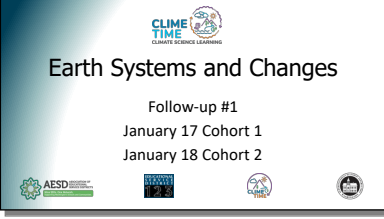
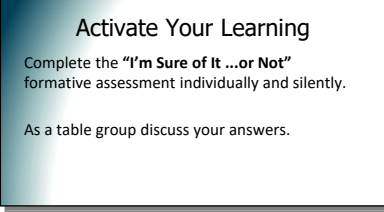
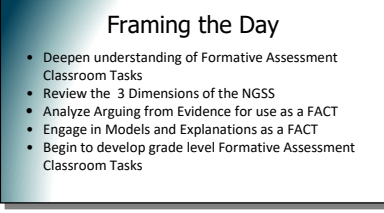
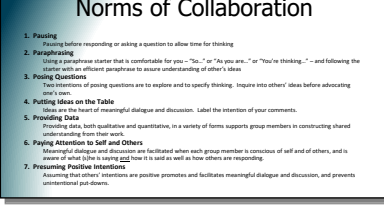
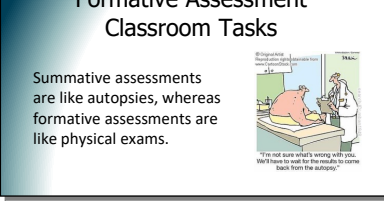


Facilitation Guide
Educational Service District 123
Earth Systems and Changes Session 2:
 Formative Assessment
 Understanding Dimensions of NGSS
 Models and Explanations
 Planning Formative Assessment Classroom Tasks

Slide 1		Slides 1-4 30 min Welcome • Activator: “I’m Sure of It...or Not probe and discuss • Norms of Collaboration • Goals • Agenda • Paperwork completed
Slide 2		Slides 1-4 30 min Welcome • Activator: “I’m Sure of It...or Not probe and discuss • Norms of Collaboration • Goals • Agenda • Paperwork completed ESC Follow-up 1 I’m Sure of it or not Doc #1
Slide 3		Slides 1-4 30 min Welcome • Activator: “I’m Sure of It...or Not probe and discuss • Norms of Collaboration • Goals • Agenda • Paperwork completed
Slide 4		Slides 1-4 30 min Welcome • Activator: “I’m Sure of It...or Not probe and discuss • Norms of Collaboration • Goals • Agenda • Paperwork completed
Slide 5		Slides 5-7 30 min PART ONE: What is a Formative Classroom Task? • Quick review of elements of FA ○ EL Minute by Minute article-read (15 minutes) ○ Slide to review the elements



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Slide 6	Changing Classroom Practice: Key Elements • Clarify and share learning intentions and criteria for success • Engineer effective classroom discussions, questions and learning tasks • Provide feedback that moves learners forward • Activate students as the owners of their own learning • Encourage students to be instructional resources for one another <i>Using Evidence of Learning to Adapt Instruction</i>	Slides 5-7 30 min • Read through the Key Elements for Formative Assessment from Dylan Willam • Quick review of elements of FA ○ EL Minute by Minute article cards-read (30 minutes total) ○ Each participant reads one (5 min) and shares out to others the key elements of that element(18-20 minutes) ○ Slide to review the elements (2 min) <i>ESC Follow-up 1 Reading Cards from Educational Leadership article Minute by Minute, Day to Day Doc #2</i>
Slide 7	Challenges of Developing 3D Assessments • How can we assess “three-dimensional learning”? • How is it different from how we have typically assessed science learning? • How can we design tasks that elicit disciplinary core ideas, practices, and crosscutting concepts?	Slides 5-7 30 min PART ONE: What is a Formative Classroom Task? • Quick review of elements of FA ○ EL Minute by Minute article-read (15 minutes) ○ Slide to review the elements ((Read Slide)) The 3D learning model in the NRC Framework comes from a synthesis of the research literature that studied how best to support equitable student learning in science (e.g., through powerful instruction), but educational assessments haven’t historically been developed for a 3D model of learning. New approaches are being developed and studied—like those that we will be exploring today.
Slide 8	Science and Engineering Practices • Form K-2 groups or 3-5 groups of 8 that include partners you haven’t worked with yet • Each read one Science and Engineering Practice for your grade band • Teach your group about your SEP • Everyone take notes! 	Slides 8 and 10 30-35 min What is a Formative Classroom Task? • 3 dimensional Formative Assessment (30) ○ Deep dive into the SEPs and CCs • Read through SEPS and jigsaw the info for note tool ○ Becky Cope video from Teaching Channel to spot use of SEPS https://www.teachingchannel.org/video/claims-evidence-science-lesson-achieve <i>ESC Follow-up 1 Science and Engineering Practices/Crosscutting Concepts Recording Tool Doc 3</i>



