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| **Lesson Planning Guide** |
| **Develop Lesson Plans for Instruction** |
| Steps in developing [NGSS](https://www.nextgenscience.org/)-/standards-aligned, phenomenon-based lessons that are guided by the [5Es instructional model](https://bscs.org/bscs-5e-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.
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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. |
| My grade level is 5th. Students should be able to map out a problem and come up with solutions to that problem, or hypothesize what could have caused the problem.  |
| **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). |
| Rocks and their age. |
| **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/). |
| How can sand tell us about the past and the future? |
| **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)** |
| Analyze sand sample data throughout the world, introducing ways to collect data and review data in charts and graphs.  | Records sand samples throughout the country and world and predict how the sand arrived at the location and how it became sand. | Describing the sand and patterns of materials in the sand.Explain what types of materials are in the sand and how they got there. |
| 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.) |
| Giving a pre test to see how much knowledge students have on the topic. |
| **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. |
| Learning about sand, its constituents, and how it was created and arrived at certain locations. |
| **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).  |
| Books, charts, online activites.  |

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|  | **Lesson Plan Template (Part B)** |
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| **Grade and Subject** | 5th Geology Learning about sand | **Instructional Time**(min.) | 30 |
| **Lesson Title (Topic)** | Learning about sand |
| **Anchoring Phenomenon**(copy from 1.b) | Rocks and their age. |
| **Driving Question**(copy from 1.c) | How can sand tell us about the past and the future? |
| **Lesson Overview** |
| **Lesson Summary**(description) | **Lesson Topics and Student Learning Goals**(copy from 1.f) |
| Create 8 art pictures, giving the locations of sand. Draw and appropriately color the sand particles and for each sand location, also draw a picture of how and where you think the sand came from. Each location will have 2 pictures (4 locations) | Learning about sand, its constituents, and how it was created and arrived at certain locations. |
| **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) |
| Books (Including Textbook)  | Analyze sand sample data throughout the world, introducing ways to collect data and review data in charts and graphs |
| Charts <https://geology.com/rocks/> | Records sand samples throughout the country and world and predict how the sand arrived at the location and how it became sand. |
| Online activity (Rock ones only) <https://www.scholastic.com/teachers/activities/teaching-content/rocks-minerals-and-landforms-12-studyjams-interactive-science-activities/> | Describing the sand and patterns of materials in the sand.Explain what types of materials are in the sand and how they got there. |
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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) |
| Kids finding art boring or not having good drawing skills and not completing the assignment. | Metamorphic, Igneous, Sedimentary |
| **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.) |
| Colored pencils, art paper, website or print out to reference. |  |  |
| **Supporting Information** |
| **References**(links to cite sources of data, images, websites, etc.) | **Background Reading**(for teachers and/or students) |
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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) |
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| **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.  |
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| **Formative Assessment** (activity sheet, Venn diagram, summary, exit ticket, think-pair-share, etc. to check for understanding of lesson concepts) |
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| **Consensus Discussion** (claims, evidence, and reasoning on what students figured out in this lesson) |
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| **New Questions and Next Steps** (student-driven questions, ideas on what to investigate in the next lesson and how to investigate it, etc.) |
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**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) |
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| **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.  |
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**AND/OR**

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| **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) |
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| **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.  |
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| **Formative Assessment** (activity sheet, Venn diagram, summary, exit ticket, think-pair-share, etc. to check for understanding of lesson concepts) |
|  |
| **Consensus Discussion** (claims, evidence, and reasoning on what students figured out in this lesson) |
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| **New Questions and Next Steps** (student-driven questions, ideas on what to investigate in the next lesson and how to investigate it, etc.) |
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**AND/OR**

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| **Elaborate: *Students deepen and expand their understanding by applying their understanding in new contexts.***APPLY Learning: Utilize information in new ways. |
| * Extends students’ understanding or applies what they have learned in a new setting
* Students use the information they have gained to propose solutions and extend their learning to new situations
* Teacher supports students in broadening their understanding and extend ideas to other situations so they can draw broader conclusions beyond their experiment or investigation
 |
| **Phenomenon-based Driving Questions** **Extended/Applied in a New Context** (questions students are likely to ask about the lesson topic) |
|  |
| **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.  |
|  |
| **Formative Assessment** (activity sheet, Venn diagram, summary, exit ticket, think-pair-share, etc. to check for understanding of lesson concepts) |
|  |
| **Consensus Discussion** (claims, evidence, and reasoning on what students figured out in this lesson) |
|  |
| **New Questions and Next Steps** (student-driven questions, ideas on what to investigate in the next lesson and how to investigate it, etc.) |
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**AND/OR**

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| **Evaluate: *Students and teachers have opportunities to assess students’ understanding of a concept.***DEMONSTRATE Ability: Write, illustrate, create, etc. artifacts that accurately describe knowledge gained. |
| * Students have the opportunity to demonstrate understanding of skills and concepts, and evaluate their own progress
* Teacher evaluates students’ understanding and progress, as well as their own instructional practice, and may implement alternative assessment strategies
* Enables adjustment of misconceptions, reinforces students’ understanding of the PE concepts in greater depth
 |
| **Phenomenon-based Driving Questions** (questions about the lesson topic) |
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| **Skills Learning Performance (SEPs) Goals** (assess student skills related to the lesson) |
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| **Formative Assessment** (quiz, test, report, presentation, poster, video, model, etc. to demonstrate students’ understanding about the PEs/standards) |
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| **Content Learning Performance (DCIs, CCCs) Goals** (assess student mastery of lesson content) |
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| **Summative Assessment** (quiz, test, report, presentation, poster, video, model, etc. to demonstrate students’ understanding about the PEs/standards) |
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|  | **Step 4: Lesson Instruction and Reflection** |
| **Lesson Notes During Instruction** |
| * What modifications (instruction, timing, etc.) were made or are needed for the lesson, activities, or resources?
* Which parts of the lesson, activities, or resources were or need to be changed?
* How effective (or ineffective) were the lesson, activities, or resources for student learning?
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| **Review and Revise Post-Instruction** |
| * Which parts of the lesson were a success?
* What were some challenges about the lesson?
* How could the lesson be changed or improved?
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