

## Materials:

- Computer with internet access (optional, for Minecraft exploration)
  - Notebook or paper
  - Drawing supplies (crayons, markers, pencils)
  - Tray or shallow bin
  - Sand or loose dirt
  - Small watering can or cup
  - Two books or flat blocks
  - Various small objects of different weights (e.g., feather, pebble, eraser, small toy block)
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## Introduction: Welcome, Earth Builder!

Have you ever noticed how sand and gravel fall straight down in Minecraft? Or how water flows and carves paths? That's because Minecraft, like our real world, follows rules based on powerful forces! Today, we're going to explore some of the amazing forces that shape our planet Earth, just like you shape your world in Minecraft.

### Activity 1: Gravity - What Goes Up Must Come Down!

Gravity is the invisible force that pulls everything towards the center of the Earth. It's why we stay on the ground and why things fall down, not up! In Minecraft, gravity pulls your character down, makes sand and gravel fall, and affects arrows.

**Experiment:** Gather your small objects (feather, pebble, eraser, block). Hold two different objects at the same height and drop them at the same time. Which hits the ground first? Try different combinations. Does weight seem to matter much for speed? (Note: Air resistance affects the feather, but gravity pulls on all objects equally!). Draw arrows in your notebook showing the direction gravity pulls things.

### Activity 2: Erosion - Water and Wind Power!

Imagine a river flowing in Minecraft, cutting through the land. That's similar to erosion! Erosion is when wind, water, or ice wear away rock and soil and move it somewhere else. Over long periods, water carves canyons, and wind shapes rocks.

**Experiment:** Fill your tray partially with sand or dirt. Gently build a small hill. Now, slowly pour water from your cup or watering can onto the top of the hill. What happens? Does the water carry the sand/dirt away? This simulates how rain and rivers cause erosion. Can you think of how wind might move sand in a desert (or a Minecraft desert biome)? Draw a picture of water changing your sandhill.

### Activity 3: Tectonic Forces - Earth Shakers and Mountain Makers!

The Earth's outer layer isn't one solid piece; it's broken into huge slabs called tectonic plates, like giant puzzle pieces floating on softer rock below. These plates are always moving very slowly. When they push together, they can crumple up the land to form mountains! When they slide past each other, they can cause earthquakes!

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**Experiment:** Take your two books or flat blocks. Hold them side-by-side with edges touching. Slowly push them together. See how the edges might lift or crumple? This is like plates colliding to form mountains. Now, hold them flat, touching sides, and try to slide one past the other. Feel how they might stick and then suddenly slip? That's like the forces building up and releasing in an earthquake! Draw two ways the plates can move (pushing together, sliding past).

## **Conclusion: Forces All Around!**

Today we explored gravity (pulling things down), erosion (wearing land away), and tectonic forces (building mountains and causing earthquakes). These forces are constantly shaping our Earth. Think about how these forces might affect how you build or explore in Minecraft! Where do you see gravity? Where might erosion happen? Could you build a mountain range?

## **Optional Extension: Minecraft Build Challenge!**

If you have access to Minecraft, try to build a landscape showing one of the forces we learned about. Build a tall mountain range (tectonic forces), create a river cutting through the land (erosion), or experiment with how gravity affects different blocks!