

SEISMOGRAPH MODEL

Section

This activity is designed not only to teach students how seismographs work and how scientists study earthquakes, but also to help them feel more confident and curious about natural events. While the topic of earthquakes can be sensitive, this lesson focuses on understanding, teamwork, and preparedness—not fear.

Use a calm and reassuring tone throughout. Let students know that the Earth is always moving a little, and scientists have created tools to help us observe and stay safe. Avoid personal or traumatic examples; instead, highlight how knowledge and collaboration help us face challenges together.

Remind students that being prepared doesn't mean being scared, it means being informed. Creating a safe classroom space for sharing thoughts, working together, and asking questions is just as important as building the model itself.

Lesson

Science

Grade

4-5

Learning Objectives

Students will analyze simple machines on group projects, apply scientific knowledge to real-life environmental contexts, and assess the future impact of human activities on the environment

Duration

1 class (40 Minutes)

Required Materials

Paper cups (1 per group)	Cardboard or a small box
Small weights (washers or similar)	String or yarn
Paper roll (receipt paper or long strip)	Markers/pens
Worksheet for observations and reflection	Rubber bands
Optional: Video showing real seismograph in action	Tape

Preparation and Implementation

Prepare kits for each group with necessary materials. Ensure you have enough for small groups (3–4 students).

Print worksheets (Annex 1) for each student. Have colored pencils, and other materials ready to use in class.

Optionally, show a short calming video showing how scientists use seismographs (without including traumatic earthquake footage).

Create a calm and curious learning environment—let students know this activity is

ACTIVITY DESCRIPTION

1 INTRODUCTION (10 Minutes)

Ask students:

- How do we know when an earthquake happens?
- Have you ever seen or heard about a seismograph?
- Why might people want to record the movement of the ground?

Provide a gentle explanation of earthquakes:

- “The Earth is always moving a little bit. Sometimes it shakes more, and scientists use special machines to record these movements. One of those machines is called a seismograph.”

Information Notes: Avoid personal or local traumatic examples. Focus on scientific curiosity.

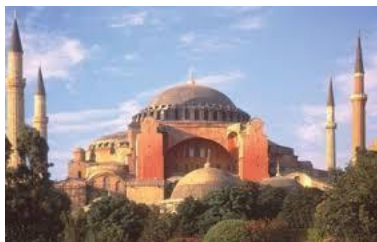
Local & Cultural Connection (Optional Sub-Section, If Desired):

Did you know Türkiye has many structures and traditions shaped by earthquakes and the Earth's movements

Examples to explore:

- **İstanbul – Hagia Sophia and Earthquake Engineering:**

Built with large domes and special foundations to survive centuries of earthquakes.



- **Modern Buildings in İzmir, Düzce, and Van:**

After major earthquakes, cities started using earthquake-resistant designs.

- **Kandilli Observatory (Boğaziçi University):**

One of the oldest earthquake research centers in the world—located in Türkiye. Kandilli Observatory has recorded almost every major earthquake in Türkiye. It's one of the oldest earthquake research centers in the world.



- **Person: Prof. Dr. Ahmet Mete Işıkara (“Deprem Dede”)**

He was the director of the Kandilli Observatory and Earthquake Research Institute at Boğaziçi University — the main center in Türkiye that collects and interprets data from seismographs across the country.

After the 1999 Marmara Earthquake, he used seismograph data to explain to the public where the earthquake happened, how strong it was, and what aftershocks to expect.

He believed that people should **not fear seismographs or earthquakes**, but instead **understand them**.

That’s why he **translated complex seismographic information into simple language** for everyone, especially for children.



Environmental Impact & Future Thinking *(Can also be added after group presentations)*

Lead a class discussion or small group reflection using these questions:

- What is the impact of buildings in earthquake zones on people and the environment?
(Think about tall buildings, crowded areas, or how nature is affected.)
- How can we build safer and more sustainable structures in the future?
(Discuss earthquake-resistant design, green spaces, environmentally friendly materials.)
- How do tools like seismographs help humans live in harmony with nature?
(Think about early warning systems, preparedness, and public safety.)

2**DISCUSSION (5 Minutes)**

Information Notes: Let students know it's okay to feel curious or even a little worried when learning about earthquakes. This classroom is a safe space where we can talk about our feelings and support each other.

Duration: 5 minutes

Introduce the concept of a **seismograph**:

- A seismograph is a device that scientists use to record how the Earth moves.
- It helps people understand earthquakes and improve safety.

Let students know:

- Today we'll build a simple version of this tool.
- Science helps us be aware and prepared.

Optional reflection:

- "Have you ever felt a small earthquake? How did you feel?"
- "How do you think scientists feel when they make tools that help people?"

3**IMPLEMENTATION (20 Minutes)****A. Building the Seismograph (10 minutes)**

In small groups, students create a basic seismograph model:

1. Suspend a pen/marker from the inside of a cup using string.
2. Attach the cup to a cardboard base using rubber bands so it can sway.
3. Place a long strip of paper underneath the pen.
4. Gently shake the table (simulate seismic movement) while pulling the paper slowly to record "earthquake lines."

