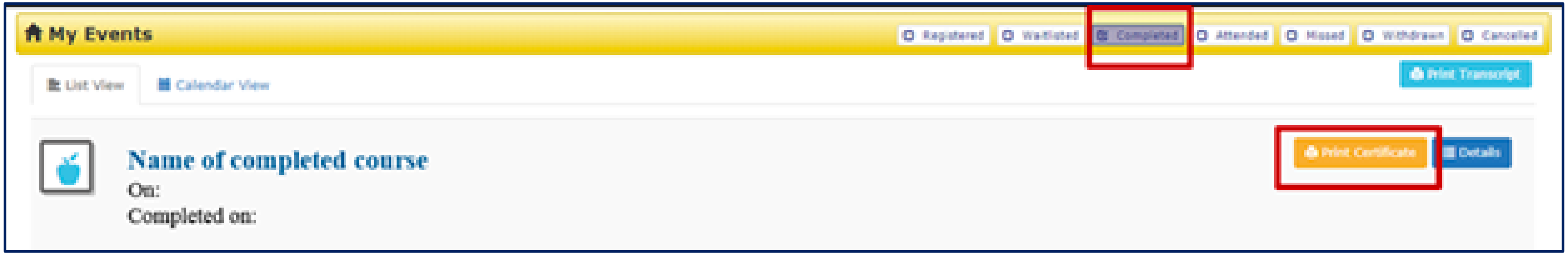
# WELCOME!

## Please review this information while we wait for all to join!

## Attendance, Resources & PD Clock Hours

- **You must stay on the whole time- 1 hour- to receive credit**

- **<u>YOU</u> print your certificate through ADE Connect- please wait 48 hours of webinar before printing certificates☺**




- **AFTER WEBINAR- Survey & follow-up email from ADE**

Arizona Department of Education

# SEP Asking Questions: Students Drive Instruction with Driving Question Boards!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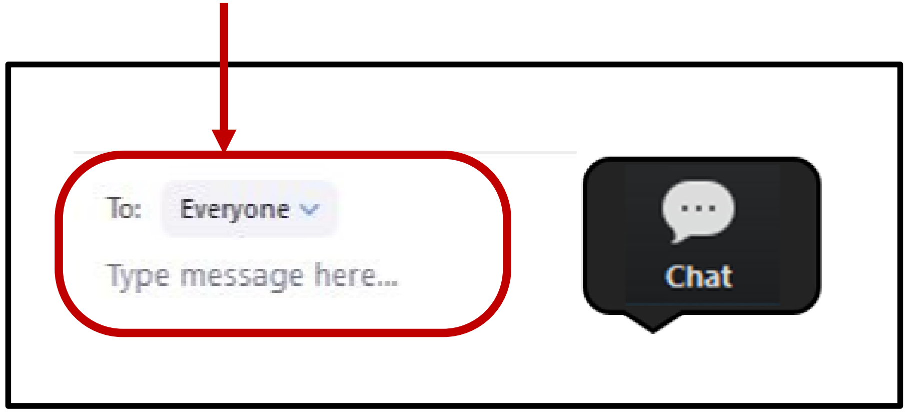
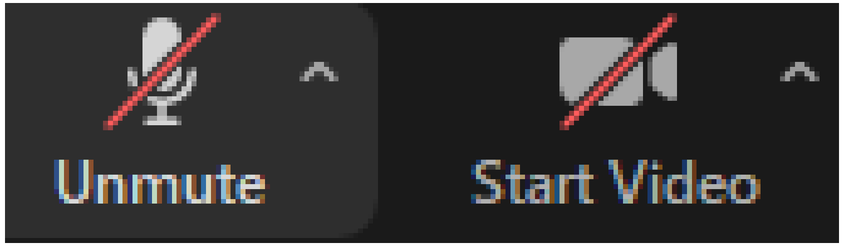
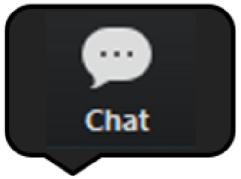
# Webinar Housekeeping

# Welcome!


- Name
- Current Position
- County

# Webinar Resource Dashboard

**SEP Asking Questions: Students Drive Instruction Using Driving Question Boards! Webinar Dashboard**

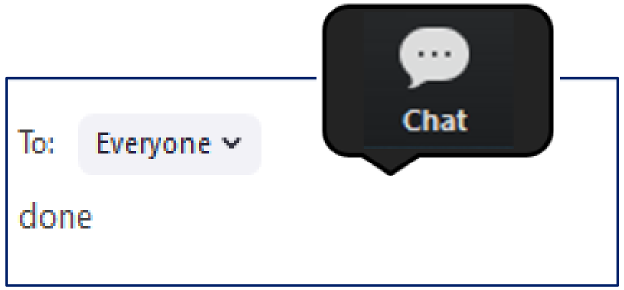
**Facilitators:** **Rebecca Garelli:** Rebecca.Garelli@azed.gov I **Sarah Sleasman:** Sarah.Sleasman@azed.gov

ADE Science Standards Page I ADE Science Resource Page I ADE Science & STEM Webinars

| | | |
|---|---|---|
| 1 | General Resources | ⊕ **Presentation PDF:** PDF of Slides<br>⊕ **PDF of Book:** Helping Students Make Sense of the World |
| 2 | 3 Categories of Science & Engineering Practices | ⊕ Assessing Practices Along a Continuum Article from NSTA<br>⊕ The Wonder of Science 3-D Cards |
| 3 | National Science Teaching Association (NSTA) Resources | ⊕ **ALL Daily Dos:** https://www.nsta.org/resources/daily-do<br>⊕ **Daily Do:** Why Does the Ice Melt Faster? |
| 4 | Phenomena Video | ⊕ Ice Melting Blocks Video |
| 5 | Alone Zone- Notice & Wonder | ⊕ See-Think-Wonder Table (make a copy) |
| 6 | Wondering Jamboards by Birthday Month | ⊕ December_January<br>⊕ February_March<br>⊕ April_May<br>⊕ June_July<br>⊕ August_September<br>⊕ October_November |
| 7 | DQB Walk & Talk Question Chains Strategy | ⊕ Walk & Talk Question Chains Video from ADE PD |

DO NOT open with Google Docs!

**DOWNLOAD AS PDF**




Gray- means we will open and use

# WHAT, HOW, WHY

- Explore how to engage students with a phenomenon to launch a learning sequence that incorporates the Science & Engineering Practice (SEP) of Asking Questions

- Explore a few strategies to help students generate, discuss, and decide on which questions can help drive the path of the investigation

- Deepen understanding of what a Driving Question Board is, how to use it, and when to use this strategy within an instructional unit

# Community Norms/Shared Agreements

- We honor each other and all our voices
- We actively and respectfully listen and speak to one another
- We commit to the group by contributing to the learning of others through active participation in this web seminar.

*Adapted from NSTA's Webinar- Transforming Science Learning: Acting, Thinking and Talking as Scientists. Engaging Students in Science and Engineering Practices on 8/12/20*

# Access to Science Literacy for ALL Students

economically disadvantaged

English learners

race and ethnicity

gifted and talented

students with disabilities

students with different cultures

# Sensemaking & Asking Questions

**"Making sense of the world begins with questions that identify what needs to be explained about the phenomena."**

**#1 in Dashboard, p.88**


*Adapted from NSTA's Webinar- Transforming Science Learning: Acting, Thinking and Talking as Scientists. Engaging Students in Science and Engineering Practices on 8/12/20*

# Two Labels for Instruction

## Information Frame

- Teacher is focused on disseminating information.
- Students are focused on knowing information.
- Science is portrayed as a body of established facts.
- Assessments are focused on "right" answers.

**Knowing about..**

## Sensemaking Frame

- Teacher is focused on developing conceptual understanding.
- Students are focused on understanding something.
- Science is portrayed as a way to make sense of something.
- Assessments are focused on use of evidence to support conclusions/generalizations.

