My Trees: Tree Inventory, Identification, and Mapping

Overview: This activity can be used to start your exploration of trees by understanding what trees are found at your house or in your neighborhood.

Objectives:

1. Collect data on the number of trees on campus, the types of trees, and their initial differences (size, color, shape, etc.)
2. Determine the different types of trees on campus.
3. Name as many of the trees as possible.

Materials:

- Ziploc baggies
- Colored flagging tape, ribbon, or other type of marker
- Flags (optional)
- Tree Map materials (butcher paper, markers, colored paper, scissors, any other fun materials!)
- Tree labels with numbers

Introduction: Center students for the activity by encouraging them to imagine what it feels like to be under a tree at a park, at their school, or at home. Ask them to recall some of the memories they have of being around trees or feelings associated with it.

This lesson will explore the question: "How many trees are at my home? How many different types of trees are there?"

Activity:

To start, you should define the area of the house yard or neighborhood that you want the students to explore. This could be a courtyard, backyard, or community green space. If needed, use flags to mark the area that they will explore.

Counting Trees: Have the students begin by counting or estimating the number of trees in the study area. If both a count and estimate method is used, students can compare their estimate to the actual number that they count.

After you count the trees, a small label with a number on it will help differentiate the trees for the upcoming activities. Tie the label to a low-lying branch or to the trunk.

Tree Size: Students can estimate which tree is the smallest and the largest. Use two different colored flagging tapes for students to mark the trees. (i.e. blue=smallest, green=largest). Students may have different responses based on whether or not they are examining the trunk width or the crown (top of the tree). Use these differences to encourage discussion.
Use the "How Big is My Tree" activity to dive deeper into the tree size.

Tree Types: Students can categorize the different types of trees that they find in their study area. Ask students how they think that we can tell trees apart? How do we know their different? Common answers will include: leaves, size, shape, bark. Encourage students to think about other characteristics like flowers, buds, nuts, fruit, etc. Depending on student familiarity with trees, this may be difficult. One prompting question could be to ask how we can tell an orange tree from an apple tree.

Next, have students (pairs or small groups) collect items from the trees that will help them determine what type they are. Small ziploc bags with the tree numbers can be used. Using the items collected in the bag, the students can write 3-5 words that describe their tree. Each group can then present their 3-5 words to the class. After everyone shares, students can walk around the room to see if any one else has the same tree type as they do. They can use the words and items to determine if they match.

As a class, finalize the "types" of trees that you have. The type doesn't have to be the exact name of the tree, but can be a creative descriptor. This will help you get set-up to name the trees.

Tree Identification: Next, students will determine the name of each tree. Resources to use include:

- "What Tree is This"- Simple Guide, https://www.arborday.org/trees/whattree/
- University of Tennessee Dichotomous Key https://extension.tennessee.edu/publications/Documents/PB1756.pdf

Remember! Tree identification is difficult. It's okay if students struggle to match their tree to one of the guides.

Map of Trees: Once the trees are named, students can create a map to display the trees of your home or neighborhood to display.

Resources

- https://www.arborday.org/trees/whattree/
- https://www.discoverlife.org/20/q?guide=Trees&cl=US/GA/Clarke/Cedar_Shoals

How Big is My Tree?

Overview: Students will measure the trees in their yard.
Objectives:

1. Students will measure the diameter and height of trees found in their yard.
2. Students will use tools like measuring tapes and calculators to collect data.

Materials:

- Measuring Tape
- Thumb Tack
- String (long enough to wrap around the tree)
- Marker
- Calculator

Advanced Materials:

- 1 Protractor
- 1 Piece of thin string, fishing wire, or strong thread, approximately 10" long
- 1 Drinking straw
- Weight that can be tied to the string (I used a large binder clip)
- Transparent tape

Introduction: The size of a tree can help you determine its age, how much it needs to be watered, and perhaps even what type of tree it is. Trees grow each year by adding to their trunk. When you look at a tree stump or tree cookie, you will see the alternating rings of dark and light. Light rings indicate growth during the wet season and dark rings show growth during the dry season. Counting the rings can tell you a tree's age. But since this is hard to do unless the tree is dead, we can use tree diameter as a good measurement instead.

