

Ice, Ice, Baby

What can we learn from Ice?

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Quick Background about me

- ❖ Triple Knight (BS, MS, EdD)
- ❖ 10 years teaching Middle School science
- ❖ 4+ years Space Lab teacher at a Magnet Elementary school
- ❖ 9 years as the District Science Specialist for Seminole County
- ❖ <1 yr as a Post Doctoral Scholar working with ESE and STEM

DebriefScape Project

DEBRIEFSCAPE



SUITE

Why Ice?

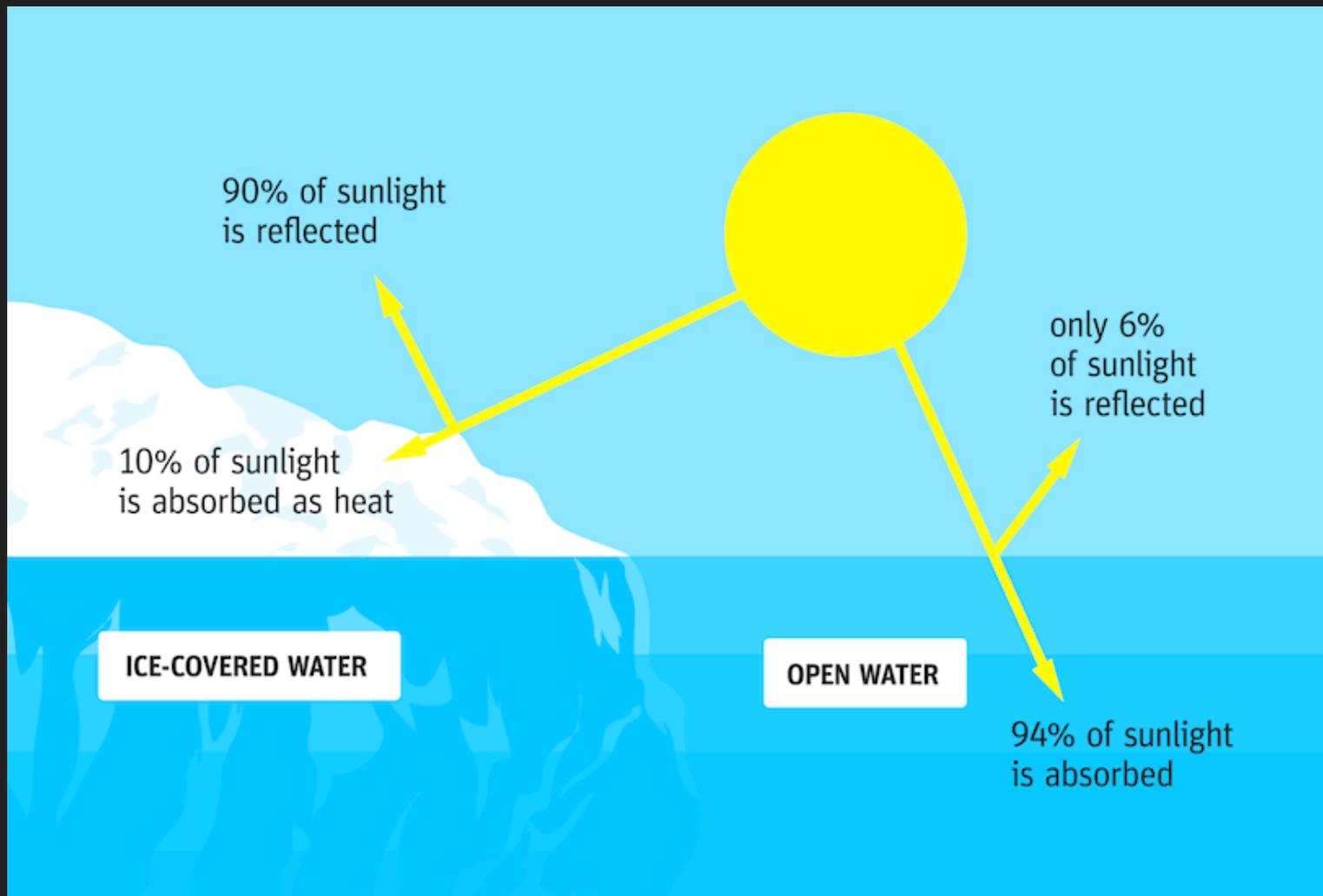
- ❖ There are 31 standards, K-12, that involve water
- ❖ Ice appears explicitly in many of these
 - 2nd grade - states of water
 - 3rd grade - changes to water
 - 4th grade - weathering and erosion
 - 6th grade - cryosphere
- ❖ *SC.912.L.18.12 Special properties of water* is part of the curriculum for 37 different HS science courses including Biology, Chemistry, and Physics!

