

**Topic:** The Devastation of the Colorado River

**Grade Level:** 4<sup>th</sup>

**Time:** 5 Days

**Science COS:** Analyze and interpret data (e.g., angle of slope in downhill movement of water, volume of water flow, cycles of freezing and thawing of water, cycles of heating and cooling of water, speed of wind, relative rate of soil deposition, amount of vegetation) to determine effects of weathering and rate of erosion by water, ice, wind, and vegetation using one single form of weathering or erosion at a time.

**NGSS:** 4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth's features.

**Science and Engineering Practices:** Analyzing and interpreting data – Analyzing and interpreting data in 3-5 builds on K-2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

- Analyze and interpret data to make sense of phenomena using logical reasoning. (4-ESS2-2)

**Disciplinary Core Ideas:** ESS2.A – Earth Materials and Systems

- Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1)

**Crosscutting Concepts:** Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change. (4-ESS2-1)

**ELA/Literacy -**

- RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. (4-ESS2-2)
- W.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. (4-ESS2-2)
- W.4.8** Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. (4-ESS2-1)

**Mathematics -**

- MP.2** Reason abstractly and quantitatively. (4-ESS2-1)
- MP.4** Model with mathematics. (4-ESS2-1)
- MP.5** Use appropriate tools strategically. (4-ESS2-1)
- 4.MD.A.1** Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. *(4-ESS2-1)*
- 4.MD.A.2** Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. *(4-ESS2-1),(4-ESS2-2)*

**Engaging Contexts:** Show pictures of the Colorado River from the West's Great River Hits Its Limits: Will the Colorado Run Dry? This picture slideshow will show students how many miles the river covers, how the river looks in different states, how the low water levels are effecting communities and farmers, and how far the water levels have dropped. Essential questions for this unit include: What are the effects of weathering on the path of the Colorado River? How can families whose water source comes from the Colorado River conserve water? These questions should be reviewed and discussed throughout the unit.

**Justification:** This science unit will include reading, writing, and math. In this unit of study, the students will learn how to explain the information and data presented in a graph. The students will use online information to research the topic. The students will take notes and organize those notes for graphing. Students will be using math skills to measure the depth of the water in a specific location.

**Measureable Objectives:** The students will be able to.....

- Examine a given graph and explain the data
- Explain the effects of weathering
- Examine data from a map to explain patterns of the river

**Lesson Materials:** sticky notes, pencils/pens, terms to know anchor chart, schema anchor chart, stream/water table, blank bar graph, Chromebooks, paragraph assessment sheet

| 5E Lesson Plan  |  |
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| <p><b>Engage</b><br/>The purpose for the ENGAGE stage is to pique student interest and get them personally involved in the lesson, while pre-assessing prior understanding.</p> | <p>As a whole class, we will look at a slideshow of pictures from the <u>Colorado River from the West's Great River Hits Its Limits: Will the Colorado Run Dry?</u> After viewing the slideshow, ask the students what would happen to their community if the main water source was drying up? Next, we will also look at the interactive article <u>The Water Question?</u></p> |
| <p><b>Explore</b><br/>The purpose for the EXPLORE stage is to</p>   | <p>As a whole group, we will discuss the terms to know on the visual aid poster. This poster will remain on display as a reference for the students. Terms to know include:</p>  |

