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

MS.LS2 Ecosy ns: I

How to read the standards »

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Students who demonstrate understanding car

MS-LS2-a. **Use a model to support expl in an ecosystem.** [Clarificatio ecosystems in terms of chang scarce resources. Models may food webs or food chains for w *Boundary: The model should r the carrying capacity of ecosy*

MS-LS2-b. **Ask questions to clarify the energy in similar ways.** [Clar and energy are obtained in va *ability to pose questions to cla multiple ecosystems.*]

MS-LS2-c. **Construct and present argu for how changes to physica ecosystem.*** [Clarification Sta an ecosystem that is altered.] *arguments with scientific evide populations and relative numb to recognize patterns in data a evidence of students' abilities*

MS-LS2-d. **Construct explanations for common patterns of interactions within different ecosystems.** [Clarification Statement: Emphasis is on explanations for common patterns of interactions (e.g., competition, predation, parasitism, commensalism, mutualism) that exist in different ecosystems.] [*Assessment Boundary: The assessment provides evidence that students can explain the consistency for the interactions of organisms with other organisms and/or the environment across different*

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

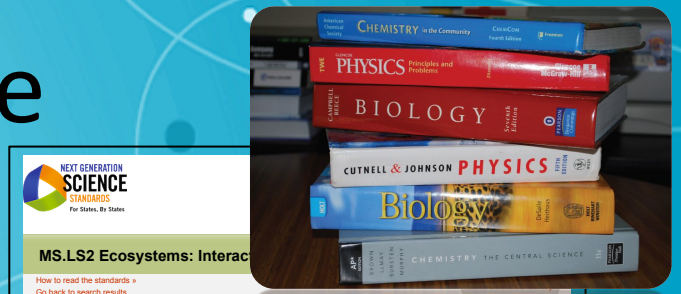
If you treat the performance expectations as separate and isolated activities in the classroom…
you will go crazy

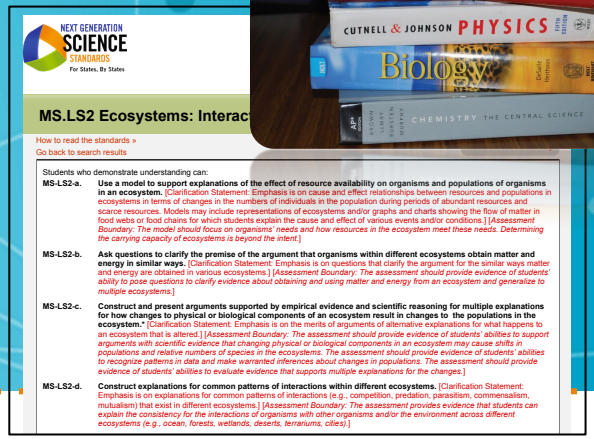
You need to identify **core science ideas** and an **anchoring phenomenon** for students to study over an **extended period of time** that **"pulls in"** a number of standards.

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




NEXT GENERATION SCIENCE STANDARDS
For States, By States

MS.LS2 Ecosystems: Interac

How to read the standards »
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Students who demonstrate understanding can:

MS-LS2-a. **Use a model to support explanations of the effect of resource availability on organisms and populations of organisms in an ecosystem.** [Clarification Statement: Emphasis is on cause and effect relationships between resources and populations in ecosystems in terms of changes in the numbers of individuals in the population during periods of abundant resources and scarce resources. Models may include representations of ecosystems and/or graphs and charts showing the flow of matter in food webs or food chains for which students explain the cause and effect of various events and/or conditions.] [*Assessment Boundary: The model should focus on organisms' needs and how resources in the ecosystem meet these needs. Determining the carrying capacity of ecosystems is beyond the intent.*]

MS-LS2-b. **Ask questions to clarify the premise of the argument that organisms within different ecosystems obtain matter and energy in similar ways.** [Clarification Statement: Emphasis is on questions that clarify the argument for the similar ways matter and energy are obtained in various ecosystems.] [*Assessment Boundary: The assessment should provide evidence of students' ability to pose questions to clarify evidence about obtaining and using matter and energy from an ecosystem and generalize to multiple ecosystems.*]

MS-LS2-c. **Construct and present arguments supported by empirical evidence and scientific reasoning for multiple explanations for how changes to physical or biological components of an ecosystem result in changes to the populations in the ecosystem.*** [Clarification Statement: Emphasis is on the merits of arguments of alternative explanations for what happens to an ecosystem that is altered.] [*Assessment Boundary: The assessment should provide evidence of students' abilities to support arguments with scientific evidence that changing physical or biological components in an ecosystem may cause shifts in populations and relative numbers of species in the ecosystems. The assessment should provide evidence of students' abilities to recognize patterns in data and make warranted inferences about changes in populations. The assessment should provide evidence of students' abilities to evaluate evidence that supports multiple explanations for the changes.*]

MS-LS2-d. **Construct explanations for common patterns of interactions within different ecosystems.** [Clarification Statement: Emphasis is on explanations for common patterns of interactions (e.g., competition, predation, parasitism, commensalism, mutualism) that exist in different ecosystems.] [*Assessment Boundary: The assessment provides evidence that students can explain the consistency for the interactions of organisms with other organisms and/or the environment across different ecosystems (e.g., ocean, forests, wetlands, deserts, terrariums, cities).*]

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.

