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Facilitation Guide
Educational Service District 123 and Pacific Northwest National Laboratory
Exploring Climate Science with Virtual Reality Follow-up #1
Models and Explanations
Ambitious Science Teaching
Continued Phenomena and Eliciting Student Ideas

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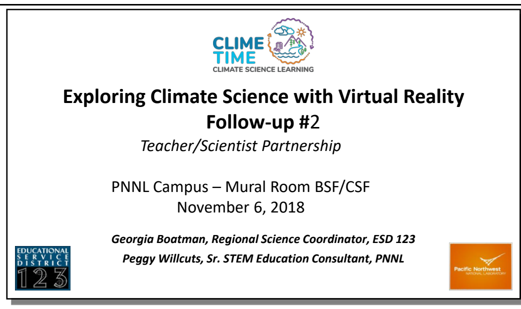
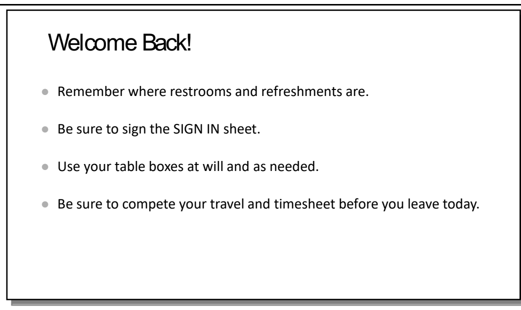


</td><td>Slide 1</td></tr>
<tr><td>Slide 2</td><td>



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Slides 1-2 10 minutes

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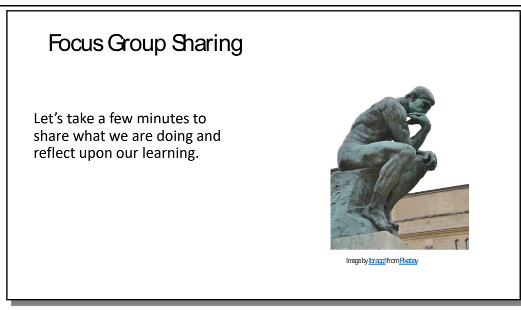
<tr><td>Slide 3</td><td>



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Slide 3: 20 minutes
Possible starter or follow-up questions

- What was the most important thing you learned at this workshop last time?
- What aspects of your new learning will you try with your students? OR
- Did you apply your new knowledge and skills in your classroom? If so, how did it go? If not, why not?
- How has this work impacted students? OR
- How do you think your students will react if you take this back to your classroom?

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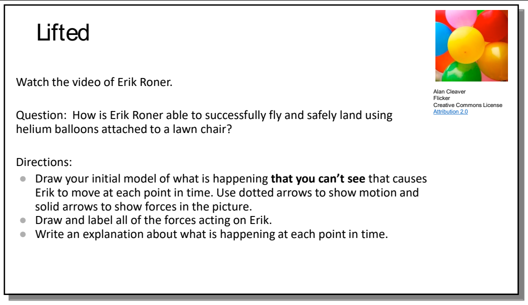
<td>
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<td>Slide 4: 25 minutes
Handout Secondary Models Document

Play the 4+ minute video (linked on picture) with the question in mind and the understanding that you will be drawing an initial model.</td>
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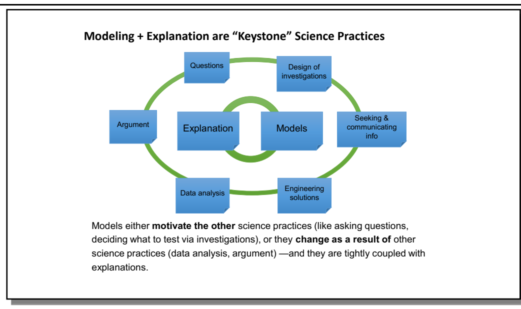
<td>
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<td>Slides 5-11: 5-7 min

