



THE GREAT TRAIL: LEARNING ABOUT CANADA'S UNIQUE GEOGRAPHY

Topics

Outdoor learning/Geography

Time

1 hour (can be adapted to cover three class periods)

Grade level

4–12 (can be adapted for younger grades)

Students will

- Learn about the human and physical geography of Canada.
- Become familiar with The Great Trail and the opportunities it offers to Canadians.
- Understand the practice of citizen science.
- Develop fundamental geographic inquiry skills and practice common techniques used in geography.
- Experience the intersection between humans, nature and technology.

Materials

- Computers, tablets or cellphones with an Internet connection
- Notebooks and writing utensils
- GPS devices, magnifying glasses, binoculars, compasses, measuring tapes
- Examples of sub-disciplines in geography card (attached)
- Sense of place worksheet (attached)
- List of citizen science portals and projects card (attached)
- List of educational apps card (attached)

Overview

Canada is blessed with unparalleled geographical beauty. From the Avalon Peninsula on the island of Newfoundland to the Nicholson Peninsula in the Northwest Territories, and everywhere in between, we are presented with countless opportunities to connect with nature and learn from our surrounding environment. Right now, there is a grassroots movement in Canada to profile its human and natural elements by way of citizen science projects that focus on the collection, analysis and dissemination of data. This data is invaluable to researchers studying human-environment interactions, but also to Canadian citizens concerned with the protection and preservation of Canadian nature and wildlife. Citizen science projects are a great way to encourage students to get outdoors and appreciate the world around them while simultaneously learning basic skills such as critical thinking, problem solving and analytical thinking, and many of these projects take place along Canada's famous Great Trail (also called the Trans Canada Trail), which covers more than 24,000 kilometres of land and water. Use the following lessons, activities and resources to help your students experience the benefits of the outdoor classroom and the excitement of citizen science, and to learn about Canada's Great Trail.

Questions for getting started

What is unique about Canada's geography? What types of plants, animals, ecosystems, and regions are there in Canada? How many people live in Canada and where are they located? In what ways can we travel across Canada? How have humans impacted the natural places in Canada and the species that live there? What data do we have about these places and species, and what data is missing? What is citizen science and what are the benefits? What is environmental conservation? What is The Great Trail and where is it located? How can humans make a difference when it comes to protecting Canada's land, water and wildlife?

Lesson Description

Minds on: The class will discuss the geography of Canada and the ways in which Canadians interact with their environment. Students will share what they know about Canada and its regions, flora and fauna. Students will understand that many places in Canada are connected via The Great Trail. The class will explore the interactive Great Trail website and discuss the importance of the Trail to Canadians and their sense of place, and make connections between their own personal sense of place and locations within their community.

Action: Students will be introduced to the concepts of sense of place, citizen science, fieldwork, data collection, and environmental conservation. The class will take part in a fieldwork activity centered on citizen science that will enable them to explore their local section of The Great Trail.

Conclusion: Once back in the classroom, students will analyze and visualize their field data. Students will consider what lessons can be learned from nature and the knowledge they have gained from their fieldwork exercise.





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Introduction

Remind students that the geography of Canada profoundly shapes the identity of Canadian citizens, and that there are three fundamental disciplines associated with geography: physical geography, human geography and geographic methods. Ask students to name the different sub-disciplines that belong to each major discipline. For example, climatology, geomorphology and biogeography are all sub-disciplines of physical geography. Use the Examples of sub-disciplines in geography card to spark ideas, or to inspire a deeper conversation about ongoing research and development being done in Canada and around the world that students are familiar with or want to learn more about.

Now, ask students to share their personal knowledge of the geography of Canada, highlighting any urban or natural places they feel a connection with. They can refer to places they have visited, places they have lived, or places they want to visit in the future. Encourage students to consider the economies, cultures and politics that make these places unique, as well as the way that students felt when they were there/when they think about these places. Have them comment on the flora and fauna of these places, as well as the types of activities they took part in/want to take part in.

Now, let students in on Canada's best kept secret! Inform them that many places in Canada, and likely many of the places they just described, are connected because they are located along, or in close proximity to, The Great Trail—a network of multi-use recreational trails that stretch more than 24,000 kilometres, joining together the Atlantic, Pacific and Arctic coasts. This trail (also called the Trans Canada Trail) includes walkways, waterways and roadways, and passes through numerous historically significant locations in Canada, such as the Shogomoc River Pedestrian Suspension Bridge in New Brunswick, the grounds of Rideau Hall in Ontario, and the Okanagan Valley in British Columbia.

