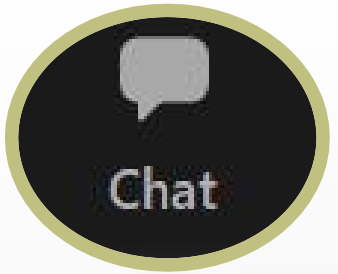
SEP'S, CCC'S, & CORE IDEAS: PUTTING THE 3-DIMENSIONS TOGETHER

March 17, 2021

Who's in the room?

Complete the poll that will be on your screen.

Webinar expectations



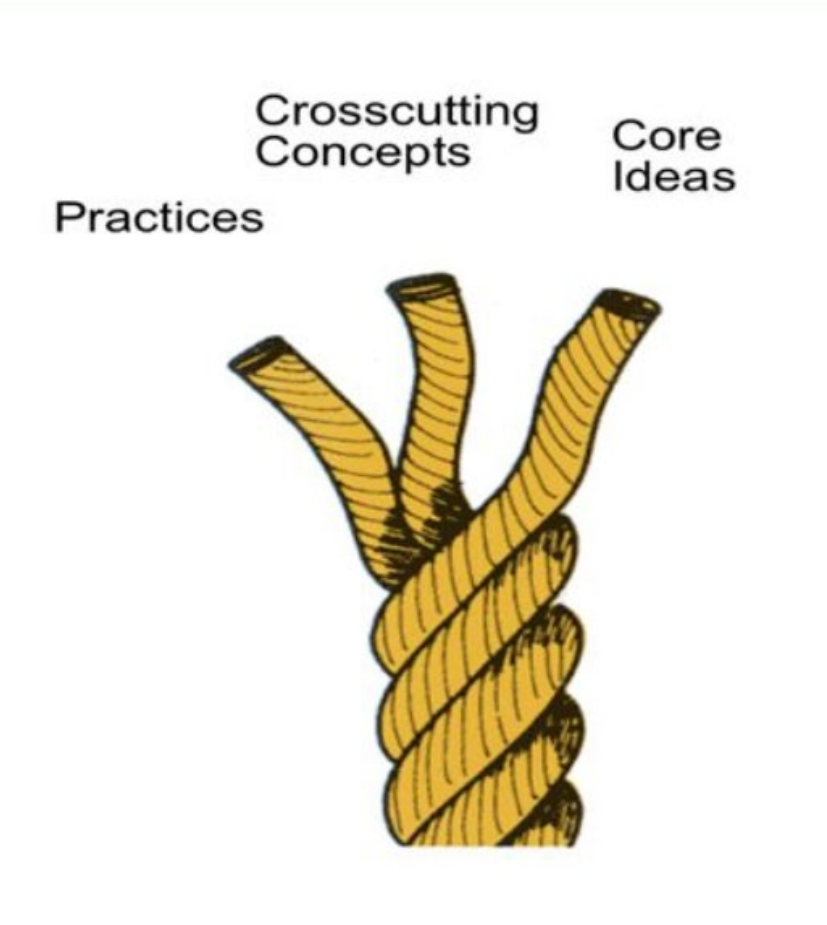
- Microphones are disabled
- Utilize the chat room for discussion/comments
- If you have the materials (70% rubbing alcohol, ice, cup) with you – please rename yourself with Y_name (meaning Yes you have the materials)

Objectives

- Experience a 3-dimensional science lesson
- Describe how the nature of instruction leads to students understanding of the ***how*** and ***why*** of the core ideas.
- Explain how the instructional strategies used in a lesson provided students an opportunity to be engaged in the 3-dimensions.

Norms

- **A**sk questions
- **E**mbrace mistakes
- **I**ntegrate new information
- **O**pen your mind to diverse views
- **U**tilize what you learn



Science and Engineering Practices	Core Ideas	Crosscutting Concepts
The doing of science and engineering	The knowing of significant ideas that are learnable over multiple grades at increasing levels of depth and sophistication	The use of intellectual tools that apply to study of any phenomena

Science Instructional Shifts

SHIFT 1.

