

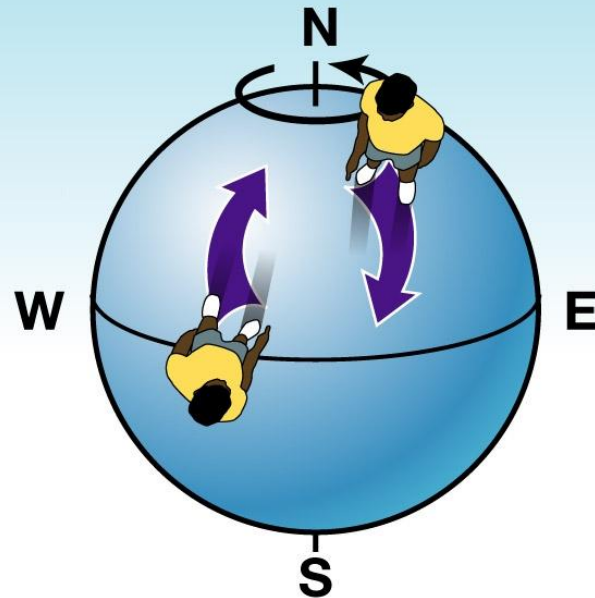
8th Grade Tutoring

4/9/2019

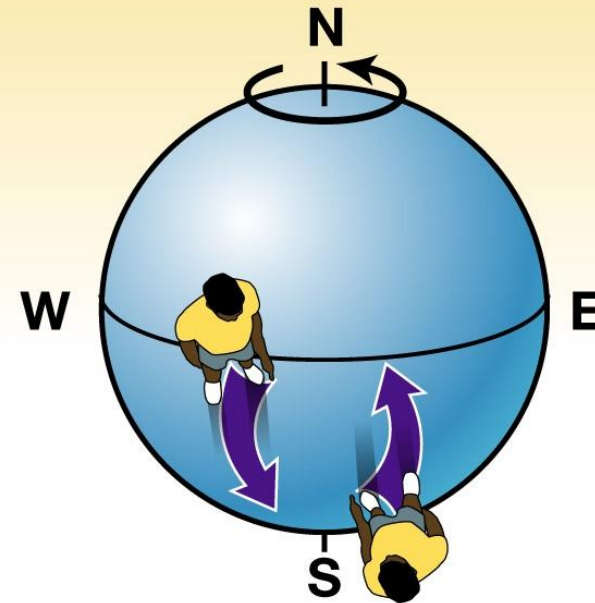
The Coriolis Effect

Due to the Coriolis Effect . . .

Winds bend to the right
in the northern hemisphere.