Even in the NGSS

HS-ESS2-2. Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. [Clarification Statement: Examples should include climate feedbacks, such as how an increase in greenhouse gases causes a rise in global temperatures that melts glacial ice, which reduces the amount of sunlight reflected from Earth's surface, increasing surface temperatures and further reducing the amount of ice.]

Background Info

Setting the icy stage



Where Is Most of the Fresh Water?



Three friends were talking about fresh water. They each had a different idea about where most of Earth's fresh water is found. This is what they said:

Sephali: I think most of Earth's fresh water is found in snow, ice caps, glaciers, and under the ground.

Mary: I think most of Earth's fresh water is found in lakes, rivers, streams, and swamps.

Pearl: I think most of Earth's fresh water is found in the ocean, seas, and bays.

Who do you agree with the most? _____ Explain your thinking.



Sample Lesson #1

High School+

Ice Cores

Why let a good thing go to waste?

Dr Mabry Gaboardi Calhoun
Geologist Extraordinaire

Rachel and Jasmine
MS Science Teachers



Panhandle and Central
Florida Teachers



Earth Science



Environmental Science for
Educators

Ice Core Basics



Your Task

- ❖ Each group has 4 ice cores taken from different depths
- ❖ Analyze the “bubbles” (beads) trapped in your cores
- ❖ Use the table provided to determine what time period your core came from
- ❖ As a group, develop one claim supported by evidence from your cores
Ex. As Ice thickness increases.....

A large number of glowing blue jellyfish are swimming in a dark tank. The jellyfish are illuminated from below, creating a vibrant blue glow. The time 20:00 is overlaid in white, and a white horizontal line is visible at the bottom center of the frame.

20:00

What could we do with this?

- ❖ SC.912.N.1.6 Inferences based on observations
- ❖ SC.912.N.4.1 Science can inform society
- ❖ SC.912.E.6.6 Consequences of energy production
- ❖ SC.912.E.7.3 Interactions between spheres
- ❖ LAFS.WHST.1.1 Write arguments based on domain-specific content
- ❖ SS.912.W.1.1 Use timelines to establish C-E relationships of historical events
- ❖ SS.912.G.5.6 Predict how environmental factors affect ecosystems
- ❖ MAFS.912.S-ID.1.1 Represent data on a number line
- ❖ MAFS.K12.MP.2.1 Reason abstractly and quantitatively

Sample Lesson #2
Elementary+
Martian Ice Samples

Speaking of Waste: Recycling Water in Space



Overview of the rest of the Lesson

- ❖ Kids learn about water on Mars (lots of it, but it's frozen)
- ❖ They get a sample of “Martian ice”
- ❖ Given materials, have to work together to make their plan to clean it
- ❖ Final day, they assess their success



What did we cover?

- ❖ SC.3.N.1.2 Compare observations made by different groups using the same tools
- ❖ SC.3.N.1.1 Investigate through systematic investigations
- ❖ SC.3.N.1.3 Keeps records of investigations
- ❖ SC.3.P.8.3 Compare materials according to properties
- ❖ SC.3.P.9.1 Describe the changes in state of water
- ❖ LAFS.3.W.3.8 Gather info from digital sources
- ❖ LAFS.3.W.1.1 Write opinion pieces supported with reasons

Key Takeaways

- Water (and by extension, ice) is critical to all life on Earth
- Changes in temperature on Earth affect ice (and vice versa)
- Studying ice from the past (and present) can help us learn more about water in our future

Questions?

Thank you!