Developing Science Practices: Constructing Explanations and Engaging in Argumentation

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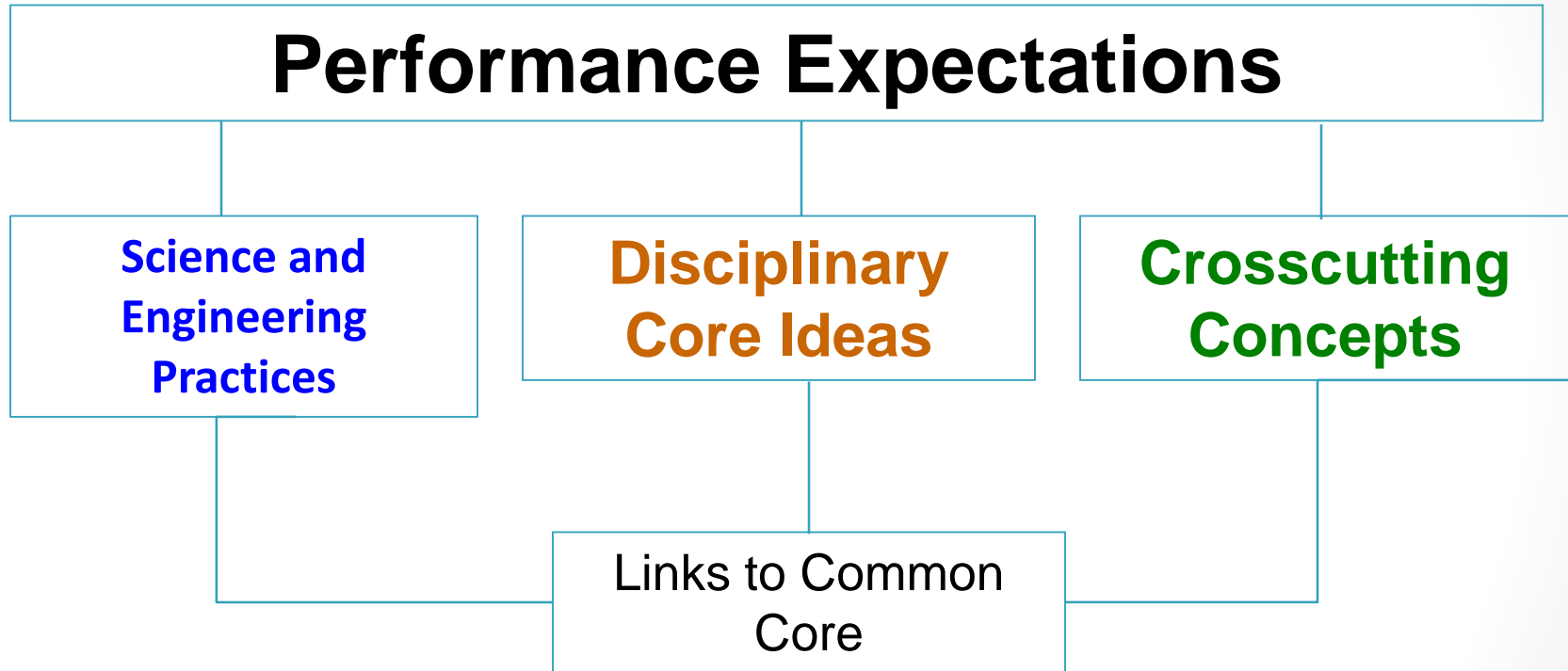
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Where do Practices Fit in NGSS?

Performance Expectations

Science and Engineering Practices

Disciplinary Core Ideas

Crosscutting Concepts

Links to Common Core

Science and Engineering Practices (SEPs)

- Analyzing and Interpreting Data

- Asking Questions and Defining Problems

- Constructing Explanations and Designing Solutions

- Developing and Using Models

- Engaging in Argument from Evidence

- Obtaining, Evaluating, and Communicating Information

- Planning and Carrying Out Investigations

- Using Mathematics and Computational Thinking

What does it mean to construct an explanation?

Scientific questions are distinguished from other types of questions because the answers lie in explanations supported by empirical evidence, including evidence gathered through explanation.

The goal of science is to construct explanations for the causes of phenomena.

- NGSS Appendices, 2013

What is engaging in argumentation?

- Argumentation is the process by which evidence-based conclusions and solutions are reached.

- Whether investigating a phenomenon, testing a design, or constructing a model to provide a mechanism for an explanation, students are expected to use argumentation to listen to, compare, and evaluate competing ideas and methods based on their merits.

<div align="right">- NGSS Appendices, 2013</div>

Types of Argumentation

- Scientific: Does our data support Explanation A or Explanation B?

- Social: Have humans had a positive or negative influence on our town's harbor?

- Other Types?

Example Activity

- From a model middle school NGSS-aligned unit on ecosystems

- Overarching issue in chapter: invasive species (Zebra mussel in the Hudson River)

- Activity five out of six in the chapter

- Elaborate activity in the 5E cycle

NGSS 3-D Alignment

DCIs	SEPs	CCCs
MS LS2.C.1	Analyzing and Interpreting Data	Stability and Change
MS LS2.A.1	Engaging in Argument from Evidence	Cause and Effect
MS LS2.A.2		

PEs: MS-LS2-4 and MS-LS2-1

Taking it Back

- What are other contexts explanations would be good for?

- What's another context/type of argument this would be good for?

Contact Info

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- Thank you to NSF for funding this project!

- Presentation will be available on sepuplhs.org

- Zebra mussel materials (graphing tool, readings) are on www.amnh.org/education/resources/rfl/web/riverecology

- Please evaluate our session at www.nsta.org/nashvillebrowser

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