Geologic Time: Part 1

Geologic Time Scales
- Relative Dating
  - Examination of relative positions of rock units
- Absolute Dating
  - Putting numerical ages on the relative time periods

Absolute Dating
- The geologic age of a fossil, rock, feature, or event given in units of TIME, usually years. Commonly refers to ages determined radiometrically.
- Beware!! An absolute date does NOT necessarily imply a high level of certainty of exactness!!

Atom
- Atomic number
  - Number of protons
  - Unique to element
- Atomic Weights
  - Mass of protons and neutrons

Isotope
- Isotope
  - Different atomic weights of same element

Radioactive Decay
- Three modes of decay
  - Loss of alpha particle
    - Convert parent into element that has nucleus containing two fewer protons
  - Loss of beta particle
    - Convert parent into element whose nucleus contains one more proton by losing an electron
    - Capture of beta particle
      - Convert parent into element whose nucleus has one less proton

<table>
<thead>
<tr>
<th>Unbound</th>
<th>Alpha particle</th>
<th>Thorium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protons</td>
<td>92</td>
<td>2</td>
</tr>
<tr>
<td>Neutrons</td>
<td>140</td>
<td>2</td>
</tr>
<tr>
<td>All</td>
<td>234</td>
<td>94</td>
</tr>
</tbody>
</table>
Radioactive Decay

- Radiometric dating
  - Radioactive isotopes decay at constant geometric rate
    - After a certain amount of time, half of the parent present will survive and half will decay to daughter

- Half-life
  - Interval of time for half of parent to decay
    - Uranium-238: 4.46 Ga
    - Carbon-14: 5.73 ka