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CLIMATE IMPACT MAP · CLASSROOM EDITION · BRITISH COLUMBIA 🍁

LESSON PLAN · GRADES 4–6 · BRITISH COLUMBIA

Sea Level Rise & Coastal Flooding: A Vancouver-Centred Investigation

📚 Grades 4–6 (ages 9–12) ⏱ 60 minutes 📍 British Columbia

🌐 theclimateimpactmap.com 🗓 [Date]

🌍 Required Tool: Climate Impact Map

This lesson is built around hands-on use of Climate Impact Map (theclimateimpactmap.com). Students should spend the majority of class time actively exploring the map. Ensure all students have device access before the lesson begins. Classroom licence unlocks all IPCC AR6 scenarios, storm surge, and infrastructure overlays.

Learning Objectives

By the end of this lesson, students will be able to:

1. Describe the key IPCC AR6 sea level rise scenarios and explain the difference between SSP pathways.
2. Use Climate Impact Map to identify flood risk for communities in British Columbia, including Vancouver.
3. Explain how sea level rise & coastal flooding affects people, infrastructure, and ecosystems differently based on location and socioeconomic status.
4. Connect global climate data to local risk in British Columbia using real NASA and IPCC datasets.

5. Reflect on the relationship between climate science and Indigenous knowledge traditions in this region.

Materials & Setup

- **Climate Impact Map** — theclimateimpactmap.com (Classroom licence required for full access)
- Device per student or per pair (tablet, laptop, or desktop)
- Student observation worksheet (create or adapt from this lesson plan)
- Whiteboard or shared digital document for class discussion
- Optional: printed map of Vancouver and surrounding region for reference

Teacher prep: Before class, navigate to theclimateimpactmap.com and confirm Classroom access is active. Pre-load the map centred on Vancouver and test all scenario buttons referenced in the Main Activity.

Background for Teachers

> 🛰️ **Live NASA Data Integration:** Climate Impact Map displays live Arctic and Antarctic sea ice extent from NSIDC (updated weekly) and active fire detections from NASA FIRMS VIIRS (updated every 24 hours). The Stats panel in the app shows current anomalies versus the 1981–2010 baseline. Reference this data during your introduction to ground the lesson in current conditions.

Sea level rise is one of the most consequential and measurable impacts of climate change. The IPCC Sixth Assessment Report (AR6, 2021) projects global mean sea level rise of 0.3–1.0 metres by 2100 under moderate-to-high emissions scenarios, with upper-end estimates reaching 1.8 metres or more. These projections account for thermal expansion of ocean water and contributions from melting glaciers and ice sheets.

The consequences are not uniform. Low-lying coastal deltas, small island nations, and cities built on reclaimed land face disproportionate risk. Storm surge — temporary but extreme sea level increases during hurricanes and cyclones — compounds chronic sea level rise, pushing inundation events into areas previously considered safe. NOAA data shows that high-tide flooding in U.S. coastal cities has increased dramatically over the past 30 years, even without storm conditions.

Climate Impact Map uses GEBCO 2025 global terrain data and GPW v4 population grids to visualize which communities face inundation under each IPCC AR6 scenario. Students can compare SSP1-2.6 (aggressive mitigation) with SSP5-8.5 (fossil-fuelled growth) to understand how policy choices made today determine outcomes decades from now.

Local context — British Columbia: Metro Vancouver's Fraser River delta and Richmond sit at or below sea level, making them among Canada's most flood-vulnerable urban areas.

Lesson Plan

Introduction (9 min)

Begin by asking students: *"What would happen to Vancouver if sea levels rose by 1 metre? By 7 metres?"* Allow 2–3 minutes of discussion. Do not correct or confirm answers yet — capture predictions on the board.

Briefly introduce Climate Impact Map: explain that it uses real GEBCO terrain elevation data, IPCC AR6 projections, and live NASA satellite data. Show the Stats panel briefly to demonstrate that the tool connects to real-time observations.

Frame the lesson: today students will use the same data that climate scientists and emergency managers use to assess flood risk — and they will ground it in the specific geography of British Columbia.

Main Activity — Climate Impact Map Exploration (33 min)

Have students open Climate Impact Map on their devices. Walk through the interface briefly (scenario panel, overlays, Cities tab, click-to-explore). Then proceed through the following steps:

1. **Open Climate Impact Map**

   Navigate to **theclimateimpactmap.com/map** on your device. The map defaults to free view with limited scenarios — if you have Classroom access, all scenarios are unlocked.

2. **Set the baseline**

   In the left panel, select **SSP1-2.6 (+0.3 m)**. This is the best-case Paris Agreement pathway. Observe which coastal areas show blue flood overlay near your city.

3 **Escalate the scenario**

Switch to **SSP5-8.5 (+1.0 m)**. Record: How many additional areas are now flooded? What infrastructure (airports, UNESCO sites) appears in the blue zone?

