

**STAGE 1 - DESIRED RESULTS**

*Grade Level: 8<sup>th</sup> Grade Earth Science SEDIMENT unit*

**S.GAUTHIER**

**Unit Title:** The Significance of Sediment: Beach Erosion on Cape Cod

**Established Goals:** Students will evaluate current erosion and deposition patterns on Cape Cod, consulting text to determine where and how beaches are eroding. Students will investigate, model, and develop possible methods of saving or reestablishing eroding beaches. Students will write an analysis of their method.

**Understandings:**

Cape Cod was both formed by and is changing because of the weathering, erosion, and deposition of sediment. This is because the Earth is dynamic. Geoscience processes of weathering, erosion, and deposition are slowly and constantly changing the surface of the Earth, including the shoreline at Cape Cod. Man has made efforts to stop this process, but these efforts do not always yields results that best suit citizens or are healthy for the environment.

**Essential Questions:**

How was the Cape formed and how is it changing? What's "natural" and what isn't? How do people stop beaches from eroding? Do these methods work? Are they safe for plant and animal life on the Cape? Can new solutions be developed?

**Next Generation Science Standards  
Massachusetts Frameworks  
Common Core Standards**

**NGSS: 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):** Students who demonstrate understanding can: Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. (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.**

**Massachusetts Curriculum Frameworks Science/Technology:** Describe and give examples of ways in which the earth's surface is built up and torn down by natural processes, including deposition of sediments, rock formation, erosion, and weathering.

**CCSS Reading Standard 8.2** Determine a central idea of a text and analyze its development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text.

**CCSS Reading Standard 8.3** Analyze how a text makes connections among and distinctions between individuals, ideas, or events (e.g., through comparisons, analogies, or categories).

**CCSS Writing Standard 8.2 a& b** Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

- a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.
- b. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.

## STAGE 2 – ASSESSMENT EVIDENCE

### Performance Tasks:

Students will:

- write an explanatory text in the form of a script for a documentary, in which they explain how Cape Cod was formed, how it is continuing to change, and what has been done and is being done to slow erosion, including information from their inquiry investigation.

Included is a rubric used to guide and assess the writing.

### Other Evidence:

Lab Analysis: Beach Erosion Prevention Methodologies

- summary of inquiry observations (what did you learn from modeling natural beach erosion?)
- methodology investigation proposal (what is your plan for slowing erosion [2 methods] and how will you measure their success?)
- evaluation of method analysis (how well did your methods work compared against each other)?

Five annotated articles (teacher provided) and at least one annotated article (student discovered).

Three article summary maps.

## STAGE 3 – LEARNING PLAN

### Summary of Learning Activities Prior to the start of this lesson

**\*A blended learning model will be used for all aspects of this unit. Students will be rolled in to various parts of this unit based on reading proficiency and ability to work independently. The following terms are used to describe what students are doing at all points of the unit delivery. Thus, all “Hangout” Lessons are small group with the teacher.**

**On Your Own:** Student works independently

**Hangout:** Students work with teacher

**Buddy Up:** Students work with a partner

**All Together Now:** Whole class together

**On Your Own:** Students will independently complete Online Module on Sediment. Students have previously studied the Rock Cycle and know about the types of rock. The module introduces them to sediment on the move: weathering, erosion, and deposition. Through primarily video clips, the

module explains how Cape Cod was formed. The module also introduces them (via video clips) to methods that have been used to slow the erosion and deposition process.

**Buddy Up:** Students will investigate Google Earth to see features on the Cape and view topographic maps of Cape Cod to determine places of higher or lower elevation. They will draw and label features on the Cape that were formed as a result of glacier action. Students will also view the Erosion Modeling video (<https://youtu.be/ZNJe6hrdL3M>) and write a summary of what has been observed.

**Lesson 1: HANGOUT** – Students will one read Beach Erosion Texts with the teacher. Teacher will model the following as students read together as they read:

1. What does the text explicitly say? (Put aside prior knowledge, inference, etc.) What am I actually reading? What are the ideas/facts so far? Prompt students to go back into the text; teacher says, “It’s harder than you think to remember the key ideas. Reread.”
2. What are the central ideas? What is a summary of the text based on everything we’ve learned from the text so far? What is the article starting to be about?
3. Is the central idea still central or is the article starting to be about something else? If so, what?
4. What interactions can I see? How are people/events/ideas connected?
5. What does the author assume I already know about while I am reading?

This is a teacher directed activity and students and teacher will read this article together. Additionally, as the article is read, the teacher will ask students to underline in ORANGE any data or statistics in the article and underline in GREEN any direct quotes from scientists or citizens. In RED, underline central ideas. An exit slip, students will write down 2 central ideas that they pulled out of the text.

Here are the articles that students can work on; depending on the group the teacher will select an appropriate text.

