which features are necessary to make the waterwheel work, and what the function of each part of the system serves. They refine their designs with each trial and determine how many syringes of water it takes to move an object a specified distance.

Content:

- The energy of flowing water can be used to do work.
- Waterwheels are machines powered by flowing water.

Modifications/Differentiation of Instruction

Differentiation Strategies for Special Education Students

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

- Define key vocabulary, multiple-meaning words, and figurative language.
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Ability to work at their own pace
- Present ideas using auditory, visual, kinesthetic, & tactile means
- Provide graphic organizers and/or highlighted materials
- Strategy and flexible groups based on formative assessment
- Differentiated checklists and rubrics, if available and appropriate

Differentiation Strategies for Gifted and Talented Students

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

Differentiated Strategies for ELL Students

- Remove unnecessary materials, words, etc., that can distract from the content
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Gradually increase the level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in “chunks”

- Varied texts and supplementary materials, including visuals
- Use technology, if available and appropriate
- Differentiate homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language.
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Allow students to work at their own pace
- Presenting ideas through auditory, visual, kinesthetic, & tactile means
- Role play
- Provide graphic organizers, highlighted materials
- Strategy and flexible groups based on formative assessment

Differentiation Strategies for At Risk Students

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

504 Plans

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

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

Examples of accommodations in 504 plans include:

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

Modification Strategies

- Extended Time
- Frequent Breaks
- Highlighted Text
- Interactive Notebook
- Modified Test
- Oral Directions
- Peer Tutoring
- Preferential Seating
- Re-Direct
- Repeated Drill / Practice
- Shortened Assignments
- Teacher Notes
- Tutorials

- Use of Additional Reference Material
- Use of Audio Resources

High Preparation Differentiation

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

Low Preparation Differentiation

- Choice of Book / Activity
- Cubing Activities
- Exploration by Interest (using interest inventories)
- Flexible Grouping
- Goal Setting With Student
- Homework Options
- Jigsaw
- Mini Workshops to Extend Skills
- Mini Workshops to Re-teach
- Open-ended Activities
- Think-Pair-Share by Interest

- Think-Pair-Share by Learning Style
- Think-Pair-Share by Learning Style
- Think-Pair-Share by Readiness
- Use of Collaboration
- Use of Reading Buddies
- Varied Journal Prompts
- Varied Product Choice
- Varied Supplemental Materials
- Work Alone / Together

Horizontal Integration- Interdisciplinary Connections

New Jersey Student Learning Standards for Mathematics

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

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

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

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

A-SSE.A. Interpret the structure of expressions

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

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

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

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

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

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

F-IF.C. Analyze functions using different representations

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

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

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

S-ID.C. Interpret linear models.

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

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

English Language Arts Standards – Grade 3

RI 1: Ask and answer questions about key details.

RI 2: Identify main topic and retell key details.

RI 3: Describe the connection between two ideas.

RI 4: Ask and answer questions about unknown words.

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

RI 6: Distinguish their own point of view from that of the author of the text.

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

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

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

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

SL 1: Participate in collaborative conversations.

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

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

SL 4: Describe with details.

SL 5: Add drawings or other visual displays to recounts of experiences.

L 4: Determine or clarify the meaning of unknown or multiple meaning words and phrases.

L 4c: Use a known root word as a clue to the meaning of an unknown word.

L 5: Demonstrate understanding of word relationships and nuances in word meanings.

L 6: Use acquired words and phrases.

W 1: Write opinion pieces.

W 2: Write informational text.

W 3: Write narratives.

W 7: Conduct short research projects.

W 8: Recall from experience and gather information from print; take brief notes and sort evidence into provided categories.

RF 3: Apply word analysis skills in decoding words.

RF 4: Read text with purpose and understanding.

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

Computer Science and Design Thinking Practices

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

8.2 Design Thinking

8.2.5.ED.1: Explain the functions of a system and its subsystems. 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. 8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task. 8.2.5.ED.4: Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints). 8.2.5.ED.5: Describe how specifications and limitations impact the engineering design process. 8.2.5.ED.6: Evaluate and test alternative solutions to a problem using the constraints and trade-offs identified in the design process.
8.2.5.ITH.1: Explain how societal needs and wants influence the development and function of

a product and a system. 8.2.5.ITH.2: Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have. 8.2.5.ITH.3: Analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use. 8.2.5.ITH.4: Describe a technology/tool that has made the way people live easier or has led to a new business or career.
8.2.5.NT.1: Troubleshoot a product that has stopped working and brainstorm ideas to correct the problem. 8.2.5.NT.2: Identify new technologies resulting from the demands, values, and interests of individuals, businesses, industries, and societies. 8.2.5.NT.3: Redesign an existing product for a different purpose in a collaborative team. 8.2.5.NT.4: Identify how improvement in the understanding of materials science impacts technologies.
8.2.5.ETW.1: Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems. 8.2.5.ETW.2: Describe ways that various technologies are used to reduce improper use of resources. 8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved. 8.2.5.ETW.4: Explain the impact that resources, such as energy and materials used to develop technology, have on the environment. 8.2.5.ETW.5: Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change.
8.2.5.EC.1: Analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects.

