



SCIENTIFIC OBSERVATIONS



Overview:

Students observe the many variations of textures, shapes, colors and sizes of the trees in their school's urban ecosystem while searching for the four elements of a habitat.

Standards:

- SC.X.7.2 Gather, analyze, and communicate evidence of interdependent relationships in ecosystems.
- SC.1.6.2 Gather, analyze, and communicate evidence to show the relationship between structure and function in living things.
- SC.4.6.3 Gather and analyze data to communicate an understanding of structure, function and information processing of living things.
- LA.X.SL.1 Participate with peers and adults in structured discussions and routines about grade level topics and texts.
- LA.X.W.5 Write informative/explanatory pieces to examine a topic or text and convey ideas and information.

Objectives:

- Students will understand the importance of biodiversity and healthy urban ecosystems.
- Students will understand the role trees play in an ecosystem.
- Students will make scientific observations of trees in their schoolyard.

Materials:

- *Scientific Observations* student handouts (**NOTE:** there is a separate option for pre-writers and early writers)
- Clipboards (*not included in kit, available from KOB upon request*)
- Magnifiers
- Pencils
- Colored Pencils (1 set per pair of students)



Background Info:

NOTE: This information is intended to provide background information and guidance for the teacher/educator so they feel comfortable teaching about the subject matter. It is not intended that this information would be read directly to students.

An observation is the use of the senses (hearing, sight, touch, etc.) or some type of measurement to gather information. Observations yield what scientists call data. Whether the observation is the result of an experiment, temperature readings taken from a rover on Mars, wind speed measurements during a hurricane, or simply noticing that a particular species of spider prefers to live in the light fixture just outside of the main school doors – they're all equally necessary data. Scientists analyze and interpret data in order to figure out how it informs their hypotheses and theories.

There are many ways art and science overlap. One example of their overlap is seen through scientific drawing. From medical journals to plant specimen renderings, artists help inform scientific texts. Frequently a drawing is more informative than a photograph. For example, an artist can combine images to make a single drawing that includes a male cardinal, a female cardinal, and a juvenile cardinal all in one tree. It is unlikely that you would see all of these in a single photograph.

Realistic art requires good observation, just like science. Even if children cannot accurately draw a perfect rendering of a cardinal, they can observe them and depict those observations: Are the wings the same color as the back? Does it have a crest? What color and shape are the beak? Drawing encourages students to focus on scientific observation in a format that is familiar and accessible. Additionally, drawing forces students to observe the animal and slow down, which also allows students to observe behavior.

Clear, detailed, and objective observation is an essential part of science.

Educators can encourage scientific observations by asking students open ended, guiding questions. Such as:

- What does it smell like?
- What colors do you see?
- What does it feel like?
- Do you notice anything different when you look at this one versus that one?
- Do you notice anything interesting?
- Does it remind you of anything?
- Do you think it might be different tomorrow?
- Look up... what do you see?
- Look down... what do you notice?
- Why do you think that is?

When students respond to open ended questions, encourage them to determine if their observations are opinions or facts. If a bug is scary or creepy, that is an opinion, but if a bug is black or has a hard shell, those observations would be fact. While scientists definitely have opinions, they try to clearly identify what is opinion and what is fact so their research is clear and easy for other scientists to understand and interpret.





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Activity:

