STEM at HOME

SCIENCE ★ TECHNOLOGY ★ ENGINEERING ★ MATH

PRESENTED BY: girlstart

Sun Designs

Utilize our Sun's rays to make construction paper change color. Investigate the importance of sunscreen as you make beautiful designs!

**We recommend that you do this activity after you start Solar Water Purifier*

TEKS:

SCI 3.8 B: The student is expected to describe and illustrate the Sun as a star composed of gases that provides light and thermal energy.
SCI 7.9 A: The student is expected to analyze the characteristics of objects in our Solar System that allow life to exist such as the proximity of the Sun, presence of water, and composition of the atmosphere.
SCI 8.8 B: The student is expected to recognize that the Sun is a medium-sized star located in a spiral arm of the Milky Way galaxy and that the Sun is many thousands of times closer to Earth than any other star.

Materials:

- Construction paper
- Cotton swab or paintbrush (optional)
- Small objects from around your house (coins, Legos, craft sticks, office supplies, etc.)
- Sunscreen (optional)
- Sunshine
- Tape

Experiment/How-To:

1. Find a hard, flat surface outside that you think will stay sunny for at least a few hours. A table, deck, or sidewalk works well!
2. Use tape to attach a colorful sheet of construction paper to this surface.
3. Arrange objects in a fun design on top of this construction paper. For example, you can make a heart, a star, a smiley face, or any other picture you would like out of the objects. Make sure to leave some of the construction paper uncovered and that the objects you choose will not blow away in the wind.
4. Wait for a few hours (or even all day). The longer your paper sits out in the Sun the stronger your design will be! While you are waiting, feel free to complete the "Sunscreen Extension" below.

5. After a few hours, head back outside and remove the objects from your construction paper. Bring the paper indoors to observe your cool Sun designs!

Sunscreen Extension:

1. Use your fingers (or a cotton swab or paintbrush) to draw designs with sunscreen on a colorful sheet of construction paper. The sunscreen will probably soak in, and that is okay!
2. If you have multiple bottles of sunscreen with different levels of SPF, try making designs on multiple sheets of paper to see if you notice any difference between SPF levels.
3. After you have made your designs, use rolled-up pieces of tape to attach your paper with sunscreen to a flat, sunny surface.
4. Observe your experiment throughout the day! After a few hours, take the construction paper inside to check out your sunscreen designs.

STEM Connection:

What happens if you stand outside in the Sun for a long time? You might sweat, feel warm, have to squint your eyes, or even get a sunburn! This is because our Sun is very powerful and gives off bright light and intense heat. You probably noticed that, after your construction paper sat in the Sun for a few hours, the color faded, or turned lighter. This happened because sunlight contains ultraviolet, or UV, rays. These UV rays have a lot of energy in them, and when they hit construction paper, this energy can actually break the bonds that are holding the paper's colorful dye in place. This causes a chemical reaction that breaks down the dyes, causing them to appear lighter in color. The Sun designs that you just made can act as a reminder of the incredible power that our Sun possesses and also teach us how to protect ourselves from sun damage.

The UV rays that caused the construction paper to fade are the same UV rays that hit our skin, hair, and eyes every time we step outside. These UV rays can damage our skin and eyes. For example, UV light makes our skin burn if we stay out in the Sun for too long and can cause us to get sun spots and moles. Luckily, it is easy to prevent damage from UV rays by standing in the shade or wearing sunscreen! To learn the best methods of sun protection, let's look back to our construction paper Sun designs:

- You might have noticed that areas of the construction paper beneath objects remained much darker in color than the areas exposed to direct sunlight. These objects acted as a form of "shade" for the construction paper and protected it from UV damage. We can protect our skin and eyes from UV damage by standing and playing in the shade when we are outdoors!
- If you completed the sunscreen extension, you probably found that areas where you added sunscreen were darker than areas without sunscreen. This is because sunscreen contains particles that help reflect UV rays away from our skin, or absorb the rays before they can damage our skin. Sunscreens with higher Sun Protection Factors, or SPFs, do a better job of blocking UV rays, and you may have found that the higher the SPF of sunscreen you used, the darker your paper remained. It is important to wear sunscreen every time you plan to be in the sun!

Career:

Solar physicists study the Sun. They work to understand all parts of the Sun from its core to its surface and the effect is has on Earth. Solar physicists also study the effect that the Sun has on the planets and planetary atmospheres in our Solar System.

Resources:

https://creativefamilyfun.net/art-science-sun-prints/
https://learning-center.homesciencetools.com/article/summer-projects/
https://www.unitypoint.org/livewell/article.aspx?id=9a64f6ba-8855-44dd-82d7-fe32b00f4e06

