1. Jasper Conglomerate, Huronian Supergroup
2.2-2.5 billion years ago

The Jasper Conglomerate was the first rock that we collected for the garden. A geologist from the Ontario Geological Survey assisted us. The geologist led us to the side of Highway 17, where there was a gravel pit. It took us all day to reach the owner of the quarry, Mr. Baldwin, and receive permission to collect a rock. The following day, we arrived early in the morning to get the rock. We used a crane to lift up the first rock onto the trailer. There was a lot of sand in the quarry, and we kind of got bogged down. We needed the loader from the gravel pit to pull us out of the sand! We did make it out, and that was our first adventure. We have another two pieces of Jasper Conglomerate, donated by Ontario Place, Toronto. The Jasper Conglomerate comes from a rock group called the Huronian. Its full name is Lorrain Jasper Conglomerate from the Huronian Super Group. The Huronian rocks are described for the area they were found in (Lake Huron) by the first geologist in Canada: Sir William Logan. If you look closely at it, you can see pebbles of white quartz and jasper. A common name for this rock is Pudding Stone; you can see why we might call it Pudding Stone with all those cherries in it!

2–3. Lorrain Quartzite, Huronian Supergroup
2.2-2.5 billion years ago

The white rock is Lorrain Quartzite. It formed from a white sandy beach. Most of the sand grains are quartz. Heat and pressure cemented the grains together, creating a resistant rock which forms the spectacular hills in Killarney Park. This ridge of rock continues east-west to Whitefish Falls. The quartzite is mined on Badgely Island, West of Killarney.

4. Gordon Lake Cherty Siltstone (Argillite), Huronian Supergroup
2.2-2.5 billion years ago

This rock was found at Gordon Lake, near Sault Ste Marie, Ontario. It is called the Gordon Lake Cherty Siltstone. Note the vertical stripes of green and brown, you can see how the layers formed as the fine mud settled out.

5. Gowganda Conglomerate, Huronian Supergroup
2.2-2.5 billion years ago

The rock with the big pink boulders in it is called Gowganda Conglomerate. It is also part of the Huronian sequence, and likely formed during an ice age in the Precambrian. You will notice there are big pieces of rounded Granite. Granite does not have very much iron or magnesium in it, making it light coloured. If you look at the top surface of the rock, you'll see that the pieces of Granite stick up above the surface. The surrounding rock, which is black, has a lot of iron and magnesium in it and has weathered back. So that shows you, that like our cars that rust easily, rock that are black with lots of iron and magnesium in them can also weather away quickly!

6. Matinenda Conglomerate, Huronian Supergroup
2.2-2.5 billion years ago

The next rock is the Matinenda Conglomerate, from Elliot Lake. There was once a mountain range here that has since eroded away. Rivers flowing from the North brought sand and gravel and deposited it. The neat thing about this rock is that when it was formed there was no oxygen in the atmosphere so the pyrite and uranium ore didn't oxidize. If they were washed up on the seashore today, they would be broken down quickly by the oxygen in the atmosphere, and disappear. In the 1950's, when people were searching for Uranium in the Elliot Lake area, they would break off pieces of this rock at the surface and send it in for analysis. It would always come back with Thorium, but no uranium. After looking at similar rocks in South Africa, a man named Franc Joubin looked at the rock, and thought perhaps the Uranium eroded away from the surface and would be found at depth. So he found a backer, named Joseph Hirshorn, to pay for the drilling. They drilled through the weathered rock to the fresh rock below. Sure enough, the Uranium was there. This started the Great Uranium Rush in the Elliot Lake area. Other uranium bearing rocks in Ontario were ancient igneous rocks from the Bancroft area. But the Elliot Lake ore was a better mining option because it was easier to get to. Now the old mines in Elliot Lake are closed, the tailings are being cared for indefinitely to limit pollution, and seniors are now using the old houses and facilities as the hospital and community centres.

7-8. Keweenawan Basalt and Conglomerate
2.5-0.5 billion years ago

The Keweenawan basalt and conglomerate formations are located close to Sault Ste Marie. These rocks originate from the same place as the large copper plate located in the Earth Sciences Museum. The conglomerate is formed from gravel from a local river. The basalt, however, originates from a huge crack in Lake Superior that used to have volcanoes.

9. Jacobsville Sandstone, Late Precambrian or Early Paleozoic
Over 550 million years ago

The Jacobsville Sandstone is a sedimentary rock, which is over 550 million years old. The sandstone shows layering, which was formed as the sand was deposited in a river delta. The red colour is caused by iron. The sandstone is the resistant rock, which forms the rapids in the river at Sault Ste Marie.

