AGENDA

- Rationale for Combining Fiction and Non-Fiction to Promote Language and Literacy Skills While Teaching Mandated Science Content to ELLs
- Discuss the 5E Model of Instruction—A Constructivist, Inquiry-based Science Teaching Approach and How It Advances Science Learning While Offering Language Development Opportunities
- Discuss Differences in the Type of Language Found in Fiction and Non-Fiction Texts and Why ELLs Need Access to Both
AGENDA

- Exploring a Science Theme That Is Taught in the Lower and Upper Grades, Using Fiction and Non-Fiction Books (Grade 1, Grade 6, Earth Science Unit 7); Show Relationship to the Other Grades (1-8)
- Selecting “Pair It” Texts and Linking them to English Language Arts and Science Content Standards
- Planning the Content, Language and Literacy Objectives
- Giving Students Practice with Oral Academic Language
- Promoting Academic Reading and Writing (with Emphasis on Writing Summaries and Explanations)

Domain 1
Planning and Preparation
1a Demonstrating Knowledge of Content & Pedagogy
1b Demonstrating Knowledge of Students
1c Setting Instructional Outcomes
1d Demonstrating Knowledge of Resources
1e Designing Coherent Instruction
1f Designing Student Assessment

Domain 2
Classroom Environment
2a Creating an Environment of Respect & Rapport
2b Creating a Culture of Learning
2c Managing Classroom Procedures
2d Managing Student Behavior
2e Managing Physical Space

Domain 3
Instruction
3a Communicating with Students
3b Using Questioning and Discussion Techniques
3c Engaging Students in Learning
3d Using Assessment in Instruction
3e Demonstrating Flexibility & Responsiveness

Domain 4
Professional Responsibilities
4a Reflecting on Teaching
4b Maintaining Accurate Records
4c Communicating with Families
4d Participating in a Professional Community
4e Growing and Developing Professionally
4f Showing Professionalism

Source: Mary Ellen Leonard, Regional Induction Specialist
Illinois New Teacher Collaborative
Rationale for Pairing Fiction and Non Fiction Texts to Teach Language And Literacy

- Teach concepts in an accessible and memorable way
- Combine learning standards—CCSS and NGSS/NYS Science Standards with English Language Development
- Promoting second language and literacy development through a paired book approach gives students access to different genres and, as you cross content areas, academic registers
- Allows you to integrate content, language and literacy objectives

Published Series that Use a “Pair It” Approach

- Stenhouse: Perfect Pairs
  - [https://www.stenhouse.com/content/perfect-pairs](https://www.stenhouse.com/content/perfect-pairs)
- Houghton Mifflin/Steck Vaughn: Pair It Books
- Learning Links: Fiction/Nonfiction Pairs
- Scholastic Book Flix
- Teacher Created Materials: Purposeful Pairs
On Reference List

Online Series that Use a “Pair It” Approach

ReadWorks:

Reading A-Z:
https://www.readinga-z.com/book-related-resources/paired-books/
Combining Fiction and Non-Fiction to Teach Science

On Reference List

Appealing—due to imaginative illustrations and engaging story lines
Stimulate students on both the emotional and intellectual levels
Designed to supplement the traditional science textbook
Helps kids understand and remember concepts better than textbooks alone
Helps integrate ELA in the teaching of other subjects
Good to pair a fiction and non-fiction book, especially for struggling readers—one presents facts and background information and the other a beautifully descriptive story, using expressive language and illustrations.

Why Use Picture Books?

Chapter 1

http://www.pictureperfectscience.com/
Leads to Improved Reading and Science Skills
(Morrow et al., 1997; Romance & Vitale, 1992; Morgan, 2001)

Multiple text reading helps correct misconceptions held by students, while making sure that they are exposed to correct information several times. They use factual books to correct any misinformation they may have believed to be true before reading. (how clouds form; what makes it rain suddenly).

More Books listed at: www.nsta.org/ostbc

4 Genres of Children’s Books:

- **Storybooks**: Entertain; hooks the reader; can contain inaccuracies. Read last if so so kids can correct erroneous information.

- **Non-narrative Informational books**: Focus on subject matter information, use technical vocabulary, informational book features (Table of Contents, bold print, captions, glossaries, index, etc.).

- **Narrative Information books** (Hybrid): Narrate a specific case that is factually accurate (girl who finds a fossil).

- **Dual Purpose books**: Tell a story and provide facts (in insets and diagrams).
Our Featured Texts

- *Come On, Rain!*
- *What Will the Weather Be?*

**Storybooks**
**Informational Books**
**Narrative Information Books**
**Dual Purpose**

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**Developing Higher Order Thinking Skills with ELLs:**

- Understanding Scientific and Engineering Practices and the Cross-Cutting Concepts in the Next Generation Science Standards
To implement the NGSS well we must focus on all three components:

- **Disciplinary Core Ideas**
- **Scientific and Engineering Practices, and**
- **Crosscutting Concepts Across the Core Areas of Science**

### Disciplinary Core Ideas

<table>
<thead>
<tr>
<th>Life Science</th>
<th>Physical Science</th>
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<tr>
<td>LS1: From Molecules to Organisms: Structures and Processes</td>
<td>PS1: Matter and Its Interactions</td>
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<td>LS2: Ecosystems: Interactions, Energy, and Dynamics</td>
<td>PS2: Motion and Stability: Forces and Interactions</td>
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<tr>
<td>LS3: Heredity: Inheritance and Variation of Traits</td>
<td>PS3: Energy</td>
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<td>LS4: Biological Evolution: Unity and Diversity</td>
<td>PS4: Waves and Their Applications in Technologies for Information Transfer</td>
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<td>ETS1: Engineering Design</td>
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<td>ESS2: Earth’s Systems</td>
<td>ETS2: Links Among Engineering, Technology, Science, and Society</td>
</tr>
<tr>
<td>ESS3: Earth and Human Activity</td>
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Chapter 15: Even More Picture Perfect Science Lessons

Life Science

Reading Level 4.4
Grades K-2

Reading Level 2.9
Lexile 460
GRL J
Grades K-2

Reading Level 2.9
Lexile 490
GRL J
Grades K-2
Chapter 9: Even More Picture-Perfect Science Lessons (Gr. 3-5)

Lexile 910 to 960 (Gr. 6-8 range)
Gr. Level 5.3


Resources:
Core and Component Ideas

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<td>LS4.C: Adaptation</td>
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<td>LS4.D: Biodiversity and Humans</td>
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<td>LS5.D: Global Climate Change</td>
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Crosscutting Concepts

1. Patterns
2. Cause and effect: Mechanism and explanation
3. Scale, proportion, and quantity
4. Systems and system models
5. Energy and matter: Flows, cycles, and conservation
6. Structure and function
7. Stability and change
### Scientific and Engineering Practices

1. **Asking questions** (for science) and **defining problems** (for engineering)
2. **Developing and using models**
3. Planning and carrying out investigations
4. **Analyzing and interpreting data**
5. Using mathematics and computational thinking
6. **Constructing explanations** (for science) and designing solutions (for engineering)
7. **Engaging in argument from evidence**
8. Obtaining, evaluating, and **communicating information**

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### What Does Science Look Like?

**Scientific and Engineering Practices For K-12 Science Classes**

*(Table 3.2: National Science Education Standards, 2012)*

**Students:**
- Ask questions and define problems
- Develop and use models
- Plan and carry out investigations
- Analyze and interpret data
- Use mathematics and computational thinking
- Construct explanations and design solutions
- Engage in argument from evidence
- Obtain, evaluate, and communicate information
What Levels of Language Are Needed?

What Proficiency Is Needed to:

- Ask questions and define problems
- Develop and use models
- Plan and carry out investigations
- Analyze and interpret data
- Use mathematics and computational thinking
- Construct explanations and design solutions
- Engage in argument from evidence
- Obtain, evaluate, and communicate information

Entering
Emerging
Transitioning
Expanding
Commanding
**ACADEMIC LANGUAGE FUNCTIONS**—Inquiry-based units will include many or most of the following process skills.

**Classifying** – arranging or distributing objects, events, or information representing objects or events in classes according to some method or system

**Communicating/Explaining** – giving oral and written explanations or graphic representations of observations

**Comparing and contrasting** – identifying similarities and differences between or among objects, events, data, systems, etc.

**Explaining models** – displaying and discussing information

**Generalizing** – drawing general conclusions from particulars

**Identifying variables** – recognizing the characteristics of objects or factors in events that are constant or change under different conditions

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**Inferring** – drawing a conclusion based on prior experiences

**Interpreting data** – analyzing data that have been obtained and organized by determining apparent patterns or relationships in the data

**Measuring and Reporting Results** – making quantitative observations by comparing to a conventional or nonconventional standard

**Observing** – becoming aware of an object or event by using any of the senses (or extensions of the senses) to identify properties

**Predicting** – making a forecast of future events or conditions expected to exist
Our Paired Texts

**Come On, Rain!**
Lexile 780
Grade Level 3.9
GRL = P

**What Will the Weather Be?**
Lexile 500
Grade Level 3.6
GRL = O

Cold/Warm Fronts; Humidity, Air Pressure, Thunderstorms

IDENTIFYING CONTENT OBJECTIVES
TYING OUR WORK TO NYS/NYC SCIENCE CONTENT STANDARDS
Key Idea 2:
Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.

**Performance Indicator 2.1:**
Describe the relationship among air, water, and land on Earth.

Major Understandings—next slide

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**2.1a Weather is the condition of the outside air at a particular moment.**

**2.1b Weather can be described and measured by:**
- temperature
- wind speed and direction
- form and amount of precipitation
- general sky conditions (cloudy, sunny, partly cloudy)

**2.1c Water is recycled by natural processes on Earth.**
- evaporation: changing of water (liquid) into water vapor (gas)
- condensation: changing of water vapor (gas) into water (liquid)
- precipitation: rain, sleet, snow, hail
- runoff: water flowing on Earth’s surface
- groundwater: water that moves downward into the ground

**2.1e Extreme natural events (floods, fires, earthquakes, volcanic eruptions, hurricanes, tornadoes, and other severe storms) may have positive or negative impacts on living things.**
Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.