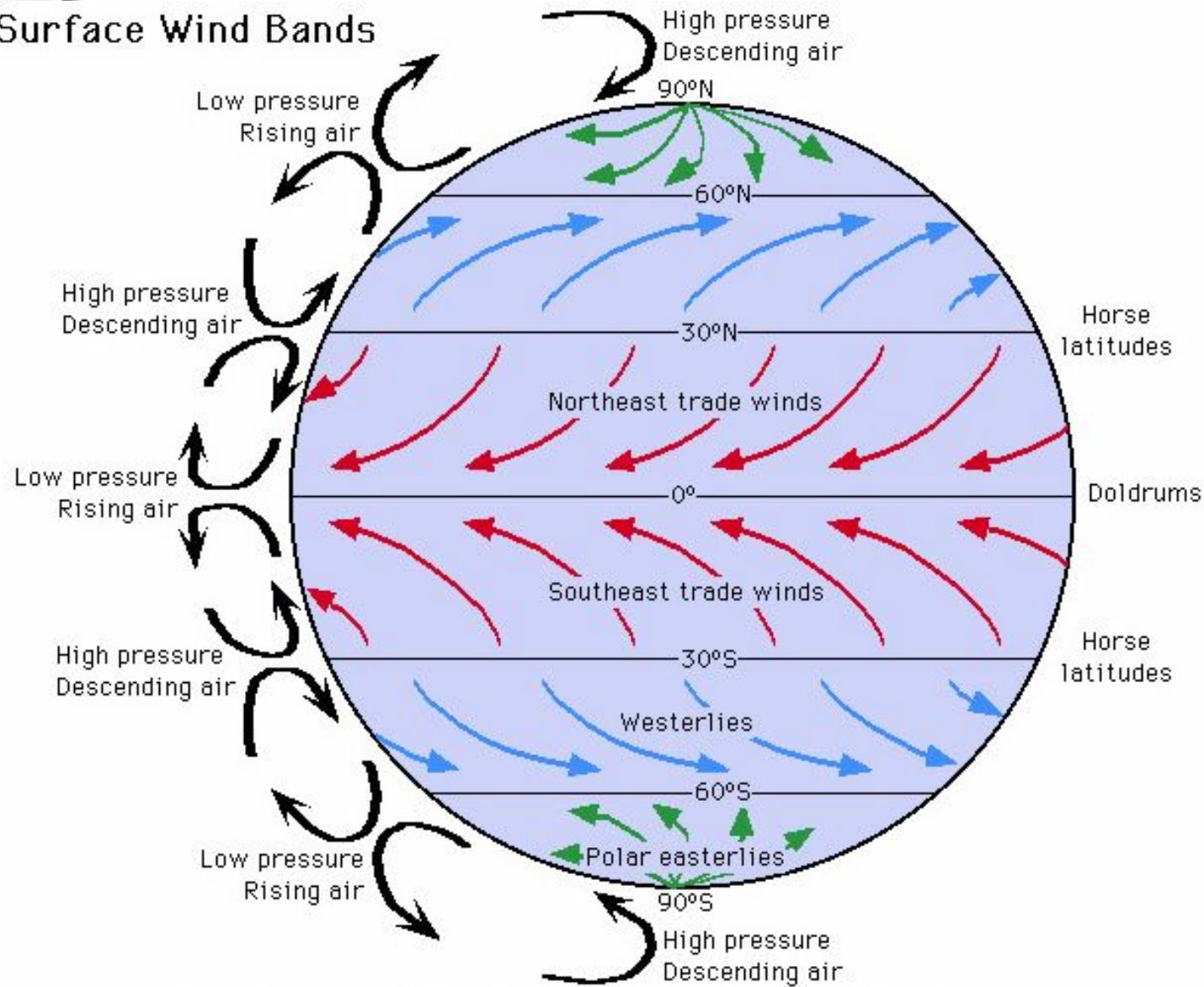


Winds bend to the left
in the southern hemisphere.



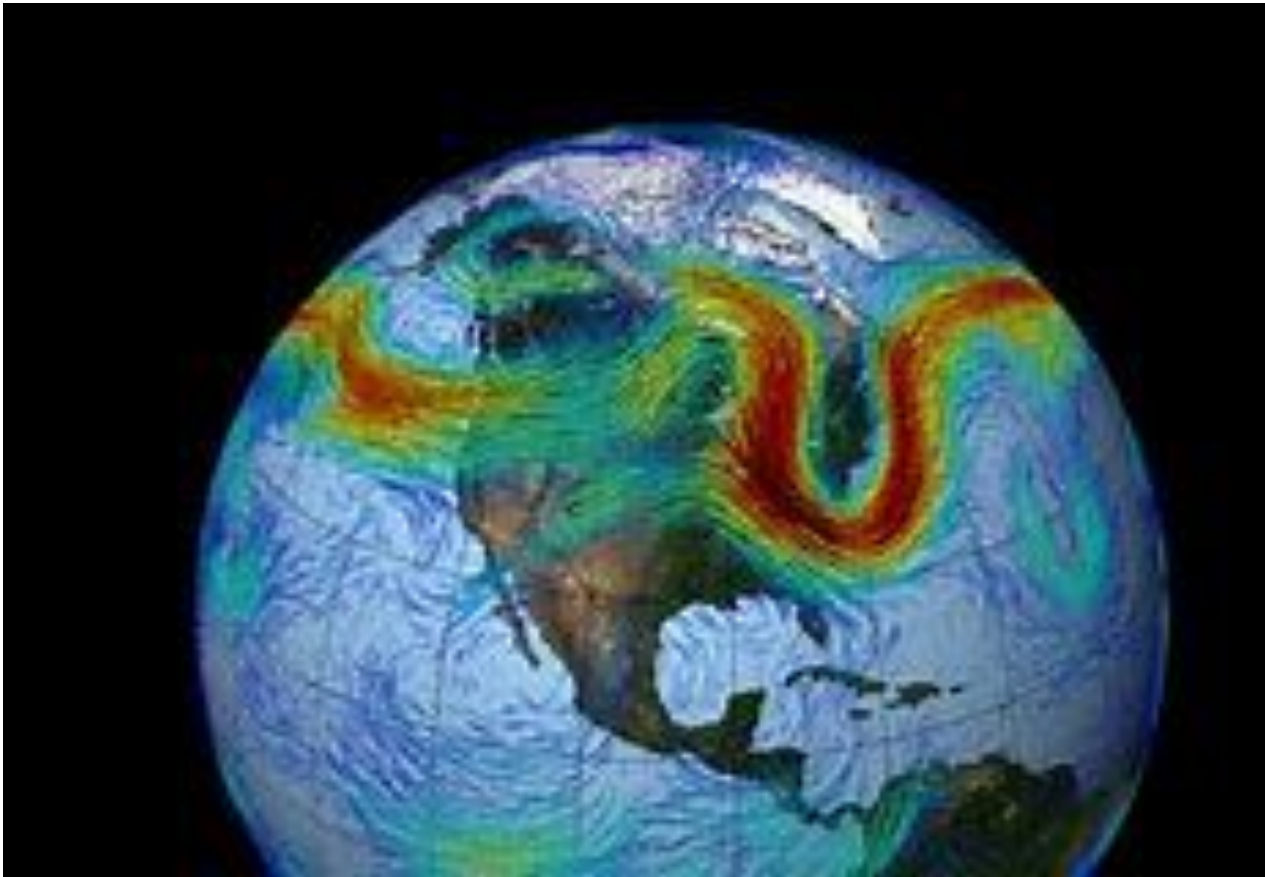
To understand “right” and “left” directions in this graphic,
imagine you are standing at the base of each arrow on the globes.

