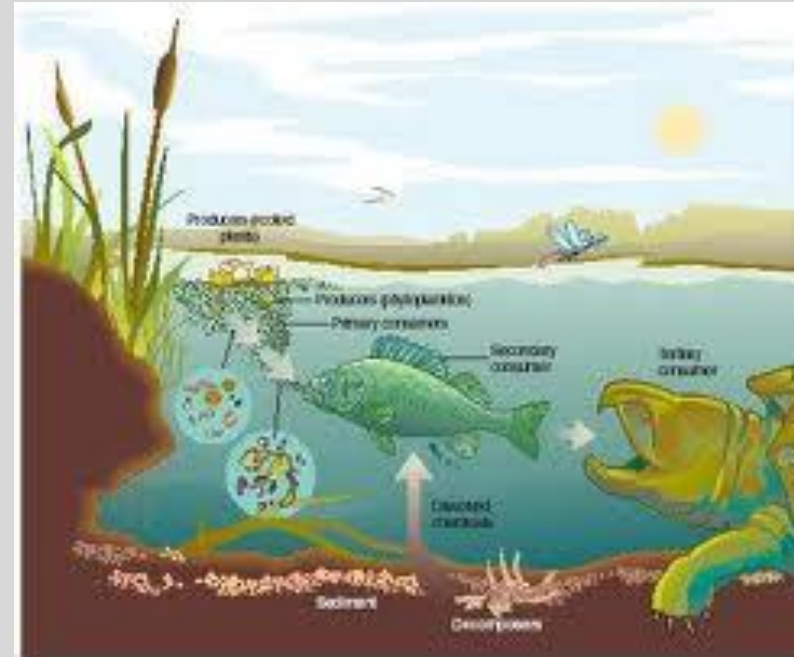# INTRODUCTION TO ECOLOGY

Pre-Assessment

- Quizzizz   https://quizizz.com/admin/quiz/6102cbd788676c001c75e191/ecology-intro-disruptions

Day 1

- **Bell Ringer**

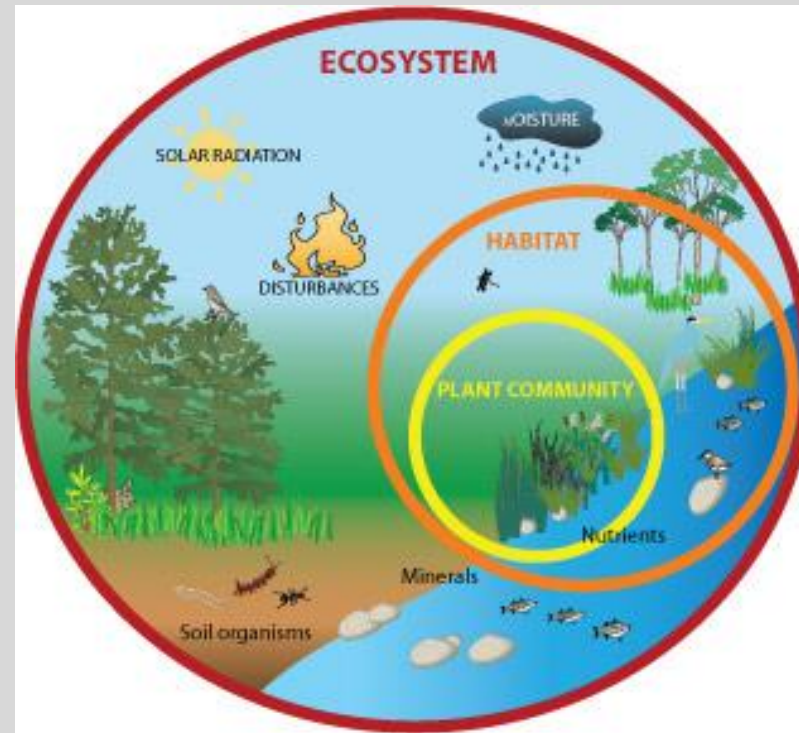- **What is an ecosystem**

- **What is an Abiotic factor**

Ecosystem

◦Ecosystem – a collection of all organisms that live in a particular place together with their nonliving environment.

