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| Name: Morgan Webster  Date: November 8, 2017  Lesson Title: Weathering and Erosion  Grade Level: 4th  Length of Lesson (Minutes): 90 | | |
| **Standards** | | |
| GLE 0407.7.1 – Investigate how the Earth’s geological features change as a result of erosion (weathering and transportation) and deposition. | | |
| **Central Focus of Unit/Learning Segment** | | |
| Represent and understand erosion, weathering and deposition and how all of those affect Earth’s geological features. | | |
| **Essential Understandings** | | **Essential Questions** |
| * The meaning of erosion * The meaning of weathering * The meaning of deposition. * Understands the difference between erosion and weathering. * Understands how a geological feature was changed by erosion, weathering or deposition. * Understand that erosion/weathering takes place by wind water and ice. * Erosion and weathering happen over a long period of time. | | * What is erosion? * What is weathering? * What is deposition? * What is the difference between erosion and weathering? * How can a geological feature be changed by weathering, erosion, or deposition? * What are the causes of weathering and erosion? * Does erosion/weathering happen quickly or over a period of time? |
| **Lesson Objectives** | | |
| 1. Students will be able to differentiate between erosion, weathering, and deposition. 2. Students will be able to describe how a landform was created whether it was by erosion, weathering, and deposition. 3. Students will understand that wind, water, and ice are the causes of erosion, weathering and deposition. | | |
| **Language Demands** | | |
| **Language Function & Key Learning Task**  *Language function*: Compare  *Key Learning Task:* Students will be able to look at a geological feature and compare it to an older version of it to be able identify how the change took place. They will discuss amongst themselves why they think it was transformed by erosion, weathering or deposition.  **Content/Academic Vocabulary**  Erosion: The removal of weathered rock material. After rocks have been broken down, the small particles are transported to other locations by wind, water, ice, and gravity  Weathering: The breaking down of rocks into smaller pieces.  Deposition: Soil, sediment, and rock are added to a landform or land mass.  Geological Feature: Any physical feature on Earth’s surface.  Landslide: Mass of earth or rock sliding down  Root Wedging: A seed wedges itself into a crack in a rock and widens the crack.  Ice Wedging: Ice wedges itself into a crack in a rock and widens the crack.  Landforms: A natural feature of the the Earth’s surface.  Sediment: Small particles that can be transported.  **Discourse & Syntax**   * Discourse :   Students will observe erosion through the Sugar Shake activity. They will discuss with their partners the changes that are taken place with the sugar cubes between each shake. During this activity they will not use formal scientific terms, as that will come later with the card sorts activity. During the card sort activity students will be expected to use the terms erosion, weathering, and deposition when trying to determine the scenarios given to them on the cards. They will also have a journal entry with the three categories and the correct scenario that goes with each term.  .   * Syntax   **Supports**   * In the classroom there will be 3 pictures with the definitions for erosion, weathering, and deposition. * Students will also put the definitions and examples of erosion, weathering, and deposition in their science journals that they will be able to use to refer back to. | | |
| **Materials/Resources** | | |
| **Teacher**   * Discoveryed.com * MysteryScience.com * Smart Board * White board * Markers * Computer * Card Sorts | **Students**   * Sugar cubes * Paper Plates * Gladware container * Sugar Shake Data Sheet * Saving My Slide-City Home * Post-its * Pencil * Individual White Boards * Markers * Individual Computers to complete DiscoveryEd activities | |
| **References** | | |
| 1. Will A Mountain Last Forever? - Video [**https://mysteryscience.com/rocks/mystery-3/weathering-destructive-forces/57?r=14529437#slide-id-0**](https://mysteryscience.com/rocks/mystery-3/weathering-destructive-forces/57?r=14529437#slide-id-0) 2. Sugar Shake Data Sheet [**https://mysteryscience.com/print/preview/g/1\_3YCh\_Qah-473PyYV-BOjs0ZXJ5XTMeeogxwPP\_eRr0/presentation/1H7VbMouk38J70aDTTqi7jG3ionbz1H\_b\_ST9cw2H9Ao/presentation**](https://mysteryscience.com/print/preview/g/1_3YCh_Qah-473PyYV-BOjs0ZXJ5XTMeeogxwPP_eRr0/presentation/1H7VbMouk38J70aDTTqi7jG3ionbz1H_b_ST9cw2H9Ao/presentation) 3. Discovery Ed: Weathering, Erosion, and Deposition [**https://app.discoveryeducation.com/learn/techbook/units/9d3f6ad1-419e-4c13-af10-e583eca423be/concepts/65a6c748-135c-40c7-8f97-abf860137ae3/tabs/759da9a7-2edf-4cde-9515-7081ca990764**](https://app.discoveryeducation.com/learn/techbook/units/9d3f6ad1-419e-4c13-af10-e583eca423be/concepts/65a6c748-135c-40c7-8f97-abf860137ae3/tabs/759da9a7-2edf-4cde-9515-7081ca990764) | | |
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| **Adaptations to Meet Individual Needs** |
| High-Level Learners: Once these students have completed the assignments on discovery ed they will create a book explaining to someone who has never heard of erosion to describe what it means and how it happens. They will provide examples from their local communities of landforms that have changed over time due to weathering and erosion.  On-Level Learners: This lesson plan is written for on-level learners and no adaptations are needed to meet these individual needs.  Struggling Learners: I will monitor these students as they work and as needed will shorten the assignments on discovery ed to give them enough time to finish all of their work.  English Language Learner: An English language learner will also be provided extra support when working on DiscoveryEd activities. |
| **Management/Safety Issues** |
| * Students should follow all classroom rules. * Students will be reminded to retrieve their computers and any other materials that are not at their desk in an orderly manner. * When working with groups or partners students will be reminded to stay on task and not get off topic. * When having class discussions students will be reminded to keep the noise level appropriate and to respect their peers as they are sharing their thoughts. * Students will need to be reminded to not eat the sugar cubes that are given to them. * Students should keep hands and feet to themselves while shaking their sugar cubes. |