Performance Indicator 2.2: Describe volcano and earthquake patterns, the rock cycle, and weather and climate changes.

2.2i Weather describes the conditions of the atmosphere at a given location for a short period of time.
2.2j Climate is the characteristic weather that prevails from season to season and year to year.
2.2k The uneven heating of Earth's surface is the cause of weather.
2.2l Air masses form when air remains nearly stationary over a large section of Earth's surface and takes on the conditions of temperature and humidity from that location.

Weather conditions at a location are determined primarily by temperature, humidity, and pressure of air masses over that location.

2.2m Most local weather condition changes are caused by movement of air masses.
2.2n The movement of air masses is determined by prevailing winds and upper air currents.
2.2o Fronts are boundaries between air masses. Precipitation is likely to occur at these boundaries.
2.2p High-pressure systems generally bring fair weather. Low-pressure systems usually bring cloudy, unstable conditions. The general movement of highs and lows is from west to east across the United States.
Weather and Seasons

Major Understandings:
Quoted from New York State Performance Indicators (PS: 1.1a-c, 2.1a-b, 3.1g, 4.2a)

1. Natural cycles and patterns include:
   - Earth spinning around once every 24 hours (rotation), resulting in day and night
   - Earth moving in a path around the Sun (revolution), resulting in one Earth year
   - The length of daylight and darkness varying with the seasons.

2. Patterns:
   - Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.
   - Patterns in the natural and human-designed world can be observed, used to describe phenomena, and used as evidence.

Essential Question:
How does seasonal change affect temperature and weather conditions over a period of time?

Key Ideas:
- PS. Key Idea 1: The Earth and celestial phenomena can be described by principles of relative motion and perspective.
- PS. Key Idea 2: Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.
- PS. Key Idea 3: Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.
- PS. Key Idea 4: Energy exists in many forms, and when these forms change energy is conserved.

RECOMMENDED TIME: MARCH – JUNE (14 WEEKS)

Unit Overview:
Weather involves interactions among air, water, and land. Students should observe and describe the weather conditions that occur during each season. They can observe, measure, record, and compare data throughout the year by using science tools.

Students should compare temperatures in different locations and compare day and night temperature. Students should illustrate and describe how the sun appears to move during the day. Students should describe how the moon changes appearance over time. Describe the 24-hour day/night cycle. Students should understand that energy exists in a variety of forms. Students should observe and record the changes in the sun's and other star's position, and the moon's appearance relative to time of day and month, and note the pattern of this change. Recognize that the sun's energy warms the air.

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The New York City Department of Education

presented orally or through other media.

SL.1.2: Models are simplified representations of objects, structures, or systems used in analysis, explanation, interpretation, or design.

Key idea 2b: Classification aids students in organizing and interpreting information about the environment.

Weather is the condition of the outside air at a particular moment. (1.1a)

• temperature
• wind speed and direction
• form and amount of precipitation
• general sky conditions (cloudy, sunny, partly cloudy)
• some properties of an object are dependent on the context in which the object exists. (1.1b)

• temperature: hot or cold
• lighting: shadow, sun
• moisture: wet or dry

• the sun and stars appear to move in a recognizable pattern (both daily and seasonally) (1.1c)

• everyday events involve one form of energy being changed to another (1.2a)

Everyday events involve one form of energy being changed to another (1.2a)

Informal communication is social in nature, and it is the purpose of this social activity to influence the thoughts, beliefs, or behaviors of others. (1.2b)

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| Every Other Event involves one form of energy being changed to another (1.2a) | Energy: hot or cold. |
| Informal communication is social in nature, and it is the purpose of this social activity to influence the thoughts, beliefs, or behaviors of others. (1.2b) | Social Activity: communication. |

ENVIRONMENTAL GUIDELINES FOR LEARNING

Key idea 3b: Classification aids students in organizing and interpreting information about the environment.

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New York City

Science

Scope & Sequence

6-12

2015–2016

The New York City Department of Education 6–12 Science Scope & Sequence Grade X | Unit X: Title  |  i

Carmen Fariña, Chancellor
New York City

Science  Scope & Sequence

6- 12

The New York City Department of Education

6–12 Science Scope & Sequence

Grade 6 | Unit 2: Weather and the Atmosphere  |  13

Cause and Effect: Mechanism and Prediction: Events have causes, sometimes simple, sometimes multifaceted. Describing cause-and-effect relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.

Habitat Focus: Corine Land Cover

Standard 2: Information Systems

Key Idea: Information technology is used to collect, process, and communicate information as a tool to enhance learning.

Standard 6: Interconnectedness: Common Themes

Key Idea 3: The grouping of magnitude of data, time, frequency, and precision or other units of measurement into a series of relative order provides a useful way to deal with the immense range and the changes in scale that affect the behavior and design of systems.

Essential Questions:

What causes weather conditions?

How do matter and energy interact to produce weather patterns?

Why do different locations have different weather conditions?

What short-term/long-term solutions can we propose that will help reduce pollution?

Major Understandings:

Quoted from New York State Performance Indicators (PS. 2.1a,c,d,j; 2.2i-r; 3.1a, c-f, g, h; 3.2a; 4.1a, c,d; 4.2a - d; 4.4a, b; 4.5a, b) (LE.7.2d)

The substances have characteristics properties.

Some of these properties include color, odor, phase at room temperature, density, solubility, heat and electrical conductivity, hardness, and boiling and freezing points. (3.1a)

Density can be described as the amount of matter that is in a given amount of space. If two objects have equal volume, but one has more mass, the one with more mass is denser. (3.1h)

Recommended Time: November – February (12 weeks)

Unit Overview:
The unit studies physical properties of matter, energy transformations, as well as how energy is released or absorbed as light and as heat. This will provide a context for how weather conditions are produced in the atmosphere, and how weather events affect life in specific regions. Students may build tools to investigate weather in their local area, gathering and analyzing patterns and trends to describe weather conditions, make informed predictions, and explain hazardous weather conditions.

Essential Questions:

What causes weather conditions?

How do matter and energy interact to produce weather patterns?

Why do different locations have different weather conditions?

What short-term/long-term solutions can we propose that will help reduce pollution?

Key Ideas:

PS. Key Idea 2: Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.

PS. Key Idea 3: Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

PS. Key Idea 4: Energy exists in many forms, and when these forms change, energy is conserved.

LE. Key Idea 7: Human decisions and activities have had a profound impact on the physical and living environment.

NYS SCIENCE STANDARDS


MST STANDARDS


NGSS CROSS-CUTTING CONCEPTS


The New York City Department of Education 6–12 Science Scope & Sequence
The rock at Earth’s surface forms a nearly continuous layer surrounding the Earth. The atmosphere is a mixture of gases, including nitrogen, oxygen, with small amounts of water vapor, carbon dioxide, and other trace gases. The atmosphere is stratified into layers, each having distinct properties. Near the Earth’s surface is the lowest layer of the atmosphere, known as the troposphere.

- The motion of particles helps to explain the phases (states of matter) as well as changes from one phase to another. The phase in which matter exists depends on the attractive forces among its particles. (5.1c)
- Gases have neither a definite shape nor definite volume. Gases assume the shape and volume of a closed container. (3.14a)
- A liquid has a definite volume, but takes the shape of a container. (3.14e)
- A solid has definite shape and volume. Particles resist a change in position. (3.15a)
- During a physical change, a substance keeps its chemical composition and properties. Examples of physical changes include melting, freezing, condensation, boiling, evaporation, freezing, and soaking. (3.2a)
- During a phase change, heat energy is absorbed or released. Energy is absorbed when a solid changes to a liquid and when a liquid changes to a gas. Energy is released when a gas changes to a liquid and when a liquid changes to a solid. (6.5a)
- Most substances expand when heated and contract when cooled. Water is an exception, expanding when changing to ice. (4.1b)
- Energy cannot be created or destroyed, but only changed from one form into another. (4.1c)
- Energy can change from one form to another, although in the process some energy is always lost by heat or light. (4.1d)
- The Sun is the main source of energy for Earth. Other sources of energy include nuclear and geothermal energy. (4.5a)

Key Idea 6: Equilibrium is a state of stability due to a lack of change (static equilibrium) or balance between opposing forces (dynamic equilibrium).

Key Idea 8: Identifying patterns of change is necessary for making predictions about future behavior and conditions.

Standard 7: Interdisciplinary Problem Solving

Key Idea 6: The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems, especially those relating to issues of science/technology/society, consumer decision-making, and inquiry into phenomena.

Stability and Change:

For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand. Explanations of stability and change in natural or designed systems can be constructed by rearranging the changes over time and forces at different scales, including the atomic scale.

Small changes in one part of a system might cause large changes in another part.

Stability might be disturbed either by sudden events or gradual changes that accumulate over time.

Systems in dynamic equilibrium are stable due to a balance of feedback mechanisms.

