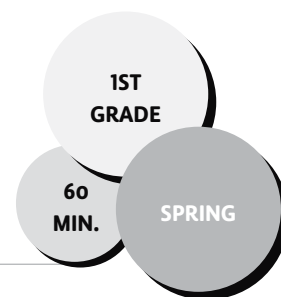


Looking Closely at Leaves

THEME: EXPLORING THE ECOLOGY OF FOOD

Inspired by California Academy of Sciences' "Introduction to Scientific Sketching" lesson



ESSENTIAL QUESTION

Why are careful observation and accurate recording important in science?

LEARNING OBJECTIVES

- ✓ Students will be able to use close observation skills.
- ✓ Students will be able to create scientific sketches.

CONCEPTS

accurate details illustration
observe scientific

ENGAGING THE CLASSROOM TEACHER

- Ask the teacher whether they have established groups of 5–6 students.
- During Action Step 1, suggest that the teacher pass out a leaf to each student.
- During Action Step 5, suggest that the teacher circulate through the room, checking that students are taking turns in their groups.
- During Action Step 6, suggest that the teacher check on students out in the garden who might need further support.

LESSON DESCRIPTION

In this lesson, students learn the foundations of scientific illustrations. They closely observe a leaf specimen, drawing it with enough detail that a classmate can find it in a group of leaves from the same plant. They then draw a plant from the garden, practicing the “ABCs of scientific illustration.”

MATERIALS

For each student:

- Leaf (all students receive leaves from the same tree or plant)
- Looking Closely at Leaves Worksheet (207)
- Clipboard
- Pencil
- Colored pencils
- Whiteboard
- Dry-erase markers of various colors
- ABCs of Scientific Illustration Poster (p. 206)

PREPARATION

- › Gather leaves for your students to sort and draw. Leaves should be from the same tree or plant but have enough variation for students to notice when drawing and sorting.
- › If you don't have a whiteboard, you can prepare accurate and inaccurate illustrations of your object for Action Step 3 ahead of time.
- › Photocopy a Looking Closely at Leaves Worksheet for each student.

ABCs of Scientific Illustration

**Accurate
Big
Colorful**

ACTION STEPS

1. Engage: Gather students in a circle and say, Today you're going to be scientists and artists! Ask students to think about the difference between a scientist and an artist. Then perhaps ask what they have in common. Get to the idea that both scientists and artists have to pay careful attention to what they're studying. Meanwhile, have the teacher pass out a leaf to each student. Tell them to observe everything they can about it while being very careful not to damage the leaf. You may want to prompt students by asking questions such as, *Does it have speckles? Does it have smooth edges?* Tell students to remember what their leaf looks like because soon they'll have to tell which is theirs from a pile of leaves. **(5 min.)**

2. Finding Your Leaf: Put students into groups of five or six, and instruct them to gently put their leaves in the middle of their group. Come around and jumble each group's leaves, and challenge students when you give a signal such as "go," to find their leaf again. Ask, *Who was able to find their leaf again? What made it helpful to find your leaf?* Reinforce the idea of paying careful attention and noticing the details of their leaf. **(5 min.)**

3. Explain Scientific Illustrations: Explain to students, *Today, we're going to make*

scientific illustrations. This is different from art. In art, we might be drawing to make something beautiful or creative. In scientific illustration, we're going to draw to share information. Show students an object such as a flower, and then draw an inaccurate, cartoon-like version of the flower quickly, perhaps not even looking at the object. Ask students, *Does my drawing look like the flower?* Explain that it might be a beautiful or exciting piece of art, but for this to be a scientific illustration, it needs to look a lot like the real flower. Ask, *How could my drawing look more like my flower? What should I do?* (slow down and notice all the small things). Then ask students to turn and talk to the person on their right. Take suggestions from students, and then draw the flower as accurately as you can. Ask, *Does this drawing look like my flower? How do you know?* Explain to students that your second drawing is more accurate than your first. Have them repeat the word "accurate." Continue by saying, *This drawing is more accurate. What do you think I might mean by "accurate"?* Have them share in pairs. Then say, *Accurate means it looks close to how it looks in real life, instead of what I imagine in my mind.* Show students the ABCs of Scientific Illustration Poster, explaining, *When scientists are out in nature, they often need to record what they see, and it's important for their drawings to be accurate, so they can share what they saw with others or maybe remember details later on. Being big and colorful helps too! When your drawing is big, you can see all the details, and when your drawing is colorful, it looks more like real life.* **(10 min.)**

4. Drawing Our Leaves: Pass out the Looking

Closely at Leaves Worksheet. Have students draw the leaf they originally studied at the beginning of the lesson, practicing the ABCs. **(10 min.)**

5. Group Guessing Game: Have students return to their original group. Say, *Put all your leaves in the middle again, and now place your illustrations around the leaves in a circle. Now each person in the group can take a turn to see if they can make a match. If someone in the group matches the right leaf with your illustration, you can tell them yes or no.* Have students play until everyone has had a chance to guess (which may mean stopping before the group guesses all correctly). **(10 min.)**

6. Drawing a Living Plant: If you have time, give students the chance to further practice the skill of scientific illustration. If you're not already in the garden, take students there now. Say, *OK scientists, I'll give you one minute to find a plant to draw. Once that minute is up, you have to stay with your plant, and draw the plant using the ABCs. Ready?* Have students walk around the garden to select a plant to draw a full scientific drawing of. Circulate through the garden once students have settled with their plant, encouraging students to add more detail or pointing out interesting aspects of their plant to add to their drawing. **(15 min.)**

REFLECTION

Have students discuss the following questions in small groups, then share with the class: **(5 min.)**

Social and emotional learning

- Ask yourself: Did I share, take turns, and help others learn in my group today?

Check for understanding

- What was helpful about a drawing when you were trying to find the matching leaf?
- What makes a drawing accurate?
- Why do you think scientists try to draw accurate pictures of what they're observing?

ADAPTATIONS

Age: For older students, you can introduce the ABCDEs with the requirements “detailed” and “explained” added.

Upper Grade Classroom Extension: Create a book with class illustrations of your school garden's plants! Bring in botanical illustrations for students to observe. Then assign each student to a plant in your garden, and have them study and draw their plant over multiple sessions. Their final/best drawing can then be included in the compiled class book.

ACADEMIC CONNECTIONS

English Language Arts Common Core State Standards

CCSS.ELA-LITERACY.L.1.4.A

Use sentence-level context as a clue to the meaning of a word or phrase.

Next Generation Science Standards, Life Science Disciplinary Core Idea

NGSS LS3.B: Variation of Traits

Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (1-LS3-1)

ABCs of Scientific Illustration

ACCURATE

BIG
COLORFUL

Name: _____ Date: _____

Looking Closely at Leaves Worksheet

Directions: Draw your leaf in the space below.

