



The Arboretum for Educators

Resources for Teachers, Students, and Families

January 2025

Winter Ecology



Scientists are beginning to recognize that winter ecology – the study of the inter-relationships between animals, insects, and plants with their habitat in the winter – is an understudied topic with negative ramifications for conservation efforts and environmental global change. [Download this comprehensive Winter Ecology Teacher's Guide](#) from the National Park Service to learn more, and then get your students outdoors learning with the activities below.

PreK–Grade 2: Tree Bark Exploration

Guide students to discover the variety of tree bark in their schoolyard or local park. Have them touch different barks and use a magnifying glass to look deeply and focus on texture. Create a word bank with descriptive words and then encourage students to think of what that bark pattern reminds them of. For example, a furrowed bark looks like a mountain range, or peeling bark looks like sunburned skin. Bring paper and crayons and help them create leaf rubbings, matching the crayon color to the various colors in bark. Then, they can create similes or small poems to add to the page.

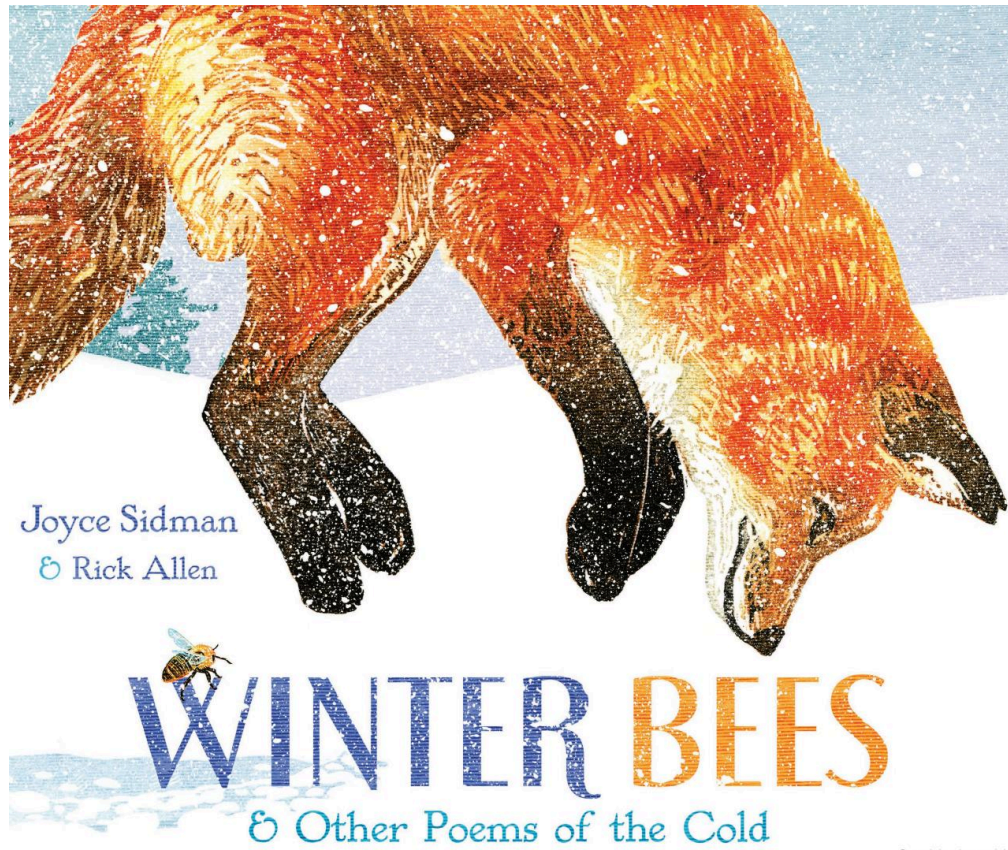
[Download this slide show](#) to learn more about the function of tree bark and how it helps trees survive winter.

Grades 3–5: Animal Detectives

Although it might appear that animals are missing from the local environment during the winter months, that is not so! Challenge students to discover animal presence by observing the evidence they leave behind. First [use this slide show](#) to home in on making claims using evidence, and then head outdoors to do some local animal sleuthing! Have students document their discoveries and return to the “scene of the crime” often to look for new evidence. Once students start noticing animal evidence, they won’t stop seeing it everywhere!

Sound can also be a powerful indicator of animal presence even when they can’t be seen. Use this fun [sound guessing game slide show](#) to learn about a few of the more common owls in Massachusetts.

Books to Discover



- ***The Longest Night*** by Marion Dane Bauer. Celebrate the return of the sun with this story starring the lowly chickadee.
- ***Over and Under the Snow*** by Kate Messner. A clever exploration of what is seen and unseen in a seemingly barren landscape.
- ***Winter Bees and Other Poems of the Cold*** by Joyce Sidman and Rick Allen. A glossary and author sidebars explain many winter ecology concepts.

Middle School: Snow and Flakes

If we are lucky there will be some snow this month, with many opportunities to learn outdoors. Measuring the depth of snow and the amount of snowfall is critical to understanding winter ecology. Students can gather data by mapping the snow on the schoolgrounds and recording the date and time, snow depth, air temperature, and sunlight or shade conditions in various locations, such as under trees, next to a building, in the open field, and on a vegetable plot or growing bed. Then, students periodically visit each site for new measurements and record how long it takes for the snow to completely melt from each of the locations. Why is this important? Read ***The Snow Man*** (including the Author's Note) by Jonah Winter, to learn how one man shaped climate research in the Rocky Mountains. [Or watch a short documentary about it.](#)

Read about another inspiring scientist from Vermont who conducted research on snowflakes and published amazing discoveries and images: [Snowflake Bentley](#) by [Jacqueline Briggs Martin](#).

[View some of his images](#) too, and then try to replicate them using fun 3D Printing techniques that require NO 3D Printer! Use [Icing](#) or [Sand](#).

High School: The Future of Skiing?

Winter sports is a lucrative industry that is increasingly threatened by climate change. Ski resorts have a high carbon footprint. Students can learn more about the [threats](#) to and [effects](#) of the ski industry to become informed about the issues. They can then also learn about some [innovative new directions adopted by ski resorts](#) to keep their industry, and the countless jobs and benefits to communities they provide, alive. A lively debate will likely ensue!

Armed with this information, students can then engage in some engineering tasks to better understand what is involved in skiing. [Build Your Own Ski Lift](#) and [Why Are Skis So Long?](#) allow students to problem-solve and test many variables to find optimal solutions.

Finally, teams of students can work towards re-imagining and designing more sustainable, climate friendly year round ski resorts. How elaborate a project is up to you to decide!

Social Media for Learning



[First Light Wildlife Habitats](#) Deborah Perkins, the Personal Ecologist, posts about plants, animals, and habitats of the northeast.



[Let's Botanize](#) features Jacob and Ben, Arboretum scientists, whose

mission is to democratize the study of plant biology using short, engaging, and scientifically accurate posts on various social media outlets.



Derak Haynes, self-described “The Chocolate Botanist,” brings ethnobotany to the mainstream through lively social media presence.



Black in the Garden is a series of podcasts hosted by Colah B. Tawkin that explores the intersection of Black Culture and Horticulture.



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