

# Unit 4: Geology and History of Earth

Content Area: **Science**  
Course(s):  
Time Period: **Marking Period 4**  
Length: **12-15 Weeks**  
Status: **Published**

## Brief Summary of Unit

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As a result of this investigation module, students will develop a better understanding of the different types of scientific models and will improve their abilities to make and record observations/measurements. They will review some of the evidence used to construct and revise models of the Earth's interior structure and will understand why it is believed that the Earth has a layered structure. Students will gain a working understanding of the process of convection and how convection within the Earth causes lithospheric plates to move and leads to volcanism and the formation of crust at mid-ocean ridges. Studying the nature of plate tectonics and the features and events that result from plate interactions will support a better understanding of the causes of earthquakes, volcanoes, and mountain building. Students will understand how evidence supports the idea that the positions of continents and ocean basins change over geologic time. The knowledge of the various methods and techniques that are used to minimize human and property losses will enhance the students' understanding of the natural hazards that stem from earthquakes and volcanoes. Additionally, students will develop a conceptual understanding of a fossil and the role of decomposition and the presence of hard parts in fossilization. Students will develop a better understanding of the role of sediment in fossil formation, how some of the more common invertebrate fossils form, and the conditions that favor the formation of fossils. They will study geologic time and how geologists interpret changes in life through time using fundamental scientific laws for interpreting rock strata. Students will improve their abilities to make and record observations and information in a clear and systematic way. Finally, students will gain a working understanding of the rock cycle and how different types of rocks lead to inferences about the Earth's past and how the Earth is dynamically changing each day. Students will be able to observe and characterize minerals, rocks, and be able to relate to natural processes such as volcanic eruptions, earthquakes, tsunamis, and plate tectonics. The crosscutting concepts of systems, system models, patterns and cause and effect will provide a framework for understanding the disciplinary core ideas. Students are expected to demonstrate proficiency in planning and carrying out investigations, analyzing and interpreting data, and developing and using models. Students are also expected to use these to use these science and engineering practices to demonstrate understanding of the disciplinary core ideas.

Revision Date: July 2020

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| LA.RI.6.7   | Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.   |
| LA.RI.6.9   | Compare, contrast and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) one author's presentation of events with that of another (e.g., a memoir written by and a biography on the same person).                |
| LA.W.6.8    | Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. |
| LA.SL.6.1   | Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.                                 |
| LA.SL.6.1.D | Review the key ideas expressed and demonstrate understanding of multiple perspectives   |

through reflection and paraphrasing.

LA.SL.6.4	Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate speaking behaviors (e.g., eye contact, adequate volume, and clear pronunciation).
LA.L.6.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 6 reading and content, choosing flexibly from a range of strategies.
LA.L.6.4.A	Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.
LA.L.6.4.B	Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., audience, auditory, audible).
LA.L.6.4.C	Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.
LA.L.6.5.B	Use the relationship between particular words (e.g., cause/effect, part/whole, item/category) to better understand each of the words.
LA.L.6.6	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.
SCI.MS-LS4-1	<p>Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.</p> <p>The collection of fossils and their placement in chronological order(e.g., through the location of the sedimentary layers in which they are found or through radioactive dating) is known as the fossil record. It documents the existence, diversity, extinction, and change of many life forms throughout the history of life on Earth.</p>
SCI.MS-ESS1-4	<p>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.</p> <p>Emphasis is on how analyses of rock formations and the fossils they contain are used to establish relative ages of major events in Earth's history. Examples of Earth's major events could range from being very recent (such as the last Ice Age or the earliest fossils of homo sapiens) to very old (such as the formation of Earth or the earliest evidence of life). Examples can include the formation of mountain chains and ocean basins, the evolution or extinction of particular living organisms, or significant volcanic eruptions.</p>
SCI.MS-ESS2	<p>Earth's Systems</p> <p>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.</p> <p>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.</p>
SCI.MS-ESS2-2	<p>Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.</p> <p>Emphasis is on how processes change Earth's surface at time 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 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.</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.

Water's movements—both on the land and underground—cause weathering and erosion, which change the land's surface features and create underground formations.

