Leaf Color Change Lesson

Includes: Content Reading

-Chromatography Experiment

-Student Worksheet & Assessment

-Teacher Guide & Answer Key

Teacher Instructions

Materials:

Green leaves from several different trees (trees with a dramatic color change work best)
Beaker or drinking glass
Isopropyl (Rubbing) Alcohol
Plastic Wrap
Filter paper or white coffee filters
Pencil

Lesson Plan:

1. Students complete pre-lab question and set up chromatography lab at beginning of class because it requires at least half an hour to soak the alcohol.

2. After setting up chromatography, students read about leaf color change.

3. True/False quiz is provided for assessment of student understanding.

4. Students observe changes in filter paper and complete discussion questions.

Adaptations and Extensions:

*True and False quiz can accompany reading of the article or may be used as a post-assessment.

*Article may be read aloud by teacher or in groups.

*Each lab group may run chromatography on one leaf, different from the other groups OR each lab group may run chromatography on all leaf types.

*Chromatography may easily be done as a demonstration by the teacher.

*The first two steps may be completed by the teacher prior to student arrival to speed up the experiment. This would allow the experiment to be easily completed in one class period.



Leaf Chromatography Lab

Student Worksheet

Pre-lab:

What do you think: Why do leaves change colors?

Lab procedure:

1. Tear the leaves into several pieces and place them in a beaker or glass, then add just enough rubbing alcohol to cover them. Cover the beaker with plastic wrap to keep the alcohol from evaporating.

2. Put the beaker in a dish of hot tap water for about 30 minutes, until the alcohol turns green as the pigments from the leaves are absorbed into it.

3. Cut a strip of filter paper or coffee filter about half an inch wide and tape it perpendicularly to a pencil. Lay the pencil across the top of the beaker and let the strip just barely touch the alcohol and pigment mixture.

4. After about 30-90 minutes, you should be able to see something happening on the filter paper.

Post-lab discussion questions:

1. The term chromatography is related to the Greek roots chroma, meaning color, and graphos, meaning written. Explain how this lab reflects the meaning of this word.

_____
_____
_____
_____
_____

2. Using the information from the reading, list which pigments were found in each of the types of leaves you used for this lab.

_____
_____
_____
_____
_____
_____

3. Un-ripe bananas are green because they also contain chlorophyll. Give an explanation for why bananas turn yellow as they ripen.

_____
_____

Why Leaves Change Color

Reading Assignment & Quiz

The reading assignment can be found at
http://www.na.fs.fed.us/fhp/pubs/leaves/leaves.shtm.

Upon completing reading assignment, please take the following true/false quiz.

_____1. The timing of leaf color change is primarily controlled by the increasing length of night.

_____2. Carotenoids give leaves a red or purple coloring.

_____3. Chlorophyll is necessary for photosynthesis.

_____4. Certain color changes and timing are characteristic of particular tree species.

_____5. Cool days and warm nights bring about the most brilliant displays of leaf color.

_____6. Leaves fall because the tree closes off the veins that carry fluids to the leaf.

_____7. Deciduous trees (trees that lose their leaves) must drop their leaves to protect themselves from harsh temperatures.

_____8. Falling leaves are rarely helpful to the environment around them.



Leaf Chromatography Lab

Teacher Answer Key

Pre-lab:

What do you think: Why do leaves change colors?

Student answers will vary.

Lab procedure:

1. Tear the leaves into several pieces and place them in a beaker or glass, then add just enough rubbing alcohol to cover them. Cover the beaker with plastic wrap to keep the alcohol from evaporating.

2. Put the beaker in a dish of hot tap water for about 30 minutes, until the alcohol turns green as the pigments from the leaves are absorbed into it.

3. Cut a strip of filter paper or coffee filter about half an inch wide and tape it perpendicularly to a pencil. Lay the pencil across the top of the beaker and let the strip just barely touch the alcohol and pigment mixture.

4. After about 30-90 minutes, you should be able to see something happening on the filter paper.

Post-lab discussion questions:

1. The term chromatography is related to the Greek roots chroma, meaning color, and graphos, meaning written. Explain how this lab reflects the meaning of this word.
_The “colors” are “writing” themselves on the filter paper, leaving marks that are visible by observation._____

2. Using the information from the reading, list which pigments were found in each of the types of leaves you used for this lab.
__Answers will vary based on trees used, but may include chlorophyll (green), carotenoids (yellow and orange), and anthocyanins (red and purple).____
_____
____

3. Un-ripe bananas are green because they also contain chlorophyll. Give an explanation for why bananas turn yellow as they ripen.
___Just like green leaves, the chlorophyll in bananas breaks down when they are detached from the tree. As the chlorophyll degrades, the banana reveals its other pigments and becomes more yellow. The more they ripen the more sugars the carotenoids produce._____

Why Leaves Change Color

Teacher Answer Key

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___T_____7. Deciduous trees (trees that lose their leaves) must drop their leaves to protect themselves from harsh temperatures.

___F_____8. Falling leaves are rarely helpful to the environment around them.

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