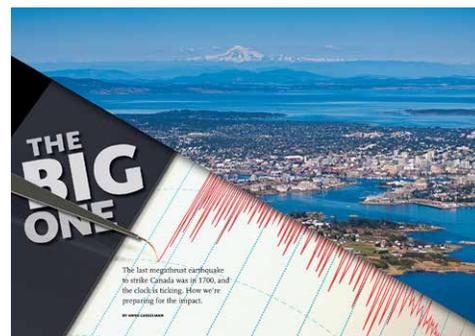


# CANADIAN GEOGRAPHIC IN THE CLASSROOM

Article **The Big One**  
Issue June 2015



The last megathrust earthquake, the world’s largest type of earthquake (at depths shallower than 30 kilometres), on the West Coast of Canada occurred more than 300 years ago. Seismologists believe these major earthquakes occur roughly every 300-600 years. As a result, the coastal and island regions of British Columbia are within the expected time range for another major earthquake. After witnessing the devastating effects of the 2011 tsunami in Japan and the 2015 earthquake in Nepal, officials in B.C. are scrambling to develop and deploy early warning systems as well as upgrade buildings, schools and other critical infrastructure.

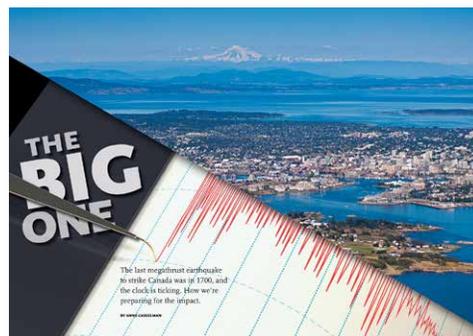
“The Big One” (*Canadian Geographic*, June 2015) includes a number of maps that show seismic events in Canada, “365 Days of Quakes” (p. 51), historical data for large earthquakes, “Canada’s Largest Earthquakes” (p. 54), along with the location of the tectonic plates, “Global Tectonic Plates” (p. 58). Exploring earthquakes with your students is an authentic way to address a wide variety of geographical and scientific concepts with numerous connections to other curricular outcomes.

## Questions to get your students thinking about earthquakes through the lens of geophysics and physical geography:

1. What are tectonic plates and how are they connected to earthquakes?
2. Where are earthquakes most likely to occur in Canada? What about globally?
3. What is a fault line and where are the major faults located in Canada?
4. What is the difference between divergent, convergent and transform tectonic plate boundaries? Which kind surrounds BC?
5. How do seismologists detect and try to predict earthquakes?
6. How are earthquakes classified and where in Canada is the seismic hazard most significant?
7. What are the different types of waves associated with earthquakes?

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## Ways to develop your students' geographical thinking skills through the topic of seismology:

1. Use Canadian Geographic Education's tiled map of Canada and manually create your own earthquake map.
  - a. Begin by piecing together the map.
  - b. Identify and mark B.C.'s 10 largest communities. Label them with bingo chips, Post-Its or coloured blocks. Next mark the location of where the fault line is and where B.C.'s major earthquakes occur.
  - c. Discuss how many people (percentage of B.C.'s population) will be impacted when the Big One earthquakes occurs.
2. Using National Geographic's MapMaker Interactive ([mapmaker.education.nationalgeographic.com](http://mapmaker.education.nationalgeographic.com)), add layers of information related to tectonic plates and earthquakes.
  - a. Begin by selecting "Add Layer" on the right of the screen. Under "Earth Systems" add the "Plate Tectonics Layer" first. Explore this concept with your students.
  - b. Next, add the "Earthquake Layer." Adjust the transparency of both layers in order to explore the relationships between earthquakes and tectonic plate boundaries. Compare this information to the seismic maps included in the June 2015 issue of *Canadian Geographic*.
3. Discuss the concept of an emergency kit. Depending on what region of Canada you are in, explore other types of natural disasters that might occur. Brainstorm a list of supplies that should be included in an emergency kit and build one complete kit as an example. Consider having your students create their own kits, or send home a list of supplies and encourage families to build an emergency kit together.
4. "The Big One" describes how many schools in British Columbia are being seismically retrofitted to better withstand the forces of an earthquake. Explore what it means to be seismically retrofitted. Using the map, "Canada's Largest Earthquakes" (p. 54), have your students identify the seismic hazard in your region. Explore how buildings are constructed to withstand the forces of an earthquake and what methods are used to strengthen older buildings. Take this concept even further by building a shake table and having students test different structural designs made from toothpicks or popsicle sticks.
5. Explore how scientists measure seismic activity using a seismometer. The short Bill Nye video, "BN Seismometers and Make Your Own" ([youtube.com/watch?v=bpFzICiWPwA](https://www.youtube.com/watch?v=bpFzICiWPwA)), helps explain how a seismometer works and provides an example of a very simple DIY seismometer you could make with your students. To extend this activity, have your students research and build a more sophisticated design that suspends a pencil over a scroll of paper and test their designs by simulating an earthquake.