SCI.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.

Analyzing and Interpreting Data

Analyze and interpret data to provide evidence for phenomena.

SCI.MS.ESS1.C

The History of Planet Earth

Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches.

SCI.MS.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.

Patterns in rates of change and other numerical relationships can provide information about natural systems.

SCI.MS-ESS2-5

Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.

Planning and Carrying Out Investigations

The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns.

## **Essential Questions**

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### **Essential Questions**

How do people reconstruct and date events in Earth's planetary history?

How and why is Earth constantly changing?

Why do the continents change shape and location, how is this related to earthquakes and volcanoes?

How do the Earth's surface processes and human activities affect each other?

### **Enduring Understandings**

Earth's inner layers affect the environment on Earth's surface

Earth's continents have been and always will be moving and at one point were part of a super continent called Pangea.

Earth's surface and its organisms have changed since Earth's formation

Scientists study the past by studying rocks and fossils

Fossils are preserved remains of organisms and they help scientists study Earth's history

The processes of weathering, erosion, and deposition have been changing the Earth since its formation and continues to shape our planet

### **Students Will Know/Students Will be Skilled At**

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Students will know how scientists study inner Earth

Students will know the correlation between temperature and pressure with depth of the Earth

Students will know how density determines the positions of the layers of the Earth

Students will know how convection in Earth's mantle causes movement of Earth's crust

Students will know how to label and describe the layers of the Earth

Students will know evidence for the theory of continental drift

Students will know the theory of continental drift

Students will know the three types of plate boundaries

Students will know the locations of recent earthquakes and volcanic eruptions & develop reasoning for correlation.

Students will know how and why earthquakes and volcanic eruptions occur.

Students will know how earthquake magnitude is measured.

Students will know the three types of volcanoes.

Students will know the positive and negative effects of earthquakes and volcanic eruptions in respect to living in areas prone to both

Students will know the job of a paleontologist

Students will know how and why fossils form

Students will know the five different types of fossils and their different characteristics

Students will know the five different types of fossils

Students will know why it is difficult for fossils to form

Students will be skilled at calculating the age of a fossil using absolute dating

Students will know how to infer the relative age of a fossil using clues from surrounding layers

Students will know the difference between relative and absolute dating

Students will know that fossils are important but recognize their limitations

Students will know when and how scientists believe the Earth was formed

Students will know important events that have occurred since Earth's formation

Students will know Earth has changed since its formation

Students will know the characteristics of minerals

Students will know that minerals relate to their everyday lives

Students will know the three types of rocks

Students will know the characteristics of each type of rock  
Students will know how sedimentary rock is used to study Earth's past  
Students will know how metamorphic rocks are formed  
Students will be skilled at drawing the rock cycle

Students will know the steps of the rock cycle & explain how they contribute to our changing Earth

## **Learning Plan**

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Demonstration: Without any discussion or background information students will observe the teacher cutting a hardboiled egg in half and then discuss what they observe. *Discussion Questions: What could the egg be a model of? Why do you think this? Could it be anything else? Which idea fits best & why?*

Notes/Discussion – Takes notes on how scientists study inner Earth, and how pressure and temperature change as depth increases.

\*Guided notes & powerpoints for students as needed\*

Graph Analysis – Students will complete a worksheet in which they must analyze a graph on temperature & pressure.

\*notes copied & given to students as needed\*

Demonstration: Dropping marbles through different substances to demonstrate how things move differently through different materials. Water, air and syrup will be put into graduated cylinders and the students will observe how quickly a marble moves through each cylinder. *Discussion Questions: What does this demonstration represent? Would you be able to tell me which material the marble was going through, by just knowing the speed and not actually looking at them? How does it correlate to how scientists study the Earth? What did you learn from this demonstration?*

Notes/Discussion/Diagram – students will draw and label a diagram of the layers of the Earth and take notes on each layer and how they affect the surface of the Earth. Assign practice worksheet to reinforce concepts. *(most likely homework)*

\*notes copied & given to students as needed\*\*peer check with table for all learners, answers posted on board for student support\*\*

\*Guided notes & powerpoints for students as needed\*

Lab Activity – students will be given three different liquids. They will record the mass and volume of each and then calculate the density. Then, the liquids will be poured into a clear cup, in any order they wish. Students will observe what happens to the liquids when they are combined and record their observations. Students will complete the analysis questions for the lab, which help the students make the real-life connection between their model and real life.

