Working through an example: Using one set of standards to help plan for instruction
This is a “shake-down” cruise for us

- How can we begin helping teachers make sense of a set of performance standards?
- How could we begin unit planning, based on the performance standards?
- You should consider re-inventing what I am doing with you today
Performance Standards

If you try to address all of these performance expectations...you will go crazy.

If you treat the performance expectations as separate and isolated activities in the classroom...you will go crazy.

You need to identify core science ideas and an anchoring phenomenon for students to study over an extended period of time that “pulls in” a number of standards.

This accommodates how the research says that students learn best.
This is where a focus on modeling comes in, but first...
Put your curriculum beside these standards, and let’s start to prioritize.

2 possible ways to start:

• We could work together and place the performance expectations in a logical order or...
• We could do a “card sort” to figure out the ideas with the most explanatory power.

Either choice is a way of finding the gaps in your own knowledge about the science—you’ll hit the limit of your content knowledge very quickly, prepare for frustration control here.
Card Sort

Write down 10 of the most important science ideas from the standards or curriculum, one on each card.

Lay them out on the table, start to move some to the outside (less central ideas, not powerful ideas to help explain ecosystems) and some to the inside (ideas with more explanatory power).

Sentence starter: If my students understood that [one or two “core” ideas or relationships], they could basically understand most of these other ideas [ones on the periphery].

Better understood in context of other ideas in the “center”. More power to explain other ideas.
What kinds of anchoring phenomenon or event might allow students to explore the ideas at the center?
Bethany’s Case

Graph: Hares vs. Predators vs. Poachers

- Population of Hares over a 10-year period

- In the beginning, predators ate a large amount of hares that are being born. Then, after the hares begin to kill the predators, and the population decrease. With less predators to eat the hares, the hares increase. After a few years, the population gets so low, they are added to the endangered list and poachers can no longer hunt them. The population of hares begins to decrease.
Students’ initial models are simple, and varied
Aer

a
couple
ac
activities
and
readings,
new
hypotheses
emerge

Hares

vs.

Poachers

Poachers' growth. The climate change which caused
this
current
bears
bears
are
never
ever

Explanations

Hares'...
Teaching this way requires that student keep track of ideas

| ACTIVITY        | WHAT HAPPENED? (patterns/observations etc.) | WHY???
|-----------------|---------------------------------------------|---------
| Deer pop. Simulation | □ Sketch of graph | □ Explain connection between |
|                 | □ Describe graph | □ Carrying capacity |
|                 |                 | □ Limiting factors |

<table>
<thead>
<tr>
<th>Your Group Hypothesis</th>
<th>Other Group Hypothesis</th>
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<tbody>
<tr>
<td>Supports Cuz it shows population growing &amp; decreasing</td>
<td>Supports Change/Change Hypothesis. We climate can prevent resources</td>
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<td></td>
<td>Resource is food resources, we need it</td>
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<td>They are so many, so many more. They average 50 to the resource. They can go times when they run out of food and they have risk of famishing.</td>
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<td></td>
<td>They say it is because they cause damage to the environment.</td>
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<td></td>
<td>They support their evidence and explain their reasoning.</td>
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Post-it note critique of each other’s models is a regular part of her teaching
How to respectfully disagree with a science idea

★ I like your ideas but I think __________.
★ Your idea is missing important parts, such as __________.
★ That may be true but my thought on it is __________.
★ I have a non-example __________.
★ I don't agree with your idea because __________.
Classroom discourse about "working on each other’s ideas" requires structure.

How to agree and add on to a science idea using evidence

I agree because...

I like your idea and I also agree with it because...

I agree with you but I also think...

Based on the evidence you showed I think your right because...

I agree with you but I did it this way...

Can I add on to be your idea?

I agree with you but I found different evidence...

I agree I think your idea is great because...

I agree with your statement, however I would like to add...

I like what you're thinking plus....

I agree but I also think

I think your statement is true because...

Indeed sir because...

I agree with you because...

I agree with...

I like this

I agree with this is what I think

I agree, your according to these facts I found....

I like your idea, I also thought...

This such a great idea, I agree because...

How to respectfully disagree with a science idea

* I like your ideas but I
Students are prompted:

“What do you need to know to make your model more coherent, complete?”
What performance standards got “pulled into” this unit? What additional ones might have been “pulled in”—how? What science practices were kids engaged in?