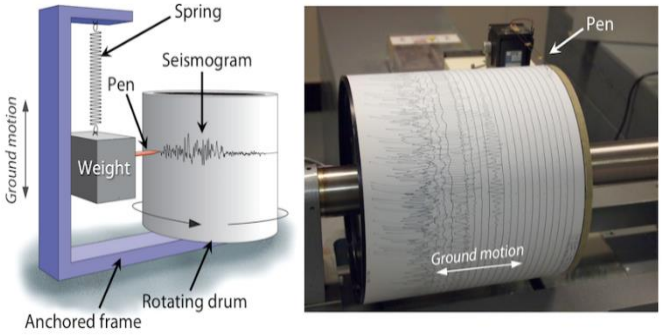
Model of a Seismograph

General information	
Respective blueprint	Build your own seismograph.
Description	After a series of earthquakes in Croatia in 2020, the public became quite interested in this topic, both adults and children. Due to the possibility of repeated earthquakes, it would be good for students to learn about a seismograph and how it works. That's why we decided to help students make a simple model of a seismograph.  Ta fotografija korisnika Nepoznat autor: licenca CC BY *Figure 1 Consequences of the earthquake*  Ta fotografija korisnika Nepoznat autor: licenca CC BY-SA-NC *Figure 2 Seismograph*
Learning objectives	• understanding the basic concept of seismography by showing how a seismograph detects and records vibrations • fostering observational abilities by observing and analysing the movement of the seismograph during simulated "earthquakes." • developing critical thinking about how the seismograph works, how to improve its sensitivity,

	and how it relates to real-world earthquake detection • raise awareness about earthquakes as natural phenomena and the importance of studying them for safety and scientific understanding		
Related curricular subjects	Math, Science, Engineering		
Duration	90 min		
Level of difficulty	Basic	Medium	Advanced
	☐	☑	☐
Inclusivity guidelines			
How to integrate students with SLD	• Present the important items in bullet points. • Use a multisensory approach: wherever possible, provide different ways for learners to interact with the content (touch, manipulate, play, etc.)		
How to integrate students who work faster	After finishing their work, students can compare their seismograph with the real one (or a scientific one) and make a presentation about the differences and similarities between their seismograph and the real one.		

Step-by-step description of the lesson

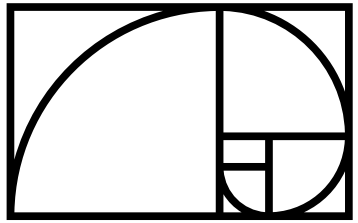
Step 1: Introduction	Estimated time: 15 min
• talk to students about earthquakes, seismology, seismography, and what are seismographs used for • follow the presentation in the attachment, where it is explained what is an earthquake, seismology, or seismograph and how it works • in the attachment is a brochure about what to do before, during and after an earthquake • students make groups	
Step 2: Making a seismograph	**Estimated time: 60 min**
• Prepare the material needed • By following blueprints, each group makes their own seismograph • Then, each group simulates an earthquake to test the seismograph • At the end, students compare results and make a conclusion	
Step 3: Evaluation	**Estimated time: 15 min**
• Each student fills out a self-evaluation template for group work • Each student answers the questions on the worksheet	

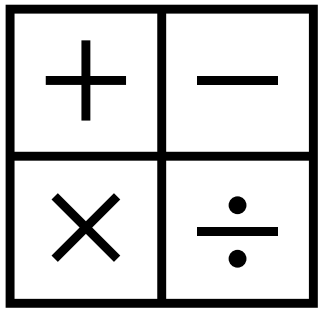
Assessment activities

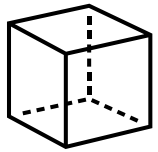
Activity 1: Self-evaluation of the group work
Each student makes self evaluation of the group work using a template for self-evaluation.
Activity 2: Answer the questions
Answer the questions using the questions worksheet in the attachments.

