

# Earth and Space- Air and Weather

Content Area: **Science**  
Course(s): **Grade 1**  
Time Period: **Second Marking period**  
Length: **12 Weeks**  
Status: **Published**

## Unit Overview

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This unit develops students' understanding of how to observe and manipulate air and weather. Students will turn their focus to the sky to make observations that will heighten their awareness, curiosity, and understanding of Earth's dynamic atmosphere and the observable patterns of objects in the sky. Students explore the natural world by using simple instruments and calendars to observe and monitor change.

Students build on the science concepts of weather and how the Sun warms Earth's surface, introduced in kindergarten. They use new tools and methods to enrich observations. Students find out about properties of air by exploring how objects interact with air. Students observe daily changes in air temperature and connect them to the daily movement of the Sun in the sky. They monitor changes in hours of daylight over the seasons and connect them to changing weather conditions. And they find the Moon in the day and night skies and monitor its movement over the month.

Throughout the unit, students engage in science and engineering practices by collecting data and designing and using tools to answer questions. Students gain experiences that will contribute to the understanding of crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; systems and system models; structure and functions; and stability and change.

## STAGE 1- DESIRED RESULTS

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## Educational Standards

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## 2020 New Jersey Student Learning Standards- Science

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## Performance Expectations

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## Physical Sciences

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

## Life Sciences

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SCI.1-LS3-1	Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
SCI.1-LS1-1	Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.
SCI.1-LS3	Heredity: Inheritance and Variation of Traits
SCI.1-LS1	From Molecules to Organisms: Structures and Processes
SCI.1-LS1-2	Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.

## Earth and Space Sciences

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

## Engineering Design

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

## Science and Engineering Practices

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

## Cross Cutting Concepts

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

## Disciplinary Core Ideas

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## Physical Sciences

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- PS1. Matter and Its Interaction
  - PS1.A: Structure and Properties of Matter
  - PS1.B: Chemical Reactions
  - PS1.C: Nuclear Processes
- PS2. Motion and Stability: Forces of Interaction
  - PS2.A: Forces and Motion
  - PS2.B: Types of Interactions
  - PS2.C: Stability and Instability in Physical Systems
- PS3. Energy
  - PS3.A: Definitions of Energy
  - PS3.B: Conservation of Energy and Energy Transfer
  - PS3.C: Relationship Between Energy and Forces

- PS3.D: Energy and Chemical Processes in Everyday Life
- PS4. Waves and Their Applications in Technologies for Information Transfer
- PS4.A: Wave Properties
- PS4.B: Electromagnetic Radiation
- PS4.C: Information Technologies and Instrumentation

## **Life Sciences**

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

## **Earth and Space Sciences**

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

- ESS3. Earth and Human Activity
- ESS3.A: Natural resources
- ESS3.B: Natural hazards
- ESS3.C: Human impacts on Earth systems
- ESS3.D: Global climate change

## **Essential Questions**

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### **Investigation 1: Exploring Air**

**Part 1:** What can air do?

**Part 2:** How does a parachute interact with air?

**Part 3:** What happens when air is pushed into a smaller space?

**Part 4:** How can water be used to show that air takes up space?

**Part 5:** How can compressed air be used to make a balloon rocket?

### **Investigation 2: Observing the Sky**

**Part 1:** What is the weather today?

**Part 2:** What time of day is the air the warmest?

**Part 3:** What types of clouds are in the sky today?

**Part 4:** What time of day can we observe the Moon?

### **Investigation 3: Wind Explorations**

**Part 1:** How can bubbles be used to observe the wind?

**Part 2:** How strong is the wind today?

**Part 3:** How can pinwheels be used to observe the wind?

**Part 4:** What does a wind vane tell us about the wind?

**Part 5:** What weather conditions are good for kite flying?

### **Investigation 4: Looking for Change**

**Part 1:** How can we describe the weather over a month?

What does the Moon look like at different times during a month?

**Part 2:** How does the amount of daylight change over the year?

**Part 3:** How does the temperature and weather change over the seasons?

## **Enduring Understanding**

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This earth and space unit develops students' understanding of: 1) What the universe is and Earth's place in it; 2) How and why the Earth is constantly changing; and 3) How Earth's surface processes and human activities affect each other.

