

Earthquake activity 2: **Creative Essay**

Description: Students write a 'newspaper article' describing an earthquake, written as if they were there at the time of the event.

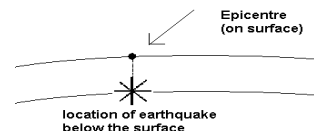
Materials: Overheads: 1. Modified Mercalli intensity scale
2. Saguenay earthquake modified Mercalli intensity map
3. Vancouver Island earthquake modified Mercalli intensity map
Student worksheet

Teacher instructions:

Before assigning the 'newspaper' essay, briefly explain the terminology and read a description of an actual earthquake so the class can understand the possible effects associated with each intensity.

1. Explain *epicentre*, *magnitude* and *intensity* to the class. Write the term and its definition on the blackboard. Project Overhead 1 or distribute the Modified Mercalli Intensity Scale chart to the class to explain how intensity is measured.

Epicentre is the position on the surface of the Earth directly above the location of the earthquake. Note: The amount of ground shaking decreases as you move away from epicentre.



Magnitude is a unique number representing the size of an earthquake and **measures the amount of fault movement at the source** of the earthquake. An earthquake has only one magnitude, however it has many values for intensity.

Intensity is a **measure of local shaking** and therefore differs from place to place.

- **Intensity** describes how the shaking was felt by people and how much damage was done to buildings.
 - Scientists have created the **Modified Mercalli Scale (MM)** as a way of measuring the intensity of an earthquake. For example, at **MM I**, although instruments have recorded an earthquake, shaking was so slight that no one felt it. At **MM III**, many people who are indoors felt it. At **MM VI**, everyone felt it. At **MM X**, most buildings are destroyed.
 - Intensity varies from place to place. It is greatest at locations close to the epicentre and less at locations further away from the epicentre.
2. As an example of varying intensity values, read one or both of the accompanying descriptions of an earthquake to the class (p.2). Use Overheads 2 and 3 intensity maps. At each Modified Mercalli (**MM**) intensity mentioned, have a student read out loud to the class the appropriate description from the accompanying chart.
 3. Ask the students to imagine that an earthquake has just occurred and that they are a newspaper reporter who lives in a city that was impacted by the earthquake. Have the students create a newspaper article, reporting on the earthquake. The students should describe what they felt, heard and saw during the earthquake and also describe how people reacted to the event. This is intended to be a creative impression of what people would experience during the event rather than a geological analysis of the event. Students should use some of the vocabulary that they have learned. Students should choose a particular intensity for their city and then their descriptions should reflect the impacts of that intensity.
 4. Distribute the worksheet of instructions.

Descriptions of an earthquake to read aloud:

The 1988 Saguenay earthquake

On Friday November 25, 1988, at 6:46 in the evening, eastern Canada and the northeastern United States were shaken by the largest earthquake that has occurred in the last 75 years. It had a magnitude of 5.9, which is very large for eastern North America (maximum magnitude 7 to 8). The epicentre was located in the Saguenay valley near the cities of Chicoutimi and Jonquière, which are northeast of Quebec City. Fortunately, nobody was killed during the Saguenay earthquake, however shaking was felt up to 1000 km away.

Near the epicentre (Chicoutimi-Jonquière-La Baie area) of the earthquake it was felt with an average intensity of **MM VII**. In a few places it was even felt with an intensity of MM VIII. For the most part, near the sparsely-populated epicentre, damages were limited to fallen chimneys and cracked plaster walls, and there were a few small landslides.

Within a range of 500 km it was felt by most people with an average intensity of **MM IV-V**.

Within a range of 1000 km, it was felt by many with an average intensity of **MM III**.

The M7.3 Vancouver Island Earthquake of 1946

On Sunday June 23, 1946, at 6: 10:15 in the morning, British Columbia and part of northwestern United States were shaken by the largest earthquake that has occurred onshore in Canada in historic times. It had a magnitude of 7.3. The epicentre was located in the Forbidden Plateau area of central Vancouver Island, just to the west of the communities of Courtenay and Campbell River. This earthquake caused considerable damage on Vancouver Island, and was felt as far away as Portland, Oregon, and Prince Rupert, B.C. Two deaths resulted from this earthquake, one due to drowning when a small boat capsized in an earthquake-generated wave, and the other from a heart attack in Seattle.

