Powerful Tools for ALL Classrooms
MSTA 2019
8am–9:45am
Hello! We are...

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Session Outcomes

Awareness of…
Powerful tools needed for 3-Dimensional learning.

Explore…
Three powerful instructional tools from the perspective of a learner as well as a facilitator.

Be able to…
Use these powerful tools in your classroom.
EVERYONE YOU WILL EVER MEET KNOWS SOMETHING YOU DON’T
Who’s in the room?
To what extent and for how long have you been working with NGSS?

1. Personal learning on your own
2. District set a vision and/or providing professional learning plan in plan for teachers
3. Piloting resources
4. Implementation year one
5. On a roll! I’ve got this!
Tool 1
Question Boards

Tomato Plant
What did you notice, what do you wonder?
Our Question!

★ How do the plant parts cause the observed changes?

Use sticky notes. Write one question per sticky; write as many questions as you can think of...
Our Question!

How do the plant parts cause the observed changes?
What does this tool look like in print?

Read through Activity 1 from the Built for Survival unit.

What did we do that wasn’t in print?
What is in print that we didn’t do?
Other comments, questions, etc.
Debrief the Process

What did we do?  What is the purpose of this tool?
Science begins with a question! Students at any grade level should be able to ask questions of each other about the texts they read, the features of the phenomena they observe, and the conclusions they draw from their models or scientific investigations. For engineering, they should ask questions to define the problem to be solved and to elicit ideas that lead to the constraints and specifications for its solution. (NRC Framework 2012, p. 56)
Questions Boards in *many* resources!

Next Gen Storylines, Grade 2: “Why is Our Corn Changing?”

MiSTAR, Grades 6-8 “Water on the Move”

Model Based Biology, High School Population Dynamics
Tool 1
Question Boards
Final Thoughts
Knowing the answers will help you in **SCHOOL**.

Knowing how to question will help you in **LIFE**.

- Warren Berger, *A More Beautiful Question*
Tool 2 & Tool 3
Scientific Models
Productive Talk
1) Observe the carnations.

2) Turn and Talk!
How did this happen?
How might what we observed help us explain what’s happening with the tomato plant?
1) Observe the celery.

2) Make a prediction for what will happen to the celery plant system when the celery is placed in colored water.
   - Work in teams
   - Use whiteboards

Use pictures, words, symbols, etc.
The next day!

1) Observe the celery
2) Record observations for how the celery has changed.
3) With your team, revise your whiteboard to predict how the color from the water got to the leaves.

Use pictures, words, symbols, etc.
Making thinking visible…
Going Public!

What have we figured out so far?

Consensus so far…
We observed… We agree …

What are we still wondering?

What could we do to figure this out?
The investigation continues ... gathering new evidence.

- What can we do to gather evidence to figure out what’s going on inside?
- With your team, use evidence to revise your whiteboard to explain how the leaves became colored.
Gallery Walk - Going Public

Reaching Consensus
Reaching Consensus
Debrief the Process

What did we do?  

What is the purpose of this tool?
Gallery Walk - Going Public

Tell A Positive
Ask a Question
Give a Suggestion

Reaching Consensus
What are Models and What is Modeling?

5 Components

1) Represent an event or process
2) Context-rich
3) Models are pictorial
4) Representations include both observable and unobservable features
5) Revisable and predictive
Debrief the Process

What did we do? What is the purpose of this tool?

Anything to add?
Tool 3

Productive Talk
“Knowledge is socially constructed.”

-Carolyn McKanders
Debrief the Process

What did we do?  What is the purpose of this tool?
There's Just Not
ENOUGH
Time!
When you say **YES** to one thing, you say **NO** to something else.

When you say **NO** to something, you say **YES** to other things!

What are your **YES**'s?
EVERYONE YOU WILL EVER MEET KNOWS SOMETHING YOU DON’T
OQB

Can we regroup or categorize these questions another way?

What have we figured out?

How do the plant parts cause the observed changes?

<table>
<thead>
<tr>
<th>Survival</th>
<th>Growth</th>
<th>Reproduction</th>
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So, why do we think these tools are so powerful?

OQB
Scientific Models
Productive Talk

Model Based CER Video
Additional Resources

- Talk Science Primer
- Talk Science FAQ
- The Driving Question Board
- Class Question Boards
- What Does Creating or Revising Scientific Models Look Like?
- Using models scientifically: Scientific models help students understand the water cycle
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