Different forms of energy include heat, light, electrical, mechanical, sound, nuclear, and chemical. Energy is transformed in many ways. (4.1c)

Most activities in everyday life involve one form of energy being transformed into another. For example, the chemical energy in gasoline is transformed into mechanical energy in an automobile engine. Energy in the form of heat, in almost every case, is the product of energy transformations. (4.1a)

Different forms of electromagnetic energy have different wavelengths. Some examples of electromagnetic energy are microwaves, infrared, visible light, ultraviolet light, X-ray, and gamma rays. (4.4b)

Light passes through some materials, sometimes refracting in the process. Materials absorb and reflect light, and may bend light. To see an object, light from that object, which is emitted from or reflected from it, must enter the eye. (4.4c)

Heat moves in predictable ways, flowing from warmer objects to cooler ones, until both have reached the same temperature. (4.4d)

Heat can be transferred through matter by the collisions of atoms or molecules (conduction) or through space (radiation). In liquid or gas, currents will facilitate the transfer of heat (convection). (4.20)

Nearly all the atmosphere is confined to a thin shell surrounding the Earth. The atmosphere is a mixture of gases, including nitrogen, oxygen, with small amounts of water vapor, carbon dioxide, and other trace gases. The atmosphere is stratified into layers, each having distinct properties. Near the Earth’s surface is the lowest layer of the atmosphere, known as the troposphere. (3.14a)

The rock at Earth’s surface forms a nearly continuous layer surrounding the Earth called the lithosphere. (3.13a)

- The majority of the lithosphere is covered by a relatively thin layer of water called the hydrosphere. (3.13b)
- Water circulates through the atmosphere, hydrosphere, and lithosphere in what is known as the water cycle. (4.4b)
- The uneven heating of Earth’s surface is the cause of weather. (3.14b)
- Weather describes the conditions of the atmosphere at a given location for a short period of time. (3.14c)
- Air masses form when air remains nearly stationary at a given location for a short period of time. (3.14d)
- Weather conditions at a location are determined primarily by temperature, humidity, and pressure of air masses over that location. (3.2b)
- Most local weather condition changes are caused by movement of air masses. (3.2m)
- The movement of air masses is determined by prevailing winds and upper air currents. (3.2m)
- Fronts are boundaries between air masses. Precipitation is likely to occur at these boundaries. (3.2m)
- High-pressure systems generally bring fair weather. Low-pressure systems bring most weather. (3.2m)
- Hazardous weather conditions include thunderstorms, tornadoes, hurricanes, ice storms, and blizzards. (3.2c)

Substances enter the atmosphere naturally and from human activity. Some of these substances include dust from volcanic eruptions and greenhouse gases such as carbon dioxide, methane, and water vapor. These substances can affect weather, climate and living things. (4.4b)

- Since the Industrial Revolution, human activity has led to a major pollution of air, water, and soil. Pollution has cumulative ecological effects such as acid rain, global warming, and ozone depletion. The survival of living things on our planet depends on the conservation and protection of Earth’s resources. (4.2k)

- The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems, especially those relating to issues of science/technology/society, consumer decision-making, and inquiry into phenomena. (4.5b)

- The Sun is the main source of energy for Earth. Other sources of energy include nuclear and geothermal energy. (4.5a)
Strand 2: Knowledge of Environmental Processes and Systems

Strand 2.1: The Earth as a Physical System

- Guideline A—Processes that shape the Earth—Learners have a basic understanding of most of the physical processes that shape the Earth. They are able to explore the origin of differences in physical patterns.
- Guideline D—Global connections—Learners become familiar with ways in which the world’s environmental, social, economic, cultural, and political systems are linked.
- Guideline E—Change and conflict—Learners understand that human social systems change over time and that conflicts sometimes arise over differing and changing viewpoints about the environment.
The Physical Setting/Earth Science Core Curriculum follows the sequence of Key Ideas and Performance Indicators listed in Learning Standards for Mathematics, Science, and Technology. The instructional methods, time allotments, and sequencing of lessons are all decisions that can and should be made at the local level. Local curriculum decisions should be made based on the resources available and with the best interests of the students in mind. The overriding goal should be to cover the material outlined in this Core Curriculum. Some teachers may choose to follow the sequence of topics in the 1970 New York State Earth Science Syllabus or the sequence of units in the 1991 New York State Earth Science Program Modifications. Many textbooks also present this material in a logical sequence.

The diagrams below give two examples of how the material in the Core Curriculum may be organized for curricular and instructional purposes:

A.

- Geology
  - Minerals & Rocks
  - Plate Tectonics
  - Weathering, Erosion, & Deposition
  - Landscapes/Topo Maps

- Earth History
  - Evolution
  - Earth’s Coordinates

- Ocean & Atmosphere
  - The Water Cycle
  - Maps

- Weather Variables
  - Weather Systems
  - Weather Prediction
  - Climate

B.

- Astronomy
  - Terrestrial Coordinates (Latitude/Longitude)
  - Earth’s Motions (Rotation/Revolution)
  - Seasons (Insolation)
  - Solar System
  - Deep Space

- Meteorology
  - Weather Variables (Temperature, Moisture, Pressure, Wind)
  - The Atmosphere (Measurements & Structure)
  - Weather Systems (Air Masses, Fronts, and Cyclones)
  - Weather Forecasting
  - Weather Hazards

- Climate
  - Insolation
  - Geographic Factors
  - The Water Cycle
  - Human Influence (Global Warming, Heat Island, etc.)

- Geology
  - Weathering, Erosion, & Deposition
  - Landscapes/Topo Maps
  - Plate Tectonics
  - Minerals & Rocks
  - Plate Tectonics
  - Minerals & Rocks

Alternative sequences may begin with topics in Geology or Meteorology.
Earth Science Regents 9th/10th Grade

Unit Overview:
Earth may be considered a huge machine driven by two engines, one internal and one external. These heat engines convert heat energy into mechanical energy. Earth’s external heat engine is powered primarily by solar energy and influenced by gravity. Nearly all the energy for circulating the atmosphere and oceans is supplied by the Sun. An insolation strikes the atmosphere, a small percentage is directly absorbed, especially by gases such as ozone, carbon dioxide, and water vapor. Clouds and Earth’s surface reflect some energy back to space, and Earth’s surface absorbs some energy. Energy is transferred between Earth’s surface and the atmosphere by radiation, conduction, evaporation, and convection. Temperature variations within the atmosphere cause differences in density that cause atmospheric circulation, which is affected by Earth’s rotation. The interaction of these processes results in the complex atmospheric occurrence known as the weather. Precipitation resulting from the external heat engine weather systems supplies moisture to Earth’s surface that contributes to the weathering of rocks. Global climate is determined by the interaction of solar energy with Earth’s surface and atmosphere. This energy transfer is influenced by dynamic processes such as cloud cover and Earth’s rotation, and the positions of mountain ranges and oceans. (Refer to Appendix A for the Humane Treatment of Animals and Conservation [16])

Key Ideas:

Key Idea 1: Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.

Key Idea 2: Information technology is used to retrieve, process, and communicate information as a tool to enhance learning.

Key Idea 3: Information technology can have positive and negative impacts on society, depending upon how it is used.

Key Idea 4: Knowledge of the impacts and limitations of information systems is essential to be effective and ethical users.

Key Idea 5: Observing patterns in nature guide organization and classification and prompt questions about relationships and cause underlying them.

Key Idea 6: Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena.

Key Idea 7: Empirical evidence is needed to identify patterns.

NGSS CROSS-CUTTING CONCEPTS

<table>
<thead>
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ES | Unit 7: Meteorology

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The New York City Department of Education

Limited on measurement when reporting quantities.

Applications of Units

- The transfer of heat energy within the atmosphere, the hydrosphere, and Earth’s surface occurs as the result of radiation, convection, and conduction. (2.2d)
- Heating of Earth’s surface and atmosphere by the Sun drives convection within the atmosphere and conduction within Earth’s surface.
- Weather variables are measured using instruments such as thermometers, barometers, psychrometers, precipitation gauges, anemometers, and wind vanes. (2.1d)
- Temperature and precipitation patterns are altered by:
  - natural events such as ENSO and volcanic eruptions
  - human influences including deforestation, urbanization, and the production of greenhouse gases such as carbon dioxide and methane

Important Science Standards

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

Common Core State Standards

- ELA/Literacy
  - RST.9-10.1: Cite specific textual evidence to support analysis of science and technical texts, attending to the precision of language, including the narration of historical events, scientific procedures/experiments, or technical processes.
  - RST.9-10.2: Draw evidence from informational texts to support analysis, reflection, and research. Make sure evidence:
    - is precise details of explanations or descriptions.
    - is presented with transition words, phrases, or signals (e.g., because, also, another, further, however, therefore) to connect ideas and
data.

Environmental Guidelines for Learning

- Instructional Strategies:
  - 91f0bc55c72d.pdf
  - On the Web:
    - http://resources.spaces3.com/89c197bf-e630-42b0-ad9a-91f0bc55c72d.pdf

Tables—Reference Tables for Physical Science—That Are Relevant to the Unit

- Selected Properties of Earth’s Atmosphere (p14)
- Pressure (p13)
- Temperature (p13)
- Relative Humidity (%) (p12)
- Dewpoint (°C) (p12)
- Setting/Earth Science
- Tracking Energy and Matter

Energy and Matter: Flows, Cycles, and Conservation

- Energy drives the cycling of matter within and between systems.
- Stability and Change:
  - For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand.

NGSS Cross-Cutting Concepts

- HSN.Q.A.1: Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
Topics Across the Grades that Support Understanding of Weather/Meteorology

- Grade 2: Earth Materials: Forces and Motion
- Grade 3: Matter (weight, temperature, volume); Energy (heat, motion)
- Grade 4: Properties of Water (water cycle in nature); Interaction of Air, Water, Land (evaporation; condensation)
- Grade 5: The nature of science (hypotheses, problem solving, explanation); Changes in the surface of the planet; weathering; Rock cycle

Topics Across the Grades that Support Understanding of Weather/Meteorology

- Grade 7: Geology (rock cycle; atmospheric effects on earth, weathering, erosion)
- Grade 8: (Forces and motion on Earth); The Sun, Earth and Moon System (in dynamic interaction); Humans and the Environment (pollution, global warming, climate change, etc.)
Teaching Science Through Inquiry

The BSCS 5E Instructional Model
(Biological Sciences Curriculum Study)

Inquiry Classrooms
Language in the Service

As We Go: Think About How Each Phase in the Cycle Promotes Language Acquisition

“The 5 E’s”
5E Instructional Model

Provides a planned sequence of instruction that places students at the center of their learning experiences encouraging them to explore, construct their own understanding of scientific concepts and relate those understandings to other concepts.

