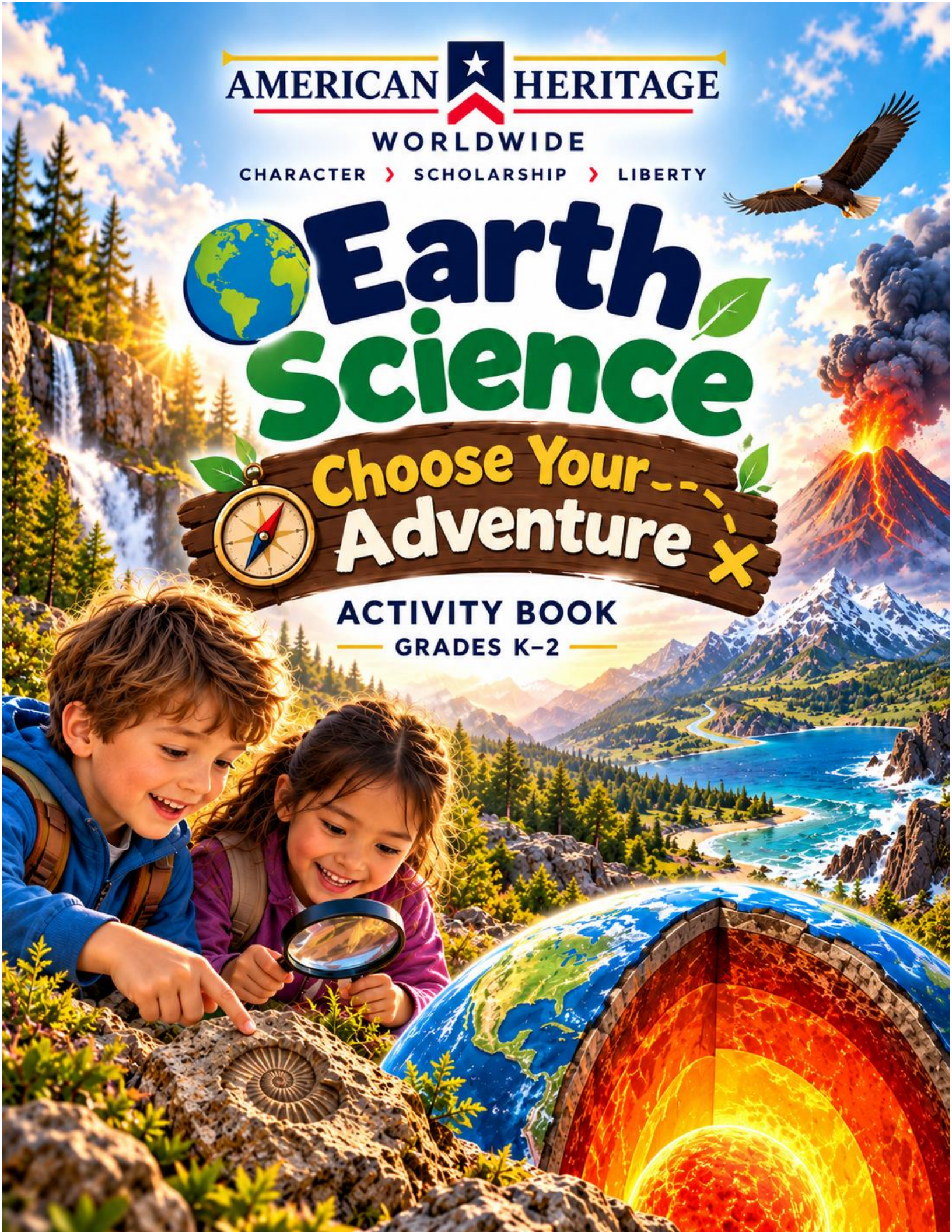
AMERICAN HERITAGE
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Earth Science
Choose Your Adventure
ACTIVITY BOOK
GRADES K–2

Choose Your Adventure!