Last time we worked on argument from evidence. That a step toward constructing explanations. Models are an important thing we can do to construct those explanations around phenomena in CS or anything else. Models and Explanations are at the heart of and the keystone for the other practices. Those practices contribute to the construction of a thorough or gapless explanation.</td>
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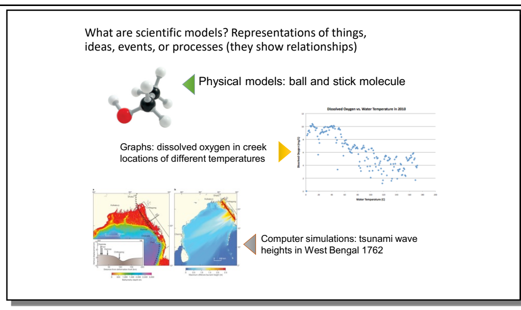
6</td>
<td>
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<td>Slides 5-11: 5-7 min

You can make use of models when you do CER and definitely they are an important part of moving toward that explanation of a phenomena. A model might be an actual physical model but it need not be and often that is not the most useful model.

Data on a graph can model something like temperature in different locations much better that a diagram or physical model
Simulations are manipulatable models.</td>
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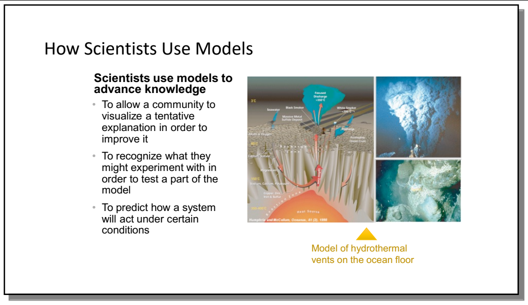
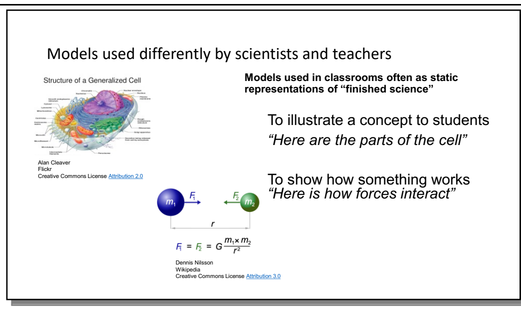
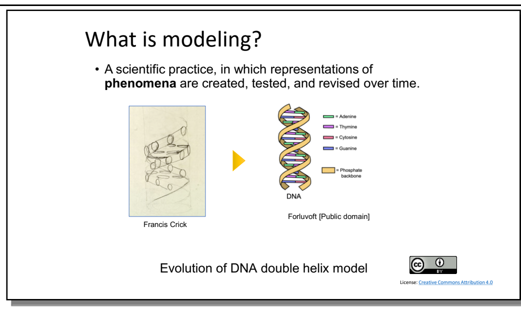
Slide 7		**Slides 5-11: 5-7 min** Scientists use models all the time. They can be that “back of the napkin” thinking as we construct our understanding they can be a way of thinking through their planning about what they might investigate or experiment with They can be use for predicting outcomes based on conditions They can help us explore things that are too small or too large to manipulate or see the system well
Slide 8		**Slides 5-11: 5-7 min** They can help us explore things that are too small or too large to manipulate or see the system well
Slide 9		**Slides 5-11: 5-7 min** Look over this slide, what does it show you. Share Rosalind Franklin’s initial ideas actually were the basis for a more evolved understanding of DNA by Watson and Crick