Surface Wind Bands



Hadley Cells

Jet stream



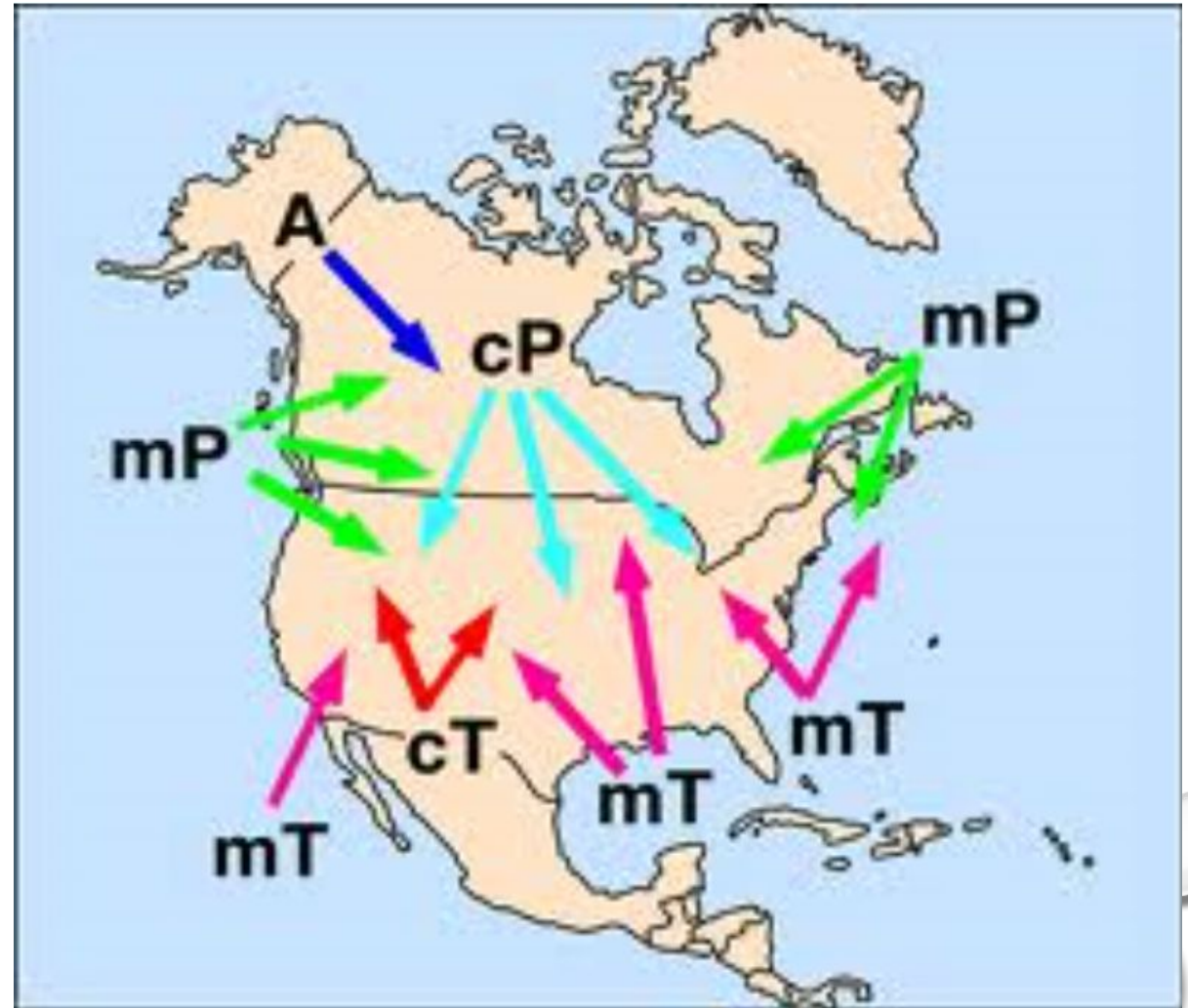
At the border of the troposphere, we have a huge pressure difference between the border of the troposphere and the stratosphere. This creates really fast winds, known as the JET STREAM.