## **Students will know...**

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### **Vocabulary**

#### **Investigation 1: Exploring Air**

air, air resistance, barrel, blow, bubble, compress, distance, engineer, gas, matter, move, parachute, plunger, pressure, push, rocket, submerge, syringe, system, tube, wind

#### **Investigation 2: Observing the Sky**

change, cirrus, cloud, cold, cool, cumulus, day, degrees Celsius, degrees Fahrenheit, describe, hot, measure, meteorologist, moon, night, overcast, partly cloudy, pattern, rain gauge, rainy, record, snowy, star, stratus, sun, sunny, sunrise, sunset, symbol, temperature, thermometer, warm, water vapor, weather, weather conditions, weather instrument

#### **Investigation 3: Wind Explorations**

anemometer, calm, direction, east, gentle breeze, kite, moderate breeze, north, pinwheel, south, strong breeze, west, wind speed, wind vane

#### **Investigation 4: Looking for Change**

fall, graph, hibernate, migrate, season, spring, summer, winter

## **Students will be able to...**

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## **Investigation 1: Exploring Air**

- Ask questions and define problems about the design of a parachute that uses air pressure to safely deliver cargo to the ground (food-supply air drop).
- Develop and use models to compare the similarities (common features) and differences in the models (drawing and diagrams) of bottles and syringe systems that push air and water from one container to the other. Use models to demonstrate patterns in the behavior of air.
- Plan and carry out investigations by observing how materials interact with air and investigating the properties of air.
- Analyze and interpret data by describing observations of simple systems that compress air (syringes and tubes) or use air to move (parachutes, balloon rockets). Make comparisons by drawing pictures and diagrams of systems to communicate answers to questions about the nature of air.
- Construct explanations and design solutions by assembling systems that serve specific functions (parachute, balloon rockets) and making firsthand observations to develop claims from evidence.
- Obtain, evaluate, and communicate information about air and its properties using grade-appropriate text, and communicate information orally and in written forms.

## **Investigation 2: Observing the Sky**

- Develop and use models (a thermometer) to represent how hot or cold the air temperature is, using a relative scale. Students can tell the difference between the actual thermometer they use to monitor the weather and the working paper model they construct.
- Plan and carry out investigations by making observations of daily weather (general conditions, temperature, cloud types). Students make observations of the Sun and the Moon in the sky at different times of the day and night and use these observations to make comparisons.
- Analyze and interpret data of weather, air temperature, and cloud types by recording information and sharing that information with pictures, drawings, and words. Students use these observations to describe patterns and to answer questions about natural world.
- Use mathematics and computational thinking by using numbers to determine the changes in the air temperature during a day and from day to day over the month.
- Construct explanations by using firsthand observations of the movement of the Sun in the sky during the day and the location of the Moon in the sky at different times of the day and night.
- Obtain, evaluate, and communicate information about weather conditions and monitoring instruments, and changes in the sky using grade-appropriate text, and communicating information orally and in written forms.

## **Investigation 3: Wind Explorations**

- Develop and use models to represent the categories of wind strength (relative scale).
- Plan and carry out investigations by making observations of the interactions between moving air (wind) and different kinds of structures (bubbles, wind vane, anemometer, kites) to serve as the basis for evidence to answer questions about wind speed or strength.
- Analyze and interpret data of the interactions of wind and objects by recording information using pictures, drawings, and words. Students use firsthand observations to answer questions about wind. They analyze flight tests in the wind to see if a kite works as intended.
- Construct explanations and design solutions from firsthand observations (bubbles, wind vane, anemometer, kites) to describe if the kite design works as intended.
- Obtain, evaluate, and communicate information about wind by communicating information orally and in written forms.