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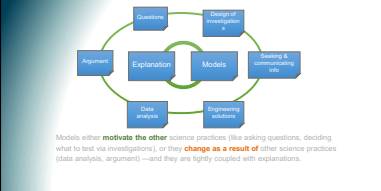
Slide 9	TAKE A BREAK Be back and ready to roll in 10 minutes!	Slide 9 10 minutes
Slide 10	Crosscutting Concepts - Everyone read each Crosscutting Concept Everyone take notes! - Now watch the video to spot examples of Crosscutting Concepts  https://www.youtube.com/watch?v=BIAYb-1uwTg	Slides 8 and 10 30-35 min PART ONE: What is a Formative Classroom Task? 3 dimensional Formative Assessment (30) - Deep dive into the SEPs and CCs - Read through CCs doc - Deer Migration video is linked for examples of CCs https://www.youtube.com/watch?v=BIAYb-1uwTg
Slide 11	Unpacking Performance Expectations MS-PS1-4. Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.	Slides 11-12 5 minutes A review on this slide illustrates the performance expectation the PE serves as the larger learning goal for a unit but a formative assessment item should be of a much smaller learning performance than the whole PE In order to identify a lesson level learning goal you must “unpack” the PE identify a lesson level learning performance in order to develop the assessment item.
Slide 12	Disciplinary Core Ideas - ESS1.C History of Planet Earth - ESS2.A: Earth Materials and Systems - ESS3.A: Natural Resources, - ESS3.B: Natural Hazards, - ESS3.C Human Impacts on Earth Systems - ESS3.D: Global Climate Change - LS3.A: Inheritance of Traits - LS3.B: Variation of Traits	Slides 11-12 5 minutes Some of the Disciplinary Core Ideas we may address in our work to develop Formative Assessment Classroom tasks for earth science and climate science related standards
Slide 13	Construct an Explanation-Prepare to Argue from your Evidence What do Earth patterns tell us about Earth systems and changes that can happen to the Earth? Summarize your evidence to construct an explanation - Analyze the evidence from the maps - Think about the patterns you see in the data - Look for causes and effects - Record your Claim, Evidence and Explanation/Justification to answer the question Argument presentation on a whiteboard The Guiding Question: Our Claim: Our Evidence: Our justification of the Evidence:	Slides 13-15 10 minutes A Quick review of our FACT last time and then look at rubric samples for that type of activity Just a review of the CER we did with our plate tectonic maps last time. We did a little gallery walk but I would do this in a classroom so that more students got a chance to orally explain their CER.
Slide 14	Argue from Evidence - Think of a question you might ask to clarify a team’s CER - Visit other groups. - Use the Gallery Walk Interview Questions to guide your discourse. - Give feedback and be ready to take back ideas to your group.	Slides 13-15 10 minutes A Quick review of our FACT last time and then look at rubric samples for that type of activity