STRONGEST: NORTHERN AND SOUTHERN POLAR JETS

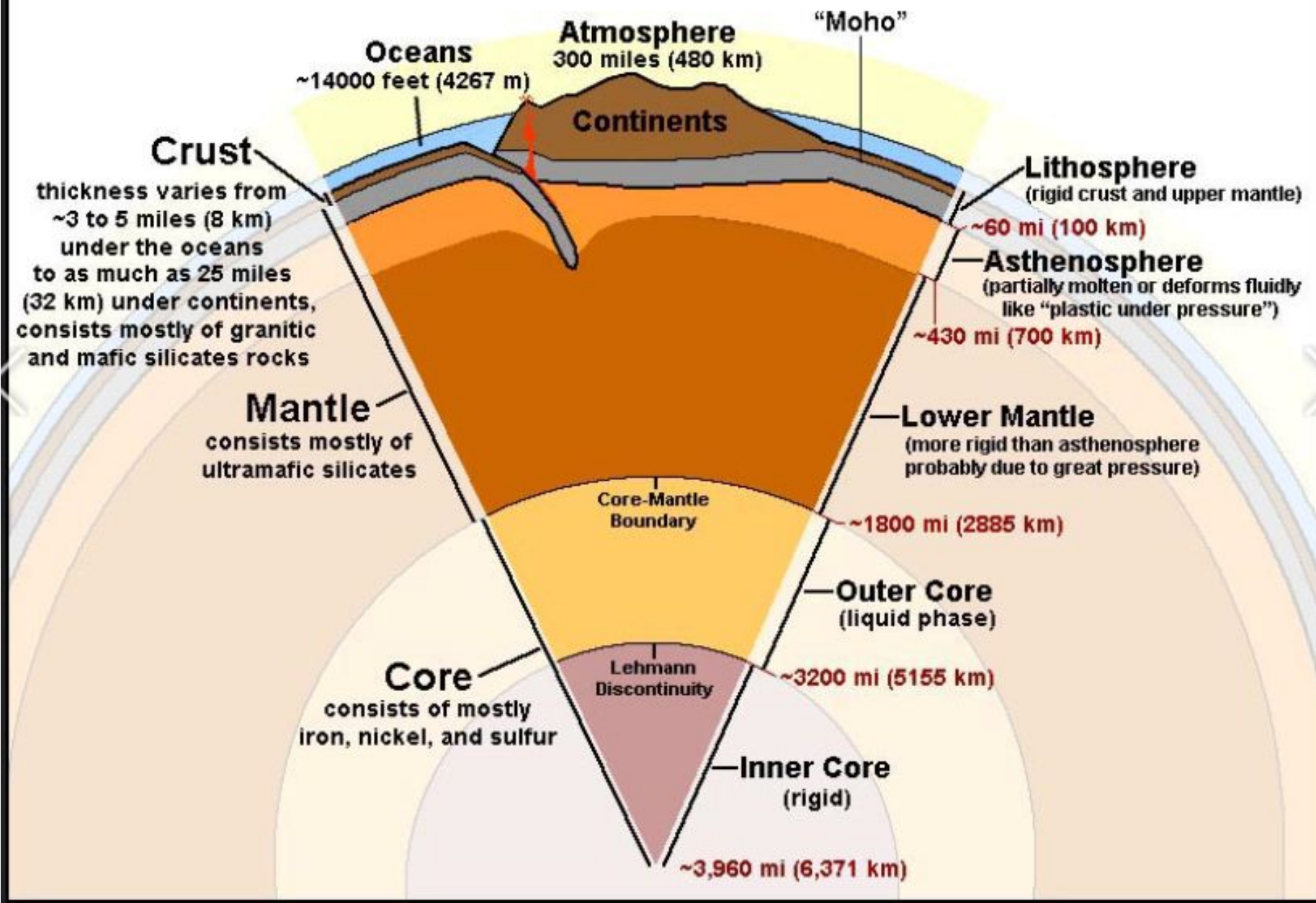
WEAKER: NORTHERN AND SOUTHERN SUBTROPICAL JETS

Air masses

Airmass Name	Abbreviation	Where it Forms	Characteristic Weather
Maritime Polar	mP	Cold Ocean	Cool and Humid
Maritime Tropical	mT	Warm Ocean	Warm and Humid
Continental Polar	cP	Cold Land	Cool and Dry
Continental Tropical	cT	Warm Land	Warm and Dry
Continental Arctic	cA	Extreme North	Very Cold Very Dry



