Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated:

Drumlin (an oval or elongated hill)

Nova Scotian Example:

Kuowaqe'jk, *Big Pine Hill* (Citadel Hill, Halifax)

MAIN CULPRIT: WATER & ICE

Halifax is known for this large drumlin overlooking the city, dropped by this culprit. Made of **unsorted sediment**, the drumlin was soft enough to carve Citadel Hill into it. This culprit also left behind a partially submerged drumlin in the harbour.



Halifax Military Heritage Preservation Society



Mélanie Léger, Radio-Canada, 2019

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated:

Erratic (a rock that does not match the rocks of the area)

Nova Scotian Example:

Kjipanu'pek, *Great bay opening out to the sea* (Areas along St. Margaret's Bay)

MAIN CULPRIT: WATER & ICE

These large granite boulders likely came from the North Mountain **batholith** and were deposited and exposed by this culprit around 10,000 years ago. **Striations** scraped into the boulders tell us the direction of the culprit's movement.



Michael C. Rygel, Wikimedia Commons

Research Card:
Animated Earth

DRIVING DISCOVERY

LE MOTEUR DE LA DÉCOUVERTE

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated:

Lake Basin (the indent where the water of a lake collects)

Nova Scotian Example:

Pitu'pok/Pitu'paq, *Long dish of saltwater/To which all things flow* (Bras d'Or Lakes, Cape Breton)

MAIN CULPRIT: WATER & ICE

This culprit carved the basins of the Bras d'Or lakes, leaving behind **stratified sediment.** As the lake basins formed, they filled with fresh water, but as the sea level rose, they filled with sea water and marine life.



Joseph Apaloo, *Research Gate*, Jan 2010

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated: **Roche Moutonée (a bare rock with a smooth gentle slope side and a steep, rough cliff side)**

Nova Scotian Example: **Nukumkikewe'jk, *At the soft place* (Taylor Head Provincial Park)**

MAIN CULPRIT: WATER & ICE

This culprit slowly travelled up the soft **sandstone bedrock**, making the gradual slope on one side. As this culprit moved, the pressure increased and fractured the bedrock into small pieces, which were then carried away by this culprit, leaving behind the steep side.



Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Impacted:

Sea Stack (rock pillar detached from the shoreline)

Nova Scotian Example:

We'kwayik/Wsituaqnek, *At the end of land* (Digby Balancing Rock, Digby Neck)

MAIN CULPRIT: WATER & ICE

The Digby Neck shoreline is made of **basalt**, which when cooled quickly along a flat surface, makes straight lines in the rock. This culprit detached the column of rock from the shoreline and eroded the base it once fully stood on.



Tourism Nova Scotia, 2017

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Impacted: **Rift Valley (a long, deep indent with steep walls)**

Nova Scotian Example: **Encompasses many Mi'kmaq territories, some seen below (Bay of Fundy)**

MAIN CULPRIT: WATER & ICE

The rift valley that became the Bay of Fundy formed as Pangea began to separate. Over time, the indent was subject to many changes like flooding, pressure from volcanoes, and a physical tilting of the land. This culprit helped the unique shape of the current bay which allows for the world's highest tides.



Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated: **Cliff (a steep rock face)**

Nova Scotian Example: **Grand Nyjagon or Chegoggin(s), *Place of the Fishing Weirs/The Great Encampment* (Joggins Fossil Cliffs, Joggins)**

MAIN CULPRIT: WATER & ICE

The flat surface atop the Joggins cliffs was once the shoreline of the Bay of Fundy, but as this culprit retreated, the shoreline was stranded leaving behind a cliff face. This rock face has been subject to **erosion** by another form of this culprit, exposing the fossils within.



CBC News via Joggins Fossil Institute, 2008

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated:

Slot Canyon (a very narrow, tall rock channel)

Nova Scotian Example:

Taqamiku'jk, *A little crossing place* (George Fraser Slot Canyon, Parrsboro)

MAIN CULPRIT: WATER & ICE

This canyon was formed by this culprit out of soft rock like **sandstone** or **limestone**. This culprit expands and deepens the cracks in the rocks, leaving a narrow opening.



Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Impacted:

Shoreline (the boundary between land and water)

Nova Scotian Example:

Tia'muisqunji'jk, *At the Moose's Nose* (Cape John Lowland Cliffs, Pictou County)

MAIN CULPRIT: WATER & ICE

The northern shoreline is made mainly of **sedimentary rock**, similar to P.E.I.'s **red sandstone**. This culprit is slowly breaking off parts of this coastline.



K. McGuigan, T. Webster , Centre of Geographic Sciences

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated:

Sinkhole (a hole in the ground with no natural drainage)

Nova Scotian Example:

Wapu'ek, *The White Waters* (Cheverie, Hants County)

MAIN CULPRIT: WATER & ICE

Below the ground, this culprit slowly dissolves water-soluble rock known as **gypsum**. Without support, the ground layer falls through, making a hole.



J. Drage, Government of Nova Scotia Geoscience and Mines Branch, 2019



J. Drage, Government of Nova Scotia Geoscience and Mines Branch, 2019

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated: **Salt/Tidal Marsh (flat, coastal wetland ecosystem)**

Nova Scotian Example: **We'kwawisisk, *Water Flow Stops* (Bear Cove, Halifax County)**

MAIN CULPRIT: WATER & ICE

This culprit formed these salt marshes by depositing **sediment** in flat areas sheltered from wind and waves. Over time, the nutrients this culprit brings allows for more vegetation to grow, diversifying its ecosystem.



Len Wagg, Nova Scotia Department of Natural Resources, 2017

Research Card:
Animated Earth

Potential Culprits

Water and Ice: All forms of water, including glaciers, the ocean, and precipitation like rain, can cause geological change through erosion and deposition. They can even be powerful enough to carve out large pieces of land.

Tectonic Plates: Tectonic plates lie on top of the fluid mantle, causing geological change through the moving the continents (continental drift). This movement can lead to earthquakes, volcanoes, and landforms like mountains or rift valleys.

Air: The atmosphere around us can cause geological change through wind erosion, deposition, and the generation of waves.

Living Things: Things that are alive can cause geological change by producing chemicals that can cause erosion and weathering, or through changing the climate. Things that were once alive make organic matter that can create some geological formations.

Research Card:
Animated Earth

Potential Culprits

Water and Ice: All forms of water, including glaciers, the ocean, and precipitation like rain, can cause geological change through erosion and deposition. They can even be powerful enough to carve out large pieces of land.

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Research Card:
Animated Earth

Definition Page

Basalt: A volcanic rock formed by the rapid cooling of lava at or near the Earth's surface.
Basin: A bowl-like indent in the Earth's surface. Some basins are filled with water.
Batholith: A large amount of volcanic rock that formed beneath the Earth's surface but was forced out to the crust.
Bedrock: Solid rock beneath surface materials like soil and gravel.
Gypsum: A mineral that produces large areas of soft rock that is soluble in water.
Limestone: A sedimentary rock with high levels of calcium, formed from parts of fossil animal shells.
Sandstone: A sedimentary rock made from sheets of sand and minerals that water easily passes through.
Sediment: Solid material that is eroded and deposited in a new location.