10. Gneiss, Grenville Province
One billion years ago

The rock that is in memory of Jesse Ingleton is a kind of gneiss. Gneiss is a metamorphic rock, formed about 25km underneath a growing mountain range. This specimen was formed from sedimentary rocks: sandstone and shale. The sandstone, by heat and pressure turned into quartzite, and the shale turned into sparkly muscovite mica. This

rock was donated in memory of Jesse Ingleton. He was an environmental driller and one while he working in a field in Southern Ontario, and his drill's wheels tipped into a hole. The drill equipment fell over on top of him and he was killed. The rock is here in his memory.

11. Gneiss
1-2 million years ago

This Gneiss, located near North Bay or Red Bridge in Ontario, is primarily composed of quartz-rich sandstone, which would become quartzite with the addition of heat and pressure. The mica present in the rock originates from clay materials undergoing metamorphism. As a result of the presence of sedimentary base materials, this rock is considered to be sedimentary gneiss. The Muscovite-rich Gneiss nearby has been turned pink as a result of the presence of Muscovite in the rock. It is interesting to note the rock is stratigraphically above the regular Gneiss.

12. Muscovite Rich Quartzite
One billion years ago

The red gneiss is a similar rock to the one above. It is from the same quarry in Red Bridge, near North Bay, Ontario. Notice the sparkly mica and the quartzite mixed together. If you look closely it sparkles like the sparkles on a Christmas card.

13. Quartz Carbonate Fuchsite Serpentinite, Archean Rocks
3.8-2.5 billion years ago

This is Quartz Carbonate Fuschite Serpentinite. It is a similar rock to the ones we were talking about that are from the Timmins area. This is the green Fuschite Mica with the Quartz veins running through it. Gold can be found in the Quartz veins. This rock will gradually change from green to brown by weathering. This was donated by Michael Wory and his mother. They were walking by on the day of Michael's graduation and through it would be nice to have a rock in the rock garden in celebration of his graduation and the Fortieth anniversary of the Cooperative Education program at the University of Waterloo.

14. (Carbonated Basalt with Quartz Veins) Hollinger Mine Gold Ore, Archean Rocks
3.8-2.5 billion years ago

As with other gold ores, this rock is Archean in age, and formed in a rifted area of crust. Carbonatite altered pillow lavas are the host rocks for the gold at Hollinger Mine. Pillow lava is formed when lava flows under water. As the lava cools it forms pillow shaped blobs. These blobs were then metamorphosed, which caused cracks to open up. Quartz veins filled the cracks, and it is in these cracks where gold may be found.

15. (Carbonatized Igneous Rock) Timmins Gold Ore, Archean Rocks
3.8-2.5 billion years ago

Gold is generally found in the white quartz veins in these rocks. The geologist working where this rock was mined used to check for visible gold in the ore – if it was visible – it was sent to the crusher and processed. This rock is Archean in age and formed in a rifted area of crust where various igneous rocks were erupted. This rock began its life as Komatiite, which is ejected from the Earth's mantle. It was rich in the mineral peridotite, and magnesium oxide. Metamorphism of this rock formed a carbonatite with fuchsite (green) chromium mica. The rock will gradually turn brown as the atmosphere works on the minerals.

16. Larvikite Over 1 billion years ago

Larvikite is a Norwegian term referring to a felsic, plutonic rock like Syenite, arising from differentiated magma (with olivine and the heavier materials at the bottom and the felsic material floating on top). It originates from the Keweenawan Coldwell Complex.

17. Syenite, Marathon, ON, Archean Rocks 3.8-2.5 billion years ago

Syenite is rock similar to granite except it does not contain quartz. It forms under mountain ranges as magma gradually cools over time. This rock is mainly labradorite feldspar. These crystals are square in shape and reflect light. These rocks are being actively prospected for economic platinum deposits.

18. Matachewan Porphyry, Proterozoic
2.5-1 billion years ago

Matachewan Porphyry was formed from a massive plume of magma that was situated near Sudbury. As the lava pushed its way up through the crust, cracks opened up from the Southeast to the Northwest in a radiating pattern. As the cracks opened up they were filled with different kinds of diabase. This rock has a porphyrtic texture, which means it has huge feldspar crystals. If you look closely you can see the feldspar is reddish on the inside and white on the outside. Sometimes you can even find them with radiating grouping of crystals that look like a snowflake or daisy pattern in the rock.

