Grade 6 Science
Unit # 2 Science Earth and Space Science

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Topic 5 (16 days) – Introduction to Earth's Systems
Topic 6 (23 days) – Weather in the Atmosphere
Topic 7 (19 days) – Minerals and Rocks in the Geosphere
Topic 8 (19 days) – Plate Tectonics
Topic 9 (20 days) – Earth's Surface Systems

Unit 2 Overview Students make sense of phenomena as they explore the disciplinary core ideas through the lens of crosscutting concepts, such as Systems and System Models, Cause and Effect, and Matter and Energy. Students begin their discovery of the physical world with models and observable phenomena and move to explore Earth's systems and their interactions, weather in the atmosphere, rocks and minerals, plate tectonics, and Earth's surface systems – erosion and deposition.

Unit 2 NYSSLS Performance Expectations (PE)
MS-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. [Clarification Statement: Emphasis is on the processes of melting, crystallization, weathering, deformation, and sedimentation, which act together to form minerals and rocks through the cycling of Earth's materials.] [Assessment Boundary: Assessment does not include the specific identification and naming of minerals and rocks but could include the general classification of rocks as igneous, metamorphic, or sedimentary.]

MS-ESS2-4. Develop a model to describe the cycling of water through Earth's systems driven by energy from the Sun and the force of gravity. [Clarification Statement: Emphasis is on the ways water changes its state as it moves through the multiple pathways of the hydrologic cycle. Examples of models could include conceptual or physical models.] [Assessment Boundary: A quantitative understanding of the latent heats of vaporization and fusion is not assessed.]

MS-ESS2-5. Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions. [Clarification Statement: Emphasis is on how air flows from regions of high pressure to low pressure, the complex interactions at air mass boundaries, and the movements of air masses affect weather (defined by temperature, pressure, humidity, precipitation, and wind at a fixed location and time). Emphasis is on how weather can be predicted within probabilistic ranges. Data can be provided to students (such as weather maps, diagrams, and visualizations) or obtained through laboratory experiments (such as with condensation).] [Assessment Boundary: Assessment includes the application of weather data systems but does not include recalling the names of cloud types, weather symbols used on weather maps, the reported diagrams from weather stations, or the interrelationship of weather variables.]

MS-ESS3-2. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. [Clarification Statement: Emphasis is on how some natural hazards, such as volcanic eruptions and severe weather, are preceded by phenomena that allow for reliable predictions, but others, such as earthquakes, occur suddenly and with no notice, and thus are not yet predictable. Examples of natural hazards could include those resulting from interior processes (such as earthquakes and volcanic eruptions) and surface processes (such as mass wasting and tsunamis), or from severe weather events (such as blizzards, hurricanes, tornadoes, floods, and droughts). Examples of data could include the locations, magnitudes, and frequencies of the natural hazards. Examples of technologies could include global technologies (such as satellite images to monitor hurricanes or forest fires) or local technologies (such as building basements in tornado-prone regions or reservoirs to mitigate droughts).]

MS-ESS2-6. Develop and use a model to describe how unequal heating and rotation of Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. [Clarification Statement: Emphasis is on how patterns vary by latitude, altitude, and geographic land distribution. Emphasis is on the sunlight-driven latitudinal banding causing differences in density that create convection currents in the atmosphere, the Coriolis effect, and resulting prevailing winds; emphasis of ocean circulation is on the transfer of heat by the global ocean convection cycle, which is constrained by the Coriolis effect and the coastlines of continents. Examples of models could include diagrams, maps and globes, or digital representations.] [Assessment Boundary: Assessment does not include the dynamics of the Coriolis effect.]

MS-PS1-4. Develop a model that predicts and describes changes in particle motion, temperature, and phase (state) of a substance when thermal energy is added or removed. [Clarification Statement: Emphasis is on qualitative particulate-level models of solids, liquids, and gases to show that adding or removing thermal energy increases or decreases kinetic energy of the particles until a change of phase occurs. Examples of models could include drawings and diagrams. Examples of particles could include ions, molecules, or atoms. Examples of substances could include sodium chloride, water, carbon dioxide, and helium.]