**Figuring out...**

# Design for Distance Learning

- Phenomena
- Science and Engineering Practices
- Student Ideas
- Classroom Norms

# Science & Engineering Practices

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

*Adapted from NSTA's Webinar- Transforming Science Learning: Acting, Thinking and Talking as Scientists. Engaging Students in Science and Engineering Practices on 8/12/20*

# Science & Engineering Practice (SEP): Asking Questions

## Where do you fall on this spectrum?

A B C D E

Chat

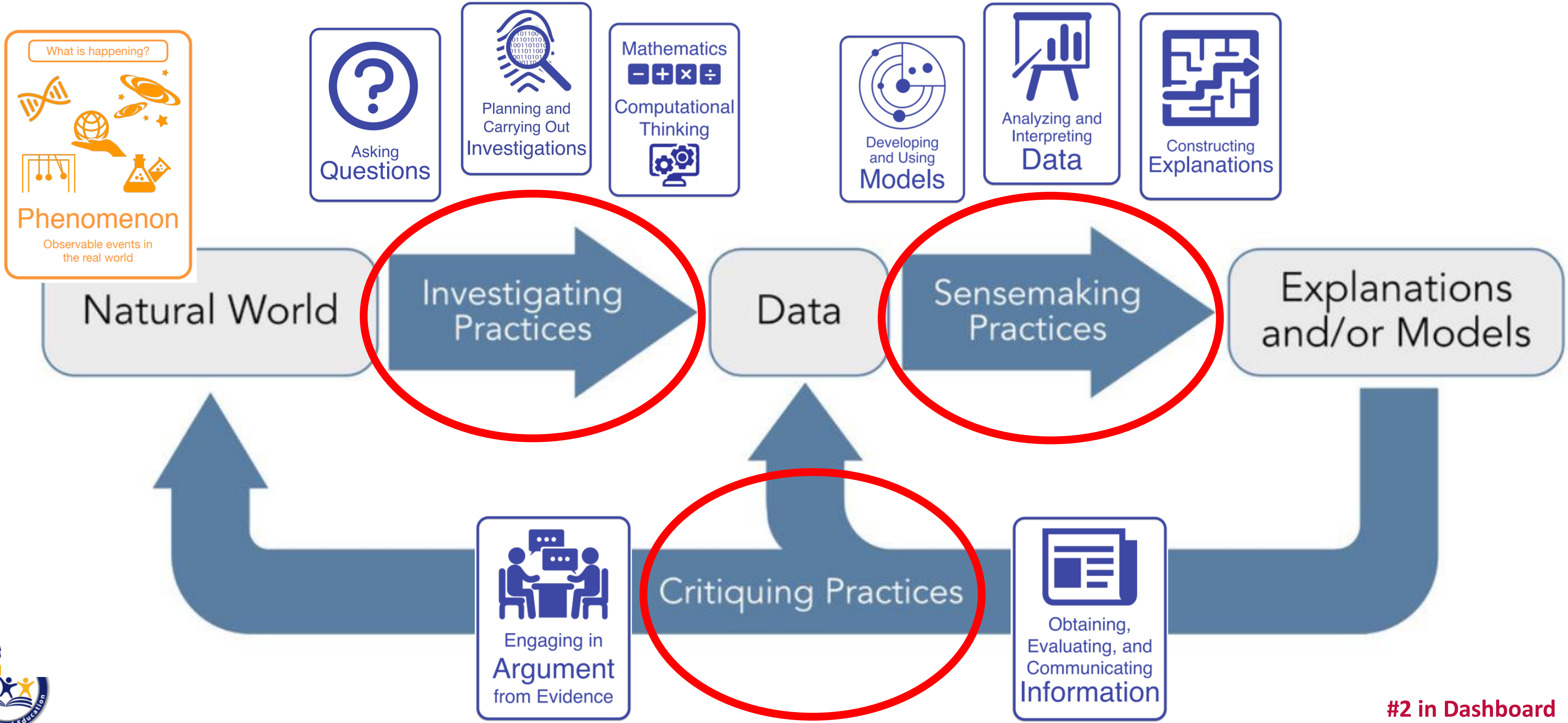
I know this SEP: Asking Questions exists

I can engage my students in the SEP: Asking Questions

I can confidently engage my students in the SEP: Asking Questions

*Adapted from NSTA's Webinar- Transforming Science Learning: Acting, Thinking and Talking as Scientists. Engaging Students in Science and Engineering Practices on 8/12/20*

# Grouping the Practices




#2 in Dashboard

# 3 Categories of Science & Engineering Practices

| Investigating Practices | Sensemaking Practices | Critiquing Practices |
|---|---|---|
| 1. Asking Questions | 2. Developing & Using Models | 7. Engaging in Argument from Evidence |
| 3. Planning & Carrying Out Investigations | 4. Analyzing & Interpreting Data | 8. Obtaining, Evaluating, & Communicating Information |
| 5. Using Mathematical & Computational Thinking | 6. Constructing Explanations | |

Article- #2 in Dashboard

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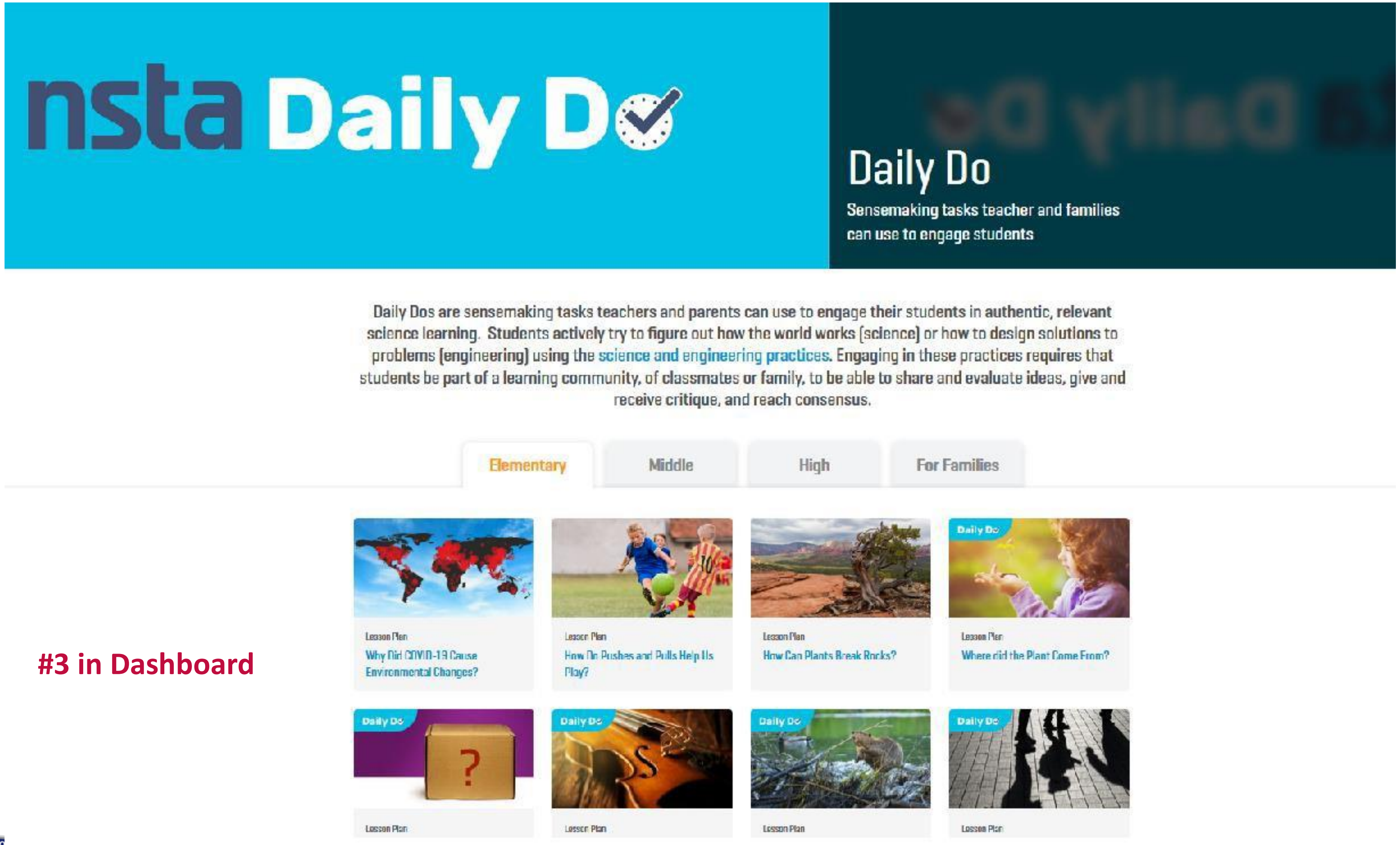
# NSTA Daily Do




#3 in Dashboard


#1 in Dashboard

*Adapted from NSTA's Webinar- Transforming Science Learning: Acting, Thinking and Talking as Scientists. Engaging Students in Science and Engineering Practices on 8/12/20*

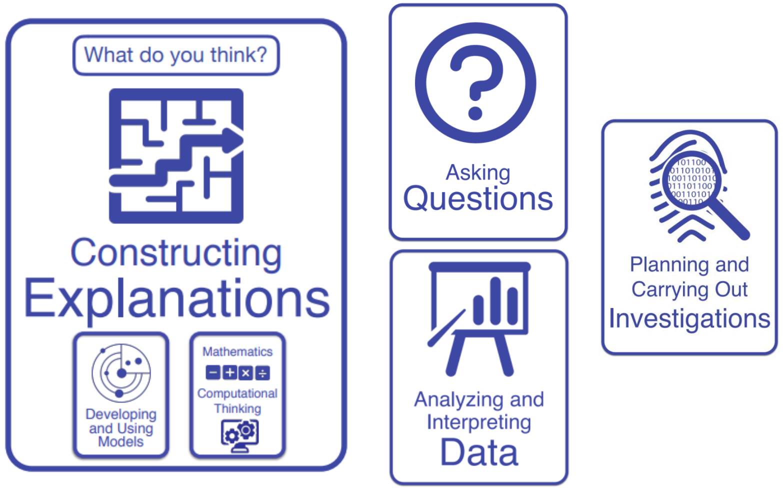
# Middle School Science Daily Do


## Connected Arizona Science Standard

| 8.P4U1.3 |
| --- |
| Construct an explanation on how energy can be transferred from one energy store to another. |