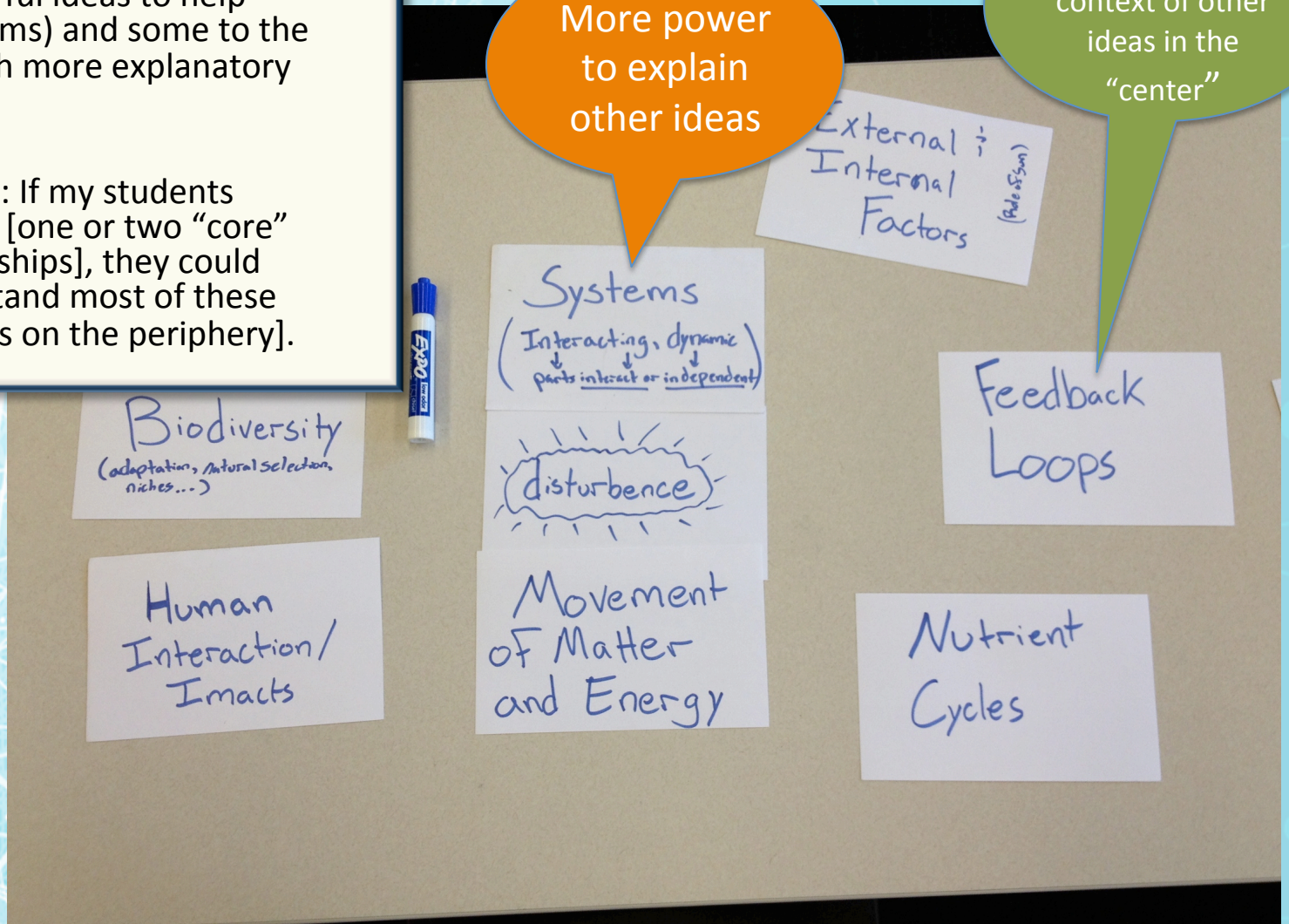
Either choice is a way of finding the gaps in your own knowledge about the science—you'll hit the limit of your content knowledge very quickly, prepare for frustration control here.

Card Sort

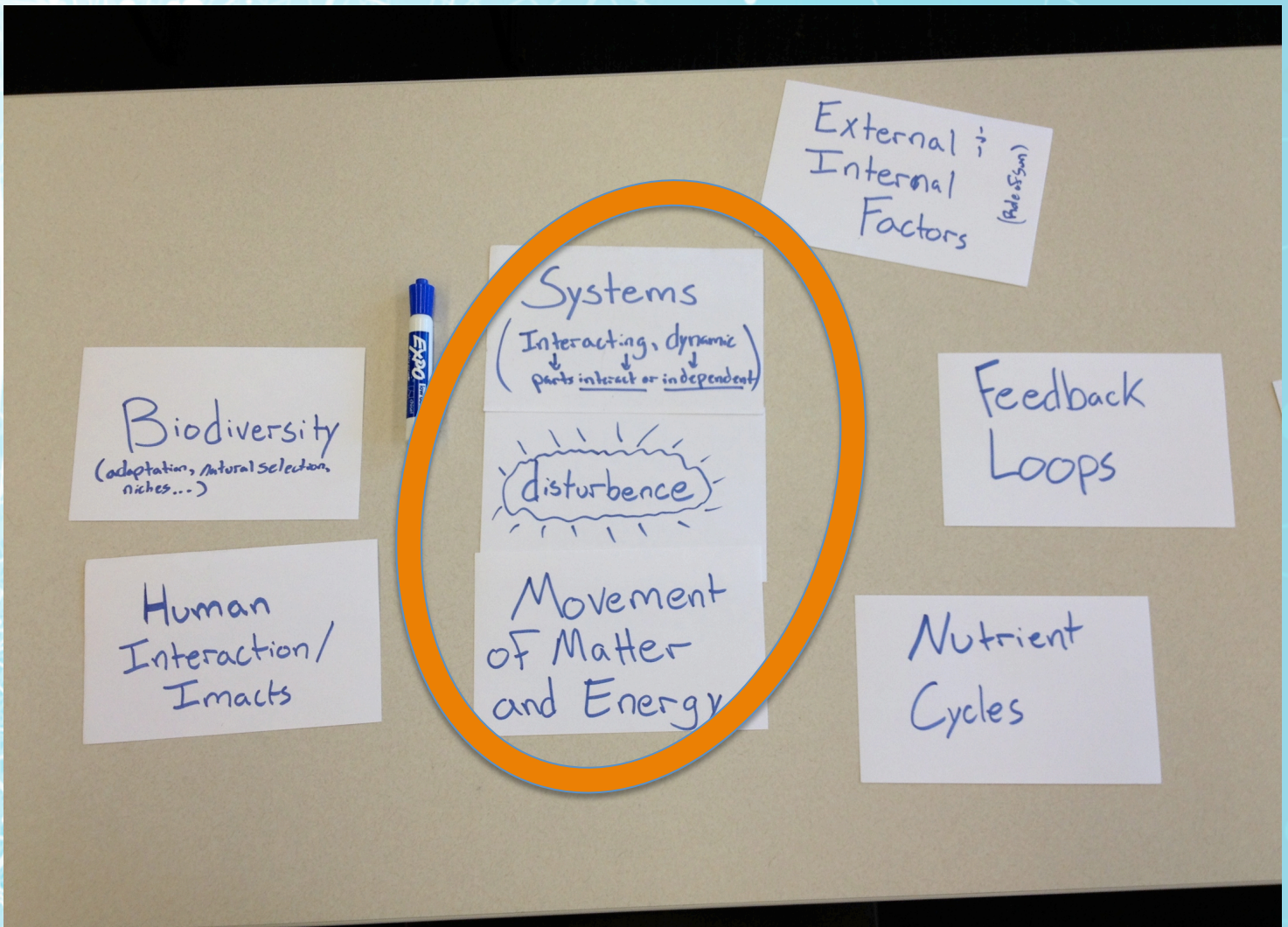
Write down 10 of the most important science ideas from the standards or curriculum, one on each card.

