Building Community Through Writing Science Curriculum

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Session Goals

1. Learn the whys and hows of the collaboration between Science and ESL in PPS.
2. Learn how equity is supported through student discourse.
3. Practice interaction strategies that promote student discourse.
4. Experience a community building lesson from a Grade 2 unit.

Who is in the room?

Stand up if...

You have English Learners in your classroom(s)/school

You teach 6-8

Your district provides NGSS-aligned curriculum

Who else?

You are a TOSA or science specialist

You are a pre-service teacher

You are an administrator

You teach K-5
Share a talent you have that is outside the realm of science or education.
Our Why: Building Community in the Classroom

Examples from Gr. 2 Life Science: Seeds, Scat, Habitat
**Our Why: Equity through ELD and Discourse**

*Then...*

Teacher gets to speak most of the time.

Students who have the answers get to speak the rest of the time.

*Now...*

Teacher facilitates student discourse.

Everyone gets to ask questions, listen, and have their ideas heard.
Our What: Write science curriculum that integrates NGSS and ELP Standards
Our How: Approaching the Writing Process

- Use local and relevant phenomenon
- Center students and discourse
- Support teachers with PD
- Include teachers in unit development and revision
- Repeat and improve
Introduce the phenomenon

What is this?
Numbered Heads Together

Lesson 1: a. What is it?

I notice...

Name __________________ Date ____________
Phenomenon Video
Notice/Wonder

I noticed...

Some people thought they saw poop.

I wondered...

What is in the poop?
Notice/Wonder

I noticed...

I wondered...

Question Starters

Use these questions and connection words to ask questions.

<table>
<thead>
<tr>
<th>Question Words</th>
<th>Connection Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who, What, When, Where, Which, Why, How much, How many, Is/Are, Was/Were, Did, Do/Does</td>
<td>can/can’t, do/does, cause/caused, did/didn’t, might, would/wouldn’t, will/won’t</td>
</tr>
</tbody>
</table>

Example Questions:
- What does phenomenon mean?
- Why did the animals run away?
- What caused the water to disappear?
- How many kinds of bees are there in a hive?
- Were all the rocks that moved the same kind?
Asking questions

What is your question?
Write it on a sticky note!
Scientists Circle

Respectful
- Talk loud enough for everyone to hear
- Listen to everyone’s ideas
- Raise your hand or follow the protocol

Fair
- One person at a time
- Include everyone
- Don’t talk too much

On Topic
- Stick to the subject
- Pay attention to the ideas
- Come prepared
Driving Question Board

What is in the poop?

Does anyone have a question that is connected?
Closing

Driving Question Board

What is...

Our big, driving question is...
DQB: The Center of the Science Community
Driving Question Board
What is the connection between plants and animals?

Science Words
scat
model
structure

Science Ideas
Animals eat plants.

Class Consensus Model
Driving Question Board
- What is the connection between plants and animals?
- What happens to seeds in the scat?
- What is the fly doing on the flower?
- What do plants need to grow?
- What plants or animals live in different places?
- What plants or animals are in our schoolyard?

Science Words
- scat
- model
- structure
- pattern
- data
- claim
- evidence
- habitat
- pollen
- pollination
- pollinators
- dispersal
- function

Science Ideas
- Animals eat plants.
- Many kinds of plants and many kinds of animals live in habitats together.
- Animals pollinate some flowers so that plants can make seeds.
- Flowers on the plants give animals nectar and pollen to eat.
- Different animals pollinate different flowers.
- Animals are involved in seed dispersal.
- Plants need water and light to grow.

