

Discovery Theater



Recommended for
Ages 5 to 10
Grades K to 5



MOTHER EARTH AND ME

A Reproducible Learning Guide for Educators

This guide is designed to help educators prepare for, enjoy, and discuss the show. It contains background, discussion questions and activities appropriate for Ages 5-10.

Programs Are Made Possible, In Part, By Generous Gifts From:

Smithsonian Women's Committee

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Sommer Endowment

ABOUT THE PLAY

The magic of earth science takes center stage in this fun, interactive Discovery Theater original.

Explore the origins of our planet, sing about the water cycle, and understand our vital role to protect the ecosystem. Science and folklore about the “**big blue marble**” we call home -kick off Earth Month, and audiences become Earth Warriors and take home some great ideas to start right away!

Earth Origin Stories

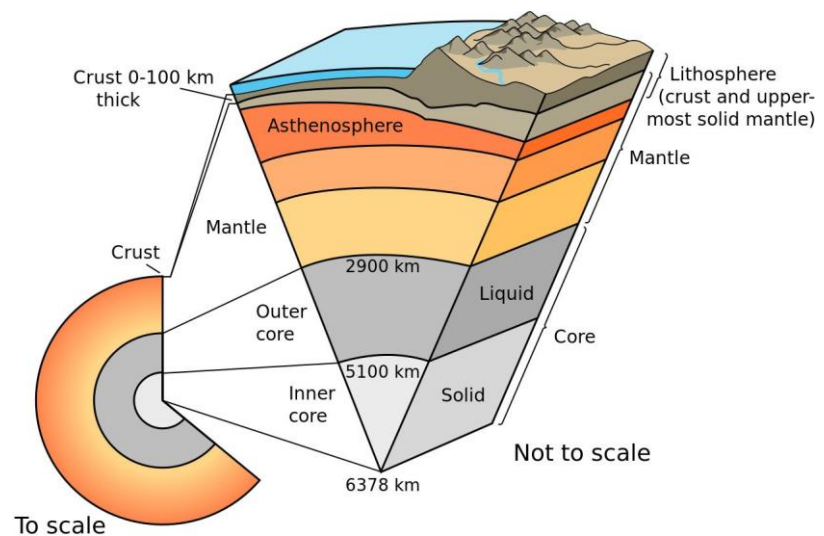
In our play, you will hear stories of the Bini (West African) and the Belauan (Palau) people. Many different stories have been passed down that talk about how the Earth came to be from all over the world. These cultures have all crafted unique stories that explained what they were seeing and experiencing like weather, movements of the Earth and Sun, and the seasons.

Explore this [Smithsonian Learning Lab Collection](#) about Origin Myths from Around the World.

Layers of the Earth

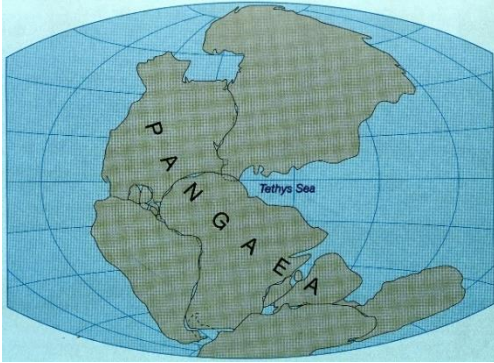
We can think about the Earth as having many different layers. The innermost layer is the **core**. The middle layer is the **mantle**. The outermost layer, where life occurs, is called the **crust**.

Chunks (or plates) of rocks make up the **lithosphere**, which is all of the crust and part of the **upper mantle**. This rock is flexible, but not liquid. The hot, liquid rock is underneath the lithosphere and helps the lithosphere move around.



PANGAEA

Imagine North America touching Africa, South America and Europe! 300 million years ago, the different plates of the earth were in very different positions.



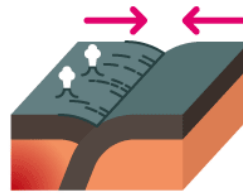
The large continent, or supercontinent, created by all of the separate continents that we know today is **Pangaea**.

Over millions of years, continents have changed. Think about it! We no longer have Pangaea. Instead, we now have 7 recognized continents: **Africa, Europe, Asia, North America, South America, Australia, and Antarctica.**

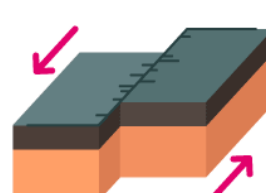
Plate Tectonics

The movement that caused Pangaea to break up is not an accident, it's **plate tectonics**!

