**Beverly Owens – GG 8733**

**Sand Investigation**

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| https://lh4.googleusercontent.com/3nF12fEN5h5hgtv4ZofuvibTcwtHVJ_NWtFhMVgHDmo2KU1R-JQY3ndc2Eo8Bc9pXdnqo8Erfx-JMqcT-KaHxMnFOfqsxBUKLF28abqNdDstymCGzJ6SlLhYSu-KzuetFn1Mts6_yLg | **Lesson Overview Template (Part A)** |
| **1.a Select grade level NGSS** [**Performance Expectations**](https://www.nextgenscience.org/search-standards?keys=&type%5B%5D=performance_expectation) **(PEs) or** [**Topics**](https://ngss.nsta.org/AccessStandardsByTopic.aspx)**, or district/state standards that support lesson-based student learning goals.**For NGSS, PE color coding reflects its 3-dimensional learning components. Search the [Evidence Statements](https://www.nextgenscience.org/evidence-statements) for details on what students should know and do. |
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| **MS-ESS2-2.** | **Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.** |

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| **1.b Identify a lesson-based** [**anchoring phenomenon**](https://static1.squarespace.com/static/56ef1da37da24f301fccaacd/t/5aa86e09652dea04982ceb94/1520987659683/NGSS%2BStorylineTool%231-AnchoringPhenomenon%2B-%2Bv2.2.pdf) **that builds towards understanding of the PEs/standards, and is engaging and relevant to students.**See more about [phenomena](https://www.ngssphenomena.com/) and using [phenomena with NGSS](https://static1.squarespace.com/static/56ef1da37da24f301fccaacd/t/581f4bb3e58c62bd0983dd03/1478446005130/Using%2BPhenomena%2Bin%2BNGSS.pdf). |
| As a class, students will view the video 11 Unususal Beaches on Earth. <https://www.youtube.com/watch?v=h02GkDe7bDk>As students watch the video, they will complete the Wows and Wonders Sheet.<https://drive.google.com/file/d/1SDLfsS2pkuYjfUNRi4fJzp2F36hcXall/view?usp=sharing> |
| **1.c Ask a Driving Question, which is authentic and student-focused, that relates to investigating the PEs/standards and phenomenon.**See more about [Driving Questions](http://www.authenticeducation.org/ae_bigideas/article.lasso?artid=53) and using [Driving Questions with NGSS](http://nstacommunities.org/blog/2013/08/01/essential-questions/). |
| What do the beaches in North Carolina look like? Why don’t they look like the beaches in the 11 Unusual Beaches on Earth video?What makes beach sand look the way that it does? |
| **1.d Unpack the** [**3-D learning components**](https://www.nextgenscience.org/three-dimensions) **of the Performance Expectations/standards in the table below.**For NGSS guidance, see the [NGSS Topic Arrangements](https://ngss.nsta.org/AccessStandardsByTopic.aspx) and [NGSS DCI Arrangements](https://ngss.nsta.org/AccessStandardsByDCI.aspx). Use tools to [unpack](https://ngss.nsta.org/ngss-tools.aspx) each PE separately. |
| [**Science and Engineering Practices**](https://www.nextgenscience.org/sites/default/files/resource/files/Appendix%20F%20%20Science%20and%20Engineering%20Practices%20in%20the%20NGSS%20-%20FINAL%20060513.pdf) **(SEP)****(skills)** | [**Disciplinary Core Ideas**](https://www.nextgenscience.org/sites/default/files/resource/files/AppendixE-ProgressionswithinNGSS-061617.pdf) **(DCI)****(content)** | [**Crosscutting Concepts**](https://www.nextgenscience.org/sites/default/files/resource/files/Appendix%20G%20-%20Crosscutting%20Concepts%20FINAL%20edited%204.10.13.pdf) **(CCC)****(connections)** |
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| [**SL.8.5**](http://www.corestandards.org/ELA-Literacy/SL/8) | [Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.](http://www.corestandards.org/ELA-Literacy/SL/8)(MS-ETS1-4) |

 | [ESS2.C: The Roles of Water in Earth's Surface Processes](http://www.nap.edu/openbook.php?record_id=13165&page=184)[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)](http://www.nap.edu/openbook.php?record_id=13165&page=184)