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).

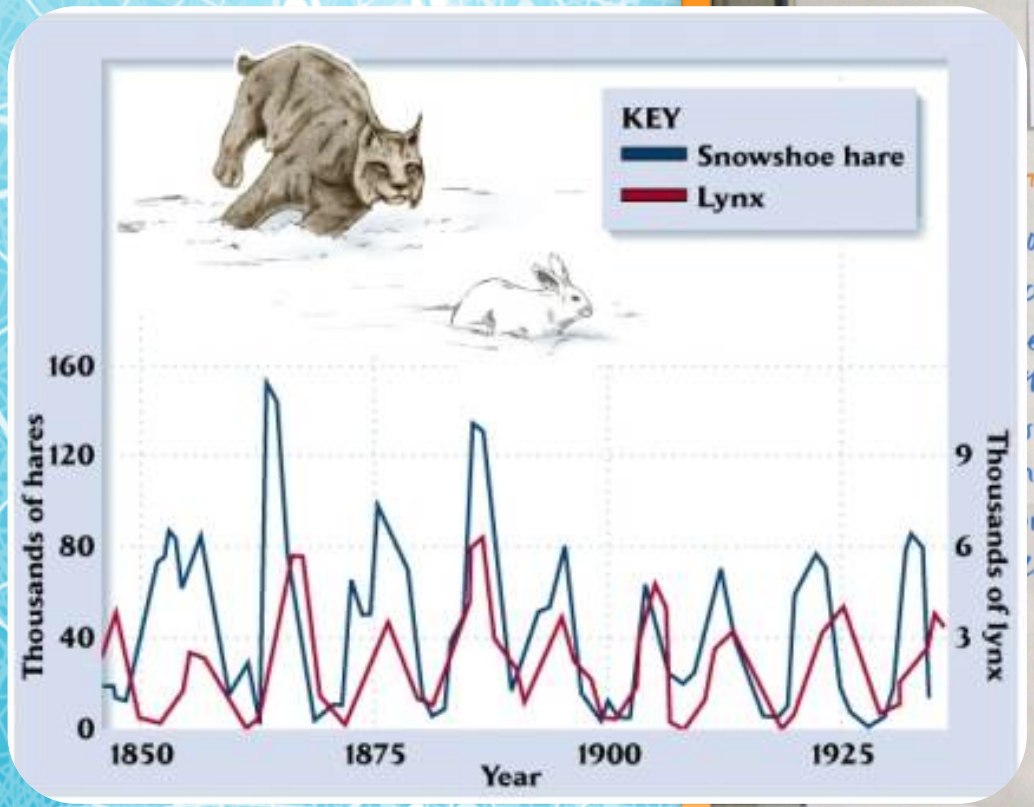
Sentence starter: If my students understood that [one or two "core" ideas or relationships], they could basically understand most of these other ideas [ones on the periphery].