- **Unsorted:** Sediment of all sizes mixed together; e.g. Glacial Till.
- **Stratified:** Sediment that shows different layers of deposited material.

Striation: One of many parallel lines or scratches on a rock surface.
Wetland: An area of land that is flooded by water either permanently or seasonally.

Research Card:
Animated Earth

The Rock Cycle

Metamorphic Rock

Rock that has been transformed from its original form through intense heat or pressure



OnlineScienceMall, 2019.

Melting and Cooling

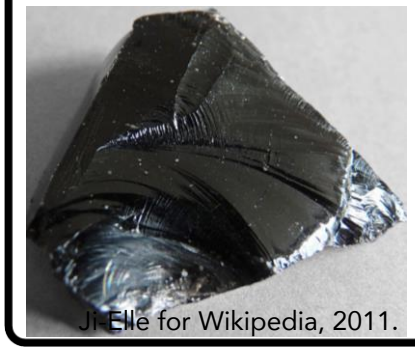
Heat and Pressure

Weathering and Erosion

Weathering, Erosion, and Pressure

Igneous Rock

Volcanic rock, formed from the cooling of magma or lava



Ji-Elle for Wikipedia, 2011.

Sedimentary Rock

Rock formed from other rocks by the deposition of small particles



Minimegeology.com, 2019.

Weathering and Erosion

Heat and Pressure

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated:

Sea Stack (rock pillar detached from the shoreline)

Nova Scotian Example:

We'kwayik/Wsituaqnek, *At the end of land* (Digby Balancing Rock, Digby Neck)

MAIN CULPRIT: TECTONIC PLATES

This culprit helped make available the **basalt** that formed the Balancing Rock. Basalt cools quickly, and when it does so along a flat surface, it makes the straight lines seen in this feature.



Tourism Nova Scotia, 2017

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated: **Rift Valley (a long, deep indent with steep walls)**

Nova Scotian Example: **Encompasses many Mi'kmaq territories, some seen below (Bay of Fundy)**

MAIN CULPRIT: TECTONIC PLATES

The Bay of Fundy has been subject to many changes over the history of the Earth, including flooding, pressure from erupting volcanoes, and a physical tilting of the land. During the separation of Pangea this culprit helped formed the original rift valley that would become the feature we know today.



NASA Earth Observatory, October 20, 2019

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Impacted:
Shoreline (the boundary between land and water)

Nova Scotian Example:
Unama'kik *Land of Fog*
(Cape Breton Island)

MAIN CULPRIT: TECTONIC PLATES

Unlike the **erosion** and **deposition** of shorelines caused by normal waves, this culprit rocked the sea floor with enough force to generate a 13m tall wave. This massive wave destroyed the Cape Breton shoreline and ocean floor.



***Although Cape Breton saw destruction, these images from Newfoundland showed the full force of this culprit.**

Provincial Archive, Government of Newfoundland and Labrador, 1929



H.M. Mosdell, from the collection of W.M. Chisholm, 1929

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Impacted:
Cliff (a steep rock face)

Nova Scotian Example:
Grand Nyjagon or Chegoggin(s), *Place of the Fishing Weirs/The Great Encampment* (Joggins Fossil Cliffs, Joggins)

MAIN CULPRIT: TECTONIC PLATES

The **fossils** in these cliffs are from organisms suited to a warmer climate than modern-day Nova Scotia. This culprit helped change this area from diverse coastal rainforest to our now cooler climate.


CBC News via Joggins Fossil Institute, 2008


Pygocephalus (shrimp)


Adiantites (plant)


Lecopsid (tree)

Joggins Fossil Institute, 2019

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Impacted:

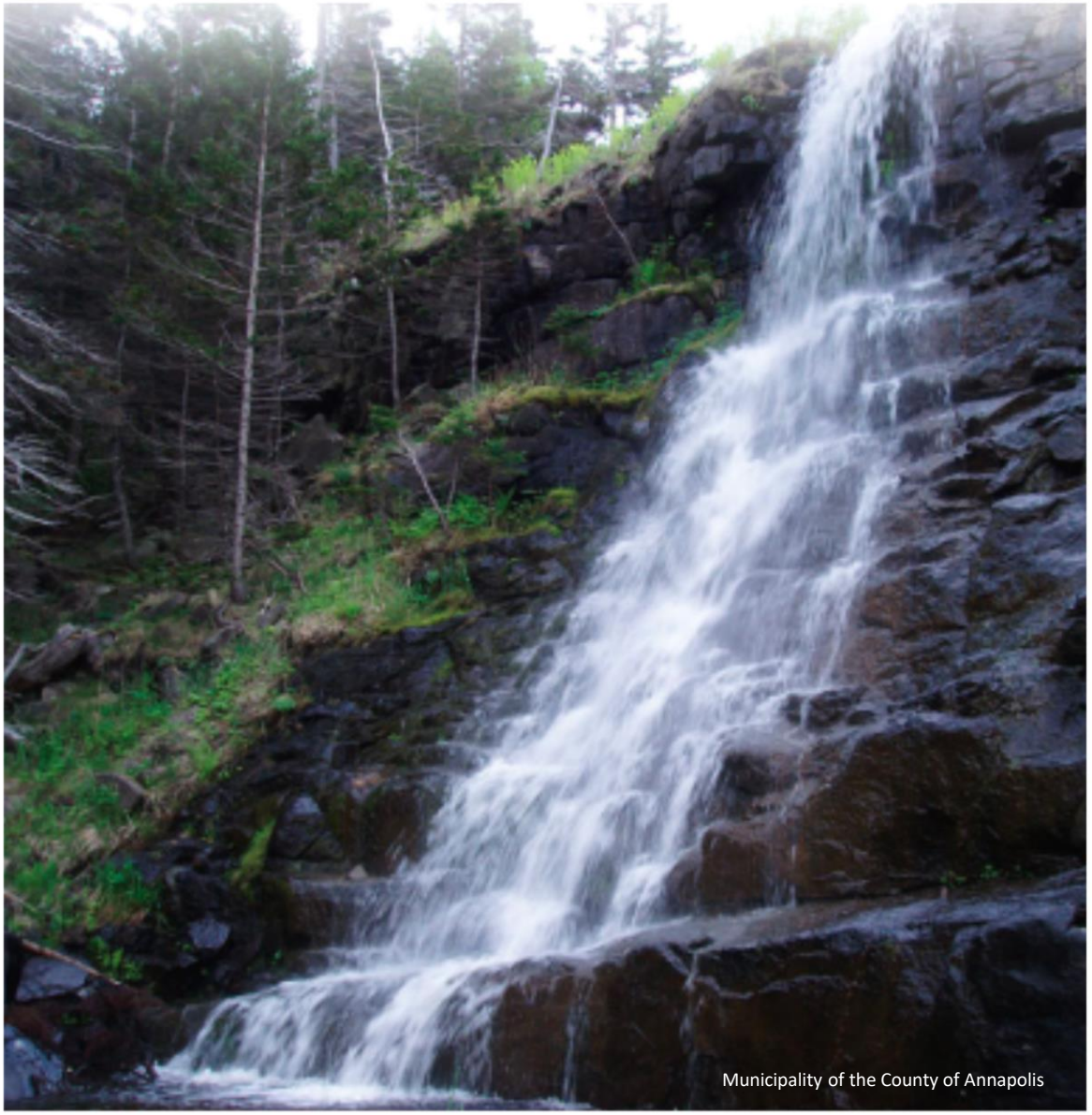
Batholith (large amount of volcanic rock forced through to the Earth's crust)

