C5ISR Center Outreach STEM@Home

Welcome to STEM@Home!

As we maneuver the challenges of COVID-19, we strive to continue to make STEM accessible to all.

The STEM@Home Newsletter is intended to be a resource to provide engaging and educational activities that can be done with minimal materials and a whole lot of imagination.

In this Issue…

Volume 1, Issue 2

Nature Scavenger Hunt (Grades K-2)

Nature is the perfect environment in which to explore, ask questions and have fun. Encourage your young explorers to go on a scavenger hunt in your own back yard to collect, draw or take pictures of items they find in their environment. Use the list below to find items using descriptive words.

Scavenger Hunt List:

- Find something green
- Find something with bright colors
- Find something patterned
- Find something big
- Find something small
- Find something that snaps
- Find something that crunches
- Find something hard
- Find something soft
- Find something smooth
- Find 3 of the same item
- Find something with a smell you like

Blending Science and Art:

- Identify everything you collected
- Organize the items you find into 4 groups: hard, soft, big and small
- Take the groups of materials and use them to create a Spring Collage
- Ask an adult to **Share your STEM** on Facebook. **Use #C5ISRCenterSTEM**

SHARE YOUR STEM…

Visit the C5ISR Center on Facebook to post a photo or video of your child completing one of the STEM@Home Activities.

https://www.facebook.com/CCDC.C5ISR/

#C5ISRCenterSTEM

The "Dirt" on Dirt (Grades 3-5)

So, what's the "dirt" on dirt?

Dirt is made up of different particles including sand, silt and clay. Each one is different.

VOCABULARY:

Sand: largest minerals (0.05 mm to 2.00 mm)

Silt: medium (0.002mm to 0.05mm)

Clay: smallest particles (less than 0.002mm)

Materials:

- Paper
- Pencil
- 2 Paper plates
- Wax paper or parchment paper
- Newspaper
- Sand shovel or scooper
- Magnifying glass
- Clear empty jar / bottle with lid
- Soil from yard
- Water

April Showers Bring May Flowers…

With the start of the warm weather, many people are going outside to begin planting gardens. Working in the garden has tons of benefits… but what do you know about the dirt you're digging in?

Part One:

1. Cover your work surface with newspaper to keep it from getting dirty.
2. Obtain some soil from your yard and scoop it onto a paper plate.
3. Put some of the dirt from the paper plate onto the wax paper:
   - Look at the dirt with your eye—what do you see?
   - Look at the dirt with a magnifying glass—what do you see?
   - What does the dirt feel like?
   - What does the dirt smell like?

Record your observations on your sheet of paper.

Part Two:

We know that dirt is made up of different types of particles.

1. Working with the dirt on the parchment paper, use your finger to try and separate it into separate particles. Did it work?

Record your observations on your sheet of paper.

Part Three:

Make some predictions: What will happen when the water is added to the soil? What will happen when the mixture settles? Record your predictions on your sheet of paper.

1. Fill your jar/ bottle about half full of soil.
2. Fill the jar/ bottle with water, leaving 2 inches of space at the top.
3. Tighten the lid and shake the jar/ bottle for several minutes.
4. Let your jar/ bottle sit for about 4 hours, so the particles have a chance to settle. (The longer the jar/ bottle sits, the clearer the water will become).

Observe the results:

1. What do your notice about the soil in the water?
2. Knowing that the heavier particles will sink to the bottom, use the vocabulary provided and label the levels of soil you see in your jar.
3. If you were to take the soil out of the jar and weigh the three layers (sand, silt, clay) separately, which one would weigh the most? What layer would weigh the least?

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What Colors Absorb the Most Heat? (Grades 6-8)

Why do we wear white in the summer?

Light is a form of energy.

Different colors absorb different wavelengths of light. The more frequencies of light a color absorbs, the less it reflects back into your eyes, and the more light it is able to convert to heat.

Look deep into nature, and then you will understand everything better.

~Albert Einstein

Color and Heat

We know from studying how light works, that different colors absorb the heat from light differently. Using simple materials from around the house, create a solar bowl or cup to determine what colors attract the most heat.

Materials:

- Paper
- Pencil
- 2 cups of water
- 3 of the same size bowl/ cups
- Plastic wrap
- Food coloring (red, blue, green and yellow)
- Sunlight

Directions:

1. Pour about two cups of water evenly in each of the three bowls or cups.
2. Put a few drops of yellow, blue, green and red food coloring in one cup, yellow in another and leave the third cup clear.
3. Cover the two cups with food coloring with plastic wrap. The third bowl or cup has plain water and no cover.
4. Leave all three bowls out in the sunshine for at least 2 hours.
5. Test the temperature in each bowl with your finger.
    - Which cup or bowl felt the warmest?
    - Which cup or bowl felt the coolest?
    - What happens if you add water and make lighter versions of the same colors?

Record your observations on your sheet of paper.

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The Chemistry of Nature (Grades 9-12)

Vocabulary:

Chlorophyll: a green pigment that absorbs sunlight for energy.
Chromatography: process of separating a mixture into individual components.
Photosynthesis: process where green plants use sunlight to synthesize foods from carbon dioxide and water.

Materials:

- 3—5 green leaves: each leaf must be from a different type of tree
- One cup per leaf
- Nail polish remover or rubbing alcohol
- Coffee filter or paper towel
- Spoon
- Scissors
- Pencils
- Tape
- Paper
- Pen

Have you ever wondered how leaves get their colors?

We can all agree that the colors of nature are beautiful, but why are certain things the colors that they are? Use these simple materials to understand what makes autumn leaves turn different colors.

Directions:

1. Gather 3-5 green leaves from different types of trees.
2. Tear the first leaf into small pieces. Put the pieces of the leaf in a cup. Repeat this step for the additional leaves, placing the pieces of each leaf into its own cup. Label each cup to remember which has which leaf inside.
3. Pour nail polish remover or rubbing alcohol into each cup. Pour just enough to cover the leaves. Use a spoon to mix and mash the leaves with the liquid.
4. Cut coffee filter or paper towel into inch wide strips. Place the strips into the mixture with the other half hanging on the edge of cup. Use a piece of tape to keep the strip in place.
5. Allow the strips to sit in the leaf mixtures for about 4 hours.
6. Pull out the strips from the cups and record your observations.

For Consideration:

Did you notice a difference between the different leaves? How does chromatography play a role when leaves change color in the fall?

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Standards: C5ISR Center STEM Outreach Activities Align with the Next Generation Science Standards

ACTIVITY ONE: 2-PS1-1 Matter and Its Interactions (K-2) and conduct an investigation to describe and classify different kinds of materials by their observable properties.
CCSS.MATH.CONTENT.K.MD.A.1: Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

ACTIVITY TWO: 5-PS1-3 Matter and Its Interactions: Make observations and measurements to identify materials based on their properties.

ACTIVITY THREE: MS-PS1-4 Matter and its Interactions: Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.

ACTIVITY FOUR: HS-LS1-6 From Molecules to Organisms: Structures and Processes:Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
HS-LS2-5 Ecosystems: Interactions, Energy, and Dynamics: Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.