

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.

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Driving Question

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

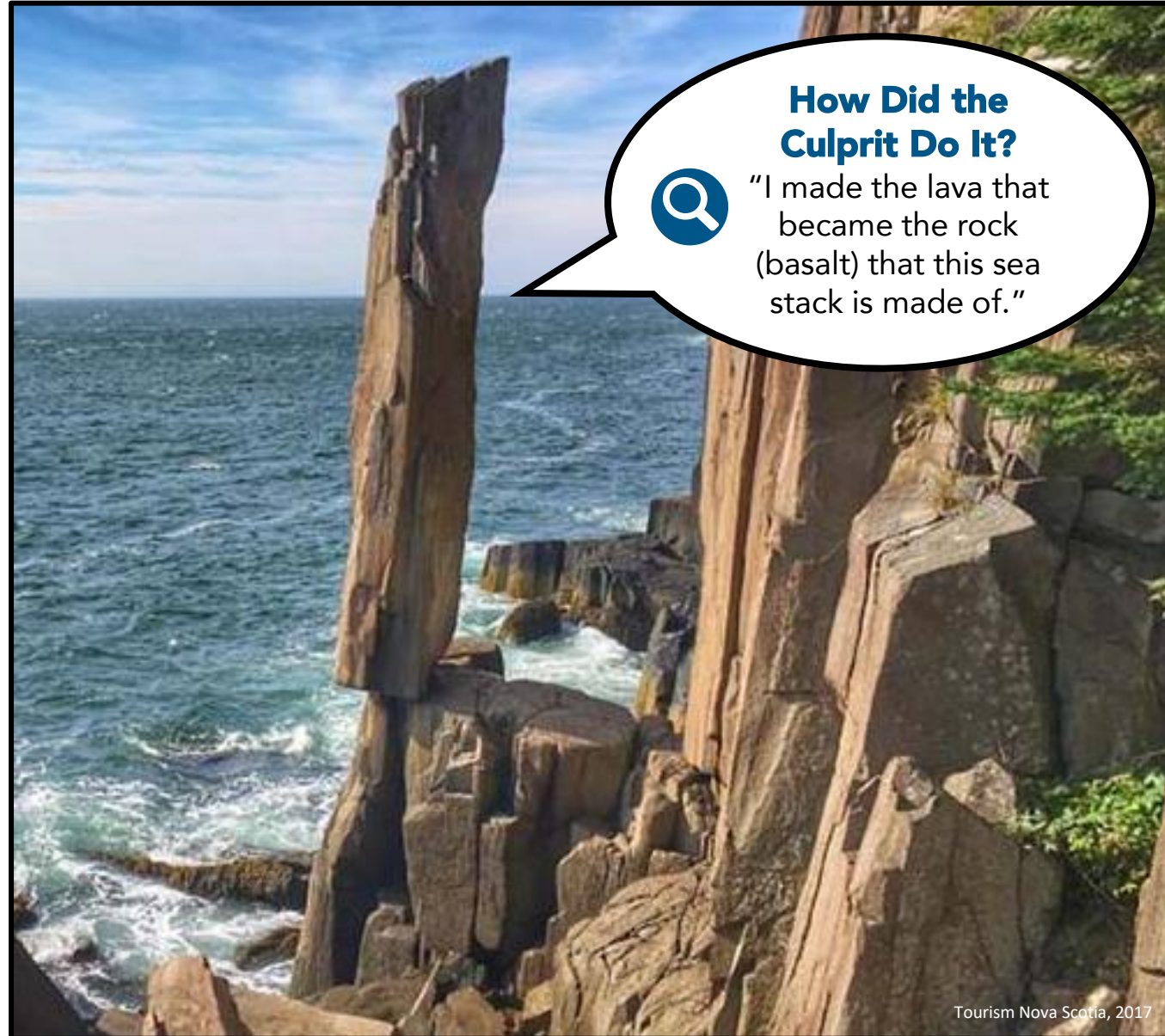


What Landform Did the Culprit Help Make? A Sea Stack (a rock pillar detached from the shoreline)



Where in Nova Scotia Can You See a Sea Stack?

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



How Did the Culprit Do It?

"I made the lava that became the rock (basalt) that this sea stack is made of."