\* mixed grouping\*

Earth's Layers Foldable – students will create a foldable on the layers of the Earth, to use as a visual representation and a study guide. It will include a diagram of the layers along with information on each layer.

Journey to the Center of the Earth – Students will create a comic strip that shows what the different layers of the Earth are like as they take a trip to the inner core. Students must follow the rubric and include all the important characteristics about each layer. While their characters and stories do not have to depict real life situations, their depictions of the layers themselves have to be true to form. Rubric will be used to guide them and assess them.

\*varied forms of assessment\*

\*\*Tiered/ Differentiated Rubrics\*\*

Plate Tectonics Puzzle Activity – Without an discussion or prior background information, students will be given different landmass puzzle pieces and try to fit the pieces together to create on giant continent. They will tape their models down and answer a few questions about how and why they constructed their puzzle the way that they did. Students will share their models with the class and a class discussion will follow. Discussion Questions: *What clues did you use to help fit the pieces together? Did you look at anything else besides the shape/outline? What about the key? Or did our current map influence your decisions? What was your reasoning for each piece? Do you think the Earth actually used to look like this, or do you think it's always looked the way it does now?*

Notes/Discussion – First, students will view maps & recall their experience from the plate tectonics puzzle to try to come up with a list of evidence to support the theory of continental drift. The maps will have keys that indicate mountain ranges, different types of fossils found and other features. Students will share their lists with the class and a class list will be compiled on the board. Then, students will come up with another list: why people didn't accept this theory/reasons against it. These lists will be shared as well, leading to a class discussion. Notes will then be taken on the topics.

\*Guided notes & powerpoints for students as needed\*

Demonstration & Notes– To help students understand convection, teacher will do the following: The floor = core & ceiling = crust & teacher = magma. As the teacher sit on the floor she will ask the student what is happening to her temperature being so close to the core & explain that heat makes liquid less dense. Then ask what happens to something that is less dense, float or rise. Teacher will step up onto chair & ask what is going to happen to her temperature as she gets closer to the crust and further from core. She will explain that colder liquid/magma become more dense and ask what happens to something that is more dense, sink. Teacher will repeat process over and over, until the students can narrate the whole process on their own without prompting questions. Notes will then be taken on convection & seafloor spreading. A quick video clip will be shown about the process of seafloor spreading, convection and plate boundaries.

Demonstration: Part 2: Teacher will demonstrate convection in a beaker on a hot plate. The beaker will contain oatmeal and hole-punched circles from construction paper. The students will observe the movement of the oatmeal and paper as the water is heated. Discussion Questions: *What do you observe going on in the beaker? Why are the materials moving? What role is temperature playing? What role is density playing? How does this demonstration model the earth? What does the hot plate represent? Would convection still occur if the heat source was coming from the top instead of the bottom? If the core of the Earth was freezing and covered in ice and the surface was extremely hot, would the magma still move? How would this change affect us?*

Demonstration - Students will each get two graham crackers/playdoh and follow along with the teacher as he demonstrates the different types of plate movements/boundaries. (divergent, convergent, transform) They will then be quizzed, and asked to demonstrate the type of boundary that the teacher calls out. Students will fill out a graphic organizer chart as they go through the demonstrations

Notes/Discussion/Diagram – Following the text analysis, students will discuss earthquakes and take notes on a

few terms that they didn't come across in their readings/video. Students will discuss and take notes on the three different scales used to measure earthquakes. Students will construct a Venn diagram comparing the three different scales. A review sheet on earthquakes will be given as homework whenever notes are complete and before moving on to volcanoes.

*\* copies of filled in notes & filled in Venn Diagram as needed\**

Smartboard Simulation – Students will watch a simulation of the damage that occurs at every level of the Modified Mercalli Scale. Students will analyze which levels can/cannot be felt, which levels barely cause damage, which levels cause substantial damage, and which levels cause complete destruction.

