

Trees and Climate Change:

Why Evergreens are Superheroes in a Changing World

This curriculum focuses on the essential role evergreens and other trees play in combating climate change and fostering a more sustainable future. Students will learn how different types of trees, particularly evergreens, improve air quality, provide homes and food for birds and animals, help us relax, and contribute to cooling the Earth. Through lessons on tree age, tree rings, and the cooling effects of trees, students will connect with nature's ability to mitigate climate change. By exploring the carbon-oxygen cycle and the healing powers of evergreens, they will understand how these superheroes are vital to both our well-being and the health of the planet. Through hands-on observation and inquiry, students will discover how trees serve as nature's tools in shaping a better world for generations to come.



Connecticut Christmas Tree Growers Association
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The Cooling Power of Trees

Nature's Superheroes at Work!

KEY CONCEPTS - Trees help keep the Earth cool in several important ways. First, they provide shade, which helps keep the ground and air cooler. Second, trees release moisture into the air through a process called transpiration, which helps cool the air. Trees also clean the air by taking in carbon dioxide (CO₂) and giving off oxygen. Understanding how trees cool the Earth helps us see why protecting and planting trees is important for slowing down climate change.

OBJECTIVE - Students will understand how trees help cool the environment and why this is important for reducing the effects of climate change. Through a hands-on experiment, students will explore the differences in temperature between sunny and shaded areas.

MATERIALS

- 2-10 thermometers *based on group sizes*
- 1 timer
- 2-10 small cups or containers *(to hold the thermometers)*
- A sunny spot on blacktop
- A shaded area under a tree
- Paper and pencil to record findings

ACTIVITY

1. Put one cup or container with a thermometer in the shade under a tree.
2. Put the other cup or container with a thermometer in a sunny spot on the blacktop.
3. Set timer for 5 minutes.
4. Check the temperature and record on each thermometer every 5 minutes - at least 3 times.

WRAP UP AND DISCUSSION

- Have students compare their recordings for temperatures in the sun and shade.
- Discuss why the thermometer in the sun is hotter.
- Discuss how trees help cool things down:
 - Shade - Trees block sunlight, so the ground stays cooler.
 - Transpiration - Trees release moisture into the air, which cools the air.

EXTENDING THE LESSON

- Try the experiment in different seasons - See how the temperature changes in summer, fall, winter, and spring.
- Compare different trees - Test the temperature under different kinds of trees to see if some give more shade.
- Map the schoolyard - Have students measure temperatures in different parts of the schoolyard and mark which areas are cooler.
- Plant a tree - Talk about how planting trees at school or home can help make the air cleaner and cooler.
- Keep a nature journal - Write down how trees change through the seasons and how they affect the weather around them.



How Old is a Tree?

Counting Tree Rings to Determine a Tree's Age

OBJECTIVE – Students will identify growth rings, and how to count them to determine a tree's age. They will also explore how environmental conditions affect tree growth.

MATERIALS

- Tree cross-sections (or printed images of tree rings)
- Magnifying glasses (for observing details)
- Pencils and paper
- Chart or diagram of tree rings
- Colored pencils (optional, for ring coloring activity)

KEY CONCEPTS

- Tree Growth Rings: Each year, a tree forms a new ring.
- Light and Dark Rings:
 - Light rings = Spring & Summer (fast growth)
 - Dark rings = Fall & Winter (slow growth)
- Counting Rings = Tree's Age
- Environmental Impact:
 - Wide rings = Good growing conditions (plenty of water & sunlight)
 - Narrow rings = Poor conditions (drought, disease, overcrowding)
 - Scars or missing rings = Possible environmental events (fire, insect damage, or human impact).

ACTIVITY

1. Show students a real tree cross-section or images of tree rings.
2. Find the Center – Identify the first (innermost) dark ring.
3. Count the Rings – Using a magnifying glass, count each dark ring moving outward to the bark.

WRAP-UP AND DISCUSSION

- Compare different trees & ages.
- Discuss how tree rings tell a story about the tree's life.
- Ask students what could have happened in years with very narrow rings or scars.

EXTENDING THE LESSON

Have students draw their own tree cross-sections with wide/narrow rings and explain what happened in their imaginary tree's life.



Evergreen vs. Deciduous

How Both Types of Trees Help Nature Thrive

KEY CONCEPTS

Evergreen trees retain their needles year-round, providing continuous cover and shelter for animals in all seasons. Their green color stays constant throughout the year, and they produce cones and seeds that serve as an important food source for wildlife. Evergreen trees also help stabilize the environment by preventing soil erosion with their strong root systems and improving air quality by absorbing carbon dioxide and releasing oxygen. Examples of evergreens include fir, pine and spruce.