Abiotic Factors

◦Physical, non-living factors that influence an ecosystem

◦Examples-temperature, precipitation, humidity, wind, nutrients, sunlight
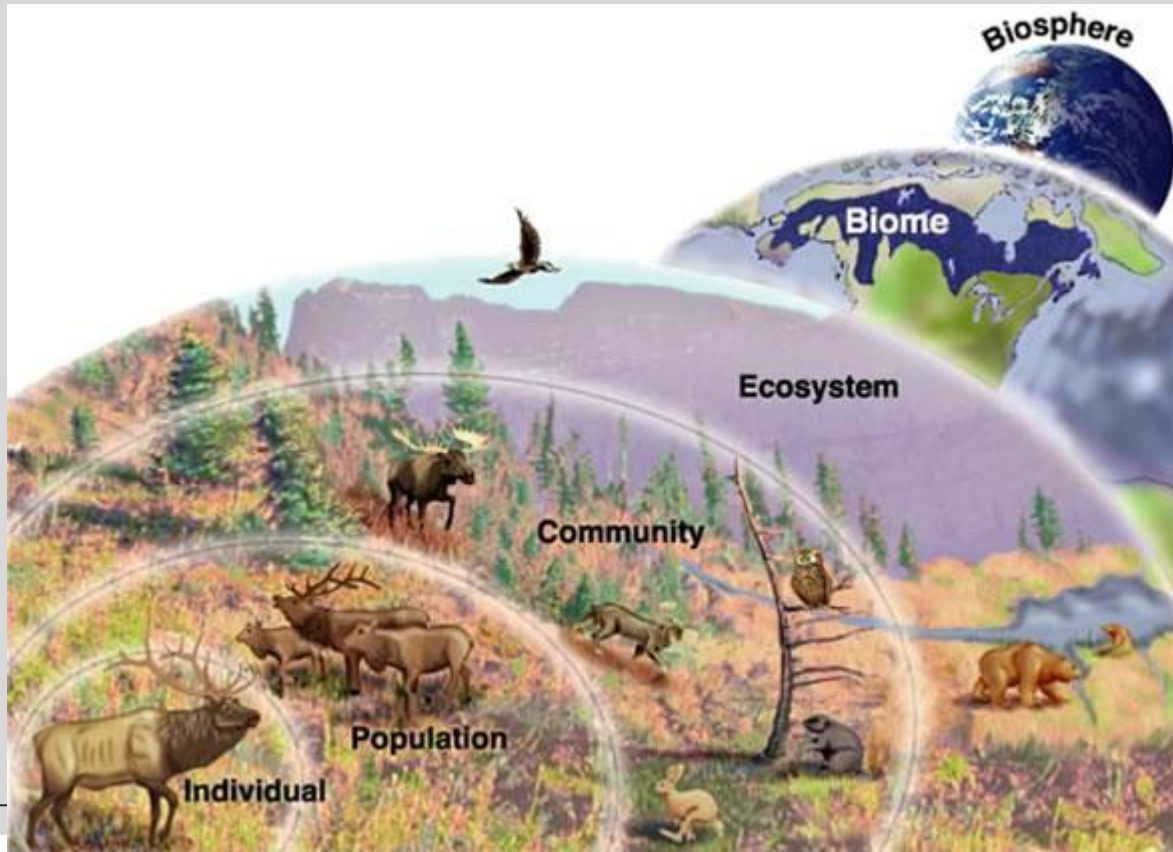
Biotic Factors