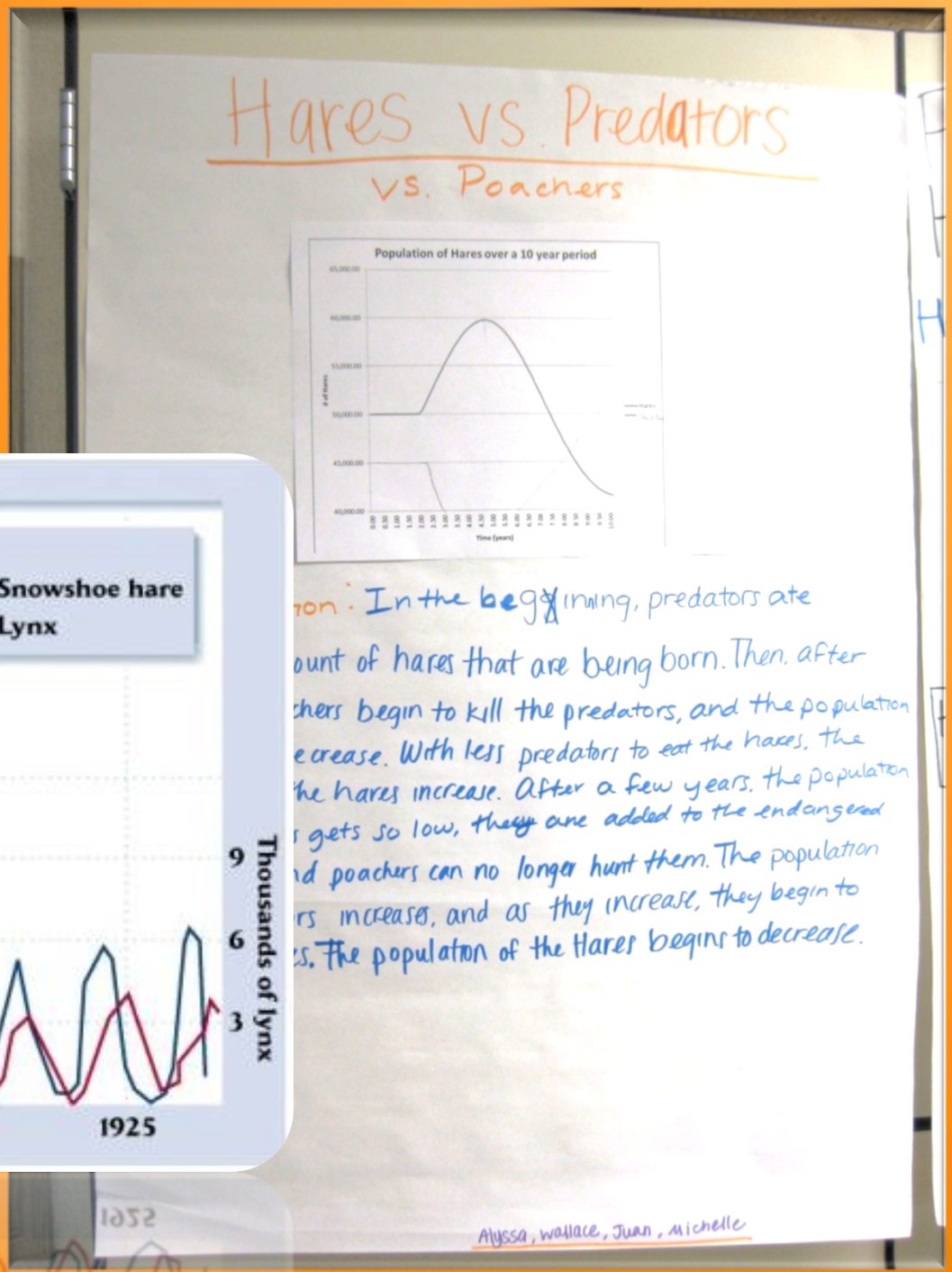


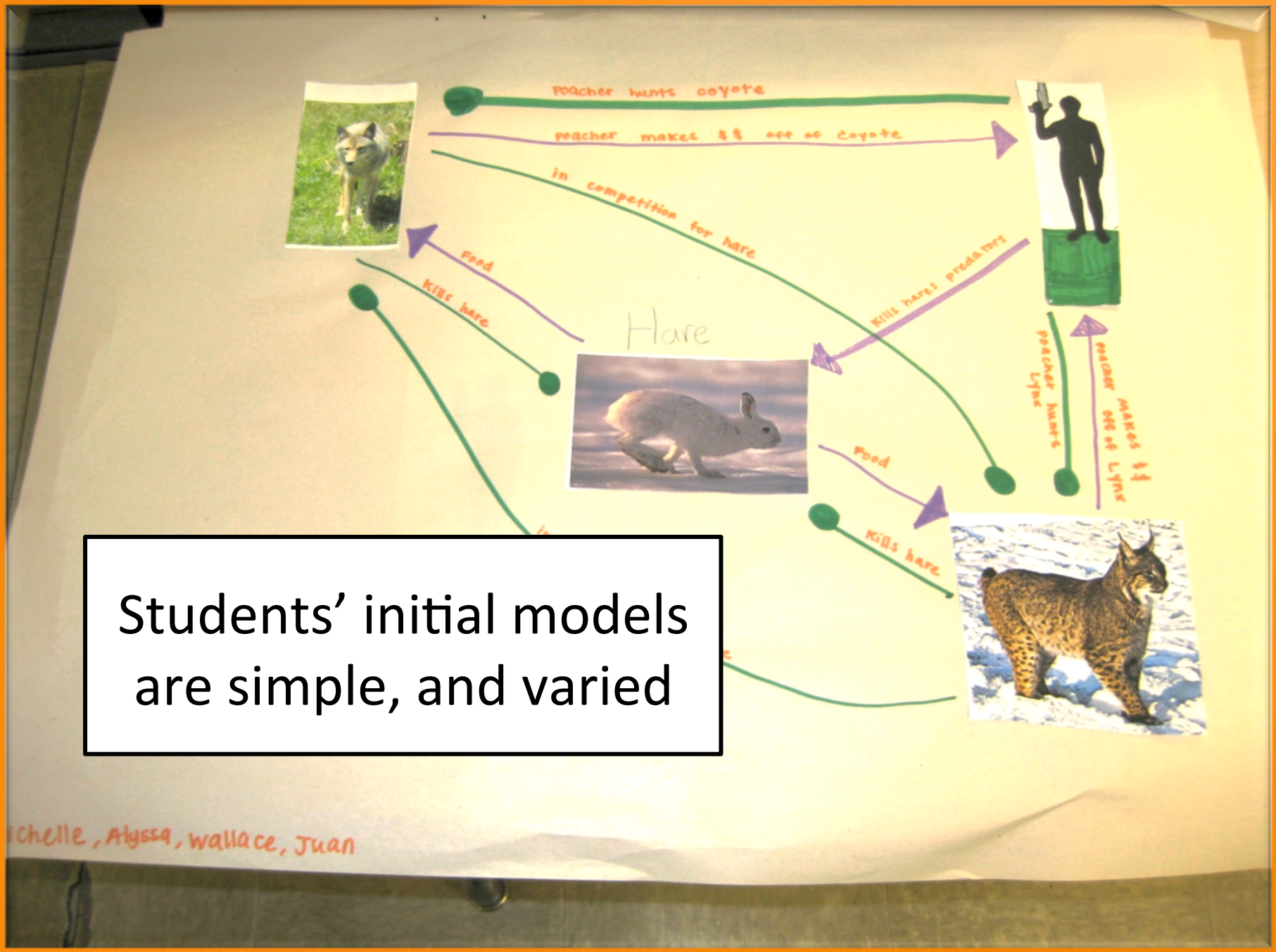
What kinds of anchoring phenomenon or event might allow students to explore the ideas at the center?