Role of the Teacher

The teacher acts as a guide: raising questions, providing opportunities for exploration, asking for evidence to support student explanations, referring students to existing explanations, correcting misconceptions and coaching students as they apply new concepts.

All of this involves eliciting language from students and providing them with language to express their ideas.
**Engage**

**Purpose:** Make connections to what students already know, generate curiosity, capture students’ interest, raise questions

- An *Engage* activity should *make connections between past and present learning experiences*
- Focus students thinking on the concept, process or skill to be learned
- Might consist of a reading, demonstration, a discussion, or other activity

**Explore**

**Purpose:** Give students a common experience; Provide cooperative hands-on learning opportunities to develop concepts, processes, and skills

- Allows students to actively work together; investigate concepts; manipulate materials so they can formulate and test hypotheses; record observations--without direct instruction from the teacher
- *Discuss observations/findings with others*
- Teacher’s role is to support students by asking probing questions, observing, listening, challenging thinking
**Explain**

**Purpose:** Students share their ideas or explain concepts they have been exploring in their own words (*accountable talk*) and listen critically to others

- *Give opportunities for students to verbalize conceptual understanding, or to demonstrate new skills and to question others or ask for clarification*
- Teacher clarifies concepts or corrects misconceptions
- *Teacher (or multimedia) formally provides definitions, explanations, while offering academic terms for concepts, processes or skills.*
- Can be didactic in nature but connects to experiences students had in the exploration phase

**Elaborate**

**Purpose:** Extend students’ conceptual understanding; allow for practice/application in new situations

- Give new experiences so learners solidify or deepen their understanding of major concepts
- Provide opportunities to clarify understanding, ask questions, practice skills, draw conclusions, record observations
- *Give opportunities to use academic language as they describe or explain phenomena*
- Students can get more information about area of interest; or teachers reteach students who need more assistance
Evaluate

Purpose: Students assess their own knowledge, skills and abilities. Teachers evaluate students’ progress towards the stated content and language objectives.

- Evaluate both language and content objectives
- Give feedback to learners
- Use to guide teacher decision-making about what to do next (move on, reteach)

The Five E’s; Not Once and Done

Teachers May Need to Re-Engage Some Students Across All Phases to Ensure Student Learning

Students May Need Several Loops Through These Phases to Be Ready to Move To the Extend Phase

A recursive cycle; interactive
Why Use Inquiry in an ELL Program?
Promotes Language and Content Development Using Sheltered Instruction Methodologies

Characteristics of Sheltered Instruction

- Comprehensible input
- Positive Affective environment
- High levels of student interaction, including small-group and cooperative learning
- Student-centered
- More hands-on tasks
- Careful, comprehensive planning, including selecting key concepts from core curriculum

(Echevarria & Graves, 1998)
Adapted from: Building Connections in the Content Areas through Sheltered Instruction
Let’s Look at Our Model Unit:
What Will the Weather Be?
(Chapter 18)

**Science:** Weather Forecasting;
Earth and Space Science;
Weather and Climate

**Technology:** National Weather Agency Websites, Computers for Data Collection and Analysis, etc.

**Engineering:** Creating Weather Instruments and Collection Vehicles (satellites, balloons, airplanes, buoys)

**Math:** Measuring Temperature, Wind Speed, Direction, Air Pressure, Humidity, etc.
### Connections to NGSS Standards

- **EARTH AND SPACE SCIENCES**
- **Core Idea:** Earth’s Systems (ESS2)
- **ESS2.D:** Weather and Climate

> By the end of grade 5: Weather is the minute-by-minute to day-by-day variation of the atmosphere’s condition on a local scale. Scientists record the patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next.

---

### Harvey and Goudvis, 2000

**Six Key Reading Comprehension Strategies**

- Making Connections (Text-to-self, text-to-text; text-to-world)
- Questioning
- Visualizing
- Inferring
- Determining Importance
- Synthesizing
Makings Connections
Making predictions and connections during reading is an important component of effective reading instruction. Helping students make these connections is vital to comprehension. Here are some strategies for helping students make connections while reading:

- **Anchors:** Use familiar stories or characters to connect new information to prior knowledge.
- **Use of illustrations:** Encourage students to make connections between the text and the illustrations.
- **Vocabulary:** Help students make connections between new words and their prior knowledge.
- **Questions:** Ask students to predict what will happen next or how the story will end.
- **Summary:** Have students summarize what they have read so far and connect it to their own experiences.

Inference
Inference involves reading between the lines, making inferences about what is not explicitly stated in the text. To improve inference skills, teachers can:

- **Model Inference:** Show students how to make inferences by modeling the thought process aloud.
- **Scaffolding:** Provide support for making inferences at first, gradually reducing support as students become more proficient.
- **Discussion:** Encourage students to discuss their inferences with peers.

Deciphering Importance
Deciphering the importance of a text is an essential skill. Teachers can:

- **Prioritize:** Help students identify the most important ideas in the text.
- **Summarize:** Teach students how to summarize key points.
- **Evaluate:** Encourage students to evaluate the importance of different ideas.

Working Strategies
Working strategies involve organizing and processing information effectively. Teachers can:

- **Organize:** Teach students how to organize information using graphic organizers or other tools.
- **Process:** Model the thinking process while reading.
- **Practice:** Provide opportunities for students to practice working strategies.

Tools to Enhance Comprehension
Tools to enhance comprehension include strategies such as summarizing, questioning, and note-taking. Teachers can:

- **Summarize:** Teach students how to summarize key points.
- **Question:** Encourage students to ask questions during reading.
- **Note-Taking:** Teach students how to take effective notes while reading.
Two Weather-Related Toolkit Lessons: Lessons 4 and 5: Lightening

4. Text Signposts (captions, labels, maps, titles, photographs)

5. Merging Your Thinking with New Learning ("I learned that…..; I never knew…….; I used to think that...")

Our Paired Books

Student Books: Come on Rain
What will the Weather Be
ESS2: Earth Systems
ESS2.D Weather and Climate
The CCSS include a staircase of increasing text complexity from elementary through high school keyed against recalibrated Lexile scores.

**Quantitative Measures and the CCSS**

<table>
<thead>
<tr>
<th>Grade Band</th>
<th>Old Lexile Ranges</th>
<th>CCR Lexile Ranges</th>
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<td>2-3</td>
<td>450-725</td>
<td>420-820</td>
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<tr>
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</tr>
<tr>
<td>6-8</td>
<td>860-1010</td>
<td>925-1185</td>
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<td>9-10</td>
<td>960-1115</td>
<td>1050-1335</td>
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<tr>
<td>11-CCR</td>
<td>1070-1220</td>
<td>1185-1385</td>
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What makes a text rigorous?

ESL Website http://esl.ncwiseowl.org/

ESL Website http://esl.ncwiseowl.org/

Grade 1: 190-530

Our books

Overlapping Lexile Bands:
Grade 1: 190-530
Grade 2-3: 420 to 820
Grade 4-5: 740-1010
Grade 6: 925-1185

www.nsta.org/publications/
ostb.ostb2013.aspx
Outstanding Science Trade Books for Students K-12
Joint project of the National Science Teachers Association and the Children’s Book Council

TextProject.org
Free downloadable informational texts for Beginning Readers
Let’s Look at Our Books for Reading and Language Demands

Reading Level 3.9
Lexile 780
GRL=P DRA=38

Reading Level 3.6
Lexile 500
GRL=O DRA = 34

Consider Language Demands

What Proficiency Levels Can Handle Each Of Our Books?

- Entering
- Emerging
- Transitioning
- Expanding
- Commanding
The sound of a heavy truck rumbles past.

Uneasy, Mamma looks over to me. “Is that thunder, Teesie?” she asks.

Mamma hates thunder. I climb up the steps for a better look.

“It’s just a truck, Mamma,” I say.

I am sizzling like a hot potato.

I ask Mamma, “May I put on my bathing suit?”

“Absolutely not,” Mamma says, frowning under her straw hat.

“You’ll burn all day out in this sun.”

Look at Page 1 of Come On Rain

Up and down the block,
 Tear pant,
 Hard waters off tar patches in the broiling alley-way.

Miz Grace and Miz Vera tend, tending beds of drooping lupine.

Not a sign of my friends Lu or Rosemary,
 not a peep from my soul Jackie joyce.

I stare out over rooftops,
 past chimneys into the way off distance.
 And that’s when I see it coming,
 clouds rolling in,
 gray clouds, hunched and hugging under a purple sky.

A creeper of hope circles ‘round my bones,
 “Come on, rain!” I whisper.
Weather forecasts tell us what kind of weather is coming. But predicting the weather is hard to do. It is easy to see what the weather is like right now. You can go outside and look. Is the air warm or cold? Is it windy or still? Is the sky clear? Or is it covered with dark clouds? Whatever the weather is like, it often stays that way for days at a time.

Entering
Emerging
Transitioning
Expanding
Commanding

Old Air

Sometimes it is cooler air from the north. Sometimes it is warmer air from the south. The cold air pushes against the old air. The place where this happens is called a front. Most changes in the weather occur along fronts.

Entering
Emerging
Transitioning
Expanding
Commanding

Where cold air pushes against warm air, we say there is a cold front. Cold fronts move fast. They can make the wind howl. They quickly push warm air up and out of the way. The rising air carries water. The water is not a liquid. It is a gas called water vapor. As the air rises, it cools, and the water vapor turns to liquid high in the sky. The drops of liquid water clump together and make clouds.
Add Informational Books for Lower Proficiency Students

Lexile 280
GRL=J
DRA 28
Lexile 400-499
GRL L, M


Add Informational Books for Higher Proficiency Students

Lexile 820
Grade Level 4.8

Available in Spanish

Weather: An Introduction to Weather

What does the word "weather" mean to you? Everyone knows how to describe the weather. There are beautiful sunny days with blue skies and then there are gray rainy days perfect for staying in bed. But do you know what actually causes weather? The picture above show the forecast for a week. Soon you will know what causes different types of weather!