In addition to the tree diameter, the height of the tree is also an important way to measure it.

Activity

<u>Measuring the Width of Your Tree</u>

1. You are making a measurement known as Diameter at Breast Height or "DBH". This is a standard measurement of a tree 4.5 feet off the ground. Since this might be too tall for some kids, you may need to adjust to 2.5 or 3 feet off the ground. If you make an adjustment, make sure that all the kids are still measuring from the same height off the ground.

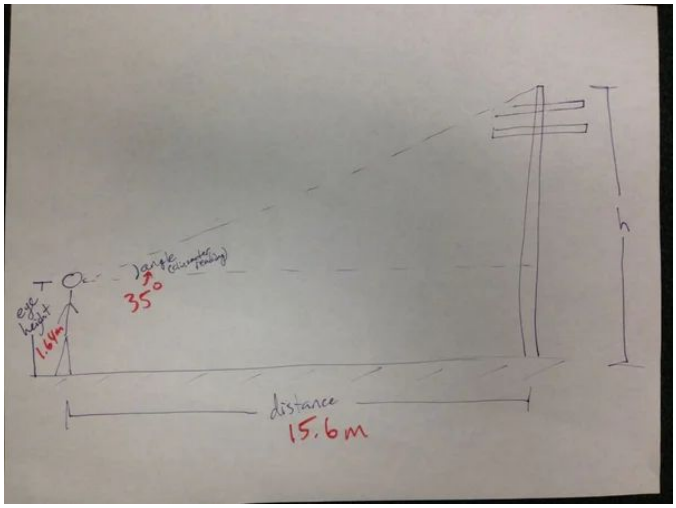
2. Measure 4.5 feet (or adjustment height) off the ground. Mark that spot with the thumb tack.
3. Next, attach the string to the thumbtack and measure around the tree.
4. Use the marker to mark where the string overlaps with the starting point.
5. Remove the string and measure the length. This is your circumference of the tree.
6. To get the diameter or width of the tree, divide this number by 3.14.
7. This is the DBH of the tree.

Measuring the Height of Your Tree

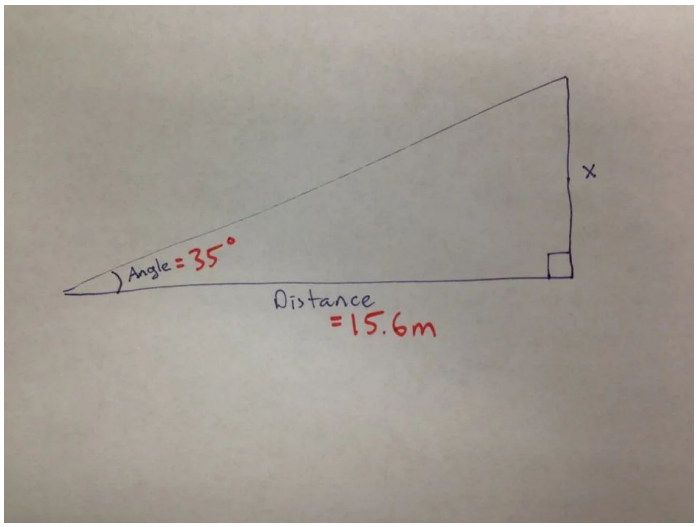
1. Kids will need to work in pairs for this activity.
2. One kid will stand near the tree. The other kid will walk away from the tree. Using the pencil, they should stop often and hold the pencil up vertically and compare it to the height of the tree. When the bottom of the pencil lines up with the bottom of the tree and the top of the pencil lines up with the top of the tree, the person should stop.
3. Now, they will hold the pencil horizontally and align it with the base of the tree. The pencil holder will tell the student at the tree to walk until they are lined up with the tip of the pencil.
4. The pencilholder will walk back to their partner.
5. Measure from the base of the tree to the partner to get the approximate height of the tree.