19. Wawa Gold Ore, Archean Rocks
3.8-2.5 billion years ago

The gold ore, is present close to Highway 17 in Wawa, Ontario, which is known to be home to an amalgamation of minerals including Iron Ore, Diamonds and even Platinum. The companies Corona Mining and Lac Minerals were fighting over the rights for this particularly rich area, Lac Minerals eventually won. The gold in this area is within the rock itself rather than in quartz veins. Due to the unusual colour of the rock, it was nearly missed during the mineral exploration phase.

20. Banded Iron Formation, Archean Rocks

3.8-2.5 billion years ago

This sample of Banded Iron Formation is from Timmiskaming. Banded Iron Formation was deposited worldwide at this time. They all consist of alternating layers of Iron Oxide (Magnetite) and Jasper. The red Jasper from these rocks also formed the pebbles in the Jasper Conglomerate.

21-22. Siderite Iron Ore, Archean Rocks
3.8-2.5 billion years ago

Helen Mine, Wawa. This iron ore was processed in Wawa to increase the iron content before shipping to Algoma Steel in Sault St. Marie for processing into steel. This rock has layers of sandstone and siderite iron ore. The sandy layers formed cracks when the earth moved. The cracks allowed the siderite, which was a soft iron carbonate clay, to flow into the cracks.

23. Cobalt Nickel Ore, Archean Rocks
3.8-2.5 billion years ago

This rock is Cobalt ore from Cobalt, Ontario. It has cobalt and nickel veins. Cobalt was famous for its silver mines, from the early 1900's to the early 1970's. If you look closely at the rock (you need a bit of imagination), you can see lines that go from the bottom to the top of the rock, parallel to the sides of the label. These are called slickensides and are the result of two sides of a fault rubbing against each other. And if you look closely at the edge, you can see some pinkish mineral that is a weathering product, called Erthyrite, or Cobalt Bloom, and that's a Cobalt indicator. Geologists that were studying the area for ore would look for the places that the pink Cobalt Bloom showed up. You can also see occasionally, greenish areas, and that would be Nickel Bloom in the same rock.

24. Amabel Dolostone, Paleozoic Sedimentary Rock
545 -248 million years ago

The next rock is Amabel Dolostone. This rock is quarried near Wiarton, Ontario. It is used as a building stone. Canadian Embassy in Washington was built using this rock. You will notice that the drill holes are very close together so that they can split the rock easily without making fractures appear. This is very important when you are extracting large pieces to be cut and ground smooth for the face of a building. Look at the top surface of this rock; this was the first slice down through the quarry. You may notice some scratch marks across the surface. These scratch marks, called glacial striae were scratched into the rock by a glacier during the ice age. If you look at the side, you'll notice a couple of cavities in the rock. This makes it unsuitable for making into building stone. But it's perfect for making retaining walls and for use in landscaping.

25-27. Lockport Dolostone
440-420 million years ago

Three gorgeous dolostone boulders were donated by Lafarge Canada Inc. and the Oxford County Geological Society. All three dolostone boulders possess fascinating calcite groupings. A special thank you is due to Tim Elliott for kindly transporting the rocks from Dundas Quarry to the Peter Russell Rock Garden. This rock was originally a limestone with fossils, which had undergone a process called Dolomitization, which added Magnesium from seawater into the rock's chemical composition and destroyed the fossils. Hot water brings in oil (the black staining on the rock), lead, zinc, sulfur in holes (calcite) and celestite (which is commonly used as the powder creating red sparks in fireworks).

28. Eramosa Dolostone, Paleozoic Sedimentary Rocks
545-248 million years ago

Laminated Eramosa Dolostone, sometimes called Waterfall Rock, is from Wiarton, Ontario. It is thinly bedded limestone formed in a quiet environment in a warm sea. The fine lime mud was being held together by a little bit of algae and it formed quite an interesting pattern. If you look on top of the rock, you can see the squiggly pattern. Sometimes, it is cut and polished. If you go to the Seagram Lofts building in Uptown Waterloo, the fountain has this rock ground smooth and you can see the pattern in it. This rock is also used around Silver Lake in Waterloo Park. Scorpions and other fossils are found in this rock.

29-31. Potsdam Sandstone, Paleozoic Sedimentary Rock
545-248 million years ago

These samples came from Inverary, near Kingston. This sandstone is from the Cambrian era. If you look at the second specimen across, it has ripple marks, just like you would find at the beach today. Also, behind it you will see a selection of cylindrical pillar structures. This was found in the quarry. These can be many metres tall and we are not sure how they are formed. Fossils, including jellyfish, have been found in these rocks!