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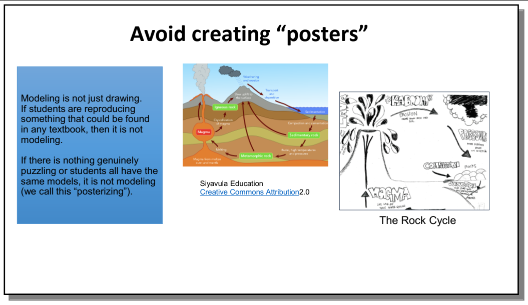
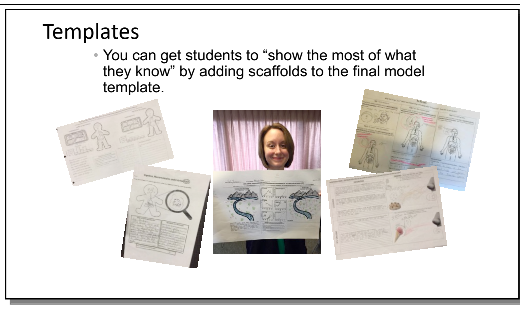
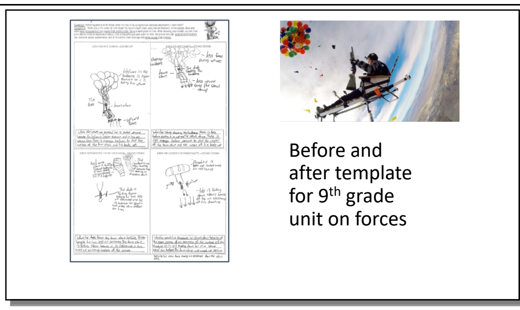
Slide 10		**Slides 5-11: 5-7 min** Models are not just drawings. It shouldn’t be a copy of existing pictures. Or ‘google-able” but rather should reflect a students’ thinking about a phenomena or event. It shouldn’t be just a poster. Example: If I show you a rock cycle graphic, give you all the components of the rock cycle and then ask you to draw the rock cycle that is not really a model so much as a pictorial way to show your summative learning. But if I asked you to draw and describe ways that rock forms over time that would be more of a model. It is all about the context in which they show their learning. A model is a thinking tool.
Slide 11		**Slides 5-11: 5-7 min** Scaffolding for students to construct models with gapless explanations can be a really useful way to truly see the evolution of student learning. This could be a valuable formative assessment task in a classroom and is part of the learning and not an add on to daily classroom learning.
Slide 12		**Slides 12-18: 20 min.** Slides 12-15 10 min. Have partners look at and discuss the initial and final models following slide directions Slides 16-18 10 min. Same process to consider scaffolds

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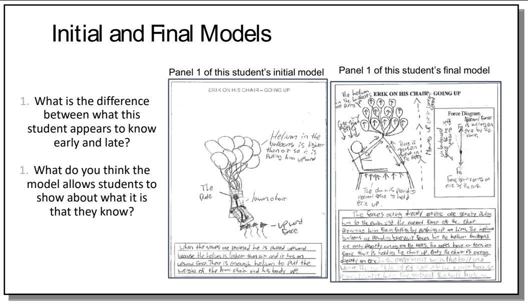
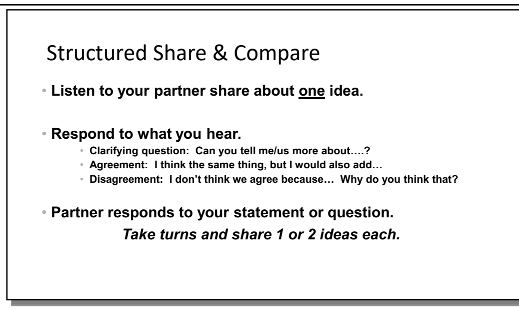
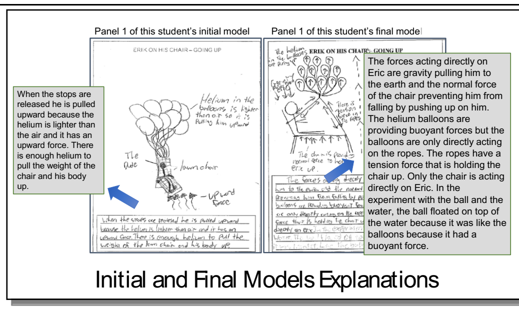
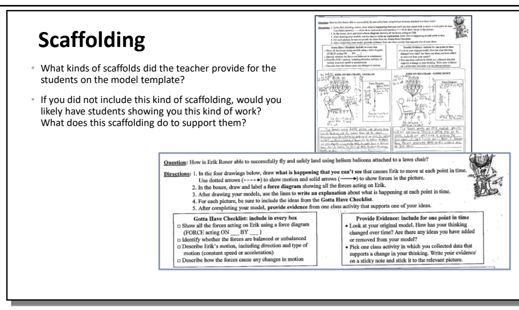
Slide 13		**Slides 12-18: 20 min.** Slides 12-15 10 min. Have partners look at and discuss the initial and final models following slide directions Slides 16-18 10 min. Same process to consider scaffolds
Slide 14		**Slides 12-18: 20 min.** Slides 12-15 10 min. Have partners look at and discuss the initial and final models following slide directions Slides 16-18 10 min. Same process to consider scaffolds
Slide 15		**Slides 12-18: 20 min.** Slides 12-15 10 min. Have partners look at and discuss the initial and final models following slide directions Slides 16-18 10 min. Same process to consider scaffolds
Slide 16		**Slides 12-18: 20 min.** Slides 16-18 10 min. Have partners look at and discuss the initial and final models following slide directions Slides 16-18 10 min. Same process to consider scaffolds