**Core Idea P4: The total amount of energy in a closed system is always the same but can be transferred from one energy store to another during an event.**
**U1: Sensemaking using practices**

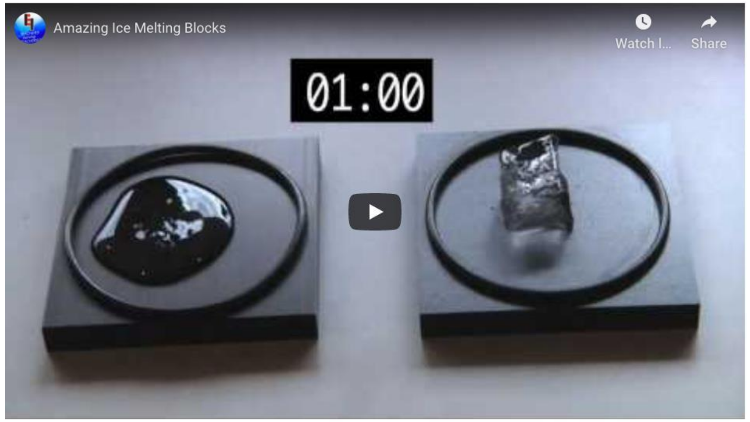
## Science & Engineering Practice(s)




## Crosscutting Concept


*Adapted from NSTA's Webinar- Transforming Science Learning: Acting, Thinking and Talking as Scientists. Engaging Students in Science and Engineering Practices on 8/12/20*

# Notice & Wonder




## Create a See-Think-Wonder table

| I notice/see | I think | I wonder |
| --- | --- | --- |
| | | |

#5 in Dashboard



*Adapted from NSTA's Webinar- Transforming Science Learning: Acting, Thinking and Talking as Scientists. Engaging Students in Science and Engineering Practices on 8/12/20*

# Notice & Wonder

## Alone Zone

As you watch the video, record your observations, initial ideas and any **questions** that arise.

| I notice/see (observations) | I think (initial ideas/prior thinking) | I wonder (questions) |
|---|---|---|
| | | |

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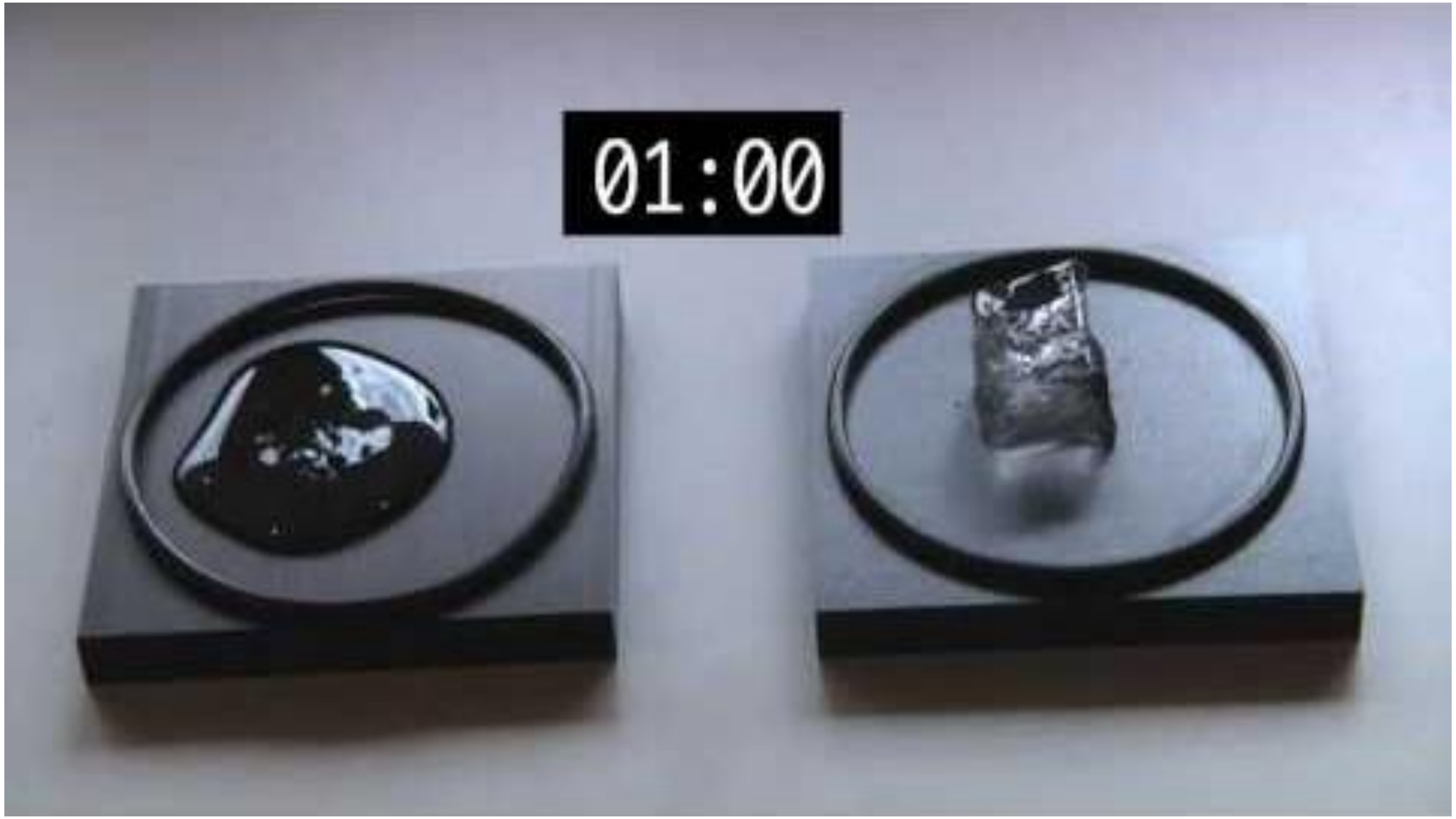
# Notice & Wonder




| I notice/see (observations) | I think (initial ideas/prior thinking) | I wonder (questions) |
|---|---|---|
| | | |

HOW OR WHY

https://youtu.be/rrYAmEptMLQ

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*Adapted from NSTA's Webinar- Transforming Science Learning: Acting, Thinking and Talking as Scientists. Engaging Students in Science and Engineering Practices on 8/12/20*

# Noticings Waterfall

## Before typing in chat box:

Chat

| I notice/see (observations) |
|---|
| |

- Review your observations
- Choose two observations to share
- Type in chat box, but DO NOT HIT ENTER!

(wait for countdown- 3,2,1..waterfall!)

## When waterfall slows down:

**Look for patterns & think**

- Which observations did you share with others?
- Which observations were new to you?
- Add any new noticings to your S-T-W table



*Adapted from NSTA's Webinar- Transforming Science Learning: Acting, Thinking and Talking as Scientists. Engaging Students in Science and Engineering Practices on 8/12/20*

# Wonderings Jamboard

## Prepare for Jamboard

- Review your own observations and the observations of your group.
- Review and/or add to the questions you recorded in **“I wonder”** column of your table.

**I wonder**

**(questions)**


## Post Questions on Jamboard

- Choose one question to share.
- **Share your question in Jamboard**

***USE YELLOW ONLY***

**What do we want to figure out?**

**Record one question that you want to help us figure out: Why does one ice cube melt faster?**

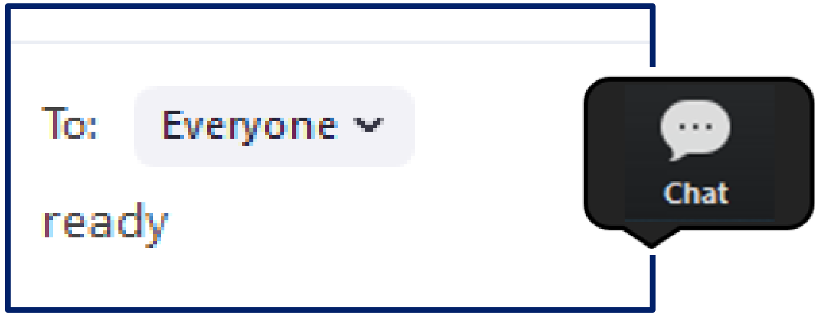



*Adapted from NSTA’s Webinar- Transforming Science Learning: Acting, Thinking and Talking as Scientists. Engaging Students in Science and Engineering Practices on 8/12/20*

# Jamboard (use your birthday month)

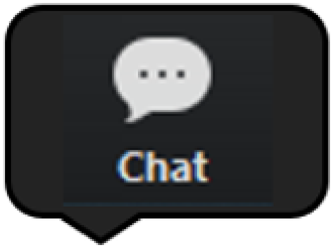
## #6 in Dashboard

| | | | |
|---|---|---|---|
| 6 | Wondering Jamboards by Birthday Month | ⊕ December_January<br>⊕ February_March<br>⊕ April_May | ⊕ June_July<br>⊕ August_September<br>⊕ October_November |



# Post-Jamboard Brainstorm

## What could we do to figure out some things about why one ice cube melted faster than the other?





# Using DQB to Drive Instruction

**Many of us are wondering about the blocks.**

- Are the blocks made of the same material?