Using a Clinometer (Advanced)

1. Construct a clinometer: https://www.instructables.com/id/Basic-Clinometer-From-Classroom-Materials/
2. Time to measure your tree. Instructions modified from this resource: https://www.instructables.com/id/Using-a-clinometer-to-measure-height/
3. Find a spot far enough away from the tree to be able to see the top.
4. Using the clinometer, look through the straw and have it angled at the top of the tree. Make sure you are on level ground.
5. Have a student partner read the angle on the string that intersects with the protractor. Subtract this number from 90 to get the angle from where you are to the top.
6. Using a tape measure, record the distance from where you are standing to the base of the tree.
7. Next, measure your eye height from the ground.
8. Now to the math!
9. Draw a picture of your set-up and the measurements you took.



9. Simplify the drawing to a triangle and use trigonometry to solve for the height.



10. Lastly, add the height of your eye to get the entire height of the tree!

Final activity

Back at home, have kids create a graph or table with each tree ID and its width and height. This will be used to reference in future activities.

Resources

- https://www.portlandoregon.gov/trees/article/424017
- https://www.instructables.com/id/Basic-Clinometer-From-Classroom-Materials/
- https://www.instructables.com/id/Using-a-clinometer-to-measure-height/

It's Gettin' Hot! Urban Heat and Trees

Overview: Students will explore how different materials absorb heat differently in the classroom and use this understanding to make predictions of temperatures outside with and without tree cover.

Objectives:

1. Predict how different materials absorb heat.
2. Connect these in-class materials to what you see outside.
3. Predict how temperature changes in different places outside of your home.
4. Collect measurements and communicate your results.

Materials:

Indoor Exploration

- Heat lamp
- Infrared Thermometer
- Black Paper
- White Paper
- Bare Soil
- Tile/Concrete
- Wet sponge
- Plants

Outdoor Investigation

- Infrared Thermometer
- Clipboard
- Data sheets
- Chart Paper for graphs (optional)

Introduction:

Urban Trees can drastically reduce the temperature we experience at our schools and homes. Shaded areas can be upwards of 45 degrees Fahrenheit cooler than unshaded areas. The term "heat island" describes built up areas that are hotter than nearby rural areas. The annual mean air temperature of a city with 1 million people or more can be 1.8–5.4°F (1–3°C) warmer than

its surroundings. In the evening, the difference can be as high as 22°F (12°C). Heat islands can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution and greenhouse gas emissions, heat-related illness and mortality, and water quality (EPA).

Activity:

Indoor Classroom Exploration: Set-up the selected materials under the heat lamp. Determine how long heat lamp can be on the materials before making measurements (30 minutes will be enough to start to see a difference, but make sure the lamp is within 5 inches of the materials). Have students create a prediction list of the material temperatures after the heat lamp has been applied for the set amount of time. Ask students to write or verbally explain their predictions.

Next, together as a class take the measurements of each material with the infrared thermometer and record the results in a table. Compare the table to student predictions and ask them to explain what was different or the same.

Connect this set-up to outside the classroom by asking the students to explain what each material might represent at their yard. Common answers will include playground, parking lot, garden, trees, etc. Students should also consider what the light represents outside (the sun).