32. Glacial Striae, Pleistocene "Ice Age" in Ontario
Less than 1 million years ago

Behind the Serpentine Marble you will see Glacial Striae, or scratches on Lorrain Quartzite. It is from Highway 17 near Debarats and Sault Ste Marie, Ontario. Notice the scratching and smooth surface. The smooth, "sheep" shape occurs when the glacier breaks off the front of the rock and is the origin of the term "roche moutonee". This is typical of Northern Ontario scenery. Scratches are formed as boulders in the base of a glacier scratch the underlying rock. This process made rock flour, which contributed to the fertile soils of Southern Ontario.

33. Calcite Garnet Pyrite Skarn, Grenville Province Rocks
One billion years ago

This rock originates from a skarn zone located in the Marmaton mine near Marmora, Ontario. This rock is composed of dark brown garnet (andradite) white calcite, and gold coloured metallic pyrite crystals. Skarns are formed at the contact zone between granitic intrusions and sedimentary rocks, such as limestone. Hot fluids from the granite dissolve and mix in a metamorphic process called metasomatism. Mineral collectors visit this mine to collect garnets, pyrite, epidote and other minerals. There are traces of pyrite and iron (magnetite) ore in this rock. The brown portions on this rock are augen (eye-shaped) garnet while the pistachio green portions are epidote. This rock was located using geophysics but it was originally found by Sir William Logan.

34. Magnetite Skarn, Grenville Province Rocks
One billion years ago

This piece of Magnetite Skarn is from Marmora, North of Belleville. The Marmoraton Iron mine was the first deposit in Ontario to be found by airborne geophysical mapping in 1948. A massive magnetic anomaly was found here, though William Logan's compass hinted at this deposit when he first mapped the area nearly a century before. The iron ore was covered with 36 meters of limestone. This rock had to be removed, and in 1955 over half a million tonnes of iron pellets were shipped to Bethlehem Steel in New York. The mine closed in 1979.

35. Columbus Limestone, Middle Devonian
380 million years old

This rock is from Ingersoll and is rich in fossils such as rugose coral (cone-shaped) or favosites coral (honeycomb-shaped).

36. Epidote Garnet Skarn Grenville Province Rocks
One billion years ago

This Epidote Garnet Skarn is from Marmora. The Epidote is the green mineral in this rock. If you look near the label, you can also see some shiny crystal faces of Garnets inside this rock. Calcite is weathering away, leaving behind beautiful Garnets at the surface.

37. Anorthosite
2.5-0.5 billion years ago

Anorthite is a variety of feldspar, making anothosite a rock which consists mostly of anorthite feldspar, as well as peridotite. This rock formed in the same way as larvikite did; the cooling of magma over a period of time resulted in the heavier minerals (such as olivine) settling to the bottom of the magma, and the lighter felsic minerals floating to the top of the magma. This specimen is from the Grenville Front, a location in Ontario known for its black granite. It is often used in tombstones and kitchen countertops.

38. Favosites Coral, Paleozoic Sedimentary Rocks

545-248 million years ago

This fossil was found in Arkona, West of London, Ontario. It formed when Southern Ontario was covered by a tropical sea.

39. Calcite Concretion Paleozoic Sedimentary Rocks
545-248 million years ago

These ball shaped rocks come from Kettle Point, Ontario. They were formed in anoxic mud, that hosted bacteria. The bacteria were breaking down materials in the mud and forming marcasite concretions. They were also forming these big ball shaped crystal formations of calcite, also called concretions. If you look at the broken piece behind the large ball, you will notice it has a radiating pattern, going from the center to the outside. Concretions grow a little bit like our Gallstones or Kidney Stones. They are found as large as two metres across at Kettle Point. Kettle Point is named for the concretions, which the early settlers thought looked like the cast iron kettles that they used to heat water over a fire. If you visit Kettle Point, you may see marcasite nodules that are rusting on the surface. Do not collect the Kettles as they are protected on the land of the Kettle Point First Nation.

40. Shatter Cones (Shock Structures)
2.5-0.5 million years ago

Metamorphism can occur from the energy released in the impact of meteors with the Earth, or from nuclear blasts. These particular structures were formed from the impact that caused the Sudbury crater. They are named ‘shatter cones’ because they are cone-shaped, and were found around the crater site with the cone tip pointing in the direction of the crater.

