

# What Makes Nature Complex?

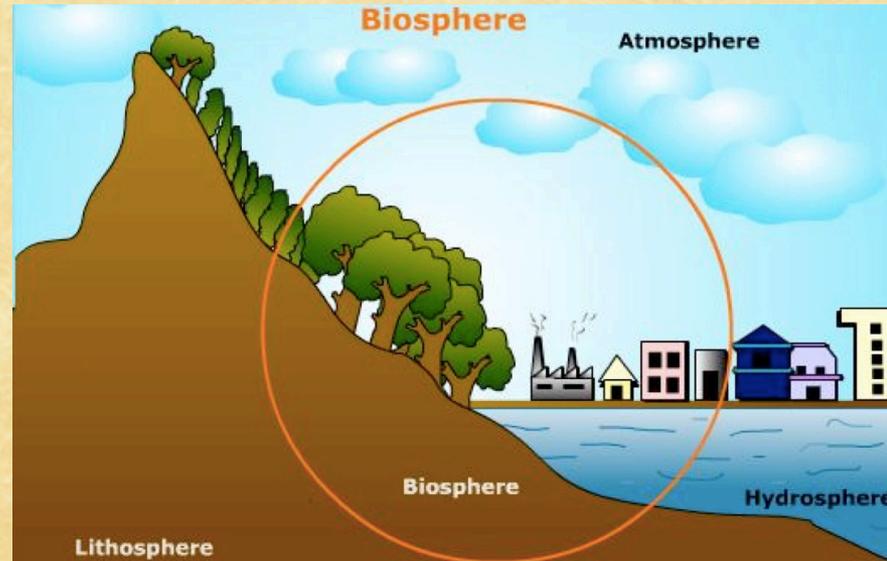
Chapter 1 Lesson 2

ByDesign Science, Level 6

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# Ecological Organization

- ♦ **Biosphere**: part of the Earth where organisms live.
  - ♦ Includes land, water, and the atmosphere.
  - ♦ Goes from the Earth's surface to several miles up in the atmosphere and down into the ocean and the rocks that make up the Earth's crust.