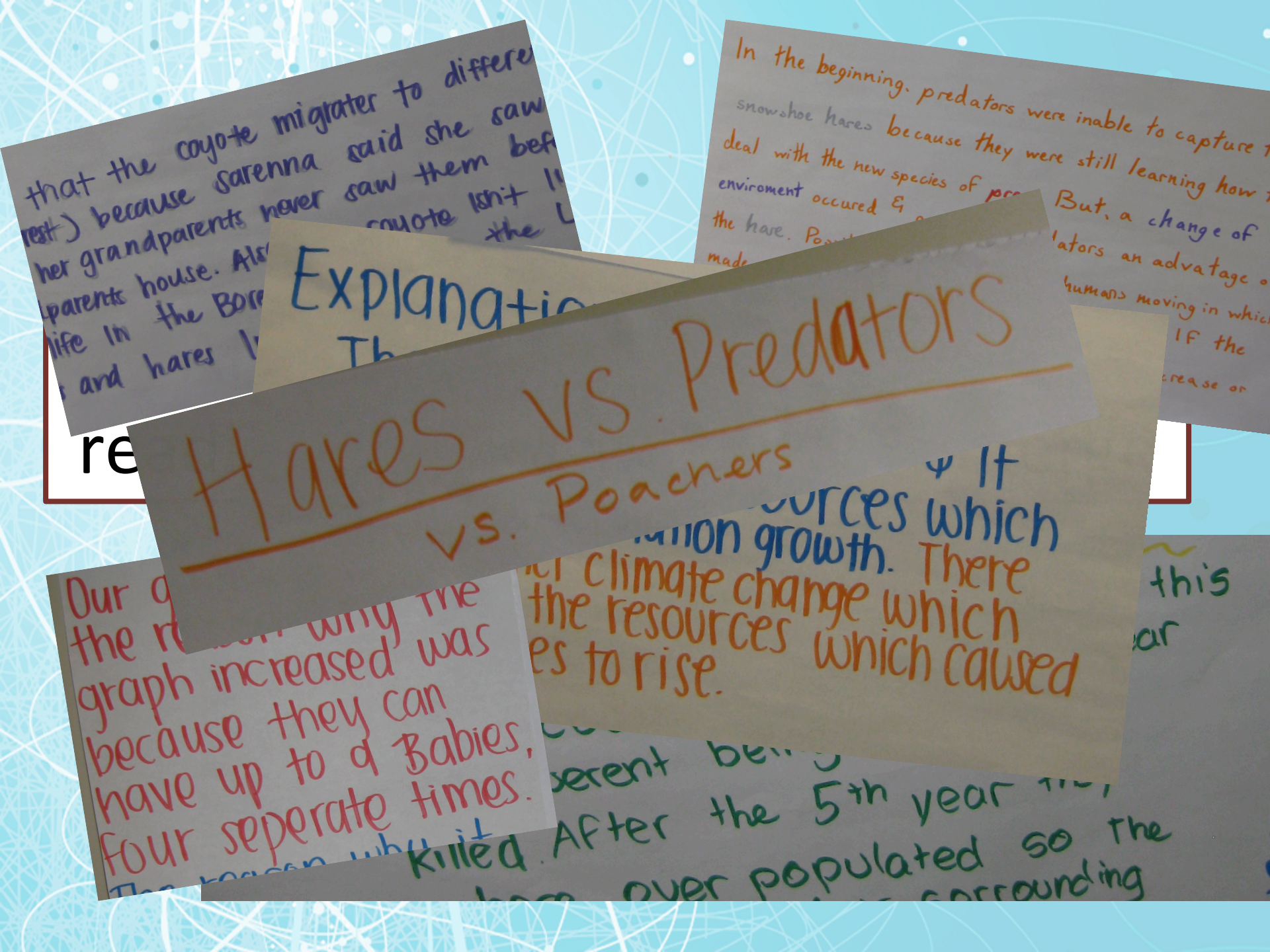
Bethany's Case



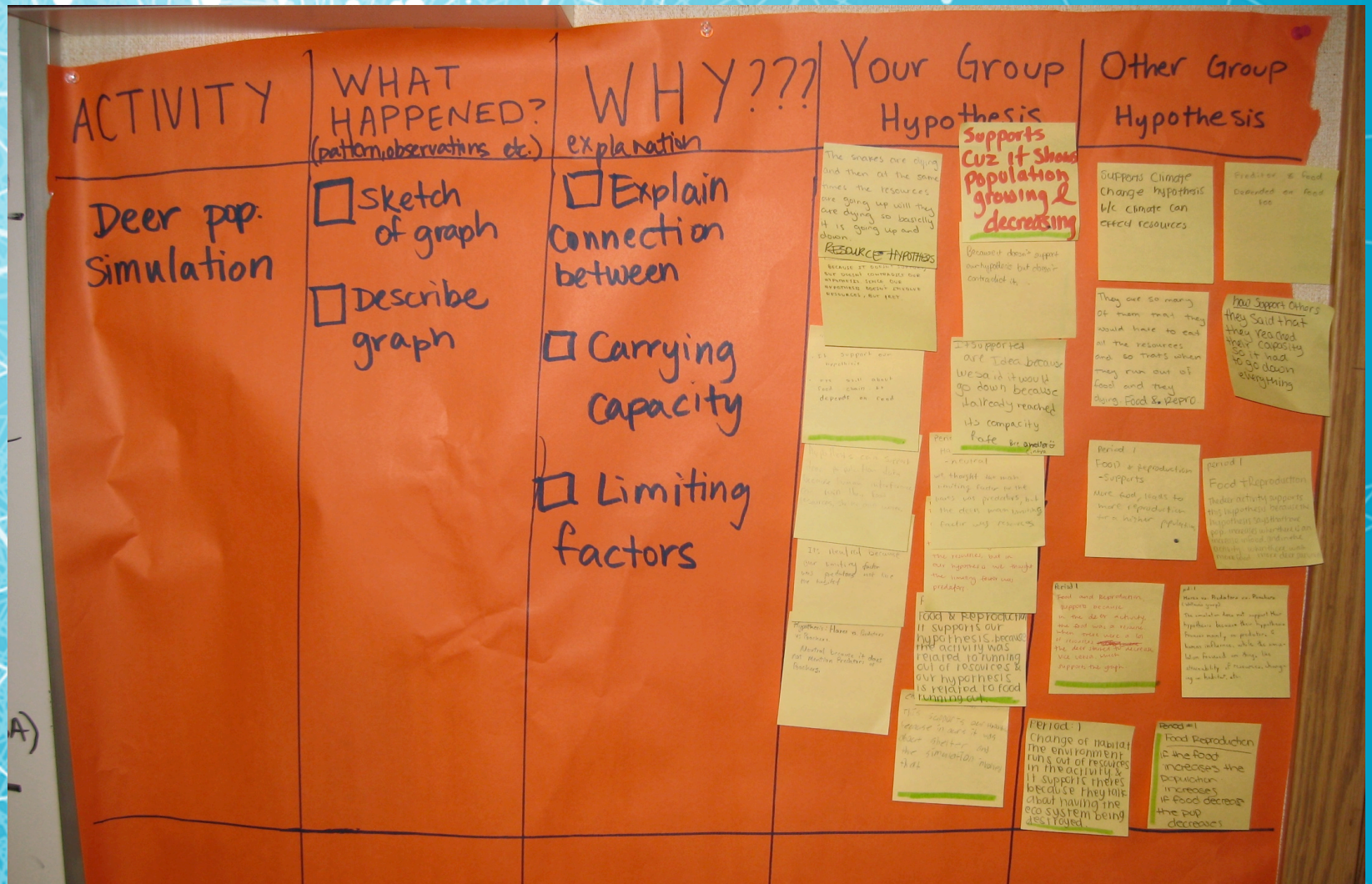


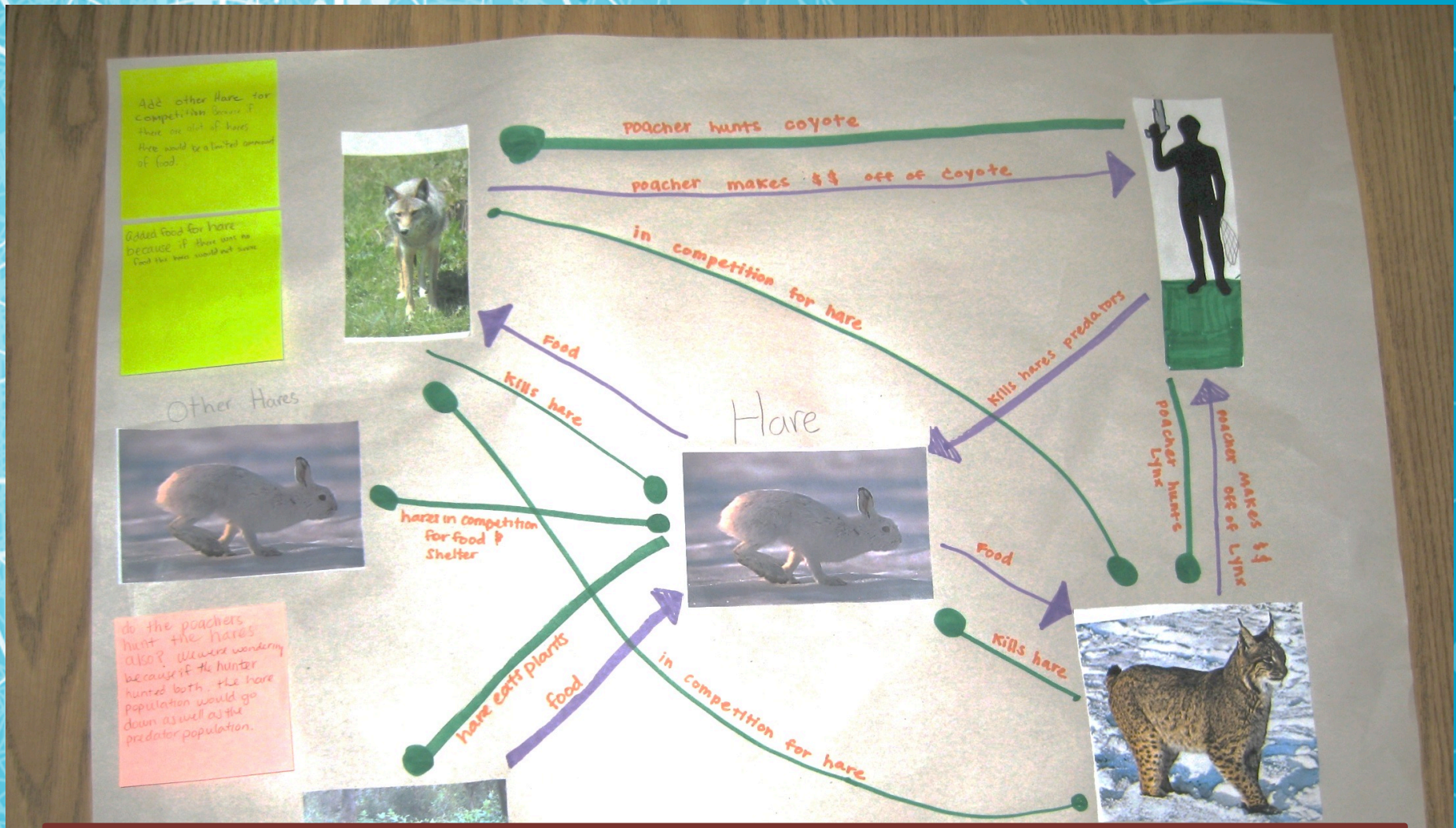


Students' initial models are simple, and varied