◦Living Factors that
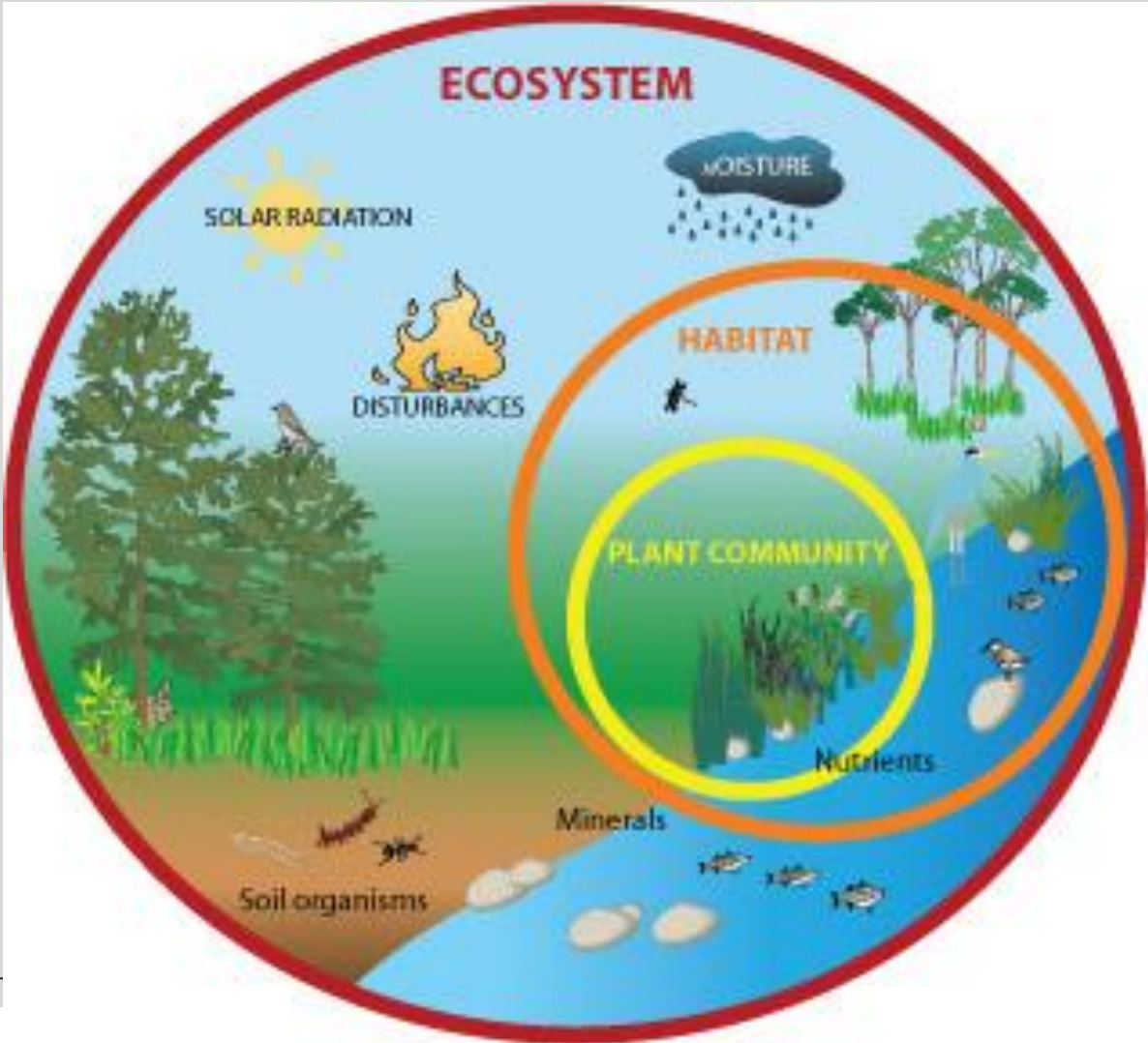 influence an ecosystem

◦Plant life

◦Animal life

Define Ecology

◦ **The scientific study of interactions among organisms and between organisms and the environment**

◦ **Can be studied at different levels**

What shapes an Ecosystem?

How many ways does the earth move? _____

Factors that affect the amount of solar energy at the surface of the earth (directly correlated with plant productivity)

1. rotation (1/24)

2. revolution (1/yr)

3. tilt of axis

(23.5 degrees)

4. atmospheric

conditions

© 2007 Thomson Higher Education
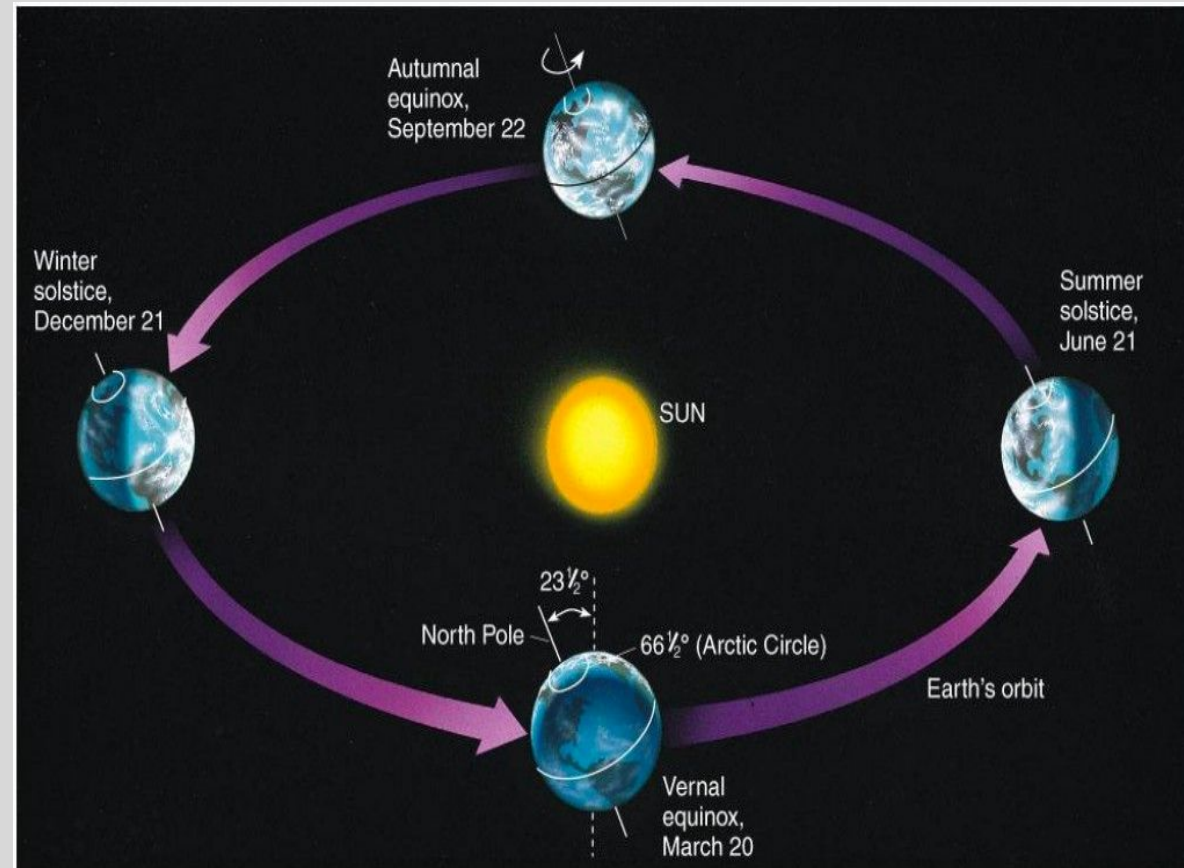
What determines climate patterns?