Nova Scotian Example:

Metepna'kia'ji'jk, *Somewhat Difficult to Climb* (areas like Delaps Cove along the North Mountain)

MAIN CULPRIT: TECTONIC PLATES

This culprit caused large amounts of magma to come to the surface. These massive deposits of **basalt**, known as the North Mountain batholith, make areas like this waterfall possible.



Municipality of the County of Annapolis

Research Card:
Animated Earth

Driving Question

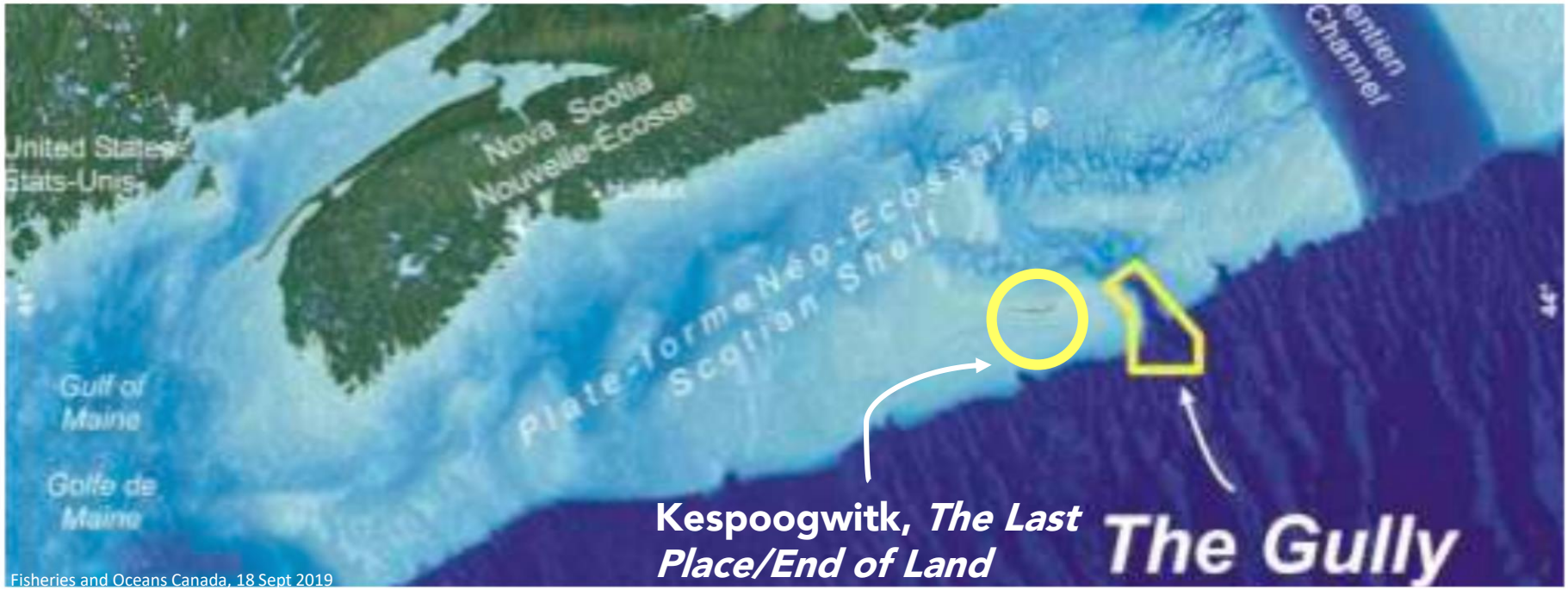
How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated: **Continental Shelf (a piece of land under relatively shallow water)**

Nova Scotian Example: **The Scotian Shelf (Atlantic Ocean)**

MAIN CULPRIT: TECTONIC PLATES

As the Atlantic Ocean began to form our culprit began thinning and breaking the crust off the coast of Nova Scotia, creating **basins** where the **Scotian Shelf** now sits. The image below shows some unique features of this shelf, like large underwater canyon known as the Gully and Kespoogwitk (Sable Island), a **barrier sandbank** formed by glacial debris.



Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated: **Goldenville Group (a large section of metasedimentary rock covering much of mainland Nova Scotia)**

Nova Scotian Example: **Wospegeak, *The sunshine is reflected from the water* (Tangier River, Eastern Shore)**

MAIN CULPRIT: TECTONIC PLATES

This culprit allowed for the gold found at the head of the Tangier river. By producing folds and upheavals of the land, the culprit generated intense heat and pressure that cracked the **granite** rocks, allowing them to be filled with gold **sediments**.



Museum of Industry, NS. 2019



Museum of Industry, NS. 2019

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated: **Highlands (an area of high or mountainous land)**

Nova Scotian Example: **Ktɨtnuk, *Highest Mountain* (Aspy Bay, Cape Breton Highlands)**

MAIN CULPRIT: TECTONIC PLATES

The mountainous Cape Breton highlands, laying along the Aspy **fault** line, were produced by this culprit. The highlands are made from ancient **metamorphic** rocks that are almost as old as the **Canadian Shield**, while the lowlands were formed of softer **sandstones** and **mudstones** much later.



Sarah West Ayres Turnbull for Earth Magazine, 2017.



Acadia University, 2019.

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated: **Peninsula (a landform surrounded mainly by water while still being connected to a mainland)**

Nova Scotian Example: **Wa'so'q, *Heaven* (Partridge Island)**

MAIN CULPRIT: TECTONIC PLATES

This peninsula, attached to the mainland by an **isthmus**, is an outcropping of **basalt** sent out of the Earth`s crust by volcanoes caused by this culprit.



