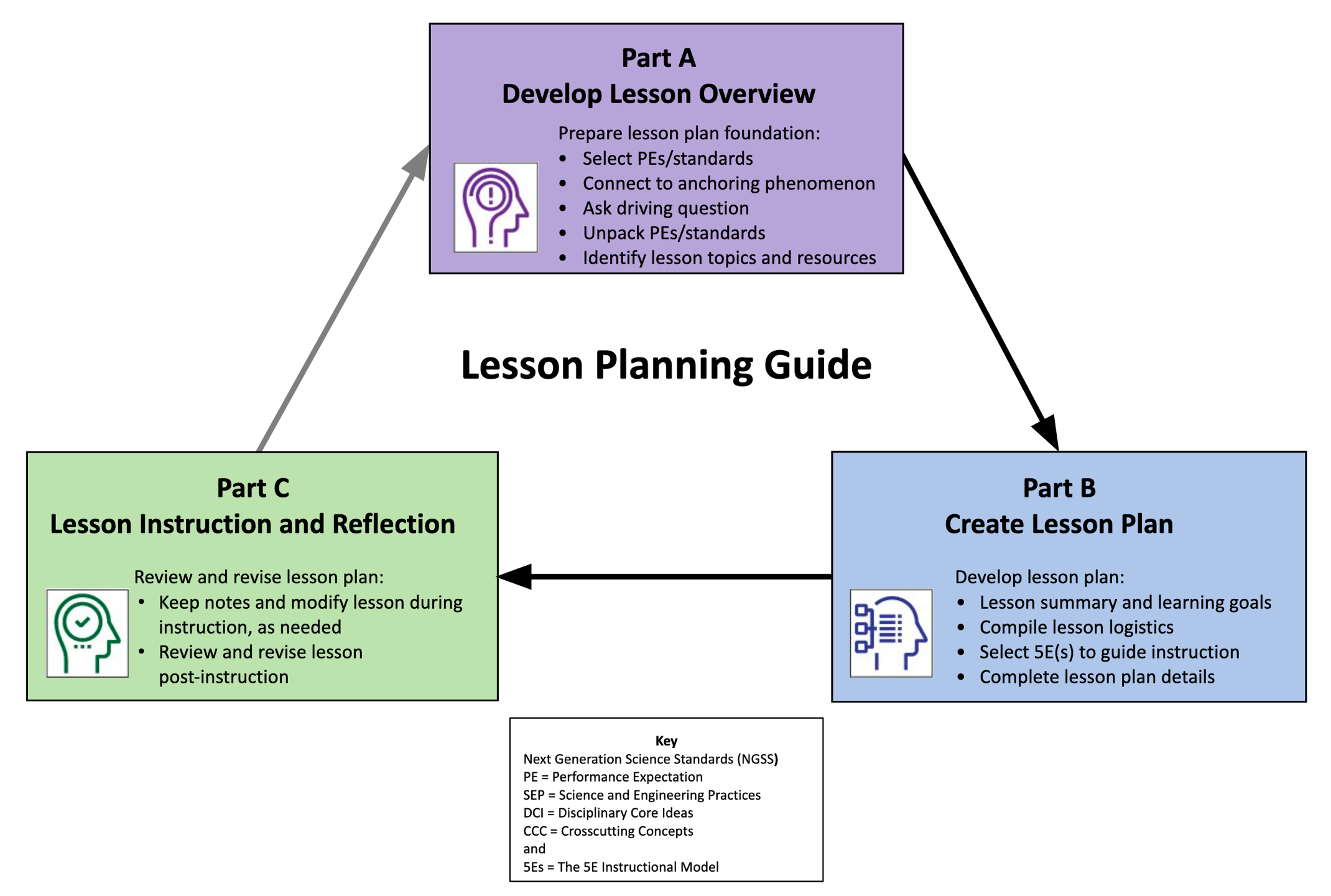
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| **Lesson Planning Guide** |
| **Develop Lesson Plans for Instruction** |
| Steps in developing [NGSS](https://www.nextgenscience.org/)-/standards-aligned, phenomenon-based lessons that are guided by the [5Es instructional model](https://bscs.org/bscs-5e-instructional-model):   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. | | | |
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| **1.b Identify a lesson-based** [**anchoring phenomenon**](https://static1.squarespace.com/static/56ef1da37da24f301fccaacd/t/5aa86e09652dea04982ceb94/1520987659683/NGSS+StorylineTool%231-AnchoringPhenomenon+-+v2.2.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+Phenomena+in+NGSS.pdf). | | | |
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| **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/). | | | |
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| **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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| 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.) | | | |
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| **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. | | | |
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| **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). | | | |
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|  | **Lesson Plan Template (Part B)** | | | | | |
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| **Grade and Subject** |  | | | | **Instructional Time**  (min.) |  |
| **Lesson Title (Topic)** |  | | | | | |
| **Anchoring Phenomenon**  (copy from 1.b) |  | | | | | |
| **Driving Question**  (copy from 1.c) |  | | | | | |
| **Lesson Overview** | | | | | | |
| **Lesson Summary**  (description) | | | **Lesson Topics and Student Learning Goals**  (copy from 1.f) | | | |
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| **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) | | | |
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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) | | | |
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| **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.) | | |
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| **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) |
|  |
| **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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| **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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| **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) |
|  |
| **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) |
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| **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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| **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? | |
| **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? | |