Explain phenomena and design solutions to problems

SHIFT 2.

***Doing* science** (three-dimensional learning)

SHIFT 3.

Coherent learning progressions over time

--Taken from NSTA Distance Learning Strategies Engage Virtual Session

P1: All matter in the Universe is made of very small particles.

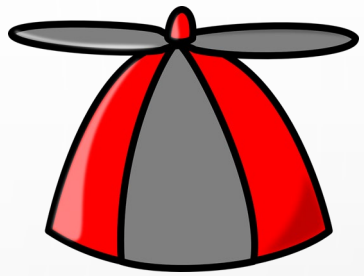
2.P 1U1.1	5 .P 1U1.1 5 .P 1U1.2	6 .P 1U1.3 8 .P 1U1.2	HS.P 1U1.1

E1: The composition of the Earth and its atmosphere and the natural and human processes occurring within them shape the Earth's surface and its climate.

7.E1U1.5 7.E1U1.6 7.E1U2.7 8 .E1U3 .7	HS.E1U1.11 HS E1U1.12 HS.E1U1.13

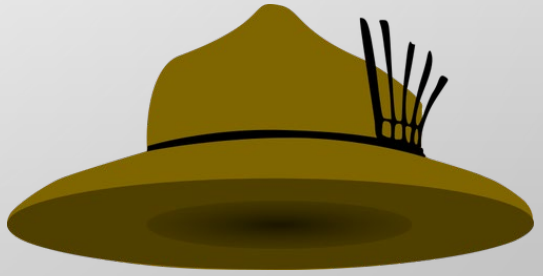
Student Hat/Teacher “Hat

Student Hat: Think like a student.

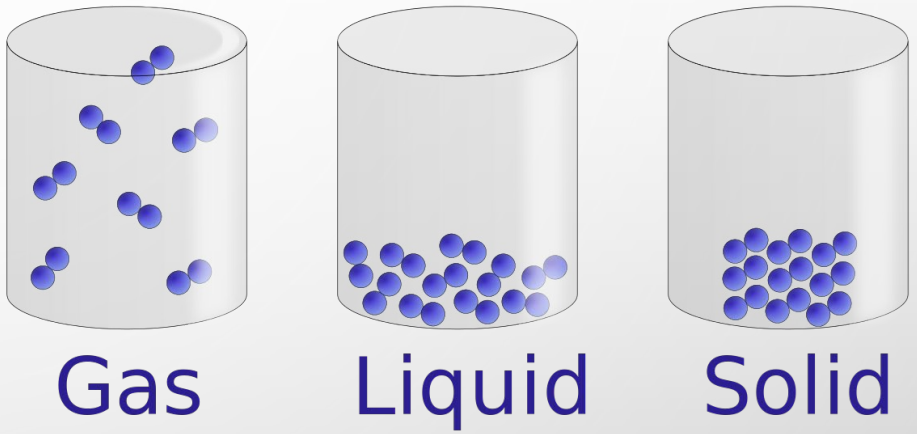


Student/Teacher Hat: Think like a student, but note teacher guidance.

Teacher “Hat”: Reflect on student experience and teacher moves.



Setting the Stage



NOTICE AND WONDER

Alone Zone

Create a See-Think-Wonder table. As you watch the video, record your observations, initial ideas and any questions that arise.

I see	I think	I wonder


H-E-B
Isopropyl
Alcohol 91%
Ice in Alcohol & Water

NOTICING

SMALL GROUP - BREAKOUT ROOMS

- **ROLES**
  - ***Facilitator*** - helps to ensure that the group stays on task, is focused, and that there is room for everyone in the conversation.
  - ***Time keeper*** - takes care of time management; keeps an eye on the clock and keeps the team moving forward
  - ***Reporter*** - presents the group's ideas to the rest of the class.