Are the blocks the same?

- Does the material the blocks are made of make the difference?

Are they made of the same type of material?

Is one block hotter than the other?

- Are the blocks different temperatures?

Is one of the blocks heated?

**Should we investigate the questions about the blocks first?**



*Adapted from NSTA's Webinar- Transforming Science Learning: Acting, Thinking and Talking as Scientists. Engaging Students in Science and Engineering Practices on 8/12/20*

# Investigation with Household Objects

Planning and Carrying Out Investigations

## Group A object

- metal pot, pan, cookie sheet, mixing bowl, etc.
- metal sink
- aluminum foil

## Group B object

- glass or ceramic baking dish, mixing bowl, etc.
- plastic or wood cutting board
- oven mitt
- parchment or wax paper

*This is not a complete materials list.*

**Are the blocks the same?**

**Are they made of the same type of material?**

# Move to Investigating- Melting Ice on Two Different Objects

Planning and Carrying Out Investigations

**Investigation 1: Melting ice on two different kitchen objects**

| | Object A | Object B |
|---|---|---|
| Initial Observations | | |
| Room Temperature | | |
| How does the object feel to the touch? | | |
| Temperature of Object | | |
| Predicted Results | | |
| What do you think will happen when you place the ice cube on the block? | | |
| Actual Results | | |
| How fast did the ice cube melt? What else did you observe? | | |

Is one block hotter than the other?

Is one of the blocks heated?

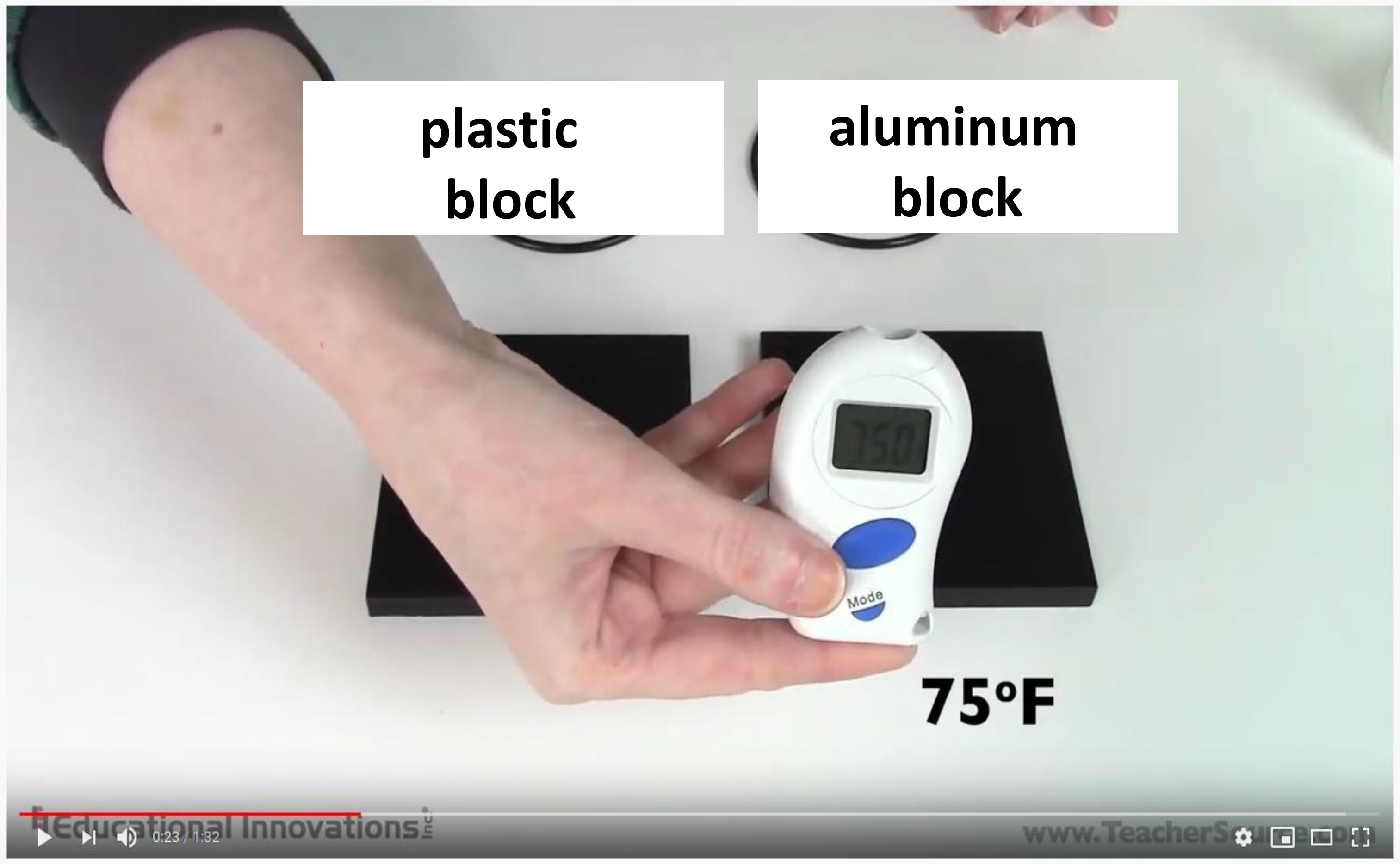
Are they made of the same type of material?

Are the blocks the same?

**#8 in Dashboard**

*Adapted from NSTA's Webinar- Transforming Science Learning: Acting, Thinking and Talking as Scientists. Engaging Students in Science and Engineering Practices on 8/12/20*

# Alternative- Video with Data





Investigation 1: Melting ice on two different kitchen objects

| | Object A | Object B |
|---|---|---|
| Initial Observations | | |
| Room Temperature | | |
| How does the object feel to the touch? | | |
| Temperature of Object | | |
| Predicted Results | | |
| What do you think will happen when you place the ice cube on the block? | | |
| Actual Results | | |
| How fast did the ice cube melt? What else did you observe? | | |

*Adapted from NSTA's Webinar- Transforming Science Learning: Acting, Thinking and Talking as Scientists. Engaging Students in Science and Engineering Practices on 8/12/20*

# Making Sense of the Investigation

**Investigation 1: Melting ice on two different kitchen objects**

| | Object A | Object B |
|---|---|---|
| Initial Observations | plastic | aluminum |
| Room Temperature | 75 | 75 |
| How does the object feel to the touch? | Cooler than B | Warmer than A |
| Temperature of Object | 75 | 75 |
| Predicted Results | | |
| What do you think will happen when you place the ice cube on the block? | varies | varies |
| Actual Results | | |
| How fast did the ice cube melt? What else did you observe? | ~7s<br>Ice melted faster, object is metal, etc. | It didn't melt<br>Object is non-metal, etc. |

Are the blocks the same?

Is one block hotter than the other?

Is one of the blocks heated?

- What patterns did you observe? How did these patterns compare to your predictions?
- How do these patterns help you explain why the ice melts faster on some objects than on others?
- What do you think might be happening at the microscopic level that would help you explain the patterns you observed?