41. Sodalite Syenite, Grenville Province
One billion years ago

Sodalite Syenite is an igneous rock formed in the Grenville Province, near Bancroft Ontario. There was once a mountain range over this area called the Grenville Mountains. Below the mountains, molten magma intruded into an area of sedimentary rocks like sandstone, limestone, shale, salt, and gypsum. This molten magma passed an area where there was a lot of salt. The sodium and the chlorine from the salt added to the magma and formed the mineral sodalite. You can see a beautiful blue patch of the sodalite on the surface. This rock comes from a quarry called the Princess Sodalite Mine. And the story goes, in the early part of the 19th century, an English Princess came over to Canada and ordered a couple tonnes of sodalite rock to be taken to build a fireplace for Marlborough House in England. We have asked Marlborough House and they do not seem to have a sodalite fireplace there. So somewhere in England, a big pile of sodalite is waiting to be made into a fireplace.

42. Graphite Gneiss

This gneiss contains carbon in the form of graphite, the same mineral found in pencil "leads". Companies mine this graphite for other uses as well. This specimen contains small garnets throughout.

43. Nepheline Syenite, Grenville Province
One billion years ago

This rock comes from the Havelock area. The quarry, owned by Unimin Canada, is called Blue Mountain Quarry. This Nepheline Syenite is an ingredient for making glass or ceramics and it is used worldwide. The main world supplier of Nepheline Syenite is this quarry. If you look closely at this rock, you will see that the Syenite is grey. That's what is separated out and used as the main ingredient for the glass and ceramics. There are some blackish minerals too: magnetite and biotite mica. Magnetite is used for toners for printing. It is used to help place the ink in the right spot using magnetism. Nepheline Syenite from the quarry is used in American Standard toilets and sinks. They use so much to make these items that broken items are shipped back to the quarry to be crushed up for reuse.

44. Serpentine (Folded) Marble, Grenville Province
One billion years ago

This Serpentine Marble is from Lanark, Ontario. This was the first decorative stone ever mined and used in Canada. It was used in the Governor General's residence, Rideau Hall, in Ottawa. This rock started out as a limestone or a dolostone with some sandy layers. Heat and pressure changed the rock to marble. Silica and Magnesium mixing made the green pattern.

45. Serpentine Marble
2.5-0.5 billion years ago

This is metamorphic rock, which was originally limestone with sandy layers. The rock was transformed by heat and pressure into marble. The green layers formed where the quartz sand occurred. It was used in building Rideau Hall, Ottawa by the same contractor that made the Rideau Canal.

46. Rose Quartz, Grenville Province
One billion years ago

The next rock is quartz from the Quadville area, near Barrie's Bay. The formation process is as follows. Granite was forming nearby. A crack opened up on the surrounding rocks. Inside that crack large crystals of feldspar formed; beryl and tourmaline grew next. Finally, in the middle of the crack, quartz crystals grew. This quartz has a beautiful pink colour because tiny crystals of dumortierite (aluminum boro-silicate) reflect the light. The pink or Rose Quartz is carefully extracted for use as a gemstone or semiprecious stone. Notice that at the top of the stone, there are attempted drill holes. They tried, but wore out

their tungsten carbide drills which didn't touch the hard quartz. This rock was donated in memory of David Michael Forget. He was a first year student whose summer co-op term was up in the arctic. He was working with another student to map the geology around a lake. A bear came out of the bush; they fired a flare at it, to scare it away. But it fell behind the bear and the bear ran towards them. They retreated into the lake and unfortunately David succumbed to hypothermia and died. There is a special Forget Award in the department of Earth Sciences. This is for a second year student. They have to write an essay explaining what got them interested in Earth Sciences. The winner is the student with the best essay. This award is given annually.

47. Chalcopyrite, Grenville Province Rocks
One billion years ago

You can see it looks like Gold or Fools Gold. This is from the Kidd Creek Mine in Timmins. Chalcopyrite like this, if it came from the Sudbury area, would have Platinum or Palladium and other rare metals like that which are useful these days. This would be ore in the Sudbury area. When Chalcopyrite is exposed to oxygen it tarnishes to a blue/green colour. We annually spray our sample in lacquer to preserve its gold colour.

48. Nickel Copper Ore, Grenville Province Rocks
One billion years ago

This Nickel Copper ore is from the Frood Mine in Sudbury, Ontario. This piece was exhibited in Paris, France at the International Exposition in 1937. It was then shipped back to Canada and in the 1990's and was on display in the Ontario North Now exhibit at Ontario Place in Toronto. After that, it was donated to the garden. Inco Ltd. was very pleased that we had this rock and they gave us a Nickel ingot to mount on its surface.

