

Winslow Township School District

Grade 7 Science

Unit 6: The Changing Earth

Overview: This unit covers several Earth Science topics. In this unit students will investigate how scientists created the geologic timeline by establishing the relative ages of rock strata and other features, including fossils. They will also explore different geoscience processes that shaped Earth’s surface over time. They will study different theories, such as plate tectonics as well as processes like weathering and erosion. In this unit there will also be a focus on Earth’s resources, both renewable and nonrenewable. Students will study why these resources are distributed unevenly on Earth and how they are extracted and utilized. Additionally, students will discover how these geoscience processes can result in natural hazards. Modeling and analyzing data will be key scientific practices utilized in this unit for students to show mastery on content.

Overview	Standards for Science	Unit Focus	Essential Questions
Unit 6 The Changing Earth	MS- ESS1-4 MS-ESS2-1 MS-ESS2-2 MS-ESS2-3 MS-ESS3-1 MS-ESS3-2	<ul style="list-style-type: none">• Geologic Time• Dynamic Earth• Distribution of Earth’s Resources• Natural Hazards	<ul style="list-style-type: none">• How are the analyses of the rock and fossil records used to determine relative ages?• How do geologists correlate rock strata across regions to develop the geologic time scale and organize Earth’s history?

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Unit 6: Enduring Understandings	<ul style="list-style-type: none">• Sequences of events are preserved in geologic record• Provide relative dates by analyzing rock strata and fossil record• Utilize different principles of relative age dating• Geologists created a geologic time scale by using correlation, evidence of Earth’s major events, and fossil records• Analyze different types of evidence to show how continents have changed location over time• Analyze evidence to show how the theory of continental drift and the theory of plate tectonics were supported or unsupported• Plate movements create geologic features like mountains and volcanoes• Weathering, erosion, and deposition shape Earth’s surface• Minerals and rocks are formed through the cycling of Earth’s materials• People depend on Earth’s energy, land, water, and air resources, both renewable and nonrenewable• Minerals, soil, fossil fuels, and ground water are distributed unevenly on Earth• Analyze patterns of how humans extract and obtain natural resources• There are factors that affect the severity and damage caused by earthquakes and safety measures that can be used to mitigate damage• By monitoring geologic forces scientists can predict some natural hazards• There are several factors that cause severe weather in different regions	<ul style="list-style-type: none">• What evidence supports the continental drift hypothesis?• What evidence supports the theory of plate tectonics?• How does the movement of tectonic plates form mountains and volcanoes, and cause earthquakes?• What geoscience processes change Earth’s surface?• How does the flow of energy and cycling of matter produce chemical and physical changes in Earth’s materials?• How do people use resources from Earth’s land, ocean, atmosphere, and biosphere?• Why are resources distributed unevenly on Earth?• How do humans impact resource distribution and availability?• Why are some areas more prone to earthquakes than others?• What geologic indicators signal the eruption of a volcano?• Why does the risk and type of severe weather vary from place to place?
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Curriculum Unit 6	Standards		Pacing	
			Days	Unit Days
Unit 6: The Changing Earth	MS-ESS1-4	Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth’s 4.6-billion-year-old history.	7	45
	MS-ESS2-1	Develop a model to describe the cycling of Earth’s materials and the flow of energy that drives this process.	6	
	MS-ESS2-2	Construct an explanation based on evidence for how geoscience processes have changed Earth’s surface at varying time and spatial scales.	6	
	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.	7	
	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 geoscience processes.	7	
	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.	7	
	Assessment, Re-teach and Extension		5	

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Disciplinary Core Ideas	Indicator #	Indicator
<p>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)</p> <p>Tectonic Processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches. (MS-ESS2-3)</p> <p>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)</p> <p>The planet’s systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth’s history and will determine its future. (MS-ESS2-2)</p> <p>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)</p>	MS-ESS1-4	Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth’s 4.6-billion-year-old history.
	MS-ESS2 -1	Develop a model to describe the cycling of Earth’s materials and the flow of energy that drives this process.
	MS-ESS2-2	Construct an explanation based on evidence for how geoscience processes have changed Earth’s surface at varying time and spatial scales.
	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.

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<p>ESS2.C: The Roles of Water in Earth’s Surface Processes Water’s movements-both on the land and underground-cause weathering and erosion, which change the land’s surface features and create underground formations. (MS-ESS2-2)</p>	<p>MS-ESS3-1</p>	<p>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 geoscience processes.</p>
<p>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)</p> <p>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)</p>	<p>MS-ESS3-2</p>	<p>Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.</p>

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Assessment Plan

<ul style="list-style-type: none"> • Exploratory activities • Warm-up activities • Individual/Group Lab report • Class discussions • Student Participation • Teacher Observations 	<ul style="list-style-type: none"> • Quizzes • Tests • Authentic assessments and projects • Presentations • Science Interactive Notebook
Resources	Activities
<ul style="list-style-type: none"> • Chromebooks • Textbook • rock cycle • BrainPOP • Study Jams Scholastic Science World Magazine • Page Keeley Science probes • Readworks • NewsELA • PhET simulations • Njctl weathering and erosion activity (found in drive) • NJCTL: It's All connected-Global circulation (In Drive) • NJCTL: Changing Water activity (In Drive) • What are Fossil Fuels? • Why is coal so important? • Diversity, Equity & Inclusion Educational Resources https://www.nj.gov/education/standards/dei/ 	<ul style="list-style-type: none"> • Students will explore the ways in which water can weather rocks and cause erosion • Students make saturated salt solutions and let them evaporate to produce crystals • Students simulate two types of metamorphism • Students model how a rock can change as the results of processes and forces in the rock cycle • Students will explore in more detail the currents of Earth's oceans by tracing them and by tracking an imaginary "Message in a Bottle." • Students will be playing the role of a water molecule changing from one form to the next. As students travel from station to station, they will also explain how they made such a transformation. • Students will engage in content through videos and articles to define fossil fuels and determine the impact of using them • Students analyze maps and data to determine the importance of coal production