Prompts for CCCs- #14 in dashboard

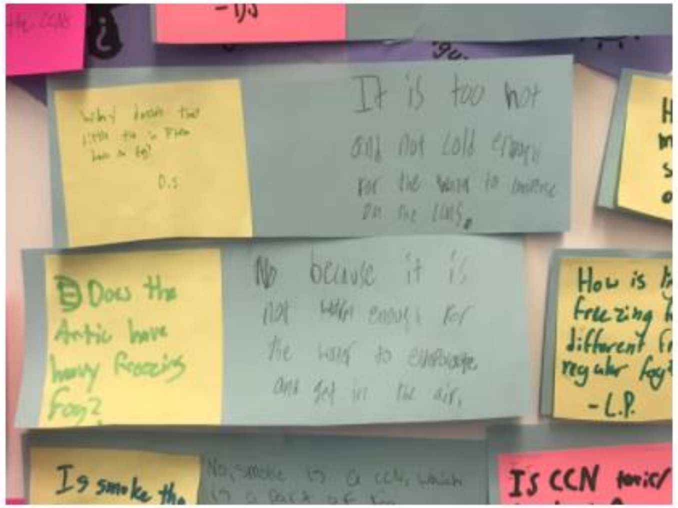
# Revisit the DQB Overtime in a Digital Space

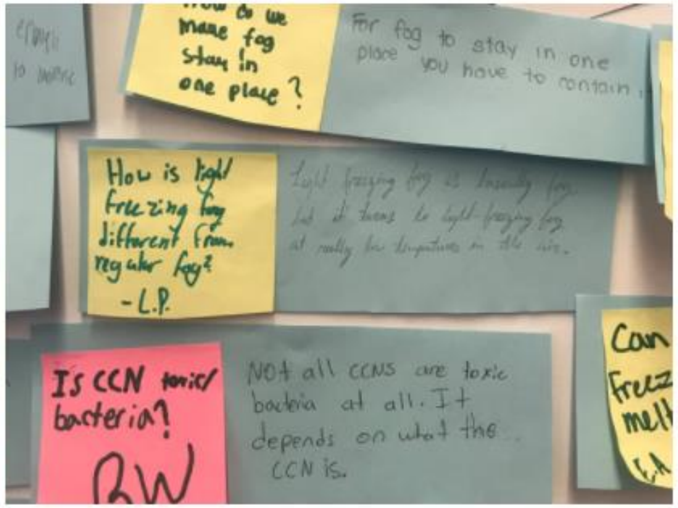
**Class revisits DQB**

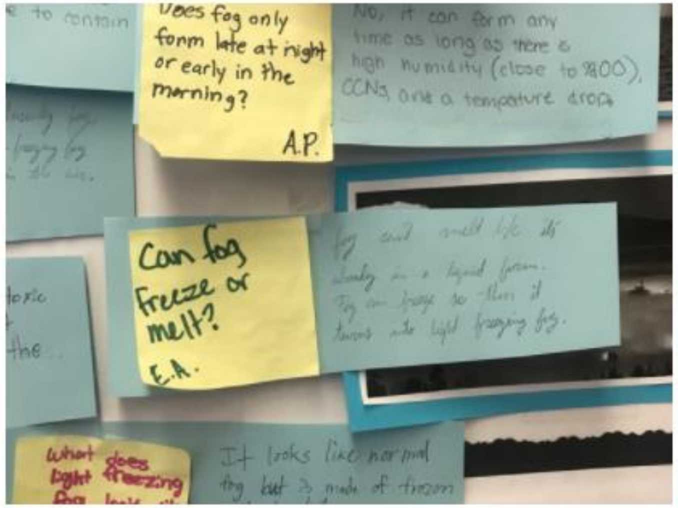
- Answer questions on DQB
- Pose *NEW* questions

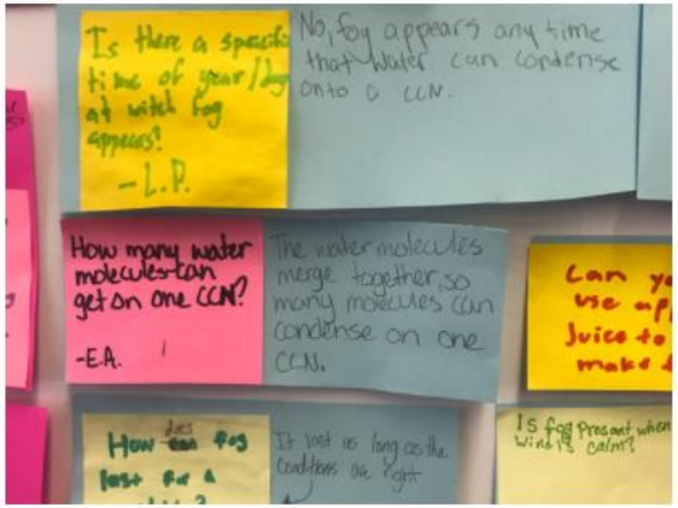
***CONTINUE TO UPDATE AS WE FIGURE THINGS OUT***

# Sample Revisit to DQB for F2F


**#11 in Dashboard** *Borrowed from Gretchen Brinza's DQB: All Questions Answered!*

# DQB Jamboard Strategy Summary

**Frame 1:** Introduction to using stickies to post wonderings/questions

**Frame 2:** Make Categories w/Pen Tool & Text Boxes

**Frame 3:** Make Categories w/Circle Shape & Text Boxes

**Frame 4:** Make Categories with Pink for Category Title, Green for questions that can be INVESTIGATED, and Blue for questions that can be RESEARCHED

**Frame 5:** Scaffold Categories with 3 pre-built categories

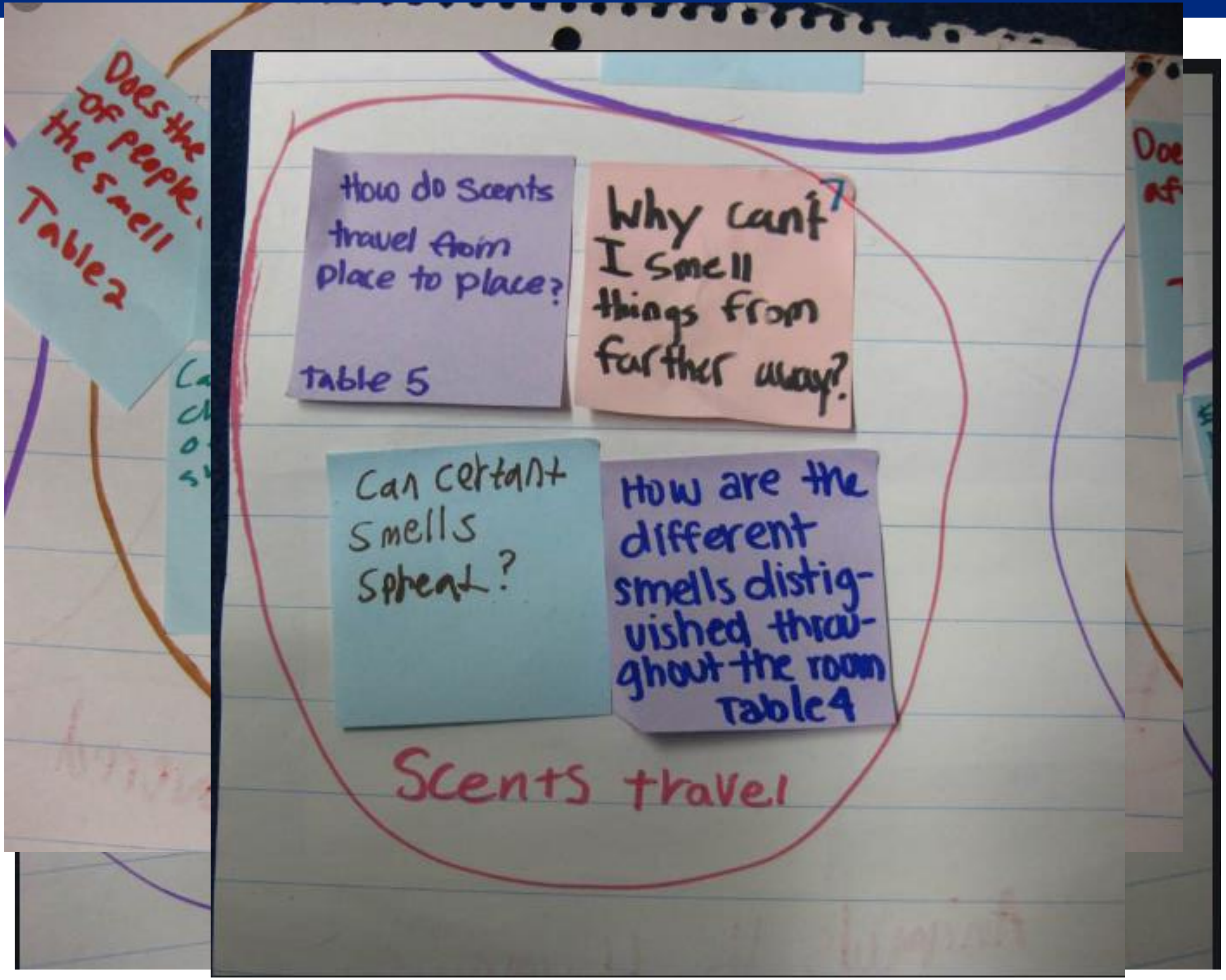
**Frame 6:** Where do questions go if they don't fit in a category?

*Important*- go back and ANSWER the questions we have FIGURED OUT

# Categorize Questions- 6-8 or HS option F2F

**Group questions that similar, connect post-its**

**What labels or categories could we give these groups of questions?**

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# F2F: Walk & Talk Question Chains Video


- Face to Face (F2F) strategy

- Interactive way to have whole class student collaboration to create a Driving Question Board with Question Chains (for a smell phenomena)


**#7 in Dashboard** [DQB: Walk & Talk Question Chains Strategy]

# Intentional Use of Asking Questions

## Teacher Hat

Use evidence from data to create a model to explain why the ice melts faster on one block than the other.