4 **Explore ice sheet scenarios**

Select **Greenland Melt (+7 m)** and then **Full Ice Melt (+70 m)**. These represent long-term worst cases. Describe what you observe in 2–3 sentences.

5 **Use the Cities tab**

Click the **Cities** tab and select a coastal city relevant to your region. Record the flood depth at each scenario and the estimated population displaced.

6 **Click a specific point**

Click on a low-lying neighbourhood in your region on the map. Record the elevation shown and whether it would flood under each scenario.

Discussion & Analysis (12 min)

Bring the class together. Use the following discussion questions to deepen analysis and connect data to broader themes:

- Which communities in our region are most vulnerable to sea level rise? Why?
- How does the difference between SSP1-2.6 and SSP5-8.5 illustrate the impact of climate policy choices?
- What would it mean for your city if sea levels rose by 1 metre? By 7 metres?
- Who has the most to lose from sea level rise globally? Is this the same as who has contributed most to emissions?

Closing & Exit Ticket (6 min)

Ask students to complete a brief exit ticket (written or verbal) responding to: *"What is one thing you learned today that surprised you, and one question you still have?"*

Collect responses to inform follow-up instruction. Consider sharing standout observations in the next class as a warm-up.

Indigenous Knowledge & Sea Level Rise & Coastal Flooding

The land on which Vancouver stands is the traditional territory of the Musqueam, Squamish, Tsleil-Waututh, and other Coast Salish peoples. Climate change is not an abstract future threat to Indigenous peoples — it is a present reality reshaping relationships with land, water, and community that have been sustained for thousands of years.

Traditional ecological knowledge held by Indigenous peoples in this region provides a long-term record of environmental change that predates Western scientific instrumentation by centuries. Changes in seasonal timing, species behaviour, water levels, and weather patterns observed by knowledge keepers offer invaluable context for interpreting Climate Impact Map data.

When using Climate Impact Map to explore sea level rise & coastal flooding scenarios, consider: whose land are you mapping? Whose communities appear in the flood zones? How does Indigenous land stewardship — including practices like cultural burning, salmon habitat management, and coastal resource governance — relate to climate resilience?

Reflection Prompt

How can Western scientific data (like IPCC AR6 projections and NASA satellite data) and Indigenous traditional ecological knowledge complement each other in understanding and responding to climate change? What would it look like to genuinely centre Indigenous voices in climate adaptation planning for this region?

Suggested resource: Consult the First Peoples' Cultural Council (BC), Ontario Native Education Counselling Association, or your region's tribal nation websites for climate-related traditional knowledge resources.

Assessment Rubric

Criteria	Beginning (1)	Developing (2)	Applying (3)	Extending (4)
Understands sea level rise scenarios	Shows limited understanding; requires significant support to complete tasks.	Shows basic understanding; completes tasks with some guidance and occasional errors.	Demonstrates solid understanding; completes tasks independently with minor errors.	Demonstrates thorough understanding; extends thinking beyond task requirements with insight.
Can describe local flood risk	Shows limited understanding; requires significant support to complete tasks.	Shows basic understanding; completes tasks with some guidance and occasional errors.	Demonstrates solid understanding; completes tasks independently with minor errors.	Demonstrates thorough understanding; extends thinking beyond task requirements with insight.
Uses Climate Impact Map to find information	Shows limited understanding; requires significant support to complete tasks.	Shows basic understanding; completes tasks with some guidance and occasional errors.	Demonstrates solid understanding; completes tasks independently with minor errors.	Demonstrates thorough understanding; extends thinking beyond task requirements with insight.
Connects science to community	Shows limited understanding; requires significant support to complete tasks.	Shows basic understanding; completes tasks with some guidance and occasional errors.	Demonstrates solid understanding; completes tasks independently with minor errors.	Demonstrates thorough understanding; extends thinking beyond task requirements with insight.

Extension Activities

1. Research your local municipality's official climate adaptation plan. Does it address the scenarios you explored on Climate Impact Map? Present your findings in a 2-page brief.
2. Using Climate Impact Map's population displacement data, calculate the estimated number of people displaced globally under SSP5-8.5. Compare this to the largest refugee crises in

history.

3. Write a letter from the perspective of a resident of a Pacific Island nation to a world leader attending a climate summit. Use specific data from Climate Impact Map to make your case.

Curriculum Connections

Curriculum Standard: British Columbia Ministry of Education — Science, Social Studies, Environmental Learning

This lesson addresses outcomes related to: Earth and environmental science; climate systems and human impact; geographic inquiry and spatial thinking; data literacy and scientific reasoning; social justice and equity in environmental contexts; Indigenous perspectives and land relationships.

Cross-curricular connections: Social Studies (geopolitics of climate change), Mathematics (data interpretation, percentages, scale), Language Arts (persuasive writing, research), Indigenous Education.