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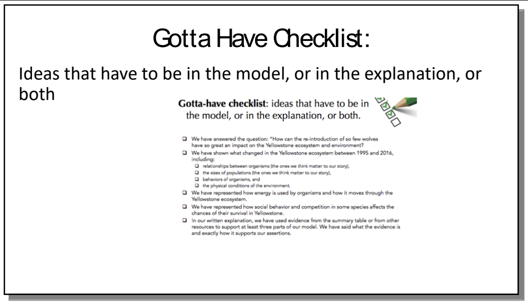
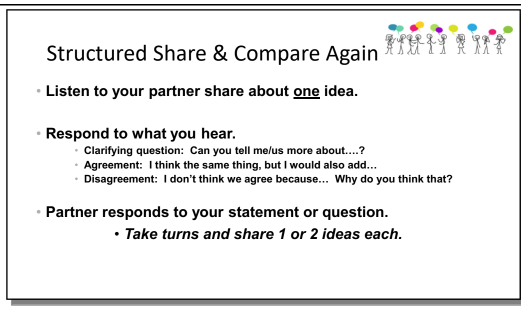
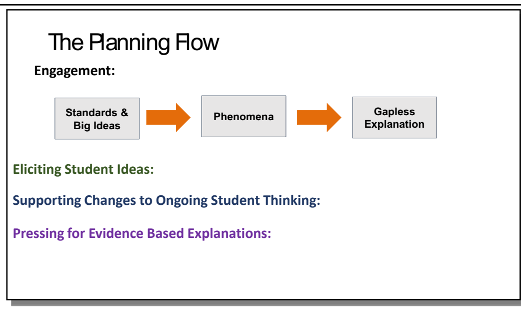
Slide 17		**Slides 12-18: 20 min.** Slides 16-18 10 min. Have partners look at and discuss the initial and final models following slide directions Slides 16-18 10 min. Same process to consider scaffolds Point out the rubric like quality of a "gotta have checklist"
Slide 18		**Slides 12-18: 20 min.** Slides 16-18 10 min. Have partners look at and discuss the initial and final models following slide directions Slides 16-18 10 min. Same process to consider scaffolds
Slide 24		**Slides 24-25 45-50 min.** A brief reminder of where we are in the process Then using the Planning for Engagement tool section 4

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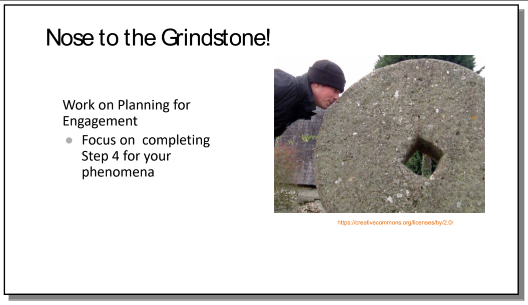
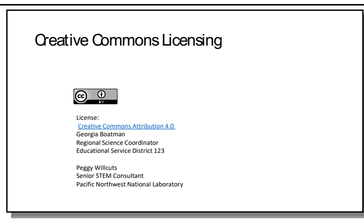
Slide 25		**Slides 24-25 45-50 min.** A brief reminder of where we are in the process Then using the Planning for Engagement tool Step 4 Be prepared to have something in writing that gets uploaded to the folder on Google Drive. Make the case for why a large variety of documents can be helpful to other teachers. We want products to share. A platform will be created by which these products will be shared.
Slide 26		Creative Commons Licensing information