



# FACILITATOR GUIDE

## Land Cover

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### Learning objectives

Learners engaged in this activity will explore these main ideas:

- The movement of water over a landscape is a constant force of change.
- Different types of land cover interact with water moving over the landscape in different ways.
- NASA scientists use observations from Earth and space to monitor changes and make predictions about the future of our planet.

### Materials

- Small double-sided paint tray
- Aquarium pebbles (about 5 pounds)
- Plastic aquarium plant
- Small net (“berry net”)
- Pitcher
- Water
- Blue food dye (optional)
- Microfiber cloth or sponge
- Larger tray (cafeteria style)
- Sign, sign stand, information sheets, and activity and facilitator guides
- GLOBE Observer postcards
- “Map your Backyard Land Cover!” worksheet
- “Tips for Leading Hands-on Activities” sheet

**The Explore Science toolkit comes complete with all necessary materials for this activity.** Materials are also readily available to create or restock activity kits. Most of the materials in this activity can be purchased through hardware stores, craft stores, or ordered online. The plastic plant and pebbles can be found through aquarium supply companies. The small red “berry” nets are originally used to contain berries and other small produce. All graphic files can be downloaded from [www.nisenet.org](http://www.nisenet.org).

## Safety

This activity includes very small pebbles. Although the pebbles are too small to be considered a choking hazard, instruct young children that the pebbles should not be swallowed or placed in the mouth.

## Advance preparation

Before you begin:

- Fill the pitcher with water (add blue food dye if desired, and stir to mix).
- Place the plastic plant at the top of one side of the small paint tray, and loop the small red net around the edges of the plastic plant.
- Add a small handful of pebbles (approximately  $\frac{1}{2}$  cup) into the side of the tray with the plant. Add another small handful of pebbles into the other side of the paint tray.
- Place the prepared small paint tray on top of a microfiber cloth and the larger cafeteria-style tray to prevent water spills. You may also want to have paper towels or a sponge on hand.

**This activity requires a reset.** Use the sponge to soak up the water from each side of the tray. You can squeeze the water back into the pitcher. You can also use the sponge to move the pebbles back up to the top of the tray. Try to keep an even amount of pebbles on either side of the tray as different visitor groups use the activity. The physical toolkit also comes with two complete sets of materials for the small tray-pebble-plant setup. You can have multiple groups working at one time, or alternate between the trays to minimize reset time.

## Notes to the presenter

This activity models some of the ways natural processes, such as erosion and sediment pollution, affect Earth's landscape. The water in the pitcher represents water runoff from rain or flooding, and the pebbles represent Earth's land cover with and without vegetation. The red net around the plant represents the root structure of the vegetation.

Data collected from satellites, such as the joint NASA/USGS Landsat satellites, help improve our understanding of Earth's land cover. Orbiting Earth, these satellites monitor changes to land cover to help scientists predict changes due to runoff and erosion, and plan for the future. The GLOBE Observer postcards and Map Your Backyard Land Cover worksheet in this activity can help learners participate in some of the ways people in museums and schools can participate in citizen science programs to photograph and classify land cover in their area and share the data with researchers who collaborate with NASA.

Young children may require assistance to slowly pour the water, since the pitcher may be heavy for them and they are still developing their fine motor skills. This activity is

excellent for all ages, and allows even young children to engage in science process skills, such as making predictions, observing, comparing and contrasting, and constructing explanations.

### **Conversational prompts**

Water runoff and erosion result in the transfer of water and soil from fields to adjacent land or water. As participants pour water over each side of the tray, encourage them to talk about what they observe.

Try asking questions like: Why does the side with the vegetation hold back the pebbles? Why is it important for scientists to study erosion and where it is likely to occur? How can policy makers and land managers use this information? Which side would you rather build your home on and why?

Some visitors in urban settings may have less experience with erosion, but may be more familiar with stormwater runoff on streets and sidewalks. Encourage participants to image what particles and sediment (or trash) that water carries, and think about why that might be a problem for local waterways.

### **Difficult concepts**

While this activity does not specifically address the causes of global climate change, you may find that you engage with some visitors on this important topic. Some participants might dispute climate change. You can respectfully respond, “Yes, while not everyone is in complete agreement about climate change, the great majority of scientists agree it is occurring, and we have a lot of supporting evidence. We are presenting the scientific perspective on the importance of studying Earth from above in this activity.” A Landsat satellite provides impartial, unbiased data that show changes of Earth’s land cover. This activity is designed to focus on tools that scientists use to study Earth and how the data are used to make decisions.

Erosion occurs over a variety of timescales. It doesn’t always happen quickly—it often takes place over long periods of time, even millions of years. Erosion happened in the past but is also currently happening and will continue in the future.

While it might not seem logical to visitors, even small amounts of flowing water can have significant effects on “strong” solid materials like rocks and buildings over long periods of time.

In some cases, erosion can benefit our society. Sometimes, erosion of sediment in rivers creates fertile delta areas at the mouth of the river.

## Staff training resources

Refer to the “Tips for Leading Hands-on Activities” sheet in your activity materials.

- An activity training video is available at [vimeo.com/304240399](https://vimeo.com/304240399)
- A content training video is available at [vimeo.com/304240277](https://vimeo.com/304240277)
- Additional training videos on misconceptions and facilitation can be found at [vimeo.com/album/4249834](https://vimeo.com/album/4249834)
- The NISE Network has a curated list of programs, media, and professional development resources that directly relate to the toolkit. These resources can be viewed and downloaded from [www.nisenet.org/earthspacekitextensions](http://www.nisenet.org/earthspacekitextensions).

## Credits and rights

This activity was adapted from a variety of educational resources by Arizona State University. And was developed for the NISE Network by the Arizona State University and the Sciencenter.

Image of rain garden courtesy E-Landscape, Specialty Solutions, LLC.

Artist’s impression of Landsat 8 over Earth courtesy NASA/ EOS



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