Let's start with a scientific definition of weather. Weather is the state of the atmosphere at a given time and place. Four main ingredients determine the weather: temperature, humidity, wind speed and direction, and air pressure.

Temperature is the heat of the air. When the sun shines down on earth, it warms up the earth's surface. But that is not all that happens. The warmth of the sun also heats up the water on earth. This process is responsible for many changes in weather and weather patterns. A thermometer measures temperature.

Humidity is the amount of water in the air. The air always has water in it, even though we cannot always see it. Most of the weather conditions that we can observe come from humidity. Clouds, rain, and snow all have to do with humidity.

Wind speed and direction carry the weather. They also help weathermen predict the weather. Weathermen can measure wind speed and direction to determine how fast a storm is moving. Often the winds blowing far up in the Earth's atmosphere are different than the winds we feel on Earth.

Air Pressure has to do with the thickness of air. To understand air pressure, imagine you are standing in a room packed with people. There is a lot of pressure in the room. You can feel the person behind you hitting your elbow. If someone opens up a door into an empty room, people will start moving into the empty room until there are about the same number of people in both rooms. Air particles move in this way. They always move from an area of high pressure to an area of low pressure. A barometer measures air pressure.

All of the weather's four main ingredients interact with each other. As air particles respond to changes in pressure and move, they create wind. When it is cloudy, many of the sun's rays never reach the earth. What does this do to the temperature?

---

Lexile 700
2nd-3rd Grade
Rain

For many people around the world, summer brings thunderstorms. Warm, wet air and strong winds help to create thunderstorms. But thunderstorms don’t happen in every part of the United States. The states along the Pacific Ocean don’t get as many thunderstorms as the states along the Gulf of Mexico. Some areas of Florida have thunderstorms once a day for most of the summer!

The best place to be during a thunderstorm is inside a building. Lightning from a thunderstorm can be very dangerous. Just before a thunderstorm, the air may feel like there is electricity in it. When people start feeling electricity in the air, they know a thunderstorm is on the way. People start heading inside buildings so they can be safe during a thunderstorm.

Part of what makes summers so hot is also what causes thunderstorms. As heat from the sun beats down on Earth, the heat evaporates some of the water in lakes and oceans. The evaporated water stays in the air. This evaporated water makes the air feel heavy and humid. Humid air is what makes you feel hot and sticky during the summer.

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So how are thunderstorms created? You can read about it here without getting wet!

Hot Air, Cold Air

Part of what makes summers so hot is also what causes thunderstorms. As heat from the sun beats down on Earth, the heat evaporates some of the water in lakes and oceans. The evaporated water stays in the air. This evaporated water makes the air feel heavy and humid. Humid air is what makes you feel hot and sticky during the summer.

Warm humid air usually does not stay in one place. The wind can move it higher in the sky where it will cool off. When warm/humid air coastal, it forms clouds. As water moves from lakes and oceans to the air, the clouds get bigger and bigger.

In summer, the air near the ground is hotter than it is during other seasons of the year. When the hot air mixes with cool air from another area, there will be changes in the weather. Greater differences between the temperatures of the hot and cool air will cause greater changes in the weather. Imagine putting an ice cube in a warm drink. As soon as the ice hits the warm drink, it will crack and pop. But, if you put the ice cube in a cool drink, it will not crack or pop as much. When warm and cooler clouds get close to one another, there may be some popping and cracking as the thunderstorms change. There may be more cloud or storms. A thunderstorm may be on its way.
Issue Overview: El Nino and La Nina

By Bloomberg, adapted by Newsela staff on 09.28.16

Word Count 748

Lexile 890

5th Grade

When the Pacific Ocean around the equator gets just a little warmer, terrible things can happen. Thousands of people around the world could die as the weather changes dramatically. Some countries may lose a lot of money. The weather destroys precious crops. Prices of goods, ranging from nickel to coffee, will rise. The countries that normally buy these products no longer afford them. The countries that sell them will therefore no longer get paid.

Then, when the waters cool, the patterns shift. Areas that were previously spared could experience devastating hurricanes, floods or drought. This cycle changes the damaging effects from one place to another based on the stage it is in.

The whole cycle is known as El Nino-Southern Oscillation. It is made up of El Nino, the Pacific’s warm phase; La Nina, the cold phase, and a neutral one in between. This cycle tends to play itself out every two to seven years.

The Situation

The El Nino that the U.S. declared in March 2015 was pronounced over in June 2016. Both the Australian and U.S. weather agencies have issued La Nina watches. The U.S. believes that La Nina could develop between July and August. The latest El Nino has been the

Lexile 1660

6th to 8th Grade
Let’s Read the PDF file of book pages

As You Listen—Note the main topics of the book

Frontloading Background Knowledge

- Washington, DC (location, climate)
- Inches, miles per hour
- Winter clothing (hats, scarves, coats, boots)
- Snow (shoveling, scraping windshields, cleaning off cars); airport closures
- Seasons in North America; East Coast; farmers/frost
- TV weather reports; weather maps of the US
- Directions (N, S, E, W)
- Earth as a planet with atmosphere
**Big Ideas**

*Weather* = Atmospheric Condition on a Local Level; Scientists *record the patterns of the weather* so they can make predictions.

---

**Planning Objectives--Primary and Secondary:**

1. **Content**
2. **Language**
3. **General Learning Skills & Strategies**

---

Tie to State Standards
Content Objective: Explore various weather instruments and how they help meteorologists predict the weather

Communicative: Ask and Answer questions
Linguistic: 3rd person (sing/pl) (clouds form; skies stay clear, air rises)

Find Two More Examples of 3rd Person Verbs: One Singular; One Plural
ACTIVITIES:

- Exploring weather instruments (weather instrument stations)
- Explaining cold fronts
- Collecting Weather Data/Weather Reports

Function Words:
- Answer questions
- Guess
- Tell
- Explain
- Describe
- Name, List
- Make observations
- Predict
- Show
- Draw and Label

Skills

- Read charts, graphs and diagrams
- Use the internet to research information (through online virtual meteorological centers—NOAA, National Weather Service)
  - [www.weather.gov](http://www.weather.gov)
  - [www.noaa.gov](http://www.noaa.gov)

Strategies

- Use a model or diagram as a prompt
- Work with a partner to practice your explanation
- Use pictures and visuals to support comprehension, etc.

RI.1.6 Distinguish between information provided by pictures or other illustrations and information provided by words in a text

RHST 6-8.5(Rdg. History/Social Studies, Science and Technical Subjects): Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g. in a flowchart, diagram, model, graph, or table).
Types of Graphics:
- Photographs (labeled or not labeled)
- Captioned Graphics
- Cross-sectional diagrams

- **Alternate Route to Information** (supplemental)
or
- **Visuals that Extend the Text**

60% of graphics in Gr.2-3 info texts convey information not given in the text (Fingeret, 2012)

CCSS emphasize understanding and using graphical elements

---

**Reading Weather Maps**

Weather Map

- wind direction
- cold air in NW is 0~10°
- warm air in SE is 50~60°
- cold front
- warm front

Page 7
Understanding Design and Color Coding
Teach by giving a graphic organizer (Venn) to show what information was found in the text and what information was found in the graphics (or found in both)

- Use Instructional Conversations:
- Do the illustrations match the words?
- What is the author trying to tell us with the graphics?

Background

A Framework for K-12 Science Education suggests that by the end of grade 5 students have some basic understanding or science content, including the fact that scientists must make the weather across different times and areas to predict what might happen next. Even without additional knowledge and experience, it is possible to use simple ideas to understand and explain the weather. The likelihood of weather events can be difficult to predict. However, knowing some basic information about weather and how to make sense of it can give you an idea of what might happen next.

- Most changes in weather occur during days, which is the boundary between two different air masses. A cold front occurs when cold air moves against warmer air. These cold fronts usually move at a faster rate than warm fronts. When a cold front moves in, the sky usually clears, and the weather is typically cloudy. Warm fronts occur when warm air moves against cold air. These fronts move much more slowly than cold fronts and produce weather changes in a more gradual manner. They may cause thunderstorms, as well as light rain. After a warm front passes, the sky usually clears, and the weather is warmer.

- Background Knowledge for the Teacher

Even More Achieve Perfect Science Lessons
Talk to Your Partner:

What facts did you refresh?

Focus Your Vocabulary/Language Development Work on Proficiency-Appropriate Targets
Word Learning Opportunities
From What Will the Weather Be?

- Descriptive Terms:
  - Air: warm, cold, cooler, warmer
  - Conditions: windy, cloudy, snowy
  - Other: big, dark(er), sudden, wispy, puffy, slowly, predictable

- Verbs:
  blow, move in, occur, move fast, howl, push up, push out, make clouds, clump together, rises, falls

- Meteorologists: predict, measure, find out
- Directions: north, south, east, west
- Nouns: clouds, sky, air, front, shower, drizzle, rain, air, air pressure, water vapor, thunder, lightening, snow, humidity; ocean, land

Learning Vocabulary/Language Practice
Grover/Sesame Street: (*)
https://www.youtube.com/watch?v=tmO9cjsj1zc
Learning Vocabulary:
https://www.youtube.com/watch?v=uwTinezUx-Y

Weather songs (*)
https://www.youtube.com/watch?v=Acp2AWpB93w
https://www.youtube.com/watch?v=-dxbC4-nlEc
With words:
https://www.youtube.com/watch?v=W5t5j89CrRq

Weather Instruments Prezi: (6th)
https://www.youtube.com/watch?v=tzLQC_2gRYA
No sound:
https://www.youtube.com/watch?v=grBVyASNLxM
Word Fact #6: The networks in informational texts are topical with interrelated concept clusters.