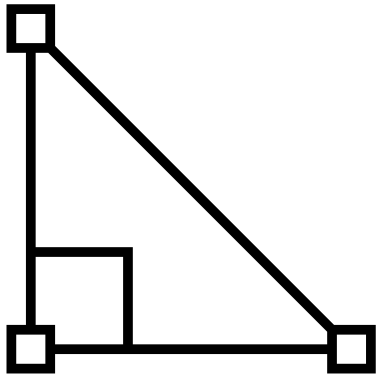
Attachments
• Presentation • Brochure - earthquake • Self-evaluation template • Questions worksheet

STEAM IN TIMES

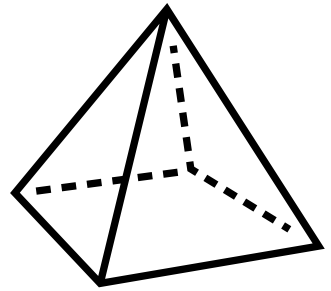








Seismograph



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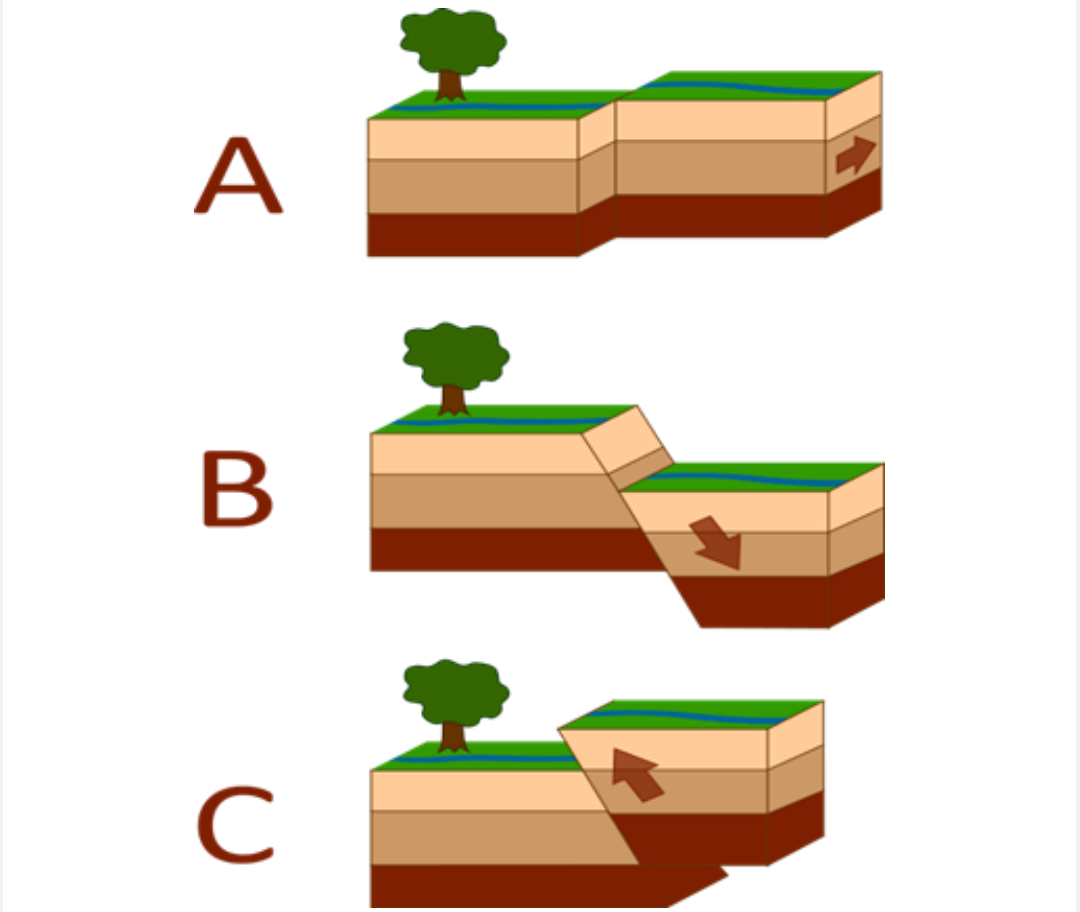
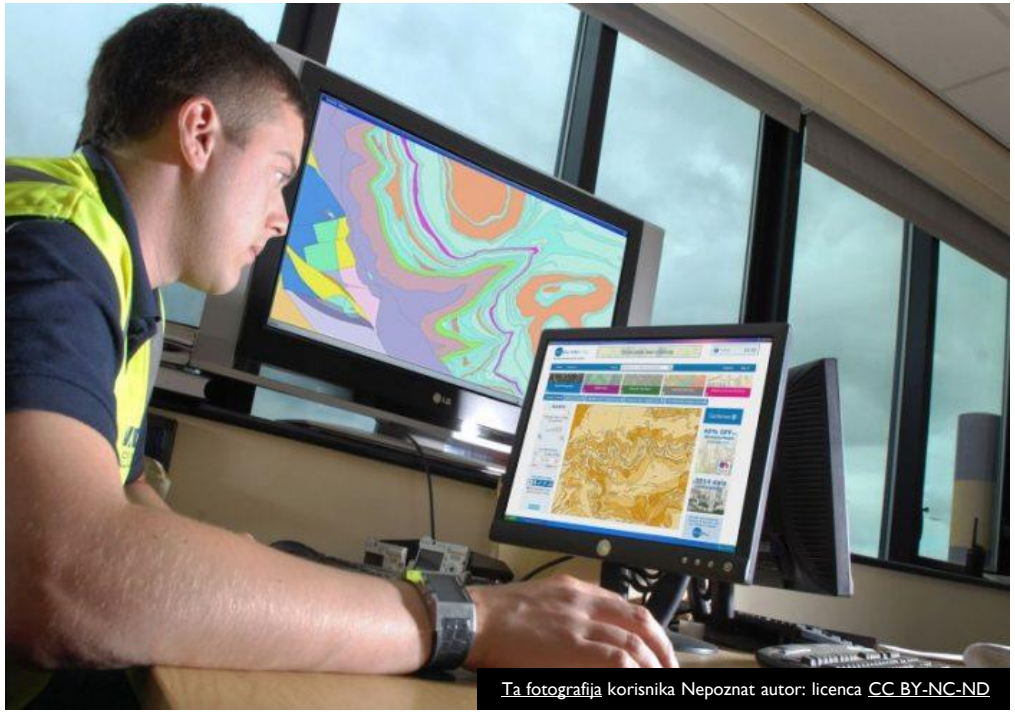
WHAT IS AN EARTHQUAKE?

