Alaska Science Standards K-2 Overview

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Alaska Department of Education & Early Development
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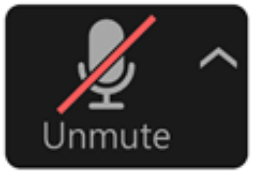
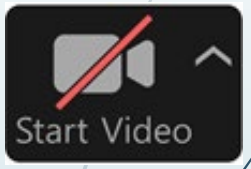
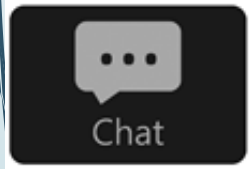
Zoom Tips



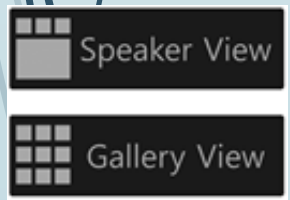
Everyone in the meeting is muted. Please remain muted unless you are in a breakout session or asked to share out.



Presenters love seeing their audience, so if you're comfortable, turn your camera on so they can see you nodding in understanding and encouragement. If you want to make sure to look your best, face a window or light source.



The chat box is a good place to engage with other participants and ask questions. Selecting this icon will open the chat window.



Speaker/Gallery View

Speaker view shows the active speaker. Gallery shows all participants. Make sure to take the time to find that button (at the top right corner of your screen) so you can switch between the views.

Meet Your Presenters

Melissa Linton is the Curriculum Coordinator for the Kenai Peninsula School District and has lived in Alaska for over 15 years. She coaches and facilitates curriculum design and professional development in all subjects areas for Kenai and has a passion for designing curriculum that is engaging for students and teachers.

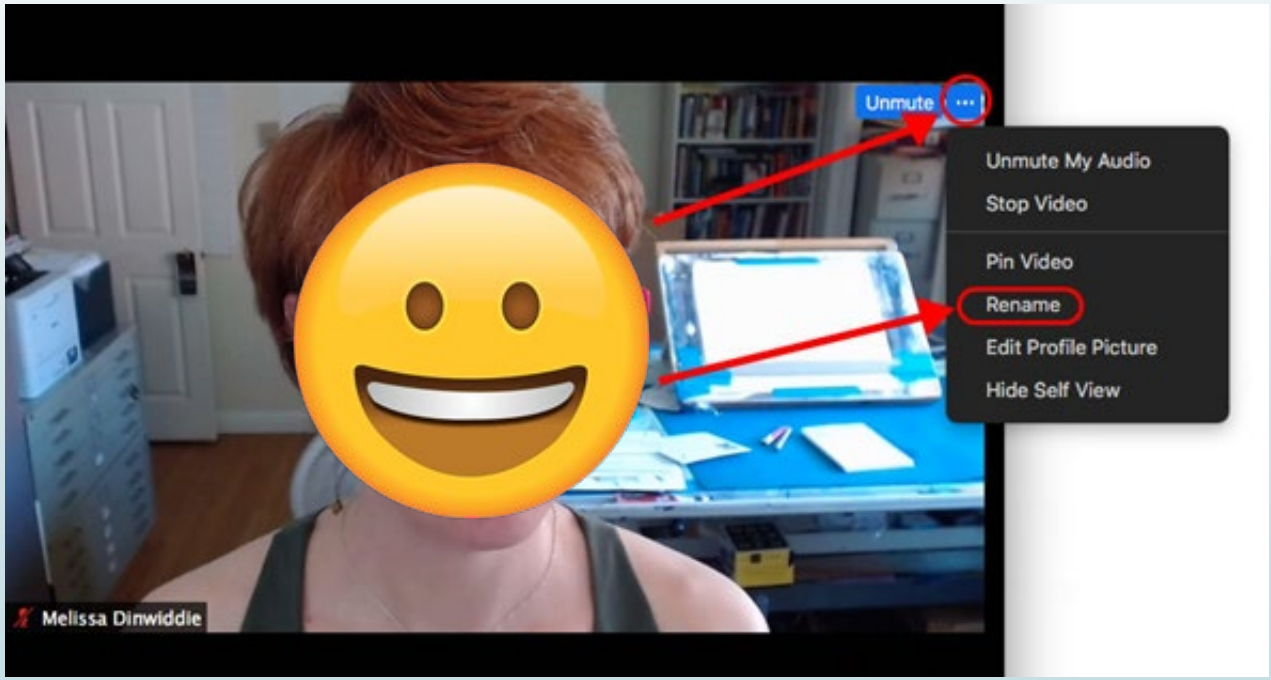
Kaz Storm is a 6th year teacher in Fairbanks. Started in middle school science and moved into a 1st/2nd grade loop with a science focus.