1. Discuss with students how making observations, and recording those observations, is essential in science. These recordings become the data scientists use to analyze and hypothesize.
 - a. Good scientific observations are factual and detailed. For example, a scientist might describe the mucus on the back of a frog as wet, slimy, and clear. But a scientist would try to avoid using descriptive words such as “gross” or “awesome” because they are opinion. In a Language Arts writing class, you might appreciate using such words because they help the reader feel emotion, but that is not the goal in scientific writing.
 - b. Some of our observations will be recorded using our language skills, detailed description words so we can compare and contrast the trees we observe, while some of our observations will be recorded with drawings.
 - c. The goal of this activity is to record our observations through drawing and/or writing. Recording identifiable features, including details, is important. For example, if you were to draw a cardinal, you could include features such as the crown on its head, its red body, and its black beak. When drawing a tree, you might notice that some of the leaves are yellow, and some are green. You may also observe the texture of the bark – is it smooth or bumpy? Other observations could include the smell of the tree (yes – some trees have a distinct smell!) Or the size of the branches.
 - d. Since students are working with a partner to help each other, be sure to encourage discussion of observations – What does the bark feel like? What does it look like? Is it one color or many colors?
 - e. Even though students are discussing observations as a team, make sure they are individually writing their answers. If they disagree after discussing something, they can each put their own responses down.
 - f. The point is to EXPLORE - so touch, smell, listen. OBSERVE. Encourage students to slow down, and take time to make detailed observations. It is more important to focus on getting good details in their answers than speeding through and finishing first.
2. Provide each student with a *Scientific Observations* handout and a clipboard. Make sure each student has a writing utensil. NOTE: there are two options for the handout. Option One is intended for students who can read and write. Option Two is intended for pre-readers and those who are still learning to write who would have an adult/educator reading the instructions to them for each step. Please select ONE option for your class/group.
3. Provide students with magnifiers or microscopes.
4. Have students work in small groups or pairs to complete the observations on their data sheet.
5. After students have completed their observations, discuss the following questions as a whole class:
 - a. What was most surprising to you while observing the trees?
 - b. What was the coolest thing you observed?
 - c. Do you have any questions about the trees you observed?
6. Possible Extension: Have students use tablets to take photos of different parts of one tree (leaves, bark, buds, etc.) and make a photo collage of a specific tree. Then have students compare photos/collages of various trees to identify similarities and differences.

Assessment:

- Completion of *Scientific Observations* handout.
- Participation in class discussion.





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STUDENT HANDOUT (OPTION ONE)

NAME:

INSTRUCTIONS:

Work with your partner to make detailed observations of a tree. Although you are working with your partner to collaborate, you will each do your own work and write your own thoughts, drawings, and answers.

1 Describe the location of your tree.

2 Step back so you can see the whole tree (if you have a big tree, you might have to step way back). What do you notice about the tree now? Use these observations to write a description of your tree. Include at least 3 details.

1.

2.

3.



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STUDENT HANDOUT (OPTION ONE)

3

Describe the bark of your tree. (Is it bumpy? Smooth? Rough? Is the bark peeling off? Are there holes? What color is it? What else do you notice?) Provide at least 2 details.

1.

2.

4

Use the space below to draw a detailed picture of the bark of your tree.



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STUDENT HANDOUT (OPTION ONE)

5

Describe the leaves of your tree. (What do they feel like? What color are they? What do they smell like? What else do you notice?) Provide at least 2 details.

1.

2.

6

Use the space below to draw a detailed picture of the leaves of your tree.



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STUDENT HANDOUT (OPTION ONE)

7

Step back again so you can see your whole tree. Use the space below to make a drawing of your tree.



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STUDENT HANDOUT (OPTION TWO)

NAME:

INSTRUCTIONS:

Work with your partner to make detailed observations of a tree. Although you are working with your partner to collaborate, you will each do your own work and write your own thoughts, drawings, and answers.

1

Draw a picture of where your tree is located. Include anything that is close to your tree, such as the school, sidewalks, other trees, and parking lots. If you can, try to label things you put in the picture.



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STUDENT HANDOUT (OPTION TWO)

2

Use the space below to draw a detailed picture of the bark of your tree. Include details - are there holes in the bark? What does it feel like - can you draw the texture? Is it all one color or do you see several colors?

3

Use the space below to draw a detailed picture of the leaves of your tree.



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STUDENT HANDOUT (OPTION TWO)

4

Step back so you can see your whole tree. Draw your tree. Be detailed and specific - are there bird nests? Broken branches? Different colored leaves? How many branches are there - can you count them? Be sure to include all the details that you see.