Shaking Things Up: Understanding Earthquakes!

Materials Needed:

- Computer with internet access
- Large world map (physical or digital)
- Markers or sticky notes
- Notebook and pen/pencil
- Access to online earthquake trackers (e.g., USGS Latest Earthquakes website)
- Optional: Toothpicks and mini marshmallows (or uncooked spaghetti and tape) for structure building
- Optional: Small weights (like coins) for structure testing
- Optional: Jelly or Jell-O in a clear container for wave demonstration

Lesson Activities:

Introduction (10 mins)

Start by asking Heidi: "What do you already know about earthquakes? What makes you curious about them?" Briefly discuss any prior knowledge or questions she has. We could watch a short, age-appropriate clip showing earthquake simulation or effects to spark interest.

Activity 1: Why Do Earthquakes Happen? The Moving Plates (20 mins)

Let's explore plate tectonics! We'll use an online interactive map or animation (search for 'plate tectonics simulation') to see how Earth's giant plates move (colliding, pulling apart, sliding past each other). Discuss how this movement builds up pressure along cracks called faults. When the pressure releases *suddenly* - that's an earthquake! Look at a map showing the major tectonic plates and fault lines.

Activity 2: Feeling the Shake - Seismic Waves (15 mins)

When an earthquake happens, it sends out energy waves. We'll learn about the two main types: P-waves (Primary - push/pull like a slinky) and S-waves (Secondary - shake side-to-side like a rope). Explain P-waves travel faster and arrive first. *Optional Demo:* Gently tap the side of the Jell-O container. Watch how the 'waves' travel through it â€“ can you see different types of movement?

Activity 3: How Big Was It? Measuring Quakes (15 mins)

How do scientists measure earthquakes? Discuss the difference between Magnitude (energy released, often using Moment Magnitude Scale, similar to the older Richter scale) and Intensity (what people feel and the damage caused, using the Modified Mercalli Scale). Emphasize that the magnitude scale is logarithmic â€“ each whole number increase means about 32 times more energy!

Activity 4: Where in the World? Earthquake Hotspots (20 mins)

Let's be seismologists! Go to the USGS 'Latest Earthquakes' website (or similar real-time tracker). Find 5-10 recent earthquakes. Using the world map, have Heidi place sticky notes or mark the locations of

these quakes. What patterns do we see? Discuss the 'Ring of Fire' around the Pacific Ocean where many earthquakes and volcanoes occur and relate it back to the plate tectonics map.

Activity 5: Build & Shake! An Engineering Challenge (25 mins - Optional but Recommended)

Challenge time! Using toothpicks and marshmallows (or spaghetti and tape), challenge Heidi to design and build a small structure. Once built, place it on a flat surface (like a book or tray) and simulate an earthquake by gently shaking the surface. Did it stand? Why or why not? Discuss how engineers design buildings to be flexible and strong in earthquake zones.

Activity 6: Staying Safe When the Ground Shakes (10 mins)

What should you do if you experience an earthquake? Teach the 'Drop, Cover, and Hold On' procedure. Discuss why each step is important. Talk about having a family emergency plan and a basic emergency kit at home.

Conclusion & Review (10 mins)

Let's review! Ask Heidi to explain in her own words: What causes earthquakes? What are the two main wave types? How are quakes measured? Where do most earthquakes happen? What's the main safety rule? Have her write down 3 main things she learned or create a quick concept map in her notebook. Answer any remaining questions.