### **Cape Cod Beaches Eroding**

<http://www.wbur.org/2011/08/04/cape-erosion>

<http://www.capecodtimes.com/article/20150208/NEWS/150209409>

<https://www.bostonglobe.com/metro/2015/02/15/sandwich-reeling-its-beaches-erode-and-storms-ravage-homes/kXxLF1a3qcualCwcioTEII/story.html>

<http://www.capecodtimes.com/article/20150212/NEWS/150219804>

### **For students looking for a challenge:**

[http://www.beachapedia.org/State\\_of\\_the\\_Beach/State\\_Reports/MA/Beach\\_Erosion](http://www.beachapedia.org/State_of_the_Beach/State_Reports/MA/Beach_Erosion)

[http://earthobservatory.nasa.gov/Features/WorldOfChange/cape\\_cod.php](http://earthobservatory.nasa.gov/Features/WorldOfChange/cape_cod.php)

<http://woodshole.er.usgs.gov/staffpages/boldale/capecod/quest.html>



structured so that students who are emerging readers or struggle with content are working together with the teacher to be certain students understand the text. The text chosen will vary based on student. For ELL students, several of the texts chosen include a short video or are record so that reading is scaffolded. Additionally, students are engaging in an inquiry activity that is hands on, sharing summary maps and results of their erosion trials and working collaboratively, thereby increasing students' exposure to ideas they may have missed in the text. Students have many opportunities to talk about their ideas and understanding of the article with each other and with the teacher.

**Re-teaching  
for students do not attain Proficient level in unit assessment**

Remediation can be applied forward; for example students who struggled despite the embedded differentiation and support might benefit from reading assignments that were already annotated by the teacher, simpler text readings, support in the form of matching videos to pre-view content, and more structured connection activities when asked to connect evidence to claim. This pre-teaching could occur while other students were reading and commenting on exemplars from the Erosion assignment, or in place of review homework, or after school before the next similar assignment.

*Rubric to Guide and Assess Learning*

**Teacher Rubric**

|  | <b>Score Point 4</b>   | <b>Score Point 3</b>  | <b>Score Point 2</b>  | <b>Score Point 1</b>  | <b>Score Point 0</b>  |
|--|--|---|---|---|---|
| <p><b>CCSS Writing Standard 8.2b</b> Write informative /explanatory texts:</p> <p>b. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.</p> | <p>Skillfully develops the topic using well-chosen facts, definitions, concrete details, quotes, and other information and examples that are pertinent and substantial</p> <ul style="list-style-type: none"> <li>· Effectively integrates and cites credible sources*</li> <li>· Shows insightful understanding of topic or text</li> </ul> | <p>Develops the topic using well-chosen facts, definitions, concrete details, quotes, and other information and examples that are relevant and sufficient</p> <ul style="list-style-type: none"> <li>· Competently integrates and cites credible sources</li> <li>· Shows competent understanding of topic or text</li> </ul> | <p>Develops the topic using facts, definitions, concrete details, quotes, and other information and examples that are limited or superficial</p> <ul style="list-style-type: none"> <li>· Ineffectively integrates and cites sources</li> <li>· Shows superficial understanding of topic or text</li> </ul> | <p>Provides minimal and/or irrelevant evidence to develop the topic</p> <ul style="list-style-type: none"> <li>· Incorrectly integrates/cites sources</li> <li>· Shows limited or flawed understanding of topic or text.</li> </ul> | <ul style="list-style-type: none"> <li>· Provides inaccurate, little, or no evidence to support topic</li> <li>· Does not use or cite sources</li> <li>· Shows no and/or inaccurate understanding of topic or text</li> </ul> |

## Student Friendly Rubric

|  | Score Point 4  | Score Point 3   | Score Point 2  | Score Point 1  | Score Point 0  |
|--|--|---|--|--|--|
| <p><b>CCSS Writing Standard 8.2b</b><br/>Write informative /explanatory texts:</p> <p>b. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.</p> | <p>Your script completely and fully explains and analyzes the topic of Cape Erosion. You integrated well-chosen facts, quotes, and data from the Erosion Prevention Methods. You cited your resources. Your work shows insightful understanding of this topic.</p> | <p>Your script explains and analyzes the topic of Cape Erosion. You integrated some well-chosen facts, quotes, and some data from the Erosion Prevention Methods. You cited your resources. Your work shows a complete understanding of this topic.</p> | <p>Your script explains some aspects of the topic of Cape Erosion. You integrated some well-chosen facts or quotes. You mentioned the data from the Erosion Prevention Methods but may not have fully explained your results. You cited some of your resources. Your work shows a partial understanding of this topic.</p> | <p>Your script explains some aspects of the topic of Cape Erosion. You integrated some well-chosen facts or quotes. You mentioned the data from the Erosion Prevention Methods but may not have fully explained your results. You cited some of your resources. Your work shows a partial understanding of this topic.</p> | <p>Your script explains some aspects of the topic of Cape Erosion. You integrated some well-chosen facts or quotes. You mentioned the data from the Erosion Prevention Methods but may not have fully explained your results. You cited some of your resources. Your work shows a partial understanding of this topic.</p> |