Article Low Tech Scientific Exploration for Students at Home

https://www.edutopia.org/article/low-tech-scientific-exploration-students-home?utm_content=linkpos5&utm_campaign=weekly-2021-01-20-A&utm_source=edu-newsletter&utm_medium=email

CRITICAL THINKING

Low-Tech Scientific Exploration for Students at Home

A fifth-grade teacher shares ideas on how students can explore common phenomena with simple materials in and around their homes.

By Pete Barnes
January 15, 2021

3bugsmom / iStock

Technology is now an essential part of education, as the vast majority of schools are using it to provide remote and hybrid instruction during the pandemic. Even when at school, many students rely more on iPads, laptops, and learning apps than on textbooks, spiral notebooks, and the learning tools of the past.

But technology has its limits. Wi-Fi goes down, apps sometimes don't work, and students suffer when they stare at screens for hours at a time. (And that's not to mention the fact that kids don't all have the same access to technology.) Kids

learning about science remotely, in particular, need opportunities to interact with their surroundings, observe and collect data, and draw conclusions about it.

4 LOW-TECH ACTIVITIES FOR DRAWING SCIENTIFIC CONCLUSIONS

I've done these activities with my fifth graders, but they can be adapted for most elementary grades, with appropriate parental supervision. Though these activities are designed to mostly avoid screens—one involves taking photos—some technology might come in handy at times: Students can report their findings by taking photos and/or uploading their findings using Padlet or other sharing tool, or answer open-ended questions on a Google Doc or Notability.

1. Explore sound: Prior to engaging with this activity, ask students to think about this question: What solid material conducts sound the best? They will need a coin and a partner (most likely a parent or sibling in our current situation). Have students choose three or four long surfaces, like floors, walls, driveways, fences, or railings inside or outside their homes. The partner will tap steadily with the coin while the student places their ear directly on each surface. Students draw conclusions from the following:

- How far away can you get from your partner and still hear the tapping?
- Which surface do you think transmits sound the best? How about the worst? Why?

Another way to survey the physics of sound is to have students put some water in a crystal wine glass, wet their finger, and rub it around the edge of the glass. Then they can answer these clarifying questions:

- Do you hear a high-pitched sound as the glass resonates?
- If you add more water to the glass, does the pitch go higher or lower? Why?

Share this hint: Solids, like metal and wood, are much better than air at transmitting sounds because their tightly packed molecules transmit sound waves quickly. Heavier things vibrate more slowly, which creates a lower frequency vibration and a lower pitch sound.

2. Investigate light: Prior to engaging with this activity, ask students to think about this question: Why do we see rainbows, and how can we bend light? They will need a CD or DVD. Have them tilt the CD or DVD against a bright light, and move it around until the tiny ridges reflect a rainbow. Ask them to draw conclusions from this question: Can you bend or refract light, but without the rainbow?

Here are some other ways to direct kids to make rainbows at home:

- Use a prism or a piece of glass with edges to create a rainbow when a bright light hits it.
- On a sunny day, spray water from a garden hose, find an oil slick, or put a mirror in a glass of water to create rainbows.

Share this hint: Anytime an object is magnified, like with a magnifying glass, eyeglasses, binoculars, or even a glass of water, it is because the light is bent or refracted.

3. Inspect force and motion: Prior to engaging with this activity, ask students to think about this question: Which ball has the most inertia? Students can demonstrate inertia at home with several different-sized balls and a cardboard box (the size of a shoe box or larger). Direct students to place the box on the ground and then roll each ball toward the box using a bowling motion. Ask them to draw conclusions: Which ball pushes the box the farthest distance? Why?

Another way to experiment with force and motion is to calculate speed. For this activity, instruct students to calculate the speed (distance divided by time) of their family members or friends in an outdoor race. Have students measure out 10 meters, or 10 yards, and time how long it takes each person to run the distance, and then calculate their speed. Encourage students to enhance the fun by doing one-legged races or backward races, or partnering up for a leapfrog race.

Share this hint: Heavier objects have greater mass and inertia, which means when they are in motion they exert more force.

4. Examine the mysteries of life science: Prior to engaging with this activity, ask students to think about this question: What makes things disappear once they die? They will explore the great outdoors (or at least a yard or park). Direct students to search their neighborhood or local park for mushrooms and other decomposers. They can turn over old logs or large rocks to find worms, beetles, and roly-polies (isopods) eating up

dead matter. Ask them to take photos of all of the different kinds of decomposing matter they find, and remind them to be sure to record the dates and pay close attention to the signs of spring starting.

Another life science idea requires students to make observations. Have students answer these questions in a nature journal:

- What trees or plants in your neighborhood show signs of spring first?
- What colors do you see blooming?
- What about birds or other animals?

Share this hint: Decomposers like fungi, worms, beetles, and bacteria break down dead things and add them back to the soil.

Kids enjoy science, but they don’t always remember that science is all around them. Get them out there searching and collecting scientific evidence, and remote or hybrid school will feel a lot more fun.