

## Study Guide mid-term 2019

On an x y graph the independent variable is on the x axis and the dependent on the y

Latitudes lines are horizontal----- and measure north or south of the equator

Longitude lines are vertical | and measure east or west of the prime meridian

The extinction of the dinosaurs has been linked to a large asteroid impact that struck Earth about 66 million years ago

Volcanic island chain like Hawaii are known as hot spots. You can see the islands moving a distinct direction.

Theories in science can be changed when new information is acquired. This can change current beliefs. Example The earth was though flat until sailors sailed around the world

Chemical weathering agents include oxidation (rust) and dissolving by acids Limestone. When limestone is dissolved by acids it can create caves and sinkholes (Karst topography)

Running water creates rounded rocks. Falls and other breakages create angular rocks(sharp edges)

Virginia Provinces

Coastal plain- Sedimentary rock youngest province bounded on the west by the fall line important resources Sand, Gravel

Piedmont – Igneous and metamorphic rock highly weathered bedrock with rolling topography (hills) Important resources Silica

Blue Ridge Igneous and Metamorphic rocks highest elevation and oldest rocks in Virginia Important resources Granite

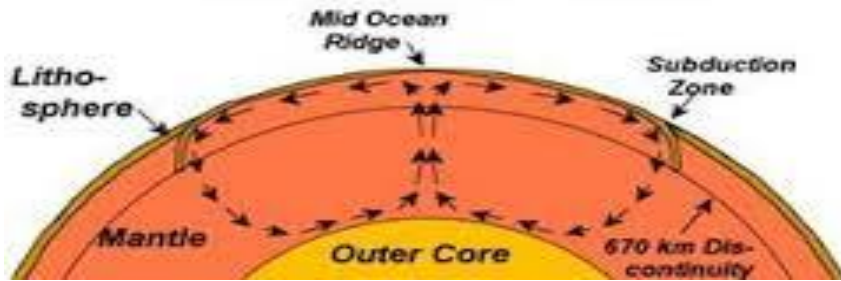
Valley and Ridge Sedimentary rock Limestone rock and caves and sinkholes (karst topography) Important resources Limestone and gravel

Appalachian plateau-Sedimentary rock plateau bisected by streams oil, Coal and Natural gas found here Important resources natural gas, oil, coal

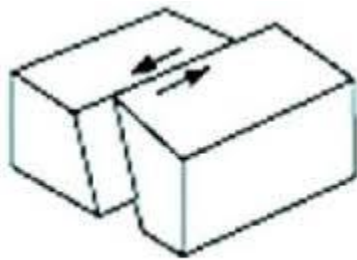
A seismograph that records P waves first is the closest to the epicenter