Designing Mixtures

- absorb
- combine
- dissolve
- property
- soluble
- acid
- abrasive
- odor

Substance

- ingredient
- mixture
- pure
- solution
- chemical

Weather Fronts

Concept Map

Name ___________________________ Date ________________
Class/Subject ________________________ Teacher ________________
Practicing Oral Academic Language
Moving from Social to Academic Language

Building In Language Learning Opportunities into Our Lesson
What Academic Language Could You Practice with this Form?

<table>
<thead>
<tr>
<th>Instrument</th>
<th>What I Think It Measures</th>
<th>What It Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermometer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WindVane</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anemometer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hygrometer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barometer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Temperature In Degrees
- Wind Speed
- Direction
- Humidity “I think…”
- Air Pressure
- Amount of Weight In Pounds
- Measures

“I know…”

NWS=National Weather Service
Use Posters to Allow Students Opportunities to Use Academic English and to Give Explanations of Complex Science Concepts

Use visuals for practicing giving scientific explanations and using complex language and academic vocabulary.
### Mentor Text for Sentence Variety

<table>
<thead>
<tr>
<th>Compound</th>
<th>Complex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two sentences joined by: for, and, nor, but, or, yet, so (FANBOYS) or a semicolon</td>
<td>Combination of Dependent and Independent clauses (introductory clause, clause set off by commas)</td>
</tr>
</tbody>
</table>

Find Two of Each on Pages 3-4-5 and 7

---

### Recycle Core Vocabulary During Small Group/Pair Activities

**Pair Share: What Activities Would Recycle Core Vocabulary?**
Encourage Interaction

- Partners are best
- Provide cooperative learning tasks with task interdependence
- Plan good language learning partners—adjacent proficiency levels are best
Listen to the story. How does the dramatic presentation help comprehension?

Chapter 18

Come On, Rain!
By Karen Hesse
Illustrated by Jon J. Muth

"Come on, rain!" I say, squinting into the endless heat.

Mamma licks a listless vine and sighs. "Three weeks and not a drop," she says, sagging over her parched plants.

The sound of a heavy truck rumbles past. Uneasy, Mamma looks over to me. "Is that thunder," she asks, "or just a truck, Mamma?"

I climb up the steps for a better look. "It's just a truck, Mamma," I say.

I am sizzling like a hot potato. "May I put on my bathing suit?" I ask Mamma.

"Absolutely not," Mamma says, frowning under her straw hat. "You'll burn all day out in this sun."

Up and down the block, cats pant, heat waves off tar patches in the broiling alleyway. Miz Grace and Miz Vera bend, tending beds of drooping lupines.

Not a sign of my friends Liz or Rosemary, not a peep from my pal Jackie Joyce. I stare out over rooftops, past chimneys, into the way off distance. And, that's when I see it coming, clouds rolling in, gray clouds, bunched and bulging under a purpose sky.

A creeper of hope circles 'round my bones. "Come on, rain!" I whisper.

Quietly, while Mamma weeds, I cross the crackling dry path past Miz Glick's window… glistening inside as I hurry by. Miz Glick's needle sticks on her phonograph, playing the same notes over and over in the dim, stuffy cave of her room.

The smell of hot tar and garbage bullies the air as I climb the steps to Jackie Joyce's porch.

"Jackie Joyce?" I breathe, pressing my nose against her screen. Jackie Joyce comes to the door. "Her long legs, like two brown string beans, sprout from her shorts," I whisper, pressing my nose against her screen.

"It's going to rain," I whisper. "Put on your suit and come straight over." Slick with sweat, I run back home and slip up the steps past Mamma. "She is nearly senseless in the sizzlin' heat," kneeling over the hot rump of a melon.

In the kitchen, I pour iced tea to the top of a tall glass. "I aim a spoonful of sugar into my mouth, then a second into the drink. Got you some tea," Mamma says, pulling her inside the house. "Listen to the story. How does the dramatic presentation help comprehension?"

Reading Level 3.9
Lexile 780
GRL=P
First five minutes: Underline All the Vivid Verbs You Hear

https://www.youtube.com/watch?v=o3gh2U-H3dk&list=ELpxERACgplKxBWFHkipdCXA&index=3

https://books.google.com/books?id=kVfkCgAAQBAJ&printsec=frontcover&dq=Come+On+Rain&hl=en&sa=X&ved=0ahUKEwibhsiJ3b_QAhWJTZAHTIJCy4Q6AEIHTAA#v=onepage&q=Come%20On%20Rain&f=false

Momme lifts a lettuce vine and sighs.
"Three weeks and not a drop," she says, niggling over her parched plants.
Use Mentor Text to Model Language Use for ESL Students

Zoom In

Come On, Rain!

VIVID VERBS
- chase
- splash
- squeal
- whoop
- make a racket
- rush out
- skid
- fling off
- toss
- join
- shimmy
- sparkle
- streaks
- twirl

- sway
- tromp
- romp
- reel
- swing
- laugh
- get a soaking

IMAGERY: sizzling like a hot potato

Regular and Irregular Verbs

Find 2 more on page 1
"Get you some tea, Mamma," I say, pulling her inside the house.

Mamma sinks onto a kitchen chair and sweeps off her hat. Sweat trickles down her neck and wets the front of her dress and under her arms.

Mamma presses the ice-chilled glass against her skin. "Ain't nothin', Tense, she says. I nod,smarty.

"Rain's coming, Mamma," I say.

Mamma turns to the window and sniffles. "It's about time," she murmurs.

Sinks
Sweeps
Trickles
Wets
Presses
Nod
Turns to
Sniffs
Murmurs

One of Our Six Key Comprehension Strategies

Use Visualization—Help Children Appreciate Rich Descriptive Text by Making a Picture in Their Mind

Rich Descriptive Language

Reading Level 3.6
Lexile 500
GRL=O
Jackie, Joyce, Liz, Rosemary and I, we grab the hands of our mamas.

We twirl and sway them,
tromping through puddles,
romping and reeling in the misty green air.

I hug Mamma hard,
and she hugs me back.
The rain has made us new.

As the clouds move off,
I trace the drips on Mamma's face.
Everywhere, everyone, everything
is misty limbs, springing back to life.
COME ON, RAIN!

by Karen Hesse, illustrated by Jon J. Muth
(Scholastic Press)
Themes: Families, Growth and Change, Multiculturalism, Nature and Seasons, Neighbors
Grade Level: K–3  (ages 5–8)
Running Time: 8 minutes

SUMMARY
This book recounts the natural drama of a summer rainstorm, beginning with “endless heat,” building in suspense as clouds roll in, and exploding in relief when the raindrops finally fall. The story is set in a city neighborhood and is told from the viewpoint of a young African-American girl who can’t wait to play in the rain. The words and pictures appeal to all the senses and draw the viewers into the suspense. When the rain finally comes, the children’s joy infects the adults as everyone dances to welcome the shower.

OBJECTIVES
• Children will watch and listen to a story about the coming of rain.
• Children will identify words and pictures that describe the senses of touch, sight, sound, hearing, and taste.
• Children will describe the progression of events in a summer rainstorm.

BEFORE VIEWING ACTIVITIES
Present the title to the students and ask them to describe occasions on which they have really wanted it to rain. Encourage them to remember details (such as temperature and wind) that preceded a rainstorm. Ask them to keep their own experiences in mind as they view the program.

AFTER VIEWING ACTIVITIES
Discuss the title again, in light of what children saw and heard in the story. Ask them to recall the feelings of the characters at various points in the story and to compare the feelings of the girls and their mothers. Why did they look forward to rain? Why were they so happy when the rain came? How did they feel after the rain passed? Go back over the program, pointing out the words and pictures that expressed the people’s feelings.

Watercolor painting, which was used to illustrate this story, is a useful way to connect art and science. Have students use watercolor painting to observe the properties of water. Show them how to cover the paper with a wash. Have them add blue or gray paint almost immediately and observe how the paint spreads on the page. Wait until the paper partially dries and then have them paint again, comparing the results with totally wet painting. Encourage students to experiment with forming clouds, splattering water to “draw” raindrops, and pooling water to create puddles. After their experiments, encourage children to apply the techniques they’ve learned by making watercolors about weather.

Connect the story to geography and social studies by discussing the rain cycle on a much larger scale. Show students how to consult almanacs to find annual rainfalls in different places around the country and around the world. For example, compare annual precipitation in New York, Hawaii, and Arizona or in Ireland and Afghanistan. Have older students prepare reports on how people live in drier and wetter parts of the world.

Use one or more of the programs listed below to make further connections between science, social studies, and literature.

Other related videos and films available from Weston Woods include:
THE SNOWY DAY, by Ezra Jack Keats
TIME OF WONDER, by Robert McCloskey

CALL 1-800-243-5020 TO ORDER THESE AND OTHER WESTON WOODS VIDEOS!

Language Development
Come on Rain

Sample of Weston Woods Video:
http://bcove.me/h1o67qje

READ ALOUD MODELING:
http://dev.nlmusd.k12.ca.us/literacy_media/media_pages/Read_Aloud/RAa8A_8_063.html
https://www.youtube.com/watch?v=oJP4hBBb_mE
(library read aloud video)
ALSO AVAILABLE AS AN AUDIOBOOK
Descriptive Words

Adverbs:
- Absolutely
- Suddenly

Adjectives:
- Hot
- Cool
- Stuffy
- Open (windows)
- Parched
- Drooping
- Listless
- Endless
- Sizzling
- Swollen (sky)

Touch--Descriptive Words

Which Words Could You Use in Retelling the Story?

