

Introduction of terms

- Classification – grouping of objects
- Inference – a guess based on observations
- Observation – uses the senses, includes measurements
- Prediction- inference about future
 - o Cyclic – repeats in a pattern
 - o Non-cyclic – no pattern
- Density – ESRT front page $D=m/v$
 - o Same material – same density
 - o Increase in pressure – density increases
 - o Increase in temperature – density decreases
 - o Objects that float are LESS dense than the liquid it is in
 - o Ice is less dense than water – it floats

Earth Dimensions

Latitude & Longitude – see diagram

- 0° Latitude = equator
- 0° longitude = prime meridian
- Altitude of Polaris = North Latitude



Lithosphere

- Solid part of Earth
- composition of crust:
ESRT front page
- includes crust and rigid mantle
– ESRT pg 10
- oceanic crust is thinner and more dense - ESRT
pg 10
- continental crust is thicker and less dense-
ESRT pg 10

Atmosphere

- shell of gas around Earth
- has different layers based on temperature
changes and composition – ESRT pg 14
- as altitude increases pressure decreases
- troposphere – closest to Earth's surface
 - o contains water vapor
 - o composition – ESRT front page

Hydrosphere

- water on Earth's surface
- composition – ESRT front page
- properties of water – ESRT front page

Topographic maps

- contour lines connect places of equal elevation
- contour interval – elevation between two adjacent contour lines
- bends in a contour line point UPSTREAM (UPHILL)
- water always flows downhill
- highest elevation = 1 less than the next contour line (the one not there)
- steepest hill – where lines are the closest
- drawing profiles
 - o label each elevation on top of the profile line
 - o place scrap paper on line
 - o mark the paper each place the contour line touches and label the elevation
 - o place the scrap paper at the bottom of the graph / grid
 - o mark elevations by moving the scrap paper up and down
 - o connect the dots with a smooth line
 - o hills or valleys **MUST NOT** be flat
- gradient = slope – ESRT front page

Minerals & Rocks

- Mineral information – ESRT back page
 - o hardness – the ability to scratch or be scratched
 - o cleavage – break along flat surfaces
 - o luster – the way a mineral reflects light (metallic / non-metallic)
 - o streak – the color of the mineral's powder
 - o remember – calcite bubbles in acid and so do the rocks that contain calcite
- Rock Cycle diagram – ESRT pg 6
 - o Rocks are classified based on how they were formed (their origin)
 - o Melting and solidification – Igneous
 - o Compaction and cementation – Sedimentary
 - o Heat and Pressure - Metamorphic
- Igneous rock chart – ESRT pg 6
 - o Intrusive – cools slowly (takes longer to cool), large minerals

- Extrusive – cools quickly, microscopic crystals or non-crystalline
- Find density (low/high), composition (felsic /mafic), color (light/dark) in center of chart
- Rocks with same composition are in columns
- Sedimentary rock chart – ESRT pg 7
 - Clastic – Land derived – classified by grain size
 - ESRT pg 6 – look at sediment sizes
 - Compaction and cementation
 - Crystalline / Bioclastic
 - Classified by composition
 - Precipitation of minerals from water
- Metamorphic rock chart – ESRT pg 7
 - “recrystallization”
 - Foliated – alignment of minerals
 - Banding – looks like stripes (minerals realign)
 - Increase in density
 - Look under comments to determine parent rocks
 - Contact metamorphism – contact w/lava
 - Metamorphic rocks are located between sedimentary layers and igneous rocks
 - Regional metamorphism – mountain building

Plate Tectonics

- Evidence
 - Continents appear to fit together
 - Correlation of fossils and rocks across ocean basin
 - Climate change / example oil in Alaska
 - Sea floor spreading / magnetic orientation
- Convection currents in the asthenosphere causes plates to move
- Rising currents – plates move apart – divergent boundaries – mid-ocean ridges – ESRT pg 5

- Falling currents – plates move together – convergent boundaries – subduction zone – ESRT pg 5
- Earth’s interior – ESRT pg 10
 - Pressure, temperature and density increase with depth

Earthquakes

- 3 seismic stations needed to determine epicenter location
- 1 station gives you distance only
- You can use the difference in arrival times to determine the distance
- P waves travel faster, move in a back and forth motion and go through anything
- S-waves travel slower, move perpendicular, goes through SOLIDS ONLY
- Shadow zone – no earthquake waves reach that area on Earth
- S waves do not reach opposite side of Earth, they cannot go through liquid outer core

Earth’s History

- Intrusion – magma moving through rock layers then solidifying and becoming Igneous rocks
 - Changes all the rocks it goes through or touches
- Extrusion – magma reaches the surface
 - Top will not have contact metamorphic
- Unconformity – caused by erosion, missing rock layers
- Folds, faults and tilting are younger than the rocks they move
- Geologic time scale based on fossil evidence
- Index fossils
 - Easily recognized
 - Short amount of geologic time
 - Wide spread geographically
- Radioactive decay
 - Carbon-14 – short half life
 - Cannot determine the age of really old fossils because its half-life is too short
 - Uranium – 238 – long half life
 - Used to date really old rocks – half-life = age of Earth