Cheryl Cooper is a retired teacher who taught grades K-6 for 23 years and has lived in Delta Jct since 1978. Has worked with teachers in AK and the Lower 48 providing professional development and workshops in science and math for 35 years. Currently involved with the Educators Rising program that encourages students to become teachers

Welcome Survey

Break the Ice

Rename yourself with a favorite location in Alaska.



Learning Outcomes

Identify components of the Science Standards for Alaska.

Explain the language shift between Grade Level Expectations and the new Science Standards

Revise an existing science lesson to align with the Science Standards for Alaska

Locate resources for further development

Community Agreements

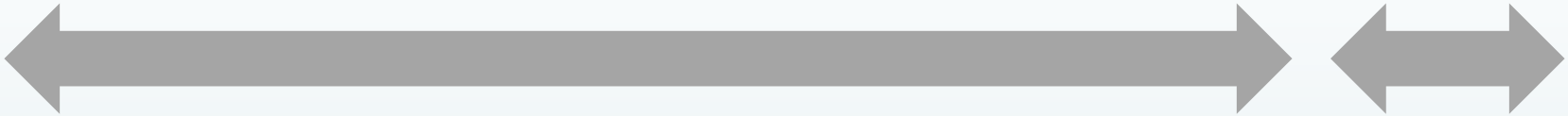
Be Present and Engaged

Share Your Reality

Seek to Understand

Lower the Stakes

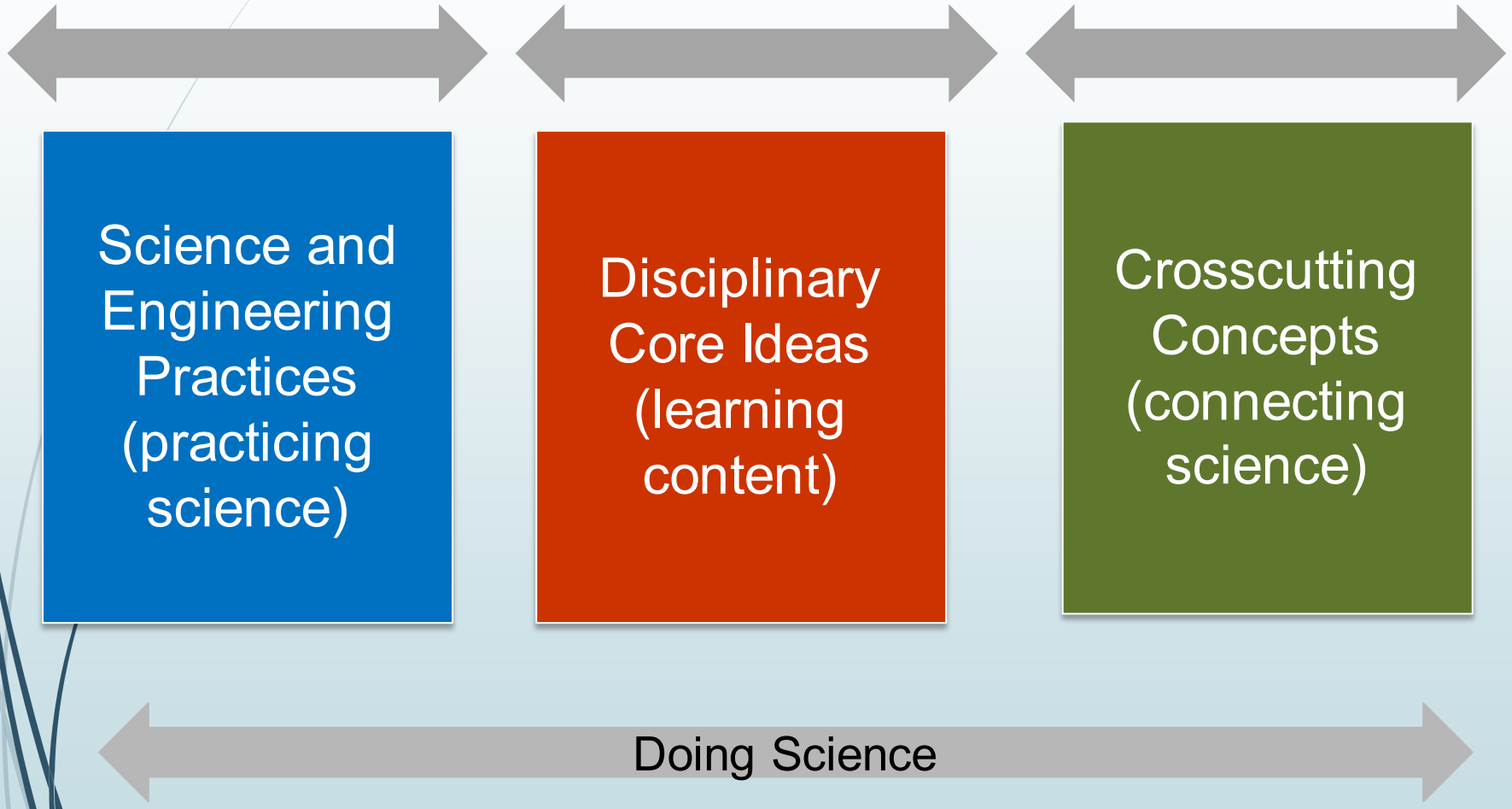
Science GLEs vs in Alaska



Facts about Science

Doing Science

Science Standards for Alaska



Understanding the Science Standards is a piece of cake!

Baking Tools & Techniques

Science & Engineering Practices

Cake

Disciplinary Core Ideas

Frosting

Crosscutting Concepts

Science & Engineering Practices

- Asking questions (science) and defining problems (engineering)
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics and computations thinking