## **Investigation 4: Looking for Change**

- Ask questions about the number of hours of daylight at different times during the year and plan how to investigate to find the answer.
- Plan and carry out investigations by making observations of change in the sky over the month (weather patterns and Moon-shape patterns) and changes over the seasons (weather patterns and patterns of daylight hours). Students use bar graphs of daylight hours during the year to make predictions.
- Analyze and interpret data of changes in the sky (weather, Moon shapes, hours of daylight) to find monthly and seasonal patterns.
- Use mathematics and computational thinking to make bar graphs to compare of weather and changes in the appearance of objects in the sky over time (the Sun and Moon).
- Construct explanations about the changes that can be observed through the seasons to make predictions.

Obtain, evaluate, and communicate information about the seasons, using grade-appropriate text, and communicating information orally and in writing.

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

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### **Formative Assessment Suggestions**

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



- Web or Concept Map

## **Authentic Assessments Suggestions**

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### **Investigation 1: Exploring Air**

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

### **Investigation 2: Observing the sky**

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

### **Investigation 3: Wind Explorations**

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

### **Investigation 4: Looking for Change**

- Science notebook entries
- Performance assessment
- Investigation 4 I-Check

## **Benchmark Assessments**

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Unit Post Test

## **STAGE 3- LEARNING PLAN**

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## **Instructional Map**

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Investigation 1: Exploring Air

Investigation 2: Observing the Sky

Investigation 3: Wind Explorations

Investigation 4: Looking for Change

### **Investigation 1: Sounds and Vibrations**

#### **Investigation 1: Part 1- Air is There**

Students work with a set of objects to see how objects can be moved by and through air.

Content:

- Air is a gas and is all around us.
- Air is matter and takes up space.
- Air makes objects move.
- Air moves from place to place.

Moving air is wind.

#### **Investigation 1: Part 2- Parachutes**

Students construct and observe parachutes dropping through air. They think about how air slows the descent of the parachute. They design and test a parachute to land a cargo container gently without spilling the contents.

Content:

- Air is a gas and is all around us.
- Air resistance affects how things move.

#### **Investigation 1: Part 3- Pushing Air**

Students use syringes to investigate air. They discover that air can be compressed and that air under pressure can push objects around.

Content:

- Air is matter and takes up space.
- Air can be compressed.
- The pressure from compressed air can move things, including water.

### **Investigation 1: Part 4- Air and Water**

Students put together tubes, a bottle, water, a rubber stopper, and two syringes to create a system. They add water and use air pressure to push the water around the system.

Content:

- Air is matter and takes up space.
- The pressure from compressed air can move things, including water.

### **Investigation 1: Part 5- Balloon Rockets**

Students set up a balloon-rocket system and find out how far the air in the balloon will propel the system along a flight line.

Content:

- Air can be compressed.
- The pressure from compressed air can move things, including water.

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### **Investigation 2: Observing the Sky**

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#### **Investigation 2: Part 1- Weather Calendars**

Students share what they know about weather and how it relates to air. Rotating class meteorologists begin recording daily weather observations on a class calendar. Students use symbols to indicate five basic types of weather.

Content:

- Weather describes conditions in the air outside.

#### **Investigation 2: Part 2- Measuring Temperature and Daylight**

Students learn to use a thermometer and take turns measuring and recording the temperature. They construct a model thermometer and practice reading various temperatures. They monitor sunrise and sunset and record the total number of daylight hours each day. They collect data on temperature changes during the day.

Content:

- Temperature describes how hot or cold the air is. Temperature is measured with a thermometer.
- The Sun rises in the east, moves across the sky, and sets each day at predictable times. The Sun warms the Earth.

### **Investigation 2: Part 3- Watching Clouds**

Students observe and compare several types of clouds and discuss the kinds of clouds that bring rain or snow. Students can use a rain gauge to measure rain or snowfall.

Content:

- Wind moves clouds in the sky.
- Clouds are made of liquid water drops that fall to Earth as rain; water is also in the air as a gas that we can't see.

### **Investigation 2: Part 4- Observing the Moon**

Students discuss their observations of the day and night sky, and begin to make systematic observations of the Moon. The observations will continue during the daytime and nighttime for 4 weeks.