Inside Earth, plate tectonics, earthquakes & volcanoes — ten optional activities

AHS Worldwide | Earth Science | Unit 1 Enrichment | A Guide for Parents

What Your Student Has Been Learning

Your young scientist has been busy exploring what is happening deep inside our Earth. They have learned that Earth is made of different layers, from the thin crust beneath our feet all the way to the incredibly hot inner core. They have also discovered that Earth's crust is broken into enormous pieces called tectonic plates. These plates are always moving, very slowly, and their movement helps create mountains, earthquakes, and volcanoes.

Now it is time to explore, create, and play. Your child can build a model, run an experiment, solve a puzzle, color, cut and create, or take on a science challenge.

HOW TO USE THESE ACTIVITIES: Choose whatever sounds fun. Pick one today, try another tomorrow, save them for a rainy afternoon, or skip them altogether. There is no required order, and no expectation that your child complete every activity.

The Ten Adventures at a Glance

- Towel Tectonics — about 10 minutes
- Build a Play-Dough Earth — about 20 minutes
- Crust to Core — about 10 to 15 minutes
- Build Earth's Layers — about 15 to 20 minutes
- Piece Together the Plates — about 15 to 20 minutes
- Shake It Up! — about 15 to 20 minutes
- Can You Build It Stronger? — about 20 to 30 minutes
- Make a Volcano Erupt! — about 20 minutes
- Inside a Volcano — about 10 to 15 minutes
- Earthquake Escape! — about 10 minutes

Printables Included in This Guide

- ☐ Crust-to-Core Coloring Page — for Activity 3
- ☐ Earth Layers Cut & Paste Page — for Activity 4
- ☐ Tectonic Plate Puzzle — for Activity 5
- ☐ Inside a Volcano Coloring Page — for Activity 9
- ☐ Earthquake Escape Maze — for Activity 10

SAFETY: An adult helps with cutting, including slicing the play-dough Earth in Activity 2. Run the volcano in Activity 8 on a tray, and keep vinegar out of eyes. Dough and marshmallows used for building are not for eating.

Activity 1 — Towel Tectonics

Estimated Time to Complete: About 10 minutes

Turn two ordinary towels into giant pieces of Earth's crust. Your child uses them to see what can happen when tectonic plates push together, pull apart, and slide past one another.

What You'll Need

- 2 hand towels or small bath towels
- A table or other flat surface

What to Do

1. Push together — a convergent boundary. Lay the two folded towels flat with their edges touching, then slowly push them toward each other. Watch the towels wrinkle, fold, and rise upward. Earth's plates can behave similarly when they push against each other, helping form mountains.
2. Pull apart — a divergent boundary. Flatten the towels again and slowly pull them away from each other. Notice the space that opens between them. In some places plates move apart, and hot material from below can rise into the opening and eventually form new crust.
3. Slide past — a transform boundary. Place the towels beside each other, then slide one forward while sliding the other backward. Along some plate boundaries enormous pieces of crust move past each other. Sometimes they get stuck, then suddenly move, causing an earthquake.

Talk About It: Which plate movement could build mountains? Which one might cause an earthquake?

Activity 2 — Build a Play-Dough Earth

Estimated Time to Complete: About 20 minutes

What would you see if you could cut Earth in half? Build our planet from the inside out, and then slice it open to find out.

What You'll Need

- Play dough or modeling clay in 4 different colors
- A plastic knife, craft stick, or another child-safe cutting tool

What to Do

1. Build the inner core. Roll a small ball of one color. This is the inner core, the hot, solid center of Earth.
2. Add the outer core. Flatten another color and wrap it completely around the inner core. This represents the liquid outer core.
3. Add the mantle. Wrap a much thicker layer of a third color around the outside. The mantle should be the thickest layer in the model.
4. Add the crust. Cover the Earth with a very thin layer of the final color. This is the crust, the thin rocky layer we live on.

5. Slice the Earth. Carefully cut the finished ball in half, look at the cross-section, and find all four layers.

Talk About It: Which layer is the thinnest? Which takes up the most space in your model?

