Hands-on

STAR★net

Tested & Approved STEM Activities

ICE-Y EXPERIENCES

Activity Guide

STAR★net

Science-Technology Activities & Resources For Libraries

A product of the Science-Technology Activities and Resources for Libraries (*STAR_Net*) program.
Visit our website at www.starnetlibraries.org for more information on our educational programs.
Developed by the Lunar and Planetary Institute/Universities Space Research Association
August 2014

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ICE-Y EXPERIENCES

Overview

Children play “Ice Bingo” using cards that contain squares with different types of ice experiences — like getting their tongues stuck on ice! — interspersed with ice facts and information about ice on Earth. Children have 5 minutes to find as many participants as they can who have had experiences described on the card.

Type of Program

☑Facilitated hands-on experience
☐Station, presented in combination with related activities
☐Passive program
☐Demonstration by facilitator

Activity Time

15 minutes

Intended Audience

Families or other mixed-age groups, *with modifications for younger children*
School-aged children ages 5-7, *with modifications*
School-aged children ages 8-9
Tweens up to about age 13

What’s the Point?

- Although we do not often think about it, ice plays a role in all of our lives.
- Some areas on Earth have ice all of the time; some areas sometimes have ice; and other areas almost never have ice outside.

Facility Needs

- ☐ An area large enough for the children to be able to comfortably mingle
- ☐ (If clipboards or tables are available for the children to use to write on, it is not necessary to print the *Ice Bingo* cards on heavy paper or cardstock.)

Materials

For the Facilitator

- ☐ 1 ruler
- ☐ *Brief Facilitation Outline* (below)

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For Each Group of 15 Children

- ☐ Optional: 1-2 Earth globes
- ☐ *Ice Bingo* card, printed on heavy paper or cardstock and preferably in color
- ☐ 1 pen or pencil

Supporting Media

Consider setting up a digital media player (such as a computer), speakers, and access to the Internet to display websites or multimedia before, during, or after the activity.

Books

The Story of Snow: The Science of Winter's Wonder

Mark Cassino, Jon Nelson, and Nora Aoyagi, Chronicle Books, 2009, ISBN-13: 9780811868662
Children will enjoy this exploration of snowflakes and how they are formed…before heading outside to catch and photograph snowflakes for themselves! Appropriate for ages 3 and up.

Weather: Whipping up a storm!

Simon Basher and Dan Green, Kingfisher Publications, 2012, ISBN: 9780753468258
This fun book, filled with cartoon personifications of science concepts, is kid-friendly and easy to understand. Children ages 8-12 will encounter entertaining definitions of seasons, hail, sleet, snow, and other weather terms.

Videos

What's So Cool About Frozen Water?

http://www.sciencefriday.com/video/01/27/2012/what-s-so-cool-about-frozen-water.html
NPR's *Science Friday* provides perspectives on ice from scientist Erland Schulson, head of the Ice Research Lab at Dartmouth College, and artist Shintaro Okamoto, founder of Okamoto Studio in Queens, New York. Appropriate for all ages (some of the science content is best suited for teens and adults).

Websites

National Geographic Education

http://education.nationalgeographic.com
There are multiple National Geographic resources relating to ice and where it's found on Earth — and in the solar system. For instance, there are encyclopedia entries, with links to multimedia, text, and activities for "ice caps," "glaciers," and "water cycle."

Interactives

Make-a-Flake

http://snowflakes.barkleyus.com/
"Cut" your own snowflake with this interactive. Download images from the gallery as JPEG or EPS files. Appropriate for ages 5 and up.

Visualizations

Snow Crystals

http://www.its.caltech.edu/~atomic/snowcrystals/

Explore images of snowflakes taken under a microscope. Appropriate for all ages; adults may enjoy "No Two Alike?"

Preparation

Six months before the activity

- Prepare and distribute publicity materials for programs based on this activity. If possible, build on the children's knowledge by offering multiple science, technology, engineering, art, and mathematics (STEAM) programs. See the STAR_Net resources listed at http://community.starnetlibraries.org/resources for ideas.
- Plan to adapt the activity based on the children's ages. Advertise the program separately to ages 5 to 7 (and their families) and to ages 8-9 and 10-13, and keep the ages separate. Or, if mixed ages will attend the program, separate into two groups guided by separate facilitators.