Ongoing Real-Time Data Collection – Each day students will access data from earthquakes that are occurring that day around the world, using an app either mirrored to the smart board using apple tv, or individually on their own i-pads. Students will collect data, location & strength of the earthquake, and then plot the earthquakes on a world map using latitude and longitude. At the end of a week or two, the students will analyze their data by answering/discussing the following questions: *Do you notice a pattern of earthquake occurrence? Which boundaries had the most earthquakes occur within the past week? What was the average strength of all the earthquakes that occurred within the past week? Were most of the earthquakes able to be felt? Why/why not? Which earthquake was the strongest? Weakest? Were we “close” to any earthquakes that occurred this week?*

Volcano Introduction – students will be shown a short video clip on volcanoes to spark their interest, and then a discussion will follow to introduce the topic. Discussion questions: *What are volcanoes? Why are we learning about them at the same time as earthquakes? How are they similar? How are they different?* Students will then take notes while viewing power point on volcanoes.

Ring of Fire – Students will briefly discuss the Ring of Fire, view a map, and then plot the most recent volcanic eruptions on the same map that they plotted the most recent earthquakes to compare their locations. Discussion/Analysis Questions – *What is the Ring of Fire? Where is the Ring of Fire? Why is it called this? Do you notice a pattern between the earthquakes & volcanoes? Why are there so many earthquakes and volcanoes here? Why do they BOTH occur here? Why do you think people continue to live within the Ring of Fire, despite its dangers?*

Volcano Types Foldable – students will create a foldable on the three types of volcanoes, to use as a visual representation and a study guide. It will include a diagram of the volcanoes along with information on each one. If time within the period, students will use the foldable to quiz each other.

Pompeii/St. Helens – students will view some pictures taken from the ruins of Pompeii, (personal pictures & internet) and then watch a short video clip about the story of the city of Pompeii and Mount Vesuvius. Students will also watch a short clip about the 1980 eruption of Mt. St. Helens. The two volcanoes and eruptions will be compared through class discussion. Discussion Questions: *How are the two stories similar? How are they different? Which one was more explosive? Why was Vesuvius more deadly? What were the major effects from both eruptions? What did we learn from each?*

Group Activity to Introduce the Unit: FOSSIL ACTIVITY - Without any discussion or background information students will be given envelopes to open. Students are working in groups and have to try to assemble an organism from the fossils in their envelope. They will open the envelopes one at a time, in a specific order, and see how their ideas change over time, as more fossils are uncovered. Each group has fossils from the same organisms, but different pieces of the puzzle. Students will then team up with another group to try to come up with a final hypothesis, and to show that sharing ideas is very helpful. Students will compare their models with a “Reference Key” to see if they can identify what they discovered. Students will complete analysis questions at the end of class or for homework. Discussion Questions: *Was that activity hard? Easy? Why? Why didn't I tell you the answer? How did you work together to decide which idea was best? Did your*

*initial guess change as the activity went forward? Why? Did the other groups have the same ideas as you? Is the job of paleontologists hard? Why? How can fossils like these help us learn about the past?*

Notes/Discussion – Takes notes on how fossils form, types of environments and type of fossils. View simulation that shows what happens to dead organisms in different environments, to demonstrate the best conditions for fossilization.

*\*Guided notes & powerpoints for students as needed\**

Students Activity/Demonstration- Fossilization Simulation: Each student will represent a member of a particular ecosystem. (alligator, fish, seaweed, trees, scavengers, etc.) Students will act out their parts briefly and then freeze when the teacher calls freeze. The teacher will then walk around the room as students draw their “fate” cards. The cards will tell them if they became a fossil or not after their death. A list will be constructed on the board. The game is designed so that only 2 or 3 students in the whole class pick “fossil” cards. This will lead to a discussion on the bias of fossils.

