Name \_\_\_\_\_ Day, Time \_\_\_\_\_

Date \_\_\_\_\_

Late Pleistocene Extinction

* Approximately \_\_\_\_\_ years ago, many animals went extinct across North America (this happened towards the end of the Pleistocene epoch).
* Before this extinction occurred, many of the animals that existed in North America were \_\_\_\_\_ (in size and diversity) to animals in \_\_\_\_\_-day Africa.
* These animals were referred to as “\_\_\_\_\_” which means “large animals.”
* Although scientists don’t exactly know the cause of extinction, they have identified three mechanisms which may have caused the extinction:

(1) Human \_\_\_\_\_

(2) \_\_\_\_\_ causes related to climate change,

(3) \_\_\_\_\_ (highly infectious disease)

We are in an Ice Age right now! Glaciers are \_\_\_\_\_ today.

* When the \_\_\_\_\_ ice caps cover a smaller area, such as present day, it is referred to as an \_\_\_\_\_ period.
* When the polar ice caps cover a larger area, it is referred to as a \_\_\_\_\_ period.

An ice age consists of two parts that make up one Milankovitch cycle:

(a) Glacial period (\_\_\_\_\_ with at least one polar ice cap),

(b) Interglacial period (\_\_\_\_\_)

90% of the Earth’s history, no polar ice caps were present. There have been \_\_\_ major ice ages:

* 2 billion years ago
* 840 million years ago (lasted for 240 million years!)
* 2 ice ages (during the Paleozoic era)
* Present ice age (began approximately \_\_\_ million years ago)

It is unclear what causes Ice Ages to occur, but current theories point to the changing position of the continents which causes:

* 1. \_\_\_\_\_ building events
  2. Different global \_\_\_\_\_ patterns
  3. Different global \_\_\_\_\_ current patterns
  4. Amount of \_\_\_\_\_ spreading (effects sea level)

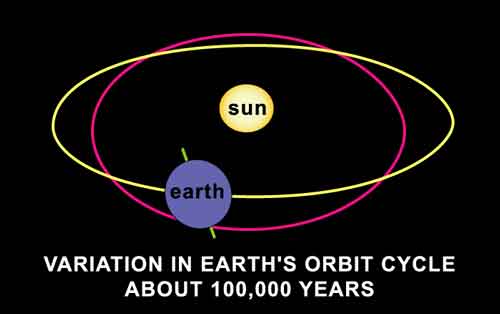
The Ice Age Theory as described by Serbian scientist, Milutin Milankovitch, points to three variations in the earth-sun geometry:

E\_\_\_\_\_ – stretching of earth’s orbit (100,000 year cycle)

O\_\_\_\_\_ – change of the earth’s axial tilt (41,000 year cycle)

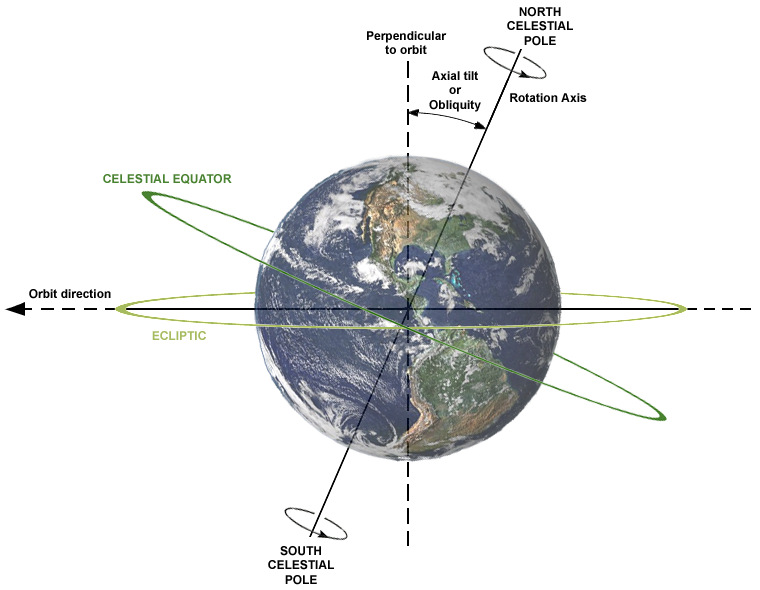
P\_\_\_\_\_ – “wobble” of the earth’s axis of rotation (~26,000 year cycle)

Eccentricity



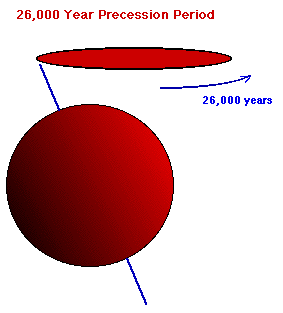
* The shape of Earth’s orbit is like a “stretched out” circle or an oval or “\_\_\_\_\_”
* Scientists use a \_\_\_\_\_ to describe this, and call it the eccentricity of the ellipse.