- Boiling
- Drenched
- Moist
- Breezy
- Dry
- Scalding
- Burning
- Dusty
- Scorching
- Clammy
- Freezing
- Slick
- Cold
- Hot
- Slippery
- Cool
- Humid
- Sticky
- Crisp
- Limp
- Warm
- Damp
- Melted
- Wet
Comparative
Superlative
Adjectives

- Hot
- Long
- Tall
- Thin
- Wet
- Hard
- New
- Wide
- Big
- Cool
- Heavy
- Bold
- Deep
- Fresh
- Clean
- Moist
- Sweet
- Dim
- Slick

-er
-est

Word Work: Forms of words

- Endless, listless, senseless
- Absolutely, Suddenly
- Sizzling, frowning, broiling, crackling-dry, glancing, pressing
Absolutely
Suddenly

Model How to Use Adverbs In Their Writing: Mentor Text

When Reading: Focus In On The Vocabulary That’s Right for Your Students’ Proficiency Level

Leveled Vocabulary Development
<table>
<thead>
<tr>
<th>Language Form</th>
<th>Entering/Emerging</th>
<th>Developing</th>
<th>Expanding/Bridging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nouns (5-6)</td>
<td>Steps Rain Porch Thunder Door Lightening Kitchen Sun Bathing Suit Clouds</td>
<td>Friends/pal Rooftop(s) Chimney(s) Screen Plant Skin Face Raindrops a Soaking Breeze</td>
<td>Drink Racket Spoonful a drink a Sip Peep</td>
</tr>
<tr>
<td>Verbs (4-5)</td>
<td>Say Ask(s) Come(s); Coming Run(s) Come on Put on</td>
<td>May I? Sigh Hate(s) Blow(s) Burn Shout Stare Knock Whisper Frown(ing)</td>
<td>Rumble Cross Burst Climb Press(es; ing) Squeal Murmurs Roll in Trickle Descend Fling off</td>
</tr>
<tr>
<td>Prepositions (3-4)</td>
<td>Over Out/In Up/Down</td>
<td>Of Other</td>
<td>Around With Through Against Toward</td>
</tr>
<tr>
<td>Conjunctions (2-3)</td>
<td>And Or</td>
<td>As While As While</td>
<td></td>
</tr>
<tr>
<td>Adjectives/Adverbs (4-5)</td>
<td>Three Gray Hot Long Tall Big Some All</td>
<td>Endless Swollen Drooping Broiling Absolutely Quietly</td>
<td>Parched Senseless Listless Sizzling Streaming Ice-chilled When</td>
</tr>
</tbody>
</table>

**Teaching Phrases**

**Figurative Language**
- Sizzling like a hot potato
- Like two brown string beans
- Fresh as dew
- (Music from Miz Glick’s phonograph) shimmies and sparkles and streaks like night lightening

**Common Phrases**
- Spring back to life
- And just like that….
- Not a sign of….(rain)
- Not a drop; Not a peep
- Not a sign of (her, him)
Language Learning Opportunities

Come on Rain City setting words: alleyways, blocks, rooftops, porches, open windows, stuffy rooms, hot tar, (door) screens

- Plants: parched plants, drooping lupines, listless vines
- Heat images: endless heat, *sizzling like a hot potato*, cats pant, heat wavers off tar patches, sweat, sizzling heat, hot (cool)

- Weather words: thunder, clouds, sky (swollen sky), rain, wind, (rain)drops, air, lightening, dew
- Verbs: chase, splash, squeal, whoop, make a racket, rush out, skid, fling off, toss, join, shimmy, sparkle, streaks, twirl, sway, tromp, romp, reel, swing, laugh, get a soaking

L.1.5.A: Sort words into categories to gain a sense of the concepts the category represents

<table>
<thead>
<tr>
<th>Story Word</th>
<th>Beyond Story</th>
</tr>
</thead>
<tbody>
<tr>
<td>amazed</td>
<td>enchanted, enthralled</td>
</tr>
<tr>
<td>fascinated</td>
<td>spellbound, captivated</td>
</tr>
<tr>
<td>marveled</td>
<td>transfixed</td>
</tr>
<tr>
<td>baffled</td>
<td>confused, mystified, perplexed</td>
</tr>
<tr>
<td>bewildered</td>
<td>perplexed, confounded</td>
</tr>
<tr>
<td>stumped</td>
<td></td>
</tr>
</tbody>
</table>

The networks in narrative texts are synonyms related to story elements (e.g., traits, actions, and emotions of characters).
Generative Word Strategy #5

• Teach students about the rich networks of similar-meaning words from which authors of narratives choose words for traits/attributes, emotions, motion, and communication.

<table>
<thead>
<tr>
<th>Story Word</th>
<th>Beyond the Story</th>
</tr>
</thead>
<tbody>
<tr>
<td>endless</td>
<td>Continuous, limitless, unending, incessant</td>
</tr>
<tr>
<td>parched</td>
<td>Withered, scorched, thirsty, shriveled</td>
</tr>
<tr>
<td>drooping</td>
<td>Limp, wilting, withering</td>
</tr>
<tr>
<td>swollen</td>
<td>Inflated, puffed, bloated</td>
</tr>
</tbody>
</table>

Let’s find related words for our fiction text:

<table>
<thead>
<tr>
<th>Term in the book</th>
<th>Related words to teach</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. broiling</td>
<td></td>
</tr>
<tr>
<td>2. sizzling</td>
<td></td>
</tr>
<tr>
<td>3. glancing</td>
<td></td>
</tr>
<tr>
<td>4. glistening</td>
<td></td>
</tr>
<tr>
<td>5. soaking</td>
<td></td>
</tr>
<tr>
<td>6. squealing</td>
<td></td>
</tr>
</tbody>
</table>
Bridging from Oral Academic Language to Academic Writing

Comparison/Contrast
Summary
Cause/Effect
Explanation

Writing Frames: Fiction Summary

W.1.2: Write informative/explanatory texts in which they name a topic, supply some facts about the topic and provide some sense of closure.

RHST.6-8.2: Determine the central ideas or conclusions of a text: provide an accurate summary of the text distinct from prior knowledge or opinions.
### Academic Language Functions in Scientific Writing

- Describe patterns
- Construct an argument with evidence
- Ask questions
- Give explanations
- Explain cause and effect
- Design problems

### Practice Writing Word Definitions

- Meteorologists
- Tools used to Measure the Weather
  - Thermometer
  - Anemometer
  - Wind Vane
  - Hydrometer
  - Barometer
Comparing Warm Fronts and Cold Fronts

Complete the Venn Diagram to show the similarities and differences between a cold front and a warm front.

Cold Fronts

Warm Fronts

Both

School-Home Connection: Have students take this page home to share with family members. They can use it to tell what they learned about predicting weather.
**Contrast**

**How Things Are Different**

When you contrast two or more things, you show how they are different.

Contrasting does not always mean good vs. bad. It also means how one thing is simply different from another.

Examples of Opening Statements

- There are several ways that ____ and ____ are different.
- There are several ways that ____ and ____ differ.
- ____ and ____ are different in several ways.
- While ____ is the main difference between these two things (people, events, places, etc.), there are others.
- These include ____ , ____ , and ____.
- ____ and ____ are different because ____.

Examples of Ending Statements

- People tend to prefer dogs as pets and adventure novels in books.
- The setting in the book was fall, while the setting in the movie was winter.

**Signal Words and Phrases**

- although and yet
- at first and afterward
- by contrast conversely
- despite difference
differ
difference
different from
differently
- either/or
- even though however in contrast instead
- former/latter
- more/less than
- neither/ nor
- nevertheless
- on the contrary
- opposite
- other hand
- regardless
- otherwise
- still
- though
- unequal
- unless
- unlike
- variations vary whereas
- while
- yet

**Examples of Statements of How Things are Different**

- ____ has ____ while ____ has ____.
- ____ does ____ but ____ does not.
- ____ acted with honor, but ____ did not.
- They were opposite. ____ liked ____ while ____ did not.
- ____ rode the bus to school every day. ____ has a different view.
- Mary liked ice cream but Howard liked brownies.
- Dogs are usually friendlier than cats, but cats are cleaner than dogs. (A contrast sentence with different adjectives: friendliness/cleanliness.)
- A different view is ____.
- Another way to view this is ____.

**Questions**

- What two or more things are being contrasted?
- What are the details to show how they differ?
- How do the things being contrasted differ?
- In what ways are these things different?
- In what ways are ____ and ____ different?

---

**Nonfiction vs. Fiction**

<table>
<thead>
<tr>
<th>Name __________________________</th>
<th>Date _______________</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nonfiction Title</strong></td>
<td><strong>Fiction Title</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[Diagram showing Nonfiction vs. Fiction with overlapping circles for Nonfiction Title and Fiction Title]
Comparing Fiction and Non-Fiction Graphic Organizer

<table>
<thead>
<tr>
<th>Text Name</th>
<th>Fiction:</th>
<th>Non-Fiction:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viewpoint</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Important Ideas</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WHST.6-8.4: Produce a clear and coherent writing in which the development, organization and style are appropriate to task, purpose and audience.

Multiple Causes and One Effect Diagram

**Cause 1**

The wind begins to blow; Cold air moves in

**Cause 2**

Cold air pushes against the warm air

**Effect**

The clouds grow big and dark; then it rains. There may be thunder and lightening.

Warm air carrying water vapor rises and as it cools the water vapor turns to liquid and form clouds

(National Geographic)
Fill the Chart for a Warm Front

WHST.6-8.4: Produce a clear and coherent writing in which the development, organization and style are appropriate to task, purpose and audience.

SIGNAL WORDS
FOR CAUSE / EFFECT

<table>
<thead>
<tr>
<th>If . . . then</th>
<th>so that</th>
</tr>
</thead>
<tbody>
<tr>
<td>due to</td>
<td>because</td>
</tr>
<tr>
<td>as a result</td>
<td>since</td>
</tr>
<tr>
<td>therefore</td>
<td>for this / that reason</td>
</tr>
<tr>
<td>for</td>
<td>that’s why</td>
</tr>
<tr>
<td>this led to</td>
<td>Then . . . so</td>
</tr>
<tr>
<td>consequently</td>
<td>accordingly</td>
</tr>
<tr>
<td>thus</td>
<td>nevertheless</td>
</tr>
</tbody>
</table>
Cause/Effect

WHY SOMETHING HAPPENED/WHAT HAPPENED

The cause tells why something happened. The effect tells what happened.