1. **global air circulation**

2. **ocean currents**

3. **Angle of sun's rays (tilt)**
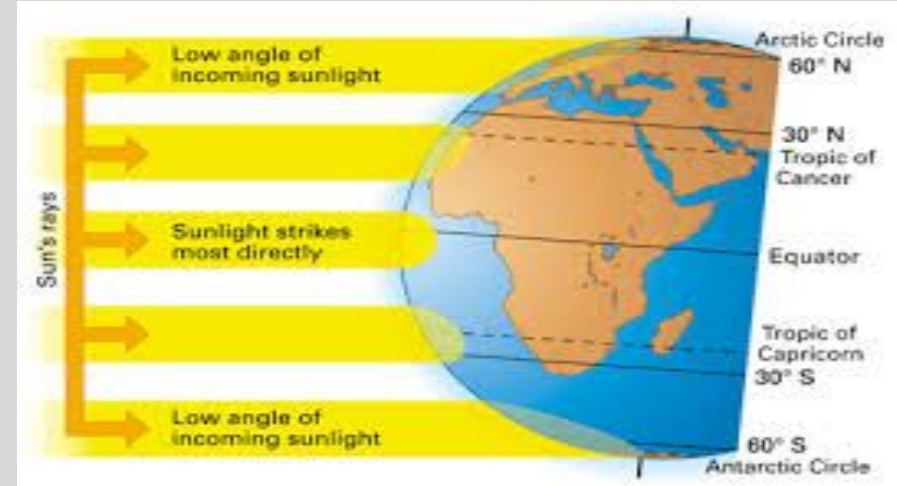
*heat and precipitation distributed unevenly

Convection Cells and Biomes

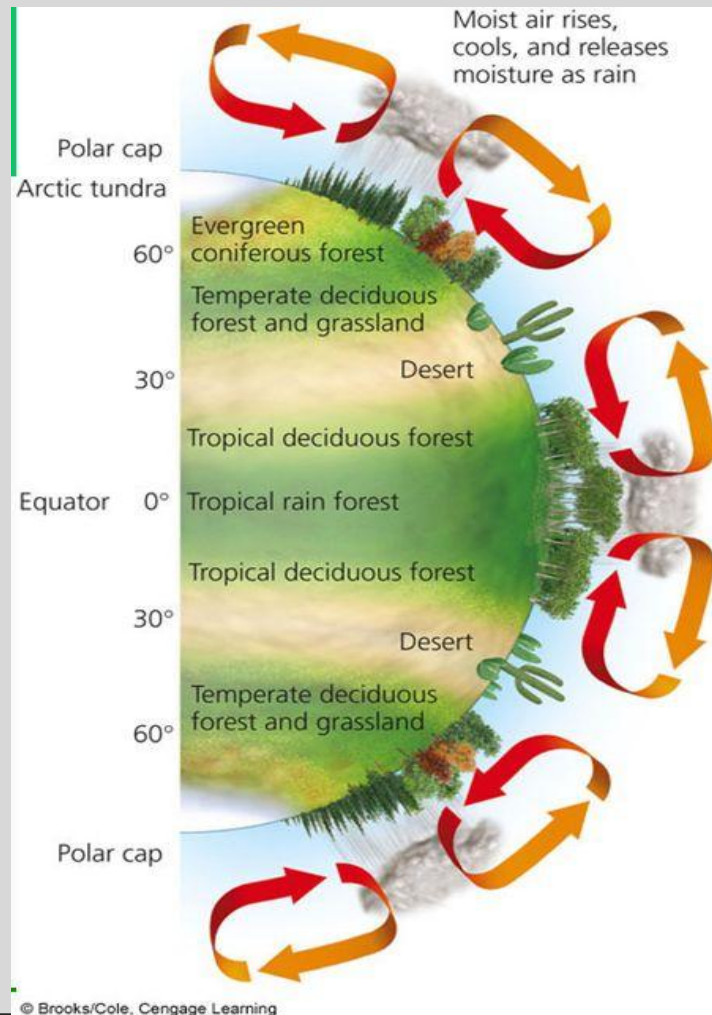This difference in solar radiation because of the angle of the sun creates specific climate for a region and therefore creates the different types of ecosystems that we see around the world