- Earthquakes are when the ground shakes and moves because of the energy deep inside the Earth
- Pieces of Earth's crust and uppermost mantle, called tectonic plates, move. Sometimes they bump or slide past each other, causing earthquakes.

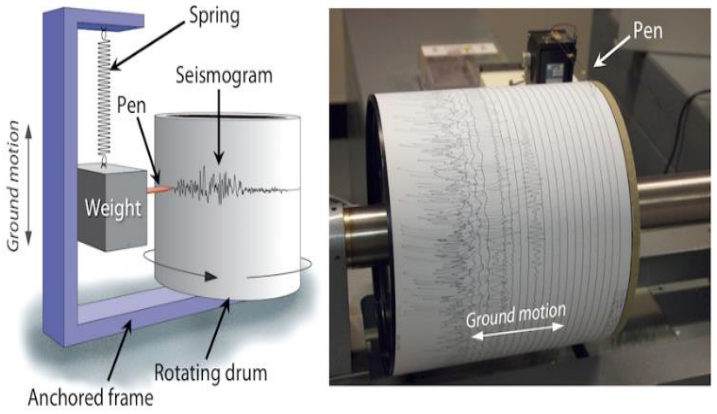


WHAT IS SEISMOLOGY?

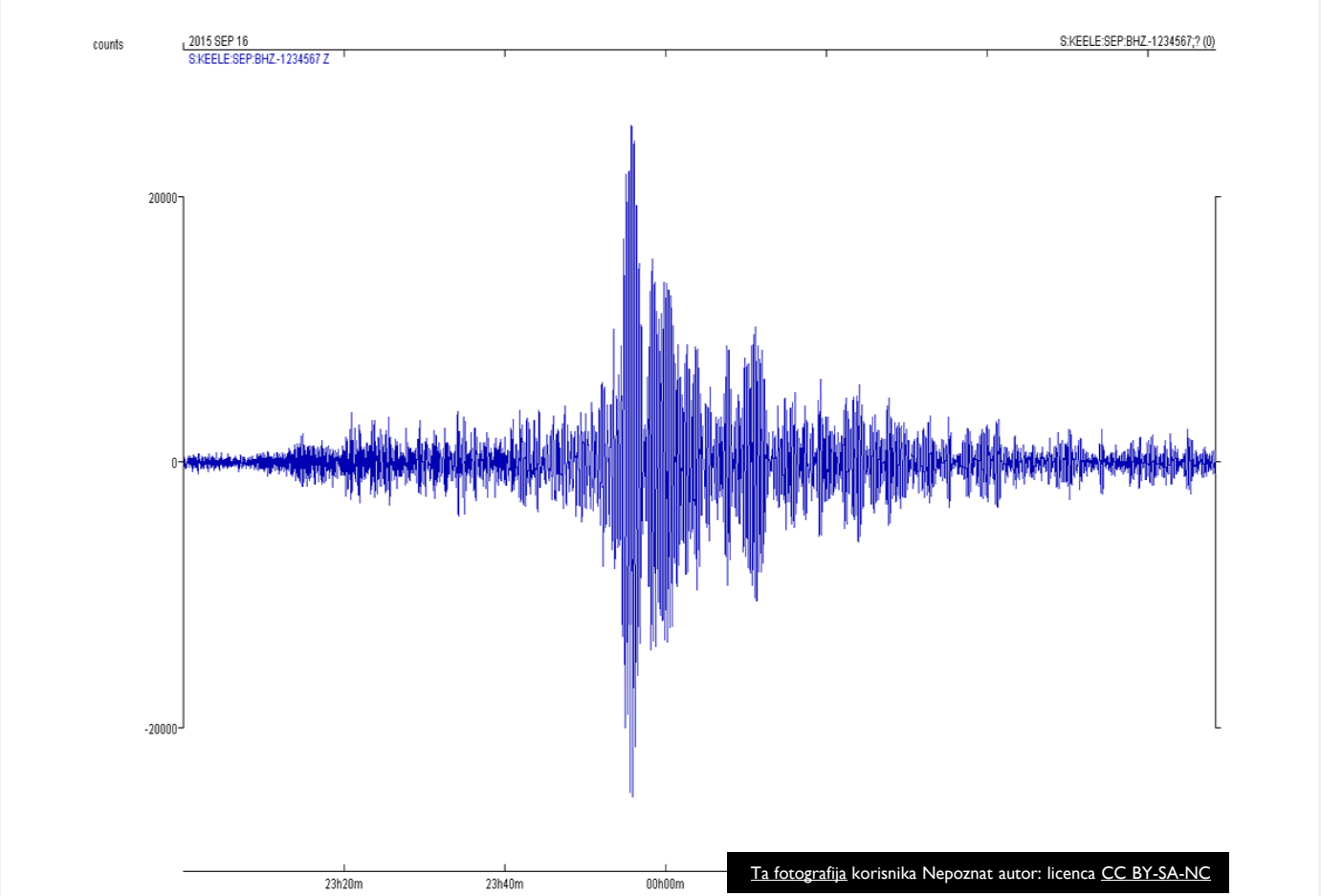
- Seismology is the science of studying earthquakes and Earth's vibrations.



WHAT IS A SEISMOGRAPH?



- A seismograph is like a detective. It is a machine that records ground vibrations caused by earthquakes.