MS-ESS2-4. Develop a model to describe the cycling of water through Earth's systems driven by energy from the Sun and the force of gravity. [Clarification Statement: Emphasis is on the ways water changes its state as it moves through the multiple pathways of the hydrologic cycle. Examples of models could include conceptual or physical models.] [Assessment Boundary: A quantitative understanding of the latent heats of vaporization and fusion is not assessed.]

MS-ESS3-1 Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geologic processes. [Clarification Statement: Emphasis is on how these resources are limited and typically non-renewable, and how their distributions are significantly changing as a result of removal by humans. Examples of uneven distributions of resources as a result of past processes could include petroleum (locations of the burial of organic marine sediments and subsequent geologic traps), metal ores (locations of past volcanic and hydrothermal activity associated with subduction zones), and soil (locations of active weathering and/or deposition of rock).]

MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying temporal and spatial scales. [Clarification Statement: Emphasis is on how processes change Earth's surface at temporal and spatial scales that can be large (such as slow plate motions or the uplift of large mountain ranges) or small (such as rapid landslides or microscopic geochemical reactions), and how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes could include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.]

MS-ESS2-3. Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. [Clarification Statement: Examples of data could include similarities of rock and fossil types on different continents, the shapes of the continents (including continental shelves), and the locations of ocean structures (such as ridges, fracture zones, and trenches).] [Assessment Boundary: Paleomagnetic anomalies in oceanic and continental crust are not assessed.]

MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

Unit 1 NYSSLS Science and Engineering Practices (SEP)
- Developing and Using Models
- Asking Questions and Defining Problems
- Analyzing and Interpreting Data
- Planning and Carrying Out Investigations
- Constructing Explanations and Designing Solutions

Unit 2 NYSSLS Disciplinary Core Ideas (DCI)

ESS2.A: Earth's Materials and Systems
- All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. (MS-ESS2-1)

ESS2.C: The Roles of Water in Earth's Surface Processes
- (NYSED) Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation, sublimation, deposition, precipitation, infiltration, and runoff. (MS-ESS2-4)
- (NYSED) Global movements of water and its changes in form are driven by sunlight and gravity. (MS-ESS2-4)

ETS1.A: Defining and Delimiting an Engineering Problem
- The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that is likely to limit possible solutions. (secondary to MS-PS3-3)

ESS3.B: Natural Hazards
- Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events. (MS-ESS3-2)

ESS2.D: Weather and Climate
- Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. (MS-ESS2-6)
- Because these patterns are so complex, weather can only be predicted probabilistically. (MS-ESS2-5)
- The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. (MS-ESS2-6)

ESS3.C: Human Impacts on Earth Systems
- Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. (MS-ESS3-3)
- Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. (MSESS3-3),(MS-ESS3-4)

PS1.A: Structure and Properties of Matter
- (NYSED) Each substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it. (MS-PS1-2) (Note: This Disciplinary Core Idea is also addressed by MS-PS1-3.)

ESS3.A: Natural Resources
- Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes. (MS-ESS3-1)

ETS1.B: Developing Possible Solutions
- A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (secondary to MS-PS1-6)

ESS1.C: The History of Planet Earth
- The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale. (MS-ESS1- 4)
- Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches. (HS.ESS1.C GBE) (secondary to

MS-ESS2-3)

ESS2.B: Plate Tectonics and Large-Scale System Interactions
- Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart. (MS-ESS2-3)

Unit 2 NYSSLS Cross Cutting Concepts (CCC)
- Patterns
- Cause and Effect
- Scale, Proportion, and Quantity
- Systems and Systems Model
- Stability and Change
- Energy and Matter

Resources
- Savvas Elevate Science Book NY Edition Course 1 Topics 5-9
- Savvas Easybridge (access via BPS Staff Resources or Clever)
- Savvas Lab materials
- http://ngss.nsta.org/Classroom-Resources.aspx

Measurement of Student Learning
- Lesson Quiz
- Topic Assessment and Remediation
- Evidence-Based Assessment
- Quest Rubrics
- Exam view Assessments