## Student Hat

We have a lot of questions that we ***need*** to answer to explain why the ice melts faster on one block than the other.

*Adapted from NSTA's Webinar- Transforming Science Learning: Acting, Thinking and Talking as Scientists. Engaging Students in Science and Engineering Practices on 8/12/20*

# What about the Science & Engineering Practices?

## Find and open this resource

#7 in Dashboard

Vertical Progressions Document

K-12 Science and Engineering Practices* Progression Matrix of Elements

For use with *Arizona Science Standards*

| Science and Engineering Practices | K–2 Condensed Practices | 3–5 Condensed Practices | 6–8 Condensed Practices | 9–12 Condensed Practices |
|---|---|---|---|---|
| **Asking Questions and Defining Problems**<br><br>A practice of science is to ask and refine questions that lead to descriptions and explanations of how the natural and designed world works and which can be empirically tested.<br><br>Engineering questions clarify problems to determine criteria for successful solutions and identify constraints to solve problems about the designed world.<br><br>Both scientists and engineers also ask questions to clarify ideas. | Asking questions and defining problems in grades K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.<br><br>• Ask questions based on observations of the natural and/or designed world.<br>• Define a simple problem that can be solved through the development of a new or improved object or tool. | Asking questions and defining problems in grades 3–5 builds from grades K–2 experiences and progresses to specifying qualitative relationships.<br><br>• Identify scientific (testable) and non-scientific (non-testable) questions.<br>• Ask questions based on careful observations of phenomena and information.<br>• Ask questions to clarify ideas or request evidence.<br>• Ask questions that relate one variable to another variable.<br>• Ask questions to clarify the constraints of solutions to a problem.<br>• Use prior knowledge to describe problems that can be solved.<br>• Define a simple design problem that can be solved through the development of an object, tool or process and includes several criteria for success and constraints on materials, time, or cost.<br>• Formulate questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. | Asking questions and defining problems in grades 6–8 builds from grades K–5 experiences and progresses to formulating and refining empirically testable models that support explanations of phenomena or solutions to problems.<br>• Ask questions that arise from careful observation of phenomena, models, or unexpected results.<br>• Ask questions to clarify or identify evidence and the premise(s) of an argument.<br>• Ask questions to determine relationships between independent and dependent variables.<br>• Ask questions that challenge the interpretation of a data set.<br>• Ask questions to clarify and refine a model, an explanation, or an engineering problem.<br>• Define a design problem that can be solved through the development of an object, tool, process or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions.<br>• Formulate a question that can be investigated within the scope of the classroom, school laboratory, or field with available resources and, when appropriate, frame a hypothesis (a possible explanation that predicts a particular and stable outcome) based on a model or theory. | Asking questions and defining problems in grades 9–12 builds from grades K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design solutions using models and simulations.<br><br>• Ask questions that arise from careful observation of phenomena, models, theory, or unexpected results.<br>• Ask questions that require relevant empirical evidence to answer.<br>• Ask questions to determine relationships, including quantitative relationships, between independent and dependent variables.<br>• Ask and evaluate questions that challenge the premise of an argument, the interpretation of a data set, or the suitability of a design.<br>• Define a design problem that involves the development of a process or system with interacting components and criteria and constraints that may include social, technical and/or environmental considerations |

*Adapted from NSTA's Webinar- Transforming Science Learning: Acting, Thinking and Talking as Scientists. Engaging Students in Science and Engineering Practices on 8/12/20*

# SEP: Asking Questions & Defining Problems

Asking Questions

## K-12 Science and Engineering Practices* Progression Matrix of Elements

For use with *Arizona Science Standards*

| Science and Engineering Practices | K–2 Condensed Practices | 3–5 Condensed Practices | 6–8 Condensed Practices | 9–12 Condensed Practices |
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**Elements:**

**Specific pieces of knowledge and skill that make up the practice at each grade band.**

**Increasing sophistication**

*Adapted from NSTA's Webinar- Transforming Science Learning: Acting, Thinking and Talking as Scientists. Engaging Students in Science and Engineering Practices on 8/12/20*

# Asking Questions/Defining Problems

Which element of the Asking Questions science and engineering practice did we engage with?

Why do you say so?

Chat

| 3–5 Condensed Practices | 6–8 Condensed Practices | 9–12 Condensed Practices |
|---|---|---|
| Asking questions and defining problems in grades 3–5 builds from grades K–2 experiences and progresses to specifying qualitative relationships.<br>A<br>• Identify scientific (testable) and non-scientific (non-testable) questions.<br>• Ask questions based on careful observations of phenomena and information.<br>• Ask questions to clarify ideas or request evidence.<br>• Ask questions that relate one variable to another variable.<br>• Ask questions to clarify the constraints of solutions to a problem.<br>• Use prior knowledge to describe problems that can be solved.<br>• Define a simple design problem that can be solved through the development of an object, tool or process and includes several criteria for success and constraints on materials, time, or cost.<br>• Formulate questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. | Asking questions and defining problems in grades 6–8 builds from grades K–5 experiences and ...sses to formulating and refining ...cally testable models that ...t explanations of phenomena or solutions to problems.<br>B<br>• Ask questions that arise from careful observation of phenomena, models, or unexpected results.<br>• Ask questions to clarify or identify evidence and the premise(s) of an argument.<br>• Ask questions to determine relationships between independent and dependent variables.<br>• Ask questions that challenge the interpretation of a data set.<br>• Ask questions to clarify and refine a model, an explanation, or an engineering problem.<br>• Define a design problem that can be solved through the development of an object, tool, process or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions.<br>• Formulate a question that can be investigated within the scope of the classroom, school laboratory, or field with available resources and, when appropriate, frame a hypothesis (a possible expl... that predicts a particular ar... outcome) based on a mode... theory. | Asking questions and defining problems in grades 9–12 builds from grades K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design solutions using models and simulations.<br>• Ask questions that arise from careful observation of phenomena, models, theory, or unexpected results.<br>• Ask questions that require relevant empirical evidence to answer.<br>C<br>• ...k questions to determine ...lationships, including quantitative ...lationships, between independent ...nd dependent variables.<br>• Ask and evaluate questions that challenge the premise of an argument, the interpretation of a data set, or the suitability of a design.<br>• Define a design problem that involves the development of a process or system with interacting components and criteria and constraints that may include social, technical and/or environmental considerations |

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*Adapted from NSTA's Webinar- Transforming Science Learning: Acting, Thinking and Talking as Scientists. Engaging Students in Science and Engineering Practices on 8/12/20*

# WHAT, HOW, WHY

- Explore how to engage students with a phenomenon to launch a learning sequence that incorporates the Science & Engineering Practice (SEP) of Asking Questions

- Explore a few strategies to help students generate, discuss, and decide on which questions can help drive the path of the investigation

- Deepen understanding of what a Driving Question Board is, how to use it, and when to use this strategy within an instructional unit

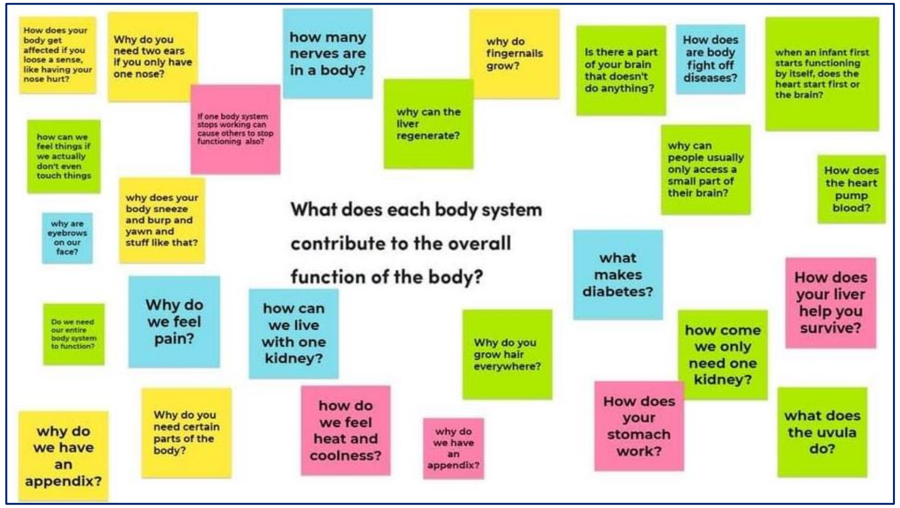
# What is a Driving Question Board (DQB)?