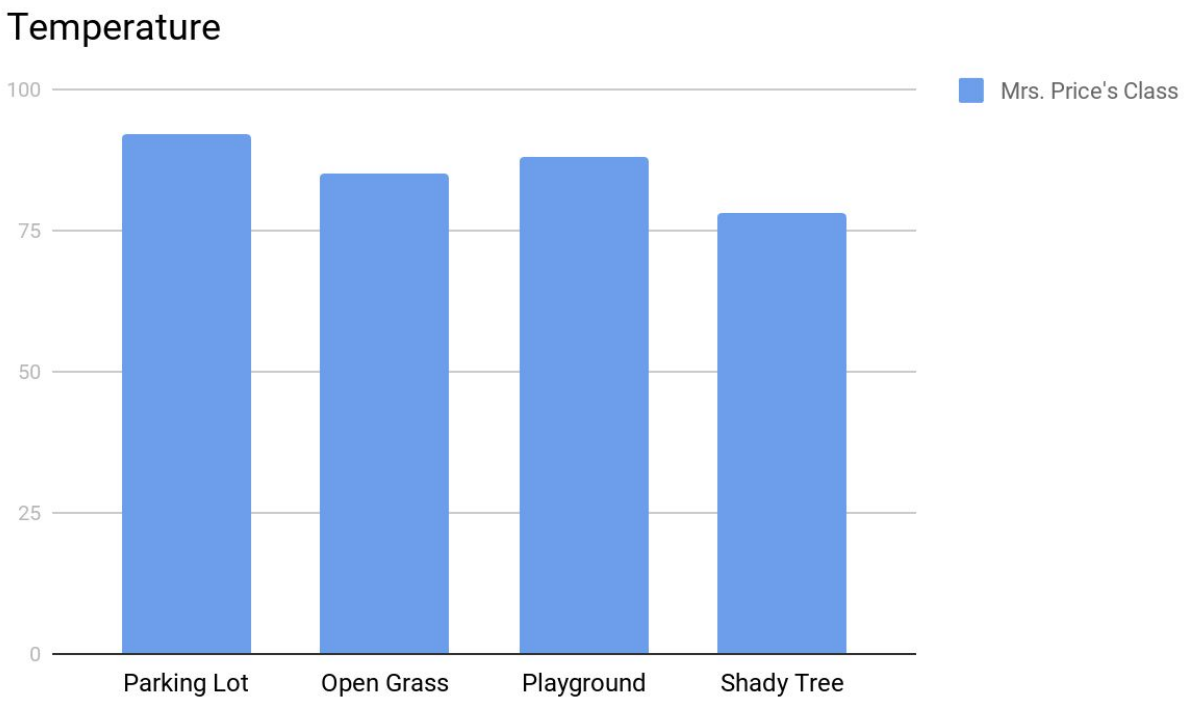
Outdoor Investigation: Based on the indoor exploration, students will now go outside to take the heat measurements around their home at different surfaces. Recommended places include: Parking Lot, Open Grass, Playground, Under the shade of a Tree.

Before heading outside, have the students make a prediction of the temperatures from warmest to coolest. In small groups, have students make the measurements and record them in the table.

Example Table:

Location at School	**Temperature**
Parking Lot	
Open Grass	
Playground	
Under a Shady Tree	

For higher grades, students can make a bar graph of their results to display.



As a class, discuss what was found in the different locations and why the temperatures would be different. Encourage students to see how the trees influence temperature.

Final Activity:

Students can answer the following questions:

1. How did my results compare to my prediction?
2. What would happen if I added more trees to my neighborhood?

Resources

https://www.epa.gov/heat-islands

Vocabulary

- Urban Heat
- Temperature

- Fahrenheit
- Celcius

Art and Trees

Overview: The natural world is a constant inspiration for artists of all kinds. In this activity, kids will explore examples of art inspired by trees and create pieces inspired by their trees.

Objectives

1. Kids will connect and interpret trees through art.
2. Kids will create and share a piece of art that represents their tree.

Materials:

- Collection of art inspired by trees.
- Art supplies
- Tree drawing & word worksheet
- Clipboards
- Writing Utensils
- Other materials as needed to create the art.

Introduction: Trees are used to inspire art including painting, photography, poetry, literature, and music. After kids have engaged in the scientific considerations of trees, it is time for them to dive into the artistic interpretation of trees.

Activity:

Getting Started: Have kids find a tree outside. Ask them to draw their tree, paying close attention to the details including colors, textures, and shapes. Ask them to write 10 adjectives that describe their tree and 10 words about how their tree makes them feel. Kids can use these to help them create their art.

Collect samples of trees used in art. Examples include Van Gogh's Olive Tree paintings, Spirit of Trees poetry resources, tree songs, and "That Tree" photography series. Find examples that fit your classroom's interests. Depending on how much time you have, you could share a few examples briefly or have kid groups explore the examples and share what they found with the class.

Once kids have an understanding of the types of artistic interpretation that is possible, they can create a piece of art based on the trees in their neighborhood. You can choose to narrow their

focus to one medium (i.e. poetry or painting) or let them pick the medium that they want to explore.

When kids projects are complete, consider hosting virtual open house to share the art work. Poems could be read during morning announcements and paintings could be displayed in the cafeteria or front hall.

Resources

- https://artsedge.kennedy-center.org/educators/lessons/grade-5/Trees_In_Nature_And_Art#Overview