

Rocks, Resources, and Geologic Time Test

ESS2.3 Describe the relationship between the processes and forces that create igneous, sedimentary, and metamorphic rocks.

ESS3.1 Interpret data to explain that earth's mineral, fossil fuel, and groundwater resources are unevenly distributed as a result of geologic processes.

ESS2.1 Analyze and interpret data to support the assertion that rapid or gradual geographic changes lead to drastic population changes and extinction events.

Remember to write two facts from each slide

OR

Answer the questions on the slide

Once you are finished, watch the video on Ms. Raymer's webpage titled

Rocks, Resources, and Geologic Time Test video

Igneous Rocks

- Formed by extreme heat melting the material into magma.
- The magma cools and hardens into an igneous rock
- Example: Granite

Metamorphic Rocks

- Formed from other rocks (igneous or sedimentary)
- The rock undergoes a process of heat and/or pressure to transform it into metamorphic rock
- Example: Marble

Sedimentary Rocks

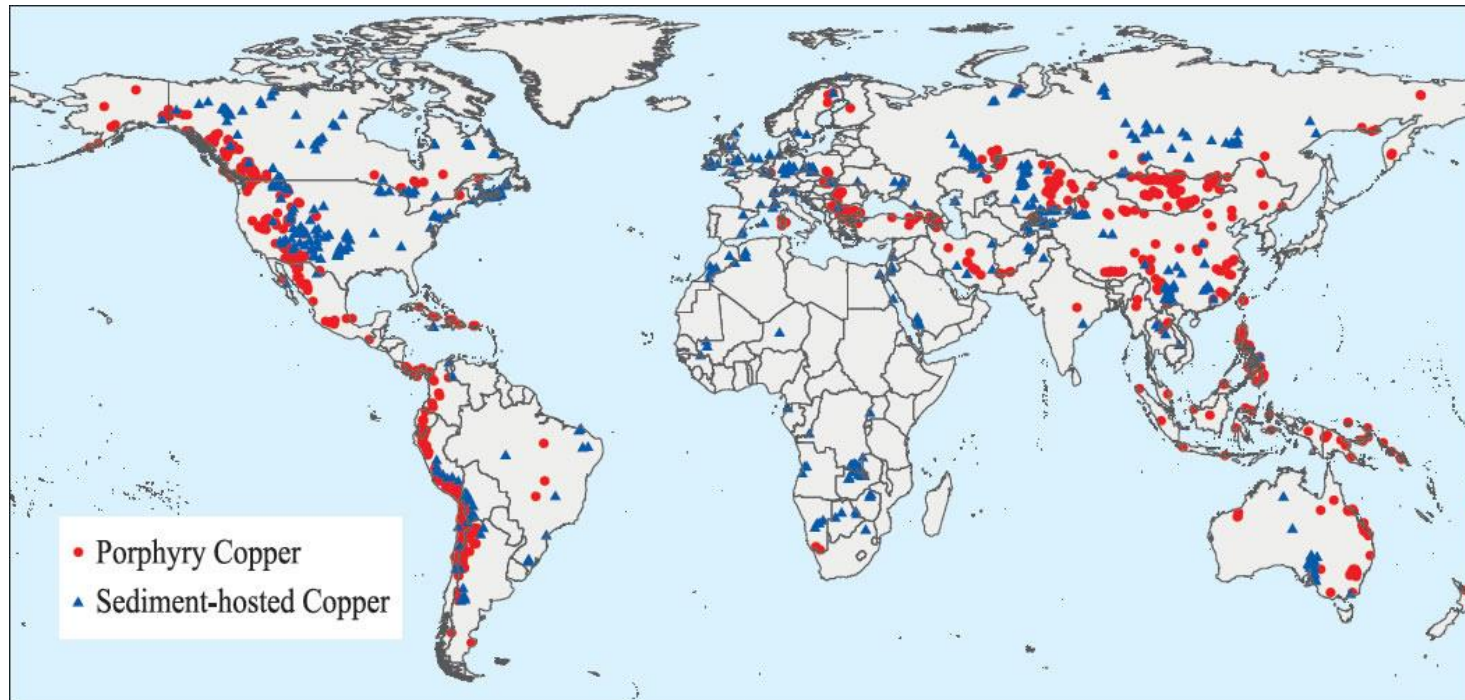
- Weathering and erosion breaks down larger material into small sediment.
- The sediment is deposited by water, wind or other natural processes
- The deposited sediment is compacted by the weight of many overlying layers
- The layer of sediment cements into a hard layer of sedimentary rock
- Example: sandstone and coal