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| **MS-ESS2-2.** | **Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.** |

 | [Cause and Effect](http://www.nap.edu/openbook.php?record_id=13165&page=87)* [Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-ESS2-5)](http://www.nap.edu/openbook.php?record_id=13165&page=87)
 |
| 1.e Determine students’ prior knowledge about the lesson concepts. (e.g., pre-test, class discussion, exit ticket, 1-minute report, KWL chart, survey, etc.) |
| On their Wows and Wonders sheet, students will describe what beaches in North Carolina look like (in terms of sediment and sand). They will also explain why they think our beaches look that way.  |
| **1.f Identify Lesson Topics and Learning Goals:** List main lesson concepts related to grade level PEs/standards that support student learning goals in figuring out the anchoring phenomenon; revise as needed. |
| * Goal 1: To understand how beaches might form
* Goal 2: To understand that beaches have different parent rock
* Goal 3: To understand that different agents of weathering and erosion have shaped Earth’s surface.
 |
| **1.g Select Lesson Resources:** Identify resources to develop lessons that address the PEs/standards and investigate the anchoring phenomenon through a variety of sequenced activities; revise as needed (include title and URL).  |
| 11 Unususal Beaches on Earth video<https://www.youtube.com/watch?v=h02GkDe7bDk>Wows and Wonders Sheet<https://drive.google.com/file/d/1SDLfsS2pkuYjfUNRi4fJzp2F36hcXall/view?usp=sharing>Sand Investigation Lab<https://drive.google.com/file/d/1SDLfsS2pkuYjfUNRi4fJzp2F36hcXall/view?usp=sharing> |

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|  | **Lesson Plan Template (Part B)** |
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| **Grade and Subject** | 8th Grade Science | **Instructional Time**(min.) | 2 hours |
| **Lesson Title (Topic)** | Sand Investigation |
| **Anchoring Phenomenon**(copy from 1.b) | As a class, students will view the video 11 Unususal Beaches on Earth. <https://www.youtube.com/watch?v=h02GkDe7bDk>As students watch the video, they will complete the Wows and Wonders Sheet. |
| **Driving Question**(copy from 1.c) | What do the beaches in North Carolina look like? Why don’t they look like the beaches in the 11 Unusual Beaches on Earth video? |
| **Lesson Overview** |
| **Lesson Summary**(description) | **Lesson Topics and Student Learning Goals**(copy from 1.f) |
| **Engage:** Students will explore how sand forms, and the parent rock and erosional forces that are involved in the development of sand. Students will watch a video to initiate inquiry, and get students thinking about beaches around the world. As students watch the video, they will complete the Wows and Wonders sheet, to record observations and questions that are generated as a result of the video. After the video, students will discuss their takeaways in small groups.**Explore:** Students will work in small groups to explore photos of different sand samples. Students will be given a selection of different rocks, minerals, fossils, and biogenics, and will try to match up parent rock to each sample. | * Goal 1: To understand how beaches might form
* Goal 2: To understand that beaches have different parent rock
* Goal 3: To understand that different agents of weathering and erosion have shaped Earth’s surface.
 |
| **Lesson Resources Aligned with Standards** |
| **Lesson Resource**(copy from 1.g, sequenced with titles and links) | **Resource Standards Alignment**(copy from 1.d, standards notated, link optional) |
| 11 Unususal Beaches on Earth video<https://www.youtube.com/watch?v=h02GkDe7bDk> |

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| Wows and Wonders Sheet<https://drive.google.com/file/d/1SDLfsS2pkuYjfUNRi4fJzp2F36hcXall/view?usp=sharing> |

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| **MS-ESS2-2.** | **Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.** |

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| Sand Investigation Lab <https://drive.google.com/file/d/1D30VRu4f8KG-17z9RZFDg3K52tfxfar1/view?usp=sharing> |

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| **MS-ETS1-3.** | **Analyze data from tests to determine similarities and difference**Analyze and interpret data to determine similarities and differences in findings. |

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| **Teacher Preparation** |
| **Student Misconceptions**(potential student ideas that are problematic when engaging in the lesson) | **Scientific Terminology**(vocabulary named once students “figure out” concepts of lesson) |
| This activity addresses the misconception that all sand is the same, and that the only thing found in sand is small rock particles. | * sedimentary rocks
* Law of Superposition
* Parent rock
* Weathering and erosion
 |
| **Materials Preparation** |
| **Student Needs**(activity sheets, data packet, etc.) | **Group Needs**(lab equipment, group data packets, etc.) | **Safety & Technology Needs**(unsafe materials, websites cued, etc.) |
| * Wows and Wonders worksheet
* chromebook
 | * Sand sample cards
* Rock, mineral, fossil samples
* Sand samples (optional)
 | n/a |
| **Supporting Information** |
| **References**(links to cite sources of data, images, websites, etc.) | **Background Reading**(for teachers and/or students) |
| **Science of Sand website** | **n/a** |