Near the epicentre (Cumberland, Union Bay, and Courtenay), the earthquake knocked down 75% of the chimneys. It also did considerable damage in Comox, Port Alberni, and Powell River (on the eastern side of Georgia Strait). Within a radius of about 100 km of the epicentre the earthquake was felt with an intensity of **MM VII or VIII**.

Within a range of 250 km from the epicentre it was felt by most people with an average intensity of **MM VI**. A number of chimneys were shaken down in Victoria and people in Victoria and Vancouver were frightened – many running into the streets.

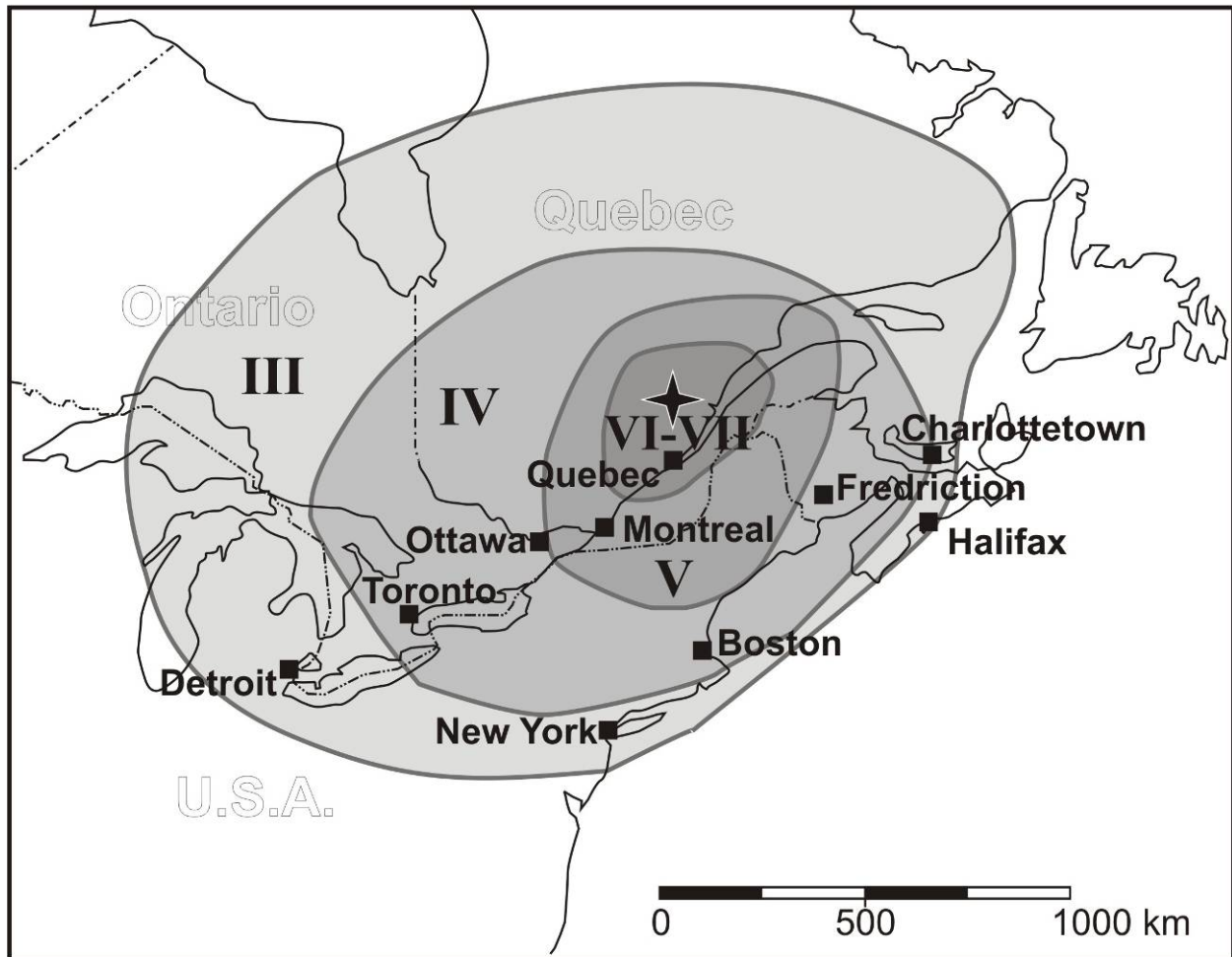
Within a range of 350 or 400 km from the epicentre it was felt by most people with an average intensity of **MM V**.