- **TIME** - 8 minutes
  - Determine roles
  - ***Move 1*** - 4 minutes
  - ***Move 2*** - 4 minutes

NOTICING

Small Group - Breakout Rooms

Move 1. Share your observations with your group:

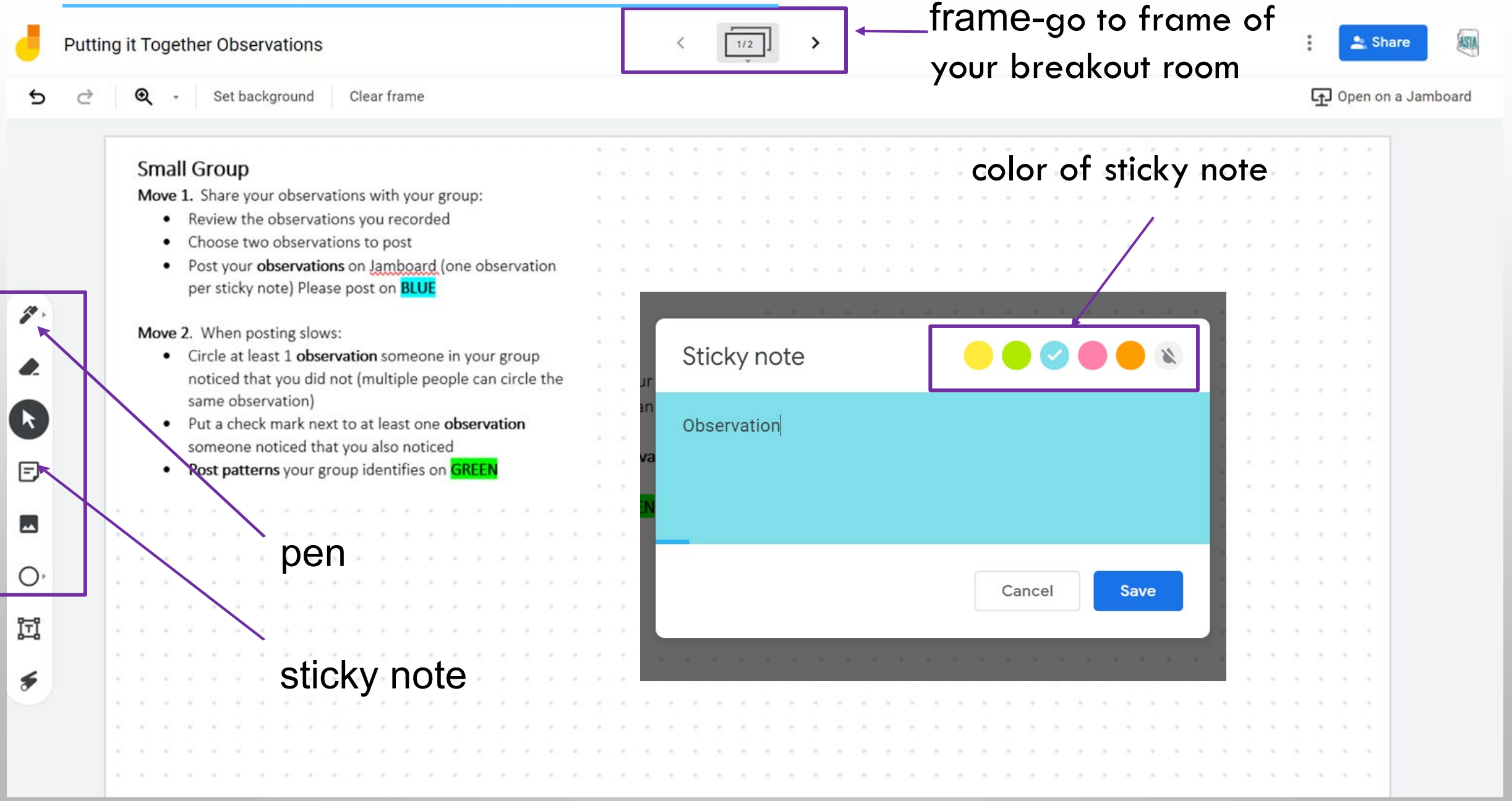
- Review the observations you recorded
- Choose two observations to post (individually)
- Post your **observations** on Jamboard (one observation per sticky note) Please post on **BLUE**