Discussion Questions: *Which organisms became fossils? Which got destroyed? What will paleontologists be able to determine about the organisms that once lived here? Is the list of fossils an accurate representation of the living community? Why not? What is the problem with studying fossils? Can we change this? Is it easy to study the past?*

Formative Assessment – Students will write a two-paragraph essay supporting the claim that fossils are important but are bias regarding the past. Students will use their notes from the past few days and the fossilization simulation to back up their argument. They will also be given an article to reference in their essay.

Quizizz used to assess students knowledge before moving onto fossil types

Lab Activities - #1: PETRIFIED – teacher demonstration, place paper towel in mixture of glue and water, stand paper towel on a paper plate and let it set over night. #2 MOLD/CAST – students will be asked to bring in a shell or take one from teacher, students will cover the shell in petroleum jelly, press it into modeling clay, and then plaster of paris will be used to fill in the mold and create a cast of the shell #3: TRACE – students will press different objects into clay, other groups will have to guess what the object is based on the trace evidence #4: DRY vs. ACID ENVIRONMENT – chicken bones will be placed in vinegar for a few days and others will be placed in a hot, dry environment. Students will compare the results and apply their observations to fossilization

Four Corners/Grouping Activity– Students will be given pictures or descriptions of different types of fossils and will have to move to the correct corner/side of the room based on their card. This will be done 2-3 times to review fossil types. Another variation: each table is given 5-6 examples or descriptions of each type of fossil and the group must place each card into the correct category.

*\*Strategic examples given to students to provide support/scaffolding, leveled grouping for second activity\**

Quizizz used to assess students knowledge & determine if more practice is needed before quiz

Short Quiz – Students will complete a short quiz on fossil types

*\*modified versions as needed\**

Notes/Discussion/Practice – Teacher will discuss relative dating with students as they take notes, show demonstration/practice problem on the board. Students will complete practice exercise/worksheet with tables, review & then complete another practice sheet on their own (most likely for homework)

*\* Peer review of homework, answers eventually put on board to support students to check\**

*\*Guided notes & powerpoints for students as needed\**

Absolute Dating – Notes/Instruction/Demonstration on how to calculate the age of a fossil using Carbon-14. *Teacher demonstration* using a piece of paper, ripping it in half over and over to demonstrate a half life. Practice problems will be put on the board as students are given time to complete them at their desks, and then answers will be reviewed. Students will then work to complete simple carbon-14 problems, using their group members for help if needed.

*\*\*differentiated math problems, and calculations\*\**

Carbon-14 Lab – Students will work in pairs to complete the lab. They will be given 100 skittles, shake them in a cup and dump them on their desk. They will count the amount face up and face down, and remove the face down ones. They will continue shaking and dumping until there are zero skittles left. They will record the amount that “decayed” for each “half life” and then graph their results. They will then answer analysis questions about the activity on the lab hand out.

*\*leveled grouping\**

Carbon -14 Station Race – Students will rotate through three stations. They will have certain tasks to complete in a set time frame. They must record their task/answers on their own worksheet. When the bell rings they must move on to the next station. Each station will contain either relative dating or absolute dating problems to solve. They must work as a team to correctly complete as many as possible in the given time limit. Each group member must have all work shown on their own worksheet with the correct answer for the group to get credit.

*\*stations in the back of the room for extension/challenge, stations in the front for required skills and provide support through extra hints/clues, students are grouped by proficiency levels\**

Fossils Review Stations – Students will rotate through three stations to review the unit on Fossils.

#1 Absolute Age: At this station students will complete the practice problems they find at Station 1 in the chart in the packet. They will work together until every member of their group has completed all of the questions. Then, students will check and correct their answers using the answer sheet provided in the manila envelope.

#2 Quizlet Station: At this station students will use the chromebooks to access the Quizlet app. They will play at least ten times and record their scores in their packet. Their goal is to increase their score each time they play.

