Let it Snow! Let it Melt!

Students will make observations and draw conclusions about what makes ice melt as well as begin to understand the properties of and differences between solids and liquids.

Grade Level: Kindergarten

Phenomena:
What turns ice from a solid to a liquid?

Objectives:
- Students will describe the difference between solid water and liquid water.
- Students will identify the sun and salt as factors that makes ice melt.

Materials:
- Ice
- Snow if available
- Tray with 3 different compartments
- Salt
- Newspaper
- At least 2 rubber gloves
- Plastic bag
- Tape
- Coloring page (Appendix B)
- Pictures (Appendix A)
- "Stranger in the Woods"

Appendixes:

Time Considerations:
- Preparations: 15-20 minutes
- Introduction: 10 minutes
- Activity 1: 15 minutes
- Activity 2: 5 minutes
- Activity 3: 10 minutes
- Activity 4: 5-10 minutes
- Conclusion: 10-15 minutes

Related Lesson Plans:

Nevada Outdoor School . org

Next Generation Science Standards

K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.

Science and Engineering Practices (SEP):
Planning and carrying out investigations.
Analyzing and interpreting data.

Disciplinary Core Ideas:
K-ESS3 Earth and human activity.

Cross Cutting Concepts:
Cause and effect
Stability and change.

Excellence in Environmental Education Guidelines

- **Strand 1—***Questioning, Analysis, and Interpretation Skills:* E) Organizing Information—Learners are able to describe data and organize information to search for relationships and patterns concerning the environment and environmental topics. G) Drawing Conclusions and developing explanations—Learners can develop simple explanations that address their questions about the environment.
- **Strand 2—***Knowledge of Environmental Processes and Systems*. **Strand 2.1–** *The Earth as a Physical System:* B) Changes in matter—Learners are able to identify basic characteristics of and changes in matter.

Background

Many factors affect snowmelt rate. The angle of the sun to the surface of the Earth is a good example. The amount of snow on the sloped side of an East to West highway, the south side will have more snow left because it does not receive as much sunshine and receives it at a lower Sun angle than the north side. The greater the angle of the Sun to the surface of the Earth, the less energy it receives.

Ice cube:(2009, Nov. 19)

The type of snow also has an affect. If the snow is light and fluffy, it may not melt as fast as heavy snow that has more liquid water in it. A light, fluffy snow also allows more light to filter through, therefore distributing the energy through a greater depth of snow. Wet, or heavy snow absorbs much of the Sun's energy near the top of the snow and therefore it melts at the top. The melted snow drips through the snowpack, making it wetter and icy if temperatures drop well below freezing.

In the winter, when there is snow and ice on the roads and sidewalk, businesses lay salt down to prevent people from slipping.

The salt is used to melt the ice and snow. The salt works by lowering the freezing point of water. The effect is called "freezing point depression".

Laying salt on ice will help it melt: Freeman, M.

Preparation

Gather all the appropriate materials needed to do each experiment: Ice, salt, plastic bag, newspaper, rubber gloves, pictures of water and ice (Appendix A), and coloring page.

Select a book that is snow themed (ex.– Stranger in the Woods).

Read background information.

Introduction:

Doing the Activity

Begin by walking around with a rubber glove full of ice (tied off) and a rubber glove full of water (tied off). Ask students what ice feels like. Is it hot or cold? (*Cold!)*

Ask what would happen if snow was brought inside. Then ask what may happen to the snow when the sun comes out. (IT MELTS!)

Place an ice cube in a plastic bag, seal it and tape it to the window. Ask students to predict what will happen to the ice cube? (IT WILL MELT!)

Tell students the class will be doing many experiments while we wait to see what happens to the ice cube.

Activity 1: Snow Experiments

After you have discussed melting snow and ice with the students, explain that they will be doing some experiments with snow (or ice) and how fast or slow it melts.

Set up a tray with three compartments: one compartment with just an ice cube, one with an ice cube and salt, and one with an ice cube wrapped in newspaper. Share the contents of each compartment as you set up; explain what students should be looking for when making their observations.

Tell students the results of each ice cube will be observed at the end of class.

Activity 2: Vote!

After you have explained what each compartment consists of, it is time to let the students predict what will happen.