Move 2. When posting slows:

- Circle at least one observation someone in your group noticed that you did not (multiple people can circle the same observation)
- Put a check mark next to at least one observation someone noticed that you also noticed.
- Post **patterns** your group identifies **GREEN**

Jamboard 1-6 and Jamboard 7-12

move from frame to frame-go to frame of your breakout room



BREAKOUT ROOM JAMBOARD SHARE OUT

WONDERING

Whole Group

Share questions with the whole group:

- Review your own observations, your groups' observations, observations of the other groups.
- Review and/or add to the questions you recorded in "I wonder" column of your table.
- **Choose one question to share that answering may help us make sense of the phenomenon**.
- Share your question in the chat window.

CONTINUE TO INVESTIGATE...3 PARTS

PART 1: In breakout rooms use the see-think-wonder table to: (5 minutes)

- Observe the behavior of a system: ice cubes in alcohol
- Describe the observed phenomena and changes in the system over time.
- Formulate questions about the behavior of the system.

LINK TO VIDEO

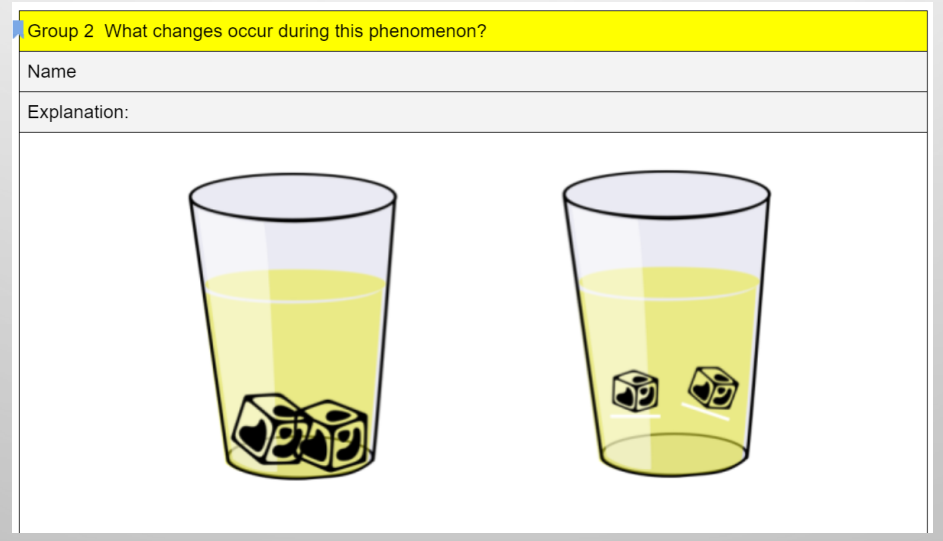
I see	I think	I wonder

CONTINUE TO INVESTIGATE…

PART 2: After 5 minutes of recording observations and discussing the alcohol and ice phenomenon, in your **ALONE ZONE begin completing the models-explanation sheet (8 minutes)**

- Create a model to explain the alcohol and ice phenomenon.
- Create an explanation through words above your image. *Utilize the information in your group heading to assist you in your thinking.*

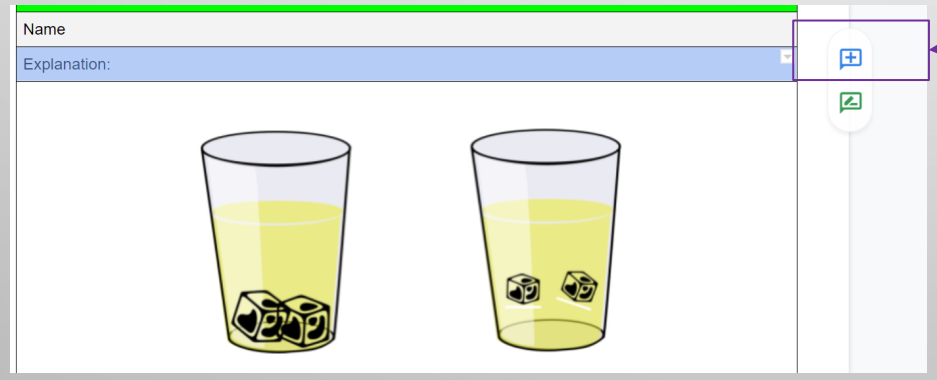
NOTE: Continue to observe your system while you work on your model.



