



FACILITATOR GUIDE

Rising Sea

Learning objectives

This activity explores the following ideas:

- Earth's sea levels are rising, submerging land and causing coastlines to recede.
- Rising sea levels will have major consequences for people all around the world.
- Scientists are monitoring the sea level, providing information that can help us prepare for and adapt to the changing ocean.

Materials

- Basin and landform
- Clear acrylic
- Jason-3 satellite model
- Colored dry erase markers
- Eraser
- Large pitcher for water
- Water
- Blue food dye
- Sponge (or paper towels)
- *Observing Earth* information sheet
- Activity and facilitator guides
- Optional: Tablet or computer to display [Jason-3 Mission](http://www.nesdis.noaa.gov/jason-3/) (<http://www.nesdis.noaa.gov/jason-3/>)
- Optional: Tablet or computer to display [Images of Change](http://climate.nasa.gov/images-of-change) NASA website (<http://climate.nasa.gov/images-of-change>)

The Explore Science toolkit comes complete with all necessary materials for this activity. Materials are also readily available to create or restock activity kits. Graphic files can be downloaded from www.nisenet.org. The basin provided in the physical kit is custom-made. To create your own basin and landform, use a plastic bin and water-resistant modeling clay. You can make measured tick marks on the basin to guide how much water is added for each new contour on the topographic map. Tick marks should be approximately one-quarter inch apart. You can use Lego® bricks to create a model satellite overhead, add buildings, and make other features on the Earth's surface.

Advance preparation

Before you begin:

- Fill the pitcher with water and color it blue with a few drops of food dye.

Notes to the presenter

Be sure to have a sponge or paper towels on hand in case there are any spills.

When the basin is placed on a table, it can be difficult for children and participants in wheelchairs to get a bird's-eye view of the basin and trace the landform. It might be helpful to have a stool or bench for smaller participants to kneel on, or to place the model on for easier access.

Some participants may choose to spend quite a bit of time carefully tracing their lines to create a map. On busy days use both basins and all the plexi sheets to allow for more participants. Once visitors have finished tracing, you can continue your conversation about rising seas while you reset for the next group.

You can use the Jason-3 satellite model both to attract visitors over to the activity, and to help illustrate how NASA missions are observing Earth from above. See below for more tips about ways to use the model satellite.

Conversational prompts

This activity provides a hands-on model of an important change that is occurring on Earth: sea level rise and the corresponding inundation of coastal land by water. Participants also create a topographic map that documents this relationship. As you facilitate the activity, you can ask questions that prompt participant observation and reflection, and provide opportunities for you to share relevant information.

As you engage participants, you can find out how much they know about NASA and what it does. You might ask, "What do you know about NASA?" Many people are surprised to learn that NASA studies Earth, as well as space.

Participants are likely to ask about the model satellite. This provides an opportunity for you to explain that NASA uses various satellites, orbiting our planet, to take images and collect important data to learn more about what is happening on Earth. You can explain that NASA's Jason-3 mission uses a satellite to measure the height of the surface of the ocean.

It's important to connect the concept of rising sea levels to the inundation of land (as the water rises, more land is under water) and to climate change. Participants are likely to observe this themselves as they pour water into the basin. You might ask them to consider why it's important to track sea level change. The topographic map is a visual record of the change happening to the model landform as water rises. To help make this connection, you can ask, "Are you aware that sea levels are rising over time? Do you know why this is happening?"

Difficult concepts

The global sea level is rising over time due to climate change. This is different from the daily rising tides caused by gravitational forces exerted by the Sun, Moon, and rotation of Earth, or by extreme weather events—which are also related to climate change. You can explain, “Yes, there are many different changes to the sea level and the coastline. Some of those changes are short-term and regular, like the rise and fall of the tides every day. Some of those changes are short-term and temporary, like storms that create floods on land. And some of those changes are long-term and potentially permanent, like the increase in sea levels due to climate change.”

Some participants might think that melting glaciers and ice wouldn’t change the sea level because it would be like an ice cube melting in a cup of water. You might say, “Yes, it’s hard to envision how sea levels can rise because Earth is so big, and there are so many different sources of water and ice. One thing to remember is that right now a lot of ice and snow is on top of land. But when it melts it flows into the ocean and adds to the total amount of water in the ocean.”

Some participants might dispute climate change. You can respectfully respond, “Yes, not everyone is in complete agreement about climate change. The great majority of scientists agree it is occurring, and have a lot of supporting evidence. We are presenting the scientific perspective on sea level rise in this activity.”

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/191167849.
- A content training video is available at vimeo.com/191171598.

The NISE Network has a curated list of programs, media, and professional development resources in the NASA Wavelength Digital Library that directly relate to the toolkit. These resources can be viewed and downloaded from nasawavelength.org/users/nisenet.

Credits and rights

This activity was inspired by The Clay Topo Map activity from NASA Space Place. Retrieved from: <http://spaceplace.nasa.gov/topomap-clay>

Artist's illustration of Jason-3 courtesy NASA/JPL-Caltech.

Observing Earth composite image courtesy NASA Goddard Space Flight Center by Reto Stöckli.

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