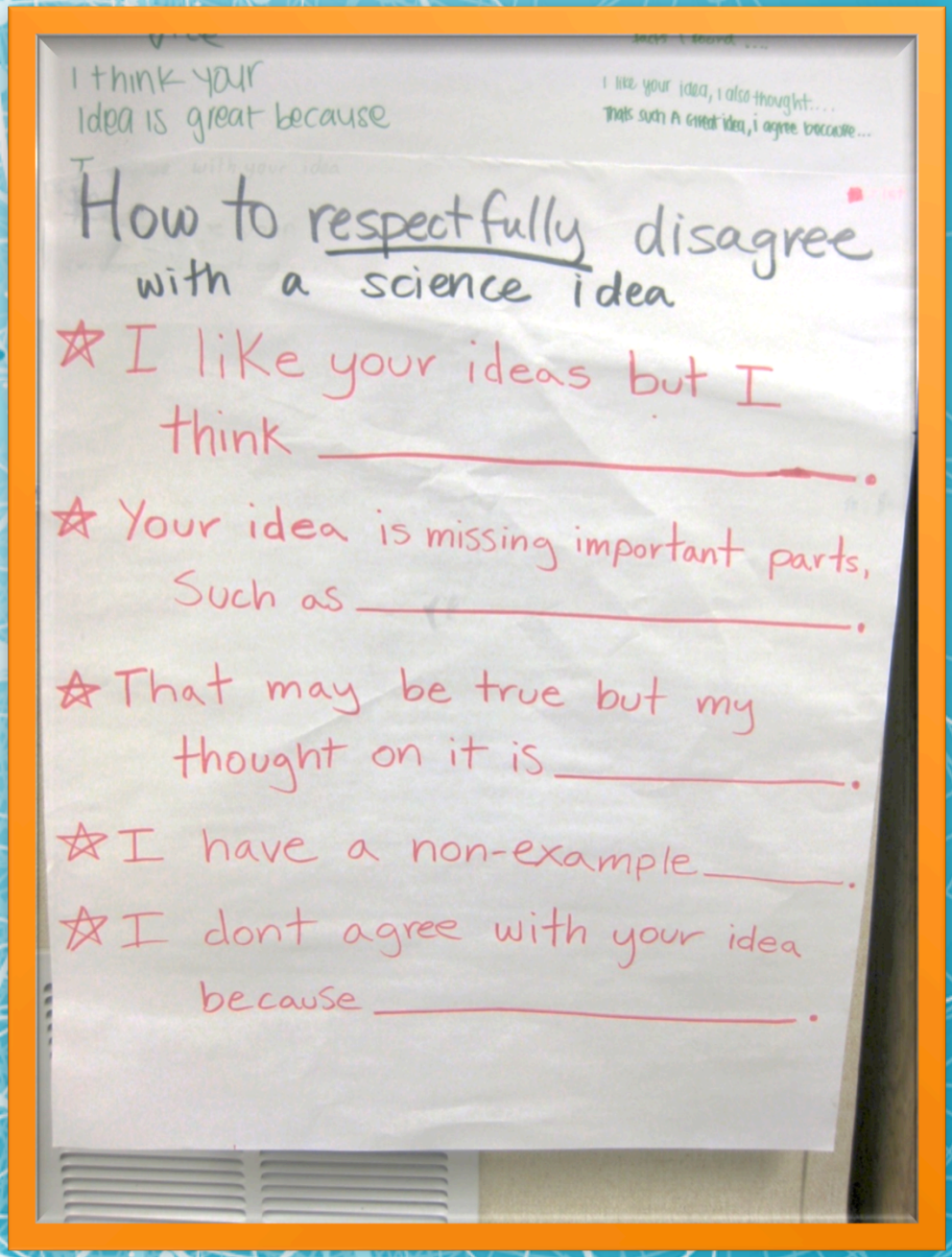

Hares vs Predators
vs. Poachers
graph increased was
because they can
have up to 4 Babies,
four seperate times.
killed. After the 5th year
over populated so the