Content:

- The Moon can be seen sometimes at night and sometimes during the day. It looks different every day, but looks the same again about every 4 weeks.
- The Moon can be observed moving across the sky; we see it at different locations in the sky, depending on the time of day or night.
- There are more stars in the night sky than anyone can easily count.

### **Investigation 3: Wind Explorations**

#### **Investigation 3: Part 1- Bubbles in the Wind**

Students use bubble wands to blow bubbles outdoors. They investigate how the air moves bubbles in a variety of locations around the school building.

Content:

- Bubbles are filled with air.
- Wind is moving air.
- Bubbles can show the changing direction and speed of the wind.

#### **Investigation 3: Part 2- Wind Speed**

Students go outdoors to feel and observe the wind. They are introduced to a descriptive wind scale (an adaptation of the Beaufort scale) and an anemometer, an instrument used to measure wind speed.

Content:

- Meteorologists use wind scales (models) to describe the strength of the wind.
- Meteorologists use anemometers to measure the speed of the wind.

### **Investigation 3: Part 3- Pinwheels**

Students construct a pinwheel and observe how it operates when they blow on it, move it through air, and take it outdoors in the wind. They compare the action of the pinwheels to the class anemometer.

Content:

- Meteorologists use anemometers to measure the speed of the wind.
- A pinwheel provides evidence about how fast the wind is blowing.

### **Investigation 3: Part 4- Wind Vanes**

Students learn about wind vanes, instruments used to indicate wind direction. Students compare the movement of the wind vanes to that of bubbles and clouds.

Content:

- Meteorologists use wind vanes to observe the direction of the wind.
- A wind vane points in the direction the wind is coming from.

### **Investigation 3: Part 5- Kites**

Students construct kites. They use the anemometer and wind vane to determine the best location and direction for flying kites.

Content:

- Wind lifts kites up into the sky.
- An anemometer can give evidence that there is good wind for kite flying.
- A wind vane points in the direction the wind is coming from.

### **Investigation 4: Looking for Change**

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### **Investigation 4: Part 1- Change over a Month**

Students organize and graph the class weather data recorded over a period of 4 weeks. The class can continue

recording the weather on the calendar and then graph the following month. Students also revisit the Moon calendar and look for patterns over the month.

Content:

- Weather conditions change over time.
- Weather observations can be organized and used to make comparisons.
- There are more stars in the sky than anyone can easily count.
- The Moon can be seen sometimes at night and sometimes during the day. It looks different every day, but looks the same again about every 4 weeks.
- The Moon can be observed moving across the sky; we see it at different locations in the sky depending on the time of day or night. It rises in the East and sets in the West.

#### **Investigation 4: Part 2- Daylight through the Year**

The class looks at the amount of daylight on the same day of each month over the year. Students describe the pattern they observe and predict the number of hours of daylight on their birthday that year. They compare the actual hours to their predicted number of hours.

Content:

- The Sun can be seen only in the day.
- The Sun heats Earth during the day.
- The number of daylight hours changes predictably through the year. Winter has the least number of daylight hours; summer has the most daylight hours.

#### **Investigation 4: Part 3- Comparing the Seasons**

The class moves from recording weather data on a calendar to creating seasonal graphs of the weather and temperature. Each season, the class creates new graphs and compares them with graphs from the preceding seasons.

Content:

- Each season has a typical weather pattern that can be observed, compared, and predicted.
- The weather affects animals and plants.

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

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#### 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

### 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
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- Ability to work at their own pace
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- Provide graphic organizers and/or highlighted materials
- Strategy and flexible groups based on formative assessment
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## **Modification Strategies**

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

## **High Preparation Differentiation**

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- Alternative Assessments
- Choice Boards

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

## **Low Preparation Differentiation**

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

- Work Alone / Together

## **Horizontal Integration- Interdisciplinary Connections**

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### New Jersey Student Learning Standards for Mathematics

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

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

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

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

A-SSE.A. Interpret the structure of expressions

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

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

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

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

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

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

F-IF.C. Analyze functions using different representations

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

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

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

S-ID.C. Interpret linear models.