Activity 3 — Crust to Core

Estimated Time to Complete: About 10 to 15 minutes

Take a colorful journey from the surface of Earth all the way to its center.

What You'll Need

- Crust-to-Core Coloring Page
- Crayons, colored pencils, or markers

What to Do

1. Look at the four layers shown on the coloring page: crust, mantle, outer core, inner core.
2. Choose a different color for each layer. Notice that the layers are not all the same size. The crust is extremely thin compared with the enormous mantle underneath it.
3. When the page is finished, point to each layer and try to name it without looking at the labels.

Talk About It: We live on the crust. If you could magically travel toward the center of Earth, which three layers would you travel through next?

Activity 4 — Build Earth's Layers

Estimated Time to Complete: About 15 to 20 minutes

Build a paper Earth from the center outward by stacking its layers in the correct order.

What You'll Need

- Earth Layers Cut & Paste Page
- Crayons or markers
- Child-safe scissors
- Glue

What to Do

1. Color. Color each Earth-layer piece a different color.
2. Cut. Carefully cut along the dashed lines.
3. Build from the inside out. Start with the inner core, then add the outer core, the mantle, and the crust.
4. Glue. Match the pieces so the labels stay visible, then glue them into place.

Talk About It: Why do you think scientists call the outside layer the crust?

Activity 5 — Piece Together the Plates

Estimated Time to Complete: About 15 to 20 minutes

Earth may look like one solid ball, but its outer surface is broken into enormous moving pieces called tectonic plates. Put the puzzle together to see how they fit.

What You'll Need

- Tectonic Plate Puzzle
- Child-safe scissors
- Crayons or colored pencils
- Glue, if you want to mount the finished puzzle

What to Do

1. Look. Before cutting, look at the shapes of Earth's tectonic plates.
2. Color. Give neighboring plates different colors so they are easy to tell apart.
3. Cut. Carefully cut along the plate boundaries.
4. Mix and rebuild. Move the pieces around, then put Earth's surface back together using the puzzle guide.
5. Find your plate. Locate North America and the North American Plate.

Talk About It: Look at how many plates touch other plates. What do you think might happen where two plates meet?

Activity 6 — Shake It Up!

Estimated Time to Complete: About 15 to 20 minutes

Can your building survive an earthquake? Build a structure and put it to the shake test.

What You'll Need

- Building blocks, LEGO bricks, wooden blocks, or another stackable material
- A cookie sheet, tray, sturdy cardboard, or cutting board

What to Do

1. Build. Place the tray on a table or floor and build a tower on top of it.
2. Predict. Do you think your building will survive?
3. Shake. Gently move the tray back and forth. Start small, then gradually make the shaking stronger.
4. Try again. Rebuild the structure differently, shorter, wider, or with a different base, and test it again.

Talk About It: What made some buildings more stable than others?

Activity 7 — Can You Build It Stronger?

Estimated Time to Complete: About 20 to 30 minutes

Your child is the earthquake engineer. Design two buildings and discover which one withstands stronger shaking.

What You'll Need

- Toothpicks and mini marshmallows, LEGO, blocks, or craft sticks and modeling clay
- A tray, cookie sheet, sturdy cardboard, or cutting board

What to Do

1. Build building number one. Create the first structure.
2. Build building number two. Change the design, perhaps making it wider, shorter, taller, or using different shapes.
3. Predict. Which building will survive the strongest earthquake?
4. Test. Shake the surface gently, then gradually make the shaking stronger.
5. Improve. Use what you learned to redesign one building, then test it again.

Talk About It: If you were designing a real building in a place with lots of earthquakes, what would you change?

Activity 8 — Make a Volcano Erupt!

Estimated Time to Complete: About 20 minutes

Build your own volcano and use a simple chemical reaction to create an eruption.