## A tool used throughout an instructional unit to:

- Generate questions
- Keep track of student questions
- Revisit questions related to the anchoring phenomena & related phenomena

## A visual representation of the class's shared mission of learning in the unit





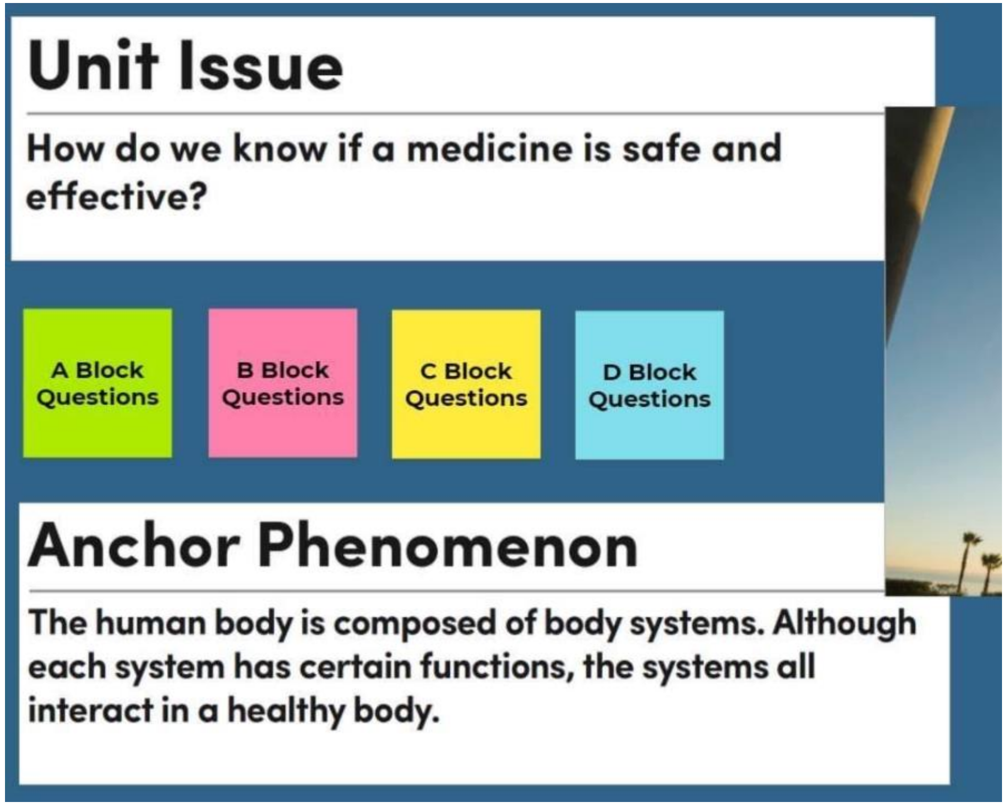



**#10 in Dashboard** *Adapted from OpenSciEd Teacher Handbook*

# When is a DQB used?

- **A DQB is usually introduced at the beginning of an instructional unit when an students engage with an anchoring phenomena**

- **Role of DQB can change over the course of a unit:**
  - **Beginning of Unit**
    - enables teacher and students to understand what students both know/do not know about the anchoring phenomena



# How is a DQB used? Possible Future Investigations

Additional examples of DQBs and Ideas for Investigation charts are shown below:

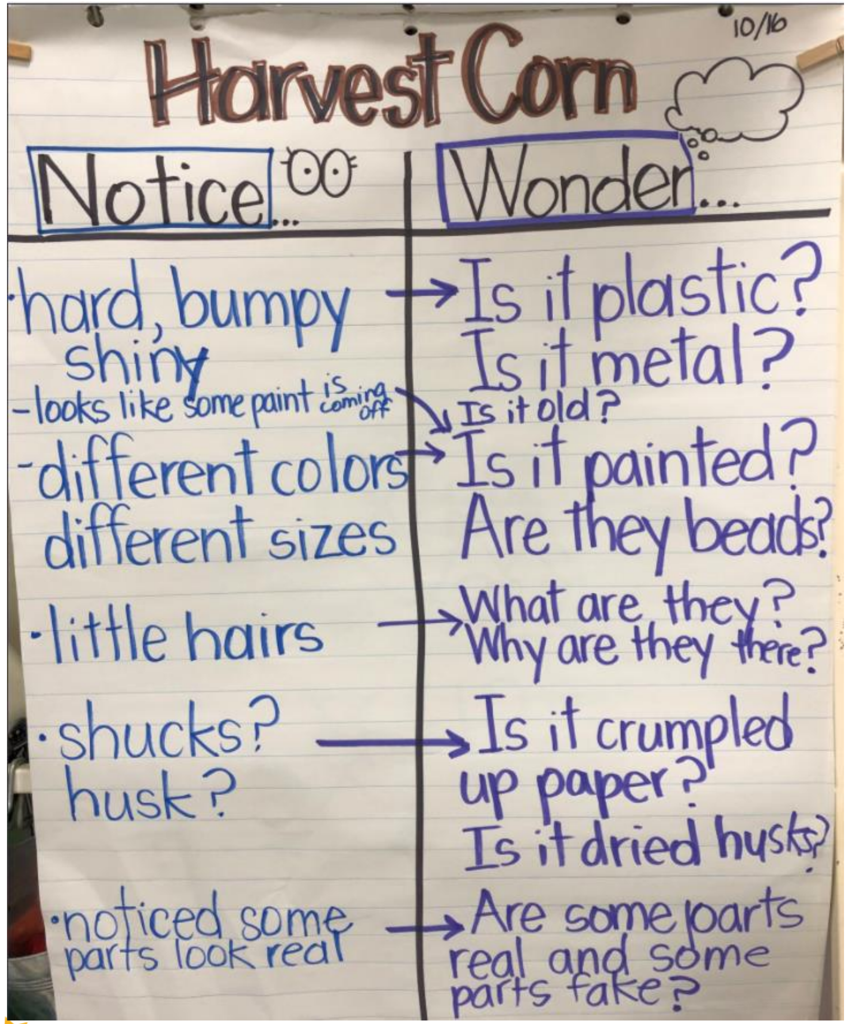


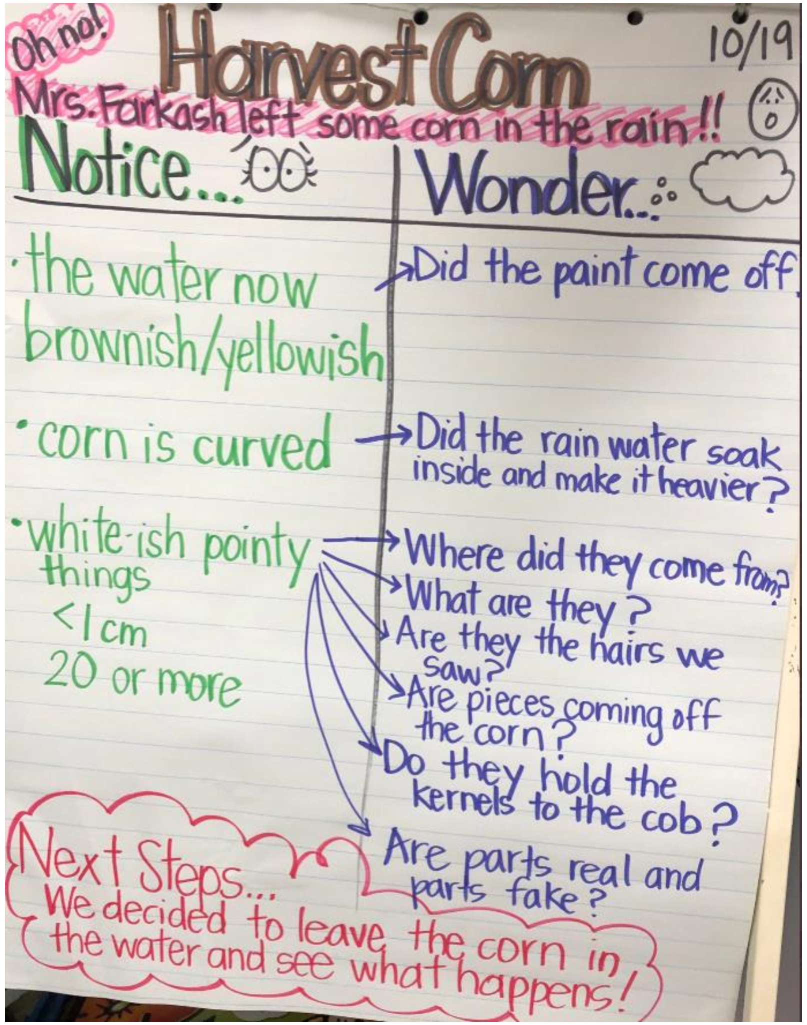

*Portions of Section D were adapted from tools and processes developed by NextGen Science Storylines at Northwestern University and from the work of the Investigating and Questioning our World through Science and Technology Project at the University of Michigan, Northwestern University, and Michigan State University.*

**#10 in Dashboard**

**From the OpenSciEd Teacher Handbook*

# What does this look like in K-2?




**#13 in Dashboard**

**Borrowed Lori Farkash @Room9Pics on Twitter*

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# Asking Questions with a Questioning Form- MS/HS