*\*\*differentiated math problems and calculations\*\**

*\*\*Texts will be leveled \*\**

Introduction Activity– Part 1 - Students will be given a half sheet of paper with a few major life events on it. The students will put the events in the order that happened in their own lives. Discussion Questions- *Was it easy to put the events in order? Can you put an exact date next to each event? Why is that harder? Can you at least narrow it to a year or two? Is that useful information? How can we apply this to the events of Earth's history?* Part 2à Students will apply their experience with part 1 in order to work together in their group to put geological events in order from oldest to youngest. Events include first life, dinosaurs, humans, etc. Groups will post their orders on the board and will compare. Discussion Questions- *How did you determine the order of these events? What events had to come first? Last? Would you be able to put exact dates next to each event? Could you give approximate dates?*

Notes/Discussion/Video Clip- students will take notes and discuss how Earth formed and what early Earth's conditions were like. National geographic video clip on Earth's formation (5-8 minutes)

*\*Guided notes & powerpoints for students as needed\**

Time Scale Demonstration- students will each be given a different geological event that they will have to place on a classroom timeline (timeline will be set up in the hall way, spanning from science closet door to the end of the hallway near the bathrooms) Students will first guess where they think their event belongs on the timeline that spans from 4.6 billion years ago to present day and stand at that point along the timeline. Then, the real timeline will be revealed, event by event, starting with the more shocking ones....like first life and humans evolving. Students will then observe the timeline. *Discussion Questions- What observations can you make about Earth's timeline? Is there anything unusual? Do you notice any patterns? Is this timeline shocking? What does this tell you about the age of the Earth? What does this tell you about how long it takes for changes to happen on Earth?*

Notes/Discussion- Students will be asked if they can remember any of the events from the Time Scale Demonstration. They will be shown the 4 Eras of Earth's history(in the correct order) and try to identify which Era the events that they can remember belong in. Once they have been given a chance to try on their own, the answers will be revealed, which will most likely shock the students since the Pre-Cambrian Era takes up most of Earth's History. Students will then take notes and discuss the major events of each era. The fact that Eras are not equal in length but instead were created based on events will be stressed. *(play more clips from National Geographic video if time)*

Human Evolution Discussion- Students will be shown skull replicas of fossils that have been found on human ancestors. As a class, we will discuss the correct order of the skulls from oldest to most recent. *Discussion Questions: How have the skulls changed over time? Is anything bigger? Smaller? What are the benefits of these changes? Why do you think these changes occurred?* Students will then view a few pictures of our ancestors and take notes on the evolution of humans and when we split from apes/chimpanzees.

Group Time Scale Project- Students will work in groups to construct an accurately scaled timeline of Earth's geologic history. Students will tape multiple pieces of paper together to make the scale accurate and manageable. Students will mark every billion years on the scale as well as every 100 million years. Students will divide, label and color the four Eras. Student will then plot 28 different events on the timeline and illustrate each one.

Introduction to Minerals: Students will have a Do Now question to answer, without any prior discussion in class; What are minerals? Students will share answers and as a class discuss & agree upon the best answer.

Class Demonstration/Discussion – Students will observe 10-15 items on the front table. With their table, students will make two lists: Made of minerals & Not Made of Minerals. They will have two different white boards to write their lists on to share with the class. Groups will share their answers & attempt to come up with one class list. This will lead to a teacher lead discussion on the correct answers & it will be revealed that ALL the materials were made from minerals. *Discussion Questions: What did you learn from this activity? What does this tell you about mineral uses? Do you think you can name any other common items that might have minerals in them?*

*\*Mixed groupings\**

Mineral Mania Web Quest: Students will explore The Science Spot on laptops and complete a worksheet on the uses and commonality of minerals in our lives.

Notes/Discussion – Students will take notes on the 5 properties of minerals & how to identify minerals. Students will watch a quick video clip from the “geology kitchen” on the properties of minerals. Students will

also take notes on the Mohs Scale of Mineral Hardness. *Discussion Questions: Does anyone know the hardest mineral? The softest mineral? What properties of minerals are very easy to determine?*

\*Guided notes & powerpoints for students as needed\*

Article & Questions – Students will read an article on mineral use in our homes & answer questions. (*most likely homework assignment*)

\* leveled articles\*

Mineral Lab – students will obtain 8 different mineral samples to be tested and identified. Students will perform six different tests on each mineral; which include hardness, smell, streak, cleavage, light, and color. Once students have collected all of their data, they will then compare their data to the chart of known mineral properties. They will attempt to correctly identify each mineral. They will answer analysis questions about the lab with their group or for homework.