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Driving Question

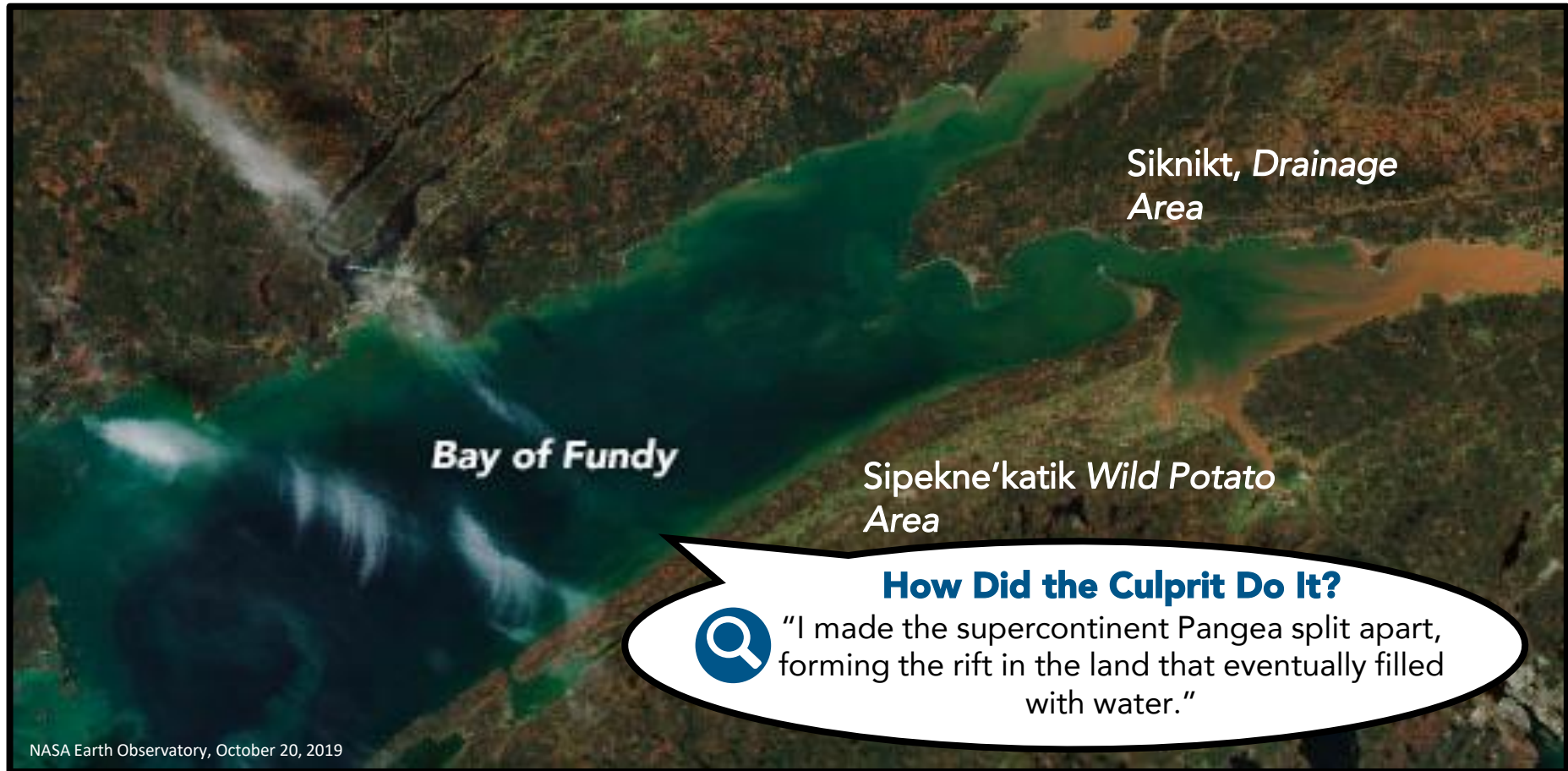
How can you analyse the sources and consequences of geological change on a global and a local scale?



What Landform Did the Culprit Help Make? A Rift Valley
(a long, deep dent in the land with steep walls)



Where in Nova Scotia Can You See a Rift Valley? The Bay of Fundy, which borders many Mi'kmaq territories such as those below



Sikniqt, Drainage Area

Bay of Fundy

Sipekne'katik Wild Potato Area

How Did the Culprit Do It?



"I made the supercontinent Pangea split apart, forming the rift in the land that eventually filled with water."

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Driving Question

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What Landform Did the Culprit Help Change? A Shoreline (the boundary between land and water)



**Where in Nova Scotia Can You See a Shoreline?
Unama'kik *Land of Fog* (Cape Breton Island)**



How Did the Culprit Do It?



"I made the sea floor tremble with enough force that I produced a 13m wave that devastated the shoreline."

