In Class

- Introduce Midterm Exercise
- Geology Jeopardy
- The Geologic Story of Minnesota – Part 1: The Precambrian (at 50,000,000 yrs/min)

Homework (15 pts)

1) Getting a Grasp of Geologic Time - Scale the following geologic events to the span of a week (to the nearest minute). Ga (giga-annum) = billions of year; Ma (milli-annum) = millions of years. The purpose of this exercise is 1) to familiarize students with the major geologic events in earth history, especially in Minnesota, 2) to convey the enormity and scale of geologic time in a way that they can relate to, and 3) to get them to practice their math skills (always a bonus). (10 pts)

<table>
<thead>
<tr>
<th>Time (Ga)</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.55</td>
<td>Earth condenses from the solar nebula Mon 12:00:01 AM</td>
</tr>
<tr>
<td>3.65</td>
<td>Oldest rocks in Minnesota - MN River Valley Montevideo Gneiss</td>
</tr>
<tr>
<td>3.00</td>
<td>Volcanic islands build out of ancient seas to form the Ely greenstone in N MN</td>
</tr>
<tr>
<td>2.65</td>
<td>Algoman Mts form by the collision of island arcs and protocontinents to form Kenoraland</td>
</tr>
<tr>
<td>2.00</td>
<td>First life-forms discovered in MN rocks algal mats (stromatalites) in iron formation</td>
</tr>
<tr>
<td>1.855</td>
<td>Penokean Mts form by collision of island arc Kenoraland grows to form Laurentia</td>
</tr>
<tr>
<td>1.109</td>
<td>Midcontinent Rift begins creating volcanic rocks of the North Shore</td>
</tr>
<tr>
<td>1.086</td>
<td>MCR-related volcanism ends, rifting is aborted</td>
</tr>
<tr>
<td>520</td>
<td>Epicontinental seas flood the interior of Laurentia depositing sand and limestone</td>
</tr>
<tr>
<td>390</td>
<td>Last of the great Paleozoic seas encroaches on southern MN depositing fossiliferous limestone</td>
</tr>
<tr>
<td>250</td>
<td>Dinosaurs appear and forage over the tropical jungles of Minnesota - leaving no trace</td>
</tr>
<tr>
<td>80</td>
<td>Great Interior Seaway laps up against western MN depositing organic-rich clay deposits</td>
</tr>
<tr>
<td>1.8</td>
<td>Continental glaciers advance out of Canada to cover most of Minnesota</td>
</tr>
<tr>
<td>11,000 yrs</td>
<td>Last of the glaciers recede into Canada</td>
</tr>
<tr>
<td>0</td>
<td>Today Sunday at the stroke of midnight</td>
</tr>
</tbody>
</table>

2) Reading reflection of Minnesota at a Glance – Precambrian Geology. After reading this short paper, write a one page summary of the main Precambrian episodes in Minnesota. Mention important ages, the principal tectonic event, and the types of rocks that formed in each episode. (5 pts)