Teaching this way requires that student keep track of ideas

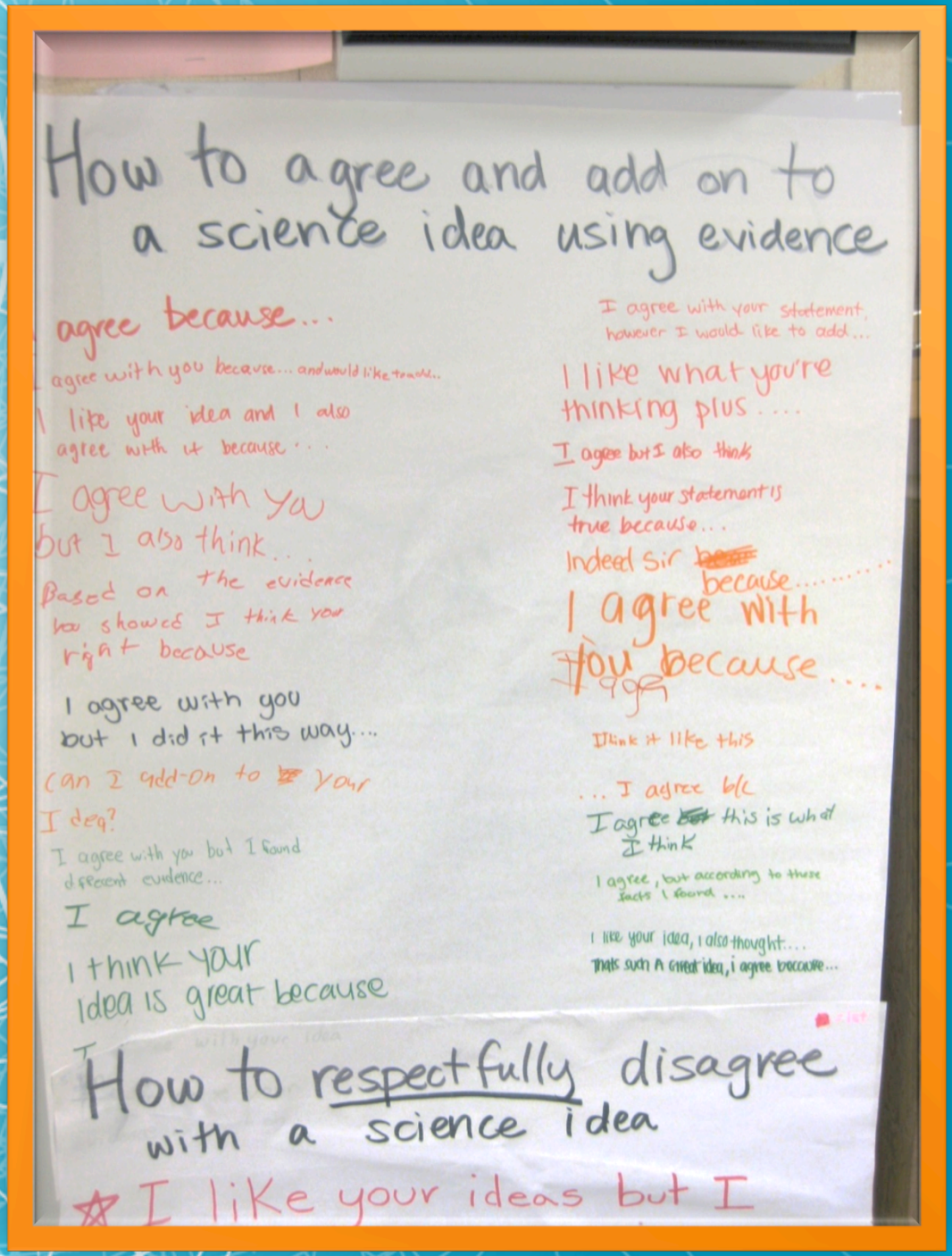




Post-it note critique of each other's models is a regular part of her teaching

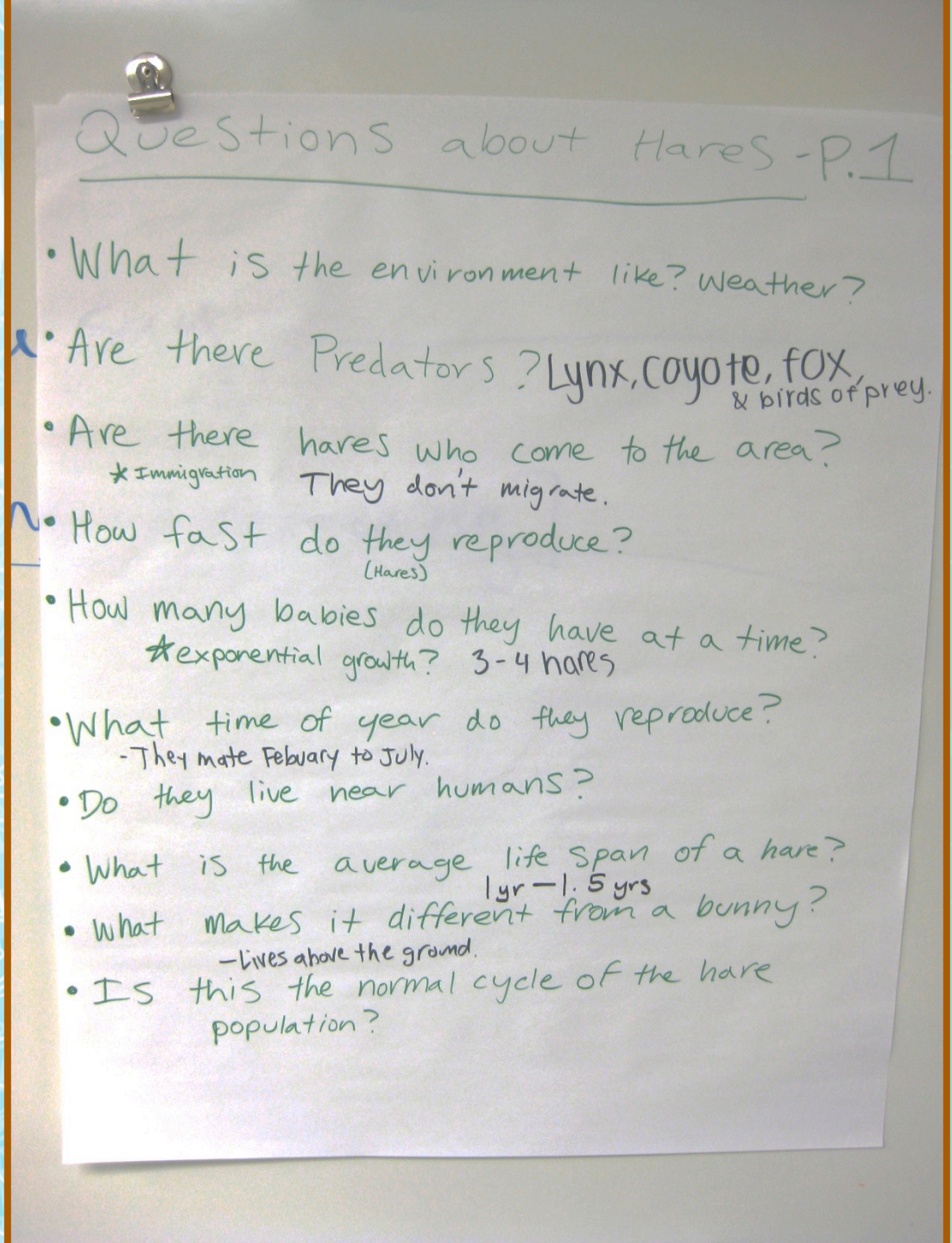

I think your idea is great because
I like your idea, I also thought....
That such A great idea, I agree because...
How to respectfully disagree with a science idea