Connections Between Animals and Plants

<table>
<thead>
<tr>
<th>Schoolyard Habitat</th>
<th>Animal</th>
<th>Connection</th>
<th>Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>squirrel</td>
<td>climbs</td>
<td>tree</td>
<td></td>
</tr>
<tr>
<td>bird</td>
<td>nests in</td>
<td>trec</td>
<td></td>
</tr>
<tr>
<td>people</td>
<td>smell</td>
<td>flowers</td>
<td></td>
</tr>
<tr>
<td>bugs</td>
<td>sit</td>
<td>leaves</td>
<td></td>
</tr>
</tbody>
</table>

Connections Between Animals and Plants

<table>
<thead>
<tr>
<th>Whitewater Ponds Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>ant</td>
</tr>
<tr>
<td>fly</td>
</tr>
<tr>
<td>fly</td>
</tr>
<tr>
<td>big tree with smooth bark</td>
</tr>
<tr>
<td>rose bush</td>
</tr>
<tr>
<td>plants with tall yellow flowers</td>
</tr>
<tr>
<td>tree with rough bark and big leaves</td>
</tr>
<tr>
<td>moss (light green)</td>
</tr>
</tbody>
</table>

Connections Between Animals and Plants

<table>
<thead>
<tr>
<th>Oakleaf Forest Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal</td>
</tr>
<tr>
<td>-------</td>
</tr>
</tbody>
</table>

Connections Between Animals and Plants

<table>
<thead>
<tr>
<th>Plants</th>
<th>Animals</th>
</tr>
</thead>
<tbody>
<tr>
<td>plant</td>
<td>animal</td>
</tr>
<tr>
<td>dandelion</td>
<td>dandelion</td>
</tr>
<tr>
<td>ant</td>
<td>ant</td>
</tr>
<tr>
<td>fly</td>
<td>fly</td>
</tr>
<tr>
<td>squash</td>
<td>squash</td>
</tr>
<tr>
<td>on</td>
<td>on</td>
</tr>
<tr>
<td>small bird with red on</td>
<td>small bird with red on</td>
</tr>
<tr>
<td>sparrow with long legs</td>
<td>sparrow with long legs</td>
</tr>
<tr>
<td>snail</td>
<td>snail</td>
</tr>
</tbody>
</table>
What is the function of the DQB in the classroom science community?

Numbered Heads Together
Our Why: Equity through ELD

Discourse builds... for all students!
What We Know...

Discourse builds..
- Language development
- Vocabulary
- Foundations for literacy

Critical thinking
- Intellectual agility
- Perspective taking
- Empathy

Engagement
- Motivation
- Confidence
- Academic identity

Negotiation of meaning
- Voice & empowerment
Our Why: Equity through ELD

Science is for... for all students!
Building Community with Teachers
Our How: Shifts in Science and ELD Instruction

Then...

Science instruction mainly focused the content such as animals and solar systems.

English language development focused on grammar and was isolated from classroom instruction.

Now...

Science instruction focuses on practices, or the “doing” of science.

English language development focuses on language use and is connected to core content.
Language and NGSS

“Recognizing science and language instructional shifts as mutually supportive can lead to better and more coherent instructional approaches that promote both science and language learning with all students, especially ELs.”  pg. 3.6
Our Why: Building Community with Teachers

“I really liked going through the lessons in a hands-on way and having time to reflect with other colleagues at my grade level on how to implement this curriculum.”

“I enjoyed the amount of hands-on work, mixed with teacher-to-teacher information. It was very informative and I feel more empowered to start teaching this unit and share it with my teaching team.”
Building Community with TOSAs
PPS NGSS Transition Timeline

2013: OR adopts NGSS
2014: Integrated Science 6-8
2017: Patterns Sequence 9-12
2017: Science/ELD experimental unit development 4th Life
2019: Science/ELD unit development K-5
2020: COVID hits. Work is delayed in favor of supporting online learning.
2021: Unit development resumes in a very complicated time. New materials adoption coming soon!
Lessons Learned Through Our Experience

NGSS Transition
- NGSS transition is not simple
- PD is essential

Student engagement
- High across diverse schools
- All students get chances to speak with each other

It’s worth it!
**Shifts**: Student-centered + Phenomena-driven = High Engagement
Shifts: Student-centered + Phenomena-driven = High Engagement
Reflection

Stand Up
Hand Up
Pair Up

What do you want to remember from today?
What will you build upon?
Question & Answers

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Resources

- Link to Grade 2 Seeds, Scat, Habitat Science/ELD unit
- Link to PPS Articulated Writing Process
- Numbered Heads Together mats
- Driving Question Board Guide for Grade 2
- Question Starters