

Name: Key

Skills

Know how to do the following:

- 1.) Read and interpret data in a graph - what type of relationship is displayed by the data? Direct, Indirect, Cyclic, Static, when equilibrium is reached
- 2.) Be able to accurately plot data given an x and y axis
- 3.) Be able to interpolate (estimate) data on a graph line
- 4.) Be able to make predictions given data (if carbon dioxide levels have been increasing for centuries, they will likely continue to increase)
- 5.) Calculate Rate of Change (pg. 1 of ESRT)
- 6.) What is an observation vs. inference

★ Draw Isolines!

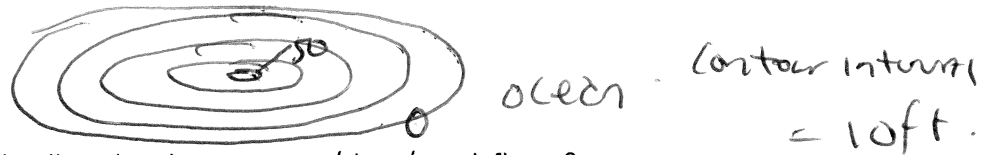
Earth's Dimensions/Mapping

- 1.) What is the shape of the earth? Oblate Spheroid
- 2.) What are observations that prove earth has a spherical shape?
the Lunar eclipses, Polaris' changed altitude / angle in the northern hemisphere, the "sinking ship"...
- 3.) Latitude lines measure position N and S of the equator 0 degrees and extend to 90° N/S degrees north and south. These lines can be referred to as "parallels" because they do not intersect.
- 4.) Longitude lines measure position E and W of the prime meridian and extend from 0 to 180 at the International Date Line. These lines Intersect at the poles.
- 5.) Coordinates are always reported as latitude followed by longitude with both degrees and (minutes) TWD map, and direction
- 6.) The Earth's rate of rotation is 15° per hour, therefore time zones are roughly 15 degrees apart in longitude. "Travel West time is less, travel east time does increase". A location on the same meridian/longitude will have the same Solar time.
- 7.) The altitude of Polaris (angle the north star makes relative to the horizon and an observer) is equal to ones latitude. Polaris can only be seen in the N. hemisphere. This means that a person located in Kingston, NY (pg. 3 of the ESRT) will find Polaris at an angle of approximately 42 degrees. As one travels north, the altitude of Polaris ↑. It would be 90 degrees at the N. pole and 0 at the equator.
- 8.) Pg. 3 of the ESRT- be able to identify a locations coordinates in both degrees and minutes. Remember there are 60 minutes for every degree of latitude/longitude. Therefore, 43.5 degrees N is really written as 43 degrees and 30 minutes. Example: Oswego, NY would have coordinates: 43° 30' N, 76° 30' W
- 9.) Be able to interpret contour lines (concentric circles, v-shaped contours, hatch marks)
↓ valleys
↑ Depressions
- 10.) How does one determine the minimum and maximum height of a mountaintop if the highest index contour was 500 ft and the contour interval is 20 ft?

max = 519 ft
min = 501 ft



- 11.) Know how to find the contour interval of a map (either written on the map key OR use the index contours and count the number of contour lines from one index contour to the next and divide by the total change in elevation)



- 12.) How do contour lines show the direction that a stream/river/creek flows?



- 13.) Be able to find the highest and lowest elevation on a map - what are key things to look for?

highest - look for mts, hills (concentric and index contours, circles).

lowest - look for water bodies / downslope of a valley.

- 14.) How does one calculate gradient on a map? What must one always use to figure out the distance using a map scale? How can one tell where the gradient is steep vs. gentle using the contour lines?

$\frac{\Delta \text{field value}}{\text{distance}}$ ← on isolines!
 distance ← use map scale + slope!

- 15.) Be able to draw a profile between any two points on a map using the contour lines on the map, a scrap sheet of paper, and a profile graph.