Signal Words and Phrases

**Cause**
- why something happened
- due to
- because
- as a result of
- in view of the fact
- since
- seeing that
- because of
- as a consequence

**Effect**
- what happened
- impact
- outcome
- result
- consequence
- effect

**Cause Questions**
- What happened?
- Why did it happen?
- To whom or what did it happen?
- When did it happen?
- What brought about the action?
- What else happened because of that event?
- Is there more than one cause?
- If there is more than one cause, is one more powerful than the others?
- What was the cause?
- What are the details and examples that explain the cause?

**Effect Questions**
- What is the impact?
- Who or what is affected?
- What are the details and examples that show the effect?
- Was there one effect or more than one?
- If there was more than one effect, was one stronger or more important than the others?
- What are the consequences?

**When do I use it?**

To tell or explain how things work; how things happen in the natural world.
How do I do it?

**Introduction**
Write what is going to be explained.

**Explanation Sequence**
Use time words and connectives to describe or explain a process. You can include diagrams or flowcharts, which you will need to comment on.
How do I do it?

Concluding Statement

You may want to include interesting comments about what you have explained.

Writing Template: Explanation

<table>
<thead>
<tr>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
</tr>
<tr>
<td>General statement about the topic; A brief description</td>
</tr>
</tbody>
</table>

| Explanation |
| Series of statements written in a logical sequence explaining how or why something works. |

| What is it about? |
| What each part does? |
| How the parts work together? |

| Conclusion |
| A summary or recommendation, general comment about use or history |

Purpose: To explain the processes involved in natural and social phenomena, or to explain how something works.

Structure: General statement to introduce the topic, e.g., in the autumn some birds migrate. A series of logical steps explaining how or why something happens, e.g., because hours of daylight shorten. Continue until the final state is produced or the explanation is complete.

Explanations, e.g., many birds fly south after the signal time. E.g., then, next, several months later, etc. Use connectives, e.g., because, so, this causes...

Features:

- Present tense, e.g., many birds fly south
- Connectives that signal time, e.g., then, next, several months later
- Causal connectives, e.g., because, so, this causes...

Writer’s Knowledge:

- Decide whether diagrams, charts, illustrations or a flow chart would help to explain.
- Use a title that indicates what you are writing about.
- Use how or why in the title helps. Try to make the title intriguing, e.g., Why do sloths hang about?
- Use paragraphs, charts, illustrations or a flow chart would indicate what you are writing about. The title indicates what you are writing about. The title helps. Try to make the title intriguing, e.g., Why do sloths hang about?
- Use a paragraph to introduce your subject to the reader.
- Organise the writing and illustrations to explain: what you need, how it works, why it works (cause and effect), when and where it works, what it is used for.
- Add in extra, interesting information.
- Use questions, e.g., Did you know that...
- Draw the reader in, e.g., strange as it may seem...

Finally, re-read your explanation, pretending you know nothing about the subject – is it clear?

Adapted from The National Literacy Strategy Guidance for Writing 1/6:8.4: Produce a clear and coherent writing in which the development, organization and style are appropriate to task, purpose and audience.
**Model Explanations**

**Academic Listening Through Videos: Listening to Explanations**

- **Let’s Rate these Videos for ELL Elementary Students:** (ease of understanding; rate of speech, amount of vocabulary)
  - [https://www.youtube.com/watch?v=huKYykjcmo](https://www.youtube.com/watch?v=huKYykjcmo)
  - [https://www.youtube.com/watch?v=gNz-EeYeJ8](https://www.youtube.com/watch?v=gNz-EeYeJ8)

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**Use Mentor Text As a Model (to guide oral reporting; later writing of informational texts)**

- **Definitional Language**
  - A hygrometer measures humidity

- **Explicit Verbs**
  - Measure
  - Rises
  - Feel (damp, humid)

- **Precise and/or scientific terms**
  - Water vapor
  - Humidity
  - Damp
  - Humid

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  - Damp
  - Humid
When air pressure is low, air is rising into the sky. Water vapor in the air turns to liquid and clouds form. As more air rises, the pressure gets lower and lower. And the clouds get bigger and darker. Lots of rain or snow may fall when the air pressure is low.

Use of Introductory clauses: When air pressure is low,... As more air rises,...

Practice Listening to Explanations

http://www.brainpop.com/science/weather/

http://www.brainpop.com/science/weather/weather/preview.weml

Technology-Based

BrainPop
BrainPop Jr.
BrainPop ESL

So let’s look at some great pairings, by grade range, for common texts that extend and expand classroom study. Then, be prepared to share paired fiction-informational books to share with kids, books with the same kind of narrative arc we so love in fiction.

**Getting Started**

The best way to begin is to target a classroom content area topic. This means discussing and ideally planning with your classroom teachers. Then, be prepared to pair these informational texts that extend and expand classroom study.

So let’s look at some great pairings, by grade range, for common classroom topics. Get ready to sink into some excellent children’s literature suggestions on both sides of the library!

**Primary Grades**

Many primary grade classrooms begin the school year with a study of families in Social Studies. There is a wealth of picture book anthologies that feature families and their traditions. *Nasty Bugs* by Lee Bennett Hopkins is an excellent informational book that goes quite far beyond ordinary nonfiction books that present family as a single concept. Hopkins interviews 14 children and combines their narrative about the wide variety of families they live in. Read those interviews aloud and then encourage children in discussion of similarities and differences among the families they have read about.

Primary grade science often involves a study of animals and what better animal group to investigate than insects? You can even bring them into the library in jars or tiny cages to join you for book sharing! Start with a poetry book, which is classified as literature rather than informational text. *Nasty Bugs* by Lee Bennett Hopkins is a picture book anthology of sixteen poems written about sixteen particularly unpleasant bugs. Then select an informational book that goes quite far beyond ordinary nonfiction books that present insects as simple concepts. Instead, Hopkins interviews 14 children and combines their narrative about the wide variety of insects that can be seen in their everyday world. Read the book in advance and select several children whose faces reflect the make-up of the families in the poems you will be sharing with or the families portrayed in the picture books you have read. Read those interviews aloud and then encourage children in discussion of similarities and differences among the families they have read about.

**Nonfiction Rewind: Pairing Informational and Fiction Books**

by Toni Buzzeo

“Originally appeared in the August issue of *Kids & Books*.”

Nonfiction: When you hear the word, do your thoughts turn to a book about holidays around the world gathering dust in the 300s, during the days when we actually had time to celebrate holidays during the school day? To the series of books in your 500s with bright, appealing photographs but a rigidly unvarying format; or to the country books in your 900s, probably a source of worry as they become outdated? If so, may your heart fail to beat a little faster when I say I’d like to encourage you to read more nonfiction aloud to your students.

Some librarians I’ve spoken with in the past year have felt downhearted and even in some cases, robbed of a deep source of joy in their workdays, as the focus of reading in schools has turned more firmly in the direction of informational texts. Our librarian complained that no one “just reads a book” to children for that enjoyment. On the other hand, the work of certified teachers is to read to children while simultaneously engaging their literacy gears. And school librarians are certified teachers! Before anyone dips too deeply into a well of despair, however, I’d suggest that we consider that the term nonfiction is a way to ensure that our children are reading books that present families, for example, as a single concept. Instead, Hopkins interviews 14 children and combines their narrative about the wide variety of families they live in. Read those interviews aloud and then encourage children in discussion of similarities and differences among the families they have read about.

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Weather Websites:

- Web Weather for Kids: [http://eo.ucar.edu/webweather/](http://eo.ucar.edu/webweather/)
Using sentence frames, sentence starters and signal words to improve language

INTRODUCTION

A key reason for using sentence frames, starters and signal words is to provide a structure that students can use to improve their academic language proficiency.

Sentence Frames

Sentence frames provide a framework for students to build their sentences. These frames can be used in a variety of ways, such as to help students organize their thoughts and express their ideas more clearly.

Sentence Starters

Sentence starters provide a partial frame for students to begin their sentence or idea. These starters can be used to help students express their ideas more clearly and provide more detailed information.

Signal Words

Signal words are words and phrases that clue in the reader or listener to the purpose of the sentence. They can be used to help students express their ideas more clearly and provide more detailed information.

EXCLUSIVE CONTENT

Using sentence frames, sentence starters and signal words to improve language

INDUSTRY Pulse

Do you use sentence frames, sentence starters and signal words to improve language proficiency?

1. Yes

2. No

To help students at all language proficiency levels incorporate higher levels of language into their speech and writing, teachers can provide sentence frames, starters and signal words. These can be used in a variety of ways, such as to help students organize their thoughts and express their ideas more clearly.

Language Functions

The use of sentence frames, starters and signal words is important because it helps students express their ideas more clearly and provides a structure for organizing their thoughts.

Sentence Frames

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Sentence Starters

Sentence starters provide a partial frame for students to begin their sentence or idea. These starters can be used to help students express their ideas more clearly and provide more detailed information.

Signal Words

Signal words are words and phrases that clue in the reader or listener to the purpose of the sentence. They can be used to help students express their ideas more clearly and provide more detailed information.

Consider posting sentence frames around the room, and encourage, or even require, students to use them in their oral or written responses.

These can be dissected and shared with students.

To develop sentence frames, think through the variety of ways you could respond to a prompt, explain a concept, etc.

These forms are the structure of language and important to know the language proficiency level of each of your students.

Note the sentence starters include a variety of academic terms, some at higher levels than others.

These can be dissected and shared with students.

The following important event was ... After that ...

The first thing that happened was ...

Despite the fact that _____________ have _____________, _________ have _____________.

Whereas __________have ___________, _________have _______________.

These forms can provide you with ideas of complex or compound sentences as well; remove the key vocabulary and look for the structure of the sentences.

To help students move to higher levels of academic language, challenge them with sentence starters that are just above their current language level.

Consider posting sentence frames around the room, and encourage, or even require, students to use them in their oral or written responses.

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