Within a range of about 600 km from the epicentre it was felt by people with an intensity of **MM IV** or less.

Overhead 1: Modified Mercalli Scale chart

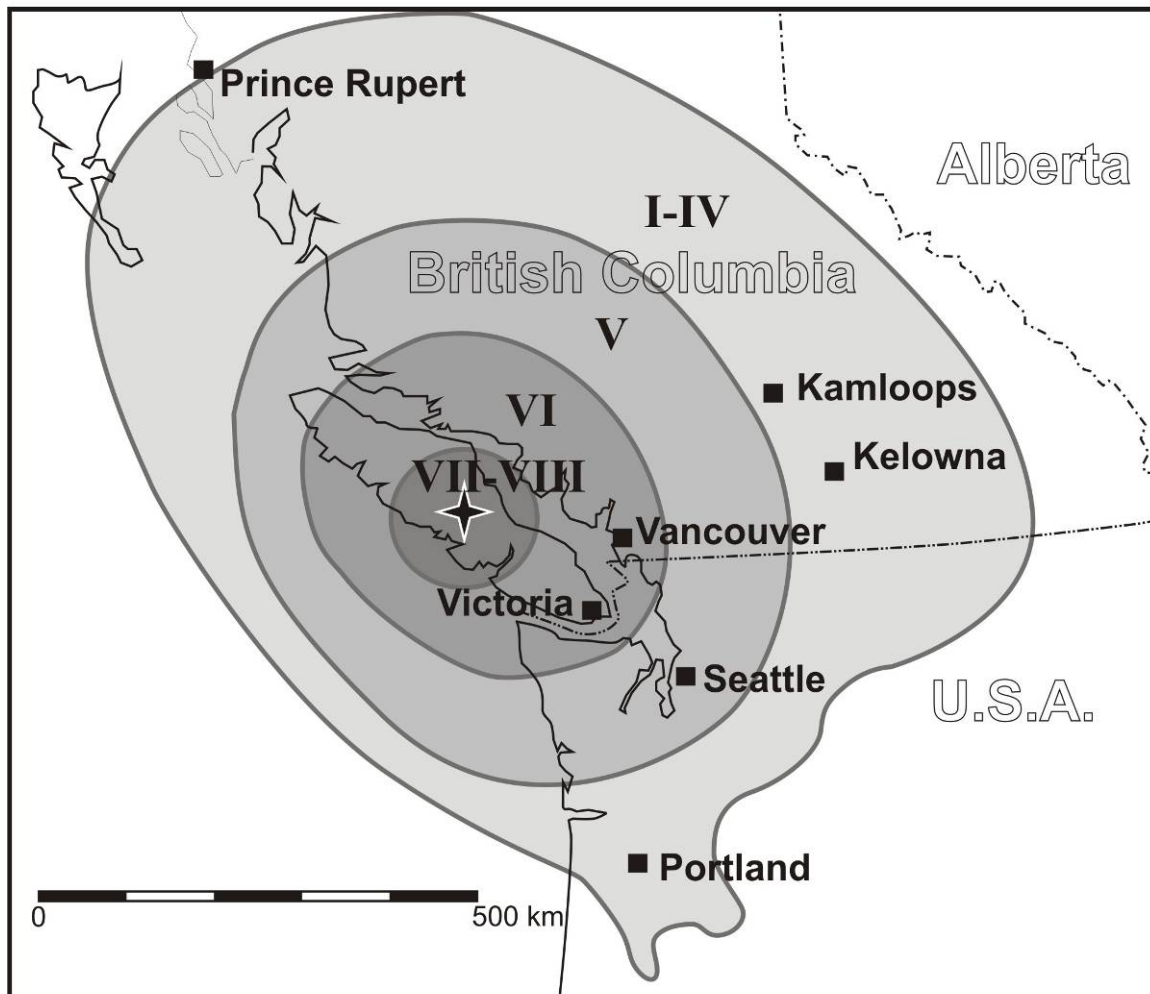
Intensity: Modified Mercalli Scale	
Scale	Earthquake Effects
I	People do not feel any Earth movement.
II	A few people might notice movement if they are at rest and/or on the upper floors of tall buildings.
III	Many people indoors feel movement. Hanging objects swing back and forth. People outdoors might not realize that an earthquake is occurring.
IV	Most people indoors feel movement. Hanging objects swing. Dishes, windows, and doors rattle. The earthquake feels like a heavy truck hitting the walls. A few people outdoors may feel movement. Parked cars rock.
V	Almost everyone feels movement. Sleeping people are awakened. Doors swing open or close. Dishes are broken. Pictures on the wall move. Small objects move or are turned over. Trees might shake. Liquids might spill out of open containers.
VI	Everyone feels movement. People have trouble walking. Objects fall from shelves. Pictures fall off walls. Furniture moves. Plaster in walls might crack. Trees and bushes shake. Damage is slight in poorly built buildings. No structural damage.
VII	People have difficulty standing. Drivers feel their cars shaking. Some furniture breaks. Loose bricks fall from buildings. Damage is slight to moderate in well-built buildings; considerable in poorly built buildings.
VIII	Drivers have trouble steering. Houses that are not bolted down might shift on their foundations. Tall structures such as towers and chimneys might twist and fall. Well-built buildings suffer slight damage. Poorly built structures suffer severe damage. Tree branches break. Hillsides might crack if the ground is wet. Water levels in wells might change.
IX	Well-built buildings suffer considerable damage. Houses that are not bolted down move off their foundations. Some underground pipes are broken. The ground cracks. Reservoirs suffer serious damage.
X	Most buildings and their foundations are destroyed. Some bridges are destroyed. Dams are seriously damaged. Large landslides occur. Water is thrown on the banks of canals, rivers, lakes. The ground cracks in large areas. Railroad tracks are bent slightly.
XI	Most buildings collapse. Some bridges are destroyed. Large cracks appear in the ground. Underground pipelines are destroyed. Railroad tracks are badly bent.
XII	Almost everything is destroyed. Objects are thrown into the air. The ground moves in waves or ripples. Large amounts of rock may move.