49. Stromatolite Marble
2.5-0.5 billion years ago

This rock was found in Eagle Lake, north of Thunder Bay, and is the first piece of stromatolite marble for the rock garden. Stromatolites are formed in a rifting tropical shallow sea by microbial life forms that grow on the rock. The microbe that created this stromatolite is called conophyton, and formed the rock in a cone shape as opposed to their typical round shape. This resulted in the zigzag pattern on the face of this specimen. Silt fills the small gaps in between. Shark Bay in Australia, a UNESCO World Heritage Area, has round stromatolites.

50. Stromatolite, Grenville Province
One billion years ago

This Stromatolitic Marble is from the Keweenawan Sibley group, near Thunder Bay, Ontario. These rocks formed about 550 Million years ago. The rocks are either Precambrian or Cambrian age. Stromatolites are a green algal material that forms cabbage shaped lumps that grow on the seabed in shallow marine environments where

nothing much else grows. They are found living today in Shark Bay on the Western coast of Australia. If you look just above the label, over to the right hand side, you can see the layering in the rock.

51. Amethyst Quartz, Grenville Province
One billion years ago

This purple rock is amethyst quartz in granite from Thunder Bay, Ontario. If you look closely, you can see broken up pieces of granite from deep in the Earth, and as the water moved up, it cooled and crystals formed in a radiating pattern around the granite blocks. Amethyst is Ontario's provincial mineral.

52. Transition Zone Rock
2.2–2.5 billion years old

This rock formed in the transition zone between the layers of a purple Lorraine quartzite and a siltstone. The specimen is both oxygen-rich and iron-rich, indicated by the purple colour of the quartzite, and the red colour of the Huronian rock.

53. Purple Lorrain Quartzite
2.2-2.5 billion years old

This Purple Quartzite is a metamorphic rock found near Sault Ste Marie. It was formed from a pure, white sandstone, which was almost entirely quartz, that was then subjected to heat and pressure, which fused the quartz grains. The purplish-reddish colour has to do with iron formation due to oxygen buildup during the Huronian.

54. Vermilion Bay Granite, Grenville Province Rocks
One billion years ago

Let's just walk up a little bit along the footpath. You will see the Granite from Vermilion Bay, which is on the West side of Ontario, near the Manitoba border. This granite is mined by Nelson Monuments. They use this Granite for making tombstones. This was the smallest piece that they had for us, it would be suitable for one tombstone.

55. Frank Slide Boulder, Carboniferous Rundle Group
350-300 million years ago

This boulder comes from the site of Canada's worst natural disaster in Crowsnest Pass, Alberta. At 4:10 a.m. on April 29, 1903, thirty million cubic metres of this rock fell down Turtle Mountain and covered part of the town of Frank. Out of six hundred people living in Frank at the time, only one hundred people were in the path of the slide. Twenty-three people escaped, including small children. At least seventy people were killed. There were men mining underneath the mountain at the time for coal and they dug themselves out of the mine.

This rock is limestone, from the Rundel formation, a Carboniferous deposit. It is about 350 million years old. The limestone contains fossils. If you look on the top you see round structures with a hole in the middle. This was part of the stem or stalk of a creature related to a sea urchin, called a crinoid or sea lily. It had roots holding it in the mud on the sea floor and a long stalk with a cup of tentacles that waved around with the ocean currents. These creatures broke up and were washed onto a beach and formed this deposit, which then turned to Limestone.

56. Labradorite, Middle Proterozoic Age About
1.5 billion years ago

This Labradorite is from Nain, Labrador. This was donated to use by the Labrador Inuit Association, the Government of Newfoundland, and Labrador and the Canadian Geoscience Council. These are rather large crystals of Labradorite. Labradorite was named for Labrador. If you find a piece of this anywhere in the world, it is still called Labradorite. If you look carefully in bright lighting, you will see iridescent peacock-like colours coming from this rock. That is caused by the twinning inside the crystals, splitting the rays of lights of light. The rock containing the Labradorite is an igneous rock called Anorthosite. Molten magma cooled deep underground forming these crystals.

57-58. Columnar Basalt and Dacite, Eocene
50 million years ago

When lava flows occur, basaltic columns can form perpendicular to surface as the lava cools. Similar to mudcracks, the columns loosely form in a hexagonal manner as the basalt cools to the centre of each hexagon (the number of sides on each column can differ). The formation of basaltic columns can bring minerals, such as gabbro, peridotite, and olivine, to the surface in the form of xenoliths. Flow banding, in the form of striations on the sides of each column, is present. This specimen was formed in the Eocene, a period of time after the dinosaurs.