Plate tectonics is driven by convection currents in the mantle

## Whole Mantle Convection

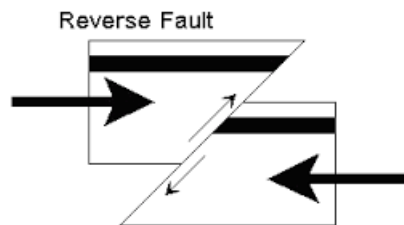


## Earthquake faults

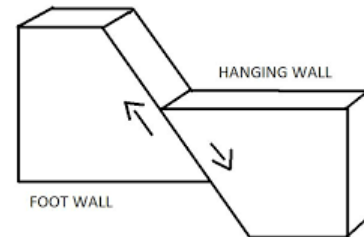


Strike Slip Fault

Shearing forces

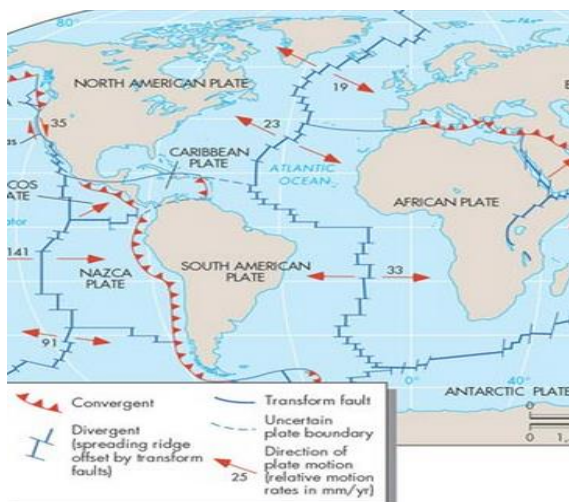


Compression forces



Tension forces

The mid Atlantic ridge is evidence that Africa and Europe were once connected to North America and South America the ridge is a divergent boundary where plates pull apart and new crust is being formed at the ridge. This means that North America is moving away from Europe and South America is moving away from Africa

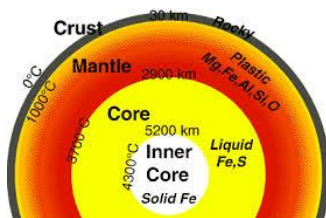


Mechanical weathering is rock is broken down into smaller pieces it does not alter the rock chemically

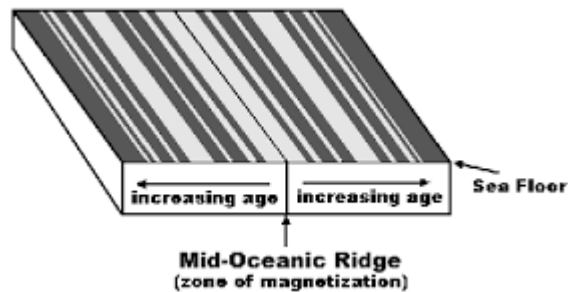
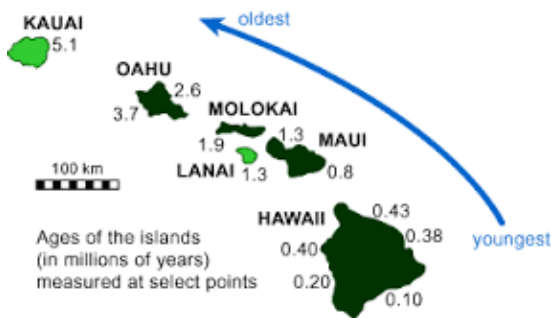
Chemical weathering is when the rock is altered chemically (the elements or compounds change)

Earthquake frequency is greatest at plate boundaries Examples Mid-ocean ridges, Subduction zones, and crumple zones.

The hottest layer of earth is the inner core and the coolest is the crust. Temperature and pressure increases with depth into the earth.



The age of rocks and volcanoes, increase the further away from the source of their magma:



The ring of Fire is an area of volcanoes that circle the Pacific Ocean. It is caused by the subduction zones surrounding the Pacific plate



The four agents of erosion are Water, wind, B Glaciers (Ice) and Gravity. Water is the agent that shapes most of Earth's surface

Fossils form 1) Dying 2) quickly buried in mud or sediments 3) An impression or hollowed area forms 4) The sediments or mud turn into rock

### The types of fossils

Preserved original remains

Molds

True fossil



Original remains- Fossils that have parts of the organism intact this can be Bone, Teeth, Shells, Fur, Skin and other soft tissues.

Molds - A hollowed out impression of where an organism died, was buried and decayed away leaving a space in the rock

**Casts - when a mold fills in with sediments or wet minerals once it hardens it will take the shape of the mold**

**Index fossils- a relative dating fossil used to date rocks and other fossils. It is widespread, abundant and lived for a short period of time**

**Fossils form from hard parts like shell bones teeth and being buried in mud Soft tissues broken down from micro-organisms SRE NOT FOSSILIZED**