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Slide 15	SEPs and CCs in Argument from Evidence Disciplinary Core Ideas Dimension: - ESS2.B: Plate Tectonics and Large-Scale System Interactions - ESS1.C: The History of Planet Earth	Slides 13-15 10 minutes A Quick review of our FACT last time and then look at rubric samples for that type of activity These were the DCIs we focused on
Slide 16	C-E-R Rubrics Examine each C-E-R Rubric example and see which one might work in your context if you use a C-E-R Formative Assessment Classroom Task - What would you change - They should be specific - Should they be evaluative (have numbers, smiley faces, etc.)	Slides 16-17 25 minutes Pass out the CER sample rubrics and have them discuss how they might develop a rubric/refine one of the samples to be a guide and evaluation for a CER they might use in their FACT. Give some time to look at rubrics at various levels and decide <i>ESC Follow-up Evidence Based Writing in Science Doc #3</i> <i>ESC Follow-up Claims Evidence Rubric Doc #4</i>
Slide 17	Think and Ink - What are your key takeaways about 3D Formative Assessment - How might you use Arguing from Evidence as a Formative Assessment Classroom Task?	Slides 16-17 25 minutes About 4-5 minutes Reflecting and Sense-making in your science notebook respond to the two prompts What are your key takeaways about 3D Formative Assessment How might you use Arguing from Evidence as a Formative Assessment Classroom Task?
Slide 18	Models and Explanations are Keystone Practices  Models either motivate the other science practices (like asking questions, deciding what to test via investigations), or they change as a result of other science practices (data analysis, argument)—and they are tightly coupled with explanations.	Slides 19-23 11:15-11:40 (20 min) Slide 19-3 min. Last time we worked on argument from evidence. That is 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.
Slide 19	Does the Ocean Influence Climate or Weather? - Read each statement about oceans and climate. - Move to the corner that best represents your thinking right now - Find a partner or two and discuss your thinking.	Slide 19-20-10 min. Do a 4 corners type activity using the Page Keeley probe statements From Uncovering Student Ideas in Earth and Environmental Science: 32 Formative Assessment Probes By Page Keeley and Laura Tucker Copyright 2016 by the National Science Teachers Association. All rights reserved. Printed in the United States of America



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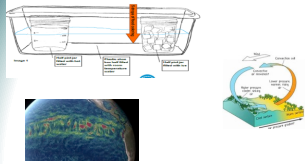
Slide 20	Four Corners Formative Assessment 1. The ocean has a major influence on climate, but I don't think it has much of an effect on the weather. 2. The ocean has a major influence on weather, but I don't think it has much of an effect on climate. 3. The ocean has a major influence on both the weather and climate. 4. The ocean does not have a major influence on weather or climate. It's just part of the water cycle. <i>Find some partners at your statement and explain why you agree with this statement the most.</i>	Slide 19-20-10 min. Do a 4 corners type activity using the Page Keeley probe statements From Uncovering Student Ideas in Earth and Environmental Science: 32 Formative Assessment Probes By Page Keeley and Laura Tucker Copyright 2016 by the National Science Teachers Association. All rights reserved. Printed in the United States of America
Slide 21	Models and Explanations 	Slide 21-22. 20 minutes Read the Newsela article and briefly show the site: Drought Seen Getting Worse in Washington https://newsela.com/read/washington-drought/id/10737/ as an example of a possible phenomena. Show the video Weather extreme connection of drought to oceans http://www.climatecentral.org/videos/extreme-weather/weather-extremes-drought Extra audio: NPR Washington Drought https://www.nwpb.org/2018/08/09/the-entire-northwest-is-abnormally-dry-with-severe-drought-in-parts-of-washington-and-oregon/
Slide 22	Why are ocean currents important to the weather and climate where we live? • Draw your own individual first model in your STEM notebook. • Draw your negotiated team model and write an explanation of the connection between oceans and our weather and climate on the top half of your poster paper.	Slide 21-22 20 minutes
Slide 23	Working Lunch! • Take a Bio Break • Grab some lunch • Complete your paperwork • Work as a team to complete your initial model Be ready to roll at 12:14 p.m.	Slide 23 Lunch 40 minutes



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Slide 24	Convection Currents Investigation 	Slides 24-27 35 minutes Convection current experiment-(20 minutes) Have the convection current experiments set up or set up during lunch-participants
Slide 25	Convection Currents - Note your observations about the currents. Consider and make note of: - What is the effect of different temperature on the movement of water? - What is the relationship between convection currents and weather or climate? 	Slides 24-27 35 minutes Convection current experiment-(20 minutes) Have the convection current experiments set up or set up during lunch-participants ESC Follow-up 1-Convection Current Lab Directions Doc #6
Slide 26	How Ocean Currents Can Impact Weather and Climate in our area-NASA  - Watch the NASA video - Record new learning and star learning that the video confirms https://www.youtube.com/watch?v=8lupgTautDWY	Slides 24-27 35 minutes NASA Video linked in satellite image 6 minutes
Slide 27	More Info...Convection Currents Read <i>How Do Oceans Affect Climate?</i> And <i>How Does the Ocean Affect Climate and Weather on Land?</i>	Slides 24-27 35 minutes Readings 15 min How Do Oceans Affect Climate? From Greentumble.com https://greentumble.com/how-does-the-ocean-affect-climate/ How Does the Ocean Affect Climate and Weather on Land? https://oceanexplorer.noaa.gov/facts/climate.html Revised May 21, 2018 by the NOAA Ocean Explorer Webmaster Office of Ocean Exploration and Research National Oceanic and Atmospheric Administration U.S. Department of Commerce
Slide 28	Why are ocean currents important to the weather and climate where we live? Below your Initial Team Model on your poster paper: - Draw and label a Final Team Model that represents your thinking about the question. - Construct a written explanation using evidence from your investigation, reading and viewing.  Gotta-have checklist: Ideas that have to be in the model, or in the explanation, or both. - We have answered the question: Why are ocean currents important to the weather and climate where we live? - We have shown how ocean currents work. - We have shown how ocean currents affect the atmosphere and on currents. - We have explained how ocean currents affect the atmosphere and on currents. - We have explained how ocean currents affect the atmosphere and on currents. We have used what the evidence is and made a final model and explanation.	Slides 28-30 50 minutes Final models 25 min Have teams reconvene to sketch their final model, including labels, why features were included (science reasons as well as fun and safe reasons) and notes about what changes they made and why. With young learners they might do the drawing and then orally discuss the written portions to the group.