Resources and Plate Boundaries

- The slow movement of tectonic plates causes great heat and pressure
- Heat and pressure over millions of years can produce minerals and fossil fuels
- These resources are non renewable because they form very slowly

Minerals and Plate Boundaries

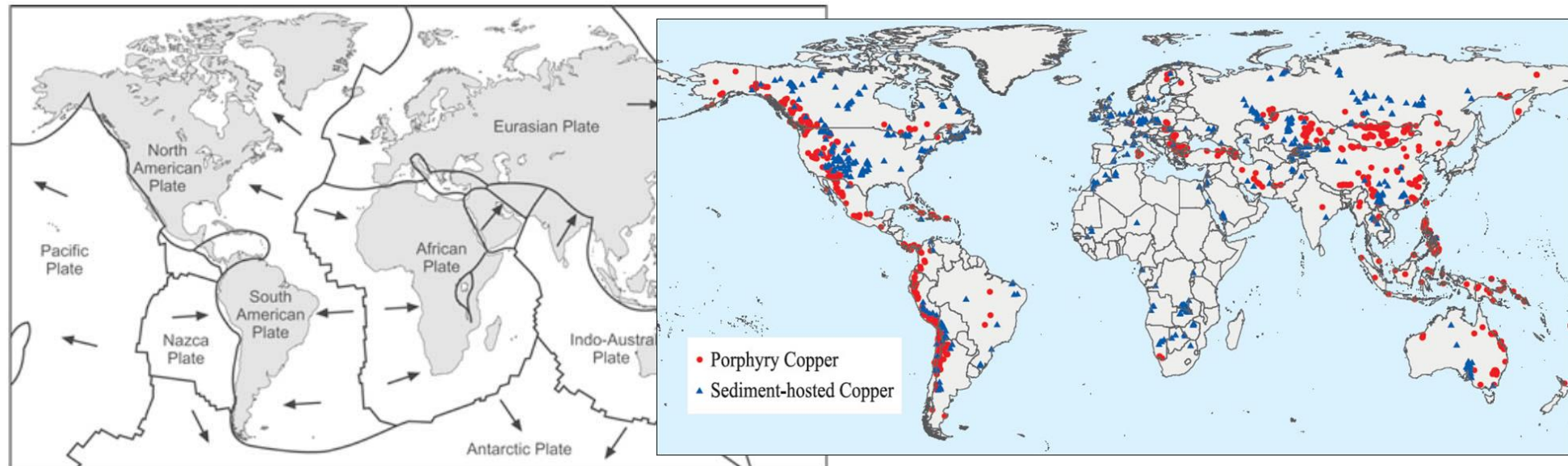
- Copper can be found along convergent and transform boundaries
- The pressure and heat at these boundaries caused the development of these minerals



Minerals and Plate Boundaries

- Looking at the plate boundaries we should be able to predict the location of mineral resources.