What You'll Need

- A small plastic cup
- Baking soda, white vinegar, and dish soap
- A tray or baking sheet
- Play dough, modeling clay, or aluminum foil
- A spoon, plus washable red or orange food coloring if you have it

What to Do

1. Build. Put the cup in the center of the tray and build a mountain around it. Leave the cup opening uncovered, because it is the volcano's vent.
2. Prepare. Put about 2 tablespoons of baking soda in the cup, then add a small squirt of dish soap and the optional food coloring.
3. Erupt. Slowly pour about a quarter cup of vinegar into the volcano and watch the bubbles rise and flow down the sides.

4. Experiment. Reset the volcano and try different amounts if you would like.

Talk About It: Our model uses bubbles to push the lava upward. A real volcano works differently, but what does the model help you picture about material moving from inside Earth to the surface?

Activity 9 — Inside a Volcano

Estimated Time to Complete: About 10 to 15 minutes

There is much more to a volcano than the mountain we see above the ground. Color a volcano from the inside out.

What You'll Need

- Inside a Volcano Coloring Page
- Crayons, markers, or colored pencils

What to Do

1. Find and color the magma chamber, the main vent, the crater, the lava, and the ash cloud.
2. Use different colors so each part is easy to see.
3. When the page is finished, trace with a finger the journey magma could take from underground to Earth's surface.

Talk About It: What is the difference between magma and lava?

Activity 10 — Earthquake Escape!

Estimated Time to Complete: About 10 minutes

The ground is shaking. Find the way through the maze while learning how to make safer choices during an earthquake.

