Rockwood Park
Student Sheet



General instructions to students:

1. Note the main RISKS at the site when you arrive, especially tide times and falling rocks.
2. Respect the geological code of conduct at all times; do not feed or disturb wildlife, close gates, do not remove rocks/fossils or sand from the site.
3. Before leaving transport, check that you have suitable clothing and footwear and the equipment to record your field observations:
   - ✔ Pencils
   - ✔ Clipboard
   - ✔ Task sheet (can vary)
4. Stay close to your teacher/supervisor at all times.
5. Try and complete your observations in as much detail as possible. Listen to the teacher as they explain what you are looking at and ask questions if you are unsure about any aspects of the site.

Tasks to be completed:

Task	Description	Completed (tick)
1	Visit the educational rock display in the middle of the Arboretum Trail. Read the signs and examine the large rock samples there. Use the page here to make your own rock guide to use to identify rocky outcroppings you find around Rockwood Park. Keep in mind that the individual characteristics of a particular kind of rock are much easier to see in broken-off areas than on smooth, weathered and lichen-covered surfaces.	❑
2	Igneous Rock walk: Visit different areas of the Park where you can find igneous rocks. Record your observations, especially noting the differences you observe between intrusive (granodiorite) and near-extrusive (dacite) samples that have almost the same chemical composition but look quite different. Find a nice exposed area (not too weathered or covered with lichen) and examine very carefully with a magnifier. Note your observations about the minerals you see: How are they distributed? How big are the crystals? Can you identify any of them (quartz, feldspar, hornblende, biotite, augite, mica)?	❑
3	Karst landscape chemical erosion experiment: a. observe the stream at the far end of the Clean Air trail. b. Identify the spot at which it disappears underground and look for the entrance to the cave there. This cave was carved out by chemical weathering, meaning that the process of weathering happened here at the molecular level rather than by physical force. c. Perform an experiment to see chemical weathering happening to chalk. The chalk contains a mineral, calcium carbonate, also found in limestone. Water contains acid which chemically breaks down the calcium carbonate. You can see this happen slowly by dropping the chalk in water. d. To see the process speeded up, next try dropping the chalk in a stronger acid: vinegar. Watch carefully as the chemical reaction occurs. Look at the eroded chalk as the sediments get carried away, just as in the Karst landscape here where chemical erosion from the acid in water weathering the calcite in the rock has created caves. e. Write down your description of how the erosion of the chalk shows what happened with the carbonate minerals to shape this landscape.	❑
4	Find conglomerate rock from the Kennebecasis Formation. You can find an example in the rock display on the arboretum trail and you can also find a large sample on the trail around Lily Lake. a. In either of these or in another piece you find, try to identify three different pebbles within the rock. Can you identify any rocks visible within the conglomerate? b. Find a piece of the limestone/marble of the Green Head Group that forms the Karst landscape and caves in parts of Rockwood Park including the Clean Air trail. This rock is close to a billion years old and is some of the oldest rock in Stonehammer and the whole Drifting Apart area. It is so old that it was already here and eroding when the conglomerate rock was forming. Its sediments can be found here, re-used later in the rock cycle. c. Sketch and label where on the conglomerate rock you found pieces of this swirly silver-grey metasedimentary rock. Add any other rocks you can identify to your sketch. d. Make a diagram of the marble's journey through the rock cycle.	❑
5	Fossil task: Stromatolite. The metasedimentary limestone/marble that forms the bedrock across a large swath of the Saint John region contains fossils from the earliest stages of evolution, when some of the only forms of life were cyanobacteria. Limestone or dolomite is the sedimentary form of this rock. However, our formation is so old (up to 1 billion years old) that it has undergone metamorphosis and become marble, more fully in some places than in others. Describe why it would be the case that the higher-grade the marble (has undergone more metamorphosis), the less likely you are to find stromatolite fossils there. What happens to fossils as sedimentary rock undergoes metamorphosis:	❑
6	Find the cliff opposite the picnic area between the playground and the swimming area of Fisher Lakes. Here you can see the distinct layers or "bedding" that built up to form the original sedimentary rock. Sketch the bedding you see.	❑

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1. Visit the educational rock display in the middle of the Arboretum Trail. Read the signs and examine the large rock samples there. Use the page here to make your own rock guide to use to identify rocky outcroppings you find around Rockwood Park. Keep in mind that the individual characteristics of a particular kind of rock are much easier to see in broken-off areas than on smooth, weathered and lichen-covered surfaces.

