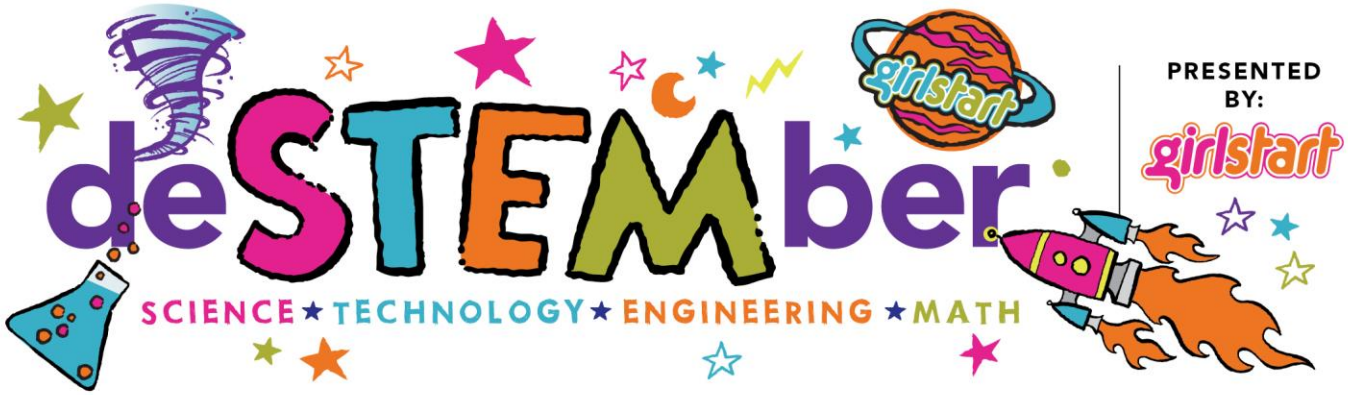


# Natural Dye Markers

The world is an array of different colors. Explore how you can use organic materials to make different dyes and create your own natural markers.

## TEKS:

SCI 4.7C: The student will identify and classify Earth's renewable resources, including air, plants, water, and animals; and nonrenewable resources, including coal, oil, and natural gas; and the importance of conservation.
SCI 5.5D: Identify changes that can occur in the physical properties of the ingredients of solutions, such as dissolving salt in water or adding lemon juice to water.
SCI 6.12A: The student will understand that all organisms are composed of one or more cells.

## Materials:

- Cutting board
- Drinking glass
- Hammer
- Knife
- Marker Refill Pack (can be purchased here)
- Natural dye sources (see Table 1 for dye options)
- Saucepan
- Strainer
- Stove
- Tweezers
- Water

## How To:

*Preparing Natural Dye:*

1. Choose what color dye you would like to make, and choose your plant source for that color. **Natural dyes can cause stains! We advise protecting your work area with newspaper or a drop cloth, as well as wearing clothing you wouldn't mind possibly getting stained.**

| COLOR | NATURAL SUBSTANCE |
|---|---|
| Red/Pink | Beets, Hibiscus flowers, Juniper, Pomegranate, Raspberries, Strawberries, and Rose petals |
| Blue/Purple | Blackberries, Blueberries, Purple cabbage, and Red grapes |
| Green | Artichokes, Chamomile, Grass, and Spinach |
| Yellow/Orange | Rosemary flowers, Alfalfa seeds, Bay leaves, Sunflower, Carrots, and Lilac |
| Brown | Coffee, Tea bags, walnuts, and Tree bark |

2. On a cutting board, use a knife to finely chop your natural source, if needed. Add enough of your plant source to a saucepan to cover the bottom of the pan. **(Adult supervision is needed when using a knife.)**
3. Add enough water to your pan to just cover the plant source. If you are using an herb, add enough water for the material to float.
4. Place your saucepan on the stove at medium-high heat. Once the water begins to boil, turn the heat down to low. Cover the pan and let simmer for 10-15 minutes. **(Adult supervision is needed when using a stove.)**
5. Remember to keep an eye on your simmering plant material and to stir periodically to avoid burning. **Due to fumes from different plant materials, it is advised that you create these dyes in a ventilated area or use a stovetop fan.**
6. Turn off the stove and remove the pan from the heat once the water has reached your desired color. If you want a more concentrated color, continue simmering your mixture and remove the lid to allow for some liquid to evaporate.
7. Prepare a drinking glass and rest with a strainer on top. Transfer the liquid from your pan to the glass, and be sure to strain out any solids from your dye. **(An adult should assist in pouring because the liquid is hot!)**
8. Allow the liquid dye to cool.
9. Follow this process to prepare other natural dye colors as well!

*Creating a Natural Dye Marker:*

1. Gather the pieces included in the marker refill kit, and make sure they are disassembled. The materials for one marker include: a barrel, cap, tip, core, and plug.
2. Place the marker core into the drinking glass that contains your natural dye. Lean the core upright on the inside of the glass.
3. Allow the core to remain in the glass 5-10 min to draw up the natural dye coloring.
4. Insert the marker tip into the barrel. The tip should protrude from the narrow end of the marker barrel.
5. Snap on the marker cap to prevent any dye from running out of the barrel.
6. After your core is soaked in dye, use tweezers to transfer the core into the marker barrel.
7. Place your marker down on a hard surface with the cap end down. Push the plug onto the other end of the marker to close the barrel. You may need to use a hammer to secure the plug into place. **Be careful not to hammer any fingers, and an adult should supervise using a hammer!**
8. When the marker tip soaks up the natural dye, the marker is ready to use. Test out your naturally colored marker!

## STEM Explanation:

Bright colors can be found across a variety of products like plastics, fabrics, art supplies, and food. Many of these products are colored by chemicals synthetically made in textile labs like the red you commonly see in candy and popsicles. This means that the colors were man-made. However, humans have been using organic materials to dye colored textiles for centuries. Many plants and organic materials have colors naturally that can be dissolved in a liquid like water or oil to make a dye. Natural colors occur when living things take in light from the sun, but some molecules can reflect the light back at different wavelengths. When reflected lights get translated by your brains, they create the different colors you see!

## Career Connection:

*Textile engineer*s design and develop the processes, equipment, and procedures that create fabrics, fibers, filters, and supplies. They utilize the natural sciences to develop different polymers and dyes for use in new textile developments. Textile engineers are responsible for a variety of products such as the pattern and cloth of a bed sheet, the color and filter in a marker, and the artificial arteries used in medical procedures.

## Resources:

https://www.sciencebuddies.org/science-fair-projects/project-ideas/Chem_p014/chemistry/make-your-own-markers?from=Blog#background
https://www.amazon.com/Crayola-74-7055-Marker-Refill-Pack/dp/B00CI6J9KG/ref=sr_1_1?s=toys-and-games&ie=UTF8&qid=1509383204&sr=1-1&keywords=marker+refill+pack

 