- Developing explanations (science) and designing solutions (engineering)
- Engaging in argument
- Obtaining, evaluating, and communicating information

Disciplinary Core Ideas

LS: Life Science

LS1: From Molecules to Organisms: Structures and Processes
LS2: Ecosystems: Interactions, Energy, and Dynamics
LS3: Heredity: Inheritance and Variation of Traits
LS4: Biological Evolution: Unity and Diversity

PS: Physical Science

PS1: Matter and Its Interactions
PS2: Motion and Stability: Forces and Interactions
PS3: Energy
PS4: Waves and Their Applications in Technologies for Information Transfer

ESS: Earth and Space Science

ESS1: Earth's Place in the Universe
ESS2: Earth's Systems
ESS3: Earth and Human Activity

ETS: Engineering, Technology, and the Application of Science

ETS1: Engineering Design

Crosscutting Concepts

- Patterns
- Cause and effect: mechanism and explanation
- Scale, proportion, and quantity
- Systems and system models
- Energy and matter: flows, cycles, and conservation
- Structure and function
- Stability and change

The 3 Dimensions of the Science Standards

Disciplinary Core Ideas (facts)

Science & Engineering Practices (doing science)

Crosscutting Concepts (connecting science)

Student Performance Expectation (PE)

Phenomena

What is a phenomenon?