**Fossils in Virginia are from the 3 modern Eras the Paleozoic, Mesozoic and Cenozoic**

**Soil forms from weathering and erosion**

**Soil formation- Solid rock begins to break into smaller pieces and is colonized by lichens (horizon C)**

**Over long periods of time more rock breaks down and organic mineral mix to form a thin layer of topsoil (Horizon A)**

**As more minerals break down the topsoil gets deeper creating a subsoil layer (Horizon B)**

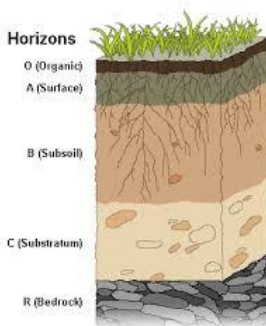
### **Soil Layers**

**Horizon A- Topsoil most nutrients and minerals dark brown to black. Organisms decay here**

**Horizon B - Subsoil lighter brown lacks nutrients of topsoil but still contains minerals washed down from leaching**

**Horizon C- Regolith very light in color Tan-Gray) pieces and chunks of bedrock**

**Bedrock- Impermeable layer of rock that soil and groundwater lay on top of.**



**Relative dating – comparing one object to another to determine its age ( lower fossils are older than younger)**

**Absolute dating - using radioactive decay of isotopes to determine the exact age of fossils**

## Absolute dating example

### *Decay of Carbon-14*

Years from Present	0	5,730	11,460	17,190	22,920	28,650	34,380	40,110	45,840	51,570
Percent of Original C14 Remaining	100	50	25	12.5	6.25	3.13	1.56	0.78	0.39	0.20

## Watersheds of VA



Big sandy, Tennessee, New ----Mississippi River (Gulf of Mexico)  
Shenandoah, Potomac, Rappahannock, James, York, Eastern Shore --- Chesapeake Bay  
Roanoke and Chowan --- North Carolina Sounds

### Minerals id chart

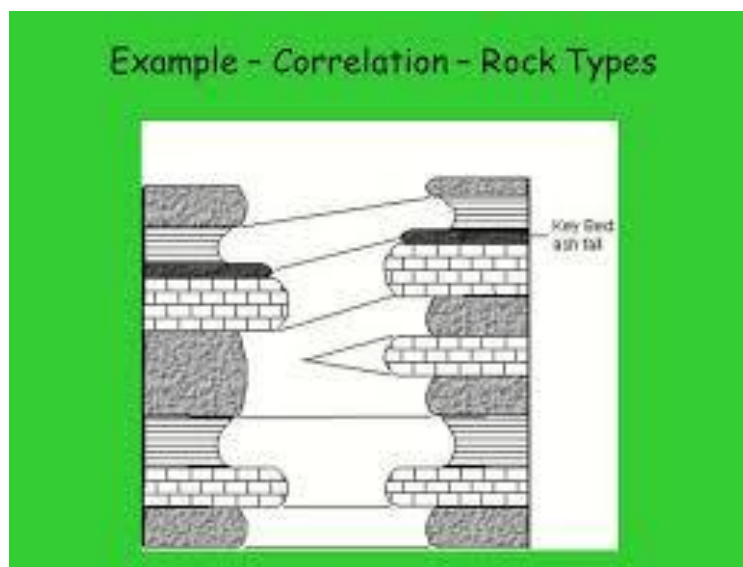
FRACTURE CLEAVAGE	STREAK	COLOR	MINERAL NAME
CLEAVAGE	yellow or brown	yellow, brown, black	<b>GOETHITE</b>
	white, yellow, or brown	white, red yellow, brown, green, black	<b>SPHALERITE</b>
	colorless	dark green, dark brown, or black	<b>BIOTITE</b>
	black	black, silver, or gray	<b>GRAPHITE</b>
FRACTURE	black	brassy yellow	<b>PYRITE</b>
	reddish	red -brown, black, silver	<b>HEMATITE</b>
	black	black or silver	<b>MAGNETITE</b>
	black	brownish	<b>PYRRHOTITE</b>
	greenish black	brassy yellow	<b>CHALCOPYRITE</b>
	black	brassy with iridescent colors	<b>BORNITE</b>