Allow students the time to explore The Great Trail in more detail. Lead students through the activities available on [The Great Trail website](#), or give them the opportunity to explore the website at their own pace on personal devices. They can “Explore the Map” by selecting sections of the Trail and toggling information such as photos, distances, elevation, and weather warnings. They can even find their closest connection to the Trail by inputting a postal code in the search bar, or download data about specific sections of the Trail to be used offline. Exploration questions/instructions can also be used, such as:

- ▶ Go to the stories section and find a story about the Trail that highlights your favourite season.
- ▶ Which section of the trail has the highest elevation?
- ▶ What is the difference between a blue trail and a green trail?
- ▶ Where are the ferry trails?
- ▶ Which sections of the trail border the United States?
- ▶ Are there any sections of the trail currently under advisory for weather-related events?
- ▶ Watch one of the videos and describe how that person connects with the geography of Canada.
- ▶ Go to the FAQ—what is the difference between the Trans Canada Trail and The Great Trail?
- ▶ Look at past issues of the newsletter—what are some exciting stories you read?

Now, ask students to think about their own community and how they feel connected to it. Use the [interactive map](#) on the Great Trail website and toggle different basemaps to spark students' imagination.

Connection to the Canadian Geography Framework

Concepts of Geographic Thinking

- ▷ Spatial significance
- ▷ Patterns and trends
- ▷ Interrelationships
- ▷ Geographic perspective

Inquiry Process

- ▷ Ask geographic questions
- ▷ Acquire geographic resources
- ▷ Interpret and analyze
- ▷ Evaluate and draw conclusions
- ▷ Communicate
- ▷ Reflect and respond

Geospatial Skills

- ▷ Location
- ▷ Maps
- ▷ Graphs
- ▷ Observation
- ▷ Data collection
- ▷ Geographic Information Systems
- ▷ Digital Earth
- ▷ Fieldwork





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Activity

Inform students that when they feel a special and memorable connection to a place, this is known as “sense of place.” **Sense of place** is a very important concept in geography—it is the personal way in which we perceive and interact with a place. Our sense of place is dictated by what we like and dislike about a place, what we respect and value in a place, our knowledge of a place and our desire to conserve or bring about positive change to a place. Sense of place is important because it is how we connect with our surroundings, appreciate Earth’s natural resources, and nurture our own personal identity.

Give each student a copy of the Sense of place worksheet and ask them to answer the questions while considering a place in their own community. Share with the class your own answers to the questions on the Sense of place worksheet. Invite students who are comfortable to share their answers and let the discussion evolve naturally. Point out that the last four questions were strategically included to get them thinking about places and patterns they want to learn more about and how they would do this if they had the chance. Explain that these types of questions are similar to the fundamental questions researchers ask themselves before heading out to do fieldwork or data collection.

Ask students what they know about **fieldwork and data collection**. If students are less familiar with these concepts, consider showing them example photos and projects that incorporate fieldwork and data collection, or invite someone with fieldwork experience to speak to the class. If students have already participated in fieldwork and data collection, ask them what they enjoyed the most, what difficulties they had to overcome, and what the end result was.

Explain to students that when fieldwork and data collection are done by a group of individuals with a common goal, this constitutes **citizen science**. Citizen science initiatives have had groundbreaking impacts on our understanding of the world, its geological processes and biodiversity, and the ways in which humans interact with the environment. With large numbers of people collecting many different types of data and openly sharing them with organizations and researchers, discovering the answers to research questions that could never before be answered is finally a possibility. Fieldwork, data collection and citizen science go hand-in-hand!

Ask the class if anyone has knowingly participated in a citizen science initiative before. If this is a new concept, share with students some examples of ongoing citizen science projects in Canada and the world. Refer to the List of citizen science portals and projects card for examples, or find your own local example.

As a class, choose a citizen science project that is of interest, and a nearby section of The Great Trail that would be a feasible fieldwork site for this type of project. Develop a plan to spend one or more class sessions outdoors collecting data and keep the following in mind:

- ▶ What citizen science project should we be a part of?
- ▶ What is the main issue or research question associated with this project?
- ▶ Which location is best suited for our fieldwork site?
- ▶ How will we get there and how much time will we spend there?
- ▶ What data will we be collecting?
- ▶ What materials and tools do we require to collect data?