CONTINUE TO INVESTIGATE…

PART 3: After 8 minutes of alone zone, in your small groups add comments to other group member's models focused on the following points: (6 minutes)

- Identify at least one similarity and one difference between your model and another group member's model using the add comment button.
- Ask one clarifying question about a different group member's model using the add comment button.



Add Comment.
Then Save.

SENSEMAKING

Models_Explanations

Alone Zone - 10 minutes

Create a model to explain the alcohol and ice phenomenon. **Create an explanation** through words above your image. *Utilize the information in your group heading to assist you in your thinking.*

Small Group - 10 minutes

- Identify at least one similarity and one difference between your model and another group member's model using the add comment button.
- Ask one clarifying question about a **different** group member's model using the add comment button.

Click on your group number to quickly find your table Group 1 Group 2 Group 3 Group 4 Group 5 Group 6

Group 1 What are the parts of the system? What is not part of the system?
Name
Explanation:

Name
Explanation:

SENSEMAKING

What are the parts of the system?

What is not part of the system?

What changes occur during this phenomenon?

What patterns were observed in the system?

What is causing the pattern(s)?

How would you describe the relationship between the cause and effect?

SENSEMAKING

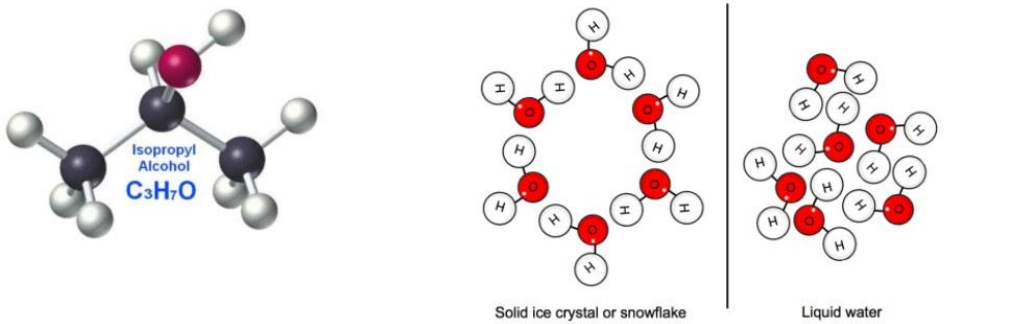
What energy transfer occur?

What part of the system have high energy? Low energy?

What changes might you observe at the particle/atomic level?

WHAT WE FIGURED OUT

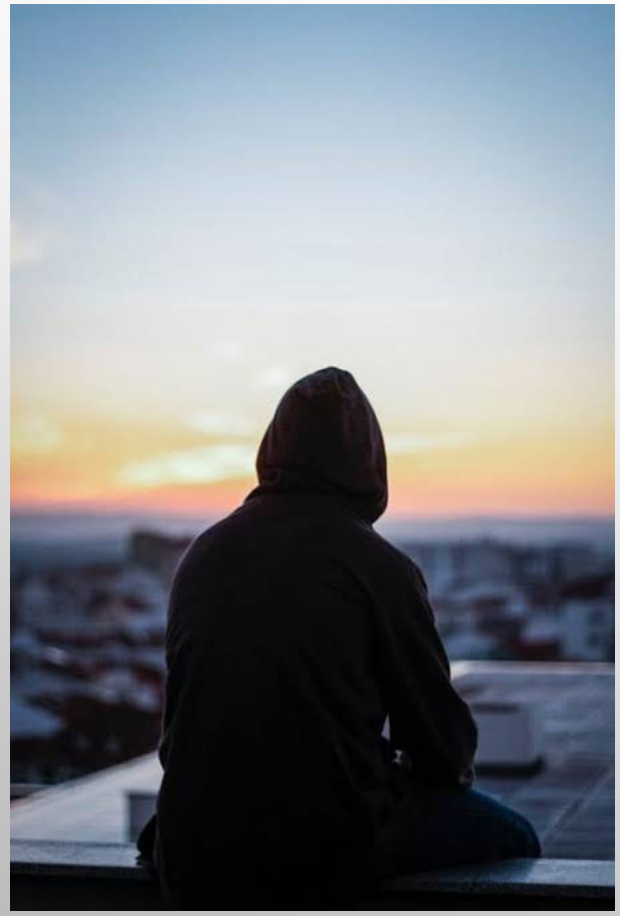
- Ice is more dense than alcohol but less dense than water.