Moist air rises, cools, and releases moisture as rain

Polar cap
Arctic tundra
Evergreen coniferous forest — 60°
Temperate deciduous forest and grassland
Desert — 30°
Tropical deciduous forest
Equator 0° Tropical rain forest
Tropical deciduous forest
Desert — 30°
Temperate deciduous forest and grassland — 60°
Polar cap

© Brooks/Cole, Cengage Learning

Weather vs Climate- weather is a short term day to day phenomena and climate is what we can predict long term based on weather patterns over the years.

Rainshadow Effect

4. Precipitation falls on the windward side of the mountain.

3. Water vapor cools and condenses to form clouds

5. air mass is now dry with no water vapor.

Region of rain shadow

2. Warm, moist air rises up the mountain

Dry air

1. Water evaporates

6. a desert forms
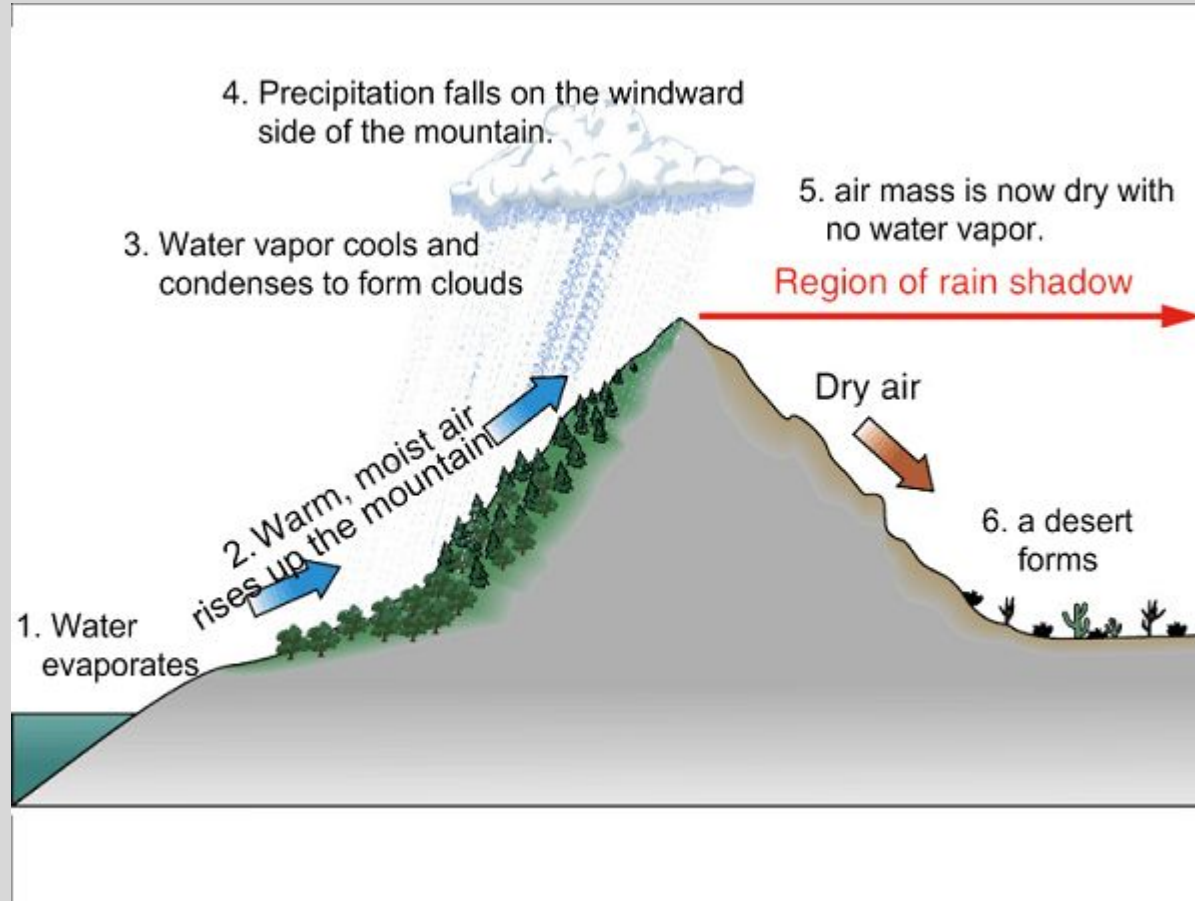
Gyre: Large-scale water circulation that moves clockwise in the Northern Hemisphere and counter-clockwise in the Southern
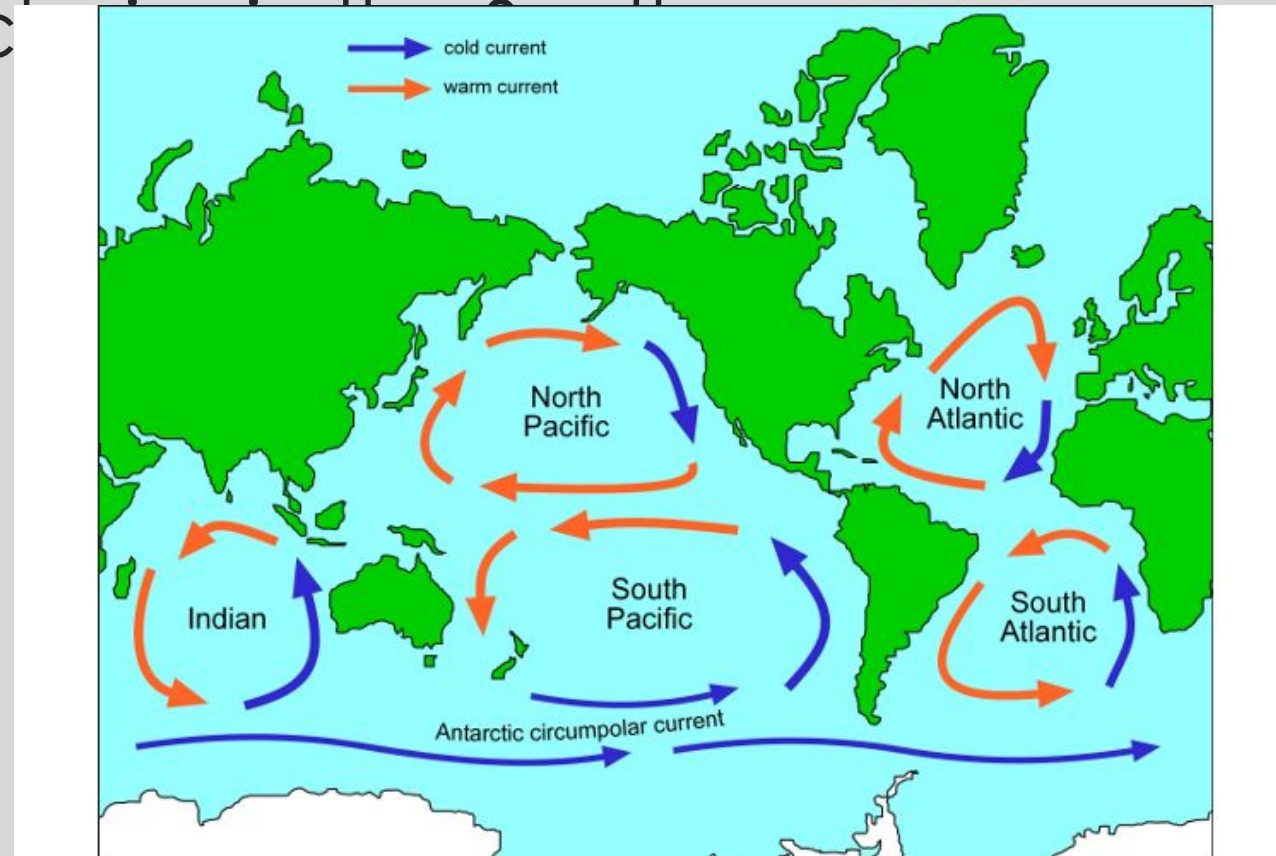
There are 8 major <u>land</u> biomes and 2 major <u>water</u> ecosystems?

