

# The World in Your Hands

## Teacher's Guide

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### The Initial View (Introducing the Activity)

The clay “smooshing” can get messy, so paper and cleanup items are important. The strings double as magnetic poles and handy ways of displaying and observing your tiny Earth!

### Take a Deeper View! (More Science)

The **Inner Core** of the Earth is composed mainly of iron and nickel in a sphere about 1600 miles across. (800 miles radius) It's under tremendous **Pressure** (about 50 million pounds per square inch (psi), compared to regular **Atmospheric Pressure** of about 15 psi)! Even though the temperature is way above the **Melting Point** of these two **Metals**, the outrageous pressure keeps them **Solid**. This core turns the Earth into a giant **Magnet** with an accompanying **Magnetic Field**. (This field can't be planted!) The **Magnetic North** and **South Poles** are the parts of the field we're the most familiar with. The 1300 mile thick **Outer Core** is **Liquid**, mostly melted iron around 5000 degrees **Fahrenheit**. The pressure is less at this depth, so these rocks can melt. The next layer is a combination of the lower mantle and upper mantle, usually just called the **Mantle**, totaling about 1800 miles thick made mostly of an **Igneous Rock** called **Basalt**. The outer core and mantle make up the largest percentage of the Earth's total **Volume**. This entire layer is a semi-molten blob of various **Silicates**. (rocks made of silicon and oxygen) This material has characteristics of both solid and **Liquid**, it acts more like a **Solid** until the pressure is released, like when a volcano **Erupts**, then it acts like a liquid! The final outside layer is the **Crust**, the home layer of **Life** and is mainly silicate rocks. The crust is extremely thin compared to other layers, only 25 miles under land and 4 miles under the deepest Ocean. An apple's peel or an egg's shell is very comparable in scale to the Earth's crust! The upper mantle and crust together make up a division called the **Lithosphere** or “rock circle”. It's here that **Volcanoes**, **Earthquakes** and **Continental Drift** or **Plate Tectonics** happen!

### More and Bigger Views! (Additional Classroom Ideas)

1. The **Magnetic Poles** and **Geographical Poles** are about 12 degrees apart. Use a protractor for this **Angle**. Adjust your model by burying a little string and tilting it.
2. Research the real Earth's **Circumference**. How was it determined?
3. Calculate or find out how fast the planet is turning. (It doesn't feel that fast!)
4. Learn more about the expeditions to the **North** and **South Geographical Poles**. Check out folks like Amundson and Scott, as well as other explorers!
5. Find out why the Earth bulges near the **Equator**. (The spinning!)
6. Make a large model of the Earth using glue, newspaper or paper mache! Use a balloon for the shape. Paint the continents, oceans, and possibly borders of countries. Label everything.
7. Find out how **Earthquakes** and the **Waves** made by these “Earth-Shakers” helped science to learn what those inside layers were made of, their thickness, and other things!
8. Research how **Seismographs** work and how important they are to science.
9. How do **Volcanoes** happen? What are some types? Make some models of them!
10. Look up **Plate Tectonics** and how the **Crustal Plates** bump and grind along.
11. What are some precautions to take in an area where earthquakes occur?
12. Write a story of what surviving a major earthquake would be like. What would you do?
13. How are buildings built to resist earthquake damage?
14. Build your model around a rod shaped magnet with the appropriate poles sticking out each end. Test your model using a compass.
15. Make a model like *The World in Your Hands*, only bigger and put **Longitude** and **Latitude** lines on it.