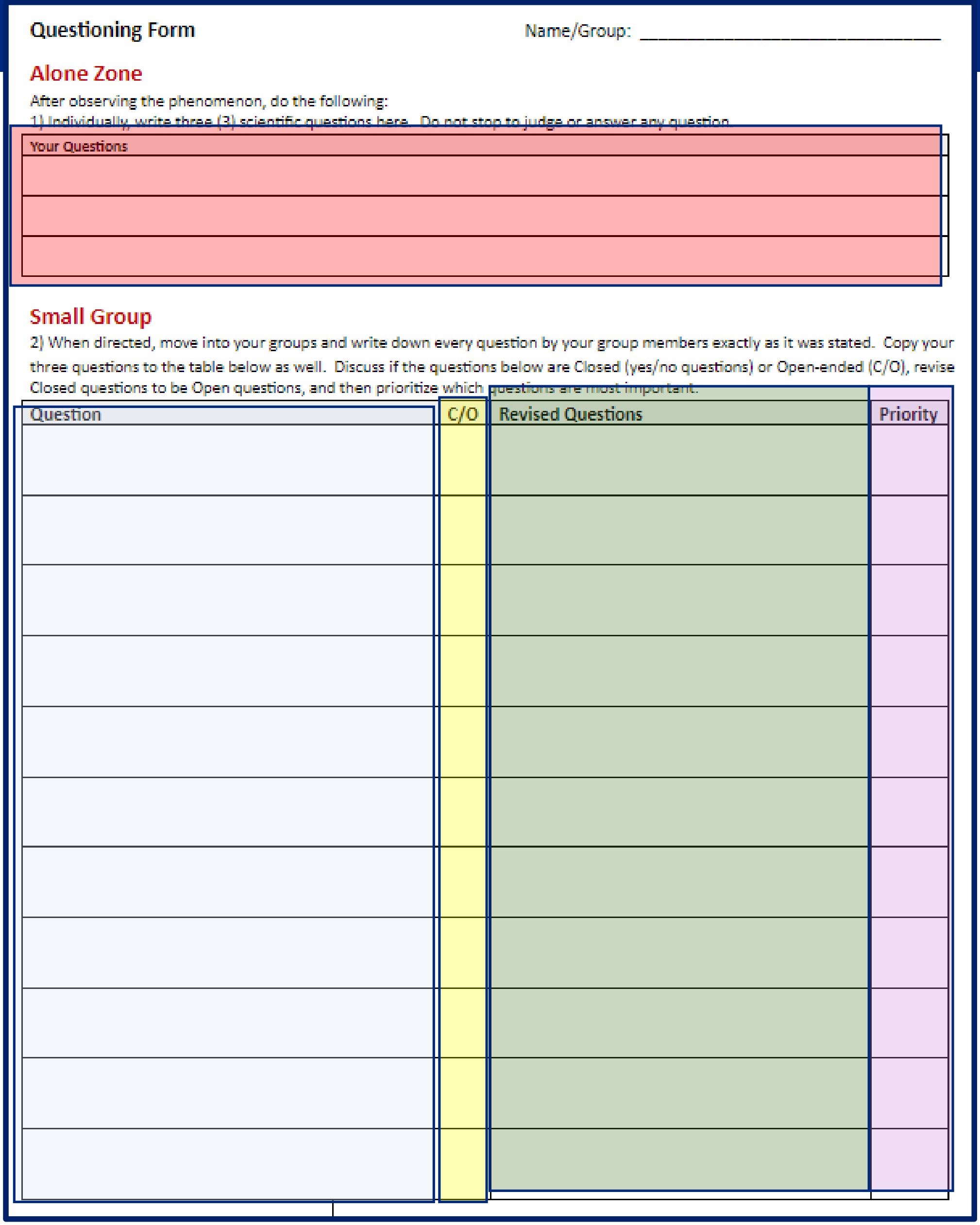
1. Alone zone- write your three questions at the top

2. Small Group Share:
   - Record EVERYONE'S questions
   - Do not stop to discuss, judge, or answer any questions

3. Categorize Questions Open (O) vs Closed (C)

4. Revise Questions: rewrite CLOSED as OPEN

5. Prioritize Questions: rank in order of importance- which ones will help us figure it out?



Questioning Form　　Name/Group: ______________________

**Alone Zone**

After observing the phenomenon, do the following:

1) Individually, write three (3) scientific questions here. Do not stop to judge or answer any question.

| Your Questions |
|---|
| |
| |
| |

**Small Group**

2) When directed, move into your groups and write down every question by your group members exactly as it was stated. Copy your three questions to the table below as well. Discuss if the questions below are Closed (yes/no questions) or Open-ended (C/O), revise Closed questions to be Open questions, and then prioritize which questions are most important.

| Question | C/O | Revised Questions | Priority |
|---|---|---|---|
| | | | |
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**#12 in Dashboard**

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[Questioning Form- Illinois Storylines](#)　　[Adapted from Experiencing the Question Formulation Technique](#)

# Key Features of the Asking Questions Practice

Questioning involves developing and revising explanatory questions about HOW and WHY phenomena happen

Both teachers and students are critical players in asking productive questions

Questioning helps identify what about the phenomena needs to be investigated


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# What Makes a Good Question


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1. **We need to go beyond YES/NO questions**
   - "Do fish breathe underwater?"

     Ask questions that get at explanation and mechanism- **HOW OR WHY**

       - "How do fish get the resources they need to survive?"

2. **We need to do more than accept answers that simply name or categorize the phenomena**
   - Example: DNA, photosynthesis

     We need to go beyond just knowing the name to explaining **HOW and WHY** the phenomena works.

3. **We need to go past questions that simply get at empirical evidence**
   - Example: Mystery substance Chemistry lab using tests to determine what the substance is

     Good questions need to not only demand empirical evidence from an investigation but also require building explanations and models that advance our knowledge and apply to new situations.

# What the Questioning Practice is *NOT*


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- NOT about teachers asking students vocabulary definitions of science terms; it is NOT about asking factual or YES/NO questions
- NOT about students asking the teacher to clarify when they misunderstand ideas or directions
- NOT just the first step in the science unit. It goes beyond only asking, “What do you want to know about X?”
- NOT a form of a trivia game; if students can simply search online for the answer, then it’s not an interesting question for investigation.

# A Sequence to Promote Sensemaking

**Phenomena**

What was the event(s) in the world that happened that we need to explain?

**Question**

What about the phenomena do we need to explain?

**Science & Engineering Practices**

How are we modeling, explaining, etc. the phenomena, or designing a solution to solve the problem?

**New Ideas**

What did we figure out using these practices?

What pieces of the Core Ideas or CCCs did we figure out?

What new ideas do we have?

What questions do I/we have?

# Thank you for sharing this space with us tonight!

## What questions do you have?

**Use a strategy called "stack"- helps build a virtual "line" or stack**


**Review of digital & F2F strategies we used:**

- Chat box
- Waterfall in chat box
- Alone Zone
- Jamboard for collaboration & sharing wonderings/questions
- Strategies for Categories in Jamboard
- Question Chains
- Stack to build a virtual "line"

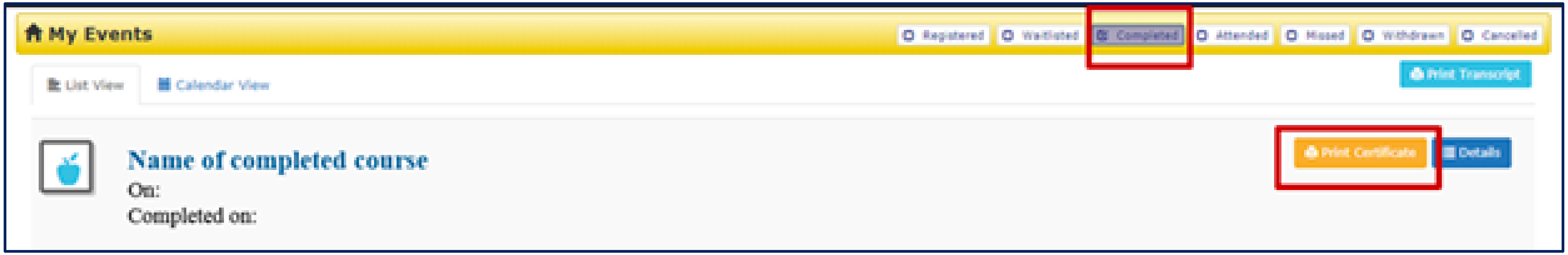
# REMINDER!

## Please review this information!

## Attendance, Resources & PD Clock Hours

- **You must stay on the whole time- 1 hour- to receive credit**

- **<u>YOU</u> print your certificate through ADE Connect- please wait 48 hours of webinar before printing certificates☺**




- **AFTER WEBINAR- Survey & follow-up email from ADE**