Deciduous trees shed their leaves in the fall and grow new ones in the spring. They provide shade during the summer, helping to keep areas cool, and allow sunlight to pass through in the winter when their branches are bare. Before their leaves fall off in autumn, they change color, creating vibrant displays of red, orange, and yellow. Examples of deciduous trees include maple, oak and birch.

OBJECTIVE

Students will be able to explain the differences between evergreen and deciduous trees. They will understand how evergreen trees help animals by providing food and shelter.

MATERIALS

- Pictures or real samples of evergreen and deciduous leaves
- Pinecones, acorns, variety of evergreen branches, deciduous branches
- Poster or drawing materials to make a chart - (Evergreen vs. Deciduous)

ACTIVITY

1. Ask students:
 - a. Have you ever seen a tree that stays green even in the middle of winter?
 - b. Why do you think some trees keep their leaves while others lose them?
2. Show pictures or samples of evergreen needles and deciduous leaves.
 - a. Ask: What differences do you notice?
 - b. Write their observations on chart paper or the whiteboard under two columns: Evergreen & Deciduous
3. Sorting Activity
 - a. Divide students into small groups.
 - b. Give each group a mix of evergreen needles, cones, and deciduous leaves.
 - c. Ask them to sort the items into two categories: Evergreen and Deciduous.
 - d. Have each group explain why they classified the items the way they did.



Evergreen vs. Deciduous

How Both Types of Trees Help Nature Thrive

WRAP UP AND DISCUSSION

Birds prefer evergreen trees in winter because these trees provide better shelter and protection from harsh weather and predators. Here's why:

1. Evergreen Trees Keep Their Needles All Year

Unlike deciduous trees, which lose their leaves in the fall, evergreens keep their needles. This means birds can find dense, leafy branches to hide in during winter.

2. Protection from Wind, Snow, and Cold

Evergreen trees act like natural umbrellas, blocking strong winds and keeping snow from piling up on birds. Their thick branches create a warmer, safer place for birds to rest.

3. Safe Hiding Spots from Predators

With their thick branches and dark green color, evergreen trees help birds stay hidden from predators like hawks, owls, and foxes.

4. A Good Place to Roost Together

Some birds, such as chickadees and goldfinches, huddle together in evergreen trees at night to stay warm. The thick branches help trap heat and keep the birds cozy.

5. Food Sources

Many evergreen trees grow pinecones, which hold seeds that birds like chickadees and nuthatches eat in winter.

Some also attract insects hiding in the bark, giving birds an extra food source.

Because of all these benefits, evergreen trees are important winter homes for many birds and small animals!

EXTENDING THE LESSON

Go on an evergreen tree hunt on a Christmas tree farm, park, or forest.

- Look for different evergreen trees and pinecones.
- Compare the different evergreens, some have longer or greener needles, some are pricklier, and some even smell like citrus.
- Observe any birds, squirrels, or insects using the tree for shelter or food.



Outside Your Window

Exploring Nature Through Observation

KEY CONCEPTS

Right outside your window is a world waiting to be discovered and explored. By exploring the natural world, students will feel more connected to their surroundings, develop their observational skills, and engage with various subject areas, including science, geography, math, and art. A nature walk offers something new for students to explore each time they step outside!

OBJECTIVE

Students will explore a natural area, focusing on trees and the life they support.

MATERIALS

- Drawing pad or clipboard with plain paper for drawing
- Checklist of things to look for
- Helpful support materials:
 - Field guide to trees
 - Field guide to animal tracks

ACTIVITY

1. Choose a Location

Select an area near your school where you can take students on a nature walk

2. Prepare a Checklist

Provide students with a checklist of things to observe during their walk and blank paper or a drawing pad to record their observations. You can create a list based on what they might see in your area. For example:

- o Trees with green leaves or needles
- o Birds, animals, and insects
- o Signs of wildlife such as scat, footprints, or nests
- o Cones or fruits from trees
- o Snow prints



3. Encourage Mindful Observation

- o Encourage students to slow down and use their five senses to observe their surroundings.
- o Take time to stop and discuss what they see.

4. Drawing Exercise

- o During the walk, have students draw something they observe.
- o Encourage them to look closely and let their eyes guide their hands as they draw.
- o Remind them that the goal is to record their observations, not to create a perfect drawing.