**Superposition-** The principal that in undisturbed rock layers the oldest fossils are at the bottom

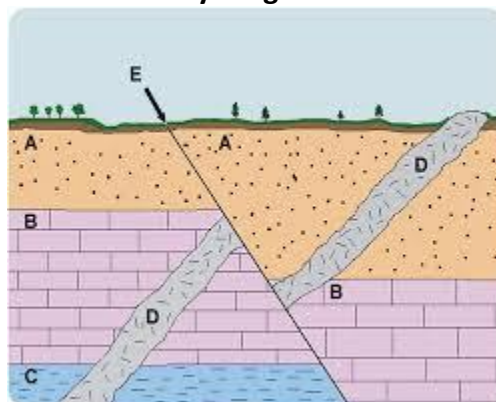
**Crosscutting-** The principal that igneous intrusions and fault lines are always younger than the layers they cut across.

### Correlation Examples



Line up the rocks according to fossil or type and then apply superposition to read the layers

Apply superposition and cross-cutting to read the rocks in the correct sequence oldest to youngest





## Aquifer diagram

Zone of Aeration or Unsaturated zone – Pores NOT filled with water

Zone of Saturation – Pores filled with water (this is the aquifer)

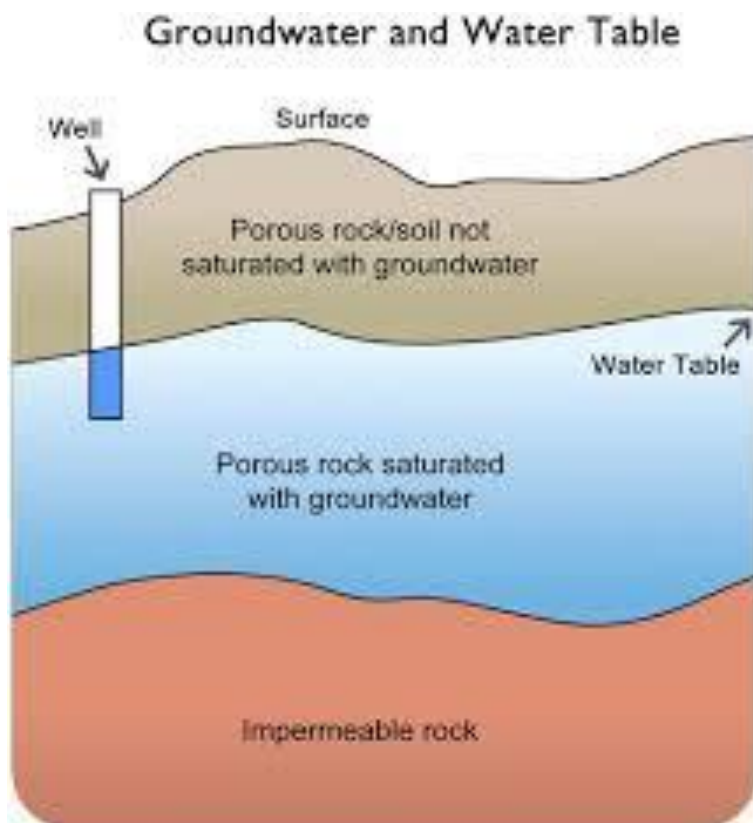
Water Table – The line that separates the 2 zones it can go up (recharge) or Down (drawdown)

Permeability – means pores in the soil are well connected water moves easily

Impermeable – Pores are not connected water cannot pass

Porosity- The amount of space between sediment particles.

Wells only work if drilled into the zone of saturation (Aquifer) anywhere else will not pump water



## Plate boundaries

Type of Margin	Divergent	Convergent	Transform
Motion	Spreading	Subduction	Lateral sliding
Effect	Constructive (oceanic lithosphere created)	Destructive (oceanic lithosphere destroyed)	Conservative (lithosphere neither created or destroyed)
Topography	Ridge/Rift	Trench	No major effect
Volcanic activity?	Yes	Yes	No

(a)

(b)

(c)