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Driving Question

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



What Landform Did the Culprit Help Make? Fossil Cliffs
(a steep rock face with exposed fossils)



Where in Nova Scotia Can You See a Cliff? Grand Nyjagon or Cheggoggin(s), Place of the Fishing Weirs/The Great Encampment (Joggins Fossil Cliffs, Joggins)



Pygocephalus
(shrimp fossil)

Joggins Fossil Institute, 2019



Adiantites
(plant fossil)

Joggins Fossil Institute, 2019

Lecopsid
(tree fossil)

Fundy Treasures, 2019



How Did the Culprit Do It?

"These animals and plants once lived in a hot, wet climate near the equator. I moved this cliff and their remains to Nova Scotia."

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Driving Question

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



What Landform Did the Culprit Help Make? A Batholith (a large amount of volcanic rock on the Earth's surface)



**Where in Nova Scotia Can You See a Batholith?
Metepna'kia'ji'jk,
Somewhat Difficult to Climb
(Delaps Cove,
Annapolis County)**



How Did the Culprit Do It?

"My movement forced magma out of the Earth's crust; once it cooled, it formed this large formation of volcanic rock."



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Driving Question

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



What Landform Did the Culprit Help Make? A Continental Shelf (a piece of land under shallow water)



**Where in Nova Scotia Can You See a Continental Shelf?
The Scotian Shelf (North Atlantic Ocean)**



How Did the Culprit Do It?



"I pulled the plate Nova Scotia is on away from Africa, thinning and breaking the plate as I did so."

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Driving Question

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



What Landform Did the Culprit Help Make? The **Goldenville Group** (a large section of metasedimentary rock covering much of the mainland)



Where in Nova Scotia Can You See The Goldenville Group? Wospegeak, *The sunshine is reflected from the water* (Tangier River, Eastern Shore)



How Did the Culprit Do It?

"I created intense heat and pressure that cracked granite rock, which eventually filled with gold."



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Driving Question

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



What Landform Did the Culprit Help Make? The Highlands (an area of mountainous land)



Where in Nova Scotia Can You See Highlands? Ktitnuk, *Highest Mountain* (Aspy Bay, Cape Breton Highlands)

How Did the Culprit Do It?



"I moved two continental plates together, pushing them upwards to form these deep V-shaped canyons."



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Driving Question

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Driving Question

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



What Landform Did the Culprit Help Make? A Peninsula (an area of land that is mostly surrounded by water but is still connected to a mainland)



Where in Nova Scotia Can You See a Peninsula? *Wa'so'q, Heaven (Partridge Island)*



How Did the Culprit Do It?

"My movements caused volcanic eruptions of lava. This cooled lava, also known as basalt, is what makes up this peninsula."

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Driving Question

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



What Landform Did the Culprit Help Make? The Feltzen Formation (a series of blue and grey layered rock beds)