The day before the activity

- Prepare an area large enough for the children to be able to comfortably mingle.
- Make enough copies of *Ice Bingo* cards for each child (ages 8 and up) to have one.

Activity

1. Share ideas and knowledge.

- Introduce yourself and the library. Help the children learn each other's names (if they don't already).
- Frame the activity with the main message: Ice plays a role in all of our lives.
- Invite the children to discuss:
  - Where they find ice in their daily lives; and
  - Where ice is found on Earth's surface and in the air.

Use discussion to help children start to think about their prior experiences with ice. The children may note that we use ice cubes and visit skating rinks. They may recognize that ice is found in glaciers, ice caps, and sea ice. Weather — depending on the location — brings snow and hail, and ice on streets, sidewalks, and hanging from buildings in the winter.

2. Play bingo — with a science twist! Hand out *Ice Bingo* cards and pens or pencils and explain that the white colored squares represent experiences with ice that some of them here may have had. Have the children follow these steps:

a. Find someone who has had one of the experiences described in the white squares.

b. Have him or her initial that square.

c. Get as many white squares initialed as possible in five minutes.

Modify the game to be more active for children ages 5 to 7. Explain that the children are to form two even lines — "walls of ice" — (of about the same lengths) and run to the opposite line every time they hear something that is true about themselves. Read each of the personal statements listed below; interject facts and jokes to add interest. The children learn who else has had similar experiences with ice by seeing who runs at the same time as they do.

Personal statements

- I have heard an ice cube crackle and pop!
- I have slipped on ice.
- I have been ice skating.
- I save energy (e.g. turn off the lights when I'm not using them) and help the polar bears.
- I have added ice cubes to water and seen the ice float
- I have made a snowperson.
- I have been ice fishing.
- I have seen icicles hanging from a roof or tree.
- I have gotten my tongue stuck on ice.
- I have been snow skiing.
- I have had a snowball fight!
- I have seen wispy clouds high up in the sky, which are made of tiny ice crystals.

Facts

- In the U.S., many major weather patterns start out in the Arctic.
- Melting and freezing ice at Earth's poles helps make our ocean currents flow.
- There is less sea ice in the north polar region than there was 40 years ago.
- Glaciers are found on mountains on all continents, except in Australia.
- Antarctic ice is almost three miles thick in some places!

Jokes

- What happens to ice when it hears a funny joke? *It cracks up!*[1]
- If you live in an igloo, what's the worst thing about global warming? *No privacy!*[2]
- What do you call fifty penguins in the Arctic? *Lost! REALLY lost!* (Penguins live in Antarctica.)[2]

[1]Submitted by Eliza, age 8, to www.jokesbykids.com
[2]http://athropolis.com

3. **Have a brief discussion to connect the game to the significance of ice in our lives.** Consider how many squares the children were able get initials for — chances are that the farther north a child has lived, the more experiences he/she has had! Invite the children to discuss:
   - Where you find ice or snow in your region;
   - During what particular season(s) you see ice and snow (if any); and
   - What experiences you have had in visiting a region with lots of ice and snow, including what it was like and where it was (e.g. on a mountain or far up north — or way down south).

Most of Our Fresh Water is Frozen…and Found in Certain Places on Earth
In our everyday experiences, we encounter water typically in its liquid state. Most of our fresh water, however, exists in its frozen form. About three-quarters of it is found in snow, sea ice, icebergs, ice shelves, glaciers, ice caps, and inside ground that has remained frozen for two or more years (permafrost). Snow and ice may appear only seasonally at mid-latitudes, but at high altitudes and in the polar regions, frozen water persists year-round as glaciers and very large ice caps, called ice sheets. Glaciers form in regions where more snow accumulates than melts, such as in high mountain valleys. In the extremely cold polar regions, the glaciers grow to form continent-sized ice sheets. The largest ice sheets cover Antarctica, and smaller ice sheets cover Greenland. Some of the ice in the Antarctic ice sheet represents the build-up of nearly a million years of snow.

Collectively, Earth's frozen water is called the **cryosphere**.