Obliquity



* Also known as axial \_\_\_\_\_ which is the angle between an object's rotational axis and its orbital axis
* Axial tilt affects the distribution of \_\_\_\_\_ radiation on Earth’s surface
* When tilt is decreased, polar regions receive \_\_\_\_\_ sunlight. When tilt is increased, polar regions receive \_\_\_\_\_ sunlight.
* The earth’s axial tilt varies from \_\_\_\_\_° to \_\_\_\_\_\_° at periods close to 41,000 years

Precession

* The Earth's \_\_\_\_\_ axis is not fixed in space.
* Like a rotating toy top, the direction of the rotation axis executes a slow precession with a period of \_\_\_\_\_ years.
* Is a change in the \_\_\_\_\_ of the rotational axis of a rotating body.
* Precession affects how severe or moderate the \_\_\_\_\_ are depending on which portion of the “\_\_\_\_\_” the earth is on.
* For example, you could have a cool summer which allows \_\_\_\_\_ in higher latitudes to last throughout the summer.

Paleoclimatology

* The study of ancient \_\_\_\_\_.
* Using \_\_\_\_\_ core samples, \_\_\_\_\_ core samples, \_\_\_\_\_ ring and \_\_\_\_\_ samples, scientists can piece together some of the history of the earth’s climate.

Label the type of sample over the top of each picture.

? ? ?



Graphs

* Note the many years of \_\_\_\_\_ climate than today.
* \_\_\_\_\_ periods are warmer and last 10-15,000 years
* \_\_\_\_\_ periods are when ice \_\_\_\_\_ expand & last 50-100,000 years

**Glaciers and Glaciation**

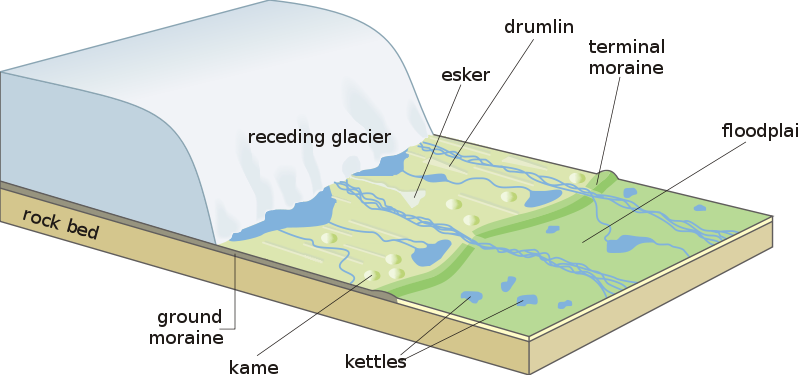
Types of Glaciers

A\_\_\_\_\_ – Formed in mountainous areas; relatively small in size.

C\_\_\_\_\_ – large expansive ice sheets (these cover Antarctica and Greenland today); these are the glaciers we will be studying.

What forms a glacier?

* Ice is formed from \_\_\_\_\_ snow
* Individual flakes of snow turn to \_\_\_\_\_ chunks of icy material
* As more snow falls, the pressure \_\_\_\_\_ the layers of the icy snow
* When the glacier gets big enough, ice at the base \_\_\_\_\_ and the glacier \_\_\_\_\_



Using Maps to Identify Glacial Features

* T\_\_\_\_\_ Maps show lines called \_\_\_\_\_. These lines connect equal areas of elevation.
* Areas that have contour lines \_\_\_\_\_\_\_\_\_ together indicate that there is a greater change in \_\_\_\_\_ in a short distance (either up or down).
* Notice the contour lines that make \_\_\_\_\_ circles … they are closer together

Formation of the Great Lakes

* During the last glacial period, lobes of \_\_\_\_\_ carved their way into softer sediment over this region of North America.
* When the climate warmed, the glacier \_\_\_\_\_, and melted into the \_\_\_\_\_ left by the ice lobes, creating the great lakes.

I\_\_\_\_\_ Rebound

* Due to the \_\_\_\_\_ weight of the ice sheet, the \_\_\_\_\_ of the earth was pushed deeper into the asthenosphere in the locations where the ice was.
* As the glacial sheet \_\_\_\_\_ back, the lithosphere began to slowly “\_\_\_\_\_” back up – and still is adjusting back up.
* For this reason, the great lakes drain to the \_\_\_\_\_ and east, out the St. Lawrence River to the \_\_\_\_\_ Ocean.

Graph 1 What does the zero line on the graphs represent? Why would this number be used?



Describe in words the average global temperature for the past 2,400 years compared to the zero line.



Graph 2 … Describe the significance of graph #2.



Graph 3 From approximately 100,000 years ago to 15,000 years ago the earth’s temperature was below the “normal” temperature. What is this period?



Graph 4 What is the pattern in graph #4? According to the pattern, how should the earth’s temperature change in the next 1,000 – 3,000 years?



What is a significant difference between glacial periods and interglacial periods?



Graph 5 Describe the significance of graph #5. How has the earth’s climate changed over the past 3 million years?