Len Wagg, Nova Scotia Nature Trust

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated:

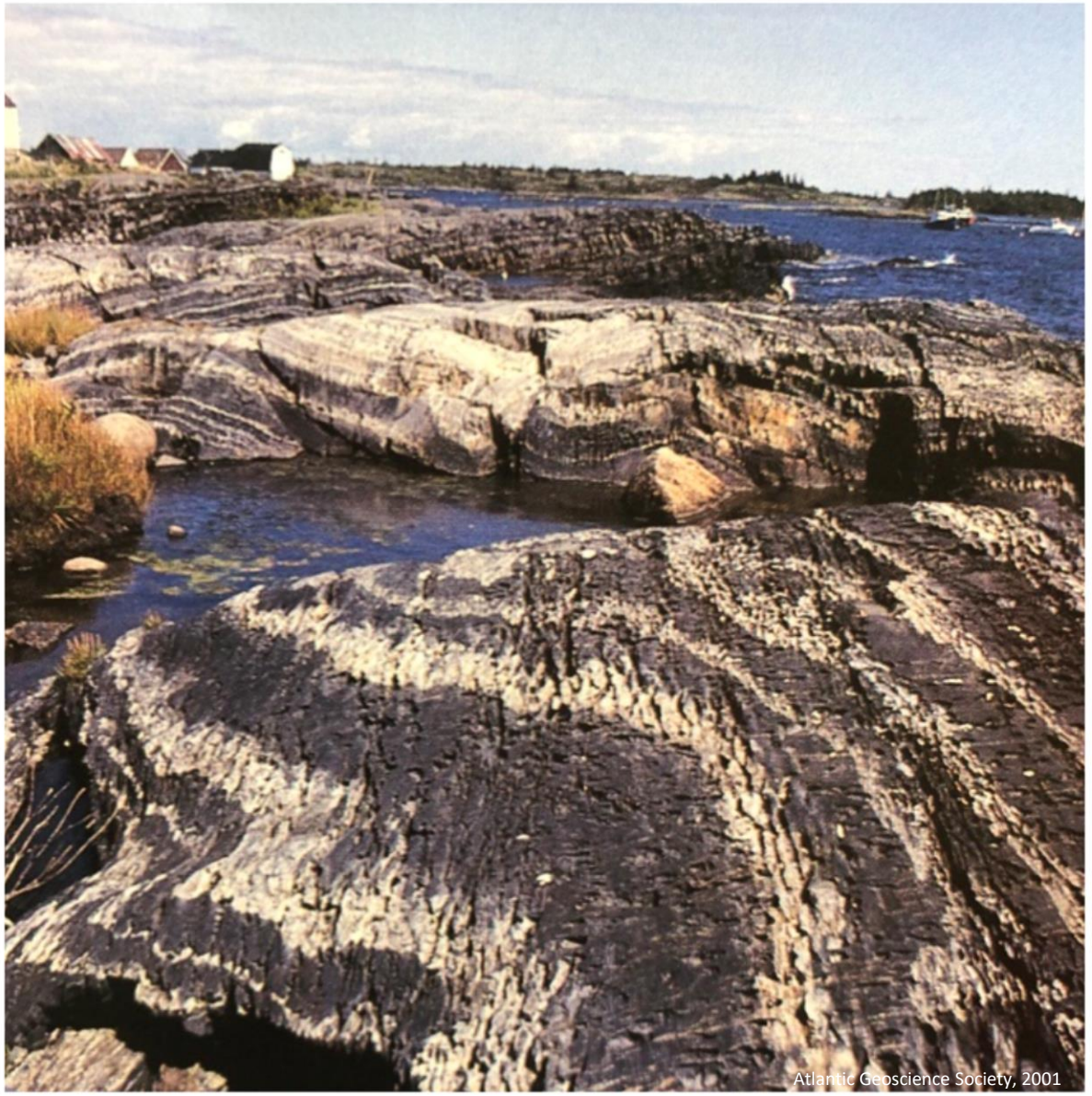
Feltzen Formation (a series of layered rock beds)

Nova Scotian Example:

E'se'katik, *At the place of Clams* (Blue Rocks, near Lunenburg)

MAIN CULPRIT: TECTONIC PLATES

These unique rocks have light and dark blue-grey bands, representing the original **sedimentary** layers. Over time, our culprit buried and crushed the rock, warping the layers of **sediment** and changing the rock to **metamorphic**. Evidence of the immense pressure is seen in the straight cracks.



Atlantic Geoscience Society, 2001

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated:

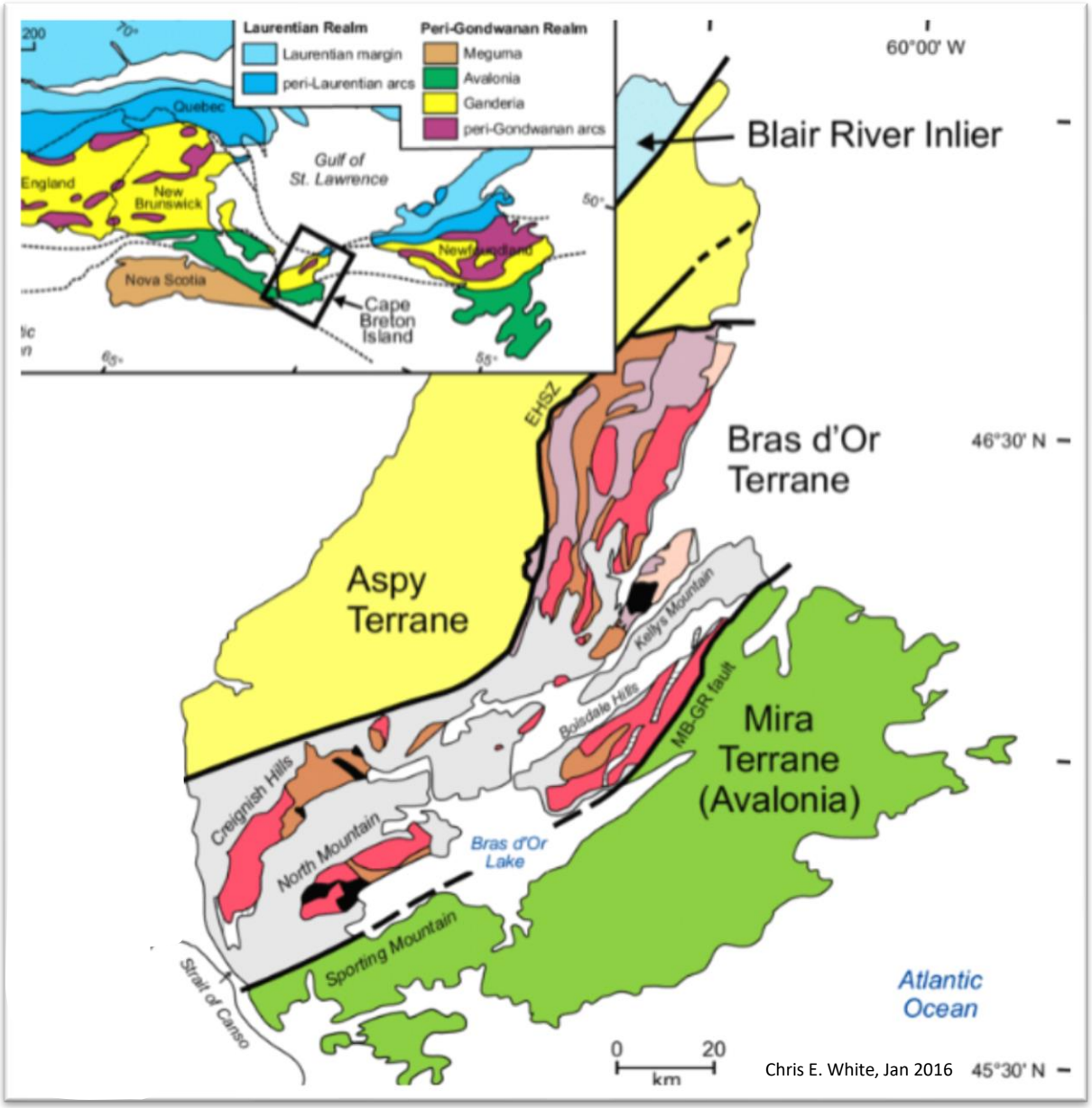
Terrane (an area of land with distinct features, bound to others by a fault)