1. What type of boundary is causing the large copper deposits in South America? _____

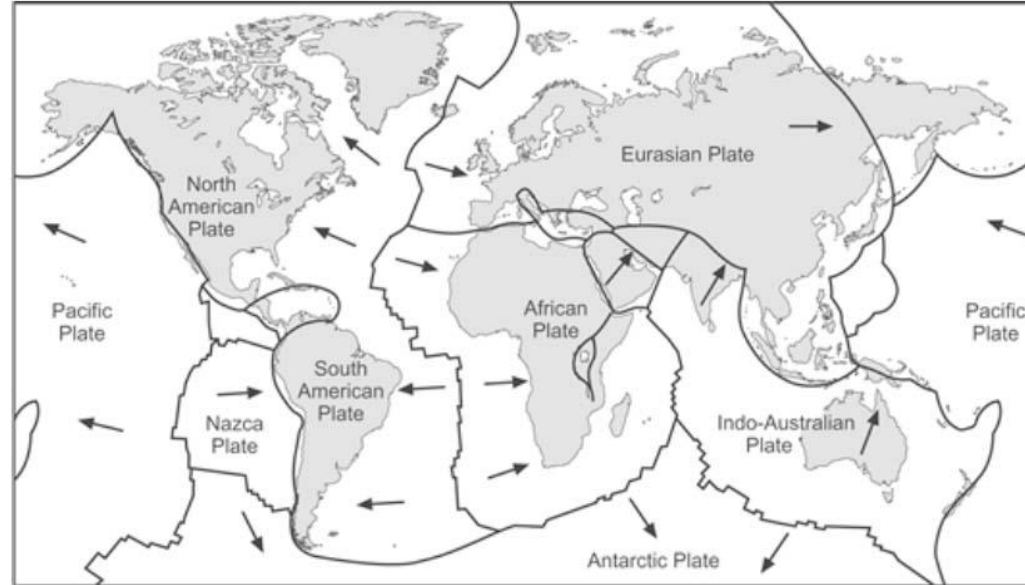


Fossil Fuels and Plate Boundaries

- Coal, oil, and natural gas are all fossil fuels.
- Coal is formed from the remains of decomposing plant matter
- Oil is formed from the remains of decomposing marine animal matter
- Natural gas is found in areas near oil reserves