HOW DOES A SEISMOGRAPH WORK?

- Seismographs have a weight and a pen. When the ground shakes, the weight with the pen moves and makes a wiggly line.

FACTS AND SAFETY TIPS

- We can't predict exact earthquakes, but seismographs help us get prepared!
- Scientists can use seismographs to listen to volcanoes rumbling and even to study what's happening deep inside the Earth
- WHAT TO DO BEFORE, DURING AND AFTER AN EARTHQUAKE? CHECK THE BROCHURE!

MATERIALS NEEDED

- • Cardbox (medium size)
- • Paper or plastic cup
- • String
- • Felt pen or marker
- • Scalpel or scissors
- • Paper or long printed receipt
- • Scotch tape or ducT tape
- • Coins, small rocks or other small heavy objects to use as weights
- • Awl
- • Meter or ruler

SAFETY TIPS: WHAT TO DO BEFORE, DURING AND AFTER AN EARTHQUAKE

BEFORE THE EARTHQUAKE

Keep in mind that it is important to know where the main switches for electricity, water, and gas valves are located and how to close them. It is also extremely important that you repair defective pipes and installations in your home. Furthermore, make sure to keep cupboards with crockery, glasses, and similar items tightly closed to prevent them from falling during an earthquake. It is necessary to fix any furniture and other objects in your home that can move and pose a hazard during seismic activity.

If there is an earthquake, do not run outside. Find a safe place in your home where you can hide during the earthquake itself. Find out now where the load-bearing walls are that can serve as shelter. A sturdy table or bench that can protect you will also come in handy. If you don't have any of these or don't know that you do, protect your face and head with your hands and lean against the corner of the load-bearing wall. Take shelter under the door frame only if you know it is a load-bearing wall. Avoid windows and anything else made of glass, and move away from furniture that is not well fixed. Anything that can fall on you is dangerous.

DURING THE EARTHQUAKE

In these moments, it is crucial to stay calm. It is difficult, but remind yourself that it is your composure that can save your life. The earthquake itself does not kill, but life-threatening panic behaviour and running outside or around the house in unsafe places. Therefore, find as safe a place as possible and take shelter there until the earthquake passes. When it passes, go outside and away from buildings, poles and other objects that could endanger you. Do not use the elevator under any circumstances!

If an earthquake hits you while you're in your car, never stand under bridges, underpasses, in tunnels or near power lines. Park the vehicle in an open area and be careful not to disturb emergency services.

AFTER THE EARTHQUAKE

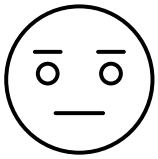
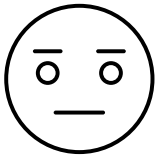
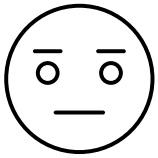
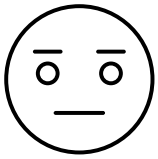
Be prepared for the fact that the ground will shake even after the "main" earthquake. Keep calm, and if possible, take what you need from home and find a safe place outdoors to stay for a while. If there are injured people near you, help them, but only if you know first aid. Call an ambulance and other emergency services that can assist. Be sure to follow the news and instructions of the competent authorities, and stay away from rumours whose sole aim is to spread panic.

https://www.hck.hr/novosti/upute-kako-se-ponasati-prije-za-vrijeme-i-nakon-potresa/11038

SELF – ASSESSMENT

NAME:

DATE:

I followed directions			
I did my best and had a positive attitude			
I completed my work			
I liked the activities			

Answer the questions: Seismograph

Circle the corect answer:

1. **A machine that measures movements under the Earth's surface is called:**

   A. Earthquake
   B. Seismology
   C. Seismograph

2. **If an earthquake happens, you will:**

   A. Start screaming
   B. Stay by the window or go outside the building
   C. Try to stay calm and find safe place

3. **Match the terms with the suitable word or an expression:**

Earthquake	a scientist
Seismologist	science
Seismograf	a machine
Seismology	movement of tectonic plates

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