Minerals and Rocks

- 1.) The chemical composition of a mineral defines what elements make up a mineral
 Ex: Quartz is SiO₂ Calcite is CaCO₃
- 2.) All physical properties of minerals are determined by the internal arrangement of atoms (elements)
 Physical properties include:
 Color, Luster ← metallic, non metallic, Shape, Hardness, Breakage
- 3.) Cleavage: means a mineral breaks in even surfaces called "planes"
 Fracture: means the mineral breaks unevenly and can look "bumpy or jagged" along the edges. DO NOT CONFUSE CLEAVAGE WITH CRYSTAL SHAPE!
- 4.) What two elements are found in the silicate group of minerals? What shape does the silica oxygen tetrahedron have in this group of minerals?
 (Pyramid type shape) Si + O
- 5.) The two minerals that will fizz or react with acid are:
 Calcite + Dolomite
- 6.) A mineral can only be scratched by another mineral (or item) with equal or greater hardness.

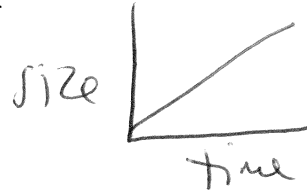


- 7.) Know the general processes that form each of the major rock groups using pg. 6 of the ESRT

- Igneous: cooling + solidification
- Metamorphic: heat and/or pressure
- Sedimentary: deposition + burial of sediments followed by compaction + cementation

- 8.) Intrusive rocks cool slow and have large crystals while Extrusive igneous rocks cool fast and have small crystals or are non-crystalline. This creates different textures. Vesicular means that that rock will have gas pockets.

Draw the relationship between cooling time and crystal size.



- 9.) Be able to determine the mineral composition of different igneous rocks using the reference table: what minerals are found in granite but not gabbro? How do these rocks differ in both color and density?

Granite - has potassium feldspar + quartz and gabbro does not. Granite - lighter (felsic) + lower density.

- 10.) The three different type of sedimentary rocks are clastic, crystalline or bioclastic.

- Name 3 clastic sedimentary rocks - Conglomerate, Shale, Sandstone ... density
- Name 3 crystalline/evaporate rocks - rock salt, limestone, rock gypsum
- Name two bioclastic rocks Limestone, Bit. coal

ALL of these Sedimentary rocks require WHAT to form? water!

- 11.) The crystalline sedimentary rocks are only composed of one mineral. This means they are mono-minerallic. The rock limestone, will react with acid.

- 12.) Know how to use the ESRT to identify the rock symbols. What is the symbol for sandstone? What sized grains does sandstone contain?



0.006 - 0.2 cm

- 13.) Metamorphic rocks can form from pre-existing rock coming into contact with an igneous intrusion and will be non-foliated. This type of metamorphism is known as Contact metamorphism. Two examples of non foliated rocks are:

ex: Marble (from limestone) **LIMESTONE**

- 14.) When tectonic plates converge, heat AND pressure increase resulting in foliated texture. This is called regional metamorphism. Two examples of foliated rocks are:

Slate, phyllite, Schist, Gneiss.

Foliation is when the minerals in the rock align themselves into a sheet like pattern.

- 15.) The rock Gneiss will show banding, which means that there is a "layered" like appearance between alternating light and dark minerals.

- 16.) Fossils are only found in Sedimentary rocks.

Structure of Earth/Density

1. Know the layers of the Earth and how to determine the ranges of density, pressure and temperature for each layer using pg. 10 of the ESRT. You should be able to estimate data if given an exact depth as well (on the x axis). Determine the data for the following layer: inner core

- Temp: 6300 - 6600 °C
- Density: 12.8 - 13.1 g/cm³
- Pressure: 3.1 - 3.6 million atmosphere

2. Which layer of the Earth has a melting point lower than its actual temperature (making it a liquid).

outer core

3. Be able to find the percent mass and volume of elements of the Earth's crust (pg 1 of ESRT).

ex. What is the percent volume of oxygen in the crust?

94.04 %

4. What caused the Earth to be layered?

Different densities of materials + Gravity!

5. What is the Moho? How was it discovered? - seismic waves

Boundary between the crust + rigid mantle.