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| <p>get students involved in the topic; providing them with a chance to build their own understanding.</p>   | <p>parameter, gage, height, temperature, weathering, erosion and turbidity. The students will use their Chromebooks during the explore stage. The students will be directed to go to <a href="#">The Grand Canyon Monitoring and Research Center</a> site. First, the students will click on the picture to the right of their screen to view the location of the river from Lees Ferry, AZ. This is the specific location in which the students will focus on for this unit. Next, the students will build a graph using the start date 06-01-2019 and end date 06-30-2019. Using the data from the online graph, the students will make their own bar graph. After the students have made their graph, the class will discuss any patterns, pattern changes, and the effects of these changes on the surrounding area. The students will also access the Alabama Virtual Library's Britannica to learn more about the river and terms.</p> |
| <p><b>Explain</b><br/>The purpose for the EXPLAIN stage is to provide students with an opportunity to communicate what they have learned so far and figure out what it means.</p> | <p>For this stage of the unit, a schema map will be used to guide students' discussion on what they have learned. The schema map will be on an anchor chart with a picture of the river at Lees Ferry, AZ at the top of the anchor chart to help connect the students' learning to our topic. The schema map will be displayed throughout the entire unit. For the schema section, the students will use a yellow sticky note to write what they knew about the Colorado River. This section will be used to assess the students' prior knowledge. Next, the students will write down anything new they have learned for the new learning section on a blue sticky note. Students may add to this section as the unit progresses.</p>  |
| <p><b>Elaborate/Extend</b><br/>The purpose for the EXTEND stage is to allow students to use their new knowledge and continue to</p>   | <ul style="list-style-type: none"> <li>• The students will elaborate on what they have learned by using the schema map. The students' prior knowledge section of the schema map will be reviewed as a whole class to look for any misconceptions. If a misconception has been discovered, it will be placed in the misconception area on the anchor chart. A teacher guided discussion will be led on what made the schema statement a misconception. The students will use a green sticky note to write down why the</li> </ul>   |

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| 5E Lesson Plan  |  |
| explore its implications.   | <p>statement was inaccurate.</p> <ul style="list-style-type: none"> <li>• A stream table will be used so that the students can view the effects of erosion and long exposure to sun without water. A ruler will be used to measure the depth of the water and the data will be tracked on the class bar graph. This activity may take several days.</li> </ul>   |
| <p><b>Evaluate</b><br/>The purpose for the EVALUATION stage is for both students and teachers to determine how much learning and understanding has taken place.</p> | <p>The schema map will visually show how much the class has learned as a whole group. It displays where the students started and how much the class has learned. The students will write a paragraph on the devastating decrease of water in the Colorado River. The students will be given data from the Colorado River at Lees Ferry, AZ to graph on a bar chart and asked to evaluate the graph in a paragraph.</p> |

**Assessment/Rubric:** A rubric will be used for grading the students written work on the devastation of the Colorado River. Also, the bar graph will be assessed for accuracy and a detailed written statement about the graph.

Writing Rubric

|       | 4                              | 3                  | 2                         | 1                             |
|-------|--------------------------------|--------------------|---------------------------|-------------------------------|
| Ideas | Several details, accurate, and | Supporting details | Few details, not on topic | Unclear details, not on topic |

|                  |  |  |  |  |
|------------------|--|--|--|--|
|                  | focused  |  |  |  |
| Organization     | Clear beginning, middle, and end with transitions. Correct paragraphing. | Has a beginning, middle, and end with transitions. Correct paragraphing. | Beginning and ending with few transitions. Irregular paragraphing. | Beginning and ending missing with no transitions. No paragraphing. |
| Sentence Fluency | The sentences enhance the writing.                                       | The sentences structure varies.  | Some variety. Repetitive sentences.                                | Incomplete and run-on sentences.                                   |

The Devastation of the Colorado River

Student Name: \_\_\_\_\_

Directions: Complete the bar graph with the given information. On June the 23rd, the depth of the water was 8.73 feet, on June 30<sup>th</sup> the depth was 8.73 feet, July 7<sup>th</sup> the depth was 9.41 feet, and on July the 14<sup>th</sup> the depth was 8.88 feet. Write about any pattern changes found in your completed graph. Also, describe how these changes may affect the surrounding area.

|              |            |            |            |            |
|--------------|------------|------------|------------|------------|
| Gage Height: |            |            |            |            |
| 10.40 ft.    |            |            |            |            |
| 10.20 ft.    |            |            |            |            |
| 10.00        |            |            |            |            |
| 9.80 ft.     |            |            |            |            |
| 9.60 ft.     |            |            |            |            |
| 9.40 ft.     |            |            |            |            |
| 9.20 ft.     |            |            |            |            |
| 9.00 ft.     |            |            |            |            |
| 8.80 ft.     |            |            |            |            |
| Dates:       | 06-23-2019 | 06-30-2019 | 07-07-2019 | 07-14-2019 |

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