Structure of the Earth



IGNEOUS ROCK

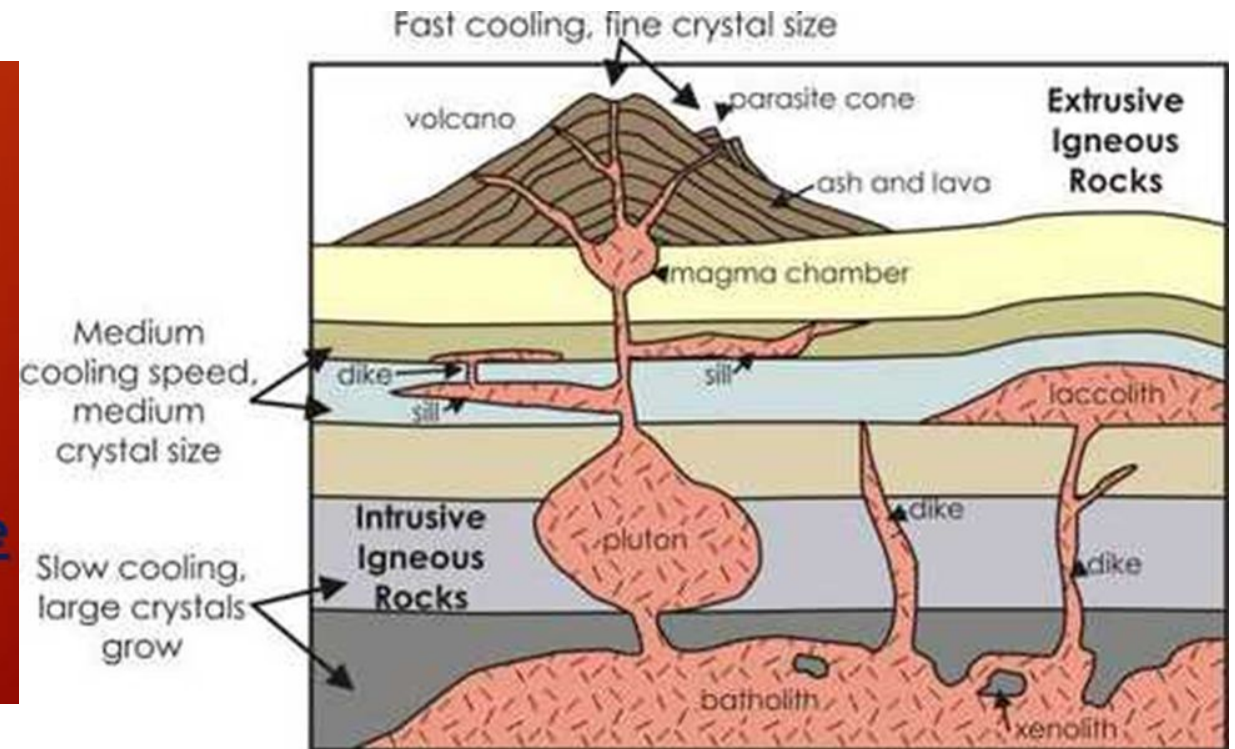
- FORMS WHEN MAGMA COOLS AND HARDENS

Igneous rock

Intrusive Igneous Rock: Slow cooling of magma deep below the crust

Extrusive igneous rock: Rapid cooling of lava on the earth's surface

The rate of cooling of rock determines the size of crystals, which determines its texture



Sedimentary Rock Classes

- **Clastic sedimentary rock:** rock fragments carried away and deposited, compacted, and cemented
- **Chemical sedimentary rock:** forms from minerals that were dissolved in water
- **Organic sedimentary rock:** forms from remains of organisms

Sedimentary Rock Features



- Stratification: layering caused by a change in the kind of material being deposited
- Ripple Marks: action of wind or water on sand
- Mud Cracks: When the sediment dries and shrinks
- Fossils: remains or traces of ancient plants and animals
- Concretions: lumps of other rock that form when minerals build up around an existing rock



Metamorphic Rock Formation

- Heat, pressure, and chemical reactions cause minerals to change into other chemicals and/or change in shape and size.
 - **Contact metamorphism**: when hot magma pushes through existing rock, the structure and mineral composition changes
 - **Regional metamorphism**: occurs over a large area due to tectonic activity where the heat and pressure of plate grinding changes the minerals' chemical composition
 - Review: lithosphere and asthenosphere

Metamorphic Rock Classification

- Foliated: extreme pressure flattens the mineral crystals and pushes them into parallel bands. Separation into bands is caused by the different mineral densities (examples: slate, schist, gneiss)



