“Speak up!”
Incorporating Discourse Into Your Life Science Classroom Instruction

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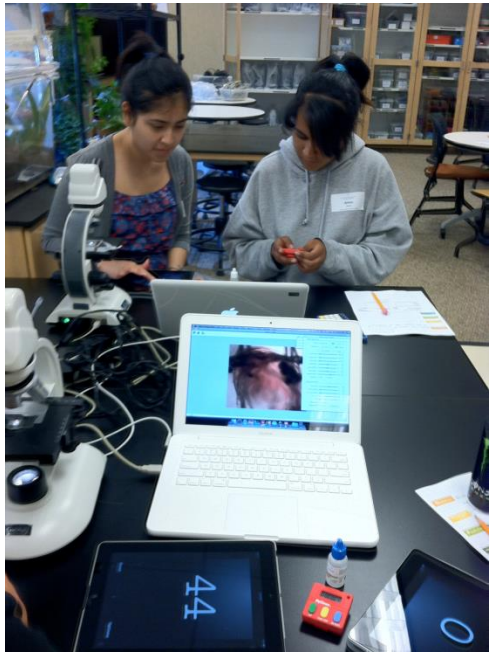
Need for Increased Discourse in Science Classrooms

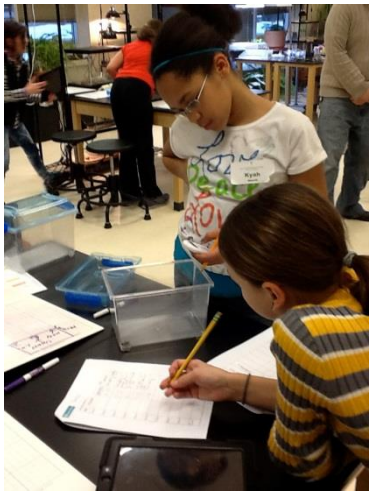
- Discourse Alignment to NGSS Science and Engineering Practices
  Practice 6 - Constructing Explanations and Designing Solutions
  Practice 7 - Engaging in Argumentation from Evidence
- Discourse Alignment to Common Core Math Standards
  Standard 3: Construct Viable Arguments & Critique the Reasoning of Others
- Discourse Alignment to Common Core English Language Arts Science Literacy Standards
  Speaking & Listening
  Comprehension and Collaboration
  Presentation of Knowledge and Ideas



What is discourse?

- Academically productive conversation
  - Critical component of the lesson, not an add-on
  - All students are engaged
  - Students are motivated to participate
  - Discussion leads to deep conceptual understanding
  - Students use evidence to build and critique academic argument

Why is discourse important?



- Window into student thinking
- Supports language and vocabulary development
- Provide “food for thought” involving academic content
- Encourages students to reason with evidence
- “Apprentices students into intellectual science practices”
- Encourages risk-taking in a safe environment
- Based on models, data, evidence

What might discourse look like in your classroom?

What might discourse look like in the classroom? (from TERC's "Talk Science Primer")

http://inquiryproject.terc.edu/shared/pd/TalkScience_Primer.pdf

- Talk Formats
  - Teacher-guided whole class discussion
    - Everyone benefits
    - Teacher can maintain high quality discussion
    - Ensures equity
  - Small-group discussion
    - Student-driven
    - May require specific tasks/points be presented
    - Students may be more comfortable to share misconceptions
  - Partner talk / Pair-share
    - Brief, underused
    - Allows students to "think aloud"

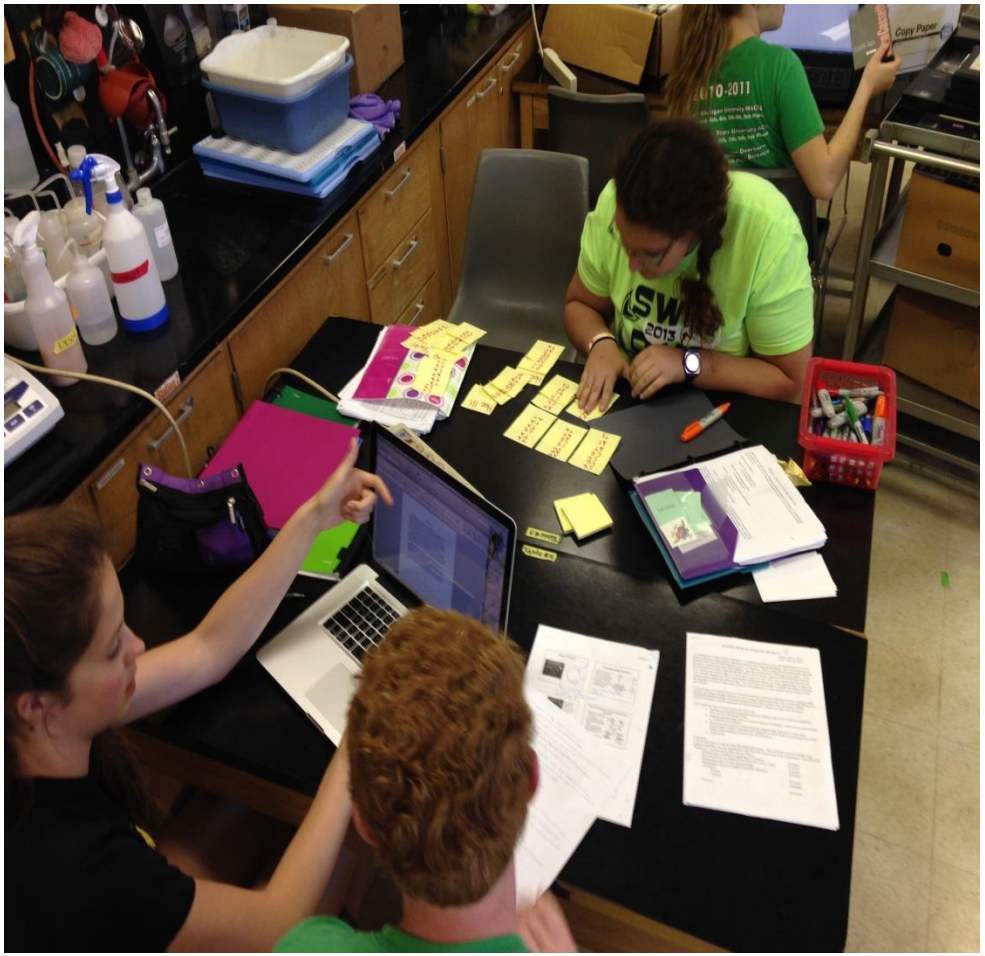
- Talk Moves (Teacher prompts)
  - Time to think
  - "So you're saying…."
  - Say more…"can you tell us more about that?" …"can you give an example?"
  - "Can someone repeat what Joe just said about that?"
  - "Why do you think that?" "Does your evidence support that claim?" "What in your reading makes you think that's true?"
  - "Do you agree or disagree with the ideas of the other group?" "Are you saying the same thing, or something different?"
  - "Can someone build on this idea?"
  - "Can someone explain this in different words?"