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- ▶ Do we need things like sunscreen, bug spray, rubber boots or work gloves?
- ▶ Does the citizen science project have an app that can be used in the field?
- ▶ Do we require an internet connection to use the app, or can it be used offline?
- ▶ Can we proceed rain or shine?
- ▶ Are there any safety considerations to make?
- ▶ Is the fieldwork site accessible to all students?
- ▶ Will we work in teams or individually?
- ▶ Can we respect the phrase “take nothing but pictures, leave nothing but footprints”?
- ▶ How will we consolidate the data that we collect after our fieldwork?
- ▶ How is this data collected by the citizen science project managers?

Conclusion

Once students have had enough time to collect data, dedicate time to discussing the experience and the overall result. Be sure to refer back to the original research question or issue and discuss how the group's efforts contributed to the project. Discussion questions could include:

- ▶ What was the overall purpose of the chosen citizen science project or the fieldwork exercise?
- ▶ How does this connect with human or physical geography, or geographical methods?
- ▶ What were the characteristic features of the fieldwork site?
- ▶ What were the advantages and disadvantages of this site in relation to the research question?
- ▶ What were the primary sources of data?
- ▶ What did you learn or enjoy about citizen science and fieldwork?

Give students the opportunity to further analyze or visualize the data they collected. This can be done by:

- ▶ Discussing the results
- ▶ Drawing charts and diagrams by hand or with graphic software
- ▶ Looking at photos taken in the field
- ▶ Writing personal reflections
- ▶ Making presentations
- ▶ Creating infographics

Have students share their newfound appreciation for The Great Trail and its unique geographical features using the following prompts:

- ▶ Now that you have explored The Great Trail online and in person, how would you describe its geography to someone who has not?
- ▶ What other sections of the Trail would you like to visit?
- ▶ Is citizen science a good way of getting people to visit the Trail?
- ▶ How can citizen science help us learn more about our country?





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Extend your geographical thinking

Did you know that The Great Trail is home to a nation-wide **treasure hunt** that takes place during the summer months? Treasure boxes are hidden along the trail that contain special tokens and rewards, and anyone who finds these treasure boxes can win special prizes! The contest is open to residents of Canada who have reached the age of majority in the province or territory in which they reside, so students can create a team with their families and friends to participate! Stay up-to-date on the treasure hunt by checking the [The Great Trail website](#) regularly – don't miss your chance to find a treasure box near you!

Do your students like telling stories? Document your experience of conducting fieldwork on or around The Great Trail and create a story to be featured on [The Great Trail stories page](#). Send your story to media@tctrail.ca.

Do you want to stay up to date on what's happening with The Great Trail? Sign up for the newsletter which highlights Great Trail Heroes and their stories.

Share your photos of The Great Trail on social media using the handle [@TheGreatTrail](#).

Download The Great Trail app and take it with you wherever you go!

Modifications

For younger students, conduct a simple fieldwork exercise, such as:

- ▶ A scavenger hunt that incorporates sights, smells, sounds, colours and objects
- ▶ A plant, insect or animal identification exercise using picture cards
- ▶ Drawing and labelling a map of the schoolyard
- ▶ Counting occurrences of pedestrians and cars to determine peak foot and automobile traffic periods
- ▶ Conducting a survey at a park
- ▶ Identifying symbols commonly used in public spaces
- ▶ Creating dioramas of photographs that include smells, sounds and textures related to a research topic
- ▶ Take before-and-after photos of an outdoor space that contribute to a discussion about the relationship between humans and their environment and environmental conservation

If an outdoor activity is not possible, guide your students through an existing [Google Earth Voyager Story](#) or create a [Google Expedition](#) that your students can use to virtually travel to any place you choose! The latter is a great way to show your students the beauty and geography of the Great Trail from the safety of the classroom.

If conducting fieldwork during class hours is difficult, encourage students to get outdoors and collect data on their own time or with their families and friends. A journal or fieldwork log are excellent ways to keep track of time spent outdoors, scientific observations and data collection.

As an alternative to participation in an already established citizen science project, conduct a mini fieldwork session with your students by using one of the educational apps from the List of educational apps card.





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If there is a citizen science project that operates locally, invite a representative to make a presentation to the class, or to take them on a guided excursion of a local place. Be sure to reserve time for students to ask questions about how this person initially got involved in citizen science, their academic background or personal interests, and what benefits they have enjoyed from being an active member of a scientific collective.