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

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

- RF 4: Read text with purpose and understanding.
- RI 1: Ask and answer questions about key details.
- RI 2: Identify main topic and retell key details.
- RI 3: Describe the connection between two ideas.
- RI 4: Ask and answer questions about unknown words.
- RI 5: Identify the front cover, back cover, and title page of a book.
- RI 7: Describe the relationship between illustrations and the text.
- RI 8: Identify the reasons an author gives to support points.
- RI 9: Identify similarities in and differences between text on the same topic.
- RI 10: Actively engage in group reading activities with purpose and understanding.
- SL 1: Participate in collaborative conversations.
- SL 2: Ask and answer questions about key details and request clarification.
- SL 3: Ask and answer questions to seek help, information, or to clarify.
- SL 4: Describe with details.
- W 5: Strengthen writing.
- W 8: Gather information to answer a question.

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

### Computer Science and Design Thinking Practices

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

## 8.2 Design Thinking

8.2.2.ED.1: Communicate the function of a product or device.

8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.

8.2.2.ED.3: Select and use appropriate tools and materials to build a product using the design process.

8.2.2.ED.4: Identify constraints and their role in the engineering design process.

8.2.2.ITH.1: Identify products that are designed to meet human wants or needs.

8.2.2.ITH.2: Explain the purpose of a product and its value.

8.2.2.ITH.3: Identify how technology impacts or improves life.

8.2.2.ITH.4: Identify how various tools reduce work and improve daily tasks.

8.2.2.ITH.5: Design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution.

8.2.2.NT.1: Model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together.

8.2.2.NT.2: Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.

8.2.2.ETW.1: Classify products as resulting from nature or produced as a result of technology.

8.2.2.ETW.2: Identify the natural resources needed to create a product.

8.2.2.ETW.3: Describe or model the system used for recycling technology.

8.2.2.ETW.4: Explain how the disposal of or reusing a product affects the local and global environment.

8.2.2.EC.1: Identify and compare technology used in different schools, communities, regions, and parts of the world.



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

### Career Readiness, Life Literacies, and Key Skills Practices

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

### 9.2 Career Awareness and Planning

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

### 9.4 Life Literacies and Key Skills

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

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

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

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

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

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

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

9.4.2.DC.3: Explain how to be safe online and follow safe practices when using the internet.
9.4.2.DC.4: Compare information that should be kept private to information that might be made public.
9.4.2.DC.5: Explain what a digital footprint is and how it is created.
9.4.2.DC.6: Identify respectful and responsible ways to communicate in digital environments.
9.4.2.DC.7: Describe actions peers can take to positively impact climate change.
9.4.2.IML.1: Identify a simple search term to find information in a search engine or digital resource.
9.4.2.IML.2: Represent data in a visual format to tell a story about the data.
9.4.2.IML.3: Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults.
9.4.2.IML.4: Compare and contrast the way information is shared in a variety of contexts.
9.4.2.TL.1: Identify the basic features of a digital tool and explain the purpose of the tool.
9.4.2.TL.2: Create a document using a word processing application.
9.4.2.TL.3: Enter information into a spreadsheet and sort the information.
9.4.2.TL.4: Navigate a virtual space to build context and describe the visual content.
9.4.2.TL.5: Describe the difference between real and virtual experiences.
9.4.2.TL.6: Illustrate and communicate ideas and stories using multiple digital tools.
9.4.2.TL.7: Describe the benefits of collaborating with others to complete digital tasks or develop digital artifacts.

## Vertical Integration- Discipline Mapping

ESS1: Grade 2: Pebbles, Sand, and Silt

Grade 4: Soils, Rocks, and Landforms

Grade 5: Earth and Sun

Grade 6: Weather and Water

Grade 7: Planetary Science

ESS2: Kindergarten: Trees and Weather

Grade 2: Pebbles, Sand, and Silt

Grade 3: Water and Climate

Grade 4: Soils, Rocks, and Landforms

Grade 5: Living Systems; Earth and Sun

Grade 7: Planetary Science

Grade 8: Earth's History

ESS3: Kindergarten: Materials and Motion

Grade 6: Weather and Water

Grade 8: Earth's History

Preparation for high school science courses

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## **Additional Materials**

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