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Instructional Best Practices and Exemplars

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| 1. Identifying similarities and differences | 6. Cooperative learning |
| 2. Summarizing and note taking | 7. Setting objectives and providing feedback |
| 3. Reinforcing effort and providing recognition | 8. Generating and testing hypotheses |
| 4. Homework and practice | 9. Cues, questions, and advance organizers |
| 5. Nonlinguistic representations | 10. Manage response rates |

9.1 Personal Financial Literacy, 9.2 Career Awareness, Exploration, Preparation and Training & 9.4 Life Literacies and Key Skills

- 9.4.8.CI.2: Repurpose an existing resource in an innovative way (e.g., 8.2.8.NT.3).
- 9.4.8.IML.3: Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping (e.g., 6.SP.B.4, 7.SP.B.8b).
- 9.4.8.IML.4: Ask insightful questions to organize different types of data and create meaningful visualizations.
- 9.4.8.IML.12: Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.
- 9.4.8.TL.3: Select appropriate tools to organize and present information digitally.

The implementation of the 21st Century skills and standards for students of the Winslow Township District is infused in an interdisciplinary format in a variety of curriculum areas that include, English language Arts, Mathematics, School Guidance, Social Studies, Technology, Visual and Performing Arts, Science, Physical Education and Health, and World Language.

Additional opportunities to address 9.1, 9.2 & 9.4:

Philadelphia Mint

<https://www.usmint.gov/learn/kids/resources/educational-standards>

Different ways to teach Financial Literacy.

<https://www.makeuseof.com/tag/10-interactive-financial-websites-teach-kids-money-management-skills/>

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Modifications for Special Education/504

Students with special needs: The students' needs will be addressed on an individual and grade level using a variety of modalities. Accommodations will be made for those students who need extra time to complete assignment. Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Physical expectations and modifications, alternative assessments, and scaffolding strategies will be used to support this learning. The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered.

- Small group instruction
- Audio books/ Text-to-speech platforms
- Leveled texts/Vocabulary Readers
- Leveled informational texts via online
- Modeling and guided practice
- Read directions aloud
- Repeat, rephrase and clarify directions
- Extended time as needed
- Break down assignments into smaller units
- Provide shortened assignments
- Modify testing format
- Repeat directions as needed
- Graphic organizers
- Study Guides, Study Aids and Re teaching as needed

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Modifications for At-Risk Students

Formative and summative data will be used to monitor student success. At first signs of failure, student work will be reviewed to determine support. This may include parent consultation, basic skills review and differentiation strategies. With considerations to UDL, time may be a factor in overcoming developmental considerations

- Audio books and Text-to-speech platforms
- Leveled texts/Vocabulary Readers
- Leveled informational texts via online
- Extended time as needed
- Read directions aloud
- Assist with organization
- Use of computer
- Emphasize/highlight key concepts
- Recognize success
- Provide timelines for work completion
- Break down multi-step tasks into smaller chunks
- Provide copy of class notes and graphic organizer

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English Language Learners	Modifications for Gifted Students
<p>All WIDA Can Do Descriptors can be found at this link: https://wida.wisc.edu/teach/can-do/descriptors</p> <p><input type="checkbox"/> Grades 6-8 WIDA Can Do Descriptors:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Listening <input type="checkbox"/> Speaking <input type="checkbox"/> Reading <input type="checkbox"/> Writing <input type="checkbox"/> Oral Language <p>Students will be provided with accommodations and modifications that may include:</p> <ul style="list-style-type: none"> • Relate to and identify commonalities in Science studies in student’s home country • Assist with organization • Use of computer • Emphasize/highlight key concepts • Teacher Modeling • Peer Modeling • Label Classroom Materials - Word Walls 	<p>Students excelling in mastery of standards will be challenged with complex, high level challenges related to the topic.</p> <ul style="list-style-type: none"> • Raise levels of intellectual demands • Require higher order thinking, communication, and leadership skills • Differentiate content, process, or product according to student’s readiness, interests, and/or learning styles • Provide higher level texts • Expand use of open-ended, abstract questions • Critical and creative thinking activities that provide an emphasis on research and in-depth study • Enrichment Activities/Project-Based Learning/ Independent Study <p>Additional Strategies may be located at the links:</p> <ul style="list-style-type: none"> ❖ Gifted Programming Standards ❖ Webb’s Depth of Knowledge Levels and/or Revised Bloom’s Taxonomy ❖ REVISED Bloom’s Taxonomy Action Verbs

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Interdisciplinary Connections

ELA:

RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts.

RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks

RST.6-8.7 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).

RST.6-8.9 Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

SL.7.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.

SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.

WHST.6-8.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

WHST.6-8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration

WHST.6-8.8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation

WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research.

WHST.6-8.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Math:

6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

MP.2 Reason abstractly and quantitatively.

MP.4 Model with mathematics.

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Integration of Computer Science and Design Thinking NJSL 8

- 8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.
- 8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis.
- 8.1.8.DA.5: Test, analyze, and refine computational models.
- 8.1.8.AP.6: Refine a solution that meets users' needs by incorporating feedback from team members and users