Encourage gentle handling of materials and teamwork.

B. Observation and Presentation (10 minutes)

Each group shows their seismograph and shares:

- What did you notice when the table moved?
- How did the pen draw differently with bigger or smaller shakes?
- What would happen if a real earthquake occurred?
- How do tools like seismographs help humans live more safely and responsibly in nature?
- Did working as a team help them feel more calm or confident? Remind them that we are stronger when we help and listen to each other.

Remind students this is a **safe simulation** and part of **being ready**. Ask students how they felt during the simulation.

FEEDBACK

Duration: 5 minutes

Distribute worksheets:

- Label the parts of your seismograph.
- Fill the observation data table
- Reflection:
 - What did I learn today?
 - How do I feel about earthquakes after today's activity?
 - How do tools like seismographs help humans live more safely and responsibly in nature?

RECOMMENDATIONS

1

Use a **calm, reassuring, and positive tone** throughout the lesson to create a safe emotional space.

- If any student seems anxious or uncomfortable, **gently redirect their attention to the scientific process**, focusing on curiosity, exploration, and problem-solving.
- Highlight the **power of knowledge and preparedness**:
- “When we understand something, we can face it better.”
- Consider adding a **short breathing or grounding activity** at the end of the lesson if the topic raises emotional responses in the class.
- It's okay to have different feelings. Talking to someone we trust can help us feel better and safer.
- Encourage students to **share local or global examples** of earthquakes or earthquake-resistant structures they know of.

These can be from:

Their own region or hometown (e.g., “My grandparents live in a village with wooden houses.”)

Other countries (e.g., Japan's earthquake drills, Mexico's early warning system, etc.)

This promotes **cultural belonging**, global awareness, and diverse perspectives.

- Emphasize **teamwork and shared responsibility**. Safety and preparedness are not just individual actions, but something we all do together.
- Invite students to **interview a family member** at home about past earthquake experiences or safety tips and bring what they learn back to the classroom.
- Avoid frightening or overly dramatic descriptions; instead, focus on **resilience, awareness, and solution-oriented thinking**.
- If students show interest in engineering or science, provide extension opportunities such as:
 - Exploring real seismograph data online
 - Visiting a local science center or observatory (virtually or physically)
 - Inviting a guest speaker (e.g., a civil engineer or scientist)

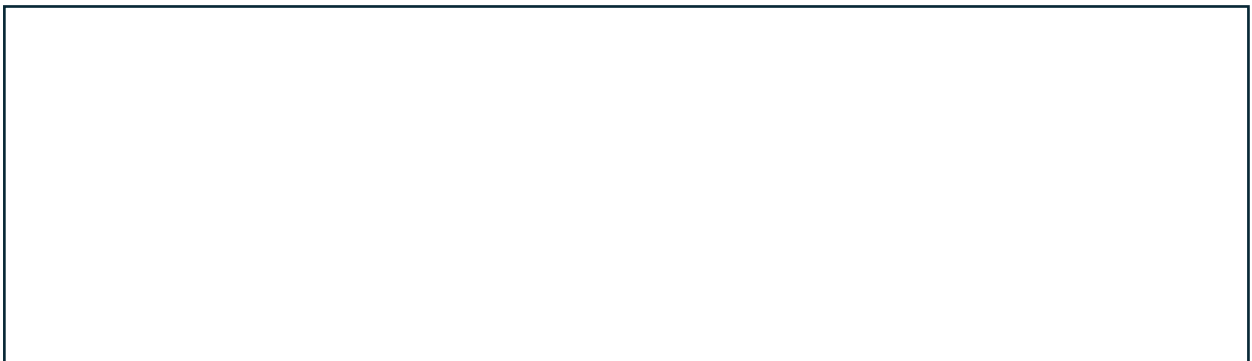
ANNEX

6.1) WORKSHEET – Seismograph Model

PART A – My Seismograph Model

Draw your seismograph below.

(Label the pen/marker, string, cup, and paper strip.)



PART B – Let's Collect Data

Test your model with 3 different shaking speeds. Pull the paper slowly and then faster. What do you observe?

Shake Type	Speed (Slow / Medium / Fast)	What did the pen lines look like? (e.g., short, long, wavy, zigzag)
Test 1		
Test 2		
Test 3		

PART C – What Did I Observe?

Check all that apply:

- When we shook the table gently, the pen drew small waves.
- When we shook it harder, the lines were bigger.
- The pen didn't move much when everything was still.
- I worked well with my team.
- I helped build the model.

What surprised you the most during the activity?

PART D – Reflection

One thing I learned today is:

I feel _____ after learning about earthquakes and seismographs.

(happy / curious / calm / nervous / excited / something else)

One way I can feel more prepared during an earthquake is:

BONUS (Optional)

What does it mean to be “prepared”? Draw or write your idea below: