What does discourse look like in science classrooms?
Productive Discourse in the Science Classroom:
Fostering Opportunities for Rich Classroom Discourse
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Goals

➢ To explain the purpose of productive scientific discourse for students

➢ To learn about effective strategies for fostering productive scientific discourse supporting a sense-making environment
NM STEM Ready! Science Standards

NGSS + New Mexico 6 Specific Standards = science standards

Together, the NGSS in their entirety, plus the New Mexico 6 specific standards comprise the NM STEM Ready! science standards.
Importance of Productive Science Discourse

• Makes student thinking visible
• Helps student clarify thinking
• Produces usable knowledge
• Refines student thinking through sense making
• All voices participate
Video

As you watch the video, please look for:

1. What structures are in place for discussions to occur?
2. What strategies does the teacher use to engage students in discussions?

Video Link:
https://www.teachingchannel.org/video/how-discussion-enhances-learning
Video Reflection

From the video:

1. What structures are in place for discussions to occur?
2. What strategies does the teacher use to engage students in discussions?
Possibilities of Productive Discourse

4 Possible Purposes of Productive Discourse

– Elicitation
– Consolidation
– Data Collection
– Explanation
Possibilities of Productive Discourse

Elicitation

• Students are:
  – Sharing their ideas or prior knowledge related to concepts/phenomenon
  – Engaging in new learning

• Usually done when launching anchoring phenomenon

Possibilities of Productive Discourse

Consolidation

• Students are:
  – Solidifying their understanding
  – Relating their learning back to the bigger scientific concept/phenomenon

Possibilities of Productive Discourse

Data Collection

• Students are:
  – Making sense of data
  – Critiquing data
  – Finding patterns
  – Evaluating different data representations

Possibilities of Productive Discourse

Explanation

• Students are:
  – Making a claim with evidence to support
  – Using multiple forms of evidence gathered during learning to construct an explanation

Cognitive Demand of Questions

• Low cognitive demand
  – Vocabulary, recalling facts, procedural
  – Questions involving a “right answer”

• High cognitive demand
  – Ask students *to do something* with ideas
  – Not a discrete answer

Supporting Productive Discourse

Creating a Safe Space

A safe space looks like students....
Supporting Productive Discourse

Creating a Safe Space

A safe space looks like students...

• Sharing ideas with one another
• Actively listening to one another
• Taking risks in sharing their thinking
• Responding respectfully to peers
• Valuing everyone’s ideas
Supporting Productive Discourse

*Norms*

- Norms – a set of practices for productive group interaction to enhance the quality and productivity of all forms of conversation in any group.

- Co-construct norms with students to build ownership
Norms (cont.)

When co-creating norms, it is recommended to:

• Select/construct from the following three categories:
  – Accountability to science and classmates
  – Equity
  – Respect for each other

• Ask students what might interfere in fully participating

• Limit to 3–5 norms

• Consistently re-enforce until norms are established practices

Adapted from Chapin, O’Connor, and Anderson (2012) and Michaels and O’Connor (2011)
Supporting Productive Discourse

*Talk Formats*

• Partner

  – A low-stakes format where students can explore ideas with one another
  – Students refine their own ideas/thoughts
  – Can be done before or during whole group discourse
  – A brief discussion building towards small/whole group discussion
  – Can provide scaffolds (sentence starters)
Supporting Productive Discourse

*Talk Formats (cont.)*

- **Small Group**
  - Involves 2–4 students sharing ideas
  - Teachers are monitoring
  - Expectations, time limit, and accountability are set for small group
Supporting Productive Discourse

Talk Formats (cont.)

• Whole Group
  – All students participate in common sense-making experience
  – Teacher-guided
  – Minimal between students & teacher
  – Between students with teacher as facilitator
Supporting Productive Discourse

Question and Sentence Stems

• Support students in beginning conversations to:
  – Deepen and support reasoning with evidence
  – Listen to other’s ideas
  – Clarify ideas
  – Evaluate ideas
Resources

- NM STEM Ready! Science Resources Page
- Doing and Talking Math and Science
  - University of Wisconsin & WIDA Consortium
- Project EXCELL’s GO TO Strategies
- STEM TEACHING TOOLS: #6, #48
- Talk Science Primer from The Inquiry Project
- A Discourse Primer from Ambitious Science Teaching
- 4 Goals and Moves Checklist
Upcoming Professional Learning

INSPIRE 2019

Making Sense of SCIENCE (June 3–14, 2019)
Final Reflection

What are the possibilities for discourse as a learning tool in a NM STEM Ready! science classroom?
References

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