



**MOTHER  
EARTH AND  
ME**

*Recommended for Ages 5 to 10*

### A Reproducible Learning Guide for Educators

This guide is designed to help educators prepare for, enjoy, and discuss *Mother Earth and Me*. It contains background, discussion questions and activities appropriate for ages 5-10.

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## EARTH AS A MOTHER

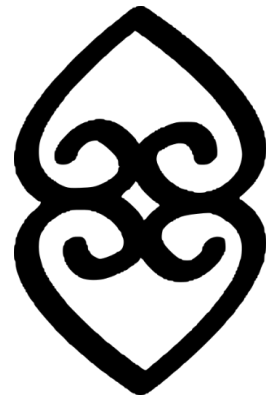


**GAEA:** The **Greek goddess** of the Earth. She was born from Chaos, the emptiness of the universe. Gaea's two sons, Pontus and Uranus, became the sea and the sky. She is also the great-grandmother of the Greek god Zeus! Because she represents the Earth, Gaea was worshipped throughout Greece and many poets – like Hesiod – were inspired to write about her.

Learn more about Gaea at:

<http://www.pantheon.org/articles/g/gaia.html>

**ASASE:** The Earth goddess from the **West African Ashanti** people. She is the wife of the sky god who created the universe; she is also the mother of Anansi, the trickster, who appears frequently in Ashanti stories. Although there are no temples to worship Asase, she is worshipped by the Ashanti farmers who ask for good harvests. Asase's symbol, the Asase Ye Duru, represents the importance of the Earth in providing life and that it is a source of great power.



**MOTHER EARTH:** In many Native American Cultures, like the **Lakota and Lenape**, the Earth is also portrayed as a mother figure. Because the Earth is sacred, all of the Earth's plants and animals are sacred as well. These Native American Cultures respected their **natural resources** and used almost all parts of plants and animals to avoid being wasteful. They frequently performed prayers after hunting an animal, to thank it for the food it would provide them. Native American communities are advocates for protecting the Earth from Climate Change.

*"With this sacred pipe you will walk upon the Earth, for the Earth is your Grandmother and Mother, and She is sacred. ... The two-leggeds and all the other peoples who stand upon the earth are sacred. ... All the fruits of the wingeds, the two-leggeds and the four-leggeds are sacred."*

*--Lakota Chief Black Elk*



## WHAT IS PANGAEA?



Have you ever looked at a map of the world and thought the shapes of the continents could fit together? Scientists now believe that, a long time ago, all of the continents were stuck together like a giant puzzle, forming one enormous landmass, or **supercontinent**, called **Pangaea** (pan-JEE-ah). The name "Pangaea" means "All Earth," and it comes from the Ancient Greek word *pan* ("all") + *Gaea*, the name of the Earth goddess in Greek mythology. Pangaea existed from about 270 million

years ago to about 200 million years ago. During this period of time, a variety of animals and plants evolved, including the earliest mammals and dinosaurs.

Scientists have found **fossils** of *Glossopteris*, an ancient plant, and *Mesosaurus*, a reptile, in both South Africa and South America. Today, these two locations are separated by the Atlantic Ocean, but the fossil evidence tells us that, millions of years ago, they were attached by land.

**Fossils** are the remains of ancient plants and animals (or their traces, like footprints) that have been preserved in earth or rock.

How did the continents get to where they are today? Watch this animation to find out:

<https://vimeo.com/14258924>.

## MAKE YOUR OWN FOSSIL!

### MATERIALS:

1. ½ cup flour
2. ½ cup used coffee grounds
3. ¼ cup salt
4. ¼ cup sand
5. Water
6. Fossil Objects (sea shells, plastic dinosaurs, leaves, or other small objects)



### DIRECTIONS:

1. To make your authentic-looking dough, mix all the dry ingredients together in a bowl.
2. Add water a little at a time until you have a thick dough. It needs to be about the right texture – not crumbly, but not too wet and sticky either.
3. Knead the dough with your hands, and then flatten it on your work surface. It needs to be a couple of centimeters thick.
4. Carefully press your fossil objects into the clay until you get good impressions, then remove them.
5. Let your clay fossil dry thoroughly for a few days.