Assessment Opportunities

Teachers can assess student responses during group discussions, and their ability to make connections between what they observe around them in everyday life and the three fundamental disciplines in geography.

Teachers can assess student responses to the questions on the Sense of place card, and their ability to understand the ways in which humans can attribute an emotional, historical, spiritual or cultural significance to a place.

Teachers can assess how students plan and strategize before going out in the field, as well as their behaviour and focus during fieldwork. If students create visualizations or summaries of what they learned after being in the field and collecting data, teachers can assess those as well.

Sources and Additional resources

Geography & Science

- ▶ Canadian Geographic Education
- ▶ The Canadian Geography Framework
- ▶ Exploring by the seat of your pants
- ▶ Choose science

The Great Trail

- ▶ The Great Trail
- ▶ The Great Trail Treasure Hunt

Sense of place

- ▶ Sense of place
- ▶ How geography can shape our work
- ▶ Storytelling and sense of place

Fieldwork

- ▶ Fieldwork guide and lesson plans

Citizen Science

- ▶ Government of Canada citizen science portal

Canadian Geographic Education resources

- ▶ Tiled maps
- ▶ Climate change infographics
- ▶ Explorer in residence

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EXAMPLES OF SUB-DISCIPLINES IN GEOGRAPHY

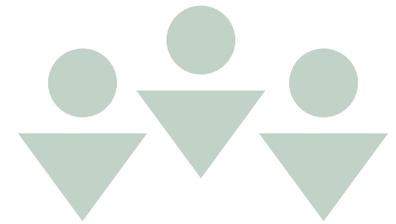
Physical Geography

- ▶ **Biogeography:** the distribution of species and ecosystems over time and space
- ▶ **Hydrology:** the movement and quality of water
- ▶ **Climatology:** the changes in climate and climatological patterns over time
- ▶ **Meteorology:** the changes in weather and large-scale atmospheric processes over time
- ▶ **Geomorphology:** the physical and chemical processes that shape the Earth
- ▶ **Lithology:** the characteristics of rocks and strata
- ▶ **Oceanography:** the circulation, and physical and chemical properties of the oceans
- ▶ **Orology:** the characteristics and history of mountains
- ▶ **Potamology:** the science of rivers
- ▶ **Limnology:** the science of lakes
- ▶ **Glaciology:** the movement and characteristics of glaciers
- ▶ **Landscape ecology:** the changes in land cover and ecosystems over time



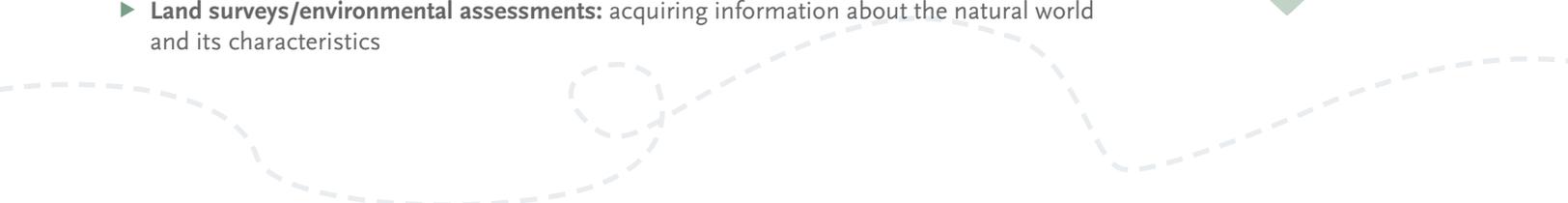
Human Geography

- ▶ **Economic geography:** the relationship between the different regions in the world and the products that are produced and consumed there
- ▶ **Population geography:** the distribution of people on Earth and the characteristics of communities and populations
- ▶ **Medical geography:** the patterns of diseases and how they connect to climate and environment
- ▶ **Political geography:** the boundaries, cooperation and conflicts between countries
- ▶ **Transportation geography:** the transportation networks around the world
- ▶ **Urban geography:** the development of cities and the impacts they have on humans and the natural world
- ▶ **Cultural geography:** the variation in cultures across time and space and the relations between different groups of people with distinct histories
- ▶ **Environmental geography:** the interactions between humans and the environment
- ▶ **Social geography:** how the natural world impacts social phenomena and the relationships between people