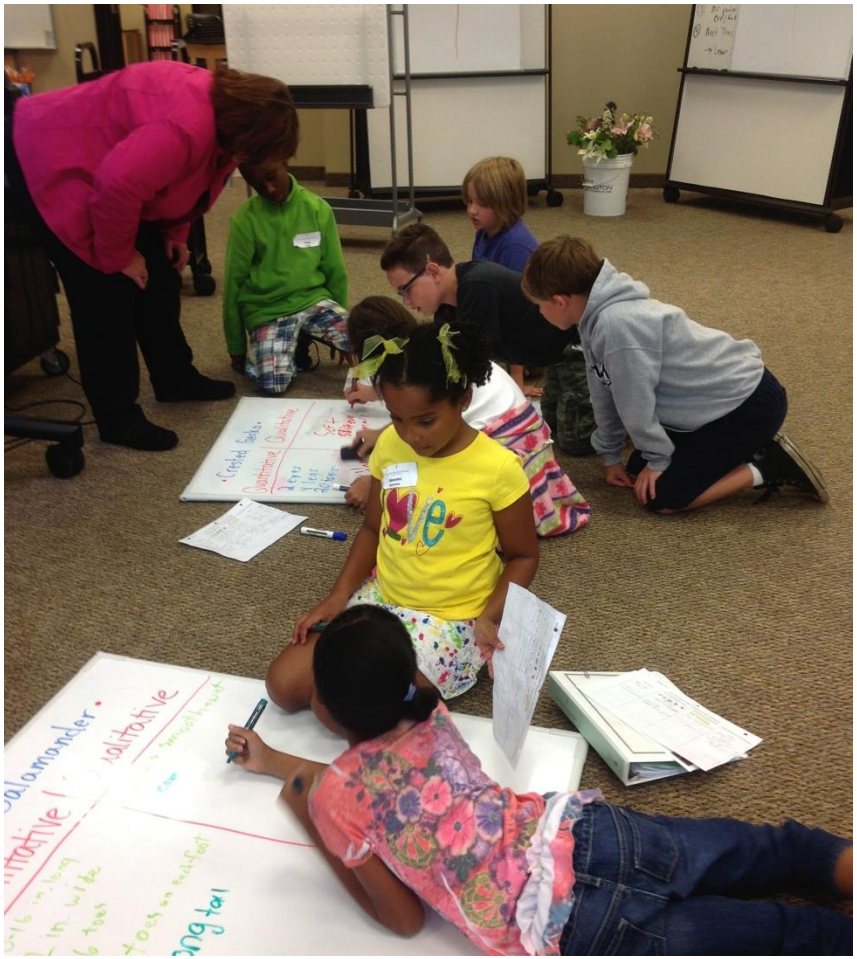
What instructional strategies scaffold and or support discourse?

Structuring thinking time prior and during discourse

- Draw – Talk – Write
- “So you’re saying...”
- Pair - share
- “Say more...”
- “Help me understand..”
- Table talk

What might discourse look like in the classroom?





How do we support the practices needed to support discourse?

- Well-established ground rules (3-5 max)
  - Trust
  - Deeply listen to one another, respond respectfully
  - Ideas, not individuals are challenged
  - Ask for clarification
  - Everyone participates, everyone has a turn to speak

How do we model the practices needed to support discourse?

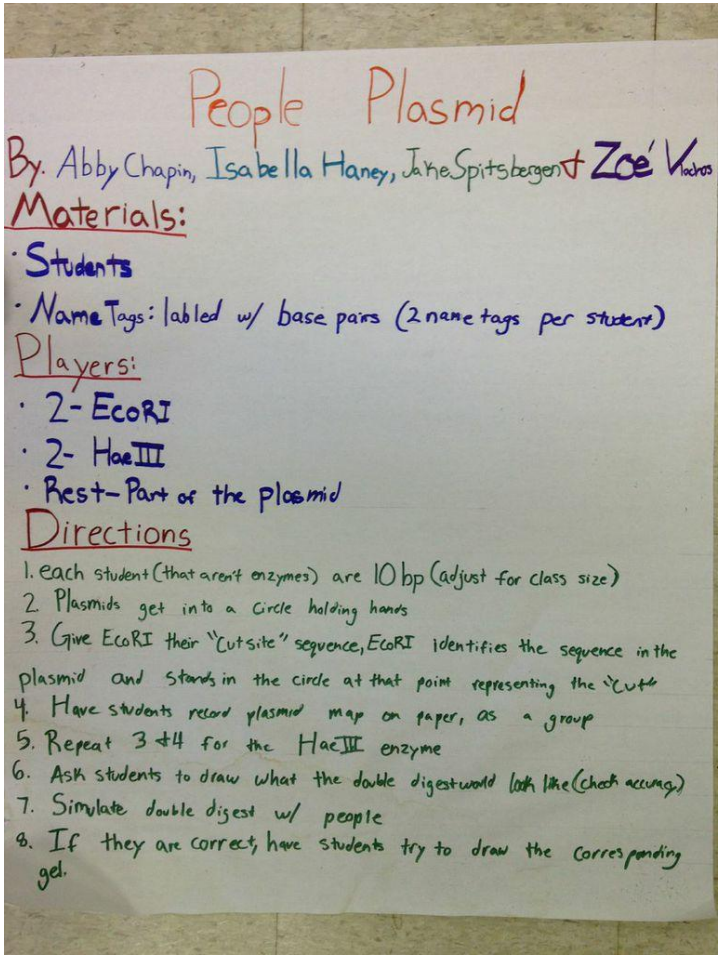
- Students need to learn how to tell their science story – we are their coaches!
  - Elicitation discussion
    - Uncovers student's **prior experience/knowledge** about a topic, insight into their understanding – brainstorming
  - Data Discussion
    - Focuses on data analysis relevant to an investigation, data analysis / representation – identifying evidence
  - Explanation discussion
    - Supports C – E – R -ties it all together
  - Consolidation discussion
    - Solidifies understanding, underlying science concepts - reflection