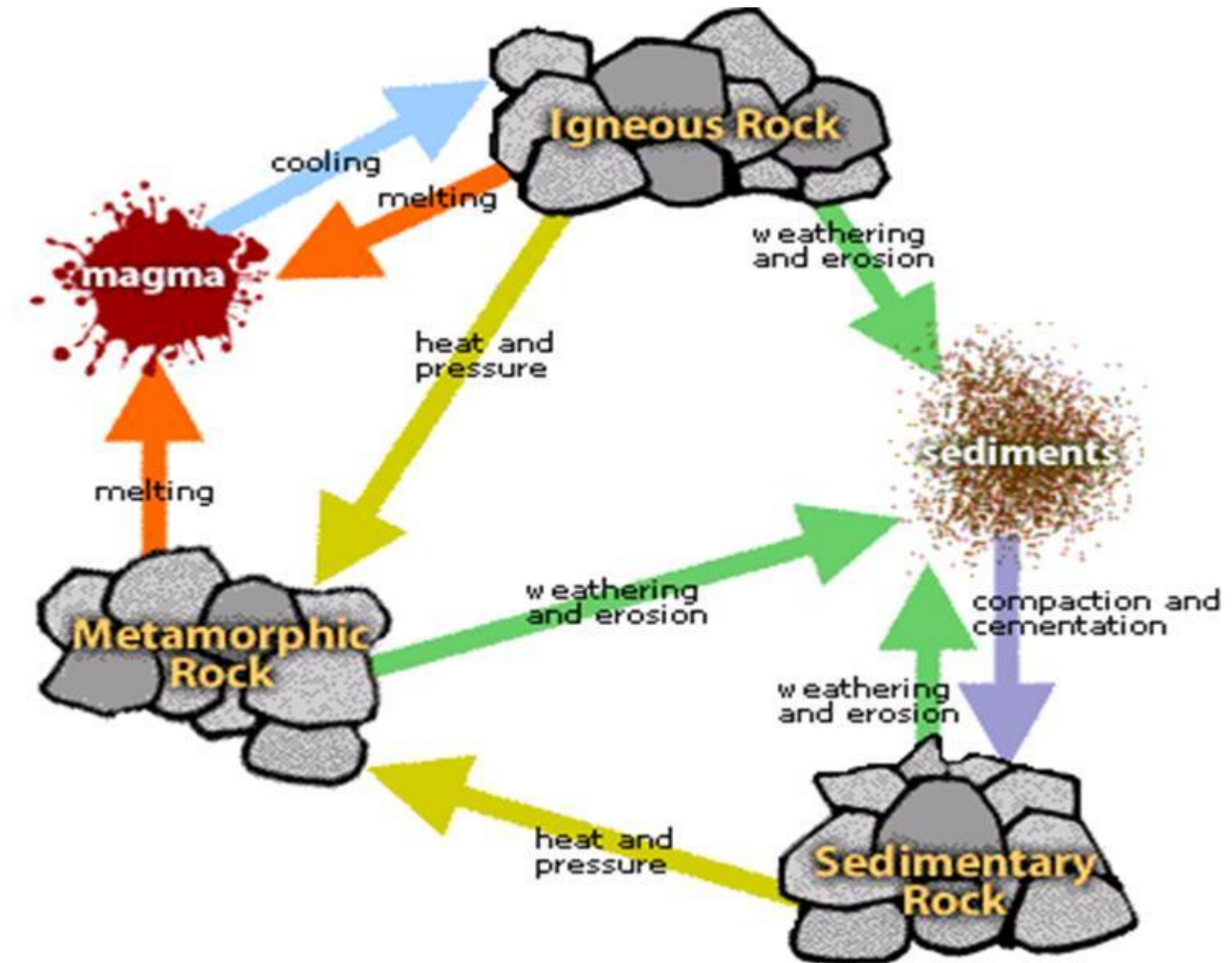
Unfoliated: sandstone is so tightly compacted that the spaces between particles disappear. (example: quartzite)

THE ROCK CYCLE

**WEATHERING
EROSION
DEPOSITION
COMPACTION AND CEMENTATION**

HEAT AND PRESSURE

**MELTING
SUBDUCTION**



review questions

Determining the Age of Earth and Studying the Past

- Fossils
- The Law of Superposition
- Radioactive Dating

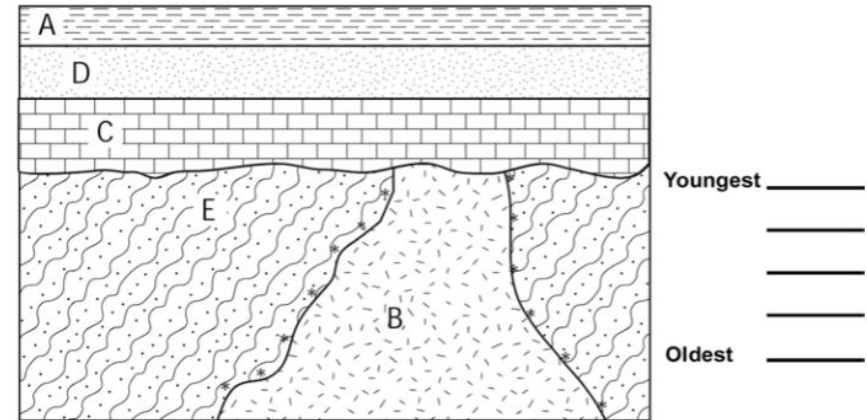
Types of Fossils

- Original Remains (True Form Fossils)
 - Preserved in amber, tar or ice
- Petrified Fossils
 - Organic materials of dead organism are replaced with minerals deposited out of water & turned to stone
- Carbon Films & Impressions
 - Liquids/gasses from organisms leave a "picture" or indentation
- Trace Fossils
 - preserved evidence of the activities of deceased organisms (footprints, burrows, nests, etc.)
- Molds & Casts
 - Under water, as sedimentary rock forms around dead organism, a mold is made. Later, the space left from the decayed organism is filled with sediment, forming a cast.