Where can we find phenomenon?

Phenomena! Let's Investigate!

Phenomena are events in nature!

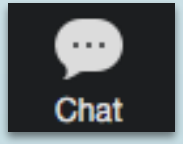
… That scientists

… and students

Investigate and then try to explain

Let’s Explore

In the chat, tell us a phenomena you would recommend!



Your turn!

LOOK AROUND!

- Take a photo/video of a phenomenon near you

OR

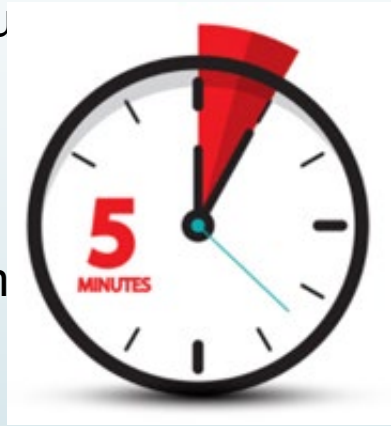
find a locally relevant photo/video online.

- Make a post in the Padlet (photo, video, comm

- Check out the other ideas in the Padlet.

- A link to a library of phenomena will be posted t

browsing as well.



Language Shifts

From learning outcomes to performance expectations

"Students develop an understanding that…"

vs.

"Students who demonstrate understanding can…"

SC3 Students develop an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy.

Building a Lesson with SSAs

1-PS4-3

Students who demonstrate understanding can: Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.

Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).

Assessment Boundary: Assessment does not include the speed of light.

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education.*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and Carrying Out Investigations • Plan and conduct investigations collaboratively to produce evidence to answer a question.	**PS4.B: Electromagnetic Radiation** • Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. (Boundary: The idea that light travels from place to place is developed through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.)	**Cause and Effect** • Simple tests can be designed to gather evidence to support or refute student ideas about causes.

Performance Expectations:

Design a product that can block light from a person's eyes without completely blocking our ability to see.

Learning Objectives:

- define 'light'
- outline some of the characteristics of light
- describe the relationship between color and light
- share facts about light

Materials Needed

- Flashlight (one per student if possible)
- An assortment of "found materials"
  - Cardboard
  - Tissue paper
  - Ziploc baggies
  - Cellophane of different colors
  - Etc.
- Glue and/or tape
- String
- f

Safety Precautions

Discuss scissor safety.
Discuss paper handling safety.
Discuss safe use of plastic near the face.
Students should stay still in the room while lights are off all of the way.

Introduction AND/OR Phenomena

Warn students that the lights will go off and a bright light will be shined. After blocking all light in the room, have students observe the room in the dark. Then, shine a light from a lamp or flashlight in such a way as to cast a shadow from students. Have students describe what is happening, what they see, and what is bothersome to them with the light on and then with it off again. What do they notice is present in the light that is not present in the dark? (Shadows) What can they do to block the light from bothering their eyes? (Ex: Raise a hand or look away.)

Main Lesson

Students will investigate provided materials to see what objects light will pass through and what objects will cast a shadow. Once students have sorted materials by their interaction with light, define "transparent," "translucent," and "opaque" together. Students will revisit their piles and re-sort with their new understanding. Facilitate discussion about how cause (light shines on an object) and effect (shadow is cast) guided our testing of different objects.

Conclusion

CHALLENGE: Students will make an object that can act as a light shield for our eyes using their sorted materials. Students will create a trifold brochure advertising their product and how it solves the problem.

Formative Assessment

Discussion throughout lesson.
Written observations during investigation.

Summative Assessment/Performance Task

Brochure advertising student invention.

Cultural Connection/Place Based Connection

https://vilda.alaska.edu/digital/collection/cdmg3/search/searchterm/snow%20goggles

Students will explore these artifacts and their characteristics, comparing them to their own inventions. *Use this archive to launch into the next topic dealing with how light travels through various sized openings.