Nova Scotian Example:

Unama'kik, *Land of Fog* (Cape Breton Island)

MAIN CULPRIT: TECTONIC PLATES

This culprit helped produce the unique geology of the island by splitting the supercontinent **Rodinia.** The three terranes, namely **Mira**, **Aspy**, and **Bras d'Or**, all from different areas were reassembled along with the **Blair River Inlier**, which is part of the **Canadian Shield**.



Research Card:
Animated Earth

Potential Culprits

Water and Ice: All forms of water, including glaciers, the ocean, and precipitation like rain, can cause geological change through erosion and deposition. They can even be powerful enough to carve out large pieces of land.

Tectonic Plates: Tectonic plates lie on top of the fluid mantle, causing geological change through the moving the continents (continental drift). This movement can lead to earthquakes, volcanoes, and landforms like mountains or rift valleys.

Air: The atmosphere around us can cause geological change through wind erosion, deposition, and the generation of waves.

Living Things: Things that are alive can cause geological change by producing chemicals that can cause erosion and weathering, or through changing the climate. Things that were once alive make organic matter that can create some geological formations.

Research Card:
Animated Earth

Potential Culprits

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Research Card:
Animated Earth

Definition Page

Aspy Terrane: Consists of older metamorphic and igneous rocks in the West and some younger metamorphic rocks in the rest of the terrane.
Barrier Sandbank: A long and narrow ridge in a body of water made of sand or other material that was deposited by the water.
Basalt: A volcanic rock formed by the rapid cooling of lava at or near the Earth's surface.
Basin: A bowl-like indent in the Earth's surface. Some basins are filled with water.
Blair River Inlier: Part of the Canadian Shield that consists of igneous mountain-building rocks that make up the Appalachian mountains, with origins dating back to when Rodinia was forming.
Bras d'Or Terrane: Consists of hard metamorphic rock like marble and quartzite, with some igneous rocks mixed between them.
Canadian Shield: An exposed portion of the North American Continental Crust that is made of ancient igneous and metamorphic rock.
Deposition: The process that adds soils, rock, or other sediments to a landform.
Erosion: The process that removes soils, rock, or other sediments from a location through wind, water, gravity, or other natural processes.
Fault: A fracture in the earth's crust where there has been movement (also: boundaries between tectonic plates).
Fossil: Remains or traces of plants and animals preserved in rock.

Research Card:
Animated Earth

Definition Page

Granite: Hard igneous rock containing quartz and other minerals. It is one of the oldest rocks on Earth.
Isthmus: A small strip of land that connects two larger landmasses.
Metasandstone: A sandstone that has undergone metamorphosis to some degree, a type of metasedimentary rock.
Metasedimentary Rock: A type of metamorphic rock that was first formed through the deposition and solidification of sediment. It was then buried and subjected to high pressures and temperatures, causing it to recrystallize.
Mira Terrane: Similar to the Canadian Shield, made up of volcanic and sedimentary rock.
Mudstones: A sedimentary rock made from a mixture of clay and very fine particles.
North Mountain: A mountain of igneous rock stretching from Annapolis Valley to Mt Uniacke.
Rodinia: A supercontinent that formed between 1.1-0.9 billion years ago and broke apart 750-633 million years ago.
Sandstones: A sedimentary rock made from sheets of sand and minerals that water easily passes through.
Scotian Shelf: A 700 km section of the Continental Shelf off Nova Scotia with an average depth of 90 m.
Sediment: Solid material that is eroded and deposited in a new location.

Research Card:
Animated Earth

DRIVING DISCOVERY

LE MOTEUR DE LA DÉCOUVERTE

The Rock Cycle

Metamorphic Rock

Rock that has been transformed from its original form through intense heat or pressure



OnlineScienceMall, 2019.

Melting and Cooling

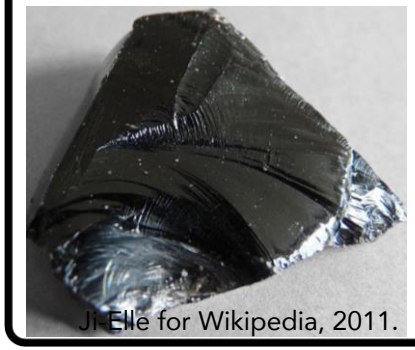
Heat and Pressure

Weathering and Erosion

Weathering, Erosion, and Pressure

Igneous Rock

Volcanic rock, formed from the cooling of magma or lava



Ji-Elle for Wikipedia, 2011.

Sedimentary Rock

Rock formed from other rocks by the deposition of small particles



Minimegeology.com, 2019.

Weathering and Erosion

Heat and Pressure

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Impacted: **Island (an area of land surrounded entirely by water)**

Nova Scotian Example: **Siskuikek, *At the muddy place* (Big Harbour Island, Melikewe'j First Nation, Cape Breton)**

MAIN CULPRIT: LIVING THINGS

Many of the Bras d'Or islands are made of soft, water-soluble **gypsum**. The combination of **sea-level rise**, **glacial rebound**, increased frequency and intensity of storms, and a reduction in ice coverage, all worsened by this culprit, are flooding and eroding islands like this one at an alarming rate.



AANDC Climate Change Adaptation Program, March 2016

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated:

Sinkhole (a hole in the ground with no natural drainage)

Nova Scotian Example:

Kwesomalegek, *The Hardwood Place* (Cumberland County)

MAIN CULPRIT: LIVING THINGS

The 40m wide Oxford sinkhole, which developed in an urban area, is likely a direct result of this culprit's activities. Oxford and surrounding Cumberland County are underlain by a type of soft and **water-soluble** rock from the **Windsor Group.**



A. Tizzard, G. J. Demont, and D. M. Brushett, NS Geoscience and Mines Branch, 2018.



Paul Palmeter for CBC, 2018.

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated: **Mine (a hole or series of holes in the ground from which things like metals are removed)**

Nova Scotian Example: **Sedabooktook, *Harbour running far back* (Crow's Nest abandoned gold mine, Guysborough county)**

MAIN CULPRIT: LIVING THINGS

This culprit fast-tracks the erosion process by removing massive amounts of rock and soil from an area to extract valuable resources. Mining an area can also result in contamination of **groundwater** and soils, and habitat loss.