Have students vote for which ice cube they think will melt the fastest and slowest. Record each count on the board. (Remind students to only vote once. One way to monitor this is to have students sit on their hands after they have voted).

Activity 3: Stranger in the Woods!

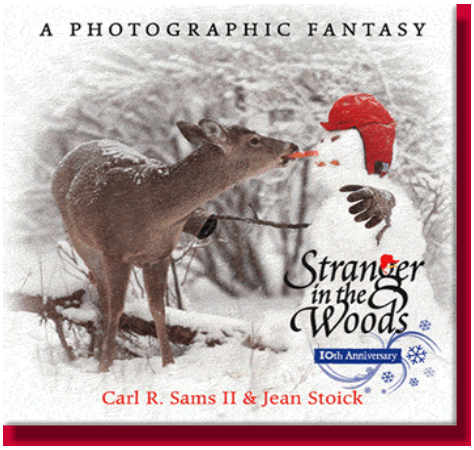
While you are waiting for the experiments to work, read a snow themed book to the class.

This book should have the theme of snow. Stranger in the Woods by Carl R. Sams II & Jean Stoick is a good book to read to the students.

Activity 4: Snowman Rhyme

Quickly check the experiment and if needed sing the snowman rhyme with the students:

"You are a big round snowman, with a carrot nose! You get to



wear a top hat and you never get cold toes! But now we know what happens when the sun shines down on you! We know you turn to water, which is a liquid too! It is a bright, warm, sunny day so the unlucky snowmen wearing "green" (color of your choice) are sadly melt, melting away"

Repeat the rhyme as many times as it takes for all the students to have melted away.

NOTE: Use your discretion as to how many times you think you should repeat the rhyme. If the ice is not ready for the students to look at, you can continue to sing the snowman rhyme.

Activity 5: The Results!

Tell students it is time to look at the results!

Show students the compartments. Go through each one at a time. As the students make observations, ask them the following: What is in the compartment that was not there before? (WATER!) What happened to the ice cubes? (THEY MELTED!)

Ask students which compartment melted the most? Which melted the least? Was their original prediction the same as the final results?

(NOTE: The ice covered with salt should have melted the most). Discuss this result with students and ask if they have ever seen salt being put on icy sidewalks or roads.

The ice cube wrapped in newspaper should have melted the least. Most students will have predicted this one will melt the fastest. Discuss this result with students and connect this with how coolers keep food cold (insulation).

Return to the ice cube left in the bag on the window. What happened to it? Did it melt more than the other three ice cubes in the other experiment? Why? (BECAUSE OF THE SUN).

What do we call water when it's frozen? (ICE!) Is that a solid or a liquid? (SOLID). What do we call water when it's not frozen? (LIQUID).

Show students pictures (Appendix A) of water both in its liquid and solid state and ask students to identify which is which.

Conclusion

Return to the rubber gloves and ask students which glove has solid water in it and which glove has liquid water in it?

Does the glove with ice look like the glove with water? (NO)

Does the water take the shape of the glove? (YES)

Ice cubes meting:
Mangiero, S.

Assessment

Assess students on their observations of each experiment.

Assess students on their answers to the questions you ask and their contributions to the class discussion.
Have students come up with their own experiments to do with ice.
They should make observations on what happens.
If it has snowed recently, take the students outside and have them look for areas where there is more snow and areas where the snow has started to melted.

Ask them to come up with reasons why some areas might be melting faster than others.

Extensions

Put ice in a bowl with warm water and ice in a bowl with cool water and ask students which ice will melt faster? And why?

Vocabulary

Freeze: to become solid or icy at a very low temperature. *Water freezes at 0 degrees Celsius*.

Freezing point: Temperature at which something freezes; the temperature at which a liquid becomes a solid.

Freezing point depression: The phenomenon that occurs when a freezing point of a liquid is lowered by adding another compound to it, such that the solution has a lower freezing point than the pure solvent.

Ice: Frozen water.

Liquid: A form of matter that is not a solid or a gas. A liquid can flow easily. It can take on the shape of any container into which it is poured.

Melt: When a substance melts, it changes from a solid to a liquid because of heat.

Snow: White crystals of ice that form when water vapor freezes in the air.

Solid: Having shape and hardness; not liquid or gaseous.

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