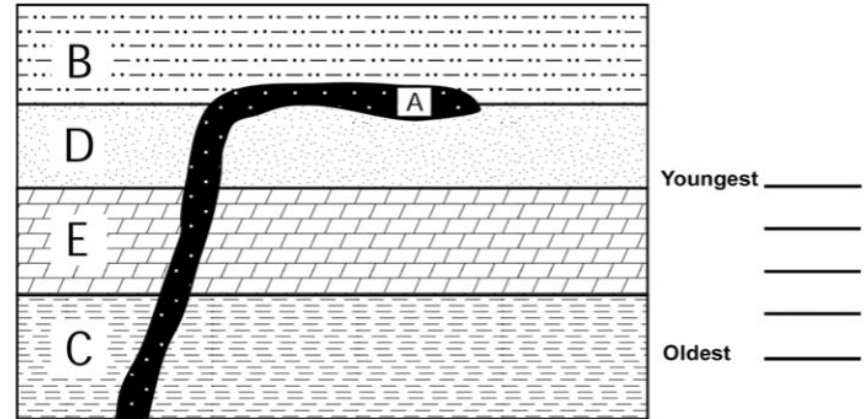


The Law of Superposition

- Older rock on bottom, younger rock on top (only if the layers haven't been disturbed)
- **Intrusion:** breaks into sedimentary rock layers. Layers that are being cut = older; rock that is doing the cutting = younger



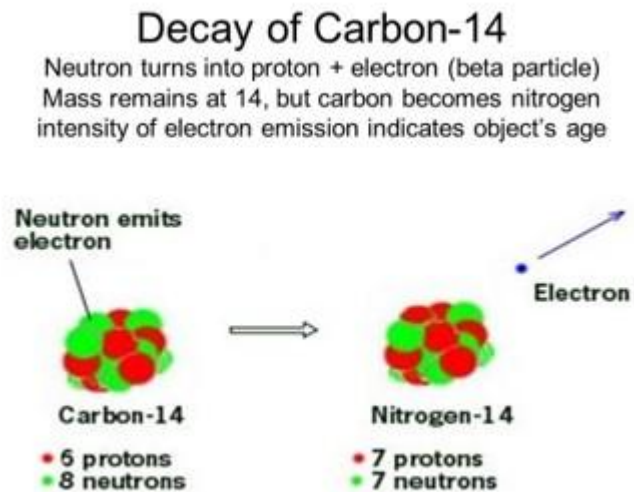
Stratigraphic Principle: _____



Stratigraphic Principle: _____

Radioactive Dating

- Radioactive elements are atoms with an **unstable nucleus**. This nucleus will breakdown, **forming a new, stable element**.
- Scientists use the ratio of older radioactive elements to newer stable elements to determine the age of rock samples.



Radioactive Decay Calculations

Number of half-lives elapsed	Fraction remaining	As power of 2	As %
0	1/1	$1/2^0$	100
1	1/2	$1/2^1$	50
2	1/4	$1/2^2$	25
3	1/8	$1/2^3$	12.5
4	1/16	$1/2^4$	6.25
5	1/32	$1/2^5$	3.125
6	1/64	$1/2^6$	1.563
7	1/128	$1/2^7$	0.781
...
n	$1/2^n$	$1/2^n$	$100(1/2^n)$

Step 1: Calculate the ratio (as a fraction, or as a percent) of radioactive atoms to stable atoms

Step 2: use the ratio to calculate how many half lives have passed

Step 3: Multiply the number of half-lives by the number of years each half-life represents

Radioactive Decay Data

RADIOACTIVE ISOTOPE	DISINTEGRATION	HALF-LIFE (years)
Carbon-14	$^{14}\text{C} \rightarrow ^{14}\text{N}$	5.7×10^3
Potassium-40	$^{40}\text{K} \rightarrow ^{40}\text{Ar}$ $^{40}\text{K} \rightarrow ^{40}\text{Ca}$	1.3×10^9
Uranium-238	$^{238}\text{U} \rightarrow ^{206}\text{Pb}$	4.5×10^9
Rubidium-87	$^{87}\text{Rb} \rightarrow ^{87}\text{Sr}$	4.9×10^{10}

questions from packet

Landforms Formed from Weathering, Erosion, Deposition

- Alluvial Fans
- Deltas
- Caves
- Coastlines
- Sandbars
- Dunes

River Deposition

Alluvial Fan: River stream from mountain empties into large body of water



Delta: river (not from mountain) empties into large body of water



WAVE EROSION

SEA CLIFFS

SEA CLIFFS FORM ALONG COASTS AS WAVES WEAR AWAY THE ROCK BELOW THE HIGH TIDE MARK. This constant wearing away of rocks near the water creates an overhang, which eventually collapses to form a vertical cliff leading into the sea.