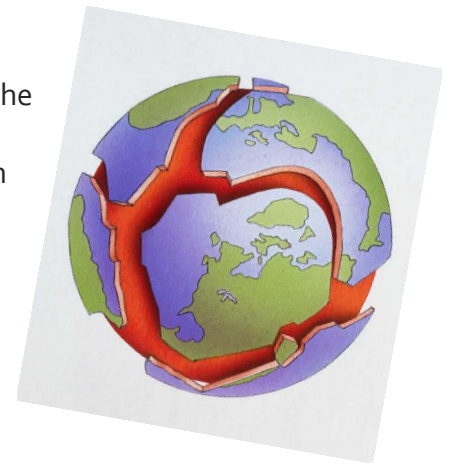
For more information, please visit:

[www.madaboutsience.com.au/store/index.php?main\\_page=page&id=52](http://www.madaboutsience.com.au/store/index.php?main_page=page&id=52)



## TETONIC PLATES

The land we're standing on may seem fixed in place, but it's actually moving very, very slowly. This is because the outer layer of the Earth, the **lithosphere**, is made up of a number of different sections, called **tectonic plates**. There are continental plates and oceanic plates, which are denser. The plates float on the **mantle**, which is a layer of Earth made up of very hot rock. The mantle is mostly solid, but the heat and pressure within the Earth can cause it to partly melt and to flow like a thick liquid, like Silly Putty. Currents in the mantle cause the gradual motion of tectonic plates over millions of years. Earthquakes and volcanoes usually occur where tectonic plates meet.



For more information, please visit:

<http://www.enchantedlearning.com/subjects/dinosaurs/glossary/Pangaea.shtml>

## TETONIC PLATE EXPERIMENT

### MATERIALS:

1. Graham crackers
2. Cool Whip or other soft food, like frosting
3. Red and orange food coloring (optional)
4. Plates



### DIRECTIONS:

1. Spread a thick layer of Cool Whip onto a plate to represent the mantle. You may want to add red and orange food coloring to show that the mantle is very hot.
2. Place two graham crackers on top of the Cool Whip to represent the tectonic plates that make up the Earth's rigid crust.
3. To demonstrate a **transform boundary**, gently push the crackers together, then slide one up and the other down. Notice how it feels when the edges of the crackers rub against each other. Why might this type of boundary cause **earthquakes**?
4. To show a **divergent boundary**, press the crackers gently into the Cool Whip while moving them apart. What happens to the mantle between the two plates?
5. Make a **subduction zone** by pushing one cracker partway under the other. Why do you think **volcanoes** form in a subduction zone?
6. Make a **convergent boundary** by dipping one end of each cracker in water, then placing them back on the Cool Whip and gently pushing the soggy edges of the crackers together. Can you see how this type of boundary makes **mountains** form?
7. Eat your model tectonic plates!

## THE WONDERFUL WATER CYCLE

Part of being an Earth Warrior is taking care of our planet's water. First, let's take a look at the water cycle!

### THE WATER CYCLE

1. Evaporation/ Transpiration
2. Condensation
3. Precipitation
4. Infiltration

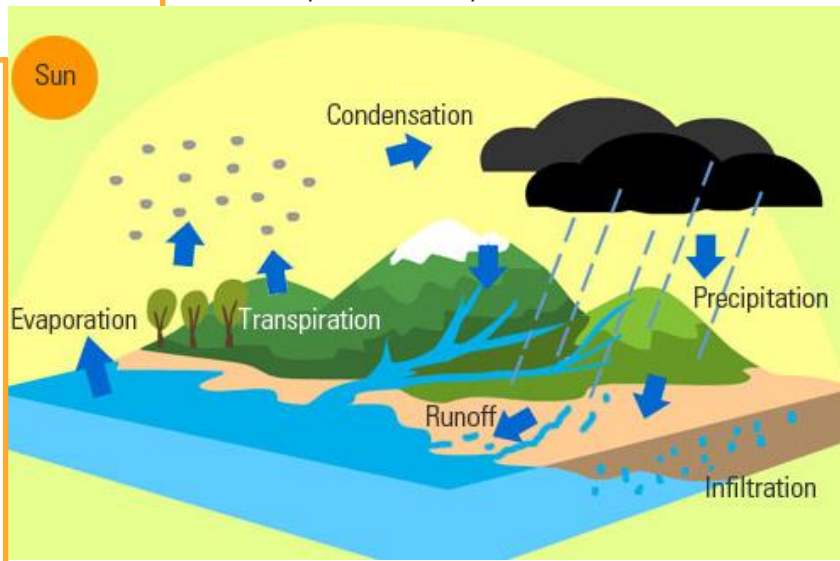
### EVAPORATION (liquid to gas)

