

# Safe and Sound

## Objectives:

- Get to know your territory
- Learn about the materials used in construction and their resistance to earthquakes

## STEP BY STEP

### Before starting

The teacher asks the class the following questions in the form of a quiz to introduce the topic.

- **Q:** What happens to a building in the event of an earthquake?
- **A:** It depends on the structure, the material used, the year of construction, the seismicity of the area
- **Q:** What happens to a building if the shocks are undulatory (horizontal)?
- **A:** If the shocks are undulatory a building built on the ground struck by the earthquake will begin to undulate exactly like the ground.
- **Q:** What happens instead if they are sussultatory (bottom to top)?
- **A:** If the shocks are sussultatory the building will begin to bend and twist.
- **Q:** In what century was the first earthquake-resistant house designed and by whom?
- **A:** In the 1500s by Pirro Ligorio. Ligorio wrote a treatise, "Libro, o Trattato de' diversi terremoti," in which he collected information about the earthquake

that devastated Ferrara at that time, the first explanations of the natural origin of the earthquake and the damage suffered by the population and buildings. Based on this information he deduces that buildings can withstand the force of seismic waves and imagines an earthquake-resistant house built of stones and bricks and reinforced in corners, floors, doors and windows, the parts of the buildings Ligorio had seen damaged by the earthquake in Ferrara.

## Earthquake-resistant materials.

The teacher then introduces the concept of "earthquake-resistant" using the glossary definition:

**Earthquake-resistant:** a material, building or structure capable of withstanding earthquake shaking without sustaining damage

Over the years, buildings have been made of different materials to suit the characteristics of the land, uses and construction costs. Not all materials, however, are able to withstand earthquakes in the same way: materials such as wood, reinforced concrete and steel are safer than others because they are able to accommodate ground movements and withstand shaking. In addition, construction technique also affects a building's ability to withstand earthquakes. The teacher can propose that the class watch the following video where some simple information about earthquake-resistant techniques and materials are summarized:

# Mapping activity

The power of an earthquake cannot be predicted or stopped. But operations can certainly be carried out to secure buildings.

At this point, using Google Maps, the teacher organizes a mapping exercise of the buildings that are important to the municipality and could be damaged in the event of an earthquake (e.g., the city hall, a museum, the hospital, one's school). The teacher then divides the class into groups and assigns a building to each group. Each group should look up the following information for the assigned building:

- Year of construction
- Shape of the building
- Construction materials
- Any other earthquakes to which the building has been subjected in the past
- Any work or renovations done on the building and whether these were subsequent to an earthquake event

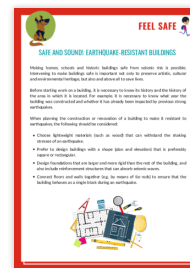
Once the information has been gathered, the characteristics of the buildings are shared with the class and the materials used and the type of structure are reflected upon together. The teacher can use the sheet on Earthquake Resistant Buildings (see

attachment "Safe and Sound - Earthquake Resistant Buildings" below) to guide the reflection.

# Concluding thoughts

How can boys and girls take action to make buildings in their area safe? The teacher discusses with the class that making a structure earthquake-proof is also the task of technicians and experts, but each of us can contribute to safety by spreading the correct behaviors to adopt in the event of an earthquake (e.g., I explain to my family members how to behave, I ask them to identify the load-bearing walls of the building I am in and point them out to others as well, I know how to call for help and how to communicate an emergency, etc.).

## ATTACHMENTS



Safe and Sound - Earthquake-resistant buildings

PDF