I like your ideas but I think _____.
Your idea is missing important parts, such as _____.
That may be true but my thought on it is _____.
I have a non-example_____.
I dont agree with your idea because _____.

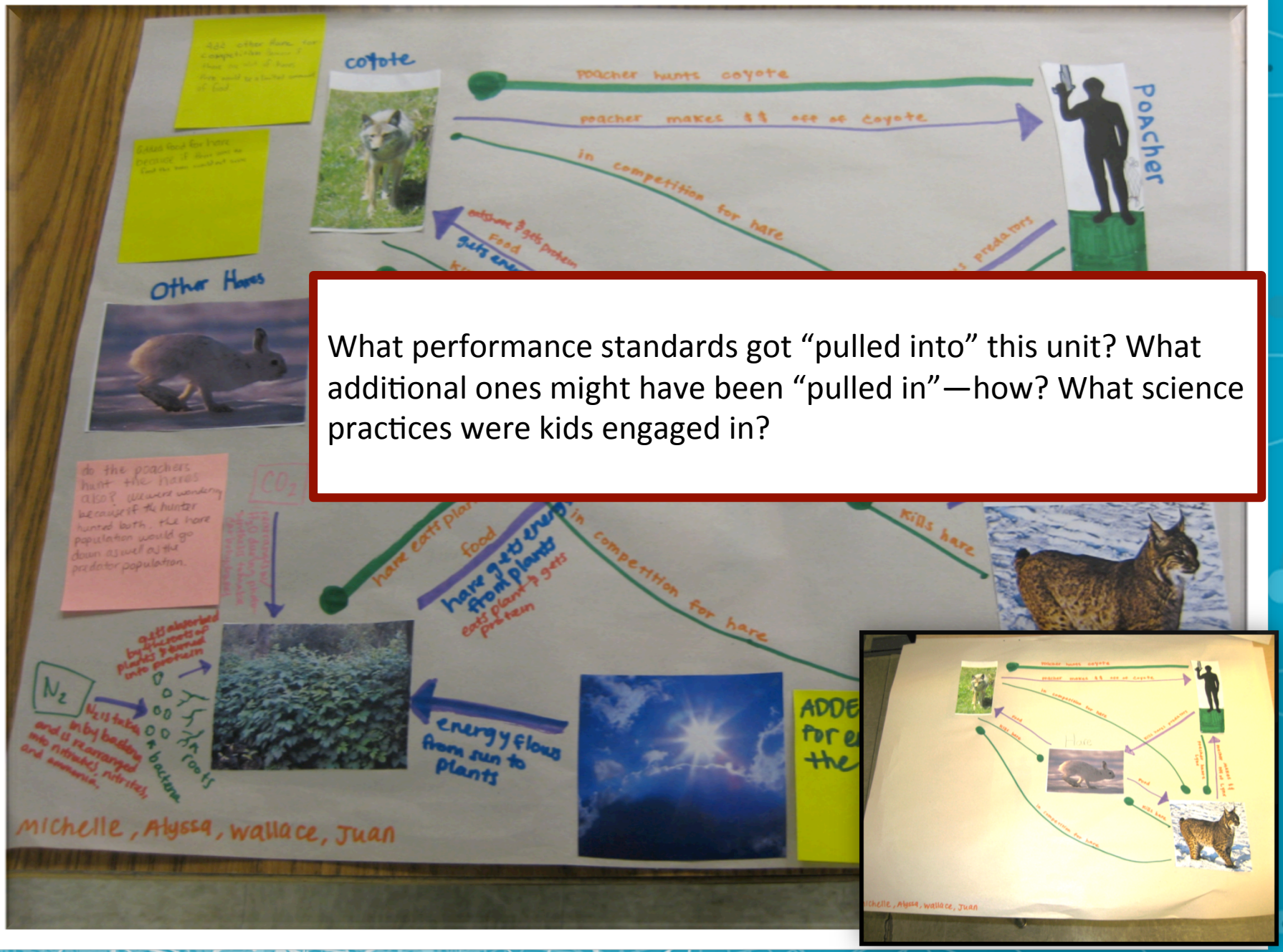
Classroom discourse about "working on each other's ideas" requires structure



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?