When the sun heats water molecules on earth, they start moving very fast, hitting each other and then bouncing farther and farther apart until they aren't in liquid form anymore – they're a gas. Then the gas can rise up into the sky and form clouds.

### TRANSPORTATION

(from trees)

Plants lose water out of their leaves, almost like sweating. The water from the leaves is then evaporated into the air as well. This is another reason that trees are such an important part of our environment.



### CONDENSATION

(gas to liquid)

Once the water vapor has formed clouds, the molecules get close together again and form drops.

### INFILTRATION

When water falls onto the land, it soaks into the soil and replenishes the ground water. This allows plants to grow and environments to stay healthy.

### PRECIPITATION

When the drops of water get so heavy that air can't hold them up any longer, the water falls to the ground in the form of a liquid, like rain, or a solid, like snow or hail. The temperature of the air affects the form the water takes when it falls.

For more information please visit: <http://www.eschooltoday.com/water-cycle/the-water-cycle.html>

## EARTH DAY!

Celebrated every year on **April 22<sup>nd</sup>**, Earth Day is a time to learn about our planet and to think about ways that each of us can take action to protect the environment. Earth Day was founded in 1970 by Senator Gaylord Nelson, who wanted to raise awareness about air and water pollution. Today, people around the world celebrate Earth Day in big ways (festivals and rallies) and small ways (planting a tree) – there are many ways to be nice to planet Earth! Best of all, you don't have to wait for Earth Day to do your part for our planet: **Earth Day is Every Day!**



For more information please visit: <http://www.earthday.org/earth-day-history-movement>

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## PROTECTING OUR WATER

Life on Earth depends on the water cycle! But it's important to realize **that there is a LIMITED amount of water on the planet.** The water cycle can't make any more water; it just recycles the water that already exists. In addition, only about 1% of that water is suitable for human uses like drinking and agriculture. That means it's especially important to protect the water we have. If we ruin it through pollution, there isn't any more.

Let's look at some of the things that can go wrong with the water cycle, and ways that you can help!

**OVERUSE OF WATER:** One major problem is simply that we use too much water! That is, humans are using up the water in our lakes, rivers, and *aquifers* (underground layers of rock that contain water) faster than it is replaced by precipitation.

**What YOU can do:** There are many ways to **reduce your water use** in daily life! Make sure to turn off the water while brushing your teeth or washing dishes. Take shorter showers – you can even make this a game by trying to beat your time or seeing who can take the shortest showers in your family. Ask your parents to only run the laundry machine and dishwasher when they are full.

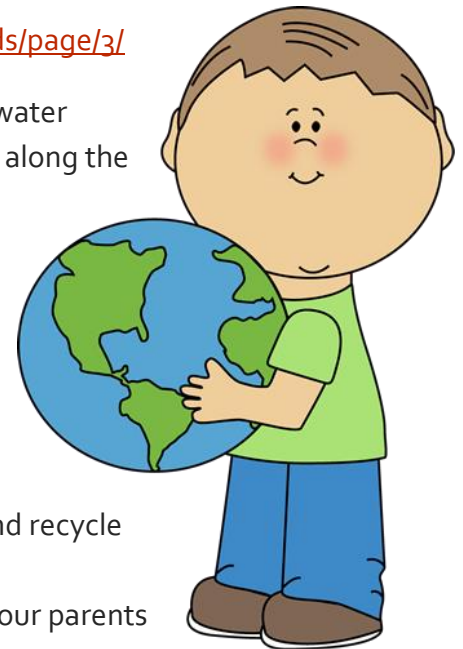
For more information please visit: <http://wateruseitwisely.com/tips/category/kids/page/3/>

**WATER POLLUTION:** One of the main causes of water pollution is **runoff:** as water from rain or snow flows into our rivers, lakes, and aquifers, it picks up pollution along the way. In towns and cities, runoff can carry heavy metals, oils, or other toxic chemicals. Agricultural runoff from farms can include pesticides, fertilizers, and animal waste.