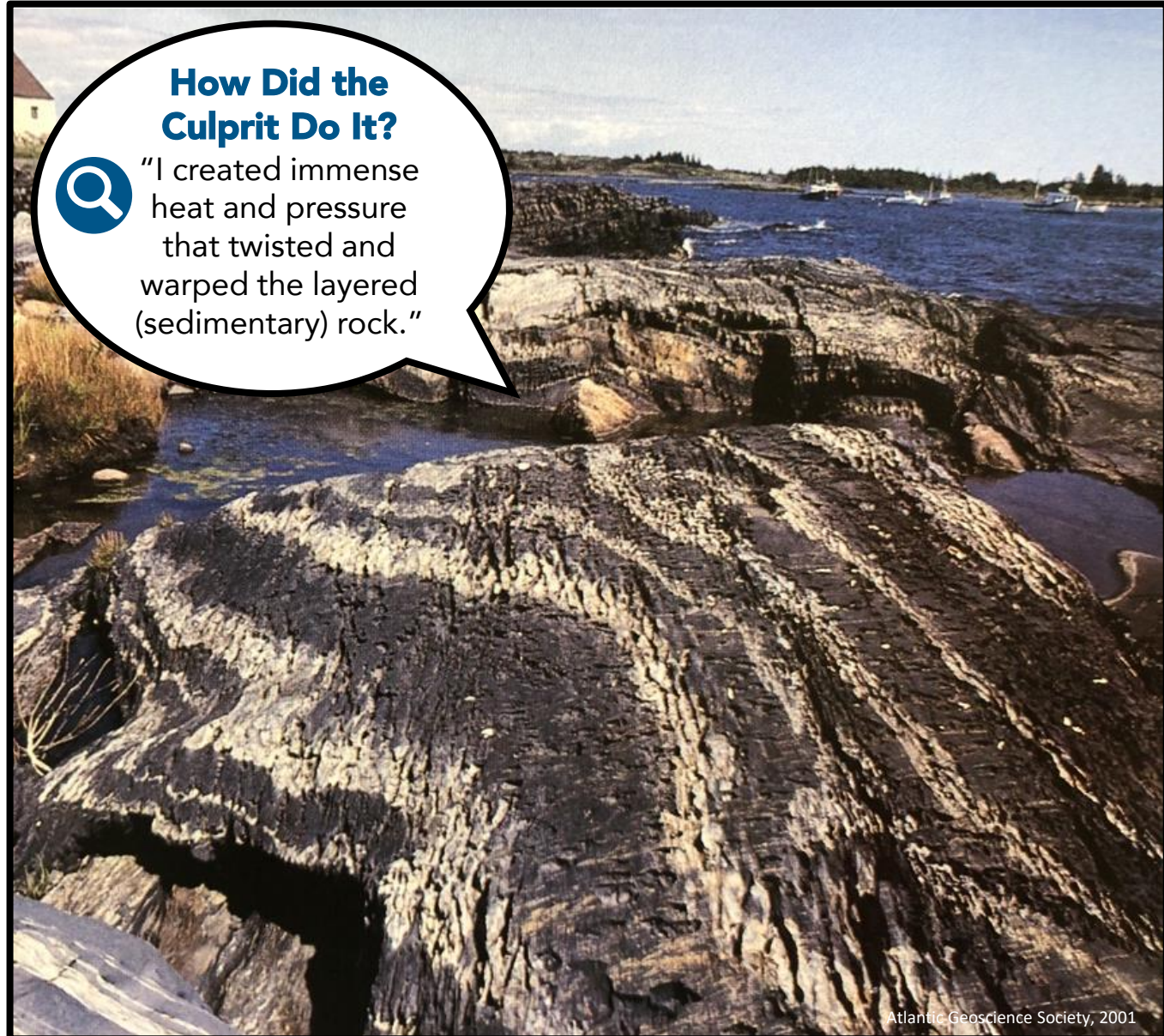


Where in Nova Scotia Can You See The Feltzen Formation? E'se'katik, *At the place of Clams* (Blue Rocks, Lunenburg County)



How Did the Culprit Do It?

"I created immense heat and pressure that twisted and warped the layered (sedimentary) rock."



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Driving Question

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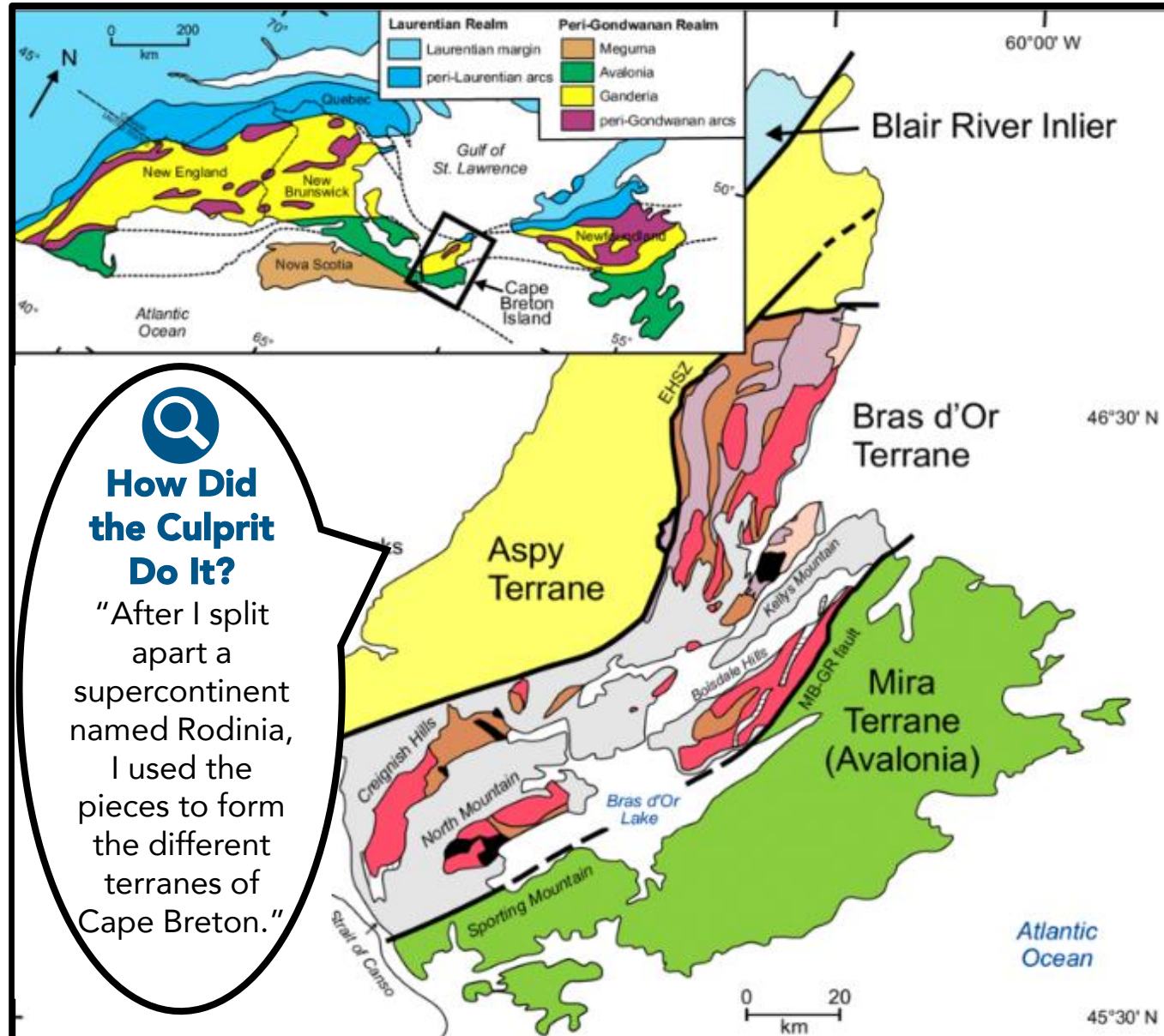
What Landform Did the Culprit Help Make?

