

# Lesson Planning Guide

## Develop Lesson Plans for Instruction

Steps in developing [NGSS](#)-/standards-aligned, phenomenon-based lessons that are guided by the [5Es instructional model](#):

1. Complete the Lesson Plan Overview (Part A) to guide development of lesson plans.
2. Use the Lesson Plan Template (Part B) to create detailed lesson plans.



## Lesson Overview Template (Part A)

### 1.a Select grade level [NGSS Performance Expectations \(PEs\)](#) or [Topics](#), 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](#) for details on what students should know and do.

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.

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

### 1.b Identify a lesson-based [anchoring phenomenon](#) that builds towards understanding of the PEs/standards, and is engaging and relevant to students.

See more about [phenomena](#) and using [phenomena with NGSS](#).

Students will use what they know about the physical geography of the chosen study areas to retrace the history of sand samples and present their findings.

### 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](#) and using [Driving Questions with NGSS](#).

How does sand form?  
 How do physical processes affect the landscape?

**1.d Unpack the 3-D learning components of the Performance Expectations/standards in the table below.**  
 For NGSS guidance, see the [NGSS Topic Arrangements](#) and [NGSS DCI Arrangements](#). Use tools to **unpack** each PE separately.

Science and Engineering Practices (SEP) (skills)	Disciplinary Core Ideas (DCI) (content)	Crosscutting Concepts (CCC) (connections)
<b>Constructing Explanations and Designing Solutions</b> Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe nature operate today as they did in the past and will continue to do so in the future. (MS-ESS1-4),(MS-ESS2-2)	ESS2.A: Earth's Materials and Systems 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. (MS-ESS2-2)	<b>Scale Proportion and Quantity</b> Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.

**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.)

Students will begin lesson with a guided classroom discussion about what they already know about physical processes that affect the planet. This will include asking questions about how students think sand is formed and travels. Students should have prior knowledge of tectonic movements and plate boundaries as well as concepts of weather and erosion.

**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.

- Gain knowledge of physical geography of study areas
- Gain knowledge of geologic history of study areas
- Understand that sand can form under different processes

**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).

The Amazing Life of Sand- Deep Look <https://www.youtube.com/watch?v=VkrQ9QuKprE>  
 How North America Got its Shape- Peter Haproff <https://www.youtube.com/watch?v=jzqnUvE66HA>  
 The Science of Sand website- <https://www.scienceofsand.info/>



## Lesson Plan Template (Part B)

<b>Grade and Subject</b>	8 <sup>th</sup> grade Earth Science class	<b>Instructional Time</b> (min.)	80-minute lesson & additional independent research time
<b>Lesson Title (Topic)</b>	Geography and Geology of Sand		
<b>Anchoring Phenomenon</b> (copy from 1.b)	Students will use what they know about the physical geography of the chosen study areas to retrace the history of sand samples and present their findings.		
<b>Driving Question</b> (copy from 1.c)	How does sand form? How do physical processes affect the landscape?		

### Lesson Overview

<b>Lesson Summary</b> (description)	<b>Lesson Topics and Student Learning Goals</b> (copy from 1.f)
This study will be a group activity. Each group (3-4 students) will select 3 different sand samples to study. The samples selected must be from 3 different geographic regions. The students will produce a map illustrating where the 3 samples were taken from; included with the map should be a brief description of the physical geography of each region. They will then research the geologic history of each area the sample was taken from. Finally, the students will analyze the 3 samples for differences in composition, color, size, shape, etc. Each group will create a presentation of choice (PowerPoint, poster, video, etc.) to share their findings.	<ul style="list-style-type: none"><li>• Gain knowledge of physical geography of study areas</li><li>• Gain knowledge of geologic history of study areas</li><li>• Understand that sand can form under different processes</li></ul>

### Lesson Resources Aligned with Standards

<b>Lesson Resource</b> (copy from 1.g, sequenced with titles and links)		<b>Resource Standards Alignment</b> (copy from 1.d, standards notated, link optional)	
The Amazing Life of Sand- Deep Look <a href="https://www.youtube.com/watch?v=VkrQ9QuKprE">https://www.youtube.com/watch?v=VkrQ9QuKprE</a>		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. (MS-ESS2-2)	
How North America Got its Shape- Peter Haproff <a href="https://www.youtube.com/watch?v=jzqnUvE66HA">https://www.youtube.com/watch?v=jzqnUvE66HA</a>		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. (MS-ESS2-2)	
The Science of Sand website- <a href="https://www.scienceofsand.info/">https://www.scienceofsand.info/</a>			
<b>Teacher Preparation</b>			
<b>Student Misconceptions</b> (potential student ideas that are problematic when engaging in the lesson)		<b>Scientific Terminology</b> (vocabulary named once students "figure out" concepts of lesson)	
All sand is formed the same way		Parent Material Erosion Deposition	
<b>Materials Preparation</b>			
<b>Student Needs</b> (activity sheets, data packet, etc.)	<b>Group Needs</b> (lab equipment, group data packets, etc.)	<b>Safety &amp; Technology Needs</b> (unsafe materials, websites cued, etc.)	
n/a	Computer access for research and to create powerpoint map, etc.	The Science of Sand website- <a href="https://www.scienceofsand.info/">https://www.scienceofsand.info/</a>	
<b>Supporting Information</b>			
<b>References</b> (links to cite sources of data, images, websites, etc.)		<b>Background Reading</b> (for teachers and/or students)	
n/a		n/a	

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

**Explain: *Students construct their understanding of a concept and develop evidence-based explanations.***

DEVELOP Concepts: Research information using real-world data.

- Develops students' explanation for the concepts they have been exploring with teacher providing supporting guidance
- Students describe their observations and come up with explanations
- Students listen critically to each other's explanations
- Students learn to apply and interpret evidence
- Develops students' academic vocabulary by applying scientific terms once students have figured out the lesson concepts
- Teacher guides students' reasoning, asks appropriate questions, and directs students to additional supporting resources

**Phenomenon-based Driving Questions** (questions students are likely to ask about the lesson topic)

What are the different ways sand is formed?

**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.

**Using prior knowledge from lessons and the videos linked above as background knowledge, a guided classroom discussion will allow students to formulate ideas of the origins of different types of sand.**

**Formative Assessment** (activity sheet, Venn diagram, summary, exit ticket, think-pair-share, etc. to check for understanding of lesson concepts)

In groups of 3-4, students will compare 3 different sand samples and retrace its course through history. Students will then prepare their findings for a presentation of their choice.

**Consensus Discussion** (claims, evidence, and reasoning on what students figured out in this lesson)

Once groups present their finds, a final class discussion can be held to compare the samples between different groups.

**New Questions and Next Steps** (student-driven questions, ideas on what to investigate in the next lesson and how to investigate it, etc.)

How does the physical geography affect biodiversity?