SHOCK WAVE

TEACHER'S GUIDE

CYCLE ONE SECONDARY

MONTRÉAL SCIENCE CENTRE

VOLVO
Hydro Québec
Société immobilière du Canada limitée
Canada Lands Company Limited
Canada

SHOCK WAVE

Can you construct a building that will withstand an earthquake? "Become" a civil engineer and help protect people in high-risk seismic zones.

WELCOME

to the Montréal Science Centre

The Montréal Science Centre educators invite your students to participate in **Shock Wave**. This **90-minute** activity relates to the Québec Education Program and offers students an experience where the joy of learning leads to the acquisition of new competencies.

DID YOU KNOW?

That our school programs...

- adhere to the MEES progression of learning;
- offer a variety of experiences that are different from classroom activities;
- are run by an educator who takes charge of the group;
- comprise student-centered, interactive activities that make learning fun.

A FIVE-STEP PEDAGOGICAL APPROACH

1 Introduction

Hurricanes, tornadoes, tsunamis, volcanic eruptions, earthquakes, floods, and landslides are among the natural risks that attack our planet. A powerful video lets students witness the impact of natural disasters on human populations. Earthquakes get special attention because some of their consequences are preventable, for example, through the construction of anti-seismic buildings: structures that are shock-resistant.

2 Overview of plate tectonics theory

Before you become a civil engineer and construct an anti-seismic building, you need to understand the phenomenon of earthquakes. Where do they originate? How do they arise? To find out, students explore the hidden interior of our planet, learning about plate tectonics and its effect on Earth.

3 Technological design

Each team builds an anti-seismic structure to precise specifications. Whether a hospital in Haiti, an office tower in San Francisco, a radio station in Nepal, or a tower in Tokyo, the structure must be able to withstand a shock wave. To verify this, a vibrating table will simulate tremors.

4 Presentation

The moment of truth has arrived. Each team presents the characteristics of its structure to the rest of the group and performs a seismic test. Students hypothesize about the resistance or non-resistance of the buildings tested.

5 Conclusion

This is an opportunity to analyze the materials, techniques and standards essential to anti-seismic construction through examples of resistance successes and failures. In conclusion, there is a demonstration of the influence of soil type on a building's resistance. Finally, although Québec may seem to be immune to earthquakes, it actually has experienced a number of seismic tremors. Our buildings are designed to resist them, thanks to our researchers and civil engineering experts. Something for us to be proud of.

Program realised with the participation of the
UNIVERSITÉ DE SHERBROOKE

MAKING CONNECTIONS: SCIENCE AND TECHNOLOGY

In connection with the practical part (Competency 1):

- Seeks answers or solutions to scientific or technological problems.
- Communicates in the languages used in science and technology.

LINKS WITH THE PROGRESSION OF LEARNING

THE EARTH AND SPACE

	Secondary Cycle 1 1	2
GENERAL CHARACTERISTICS OF THE EARTH		
INTERNAL STRUCTURE OF THE EARTH		
Describes the main characteristics of the three parts of the internal structure of the Earth (crust, mantle, core)	→	★
GEOLOGICAL AND GEOPHYSICAL PHENOMENA		
TECTONIC PLATE		
Describes the main elements of the theory of tectonic plates (e.g. plate, subduction zone, mid-oceanic ridge)	→	★
EARTHQUAKE		
Describes the processes that cause earthquakes (e.g. tectonic plate movements, slides)	→	★

THE TECHNOLOGICAL WORLD

	Secondary Cycle 1 1	2
MANUFACTURING		
SPECIFICATIONS		
Defines specifications as a set of constraints associated with the design of a technical object	→	★

TECHNIQUES

	Secondary Cycle 1 1	2
TECHNOLOGY		
MANUFACTURING		
Assembling	→	★

→ The student learns to do this with the teacher's intervention. ★ The student does it by himself at the end of the school year.