

## DSU Lesson Plan Science

### ND Standards addressed in this lesson:

**Science 3.4.3** Identify the needs of living things (e.g., food, shelter, soil, space, water)

### CCSS ELA addressed in this lesson:

**SL.3.4** Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.

### Objective(s):

1. Student will explain the process that causes leaves to change color in the fall
2. Student will be able to analyze and describe data that they have collected

### Assessment:

1. Student completes an observation sheet that correctly details why leaves change color in the fall
2. During class discussion, the student verbally shares their observation sheet data

### Lesson Activities:

#### (5 Min) Engage

- Tell the students to raise their hands and share if they can remember the colors of the leaves from the Huron legend. Let a few students answer.
- Discuss how the legend is just a story, but science actually tells us why the leaves change colors in the fall.
- Display the focus question on the whiteboard: Why do leaves change color in the fall? Tell the students that we are going to figure out the question today.
- Ask if anyone knows what pigment is, accept correct answer. Explain that pigment determines the color of the leaves. Write *pigment: determines the color of the leaves* on the white board.
- Tell the students that a leaf is green because of the green pigment inside the leaf; chlorophyll. Write *chlorophyll: green pigment inside a leaf* beside the green leaf on the board.
- Remind the students that the trees use chlorophyll to stay alive; chlorophyll breaks down in the leaves during photosynthesis, which produces sugars in the leaves which travel to the rest of the tree as food. Draw or display a diagram depicting chlorophyll, photosynthesis, and the path of the sugars.
- Write *photosynthesis: process that turns sunlight into sugars that feed the tree.*
- Ask the students what their ideas are as to why the leaves change colors from green in the fall. Write their ideas down. Then say “How can we make our ideas sound more scientific?”
- Rewrite and say aloud one of their ideas in this format *I think that leaves change color in the fall because (fill in with one idea here).* Note the use of *I think* and *because*. Underline those two words.
- Tell the students they will be filling out an observation sheet while you go through the lesson. Show them the sheets and tell them to fill out the *My Idea* section with their idea of why leaves change color. Tell them to reference the board if needed.
- Have the students turn their papers over once they are finished.

#### (15 Min) Explore

- Tell the students that they will be doing an experiment to see the pigments in leaves.
- Demonstrate the process by first putting a long piece of masking tape on the side of the jar and writing your name on it.
- Then cut up 2 leaves of the same kind very small and place them in the bottom of the glass jar.
- Tape a 6 inch strip of chromatography paper to a pencil.

- Tell the students that at that point, they need to bring their jar and pencil to you so you can put rubbing alcohol in their jar. Explain that the rubbing alcohol breaks down the chlorophyll and lets the other pigments come through, just like a leaf does in the fall.
- Pair the students up and have them stand at one desk. Give them a directions sheet to guide them as they work their way through the experiment.
- Pour the rubbing alcohol in for each pair of students and place the jars on a counter.
- Have the students watch as the pigments travel up the paper.
- After the yellow and/or orange pigments are visible on the paper, remove the strips and place them on a paper towel to dry a little. Have the students take their paper strip back to their desk on the paper towel.

**(5 Min) Explain**

- Ask the students which colors they see on the chromatography paper. Help them make the connection that chlorophyll isn't the only pigment in the leaves.
- Tell the students that chlorophyll isn't the only pigment that leaves have. They also have carotenoid pigments. Write *carotenoid* on the board. Explain that carotenoid is a yellow or orange pigment inside a leaf. Write *yellow or orange pigment inside a leaf* after *carotenoid*: on the white board.
- Explain to the students that chlorophyll masks the carotenoid in the leaves so that we can't see it during the summer. As the days grow shorter and there is less sunlight, the trees stop replenishing the chlorophyll when it breaks down. As the chlorophyll gets less and less, we see more and more of the pigment that was masked. Point to the photosynthesis diagram as you explain.
- Ask the students to think about the data that they have now, what they know, and help you fill out the following sentence using the words from the board. *I observe that the leaves contain \_\_\_\_\_ and \_\_\_\_\_.* Guide them to *chlorophyll* and *carotenoid*.
- Have the students help you fill out the next sentence. *I thought that leaves change color because \_\_\_\_\_ but now I think that leaves change color because \_\_\_\_\_.* Use a student idea for the first blank and guide the students to the real reason for the second blank.
- Tell the students to fill out the same framework sentences on their observation sheet. Remove the answers from the framework sentences on the board before the students begin.
- Walk around the room to check for understanding.
- Give students that finish quickly the red pigment handout.

**(2 Min) Elaborate**

- Show the students chromatography strip pictures from local plants' leaves and discuss how tree leaves aren't the only leaves that contain chlorophyll and carotenoid.
- Let any student that received a handout share the information they learned about red pigment.

**(3 Min) Evaluate**

- Have the students discuss everything they learned and ask some students to share their *I thought/but now I think that* with the class.
- Collect the observation papers.

**LESSON MODIFICATIONS**

One student has one to one assistance with an instructional aide that will help him complete the assignment. Check on the progress of these student as he works with his aide. Have a one on one discussion with Fancy about the assignment when she is having trouble with her hearing aids.

**MATERIALS, TECHNOLOGY, AND MEDIA**

Pencils  
Plastic cups  
Chromatography Strips

22 Science sheets/10 Red pigment handouts

White board and dry erase markers

Examples of local plants with pigments