59. 50th Anniversary Gneiss Grenville Province
One billion years ago

Near the Earth Sciences Chemistry building, a large slab of gneiss was placed here to celebrate the 50th Anniversary of the University of Waterloo in 2007. The rock includes Plaques for 50 special Science Alumni, who were celebrated during the 50th anniversary year. This rock is gneiss from North of the French River. This rock was formed by heat and pressure, approximately 25 kilometers underneath the Grenville mountain range. The layers are formed of quartz, feldspar and mica.

60. Slate, Cambrian
542-488 million years ago

This Slat comes from Pootney, Vermont. This rock is formed by mud that became the sedimentary rock Shale. Heat and pressure was added to the rock, which then turned it

into the metamorphic rock Slate. Slate used to be used to make blackboards and roof tiles. It's still used today under the green base on a billiard or snooker table. In the Student Life Center in the university we have some of this slate as flooring tiles. Many students walking across it, bringing a little bit of grit on their feet, gradually wear the slate down. This can be noticed if you walk down the stairs to the basement of that building. Notice this is greenish and reddish slate. Both of these colours are caused by iron in the slate.

61. Purple Lepidolite Mica
2.64 billion years old

This purple rock is Lepidolite Mica from Tanco mine. Tanco mine is a pegmatite mine in Manitoba. This rock is mainly purple mica. The purple colour is from lithium in mica. Lithium is used for many different things. It's used in atomic reactors to hold the pellets of uranium as well as batteries, medication for treating manic depression.

62. Meta-Basalt
About 2 billion years old

This rock comes from Weyburn, Saskatchewan and is about 2 billion years old. Cracks opened up in the Earth's crust and the basalt injected into the cracks. This rock was then changed by heat and pressure, giving it that greenish look. Cracks opened up in the basalt and calcite formed in the cracks. If you look closely just above the Meta-basalt sign, you can see a vein that has formed and moved apart. This vein, which goes from the left hand side to the right hand side at an angle, has split the one going from the bottom of the rock to the top, and the vein has moved about three and a half centimetres apart along that crack. It has been moved and torn by stresses in the Earth. This rock is in memory of Kenton Carnegie, a geological engineering student at the University of Waterloo. He was working on a co-op job in northern Manitoba. He went out for a walk near town, and a wolf attacked and killed him. The wolf apparently was used to humans, and probably got its living from the garbage dump nearby.

63. Tyndall Stone, Ordovician
450 million years ago

The Tyndell stone is an Ordovician dolomitic limestone. The rock was changed from a limestone into a dolostone because of magnesium in the sea water. This is a decorative stone, used in parliament buildings in Ottawa. You may notice there is a characteristic pattern to the surface. It has dark and light patterns in it. Another name for this rock is tapestry rock. The reason for the pattern is because it was originally lime mud on the bottom of the sea. Holes were dug in the mud by shrimp, and tree-root like tunnels were made. The seabed shrimp also left their waste in the tunnels, and this is what made the different patterns in the rock. We have fossils in this rock which you may see if you look carefully. Near the bronze plaque you can see a curved piece of material with squares on it. This is a kind of fossil called a receptaculites. It's a kind of fossil that looks like a CD. It had a disc-like hole in the middle, just like a CD today. We're not exactly sure what it

was, but it may have been similar to a coral. Up on top of the rock right about 15 cm from the top and 10 cm in from the right hand side, you can see a piece of a white coloured fossil coral with radiating patterns.

64. Porphyritic Biotite Granite
60 million years old

The granite from Nelson Quarries is two billion years old. The Cascade Coral Pink granite from the Okanargan batholith in British Columbia is only 60 million years old, so it's very young. Notice the drill holes in the rock; they were created when the rock was extracted out of the quarry. If you look closely at the rock you may see large crystals of Feldspar that sparkle in the sunshine.

65. Nephrite Jade, Carboniferous Age
359-299 million years ago

This Nephrite Jade was formed from the same source rock as the Serpentinite. You start off with peridotite, and when you add heat and pressure, it will either alter into Serpentine or it will alter it into Nephrite Jade. It can be found in some of the asbestos mines in British Columbia or in Quebec. This piece was cut and polished to see if it was suitable to send to China or Hong Kong for cutting into carvings. If you've ever been to a store and looked at little green bears with fish stuck in their mouths, then you should know that those souvenirs were carved in China from Canadian rock, and then re-imported.