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| **Complete the 5E Instructional Model section(s) that are relevant to the lesson:** |

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| **Engage: *Interest in a concept is generated and students’ current understanding is assessed.***ACTIVATE interest: Introduce anchoring phenomenon and driving question. |
| * Engages students in the concepts through a short activity or relevant discussion
* Connects students’ past and present experiences
* Creates interest and generates curiosity
* Uncovers students’ current knowledge and misconceptions
* Initiates students’ investigation into the anchoring phenomenon based on an observation, problem, or question
 |
| **Phenomenon-based Driving Questions** (questions students are likely to ask about the lesson topic) |
| * Why does that beach look a different color?
* Why does that beach have glass?
* Why are our beaches in North Carolina “boring” brown?
* Why are some beaches made of big shells?
 |
| **Lesson Activities** (experiment, demonstration, video, visualization, reading, etc., coherently sequenced to help build understanding of PE/standard)For each activity, provide details of the procedure including timing, teacher guidance, student prompts, strategies for discussions and differentiation, etc.  |
| Students will watch the 11 Unusual Beaches on Earth video. This short video highlights some beaches that have differing types of sediment. As students watch the video, they will complete the [Wows and Wonders](https://drive.google.com/file/d/1SDLfsS2pkuYjfUNRi4fJzp2F36hcXall/view?usp=sharing) worksheet. Prior to watching the video, students should complete the “Focus” section, to describe what their observations have been about beaches in North Carolina.  |
| **Formative Assessment** (activity sheet, Venn diagram, summary, exit ticket, think-pair-share, etc. to check for understanding of lesson concepts) |
| After watching the video, students will complete the “Conclusion” section, where they will attempt to explain why North Carolina beaches look different from the beaches in the video. |
| **Consensus Discussion** (claims, evidence, and reasoning on what students figured out in this lesson) |
| In small groups, allow students to each share 1 wow and 1 wonder, from their Wows and Wonders sheet. During this time, teachers should monitor and facilitate in any groups that need assistance. Encourage students to try and answer other students’ “wonder” questions.Next, as a whole class, discuss some of the questions that students listed on their Wows and Wonders sheet. Allow student volunteers to share their wonders with the class. |
| **New Questions and Next Steps** (student-driven questions, ideas on what to investigate in the next lesson and how to investigate it, etc.) |
| For the next activity, show students some photomicrographs of sand samples collected in different places around the world, and allow students to explore possible connections between sand and parent rock (Sand Investigation Lab – see explore section). |

**AND/OR**

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| **Explore: *Students participate in activities to explore questions related to a concept****.*BUILD Knowledge: Learn the science behind concepts. |
| * Students explore the concepts with others to develop a common set of experiences
* Provides students with one or more actual experiences
* Offers opportunities for creative thinking and skills development
* Students make and record observations and ideas, make connections, and ask questions
* Students usually work in groups
* Teacher acts as coach or facilitator in student-led investigations
 |
| **Phenomenon-based Driving Questions** (questions students are likely to ask about the lesson topic) |
| * Where did this come from?
* Do you have a real sample of sand that we can look at?
* Where did the parent rock come from?
 |
| **Lesson Activities** (experiment, demonstration, video, visualization, reading, etc., coherently sequenced to help build understanding of PE/standard)For each activity, provide details of the procedure including timing, teacher guidance, student prompts, strategies for discussions and differentiation, etc.  |
| Students will work in groups to analyze sand photomicrographs. As they examine the pictures, students will try to determine what the parent rock is. Provide students with examples of parent rock material, like a coral sample, quartz, shells, and mica. Students will try to determine which sand pictures were derived from the different parent rock examples. As an optional extension, provide students with an actual sand sample to examine. |
| **Formative Assessment** (activity sheet, Venn diagram, summary, exit ticket, think-pair-share, etc. to check for understanding of lesson concepts) |
| Submission of the [Sand Investigation Lab](https://drive.google.com/file/d/1D30VRu4f8KG-17z9RZFDg3K52tfxfar1/view?usp=sharing) student handout – formative assessment questions are built into the lab sheet. |
| **Consensus Discussion** (claims, evidence, and reasoning on what students figured out in this lesson) |
| As students are completing the lab, they will be working in groups. In trying to determine the parent rock of each sand sample, students will need to conduct discussions with their group, including what do they think is in the sand sample, and what do they think it derived from? |
| **New Questions and Next Steps** (student-driven questions, ideas on what to investigate in the next lesson and how to investigate it, etc.) |
| After this activity, a lesson on weathering and erosion would be appropriate. This would be the next step in the 5E lesson plan, as the “Explain.” |