Granodiorite:

Conglomerate:

Volcanic (Dacite):

Limestone/Marble:

Gneiss:

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2. Igneous Rock walk: Visit different areas of the Park where you can find igneous rocks. Record your observations, especially noting the differences you observe between intrusive (granodiorite) and near-extrusive (dacite) samples that have almost the same chemical composition but look quite different. Find a nice exposed area (not too weathered or covered with lichen) and examine very carefully with a magnifier.
Note your observations about the minerals you see: How are they distributed? How big are the crystals?
Can you identify any of them (quartz, feldspar, hornblende, biotite, augite, mica)?

Some of the best locations include:
a. Visit Canada Visitez Confederation Trail: across the road from the Newfoundland and Labrador stop find a natural outcropping of granodiorite. This is an intrusive igneous rock.
b. Rock climbing rock between the entrance to the campground and Hathaway Pavilion, across from the duck pond and Interpretation Centre. This rock is dacite, a near-extrusive igneous rock which is the volcanic equivalent of granodiorite.
c. Cut rocks around the edge of the duck pond: several different igneous rocks are found here as well as other rock types including metamorphic gneiss that has been changed from the original igneous rock. Can you identify any of these rocks? Show your teacher your choices and explain why.

Location:

Observations: colour, grain size:

Minerals Observed:

Other Characteristics:

Rock Type:

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3a. Observe the stream at the far end of the Clean Air trail.

3b. Identify the spot at which it disappears underground and look for the entrance to the cave there. This cave was carved out by chemical weathering, meaning that the process of weathering happened here at the molecular level rather than by physical force.

3c. Perform an experiment to see chemical weathering happening to chalk. The chalk contains a mineral, calcium carbonate, also found in limestone. Water contains acid which chemically breaks down the calcium carbonate. You can see this happen slowly by dropping the chalk in water.

3d. To see the process speeded up, next try dropping the chalk in a stronger acid: vinegar. Watch carefully as the chemical reaction occurs. Look at the eroded chalk as the sediments get carried away, just as in the Karst landscape here where chemical erosion from the acid in water weathering the calcite in the rock has created caves.

3e. Write down your description of how the erosion of the chalk shows what happened with the carbonate minerals to shape this landscape.

Observations:

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4a. Find conglomerate rock from the Kennebecasis Formation. You can find an example in the rock display on the arboretum trail and you can also find a large sample on the trail around Lily Lake. In either of these or in another piece you find, try to identify three different pebbles within the rock. Can you identify any rocks visible within the conglomerate?

4b. Find a piece of the limestone/marble of the Green Head Group that forms the Karst landscape and caves in parts of Rockwood Park including the Clean Air trail. This rock is close to a billion years old and is some of the oldest rock in Stonehammer and the whole Drifting Apart area. It is so old that it was already here and eroding when the conglomerate rock was forming. Its sediments can be found here, re-used later in the rock cycle.

4c. Sketch and label where on the conglomerate rock you found pieces of this swirly silver-grey metasedimentary rock. Add any other rocks you can identify to your sketch.

4d. Make a diagram of the marble's journey through the rock cycle.

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5. Fossil task: Stromatolite. The metasedimentary limestone/marble that forms the bedrock across a large swath of the Saint John region contains fossils from the earliest stages of evolution, when some of the only forms of life were cyanobacteria. Limestone or dolomite is the sedimentary form of this rock. However, our formation is so old (up to 1 billion years old) that it has undergone metamorphosis and become marble, more fully in some places than in others. Describe why it would be the case that the higher-grade the marble (has undergone more metamorphosis), the less likely you are to find stromatolite fossils there.

What happens to fossils as sedimentary rock undergoes metamorphosis:

6. Find the cliff opposite the picnic area between the playground and the swimming area of Fisher Lakes.
Here you can see the distinct layers or "bedding" that built up to form the original sedimentary rock. Sketch the bedding you see.