Introduction to Rocks:

Assess prior knowledge – Students will be asked to name the 3 types of rocks and any characteristics of them that they can think of. Discussion will lead to notes on the topic.

Notes/Discussion – Students will take notes on the three basic types of rocks and their general characteristics. Students will view examples of rocks & try to place them in the correct category. \*Guided notes & powerpoints for students as needed\*

Game: Students will match characteristics to the correct type of rock

\*\*mixed grouping \*\*

Igneous, Sedimentary, & Metamorphic: Students will take notes on each type of rock, more in depth from the introduction.

Igneous: article & questions for background knowledge, notes/discussion, geology kitchen video clip

Sedimentary: article & questions for background knowledge, notes/discussion, geology kitchen video clip

Metamorphic: article & questions for background knowledge, notes/discussion, geology kitchen video clip

\* leveled articles\*

\*Guided notes & powerpoints for students as needed\*

Who Am I Game – Students will come up with 10 “Who Am I” statements and then swap with another table to see how many they can get correct.

Rock Cycle: Prompt discussion of rock cycle by asking class: *What processes have we learned about that involve rocks? What do you think the rock cycle is? Do you think you can name any steps of the rock cycle?*

Diagram/Notes: Students will fill in a graphic organizer/diagram on the rock cycle and take notes on the steps. \*Filled out notes & powerpoints for students with IEPs\*

Worksheet: Homework to reinforce concepts learned in class

Rock Cycle Lab: Students will be given starbursts and a blank rock cycle diagram. They will try to

demonstrate each step of the rock cycle with the starbursts using the given materials. They will not get any hints or procedure. They will have to come up with the steps on their own. When they have successfully demonstrated all the steps they will answer the analysis questions on the lab sheet. *Class Discussion: How did you create each type of rock? What did you do to demonstrate each process? Was there only one way to fill the chart out? Could the steps have been reached in different ways? How are the rock cycle and water cycle similar?*

\*mixed grouping.\*

## **Evidence/Performance Tasks**

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Science courses are designed to promote skill attainment. Student progression and pace through which they proceed through the performance tasks is based on their affinity for and ability to reach skill attainment. The teacher will determine formative and summative skill attainment; alternative assessments will be incorporated for each student based on their strengths and challenges.

### **Formative Assessments:**

- Worksheets
- Do Nows
- Exit Tickets
- Class Discussions

### Quizzes:

- Layers of the Earth Quiz
- Earthquake Quiz
- Volcano Quiz
- Fossil Types Quiz
- Absolute Dating Quiz
- Earth's History Quiz
- Rocks and Rock Cycle Quiz
- Minerals Quiz

### **Bench Marks:**

#### *Formal Lab Reports*

- Density Mini Lab
- Carbon-14 Lab
- Mineral Lab
- Rock Cycle Lab

### **Alternative:**

- Earth's Layers Comic Strip
- Earth's layers foldable
- Volcano Foldable
- Plate Tectonic Activity
- Quizizz Pre-assessment
- Fossil Introduction Activity
- Quizizz Pre-assessment
- Fossil Four Corners
- Relative Dating Worksheets
- Absolute Dating Worksheets
- Timeline Project
- Mineral Mania Webquest
- Rock Matching Game

### **Summative:**

#### *Unit Tests:*

- Earth's Structure Unit Test
- Earthquake and Volcano Unit Test
- Fossils Unit Test
- Rocks and Minerals Unit Test

### **Materials**

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McGraw-Hill Earth Science iScience Textbooks (ISBN#: 978-0-07-888003-2)

Guided note packets (teacher developed)

Technology (student & teacher laptops, SmartBoard, document camera)

Thermometer

Balances

Meter sticks

Calculators

Hot plate

Starbursts

Rulers

Art supplies

Graph paper

Lab goggles

Microscopes

Mineral Kits (scratch plates, HCL acid, magnifying glasses, black light, magnet, glass plate)

Rock samples (igneous, sedimentary, metamorphic)

Fossil samples (marine and terrestrial samples)