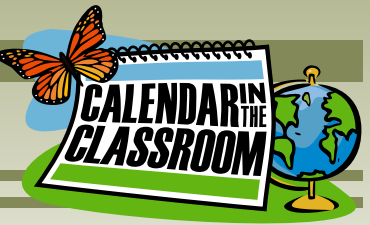




Collecting Crystals



Overview

This winter activity offers children a chance to observe snowflakes up close. They will discover that each snowflake is unique and some students may also discover that all snowflakes have six sides. In this activity, children have the opportunity to observe water in its solid state (as ice or snow) as well as its liquid state.

Background

One of the many things that makes water so special is that it occurs in three different states: solid (as ice), liquid (as water), or gas (water vapor or steam). The water cycle, which students become familiar with in fourth grade, is the process of water moving through these different states and cycling around through the atmosphere. It's not necessary to share the details of the water cycle with kindergarteners, however it may be helpful for you to review the process before beginning this activity.

The water cycle consists of three main events: Transpiration occurs when water vapor enters the atmosphere as a by-product of plant respiration. Evaporation is the process of water vapor rising into the atmosphere. Water droplets collect in clouds and join together (this is known as condensation). If the atmosphere is cold enough, the droplets freeze in the form of snowflakes. When snow or rain falls, it's called precipitation.

Using snow, children will observe water in its solid state. They will use magnifying lenses to identify different features and patterns, and will also observe the process of their snowflakes melting-returning to a liquid state.

The Activity

Using the *Minnesota Weatherguide Environment™* Calendar, work with the children to identify pictures depicting snow. Ask the children what they know about snow. What is it made of? Where does it come from? Snow falls from clouds. Inside the clouds, tiny water droplets are frozen together in the form of snowflakes. (When it's warm the droplets fall as rain.)

Give each student a piece of black paper or cloth that has been cooled in the refrigerator (or outdoors) and take students outdoors on a snowy day. Collect the snowflakes on the paper as they fall. If it is not snowing, you may scoop up a small amount of snow to observe. Use a magnifying glass to observe that each snowflake is unique. Although it may be hard for some kindergartners to discern, each snowflake has six sides. Challenge the children to identify the six sides.

Upon returning indoors, ask the children to draw their snowflakes in their journals. They may not remember exactly what the snowflakes looked like, but they can do their best to draw what they do remember.

*Take a tablet, or tablets, outdoors and take pictures of students' snowflakes that they may use as they draw their snowflakes back in the classroom.

Time:

30 minutes or more.

Skills:

Observation
Critical thinking
Describing

Vocabulary:

evaporation
condensation
precipitation
solid
liquid
gas

Materials Needed:

- Magnifying glasses (refrigerate for at least two hours prior to this activity)
- Black cloth or paper that has been refrigerated
- Pictures of snowflakes
- *Minnesota Weatherguide Environment™* Calendar

Questions for Discussion

- Why do you think it doesn't snow in the summer? The atmosphere isn't cold enough in summer as it is in winter.
- Why don't clouds always produce snow in winter? There must be enough moisture in the clouds to produce snow AND the air temperature must be cold enough that the snowflakes won't melt as they fall.
- Are all snowflakes the same size? No, in general warmer temperatures and more moist air produce larger flakes.

Extensions

Make observations on days with different weather conditions. Have students look for different shapes and patterns that frozen water makes-snowflakes form when water vapor freezes, icicles form when water drips in very cold air, ice crystals make patterns on cold windowpanes when water vapor freezes slowly, and sheets of ice cover the surface of puddles, pails, tubs, and ponds. Put a shallow pan of water outside on a cold day. Check the pan periodically to see if crystals form. A heated dog bowl or bird bath placed outside on a cold day may get fluffy crystals around the edges as water evaporates.

Resources

Briggs Martin, J. *Snowflake Bentley*

Minnesota Weatherguide Environment™ Calendar

online: <https://jeffersfoundation.org/programs/calendar-in-the-classroom/>

Libbrecht, K.G. *Pictures of Snowflakes and Snowflake Science*: <http://www.snowcrystals.com/>

Minnesota Academic Standards

3-D Science Standards

Science Practices:

1. Ask Questions
4. Analyzing and Interpreting Data
8. Obtaining, Evaluating and Communicating Information

Crosscutting Concepts:

1. Patterns
3. Scale, Proportion, and Quantity

Disciplinary Core Ideas:

ESS2: Earth's systems

- K: Make daily and seasonal observations of local weather conditions and describe patterns over time
- 4th Grade: Ask questions about how water moves through the Earth system

Art Standards

Grade	Strand	Anchor Standard	Benchmarks
K	Create	Create original artistic work	1. Create art that communicates an idea using artistic foundations.
4	Create	Create original artistic work	1. Create art that is representational and non-representational using artistic foundations. For example: Naturalism and abstraction.