LAND (8): RAINFORESTS, DESERTS, GRASSLANDS, DECIDOUS FORESTS, BOREAL FORESTS, SHRUBLAND, TAIGA & TUNDRA

WATER (2): FRESHWATER & MARINE ECOSYSTEMS

RAIN FORESTS

◦ **There are 2 main types of rain forests: <u>Temperate</u> Rain Forests and <u>Tropical</u> Rain Forests.**

DESERTS

○ **Desert = An area that receives less than 25 cm of rain per year.**

○ **Some deserts receive NO precipitation at all during one year.**

○ **Deserts often undergo large shifts in temperature during the course of a day.**

GRASSLANDS-Savanna & Chaparral

◦ Grassland (prairie)= An area that is populated mostly by grasses and other non-woody plants.

◦ Receive 25 to 75 cm of rain per year.

◦ Fires and droughts are common.

DECIDUOUS FOREST

◦ Deciduous trees= Trees that shed their leaves and grow new ones each year (Oaks, Maples...)

◦ Receive enough rain to support the growth of trees and other plants (at least 50 cm per year).

◦ Growing season is 5 to 6 months long.

BOREAL FOREST (*taiga*)

◦**Mostly contains coniferous trees (trees that produce their seeds in cones and have leaves shaped like needles). Ex. Fir, Spruce, Hemlock…**

◦**Very cold winters (a lot of snow).**

◦**Warm and rainy summers.**

TUNDRA

◦ **Tundra = Extremely cold and dry biome.**

◦ **Usually receives NO more precipitation than a desert biome.**

◦ **Most soil is frozen all year long (permafrost)**

◦ **During summer, the top layer of soil thaws, but the rest remains frozen.**

PERMAFROST

Day 2

- **Bell Ringer**

- **What are some factors that influence the type of ecosystem that you would find in a location like North Dakota?**

Day 2 Human Influences

◦ **Biodiversity -**The total of all the different species living in a given area.

◦ The greater the biodiversity the greater the stability of an ecosystem

Why is Biodiversity important to me?

◦ Most of our pharmaceuticals or medicines come from plants, animals, and fungi that are found in the rainforest.
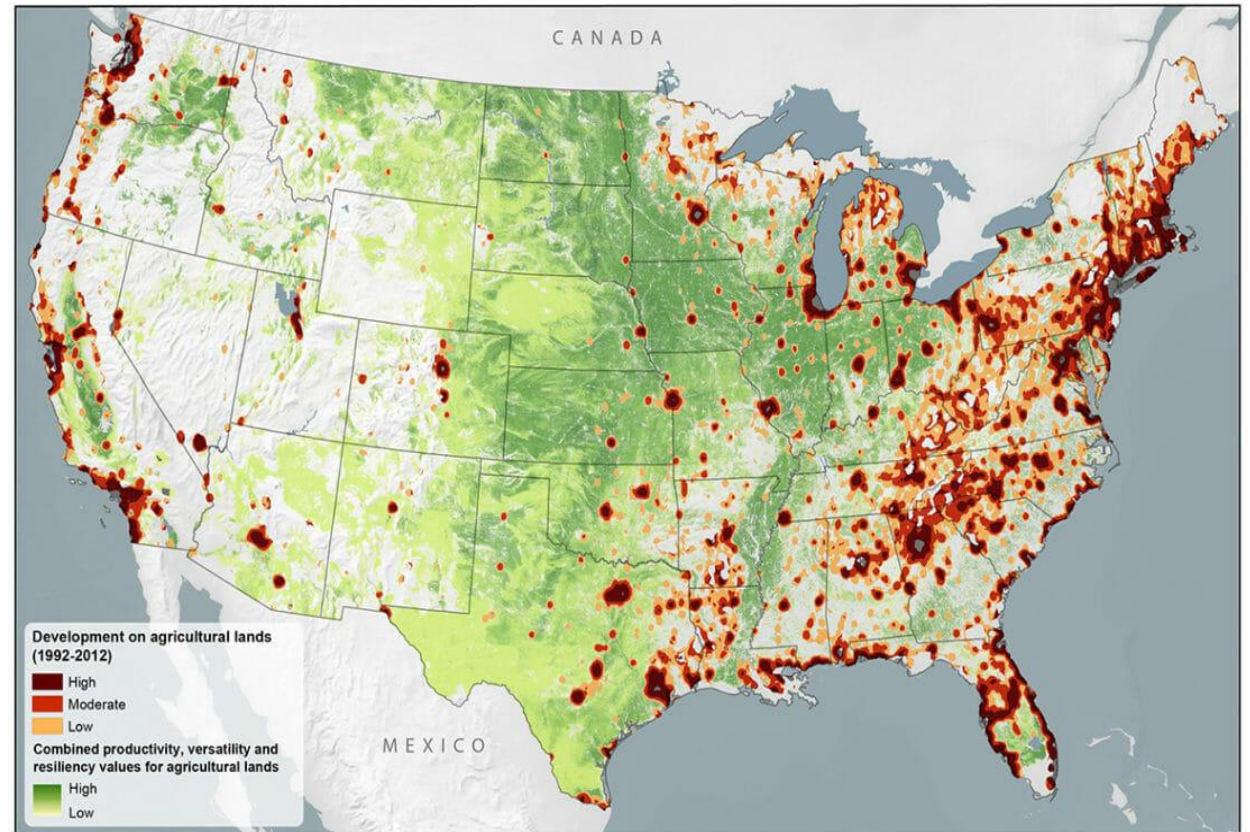
Threats to Biodiversity

