**Part 1: Figure out the NGSS Performance Expectations and the science behind them.**

What are the fundamental scientific concepts and model constructs underlying the PEs you are addressing? What what do students need to know to get to where they need to be?

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| Science Idea or Concept | Underlying Conceptual or System Model that the INSTRUCTOR NEEDS TO UNDERSTAND | Which parts do STUDENTS need to understand? |
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**Part 2: Identify the Important progressions.**

Using the concept progression from Appendix K of the NGSS, notice what in earlier grades should come before my work with students that I could both review and capitalize on as I begin these lessons. Next, I need to look at where my students will next see these concepts, and in what context. What do I need to pay attention to as I design lessons?

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| Where they come from: Early concept, practice and possible phenomena students may have seen? | What I will do with them: how I will use the earlier work for maximum learning? | Where they are going: how will students build on concepts at my level to develop deeper understanding later on? |
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**Part 3: Identifying and Explaining phenomena**

A phenomenon is any event, incident or state in the physical world that evokes questioning and wonder. It is something about the world that offers a mystery or puzzle that we want to solve, and we know we want to solve it because we immediately begin asking questions. Phenomena can include all manner of observable aspects of the world, such as whether events, rocks, a chemical reaction, etc. But phenomena can also be images or video or even descriptions of all these things, or data that captures something about an event. Sources for finding these phenomena include text and images on the internet, conversations with scientists, student observations, and data sets. As long as it relates to the natural world and prompts questions, it can be a phenomenon.

The challenge is to choose phenomena that will simultaneously engage students as well as narrow their work so that sense-making can happen.

What are some appropriate phenomena that relate to the concepts and models I identified earlier?

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| Concept | Phenomenon that will illicit questions and provoke inquiry | Resources needed to use the phenomenon in the classroom (i.e, xeroxed data sets, lab set up, etc) |
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**Part 4: Uncovering initial student ideas**

How will I introduce the phenomenon and how will I prompt and collect questions from students?

What tool will you use to uncover initial thinking from students? Examples might include an agree/disagree tool, a group modeling task, or an informal writing prompt.

What do you think student will originally ask and think about this idea? Try to anticipate what students might say, but note that you will likely always be surprised at the range of different ideas.

What will I do for students who are deficient in prerequisite ideas for this level? What review can I build in that work for all students, or how can I differentiate so as to meet all needs?

**Part 5: Incorporating Reading, Writing and Dialogue**

How will you include common core communication strategies into your lessons?

1. Where will you have students engage in meaningful dialogue about something they are trying to make sense of? Which protocols will you use to prompt them to use dialogue and to make sure they are taking turns and listening to others?
2. Which reading selections will you include, when, and how will you give students tools to read and comprehend these pieces. What will they do after they have read (they could write, create a graphic, or dialogue as ways to synthesize what they’ve read).
3. What writing prompts or specific writing pieces will you assign throughout these lessons? Will they be opener prompts to engage students as they come in? Will you include more formal pieces as assessments? Will you use notebooks or google docs or other formats?
4. Formative assessments: how will you assess what student are learning and doing throughout the lesson segment? Would you use exit tickets? White boards? Short presentations? Submitted questions?

**Part 6: Designing a learning sequence**

The approach of NGSS centers on sense-making of phenomena. So, each cycle of learning should begin with one or more phenomena that provokes questions. Then, students should be tasks that require them to engage in the appropriate science and engineering practices to be able to do the performance education. Common core dialogue, reading and writing prompts help students make sense of what they’re learning as well.

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| Targeted concept | Learning Tasks (what will student do and which practices will they engage in, and what communicative practices will they employ?) | Evidence of learning (how will students show/demonstrate what they are learning?) | My reflection on the task after implementing. Where do I need to insert or remove scaffolding |
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**Part 7: Model and explanation revisions**

How will I scaffold the revision of models and explanations in the middle of the unit?

How will I scaffold the creation of a final model and explanation at the end of the unit?

**Part 8: Application of student learning / summative assessment**

How will students demonstrate the performance expectations in the context of a new phenomenon?

Begin constructing specific questions, problems or applications students will be asked to perform.