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

Career Readiness, Life Literacies, and Key Skills Practices

CRP.K-12.CRP1	Act as responsible and contributing community members and employee.
CRP.K-12.CRP2	Attend to financial well-being.
CRP.K-12.CRP3	Consider the environmental, social and economic impacts of decisions.

CRP.K-12.CRP4	Demonstrate creativity and innovation.
CRP.K-12.CRP5	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP6	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP7	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP8	Use technology to enhance productivity, increase collaboration and communicate effectively.
CRP.K-12.CRP9	Work productively in teams while using cultural/global competence.

9.2 Career Awareness and Planning

9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes. 9.2.5.CAP.2: Identify how you might like to earn an income. 9.2.5.CAP.3: Identify qualifications needed to pursue traditional and non-traditional careers and occupations. 9.2.5.CAP.4: Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements.

9.4 Life Literacies and Key Skills

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 (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6). 9.4.5.CI.2: Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7). 9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a). 9.4.5.CI.4: Research the development process of a product and identify the role of failure as a part of the creative process (e.g., W.4.7, 8.2.5.ED.6).
9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2). 9.4.5.CT.2: Identify a problem and list the types of individuals and resources (e.g., school, community

agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1). 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems. 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).
9.4.5.DC.1: Explain the need for and use of copyrights. 9.4.5.DC.2: Provide attribution according to intellectual property rights guidelines using public domain or creative commons media. 9.4.5.DC.3: Distinguish between digital images that can be reused freely and those that have copyright restrictions. 9.4.5.DC.4: Model safe, legal, and ethical behavior when using online or offline technology (e.g., 8.1.5.NI.2). 9.4.5.DC.5: Identify the characteristics of a positive and negative online identity and the lasting implications of online activity. 9.4.5.DC.6: Compare and contrast how digital tools have changed social interactions (e.g., 8.1.5.IC.1). 9.4.5.DC.7: Explain how posting and commenting in social spaces can have positive or negative consequences. 9.4.5.DC.8: Propose ways local and global communities can engage digitally to participate in and promote climate action (e.g., 6.3.5.GeoHE.1).
9.4.5.IML.1: Evaluate digital sources for accuracy, perspective, credibility and relevance (e.g., *Social Studies Practice* - Gathering and Evaluating Sources). 9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3). 9.4.5.IML.3: Represent the same data in multiple visual formats in order to tell a story about the data. 9.4.5.IML.4: Determine the impact of implicit and explicit media messages on individuals, groups, and society as a whole. 9.4.5.IML.5: Distinguish how media are used by individuals, groups, and organizations for varying purposes. (e.g., 1.3A.5.R1a). 9.4.5.IML.6: Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions (e.g., RI.5.7, 6.1.5.HistoryCC.7, 7.1.NM. IPRET.5). 9.4.5.IML.7: Evaluate the degree to which information meets a need including social emotional learning, academic, and social (e.g., 2.2.5. PF.5).
9.4.5.TL.1: Compare the common uses of at least two different digital tools and identify the advantages and disadvantages of using each. 9.4.5.TL.2: Sort and filter data in a spreadsheet to analyze findings. 9.4.5.TL.3: Format a document using a word processing application to enhance text, change page formatting, and include appropriate images graphics, or symbols. 9.4.5.TL.4: Compare and contrast artifacts produced individually to those developed collaboratively (e.g., 1.5.5.CR3a). 9.4.5.TL.5: Collaborate digitally to produce an artifact (e.g., 1.2.5CR1d).

Vertical Integration- Discipline Mapping

ESS2: Kindergarten: Trees and Weather; Animals Two by Two

Grade 1: Air and Weather

Grade 2: Pebbles, Sand, and Silt

Grade 3: Water and Climate

Grade 4: Soils, Rocks, and Landforms

Grade 5: Earth and Sun; Living Systems

Grade 6: Weather and Water

Grade 7: Planetary Science

Grade 8: Earth History

ESS3: Kindergarten: Trees and Weather; Animals Two by Two

Grade 3: Water and Climate

Grade 4: Environments

Grade 5: Earth and Sun; Living Systems

Grade 6: Weather and Water

Grade 8: Earth's History

PS1: Grade 1: Sound and Light

Grade 3: Water and Climate; Matter and Motion

Grade 5: Earth and Sun; Mixtures and Solutions

Grade 8: Chemical Interactions

Preparation for high school science courses

Additional Materials

Visit FOSSWEB.com for list of websites, and additional readings.