Differentiation Notes

Possible Points of Confusion

Mixing up of terms translucent and transparent.
Holding objects properly to check for shadows cast.

Breakout Rooms

A copy of the lesson plan will be shared in the chat.

Read the lesson plan and help each other identify a piece of the SSA in the plan.

What are some ways this lesson plan can be improved upon to align more tightly to the SSA?

Making this Work Actionable

NARROWING

Choose 1 focus area to build or enhance for this session

BRAINSTORMING

Connect to what you have done in the past/ are already doing

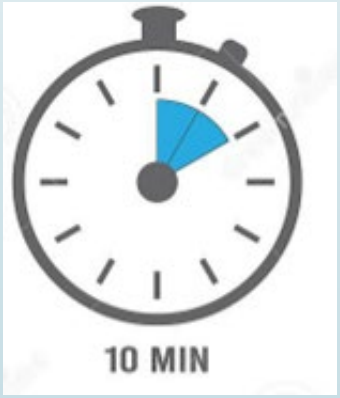
STUDENT

Think about your students' experience

Your Turn

Share a favorite science lesson that you want to align more closely with the SSAs.

Work together to find ONE change you can make to improve the lesson.



Something you can use

If you are comfortable, share your adapted plan or general idea for a lesson to this padlet to share with your peers.

Exit Survey

Contact

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NSTA and DEED and NGSS lesson plan resources

Lesson Plan Template (Make a copy to your own Google Drive):
https://drive.google.com/file/d/16BObM62eGWL3SwmLGVGflraPg7gv5qco/view?usp=sharing

Assorted Lesson Plans from this work session/
https://padlet.com/kazstorm/scienceplans

Science Standards for Alaska and More to Know:
https://education.alaska.gov/standards/science

GLEs to SSAs crosswalk:
https://education.alaska.gov/akstandards/science/GLE_crosswalk.docx

SSAs to ELA and Math connections:
https://education.alaska.gov/akstandards/science/Science%20Standards%20for%20Alaska%20(SSA)%20to%20Alaska%20ELA%20Math%20Standards%20Connections.pdf

NSTA Daily-Do Lesson Plans:
https://www.nsta.org/resources/daily-do

NGSS Lesson Exemplars: https://www.nextgenscience.org/resources/examples-quality-ngss-design

Additional Resources

NGSS Phenomena Library

https://www.ngssphenomena.com/searchable-phenomena

The Wonder of Science Phenomena Library

https://thewonderofscience.com/phenomenal

NGSS Phenomena Overview

https://www.nextgenscience.org/resources/phenomena

Assorted Phenomena Padlet
https://padlet.com/kazstorm/assortedphenomena

Ted Willard's Got Talent - NSTA

https://www.youtube.com/watch?v=aaDa6G4K4rU

Teacher Primer for the Science Standards for Alaska

https://drive.google.com/file/d/17IoR_RUP1DDreQ-9ITSzmz5Cb5R0fZQR/view?usp=sharing

More Additional Resources

NGSS Hub
Click on The Standards which will show the standards for grade strands. When you click on a standard there will be resources/lessons plans and/or activities listed to use with each standard

https://ngss.nsta.org/

STEM Teaching Tool #9 is "How should districts and schools focus professional development when starting to implement NGSS?"

http://stemteachingtools.org/brief/9

STEM Teaching Tool #13 is "Professional Development that supports teacher learning about the new vision for science education."

http://stemteachingtools.org/brief/13

STEM Teaching Tool #14 is "Next Generation Science Standards: What's different, and do they matter?"

http://stemteachingtools.org/brief/14

STEM Teaching Tool #21 is "What school building administrators should know about the new vision for K-12 Science Education."

http://stemteachingtools.org/brief/21

Open Q&A

Use the raise hand feature in Zoom to indicate you have a question.