SEA CAVES

SEA CAVES FORM IN SEA CLIFFS WHEN A HOLE IS WORN INTO THE CLIFF CREATING A CAVE.



ARCHES

ARCHES FORM WHEN A SEA CAVE IS WEATHERED AWAY LEAVING ONLY THE OPENING STANDING.



SEA STACKS

SEA STACKS FORM WHEN THE TOP AN ARCH COLLAPSES LEAVING THE TWO SDES STICKING UP OUT OF THE WATER.



WAVE DEPOSITION

BEACHES

SOME OF THE SEDIMENT CARRIED UP ONTO THE LAND BY SWASH IS DEPOSITED CREATING A BEACH.

A BEACH IS THE AREA BETWEEN THE HIGH-TIDE AND LOW-TIDE LEVEL ON A COASTLINE.

They may be sandy, pebbly, or even rocky. The composition of the beach depends on the material that's available, and the slope of the shoreline. If the seafloor is steep then all of the sand and clay are easily washed away from the beach by backwash, and all that's left at the beach is pebbles. If the seafloor has a gentle slope, then only clay gets washed out and a sandy beach forms.

Most sand grains at the beach are made from durable minerals like Quartz and Feldspar, but may contain mica and magnetite, depending on the prevalence of minerals in an area



SANDBARS

A SANDBAR IS A SHALLOW SANDY AREA IN THE WATER OUT FROM THE BEACH. THEY ARE CREATED BY SAND DEPOSITED BY UNDERTOW AND BACKWASH CURRENTS.



BARRIER ISLANDS

BARRIER ISLANDS ARE SIMILAR TO SANDBARS, EXCEPT THEY ARE LARGER AND EXTEND LONGER DISTANCES.

The formation of barrier islands is believed to be a combination of glaciers depositing sediment at the end of the last ice age, and waves continually depositing sediment. Barrier Islands are important because they protect coastlines from storms and flooding, and create sheltered harbor habitats.



WIND EROSION

VENTIFACTS

In dry desert areas with lots of sand, and very few trees to block the wind, blowing sand wears away enough rock to create very unique features.

VENTIFACTS ARE ODDLY SHAPED ROCKS CARVED AND GROUND DOWN BY SAND BLASTING INTO BOULDERS.

THE WINDWARD SIDE BECOMES SMOOTH, FLAT, AND WORN AWAY.

THE LEEWARD SIDE MAINTAINS ITS ORIGINAL SHAPE.



ARCHES

ARCHES ARE EXACTLY WHAT THEY SOUND LIKE, A BIG ARCH MADE OF ROCK.

They are carved by wind, as the hollow area in the middle is worn away faster than the outside area.



BLOWOUT

BLOWOUTS ARE HOLLOW BASINS WHERE ALL SEDIMENT HAS BEEN ERODED AWAY FROM THE DESERT FLOOR, LEAVING A CRAKED FLAT SURFACE.



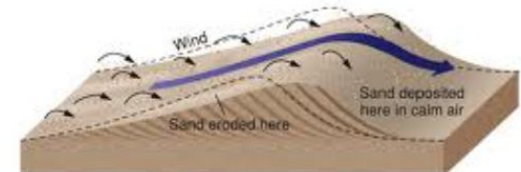
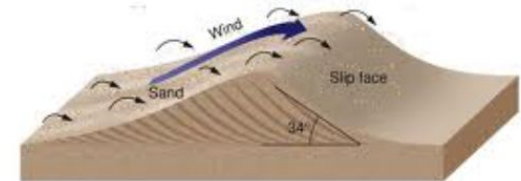
DUNES

DUNES ARE LOPSIDED HILLS OF SAND DEPOSITED BY WIND.

THE WINDWARD SIDE HAS A GENTLE UPWARD SLOPE.

THE LEEWARD SIDE HAS A STEEPER DROP OFF.

Dunes form as the sand piles up against shrubs, boulders or other obstructions. If the wind is steady from one direction it creates a gentle slope on the windward side, and a shorter steeper slope on the leeward side. These dunes can range in size from a few



FLORIDA LANDSCAPES



- **WETLANDS: A LOW AREA OF LAND THAT IS COVERED WITH SHALLOW WATER FOR ALL OR PART OF THE YEAR**
- **COASTAL PLAINS: FLAT, LOW-LYING LAND ADJACENT TO A SEACOAST.**