Fossil Fossil Fuels and Plate Boundaries

1. What type of boundary caused the oil reserves in the middle east?
(hint: the plates are sliding)



1. What type of boundary would cause the most of heat and pressure?



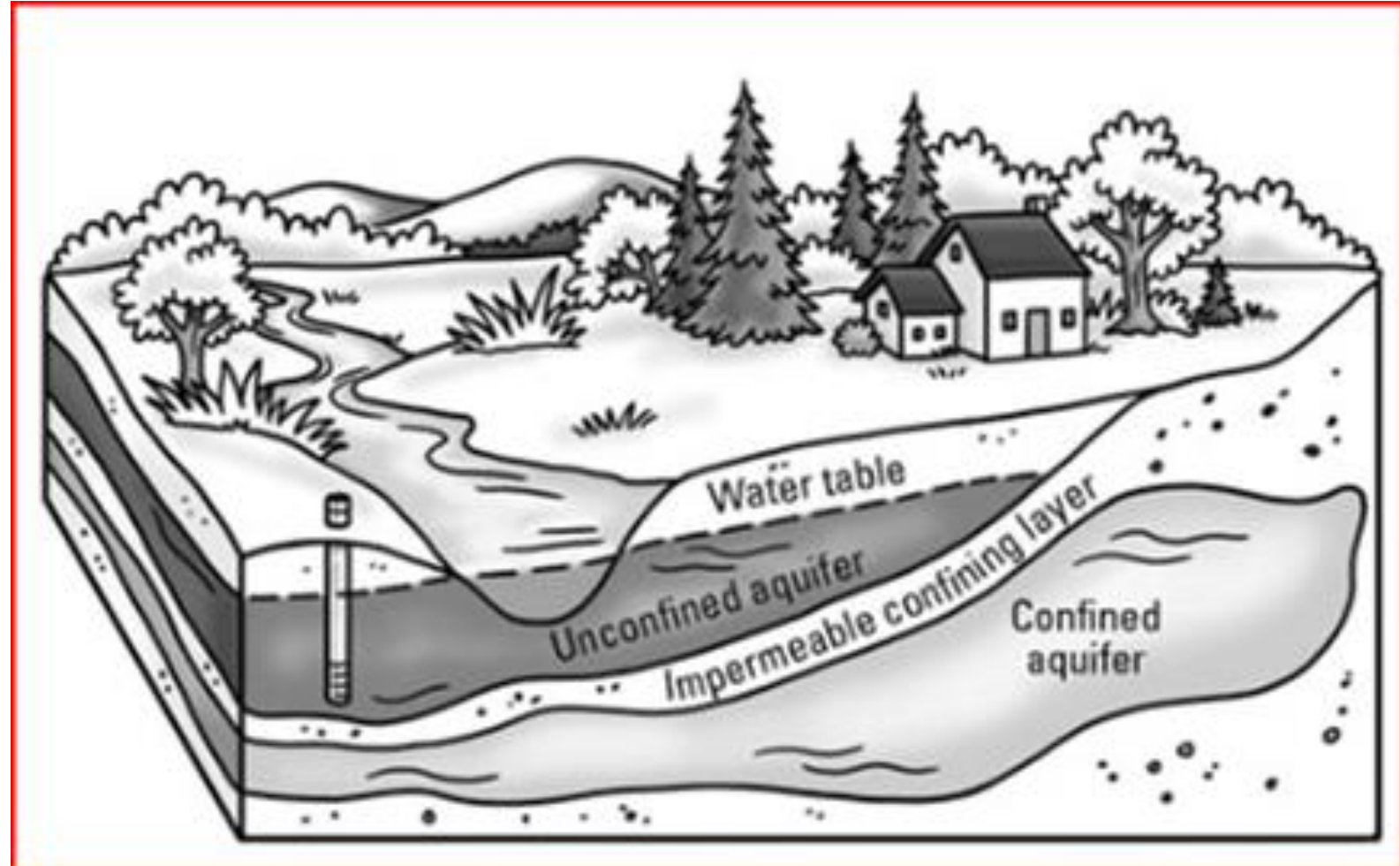
Groundwater and Aquifers

- Permeable rock and sediment can hold water which can be pumped for human use.
- Permeable rock includes: sedimentary, gravel, sand, silt, etc
- Igneous and Metamorphic rock do not allow water to permeate through (move through) the material.
- Ground water can be recharges (or replenished) naturally by rainfall, melted snow, nearby lakes, etc.