66. Serpentinite, Lower Ordovician
488-443 million years ago

Serpentinite is a metamorphic rock that is composed of serpentine minerals. Asbestos is one type of serpentine mineral and can be found in serpentinite rocks. Asbestos has a fibrous structure and small strands of it can easily be broken off. These fibres are dangerous if they are breathed in; they are known to cause cancer after long-term exposure. Asbestos was used in building and clothing materials because of its high heat resistance, but its popularity has diminished due to its adverse health affects.

67. Peridotite, Lower Ordovician
488-443 million years ago

Peridotite is a rock rich in peridot, which is a mineral rich in iron and magnesium. The upper layer of the earth's mantel, the layer underneath the crust, is mostly composed of peridotite. If peridotite is subjected to heat and pressure it is altered into serpentine, on this sample you can see some sections that have begun to be serpentinized.

68. Anthracite Coal, Pennsylvanian Age
318-299 million years ago

This black rock is Anthracite Coal. Anthracite and other coals are formed as trees fall into a swamp. Over time, they were covered over with mud. About 9 m of trees is compacted into the 1m of coal. That is how this Bituminous Coal was formed. You would need more pressure on the coal to make Anthracite Coal. Anthracite is very hard and doesn't have much sulphur in it, so it is a cleaner burning coal. In Pennsylvania anthracite is extracted by mining the tops of hills. (Visit the coalmines on Google Earth – visit Coaldale, Pennsylvania.) This specimen was originally outside of Hogg Fuel Company in Waterloo.

69. Garnet Rich Anorthosite
2.5-0.5 million years ago

This anorthosite is from the Appalachians, and formed, once again, by the differential cooling of magma. The presence of garnet in the rock indicates the temperature at which this rock cooled. Additional cleavages in the garnet were formed from stresses in the rock. Garnet has a variety of uses, including sandpaper grit and sandblasters.

70. Giant Mine Breccia
age?

This breccia from the now-closed Giant Mine near Yellowknife formed between two faults, and is Pre-Cambrian in origin. Stresses in the rock allowed liquids with dissolved minerals to flow through and cement angular pieces of the rocks together. There are also angular pieces of quartz and arsenopyrite in the rock, and arsenopyrite is a source of arsenic. The gold from Giant Mine was found in the arsenopyrite ore, and closure of the mine was due to the environmental risk of arsenic tailings seeping into groundwater. Giant Mine was also known for an incident in the 1990s when a miner on strike planted a bomb in the mine, killing 9 "blackleg" workers who were employed while others were on strike.

71. Oldest Rock on Earth – Tonalitic Gneiss
4.03-3.96 billion years ago

This Acasta Gneiss is a part of the Acasta Gneiss Complex, a metamorphic Tonalitic Gneiss in the Slave craton from Canada's Northwest Territories. Radiometric dating has indicated the time of formation of the original intrusive granitoid rock, the parent rock for the gneiss, as approximately 4.01 billion years ago. The gneiss was first recognized during the Geological Survey of Canada's regional mapping program at the western margin of the Archean Slave Province where the several hundred square kilometre area of rock is exposed along the Acasta River approximately 300 kilometres north of Yellowknife.

72. St. Georges Granite
428-426 million years ago

The St. Georges granite (also known as Utopia Granite) is part of the Saint George Plutonic Suite, a gabbroic to granitic assemblage of plutons of Late Silurian – Late Devonian age. They are found north of St. George, Charlotte County in southwestern New Brunswick. They are medium-grained, red to pink biotite granites with a distinctive bright red coloration and even texture. The colour and texture of this extensive granite deposit made it a prime resource for dimension stone in an ornamental stone industry that flourished from 1872 until the mid 1930's. The nearby town of St. Georges became known as "Granite Town" with the surrounding quarries supplying large sized stone blocks to processing facilities that cut, shaped and polished the stone for monuments, columns and some building stone.

73. Sediment-hosted Zinc-Lead Ore
338 million years ago

The Red Dog ore deposits are sediment-hosted zinc, lead and silver deposits, with the zinc-lead ore considered to have been deposited on the sea floor as layers of sulphide-rich sediments. Red Dog Operations is one of the world's largest zinc mines, located about 170 kilometres north of the Arctic Circle in northwest Alaska. The deposit was first discovered by pilot and prospector Bob Baker in the late 1960's while flying over the mountains when he noticed a rusty alteration zone in a creek, which was later called Red Dog Creek, after his dog. He alerted the U.S. Geological Survey who visited the site a decade of intense exploration in the Red Dog district followed.

74. Ophiolites

75. Columnar Basalt

76. Petrified Wood