- Habitat destruction
- Deforestation
- Global Climate Change
- Species Exploitation
- Species Extinction
- Mudslides/slope fails

Loss of habitat to human development

175 acres per hour of agricultural land lost to development – 3 acres per minute.

The U.S. lost **11 million acres** of America's best agricultural land – land with superior soil conditions and weather for growing food – from 1992 to 2012.

Development on agricultural lands (1992-2012)
- High
- Moderate
- Low

Combined productivity, versatility and resiliency values for agricultural lands
- High
- Low

Amazon Deforestation

Extinction vs. Endangered Species

○Extinction is when a species is completely wiped out of its habitat

○Endangered species is when a species' population is declining rapidly and they are close to extinction

Landslides and slope failures

◦ **Landslides are caused by disturbances in the natural stability of a slope. They can accompany heavy rains or follow droughts, earthquakes, or volcanic eruptions. Mudslides develop when water rapidly accumulates in the ground and results in a surge of water-saturated rock, earth, and debris**

◦ **Areas where wildfires or human modification of the land have destroyed vegetation on slopes are particularly vulnerable to landslides during and after heavy rains. Can result in billions of damages**

Examples

Day 3   Bell Ringer

Human activities have had a major impact on biodiversity. Scientists cannot solve this problem alone. Concerned individuals need to be involved in restoring and maintaining biodiversity.

Explain how a loss of biodiversity today can affect the survival of humans in the future.

State *one* specific action that you as a student can take in your community to help maintain or increase biodiversity.

Google Earth-introduction

Day 4 Google Earth Research continued

◦ Capture 5 images from around the world showing dramatic changes in the ecosystem (deforestation, urban sprawl, slope failure etc.) over time.

Day 5

○ **Bell Ringer- what percent of usable farmland in the U.S. has been lost over the last 10 years?**

○ **31 million acres of farmland lost to development, in total, between 1992 and 2012.**

○ **That's 175 acres per hour of agricultural land lost to development – 3 acres per minute.**

Introduction to using the NOAA website

Day 6 & 7   Building a poster for Ecosystem Destruction

◦ **Poster Rubric**

Making A Poster : (or Infographic): Human Impact on the Environment

Student Name: _____

CATEGORY	4	3	2	1
Graphics - Relevance	Product includes at least three graphics. All graphics are related to the topic and make it easier to understand. All borrowed graphics have a source citation.	Product includes at least two graphics. All graphics are related to the topic and most make it easier to understand. All borrowed graphics have a source citation.	Product includes at least one graphic. All graphics relate to the topic. Most borrowed graphics have a source citation.	Graphics do not relate to the topic OR several borrowed graphics do not have a source citation.
Content - Accuracy	At least 7 accurate facts are displayed on the poster.	5-6 accurate facts are displayed on the poster. At least one fact about habitat loss is included.	3-4 accurate facts are displayed on the poster.	Less than 3 accurate facts are displayed on the poster.
Required Elements	The poster includes all required elements as well as additional information. At least one fact about habitat loss, at least one fact about habitat degradation or pollution, and at least one fact about subsidence are all included.	All required elements are included on the poster. At least one fact about habitat degradation or pollution is included. At least one fact about subsidence is included.	All but 1 of the required elements are included on the poster. One of the three main topics of habitat loss, pollution, and subsidence is missing.	Several required elements were missing. Two of the three main topics of habitat loss, pollution, and subsidence are missing
Use of Class Time	Used time well during each class period. Focused on getting the project done. Never distracted others.	Used time well during each class period. Usually focused on getting the project done and never distracted others.	Used some of the time well during each class period. There was some focus on getting the project done but occasionally distracted others.	Did not use class time to focus on the project OR often distracted others.

Post-Assessment

- ◦ Quizzizz   https://quizizz.com/admin/quiz/6102cbd788676c001c75e191/ecology-intro-disruptions