Outside Your Window

Exploring Nature Through Observation

5. Explore Different Perspectives

- Ask students to observe things from different angles:
 - Are there birds overhead?
 - Leaves on the ground?
 - Can they look under trees, leaves, rocks, or benches?

6. Focus on a Tree

- Choose a tree to observe more closely.
- Ask:
 - What is under the tree?
 - Are there signs of animals living in or near the tree?

WRAP-UP AND REFLECTION

- Towards the end of the walk, gather students together and review the checklist.
- Ask:
 - What did they see?
 - What would they like to observe more closely on the way back to the classroom.
- When you return to the classroom, have students form small groups to share their observations.
- Discussion Questions:
 - What was their favorite observation?
 - What surprised them?
 - What will they look for next time?

EXTENDING THE LESSON

- Start a Nature Journal - Encourage students to keep a nature journal to record their observations throughout the year. Set aside time for regular nature walks and recording sessions. How do their observations change over time? How do the seasons affect what they see?
- Tree Identification - Teach students how to identify trees using a simple field guide. Discuss different types of trees (evergreens vs. deciduous) and how they provide food and shelter for animals.
- Animal Signs - Teach students how to identify animal tracks, scat, and nests. Discuss what these signs reveal about animal behavior and habitat.
- Bird Identification - Teach students how to identify birds:
 - By their songs
 - By their size
 - By their coloring
 - By their flight patterns
 - By using a field guide
- Discussion on Ecosystems - How trees support animal life. How (evergreens vs. deciduous) provide different benefits, from shelter to food.

Connecting Together

The Carbon-Oxygen Cycle and the Role of Trees

KEY CONCEPTS

The carbon-oxygen cycle is like a big teamwork game between plants and animals.

Plants and animals need each other to survive, and they help each other by sharing the air they breathe in and out. Let's break it down step by step:

How Plants Help

- Plants breathe in a gas called carbon dioxide (CO_2) from the air.
- They use sunlight, water, and carbon dioxide to make their own food through a process called photosynthesis (say it like this: photo-sin-thuh-sis).
- When plants make food, they give off a gas called oxygen (O_2) into the air.
- This is helpful because animals and humans need oxygen to breathe and stay alive!

How Animals Help

- Animals and humans breathe in oxygen from the air.
- Our bodies use oxygen to give us energy so we can run, play, and grow.
- When we breathe out, we release carbon dioxide into the air.
- This helps plants because they need carbon dioxide to make their food.

The Cycle Continues

- Plants take in carbon dioxide and give off oxygen.
- Animals and humans breathe in that oxygen and give off carbon dioxide.
- Plants take that carbon dioxide and make more oxygen – and the cycle keeps going!



OBJECTIVE

Students will use the balls to create a model of the carbon-oxygen cycle, demonstrating how trees absorb CO_2 and release oxygen. This hands-on activity will help students understand how trees contribute to the health of the planet and benefit both people and animals.

MATERIALS

For each group of two students:

- 3-6 small to medium-sized playground balls:
 - 2-4 of one color to represent oxygen
 - 1-2 of another color to represent carbon
- Construction paper
- Tape
- Markers
- A large container to hold the balls (e.g., a small kiddie pool or large bucket)

Tip: The best type of ball to use are those that can stick together, such as:

- Balls with Velcro
- Fabric toss game balls
- Soft sensor spike balls

Connecting Together

The Carbon-Oxygen Cycle and the Role of Trees

ACTIVITY

1. Prepare the Materials:

- Label one color of ball as carbon (e.g., green).
- Label the other color of balls as oxygen (e.g., blue).
- Have students make labels out of construction paper to wear to become either a tree or an animal. They can draw a picture on their label if they want.

2. Set Up the Circle:

- Have the students sit or stand in a circle.
- Place all the balls in the center of the circle (on the ground or a table)

3. Start the Cycle:

- Students labeled as animals should take one green ball (representing carbon).
- A student labeled as a tree should gather one green ball (carbon) and two blue balls (oxygen), representing a full carbon dioxide molecule (CO_2).

4. Exchange the Oxygen and Carbon:

- The tree student should walk over to an animal student, give them the two blue (oxygen) balls, and drop the green (carbon) ball on the ground or table.