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Slide 29	TAKE ANOTHER BREAK Be back and ready to roll in 10 minutes!	Slides 28-30 50 minutes (10 minute Break)
Slide 30	What-How-Why Rubric - Read pages 1-3 of the What-How-Why Rubric and make notes about: - important ideas you want to remember - questions you have - ways to use this document	Slides 28-30 50 minutes WHW rubric 15 min. <i>ESC Follow-up 1-What How Why Rubric Doc #7</i>
Slide 31	Think and Ink - What are your key takeaways about Models and Explanations? - How might you use Models and Explanations as a Formative Assessment Classroom Task?	Slide 31 5 minutes
Slide 32	Identifying Academically Productive Phenomena - Watch the video - Jot what you remember about phenomena from last time in your notebook - Remind each other at your table 	Slide 32-34 7 minutes review of phenomena and the resources the have The video link in the picture goes to NGSS EQUiP Rubric Using Phenomena https://www.teachingchannel.org/video/using-phenomena-achieve On Teaching Channel
Slide 33	"Phenomenal" Brainstorming  - Think about that current science units/lessons you do or will do that involve Earth Science and Human Impacts or Life Science - Brainstorm or identify a possible phenomena that could "anchor" this unit or some of its lessons - Share the unit context and your brainstorm ideas with tablemates https://phenomenoncenter.org/phenomena/nc12/02	Slide 32-34 7 minutes review of phenomena and the resources the have
Slide 34	Identifying Academically Productive Phenomena Use the <i>Qualities of a Good Anchor Phenomena</i> document to be sure your phenomena fits the criteria.	Slide 32-34 7 minutes review of phenomena and the resources the have

Slide 35	Challenges of Developing 3D Assessments • How can we assess “three-dimensional learning”? • How is it different from how we assess science learning now? • How can we design tasks that elicit disciplinary core ideas, practices, and crosscutting concepts?	Slides 35-38 50 minutes 1 minute for the 3 slides Rest of time to work on FACT Reminder of our challenge
Slide 36	Criteria for an assessment 1. allow students from non-dominant communities (e.g., ELLs, students from poverty-impacted communities) to fully engage with the task. ◦ We should design for them first! 2. involve a compelling phenomena related to one or more of the DCIs being assessed—and not feel like a test-like task. ◦ It should beg for explanation! Make it more like an anchoring phenomena for an awesome, month-long unit. 3. lend itself to a broad range of the science and engineering practices. 4. be understandable quickly by students. ◦ For this reason, selecting everyday situations can be useful.	Slides 35-38 50 minutes 1 minute for the 3 slides Rest of time to work on FACT Reminder of our challenge
Slide 37	Developing 3D Classroom Formative Assessment Tasks • Smaller “nuggets”...easier to analyze quickly and act on (lessons and units are BIG) • Generates good conversation and deeper understanding of the 3 Dimensions • Will help us to see if dimensions are working together or not	Slides 36-38 1:55-2:50 1 minute for the 3 slides Rest of time to work on FACT
Slide 38	Adapting or Developing Tasks: Choose Your Own Adventure • Work in teams • Use the Planning for Classroom Formative Tasks document to guide your planning time • Be ready to publicly share your thinking and progress	Slides 36-38 1:55-2:50 1 minute for the 3 slides Rest of time to work on FACT



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