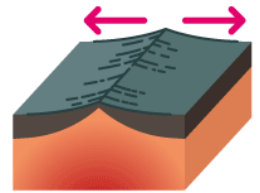
This is a scientific theory that the earth's surface is made up of several plates of rock that float on top of molten rock. Overtime, these plates shift on top of the molten rock. They might drift further away, crash into one another, or shift alongside the neighbors. These movements cause the formation of mountains, volcanoes, and earthquakes.



Subduction



Lateral sliding



Spreading

Experiment Time!

Inspiration for this activity comes from [Science Sparks](#). In this experiment, you are going to become a geologist and investigate **plate tectonics** and how they might interact.

Materials:

- 1 Orange
- Toothpicks
- Paper Plate
- Jam or Jelly (optional)



Instructions:

- Peel your orange carefully, keeping the peel in as large of a piece as you can.
- Rip the peel into 3-4 pieces.
- Use toothpicks to place the peel back onto the orange like a puzzle. You have created tectonics plates on your "Earth"

Where do pieces of orange peel crash into each other? This is a **convergent boundary**.

Where do pieces of orange peel leave gaps? This is a **divergent boundary**.

Challenge: Before putting the pieces of peel back together, cover your orange in jam. This jam might affect the movement of your plates and models molten rock in the upper mantle!

WATER CYCLE



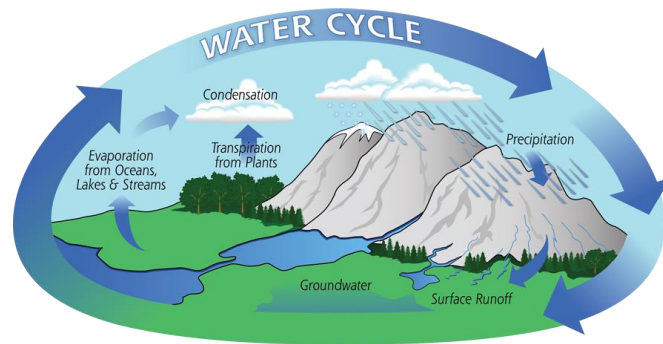
Photo from
Smithsonian
American Art
Museum

Photo from
National
Museum of
American
History



Water is an important resource for all living things. Without it, we would not have life. Water appears in art and stories throughout human history and often has spiritual or religious meanings.

The water cycle describes how water moves from the Earth's surface (**evaporation**), concentrates in the atmosphere (**condensation**), then returns to the earth's surface (**precipitation**) and enters the earth's soil (**infiltration**).



What is your precipi -type?

Precipitation is an important part of the Water Cycle and comes in many forms.

Try this [interactive quiz](https://www.noaa.gov/education/multimedia/photos-images/what-is-your-precipitype-take-our-precipitation-personality-quiz-to-find-out) from the National Oceanic and Atmospheric Administration (NOAA) to find out what kind of precipitation you identify with. Are you more rain, hail, sleet, or snow?

<https://www.noaa.gov/education/multimedia/photos-images/what-is-your-precipitype-take-our-precipitation-personality-quiz-to-find-out>

Types of Precipitation

Rain: Precipitation that falls to earth as liquid droplets

Snow: Precipitation that falls as ice crystals. Snow has complicated structures called snowflakes!

Sleet: When a thin layer of warm air is between two layers of cold air, sleet is formed. Precipitation from the top layer of cold air falls, melts in the warm air and then re-freezes.

Hail: Precipitation that freezes in clouds in a layer of cold air. As they grow and more water freezes, they get heavy and fall to the ground.

RECYCLING: A BRIEF HISTORY



Photos from
National Museum of American History

Did you know that recycling is older than the United States? Reusing and repurposing old clothes and fabrics helped create newspapers and books in Philadelphia in the 1690s.

Throughout American History, people have turned to reusing and recycling materials. During periods like World War II, Americans answered the call to recycle all kinds of material to provide equipment and aid to soldiers fighting in Europe and the Pacific.

However, it was not until the 1970s that Americans began to hear “Reduce, Reuse, Recycle.” At that time, the Federal Government and citizens throughout the country had a renewed sense of protecting the environment. After World War II, landfills began to fill up and people began to notice that the health of the environment was declining.

Earth Day was created at this time and recycling became a popular movement. It encouraged people to **reduce** the amount of trash they used, **reuse** materials at home, and **recycle** other items that could be remade into new things.

Class Discussion

Before the Show

- What do you recycle at your home?
- What kinds of objects CAN'T be recycled?
- What do you wonder about how the Earth works?

♦

After the Show

- How might your choices about recycling help or hurt the Earth? What about the Water Cycle?
- Have you heard or learned about any other stories like King Oba's?
- What other stories about Mother Earth do you know?
- What is one lesson you learned from the play?