- Energy moves from high to low
  - Thermal energy moved from the alcohol (exothermic) to the ice (endothermic)
  - Condensation occurred - heat being removed from the surrounding air

Cause	Effect

ALONE ZONE



Take a moment to revise your explanation based upon what you know now.

ALONE ZONE - WATERFALL

What sources of evidence did you use to support your explanation?

TEACHER REFLECTION

Based upon your birthday month - reflect on: **How did the approach to sensemaking (nature of instruction) leads students** to:

- …use **crosscutting concepts** to organize their thinking (January - April)
- **…construct an explanation** based on evidence (May - August)
- …the **core idea(s)** that were needed to make sense of the phenomenon (September - December)

TARGETED CORE IDEAS

P1: All matter in the Universe is made of very small particles

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: Scientists explain phenomena using evidence obtained from observations and/or scientific investigations. Evidence may lead to developing models and/or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised.

TARGETED 3-DIMENSIONS

SCIENCE & ENGINEERING PRACTICES

Asking questions

Developing & using models

Constructing explanations

CROSSCUTTING CONCEPTS

Patterns

Cause & effect

Energy & matter

Systems & system models

WHAT QUESTIONS DO YOU HAVE?

Academic Standards

Learning begins at birth and continues throughout every stage of life. The Academic Standards team oversees the standards for learning for children and students in Arizona from birth to high school graduation. The Academic Standards team leads standards work across the state by writing, revising, and implementing the standards with different stakeholders. This team provides professional learning opportunities, resources, guidance, and technical assistance to build educator and caregiver capacity in best practices across the birth through twelfth grade continuum. The Academic Standards team leads state-level work related to early childhood, literacy, computer science, educational technology, English Language Arts, history and social sciences, math, science, and world and native languages.

Standards & Competencies

- Computer Science
- Educational Technology
- English Language Arts
- Mathematics

Standards & Competencies

- Arts Education Standards
- Health Education Standards
- Other Standards
- Physical Education Standards
- Science Standards

Early Childhood

- Family Engagement
- Headstart
- Professional Development
- Publications
- Resources

RESOURCES | PROFESSIONAL DEVELOPMENT

NEW STANDARDS (2018) *(Adopted October 2018)* Complete Standards document | PDF

- Grades Kindergarten - Highschool

NEW STANDARDS SUPPORT MATERIALS

- Planning Tools *NEW
- Administrator Tool Kit *NEW
- Vertical Progressions
- Distribution of Core Ideas
- Timeline and Resources

PROFESSIONAL DEVELOPMENT

- Professional Development
- Recorded Webinars
- Science Standards Videos

Contact

Academic Standards Front Desk
(602) 364-2333
acadstandards@azed.gov

Grades Kindergarten - Highschool

NEW STANDARDS SUPPORT MATERIALS

Planning Tools *NEW

Administrator Tool Kit *NEW

Vertical Progressions

Arizona State Science Standards

- Vertical Progression of Knowing Science
- ***Accessibility Versions*** Vertical Progression of Knowing Science
- Vertical Progression of Crosscutting Concepts
- Vertical Progression of Science and Engineering Practices