Geographic Methods

- ▶ **Cartography:** the development and use of maps
- ▶ **Geographic Information Systems (GIS):** the development and use of mapping technology
- ▶ **Remote sensing:** the use of technology to collect data about an object, species, or phenomenon from a distance
- ▶ **Global Positioning Systems (GPS):** satellite-based geographic positioning technologies
- ▶ **Data collection:** acquiring and analyzing qualitative and quantitative data
- ▶ **Interviews/focus groups:** acquiring information about human perspective/experience
- ▶ **Land surveys/environmental assessments:** acquiring information about the natural world and its characteristics



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LIST OF CITIZEN SCIENCE PORTALS AND PROJECTS

Portals

- ▶ Government of Canada citizen science portal
- ▶ Citizen Science Association
- ▶ David Suzuki Foundation citizen science
- ▶ NatureWatch
- ▶ Anecdata
- ▶ SciStarter

Projects

- ▶ Audubon Christmas bird count
 - ▶ Aurorasaurus
 - ▶ Biodiversity Heritage Library
 - ▶ Birds and windows project
 - ▶ Bumblebee watch
 - ▶ Cities at night
 - ▶ CrowdWater
 - ▶ Did you feel it?
 - ▶ eBird
 - ▶ eButterfly
 - ▶ eOceans
 - ▶ FreshWater Watch
 - ▶ Geo-Wiki
 - ▶ Globe at night
 - ▶ Great backyard bird count
 - ▶ HerpMapper
 - ▶ ISeeChange
 - ▶ iSpot Nature
 - ▶ Litterati
 - ▶ MapIt for a clean planet
 - ▶ MonarchWatch
 - ▶ NestWatch
 - ▶ Ontario BioBlitz
 - ▶ PlantNet
 - ▶ SatCam
 - ▶ Secchi Disk Phytoplankton Project
 - ▶ SnowTweets
 - ▶ SPLASHH
 - ▶ WildLifeLog
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LIST OF EDUCATIONAL APPS

Mapping

- ▶ TheGraitTrail: explore Canada! (Apple, Android)
- ▶ Walkmeter Walking & Hiking GPS: tracks your route and your fitness statistics (Apple, Android)
- ▶ ViewRanger: map your route without a mobile signal (Apple, Android)
- ▶ GPS Logger: log your GPS coordinates at regular intervals (Apple, Android)
- ▶ MapIt: map sites that are of interest with GPS (Apple, Android)
- ▶ ArcGIS apps: a collection of apps that can be used in the field or the classroom (Apple, Android)
- ▶ Compass: determine direction in the field (Apple, Android)
- ▶ GAIA GPS: outdoor navigation app (Apple, Android)
- ▶ Spyglass: offline GPS app with great visuals (Apple, Android)
- ▶ AllTrails: a hiking, running and cycling app (Apple, Android)
- ▶ Google Earth: a virtual globe (Apple, Android)

Data Collection

- ▶ Collector: use maps and make observations (Apple)
- ▶ Survey123: collect and visualize data (Apple, Android)
- ▶ Sketch: take a picture and share the location (Apple)
- ▶ FieldNotes: take notes while in the field (Apple, Android)
- ▶ Altimeter and barometer: measure elevation and pressure in the field (Apple, Android)
- ▶ Clinometer: measure slopes in the field (Apple, Android)
- ▶ EpiCollect: collect data in the field (Apple, Android)

Identification

- ▶ FlowerChecker: identify plants (Apple, Android)
- ▶ iNaturalist: identify plants and animals (Apple, Android)
- ▶ LeafSnap: identify plants (Apple, Android)
- ▶ PeakVisor: instantly recognizes then name of any nearby mountain (Apple, Android)
- ▶ ChirpOMatic or Warblr: identify birdsongs (Apple, Android)

General

- ▶ Starting with soil: gardening and the importance of soil (Apple)
- ▶ UVLens: information about the UV Index (Apple, Android)
- ▶ First Aid: Canadian Red Cross app (Apple, Android)

Virtual Field trips

- ▶ Cardboard: use virtual reality to visit places via Google Earth (Apple, Android)



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SENSE OF PLACE

1. Which location in your community is important to you and your sense of place?

2. Describe the human and physical characteristics of this place.

3. Does this location have emotional, historical, spiritual or cultural significance to you? Explain.

4. How does this location impact your personal identity?

5. What are the ways in which you interact with or use this location?

6. Are there any issues affecting this location that you are aware of?

7. If you had the opportunity to learn more about this place, what would you want to know?

8. How would you go about acquiring this information?

