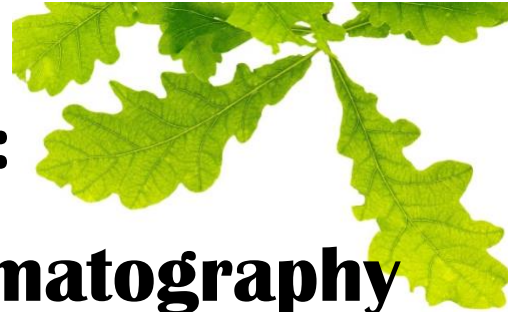




DIY Air Force Activities:

Chlorophyll Chromatography



Materials:

- small glass mason jar or cup
- rubbing alcohol
- spoon
- pencil
- scissors
- white construction paper
- tree leaves



The change of seasons from summer to fall brings the change in the trees from green to brilliant reds, yellows, and oranges! Have you ever wondered how this change happens? Where did all that red, orange, and yellow come from? They are actually always present! The color we see comes from pigments. When light reflects off of the leaf, the dominant color reflected back is the one we observe. During spring and summer, the plants turn the sun's light energy into food energy using a green pigment called chlorophyll. This pigment resides inside a cell called the chloroplast. The chemistry behind this process is quite fascinating and worth looking into. In the fall, the trees are preparing to go dormant, and are no longer using their leaves to make food energy, and thus stop producing the chlorophyll. At this time the other pigment colors become visible. You can use the power of chromatography to separate out these pigments and see what other colors reside in a leaf.

Directions:

1. Select a leaf from a tree. Shred it up and place the pieces in your glass.
2. Add enough rubbing alcohol that the leaf pieces are submerged.
3. Use the spoon to muddle or crush the leaf up further in the alcohol. Then leave it soak for AT LEAST 2 hours, longer is better. You should notice the alcohol turn green.
4. Cut a strip of white construction paper about 1" wide and 6-8" long.
5. Wrap the paper strip around your pencil, creasing it occasionally so it does not unravel, until it is short enough that the end will reach the alcohol when the pencil is resting across the rim of your glass. Set the glass somewhere it will not be disturbed and insert the strip into the cup with the pencil resting on the rim.
6. Leave the strip to soak for a few hours, checking it on it occasionally to record your observations. Once the alcohol has moved up to the top of the strip, you can remove it. What do you observe?

Try this experiment with a variety of different leaves! How do your results change?

Air Force Associations:

Plants have an amazing ability to capture sunlight and convert it into energy. Scientists want to use this as an inspiration to attempt to produce fuels from sunlight using artificial photosynthesis. The Department of Energy has recently announced they will provide \$100 million dollars in funding over 5 years to advance this research. They believe that this effort will "keep America at the forefront of artificial photosynthesis research" and "revolutionize the U.S. energy economy."

<https://www.energy.gov/articles/department-energy-announces-100-million-artificial-photosynthesis-research>