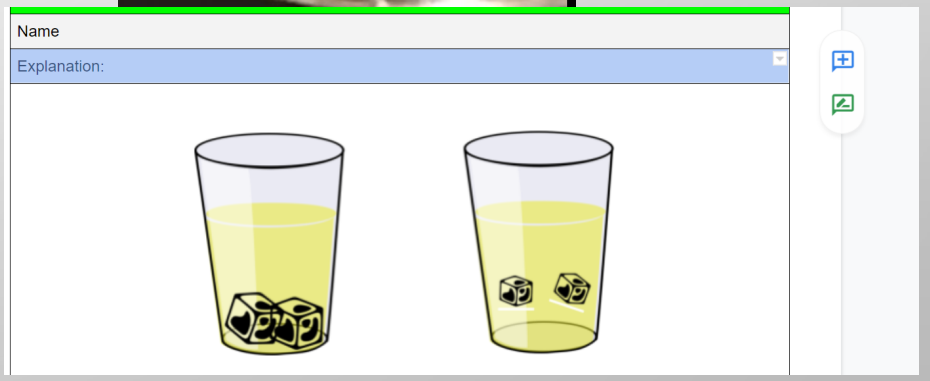
Distribution of Core Ideas

KEY TAKEAWAYS

I see	I think	I wonder

Students should routinely be engaged in interest-driven, sustained investigations of phenomena in which **they engage** in the **practices of science and engineering** to learn and apply **core ideas** and connect to **cross-cutting concepts.**

--STEM Teaching Tool #21

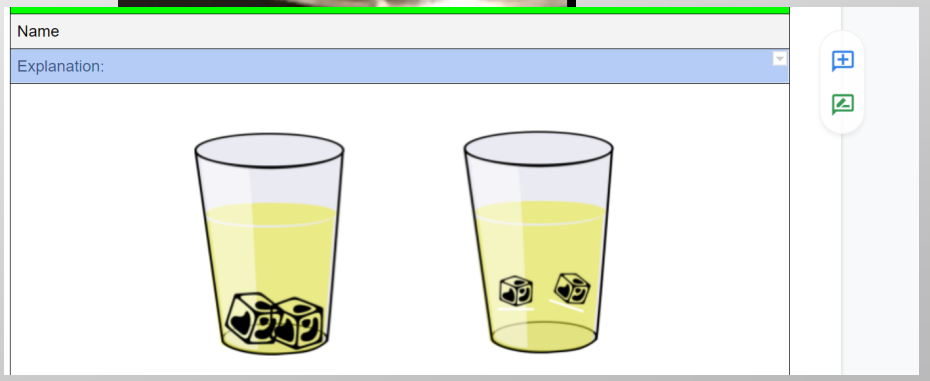


KEY TAKEAWAYS

I see	I think	I wonder

No single lesson or unit should be considered as the sufficient end of teaching a particular standard; the building of ideas toward a standard should occur continuously across time.