Nova Scotia Minehunters, CBC 2017.

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Impacted: **Agricultural Land (land that can support the growing of crops)**

Nova Scotian Example: **Kespukwitk, *End of Flow* (Annapolis Valley)**

MAIN CULPRIT: LIVING THINGS

The soils in the Annapolis Valley are susceptible to high levels of erosion, in part because of this culprit. Tilling, growing only one crop each year in the same soil and using fertilizer increases the risk of agricultural soil erosion. This erosion can produce chemical pollution in waterways and threaten future growth.



Research Card:
Animated Earth

Driving Question

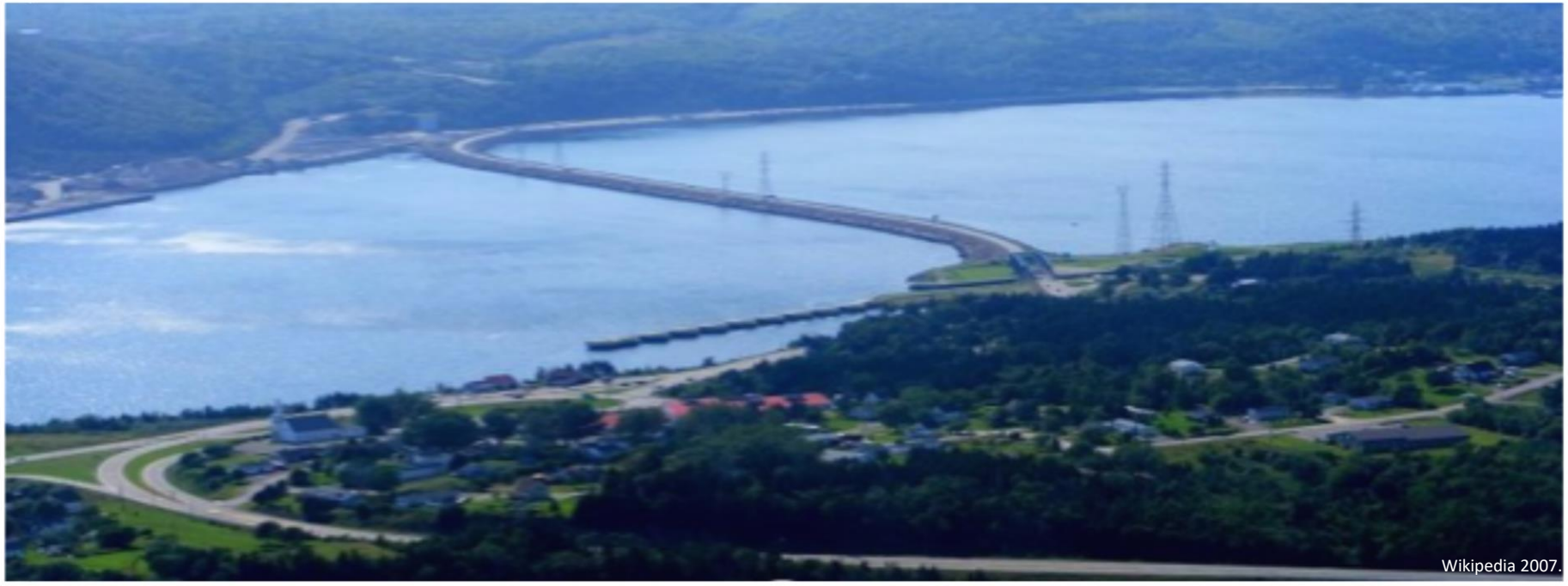
How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated: **Land Bridge (a strip of land which is at least partially underwater and connects two landmasses)**

Nova Scotian Example: **The Canso Causeway in Cape Breton, connecting Matuesuatp, *Porcupine Head* (Cape Porcupine) and Apatamkiaq, *At the place of the turning sand (Port Hastings)***

MAIN CULPRIT: LIVING THINGS

This culprit deposited more than 9 million tonnes of rock to form the Causeway. The bridge, which connects the Island to the mainland, separates the **fjord** on the southern side from the northern Atlantic Ocean, majorly impacting marine and terrestrial life.



Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Impacted:

Shale Formation (a smooth rock made of clay, mud, or silt, which breaks easily into thin layers)

Nova Scotian Example:

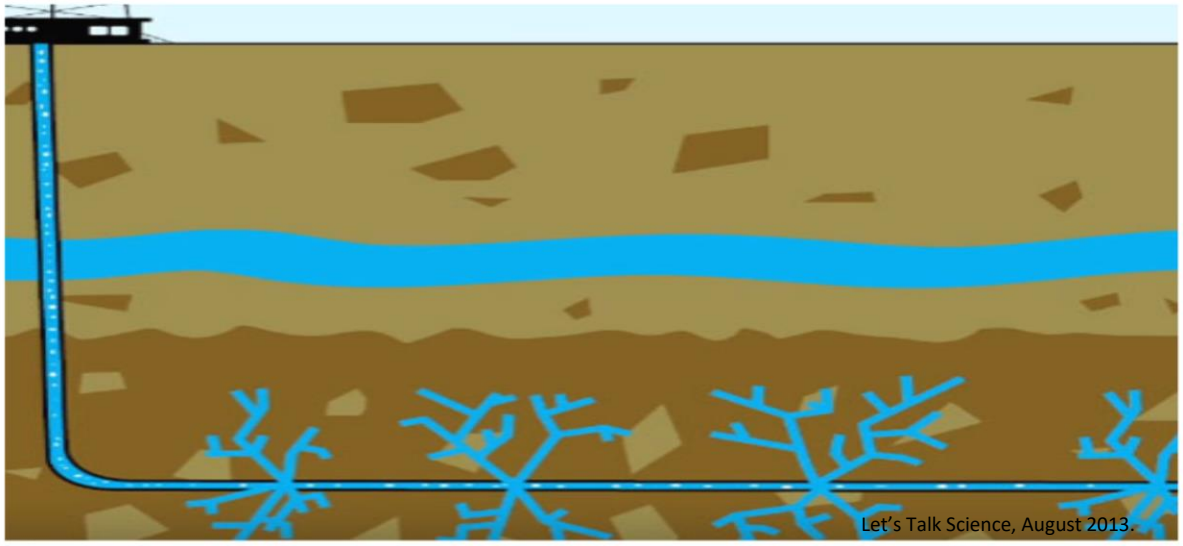
Knektkuk *River extending far away* (Kennetcook, East Hants County)

MAIN CULPRIT: LIVING THINGS

This culprit fractures large areas of **bedrock** below the earth, releasing deposits of natural gas. This has led to **groundwater** contamination, new **fissures** in the earth, and even minor earthquakes.



Nofrac.com 2012.



Let's Talk Science, August 2013.