4. **Optional: Have the children point out areas on the globe where there is always ice and snow.** Find areas that only have ice and snow in the winter. Find areas that almost never have ice and snow.

5. **Conclude.** Summarize that ice plays a role in all of our lives. Encourage the children to make use of related library and community resources to explore the topic of ice on Earth and its role in weather further.

Correlation to Standards

National Science Education Standards

Grades K–4
Earth and Space Science **–** Content Standard D
Properties of earth materials

- Earth materials are solid rocks and soils, water (and ice), and the gases of the atmosphere.

Grades 5–8
Earth and Space Science - Content Standard D
Structure of the Earth System

- Water, which covers the majority of the earth's surface, circulates through the crust, oceans, and atmosphere (and cryosphere) in what is known as the "water cycle."

Extensions

Cut out Snowflakes!

Bring some science into this classic craft activity! There are no eight-sided or four-sided snowflakes in nature, so help the children make their snowflakes with six sides – just like the real crystals! – using activities such as:

Paper Snowflakes

http://highhopes.com/snowflakes.html

Images, text, and a video guide crafters in creating their own six-pointed snowflake. Appropriate for ages 8 and up.

Snowflakes

http://bedtimemath.org/snowflakes-a-partridge-in-a-pear-tree

Add a little math – and a lot of fun – to your exploration of snowflakes with this "Daily Math Problem" from the Bedtime Math Foundation. Appropriate for ages 3 to 10.

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Personal statements

- I have heard an ice cube crackle and pop!
- I have slipped on ice.
- I have been ice skating.
- I save energy (e.g. turn off the lights when I'm not using them) and help the polar bears.
- I have added ice cubes to water and seen the ice float
- I have made a snowperson.
- I have been ice fishing.
- I have seen icicles hanging from a roof or tree.
- I have gotten my tongue stuck on ice.
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Facts

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- Melting and freezing ice at Earth's poles helps make our ocean currents flow.
- There is less sea ice in the north polar region than there was 40 years ago.
- Glaciers are found on mountains on all continents, except in Australia.
- Antarctic ice is almost three miles thick in some places!

Jokes

- What happens to ice when it hears a funny joke? *It cracks up!*[1]
- If you live in an igloo, what's the worst thing about global warming? *No privacy!*[2]
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   - During what particular season(s) you see ice and snow (if any); and
   - What experiences you have had in visiting a region with lots of ice and snow, including what it was like and where it was (e.g. on a mountain or far up north — or way down south).

4. **Optional: Have the children point out areas on the globe where there is always ice and snow.** Find areas that only have ice and snow in the winter. Find areas that almost never have ice and snow.

5. **Conclude.** Summarize that ice plays a role in all of our lives. Encourage the children to make use of related library and community resources to explore the topic of ice on Earth and its role in weather further.

Activity Materials to Print

Ice Bingo

Put your name or initials on the line in the blocks for the ice experiences you have had. Then find different people who have had other experiences and ask them to initial that box.

I have heard an ice cube crackle and pop! _____ (initials)	What happens to ice when it hears a funny joke? It cracks up! Submitted by Eliza, age 8, to www.jokesbykids.com	I have slipped on ice. _____ (initials)	Melting and freezing ice at Earth's poles helps make our ocean currents flow.	I have been ice skating. _____ (initials)
I have been snow skiing. _____ (initials)	I have had a snowball fight! _____ (initials)	In the U.S., many major weather patterns start out in the Arctic.	I have gotten my tongue stuck on ice. _____ (initials)	Sea ice in the north polar region has decreased by 40% in the last 40 years!
Glaciers are found on mountains on all continents, except Australia.	I have been ice fishing. _____ (initials)	I have seen icicles hanging from a roof or tree. _____ (initials)	If you live in an igloo, what's the worst thing about global warming? No privacy!	I have made a snowperson. _____ (initials)
What do you call 50 penguins in the Arctic? Lost! REALLY lost! (Penguins live in Antarctica.)	I have added ice cubes to water and seen the ice float / sink (circle one). _____ (initials)	Antarctic ice is almost three miles thick in some places!	I save energy (e.g. turn off the lights when I'm not using them) and help the polar bears. _____ (initials)	I have seen wispy clouds high up in the sky, which are made of tiny ice crystals. _____ (initials)

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