Terranes (an area of land with distinct features, linked to other land by a fault)



Where in Nova Scotia Can You See Terranes?

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



How Did the Culprit Do It?

"After I split apart a supercontinent named Rodinia, I used the pieces to form the different terranes of Cape Breton."

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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.

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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.

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The Rock Cycle

Metamorphic Rock

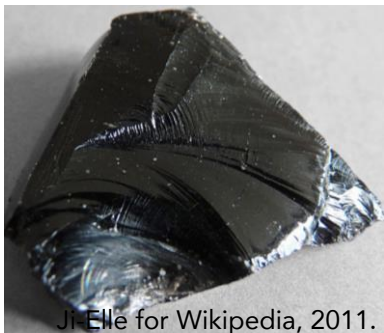
Rock that has been transformed from its original form through intense heat or pressure



OnlineScienceMall, 2019.

Igneous Rock

Volcanic rock, formed from the cooling of magma or lava



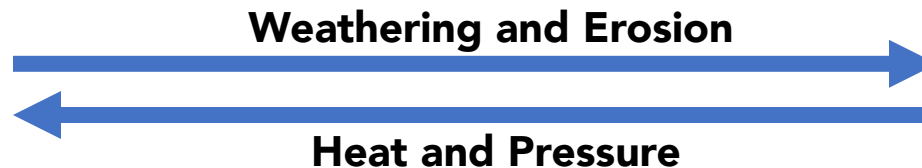
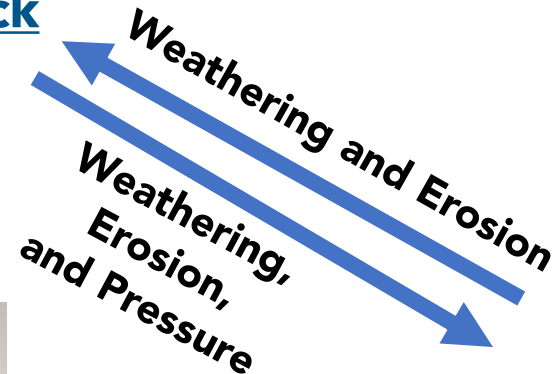
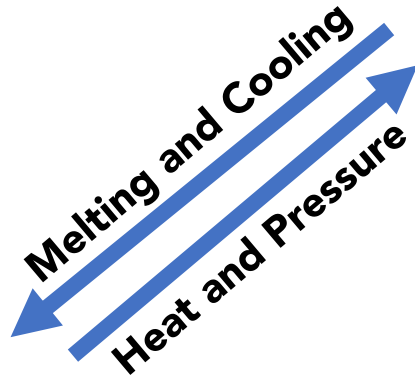
Ji Elle for Wikipedia, 2011.

Sedimentary Rock

Rock formed from other rocks by the deposition of small particles



Minimegeology.com, 2019.



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Our Most Likely Culprit Is...