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Impacted:

All Rock Types

Nova Scotian Example:

Kjipanu'pek, *Great bay opening out to the sea* (Areas along St. Margaret's Bay)

MAIN CULPRIT: LIVING THINGS

This culprit erodes rocks across Nova Scotia through **mechanical weathering.** They increase pressure on the rock, making small cracks larger. This culprit also dissolves the rock's surface with acids, a type of **chemical weathering.**



Nova Scotia Forest Notes, January 201



Carolyn Stampeen, 2016

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Impacted:

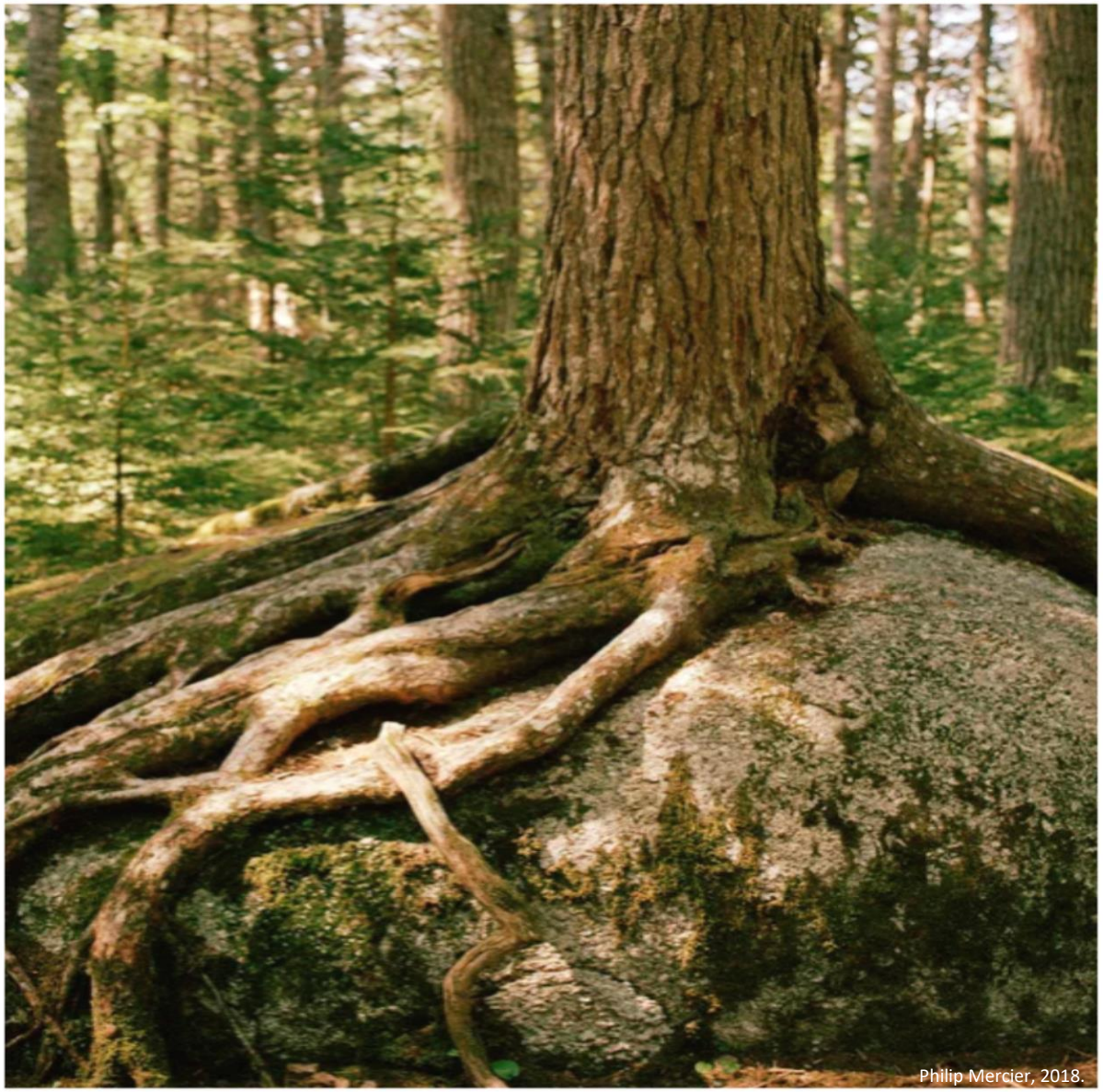
Rock Fragments (unattached pieces of rock that are resistant to further cracking)

Nova Scotian Example:

Kejimkujik, *Tired Muscles/Little Fairies* (Kejimkujik National Park)

MAIN CULPRIT: LIVING THINGS

This culprit puts stress and pressure on rocks as it grows, causing the rock to crack. These cracks allow other substances to erode the rock, causing fragments of the rock to break off.



Philip Mercier, 2018.

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Generated: **Horton Group (a large area of sedimentary rock across much of central and eastern Nova Scotia)**

Nova Scotian Example: **So'qmkiknuk *At the place where the pole is used to push instead of paddling*** **(Shelburne, Shelburne County)**

MAIN CULPRIT: LIVING THINGS

This culprit provided the **organic matter**, which when compressed in **peat bogs**, produced the millions of tonnes of **coal** that have been mined in Nova Scotia.



Government of Nova Scotia, 2017.



Anthony Devlin for PA Wire, 2017.

Research Card:
Animated Earth

Driving Question

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Landform Generated:

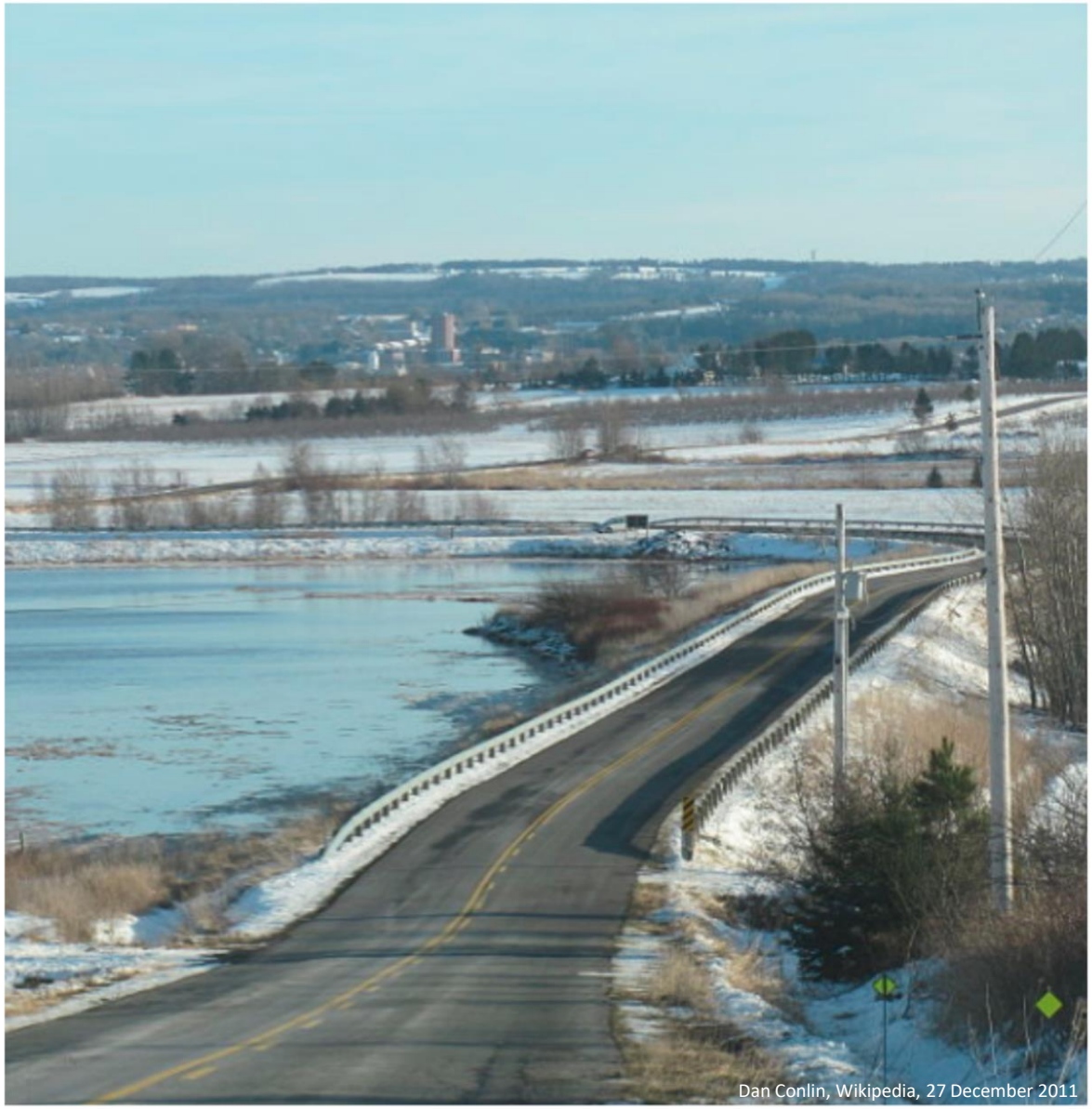
Agricultural Dyke (a bank used to hold back water)

Nova Scotian Example:

Apji'jkmujue'katik, *Place of the Ducks* (Wellington Dyke, Kings County)

MAIN CULPRIT: LIVING THINGS

This culprit helped form the barrier between high tidal waters from the Canard River and fertile agricultural land. Without this formation, this area would be underwater and thus unsuitable for farming.



Dan Conlin, Wikipedia, 27 December 2011

Research Card:
Animated Earth

Driving Question

How can you analyse the sources and consequences of geological change on a global and a local scale?

Landform Impacted:

Quartzite Ridges (hard and dense metamorphic rock)

Nova Scotian Example:

Kwipek* (Bedford Barrens, Halifax County)

Mi'kmaw meaning uncertain

MAIN CULPRIT: LIVING THINGS

Over 11,000 years ago, this culprit made markings like the one on the quartzite ridges of the Bedford Barrens. These markings can still be seen today at various points within this national historic site but are slowly fading due to **erosion**.



Stephen Brake, Ku'ku'kwes News, 26 August 2015

Research Card:
Animated Earth

Potential Culprits

Water and Ice: All forms of water, including glaciers, the ocean, and precipitation like rain, can cause geological change through erosion and deposition. They can even be powerful enough to carve out large pieces of land.

Tectonic Plates: Tectonic plates lie on top of the fluid mantle, causing geological change through the moving the continents (continental drift). This movement can lead to earthquakes, volcanoes, and landforms like mountains or rift valleys.

Air: The atmosphere around us can cause geological change through wind erosion, deposition, and the generation of waves.

Living Things: Things that are alive can cause geological change by producing chemicals that can cause erosion and weathering, or through changing the climate. Things that were once alive make organic matter that can create some geological formations.

Research Card:
Animated Earth

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Research Card:
Animated Earth

Definition Page

Basin: A bowl-like indent in the Earth's surface. Some basins are filled with water.
Bedrock: Solid rock beneath surface materials like soil and gravel.
Chemical Weathering: The process of breaking down rocks by changing their chemical structure.
Coal: A hard rock containing a lot of carbon that can be burned as a solid fossil fuel.
Deposition: The process that adds soils, rock, or other sediments to a landform.
Fissure: A narrow crack or opening.
Fjord: A deep, narrow body of water that stretches inland.
Glacial Rebound: The rise of land masses that were under pressure from the huge weight of ice sheets during the last ice age.
Granite: Hard igneous rock containing quartz and other minerals. It is one of the oldest rocks on Earth.
Groundwater: Water beneath the Earth's surface contained in soil, cracks in rocks, and underground reserves.

Research Card:
Animated Earth

DRIVING DISCOVERY

LE MOTEUR DE LA DÉCOUVERTE

Definition Page

Gypsum: A mineral that produces large beds of soft rock that is soluble in water.

Mechanical Weathering: The process of breaking larger rocks into smaller ones.

Organic Matter: Decomposed or decomposing matter that was once alive, containing high amounts of carbon.

Peat Bog: A wetland where high amounts of organic matter are repeatedly deposited.

Sea-Level Rise: The average long-term global rise of the ocean's surface measured from the centre of the earth. In the past century, climate change has drastically increased the rate of sea-level rise around the world.

Tilling: Preparing the land for crops by turning up the earth.

Water Soluble: Able to be dissolved by water.

Windsor Group: A group of rocks covering large areas of Hants County and Kings County that consist of soft, water-soluble calcium and salt-rich rocks like gypsum, limestone, and siltstone.

Research Card:
Animated Earth

DRIVING DISCOVERY

LE MOTEUR DE LA DÉCOUVERTE

The Rock Cycle

Metamorphic Rock

Rock that has been transformed from its original form through intense heat or pressure



OnlineScienceMall, 2019.

Melting and Cooling

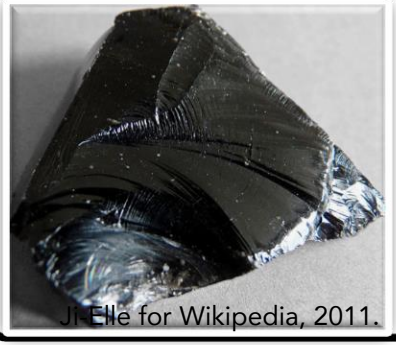
Heat and Pressure

Weathering and Erosion

Weathering, Erosion, and Pressure

Igneous Rock

Volcanic rock, formed from the cooling of magma or lava



Jj Elle for Wikipedia, 2011.

Sedimentary Rock

Rock formed from other rocks by the deposition of small particles



Minimegeology.com, 2019.

Weathering and Erosion

Heat and Pressure