GEOL 02: Historical Geology
Lab 8: Archean and Proterozoic Eon (Pre-Cambrian)

Name: _____ Date: _____

"Earth Through Time" Readings: p. 216, 228-245 (Chap 8); p. 252-271 (Chap 9)

1. Provide short definitions for the following geologic terms. These terms are used in descriptions of the geologic events, so it is important to understand their meanings.

a. Craton

b. Orogeny/Orogenic Belt (and its association with a convergent plate boundary)

c. Laurentia

d. Clastic Wedge

e. Flysch

f. Rift/Rift Valley

2. Provide the requested information for each of the Precambrian (Hadean, Archean, and Proterozoic) events listed. This information can be found in Chapter 8 (p. 228-248) and Chapter 9 of the textbook. Write you answers on separate sheets of paper.

a. Tectonic Events, Rock Sequences and Orogenies
   - Oldest rocks - provide time and type of evidence (p. 216)
   - Oldest evidence of plate tectonics = provide time (p. 235)
   - Wopmay and Trans-Hudson Orogeny = provide the time, location and process involved
   - Mazatal Orogeny – provide time, location and rocks

- Kewenawan Rifting – provide time, location, rock and mineral types involved
- Grenville Orogeny – provide time, location, relationship to supercontinent
- Belt Super Group – provide time, location and significance to plate setting
- Breakup of Rodinia

b. Climate and Glaciation
   - Gowganda glaciation – time and location of deposits
   - Cryogenian Period (SnowBall Earth) – characteristics and locations of (hint: more than one place)
   - Banded Iron Formation (BIF) – time, composition of rocks, significance to climate, cause
   - Neo Proterozoic Red Beds – time and significance to climate development

c. Evidence of Life
   - First appearance of Prokaryotes – what are prokaryotic cells (characteristics)
   - Stromatolites – type of organism, age of oldest known, characteristics
   - First appearance of Eukaryotes – what are eukaryotic cells (characteritics)
   - Appearance of Metazoans – what are metazoans? When do they appear in rock record?
   - Edicanan Biota – characteristics of these organisms, location, time of deposits.

3. Use the sheets of graph paper to make a time scale of the events and features you listed in section 2 of this lab.

You will be able to use this on the exam!

Your graph paper should extend from the time of Earth's origin (4.56 Ga) to the end of the Proterozoic (0.544 Ga).

You need to devise a scale that fits this time span – how many millions of years will each block on your graph paper represent? Remember that 1 Ga is 1000 million years.

Plot the time scale as a column on the left side of the graph and leave room on the right.

To the right of each appropriate time, list the events and features described in the questions of 2a, 2b, 2c of this lab (Tectonic events, Rock Sequences, Ogoenies, Climate, Glaciation, Life)

Provide short descriptions next to the events listed.

Example:

First appearance of Eukaryotes – cells containing a true nucleus with well-defined chromosomes.

Grenville Orogeny – east coast of Laurentia, part of continental collisions involved in the formation of Rodinia.