Modified Mercalli Intensity Map



Saguenay Earthquake
November 25, 1988
Magnitude 5.9

Modified Mercalli Intensity Map



Vancouver Island Earthquake
June 23, 1946
Magnitude 7.3

Earthquake Article

Name: _____

1. Choose any Canadian city. Your city is _____.
2. Imagine that it has just been shaken by a large earthquake. Imagine what it felt like. Imagine what would have happened.
3. Choose an earthquake intensity from **V** to **IX** on the Modified Mercalli scale. This will be the intensity felt in your chosen city. Your intensity is _____.

Intensity: Modified Mercalli Scale	
Scale	Earthquake Effects
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VI	Everyone feels movement. People have trouble walking. Objects fall from shelves. Pictures fall off walls. Furniture moves. Plaster in walls might crack. Trees and bushes shake. Damage is slight in poorly built buildings. No structural damage.
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IX	Well-built buildings suffer considerable damage. Houses that are not bolted down move off their foundations. Some underground pipes are broken. The ground cracks. Reservoirs suffer serious damage.

4. Pretend that you are a local newspaper reporter and write a short newspaper article (approx. 300 words) about this event for your newspaper. Your job is to tell your readers all about the damage, what happened, what you felt, heard and saw during the event and how local people reacted to the damage.
 - You can use 'pretend' quotes from eyewitnesses.
 - Include a dramatic newspaper headline (title).
 - You can illustrate your article with a drawing or map.
- When writing your article be sure that your description fits your chosen Modified Mercalli Intensity scale. Please print your chosen scale in the upper right corner of your paper.