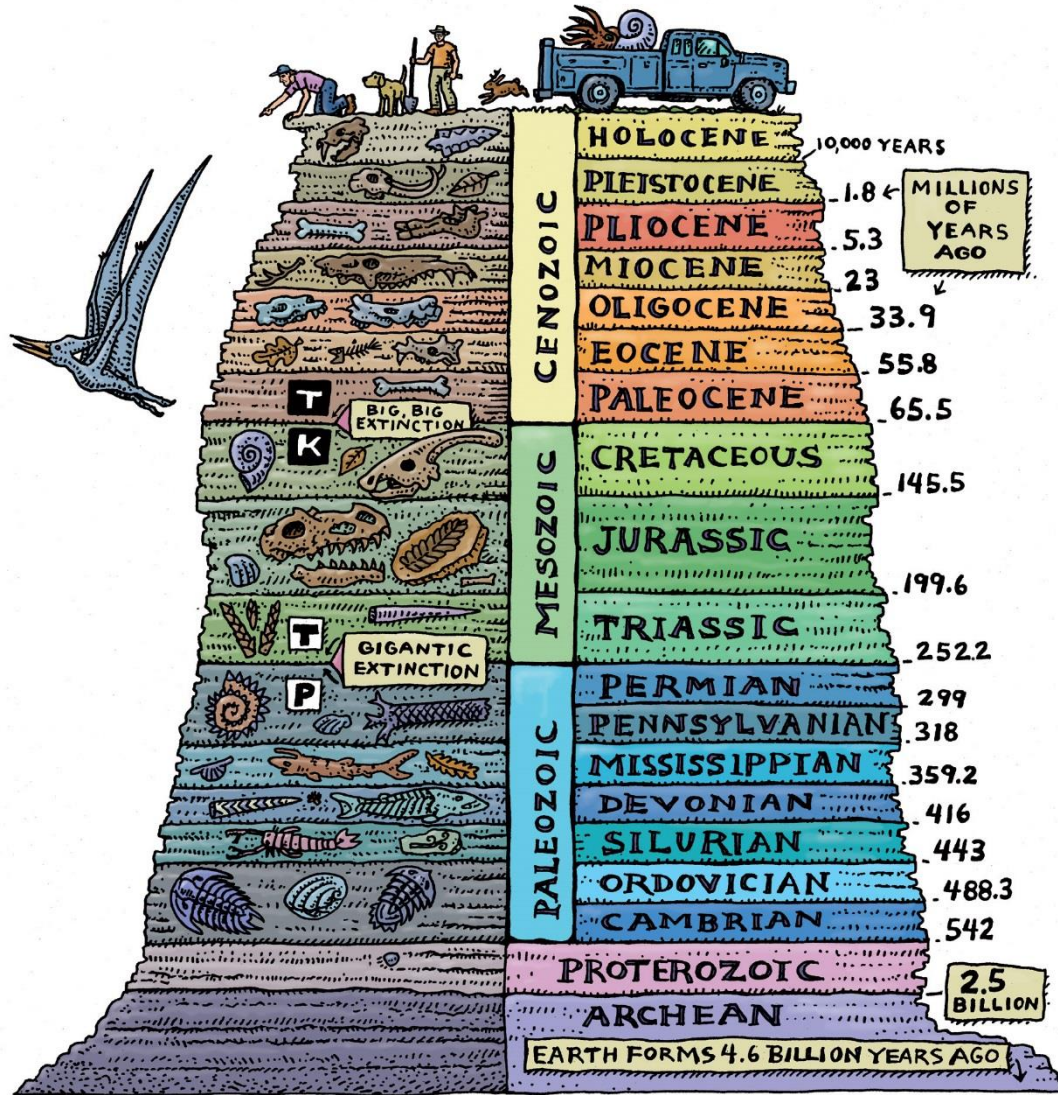
Groundwater/Aquifers

Questions:

1. What is a source of recharge shown in the diagram for the aquifer?
2. What type of rock could make up the “Impermeable confining layer”?



Geologic Time Scale of Earth's History



Divisions determined by mass extinctions

Question:

1. Between which eras was there a mass extinction?

Questions:

1. What is the longest division of geologic time?
2. What is the shortest division of geologic time?

GEOLOGIC TIME SCALE is.....

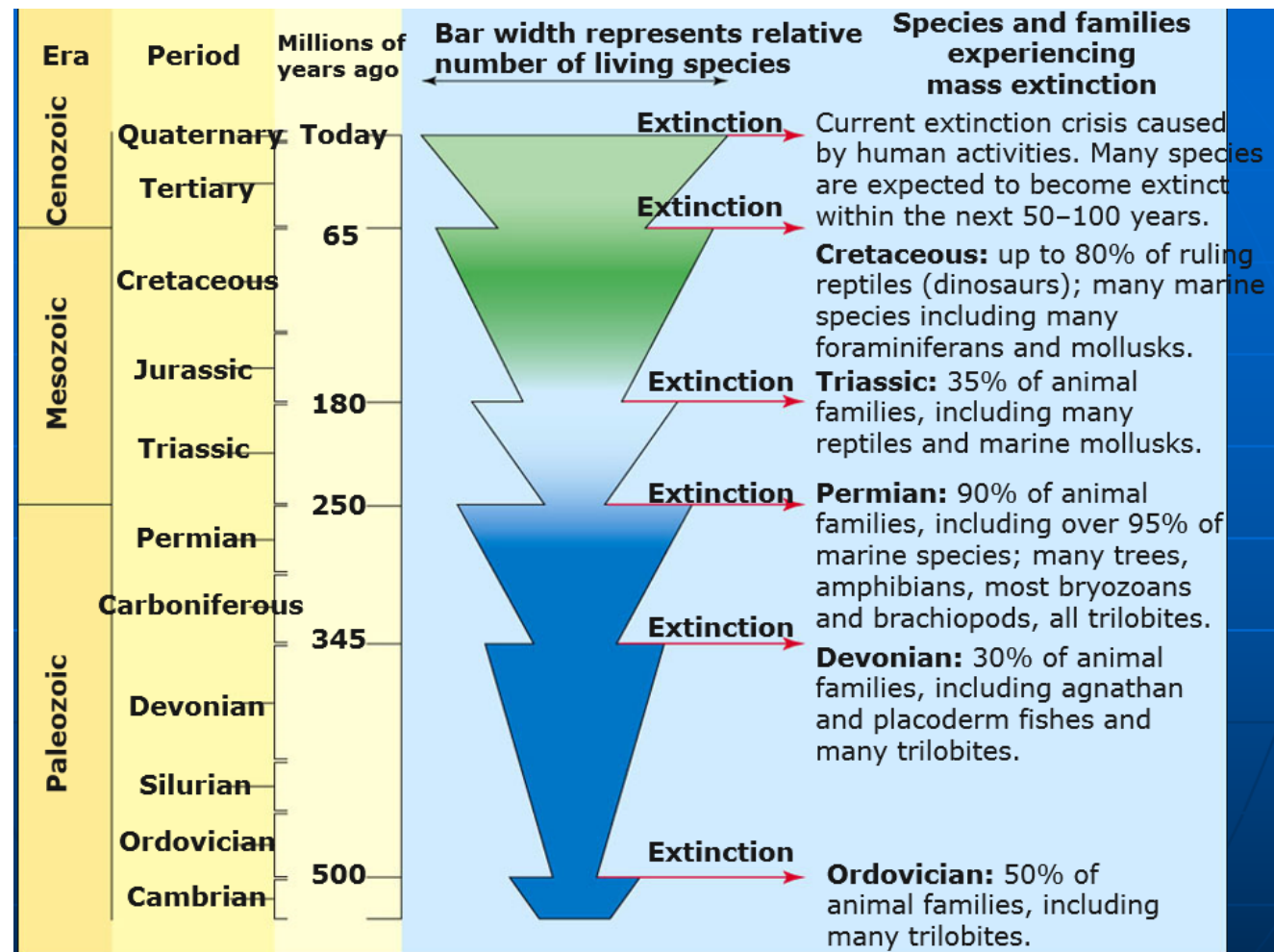
A SUMMARY OF THE MAJOR EVENTS IN EARTH'S HISTORY