Water pollution is also caused by all the plastic and other waste that we throw away. This trash ends up in the ocean, where it can take hundreds of years to decompose and is harmful to ocean animals that may eat it or get caught in it.

**What YOU can do:** Make sure you put trash in the correct container, and recycle whenever possible!

Don't pour chemicals, paint, or medicine down the drain. Instead, ask your parents to find out where to dispose of these pollutants safely.



For more information please visit: <http://kidsenvirohealth.nlm.nih.gov/topic/004/water-pollution/>  
<http://eschooltoday.com/pollution/water-pollution/what-is-water-pollution.html>

## REDUCE, REUSE, RECYCLE

Three things YOU can do to protect the Earth.

**REDUCING** means making something smaller. When we take only what we need, we **reduce** the amount of waste we produce and help the environment!

- Buy only what you need, and use all of what you buy.
- Choose products that use less packaging. For example, buy a big bottle of juice instead of lots of smaller bottles.
- Bring your own bag to the grocery store. (Americans throw away **100 billion** plastic bags every year!)



**REUSING** things instead of throwing them away is a great way to reduce your environmental impact!

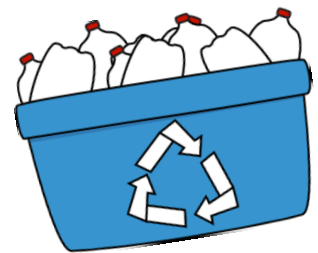
- Choose reusable items, like metal forks instead of plastic ones.
- Thirsty? Grab a reusable water bottle or travel mug instead of buying bottled water!
- If you don't want something anymore, like a toy or piece of furniture, give it to someone else or donate it to charity instead of throwing it away.
- Ask your parents to help you fix broken toys instead of buying new ones.



**RECYCLING** is the process of turning used waste and materials into new products. This prevents potentially useful materials from being wasted as well as reducing energy use and pollution. Recyclable items listed below.

- **Plastic Bottles**
- **Glass Bottles and Jars**
- **Cans**
- **Paper** (including newspaper, magazines, writing paper)
- **Cardboard boxes**

*Find out what else you can recycle in your area!*



Watch this video to find out what happens when you recycle plastic! <https://youtu.be/ccubxZfwUFI>

For more tips, see:

<http://kids.niehs.nih.gov/explore/reduce/>

<http://educators.brainpop.com/lesson-plan/reduce-reuse-recycle-background-information-for-teachers-and-parents/?bp-jr-topic=reduce-reuse-recycle>

<http://www3.epa.gov/recyclecity/index.htm>



## TAKE THE EARTH WARRIOR OATH!



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I PROMISE... TO LEARN ABOUT  
CARE ABOUT  
AND LOVE THE EARTH  
AND HER WATERS, AIR AND LAND.

I WILL DO WHAT I CAN  
LITTLE AND BIG  
TO HELP HER HEAL

SO THAT ALL OF US CAN LIVE.

WE ARE EARTH WARRIORS!

Sign Your Name Here:

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## SMITHSONIAN CONNECTION

After the show, head on over to the *National Museum of Natural History* and learn more about the Earth in the *The Janet Annenberg Hooker Hall of Geology, Gems, and Minerals*. This permanent exhibit features the museum's unparalleled specimens of gems, minerals, rocks and meteorites including *the Hope Diamond*, the National Gem Collection, the Mine and Rocks Galleries, the Plate Tectonics Gallery and the Moon, Meteorites and the Solar System Gallery!



For more information please visit: <http://naturalhistory.si.edu/exhibits/current.html>



## The mission of the Smithsonian Institution is “The increase and diffusion of knowledge.”

Smithsonian Associates advances the Institution’s mission to “increase and diffuse knowledge” 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 30 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](http://www.discoverytheater.org).

### Our Location

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