--pg. 280 Disciplinary Core Ideas: Reshaping Teaching & Learning

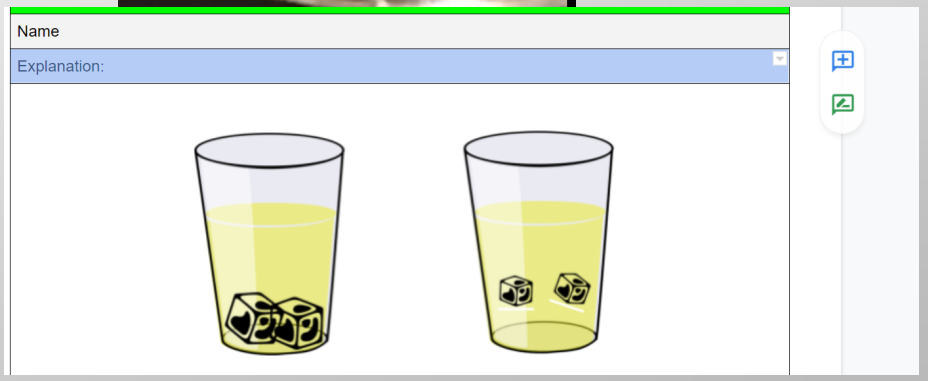


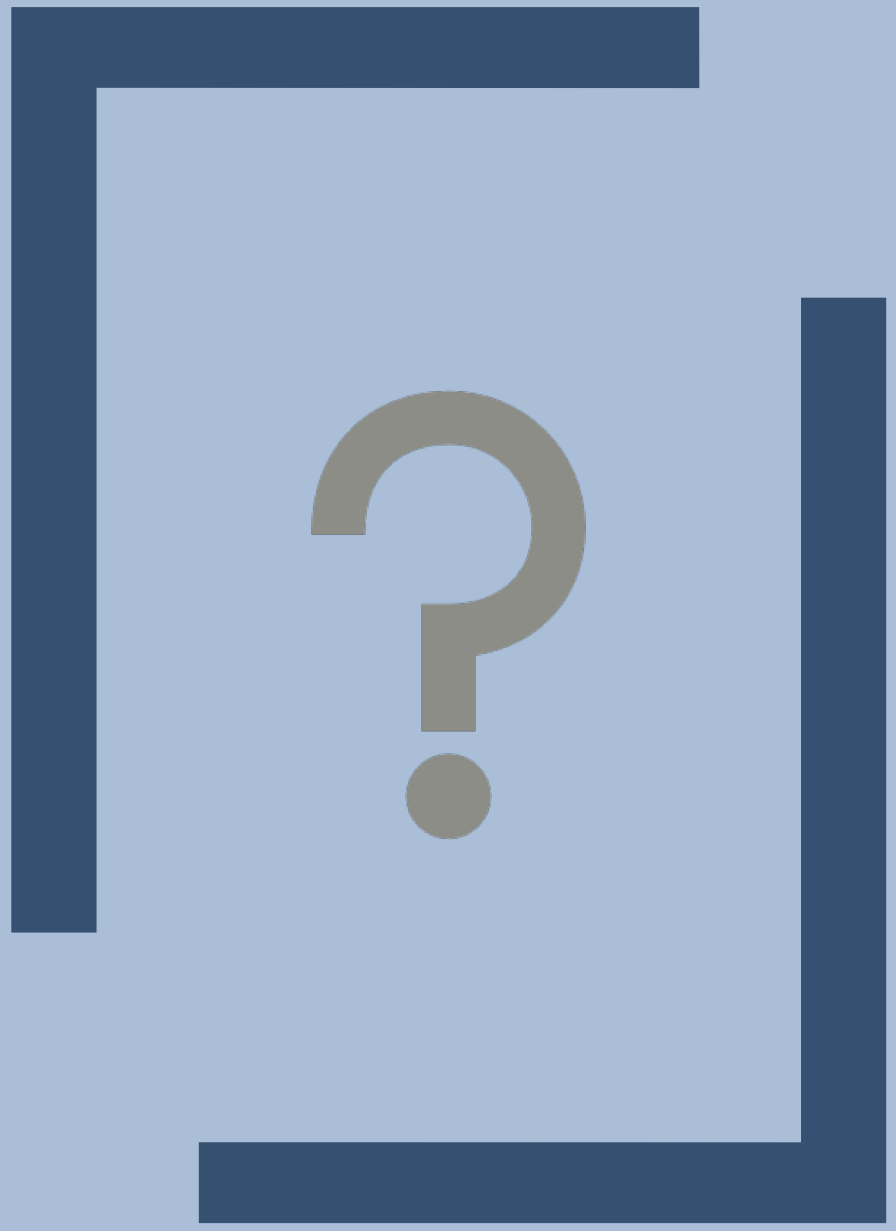
KEY TAKEAWAYS

I see	I think	I wonder

All students are engaged in an enjoyable science learning experiences.

--pg. 1 A Vision & Plan for Science Teaching & Learning by Moulding, Bybee, & Paulson





WHAT QUESTIONS DO YOU HAVE?

THANK YOU!

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