EON – largest segment of geologic time

ERA

PERIOD

EPOCH – smallest segment of geologic time



1. Which mass extinction was the largest?
2. What is considered a mass extinction?

Earth is Constantly Changing

- These changes can happen rapidly (fast) or gradually (slow).
- It is easier to adapt to slow changes than fast changes.
- Organisms that cannot adapt to these changes die.
 - If too many individuals die it can lead to extinction of a species

Gradual Change

Ice Age to Warm Period



Mammoths

Rapid Change

Asteroid Impact



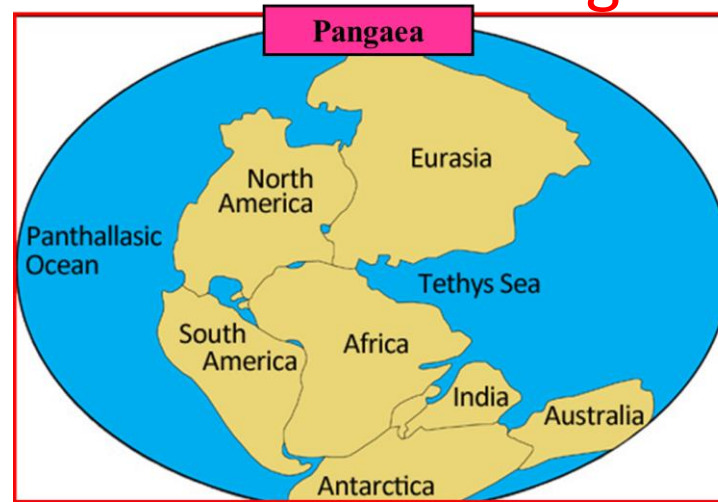
Dinosaurs

Gradual Change: Continental Drift

- As part of Pangaea, Antarctica was once further North.
- It was much warmer, and dinosaurs lived there.
- Tectonic plates broke apart and Antarctica moved south.
- This movement changed Antarctica's climate.
- Flora (plants) and fauna (animals) had to adapt or die.

1. What caused the drastic changes in Antarctica's environment?

2. Why would this be considered a gradual change?



Gradual Change: Continental Drift

- About 100 million yrs ago, the Pacific & North American plates collided.
- This formed a shallow ocean called the North American Inland Sea.
- This gradual change could have led to the adaption or extinct of species.