How do we model the practices needed to support discourse?

- Framing questions, follow-up questions
  - Open-ended, clear, framing question should spark multiple positions or solution paths
  - Ex. “Why are *Daphnia* a good model organism for our study? Can you think of a better example?” “Why did the researchers choose those study sites?”
  - Should be developed before lesson, allows teacher to focus student ideas, hear connections and support dialogue

Sharing Research with An Audience

- Gives students an opportunity to share their thinking
- Requires them to organize their findings
- Provides a record of the data/procedures used
- Gives the audience a way to ask focused questions



People Plasmid

By. Abby Chapin, Isabella Haney, Jane Spitsbergen + Zoé Vlachos

Materials:

- Students
- Name Tags: labled w/ base pairs (2 name tags per student)

Players:

- 2- EcoRI
- 2- HaeIII
- Rest- Part of the plasmid

Directions

1. each student (that aren't enzymes) are 10 bp (adjust for class size)
2. Plasmids get into a circle holding hands
3. Give EcoRI their "cut site" sequence, EcoRI identifies the sequence in the plasmid and stands in the circle at that point representing the "cut"
4. Have students record plasmid map on paper, as a group
5. Repeat 3 & 4 for the HaeIII enzyme
6. Ask students to draw what the double digest would look like (check accuracy)
7. Simulate double digest w/ people
8. If they are correct, have students try to draw the corresponding gel.

Data Nuggets

datanuggets.org

DATA Nuggets

Worksheets that bring real scientific data into the classroom, guiding students through the entire scientific method while building their quantitative skills.

dangerously bold

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1.7.14 Dangerously Bold

The worksheets are as follows:

- Teacher Guide
- Student worksheet, Graph Type A, Level 1
- Student worksheet, Graph Type B, Level 1
- Student worksheet, Graph Type C, Level 1
- Grading Rubric

Just like in humans, individuals of the same species can behave very differently. The way animals behave changes the way they interact with their environment. **Boldness** is a behavior that describes whether or not an individual takes risks. The risks animals are willing to take have a big impact on how fast they grow, reproduce, and whether they survive. For example, if a fish is very bold, it could benefit by getting more food, but have a higher risk of getting eaten.

SITE NAVIGATION

- CURRENT DATA NUGGETS
- MAKING YOUR OWN NUGGET
- ADDRESSING SCIENCE STANDARDS
- FOR TEACHERS
- FOR SCIENTISTS

CONTACT US

Have a question, want more information, or have a Data Nugget to submit? Email Liz (eschultheis@gmail.com) or Melissa (kjelvikm@gmail.com)!

SEARCH THE SITE

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To Do

- Copies of Data Nuggets
- Copies of slide #6
- Markers and boards
- Copies of TERC
- Starter Strips