6. What sort of information do scientists use to study earth's interior if we have never been deeper than the upper portion of the crust?

→ Seismic waves (best) - Meteorites (outer + inner core), Volcanic eruptions - magma for mantle

7. How do seismic waves change their speed and direction as they encounter different layers of the earth?

They ↑ speed w/ ↑ density, they refract (bend)

Plate Tectonics/Continental Drift

continents travel through cliff/crest layers.

1. Know specific evidence that supports continental drift. (ie. How did the findings of different reptile fossils on distant continents support this theory? How did certain paleoclimatic data?)

ie. Mesosaurs found on coast of Africa + S. America

2. Be able to utilize the ESRT pg 8-9 (geologic timeline) to estimate the numerical ages, time periods, or era's that major geologic events occurred (nothing with life/fossils will be tested on the mid-term).

ex. ← Cambrian period - 541 - 252 mya

ie: the forming of the Appalachian mountains (from collision of America with Africa and part of Europe), Pangea, the break-up of Pangea. ← end of Triassic, ~225 mya

3. Understand the significance of magnetic reversals; it was used as evidence to prove seafloor spreading was occurring; which occurs at a divergent plate boundary. Locations equal distance from the mid Atlantic ridge will show the same or different magnetic polarity?

3. Know the relative age distribution of oceanic rock on either side of ocean ridges and how their age compares to continental rocks.

↑, AGE ↑ As distance from the ridge

4. How do convection currents drive plate tectonics? How do the currents move under divergent boundaries? Convergent boundaries? - there are clues on page 10 of your ESRT.

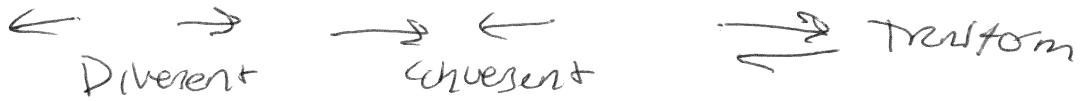
Divergent - they rise ↑↑

convergent - they sink ↓↓

5. How does continental crust differ from oceanic crust in terms of thickness and density?

Continental - thicker + less dense

6. Describe and be able to identify illustrations of divergent, convergent and transform fault plate boundaries.



7. Know what happens at a subduction zone and how density differences between ocean and continental plates determine what happens when they collide.

→ oceanic crust will subduct b/c it is denser, causing a volcanic mountain range or volcanic island arc.

8. Be able to locate the name of specific tectonic plates using the Earth Science Reference Tables as well as specific types of plate boundaries.

ie: A volcanic island arc is formed in the Pacific Ocean; what type of plate boundary created this landform? Name two specific plates involved with this type of boundary.

ex: → Convergent (Type)

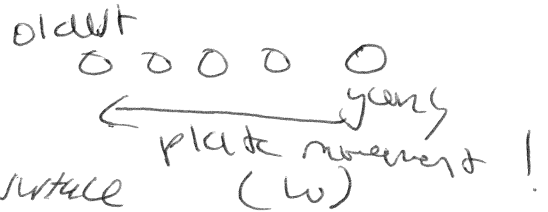
ex: - Pacific + Philippine plate

9. What is the relationship between plate boundaries and earthquakes and volcanoes?

They are associated w/ active plate boundaries.

10. What is a hot spot? Are they associated with plate boundaries? How do the ages of a volcanic island chain created by a hot spot show the direction of plate movement?

a random mantle plume; NO. As the AGE of the island ↑, the plate moves in that same direction. Earthquakes



1.) Know what the term focus and epicenter mean

where break along fault occurred.

↑ above focus on surface

2.) All earthquakes are associated with faulting. Faulting occurs along which type of plate boundary, or all?

all!

3.) Know the two different types of seismic waves: P and S-waves. How do their speeds vary from one another?

P- faster (through all layers).

S- slower (only through solids)

4.) How do the travel times, and S-P time interval of P and S waves change as the distance from the epicenter increases?

As distance to the epicenter ↑, the travel time of both P & S waves ↑, which means that the lag-time / time interval, also increase!