1. What type of fossil should we expect to find in the states covered by the inland sea millions of years ago?



Rapid Change: Volcanic Eruptions

- **Super-volcanoes or large numbers of smaller volcanoes can erupt throwing huge amounts of ash up into the atmosphere.**
- **This blocks sunlight which reduces global temperatures.**
 - **Due to less sunlight, plants begin to die.**

1. If only 1 volcano exploded it would not be a rapid extinction event. Explain why.



Permian-Triassic Event

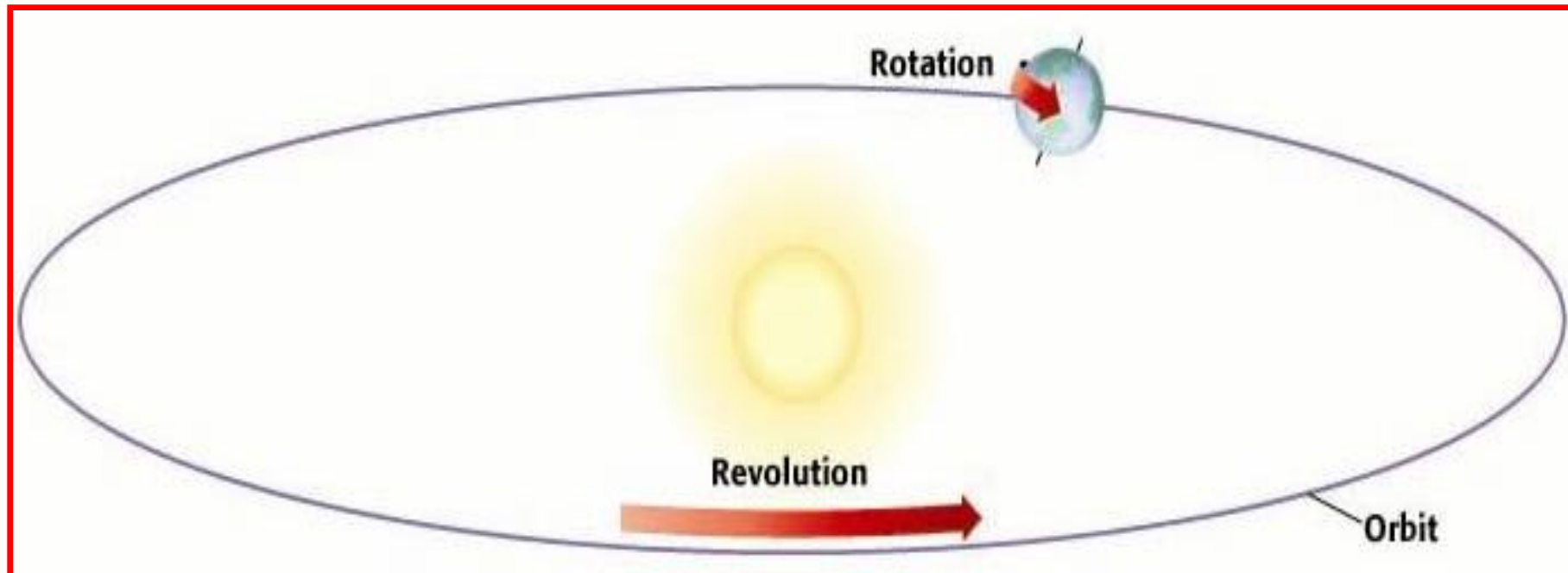
- A.K.A. “The Great Dying”
- About 250 million years ago, massive eruptions occurred in Russia (the Siberian Traps).
- Scientists are not sure if this was a gradual or rapid event.
- This caused the extinction of over 96% of all life on Earth.

1. Explain why large and numerous volcanic eruptions can cause multiple species to become extinct.



Gradual Change: Ice Ages and Warming Periods

- Another cause of environmental change is due to the way the Earth orbits (revolves) the sun.
- In reoccurring cycles, the Earth wanders in its orbital path.
 - When it wanders closer to the sun, the planet gets warmer.
 - When it wanders away from the sun, the planet gets colder.



These cold periods are called “Ice Ages.”
These warmer periods are called “Inter-glacials.”

Rapid Change: Asteroid Impact

- Impacts from large asteroids can propel huge amounts of rock-dust into the atmosphere which will block sunlight.
- Less sunlight reduces global temperatures.
 - Due to less sunlight, plants begin to die
 - Then plant eaters (herbivores) start to starve and die.
 - Next, animals that eat herbivores (carnivores) start to starve & die.
 - This is what caused the dinosaurs to go extinct.