What You'll Need

- Earthquake Escape Maze
- A pencil, crayon, or marker

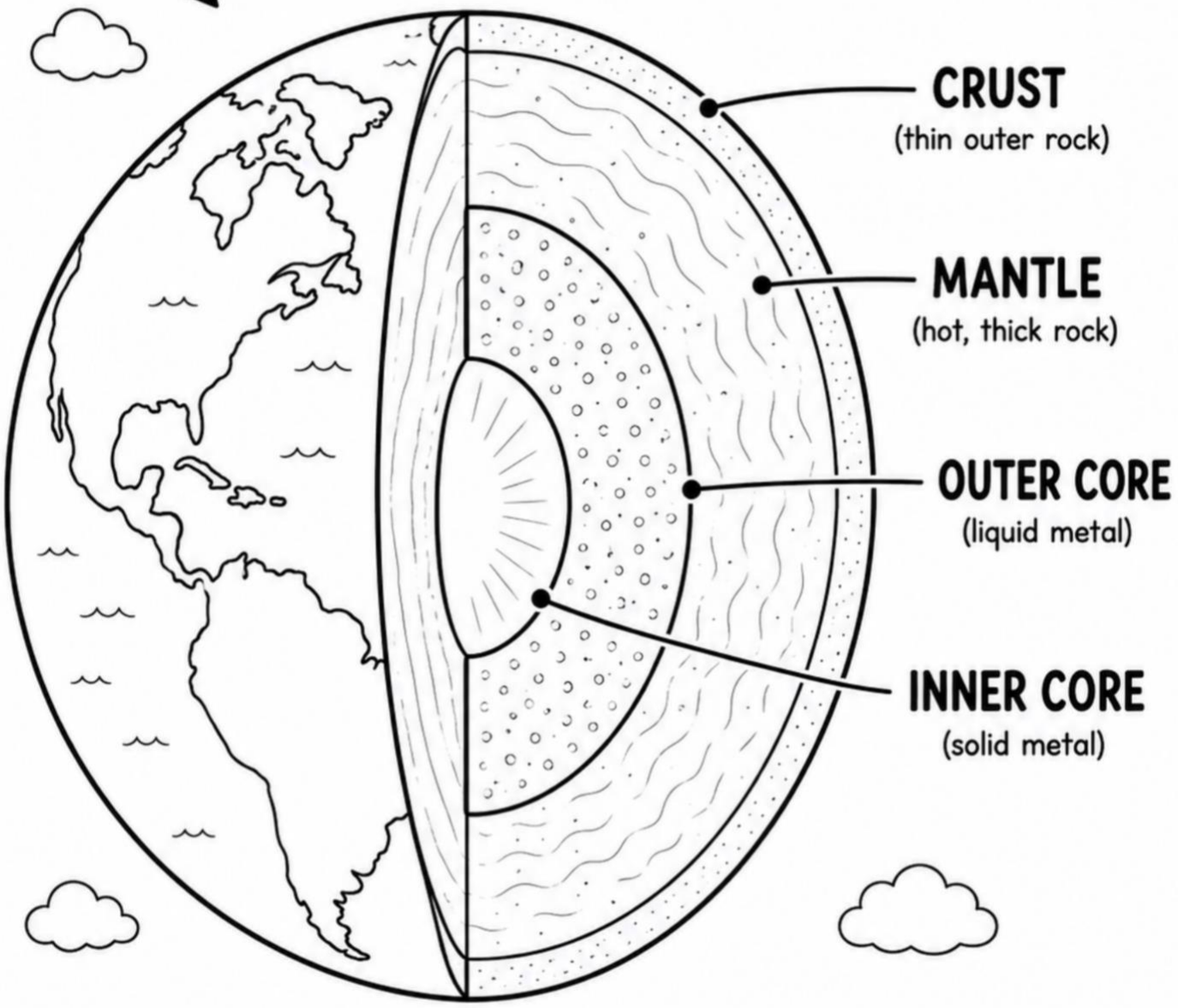
What to Do

1. Help the character travel through the maze to the safe spot.
2. Avoid hazards such as falling objects, tall furniture, windows, and things that could fall from shelves.
3. Remember: drop, cover, and hold on. Get low, protect your head and neck under sturdy furniture when possible, and hold on.
4. After solving the maze, complete the bonus challenge and circle three earthquake hazards.

Talk About It: Look around the room you are in right now. Where would be a safer place to protect yourself if an earthquake started?

CRUST TO CORE!

Color each layer a different color!

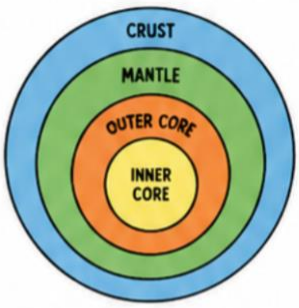


We live on the _____.

BUILD EARTH'S LAYERS!

Color. Cut. Build Earth from the inside out. **Then glue!**

EXAMPLE



This is how your Earth should look when you're finished!

CRUST
(thin outer rock)

MANTLE
(hot, thick rock)

OUTER CORE
(liquid metal)

INNER CORE
(solid metal)

Tip: Color each layer a different color!

HOW TO GLUE

Start with the INNER CORE in the center. Then glue the OUTER CORE around it. Next glue the MANTLE. Last, glue on the CRUST.

PIECE TOGETHER THE PLATES!

Color the plates different colors. Cut along the dashed lines.
Mix up the pieces and put Earth back together!

PUZZLE GUIDE

Use this map to help you put the pieces back together!



- North American Plate
- South American Plate
- Pacific Plate
- Eurasian Plate
- African Plate
- Indo-Australian Plate
- Antarctic Plate
- Nazca Plate