| **Rationale/Theoretical Reasoning** |
| **Rationale**   * It is important that students understand the geological features that make up the Earth. * Students need to understand that geological features can and do change over time by weathering, erosion and deposition.   **Theory**   * Research shows that there are seven distinct intelligences and “students possess different kinds of minds and therefore learn, remember, perform, and understand in different ways,” (Gardner,1991). * In the lesson students will be provided with a variety of different ways to learn, from hands on, reading/writing, and verbally discussing the lesson.   <http://www.tecweb.org/styles/gardner.html>   * According to Vygotsky’s Social Learning Theory students learn from one another. * In this lesson students will be provided many opportunities to work in groups and partners.   <https://jan.ucc.nau.edu/lsn/educator/edtech/learningtheorieswebsite/vygotsky.htm>  **Common Misconceptions or Difficulties -**  Weathering and Erosion Misconceptions:   * Rocks do not change * Weathering and erosion are the same thing and the terms can be used interchangeably * Erosion happens quickly * Erosion is a bad thing * Teachers should emphasize that erosion does have positive effects * Geological features have always been there and do not change * Students tend to think that flowing water can only move dirt and small rocks. * Students tend to view Earth as unchanging   <http://beyondpenguins.ehe.osu.edu/issue/earths-changing-surface/common-misconceptions-about-weathering-erosion-volcanoes-and-earthquakes>  <https://app.discoveryeducation.com/learn/techbook/units/9d3f6ad1-419e-4c13-af10-e583eca423be/concepts/65a6c748-135c-40c7-8f97-abf860137ae3/tabs/759da9a7-2edf-4cde-9515-7081ca990764> |

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| **Assessment/Evaluation Criteria** |
| **Formative Assessment**   1. Sugar Shake Data Sheet 2. Erosion/Weathering Card Sort   After watching the video “Do Mountains Last Forever” students will perform a Sugar Shake activity which uses sugar cubes to demonstrate how weathering and erosion change rocks. They will record their data on a sheet that I will look over to make sure they are noticing the changes as they shake the sugar cubes. After erosion and weathering lesson students will have to sort cards into the proper categories of how the landforms were changed over time with their table. I will walk around and observe them as they do this to make sure they understand.  **Summative Assessment**  Assessment Tool: Discovery Ed Assignment  Students will log onto their Discovery Ed account and complete the assignment on there. Questions will consist of erosion, weathering, and deposition scenarios that students will have to determine. Students will be given a percentage score based on the number of questions they get correct.  **Academic Feedback**  For the formative assessment I will be walking around the room and giving them verbal feedback on their work. They will also turn in their Sugar Shake Data Sheet for a grade. The summative assessment will be given a letter grade once they have finished the assignment. |

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| **Instruction** | **Higher-Order Thinking Questions** |
| **Set/Hook/Motivator (10 Minutes)**   * Begin with a video titled “Do Mountains Last Forever?” * Pause video as it asks questions to give students time to think and answer before continuing on with the video. * Further discuss the video to make sure students understand why mountains do not last forever and review what happens to them to break them down. | * Will a mountain last forever? * Is our Earth changing or does it always stay the same? * What could cause changes to Earth’s geological features? * What are two causes for mountains/rocks to change? |
| **Instructional Procedures (75 Minutes) -**  **Sugar Shake Activity (30 Minutes):**   * Students will perform Sugar Shake activity to demonstrate how rocks can change over time. * Students will be given 5 sugar cubes and a tupperware container. They will take two of the sugar cubes and outline the edges with a marker. All of the sugar cubes will go back into the container except 1 of the colored ones (this one will be used to compare with throughout the activity). * Once all students have their sugar cubes back in their container the teacher will instruct them to shake the container for 15 seconds. * After students have shaken the sugar cubes they will take out the other colored cube and compare it to the one left out. * They will answer questions on a coordinating worksheet about the sugar cubes. * This is repeated 4 more times. * Students will be performing the activity with a partner at their table.   **Weathering, Erosion, Deposition (15 Minutes):**   * As a class we will watch and discuss the videos on Discovery Ed about weathering, erosion and deposition. * The Discovery Ed website has a video discussing weathering, erosion, and deposition with questions prompting student discussion. * When these questions are asked the teacher will pause the video to allow students to discuss with one another and answer any further questions.   **Erosion/Weathering/Deposition Card Sort (15 Minutes):**   * As a group students will determine if a statement is describing erosion, weathering, or disposition. * They will work in groups with their table * Once they have correctly sorted their cards they will write the examples in their science journals under the correct category.   **Landform Card Sort (15 Minutes):**   * The students will then work with their table groups to sort landform cards into the correct category of how they were formed (wind, water, ice). * The teacher will handout different cards with landforms and students will fill in their group worksheet whether that landform was formed by wind, water, or ice. | * Why do you think all of the rocks started sliding at once? * How did the rocks break loose to being with? * What is weathering? * What is erosion? * What is the difference? * What are the causes of weathering and erosion? * What is deposition and why does it happen? |
| **Closure (20 Minutes)**   * Students will log onto their Discovery Ed account and will complete the assignment. * Technology based assignment that questions their knowledge on Erosion, weathering, and deposition. * Scenarios will be given and students have to determine which of the three it is referring to. | * Questions from instruction will be repeated to make sure they have a clear understanding. |