Thinking About Climate Change

The climate is different from the weather! Weather is what is happening in the atmosphere on any day. This includes things like precipitation, temperature, wind speed, and humidity. Climate is the weather pattern over a long period in one area.

Climate Change is when the climate in an area changes over time. The Earth is always undergoing climate change as different parts of the environment change or influence the atmosphere (think about the water cycle, it's all connected). Right now, humans are speeding up natural climate change patterns when we use fossil fuels (like oil and gas) and generate pollution.

There are things that we all can do to prevent climate change from reaching a dangerous level. Some things you can do are planting and eating more plants, conserving electricity and water, and cutting down the time that you use cars.

What are some other ways that you can help to protect the environment and be aware of climate change?

Vocabulary

Theory – An idea based on experiments and data that explains how or why something happened

Tectonic Plate – Large, rigid pieces of the Earth's lithosphere that move and interact with each other, causing earthquakes, volcanic activity, and the formation of mountains

Conservation - The protection and preservation of natural resources

Landfill- A large area of land where garbage is disposed of and buried under layers of soil

Recyclable- Materials that can be processed and used again to make new products, such as paper, plastic, and glass

Recycling Project Ideas for Home and School

- Create a **quilt** out of old t-shirts and clothes that don't fit or are not wearable anymore.
- Use **plastic bottle caps** to create suncatchers or **windchimes** to celebrate nature! Using materials from around your house, build a **recycled city**!
- **Coffee Cans** can be painted and decorated for containers and organizers around the house, and also make great opportunities for bug/bee hotels.
- A **large liter bottle** can be turned into self-watering planters.

Talk about recycling magic!

BOOKS

We Are Water Protectors by Carole Lindstrom, illustrated by Michaela Goade. (Ages 3 and Up).

Water Cycles by DK Life Cycles. (Ages 5 to 9)

The Street Beneath My Feet by Charolette Guillian. (Ages 4 to 7) **The Barefoot Book of Earth Tales** by Dawn Casey. (Ages 7 to 12)

Super Earth Encyclopedia by DK and Smithsonian. (Ages 8 to 13)

Wonder Walkers by Micha Archer (Ages 3 to 7)

Ducks Overboard! A True Story of Plastic in Our Oceans by Markus Motum.
(Ages 7 to 10)

Recycle and Remake: Creative Projects for Eco Kids by DK. (Ages 6 to 9)

What a Waste: Trash, Recycling, and Protecting Our Planet by Jess French
(Ages 4 to 9)

When the Whales Walked: And Other Incredible Evolutionary Tales by Dougal Dixon
(Ages 8 to 12)

Earth Shattering Events by Robin Jacobs. (Ages 6 to 12)

Rhythm of the Rain by Grahame Baker-Smith (Ages 2 to 6)

WEBSITES

- ♦ [*Reduce, Reuse, Recycle Resources for Students and Educators*](#) from the Environmental Protection Agency
- ♦ [*Garbage to Gardens*](#) from Smithsonian Gardens
- ♦ Use this [*Tectonic Explorer*](#) to investigate how plate tectonics and continental shift occur.
- ♦ Explore [*Geology*](#) at Kids Discover! Online
- ♦ Explore more information about [*Recycling*](#) at Energy Kids!

Check out Discovery Theater on Smithsonian Learning Lab:
[*www.learninglab.si.edu/q/ll-c/85ytqAT21jm9DRPG*](http://www.learninglab.si.edu/q/ll-c/85ytqAT21jm9DRPG)

OUR MISSION

"THE INCREASE AND DIFFUSION OF KNOWLEDGE"



Smithsonian Associates advances the Institution's mission through life-enriching educational and cultural experiences inspired by the Smithsonian's research and collections for DC-region students, families, and adults, and for learning communities nationwide.

Discovery Theater has been presenting DC-area children with live educational performances for more than 60 years. With programs that enrich the Smithsonian experience for nearly 50,000 children annually, Discovery Theater is a gateway to the exhibits, collections, and themes contained in the museums and galleries on the National Mall and beyond. We explore American history and cultures, folk tales from around the world, and exciting, accessible science and math programs in the company of puppeteers, storytellers, dancers, actors, and musicians. Discovery Theater performances unite ideologies, enact themes that reflect the diversity of its audiences, open avenues of self-reflection, and offer an enjoyable means for parents and teachers to demonstrate life's lessons.

There's so much to do and explore at the Smithsonian—and Discovery Theater is the ideal place to begin!

For more information, please visit our website www.discoverytheater.org



Smithsonian Associates

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