NORTH AMERICAN PLATE

EURASIAN PLATE

AFRICAN PLATE

PACIFIC PLATE

NAZCA PLATE

SOUTH AMERICAN PLATE

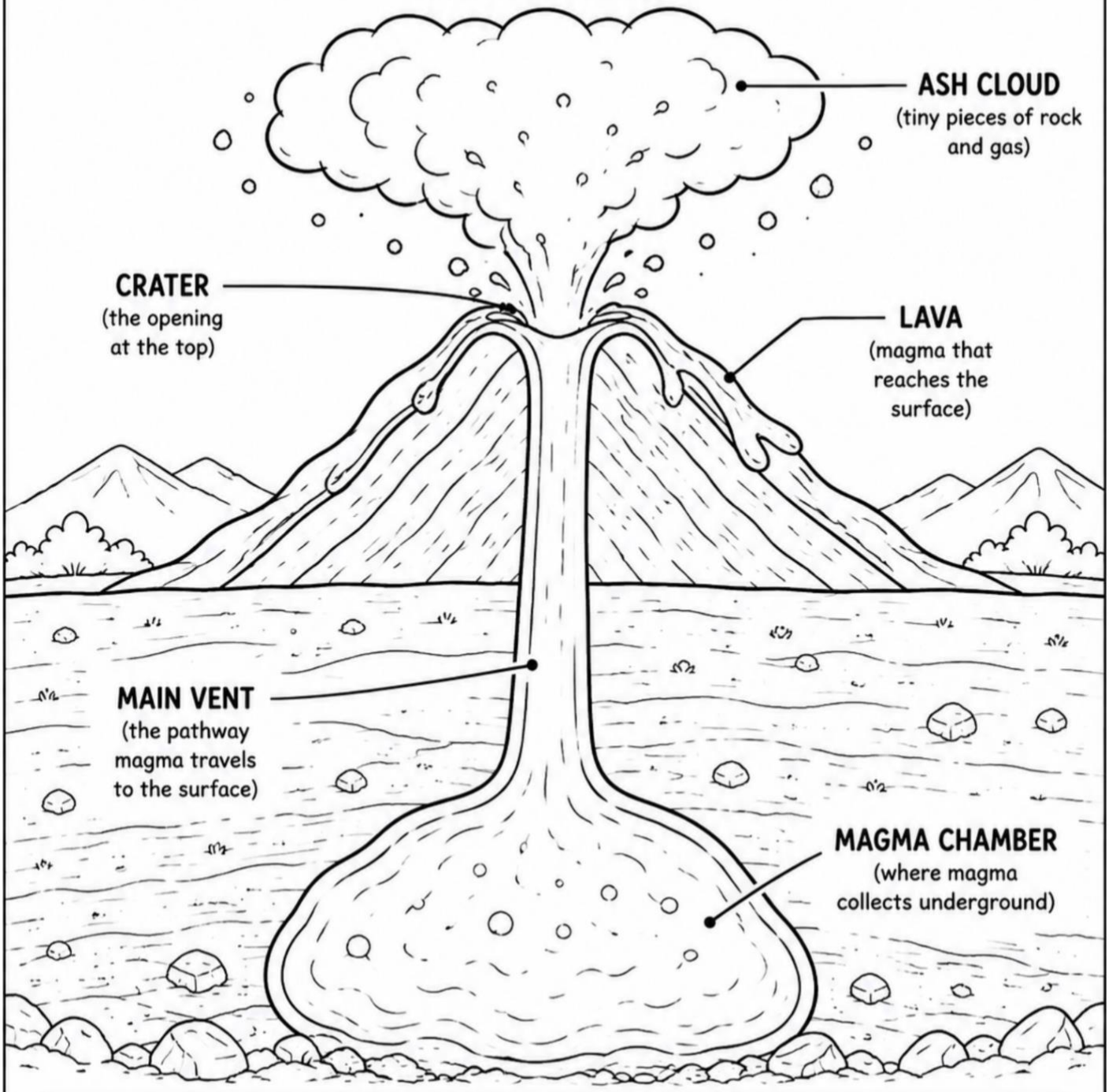
INDO-AUSTRALIAN PLATE

ANTARCTIC PLATE

Don't forget the puzzle guide above to help you! ↑

INSIDE A VOLCANO!

Color the volcano!



Trace magma's journey to the surface with your finger!

EARTHQUAKE ESCAPE!



Help the kid get to the safe spot!
Choose the safest **path** through the maze.

START

SAFE SPOT!

When an earthquake happens...

DROP!



Get down low.

COVER!



Get under something sturdy.

HOLD ON!



Hold on tight.

BONUS CHALLENGE!

Circle 3 earthquake hazards hidden in the picture.