5. Continue the Exchange:

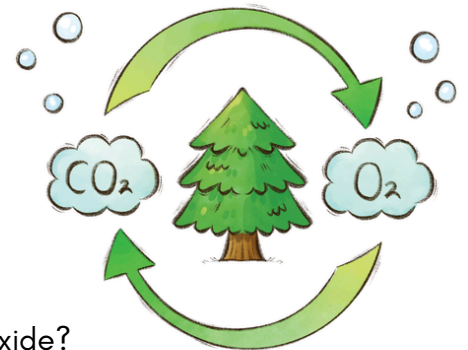
- The animal student should pick up the green and blue balls (forming a CO_2 molecule) and walk over to a tree student.
- The animal gives the full CO_2 molecule to the tree.
- The tree student absorbs the CO_2 and gives back the oxygen balls, continuing the cycle.

6. Repeat the Cycle:

- Keep the exchange going until all students have had a chance to play the role of both a tree and an animal.

WRAP-UP AND DISCUSSION

- After the activity, gather the students together and discuss:
 - What did they notice about the cycle?
 - Why is the carbon-oxygen cycle important for life on Earth?
 - How do trees help support animals and people?
 - What would happen if there were no plants?
 - What would happen if there were no animals to give off carbon dioxide?
 - How can we help take care of plants and trees to keep the cycle going strong?
 - Reinforce the idea that trees are essential for maintaining the balance of oxygen and carbon dioxide in the atmosphere.



The Healing Power of Evergreens

How Trees Help Us Feel Better

KEY CONCEPTS

Evergreen trees play a significant role in promoting mental health by offering numerous benefits of nature that help reduce stress and foster a deeper connection to the environment. The calming presence of these trees, with their constant greenery, can soothe the mind and ease feelings of anxiety. Spending time in nature, especially near evergreen trees, has been shown to improve mood, lower stress levels, and enhance overall well-being. The fresh air provided by these trees, along with their peaceful surroundings, helps individuals feel more relaxed and grounded, encouraging a stronger bond with the natural world. In this way, evergreen trees not only support physical health but also provide important emotional and psychological benefits.

OBJECTIVE

Students will understand how forests and evergreen trees contribute to mental health by providing stress relief, promoting calmness, and creating a sense of connection to nature. They will also explore the calming effects of spending time near trees and being outdoors.

ACTIVITY

1. Teacher-Led Explanation (10 minutes):

- Begin by asking students, "How do you feel when you spend time outside in nature vs. inside your house?"
- Briefly explain mental health in simple terms, focusing on emotions and how nature can help us feel better.
- Evergreen Trees and Mental Health:
 - Explain that being near evergreen trees can help reduce feelings of stress and anxiety.
 - Emphasize that evergreen trees improve air quality, which makes it easier for us to breathe and feel better.
 - Discuss how the color green in nature can calm the brain, and how the stillness of evergreen trees helps us feel relaxed and peaceful.
 - Evergreen trees help us feel connected to the environment, making us feel part of something larger and offering comfort..

2. Nature Walk or Observation

- Take the class or group outside or to a Christmas tree farm to observe evergreen trees.
- Ask students to pay attention to how they feel when they are around the trees. Do they feel calmer or happier?
- Encourage them to notice the sounds, smells, and sights around them.
- Encourage them to hug a tree, how does it feel?
- Encourage note taking to describe their feelings, sounds, smells and sights.

The Healing Power of Evergreens

How Trees Help us Feel Better

3. Group Discussion and Charting

- Gather the students and ask them to share their observations from the walk.
- On chart paper, list the ways evergreen trees help with mental health (e.g., calming, stress relief, better air quality).
- Add ideas as they discuss their experiences.
- Ask the students, “Why do you think trees, especially evergreens, make us feel better?”;
- Discuss how spending time with nature is not just fun but also important for keeping our minds healthy.
- Reflect on the experience: “What’s your favorite thing about spending time outside, and how can you use nature to feel better when you’re stressed or upset?”

EXTENDING THE LESSON

1. Mindfulness in Nature - Have students practice mindfulness by sitting quietly under a tree or imagining they are surrounded by nature. Ask them to focus on their breathing and listen to the sounds around them, reflecting on how nature makes them feel.
2. Nature Journals - Encourage students to keep a journal where they write or draw about their time spent outdoors, focusing on how nature (specifically evergreen trees) makes them feel and why they think it helps them feel better.
3. Planting Evergreen Trees - If possible, organize a class project where students can plant small evergreen trees or shrubs in the schoolyard. Discuss the ongoing benefits these trees will provide for the school community in terms of mental health, air quality, and beauty.
4. Art With Nature - Have students create art projects using materials inspired by evergreen trees—whether drawing, painting, or making a craft. Discuss how their artwork represents the calming effect they feel from being around nature.