Savvas Elevate Science Supports
- Topic Differentiated Instruction in TE
- Topic Remediation Summary in TE
- ELL Support in TE
- ELL Vocabulary Support in TE

| English Language Learners (ELL) Enhancements

To access hyperlinked material, you must be logged into your BPS Google Drive | **Listening**
● **Cross- Linguistic Practices:** Gives students opportunities to make connections between what they hear and their home language (For example, allow students to listen to a passage and identify cognates).
● **Activating Prior Knowledge** Activating prior knowledge means both eliciting from students what they already know and building initial knowledge that they need in order to access upcoming content**.**
● **Visuals** - GIFs, pictures- will assist students in understanding what they are listening to. Use **visual thinking strategies** to set the lens for learning.
● Video to review or introduce a topic – use **closed captioning** to help students see the words and pronunciations while they listen to the content.
● **Word stretching / Vowel stretching** when instructing allows student to listen closely to the pronunciation of the word.
● **Performance Level Descriptors** this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of listening. |
| | **Speaking**
● **Sentence Stems/Frames** - to begin a sentence - such as *Evolution is…* or *I think that evolution is…*
● **Academic Conversation Starters:** Have a visual of a list of academic sentence starters that students can refer to in a discussion. |

	- **Choral Reading** - To build fluency, self-confidence and motivation with reading/speaking. - Create **movement** to go with the word. Movement can be a motivating factor, as well as a kinesthetic tool for conceptualizing the rhythm and flow of fluent reading while triggering brain function for optimal learning. - **Performance Level Descriptors** This document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of speaking.
	Reading - Supplementary Text to help reinforce concepts. - **Visual Aids** - Pictures or models to support vocabulary words and concepts - Video to review or introduce a topic - use **closed captioning** to help students read along while they listen to the content. - **4 Square / Frayer models** to help students gain a deeper understanding of vocabulary. - **Highlighting** important text to assist students in answering questions after the reading. - **Chunking**-Break reading of text into chunks or paragraphs - **Vocabulary Morphology**- Morphology relates to the segmenting of words into affixes (prefixes and suffixes) and roots or base words, and the origins of words. Understanding that words connected by meaning can be connected by spelling can be critical to expanding a student's vocabulary. - **Performance Level Descriptors** this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of reading.
	Instructional Accommodations (depending on the student's needs) - **Extended time** for tests in class, projects and assignments - **Directions read.** Broken down as necessary - **Model** how to complete the activity in the lesson - **Oral simplification** of directions or questions - **Translated version** of test when available. Student may have both version English and native language version - Use of **approved bilingual glossaries** from NYS in each subject
Special Education Modifications Special Education students must have accommodations as per Individual Educational Plan (IEP)	**Instructional** - **Pre-teach** vocabulary - Use **picture vocabulary** - Scaffold **Depth of Knowledge** questions - Provide copy of notes/**notes in "cloze"** form - Use of **Think, Pair, and Share** strategy to help process information - **Scaffold** written assignments with the use of **graphic organizers** - Allow for **multiple ways to respond** (verbal, written, response board) - Provide **model of performance task** - **Modify informational text** to fit the needs of the students - Provide a digital or paper i**nteractive notebook** - Present complex **tasks in multiple ways** - Provide **mnemonic strategies** for scientific concepts
	Technology: - **Audio** reading of text - **Text to type** functions - **Videos** to clarify/visualize science concepts - **Record class lecture/discussions** and make accessible to student - **Nearpod**- interactive presentations of notes

	In Class Assessments ● Provide **multiple options** for projects ● **Use of timer** in class ● Break all complex tasks into chunks
Step Up to Writing Step Up to Writing Materials can be found in BPS Science K-12 Schoology Folder Grade 5 Resources Grade 5 SUTW materials	● Easy Two-Column Notes ● Breaking Down Definitions ● Paragraph Frame- What I Learned ● **Performance Level Descriptors** this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of writing.
Culturally and Linguistically Responsive Teaching (CLRT) in the Science Classroom	● Materials, resources, and/or discussions address diverse cultural backgrounds and real-world applications ● Artifacts (posters, charts, etc.) in the science classroom are representative of the cultures of the student population ● All students are given an opportunity to engage in science discourse ● Teacher demonstrates high expectations for all students