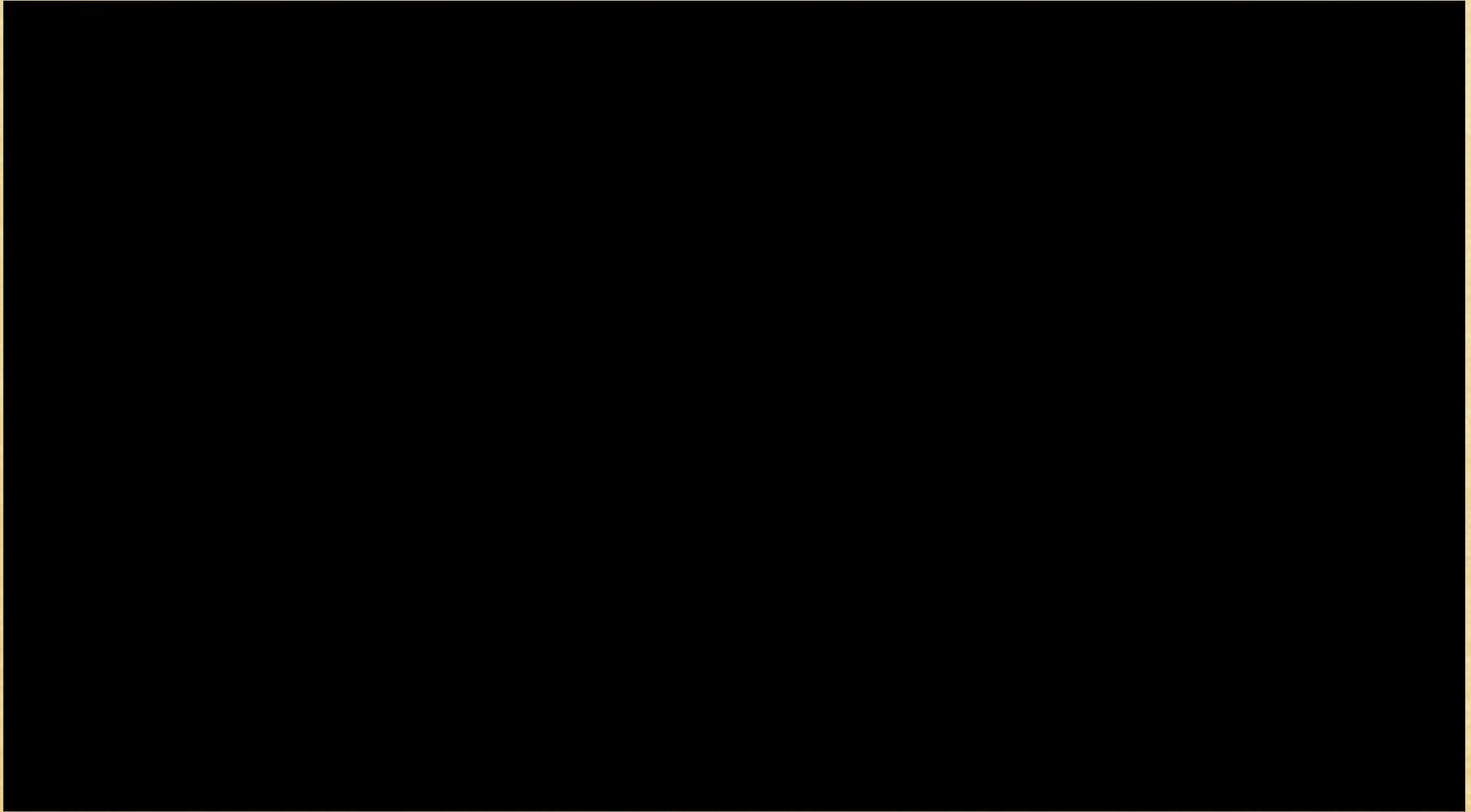


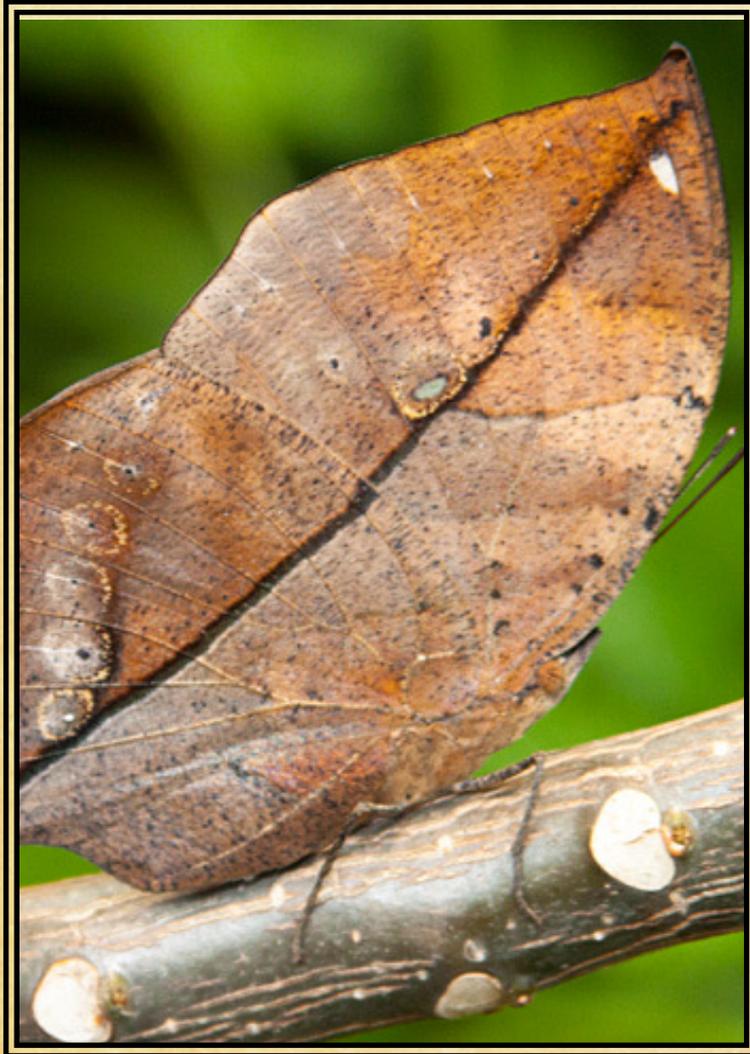
# Ecology

- ◆ **Ecology**: the scientific study of relationships between organisms and their environment.
- ◆ **Ecologists**: scientist who study ecology.
- ◆ Ecologists study organization with biosphere.
  - ◆ Biomes, ecosystems, communities, and populations
- ◆ Ecology is just one of the sciences used to study the biosphere.



# Ecology



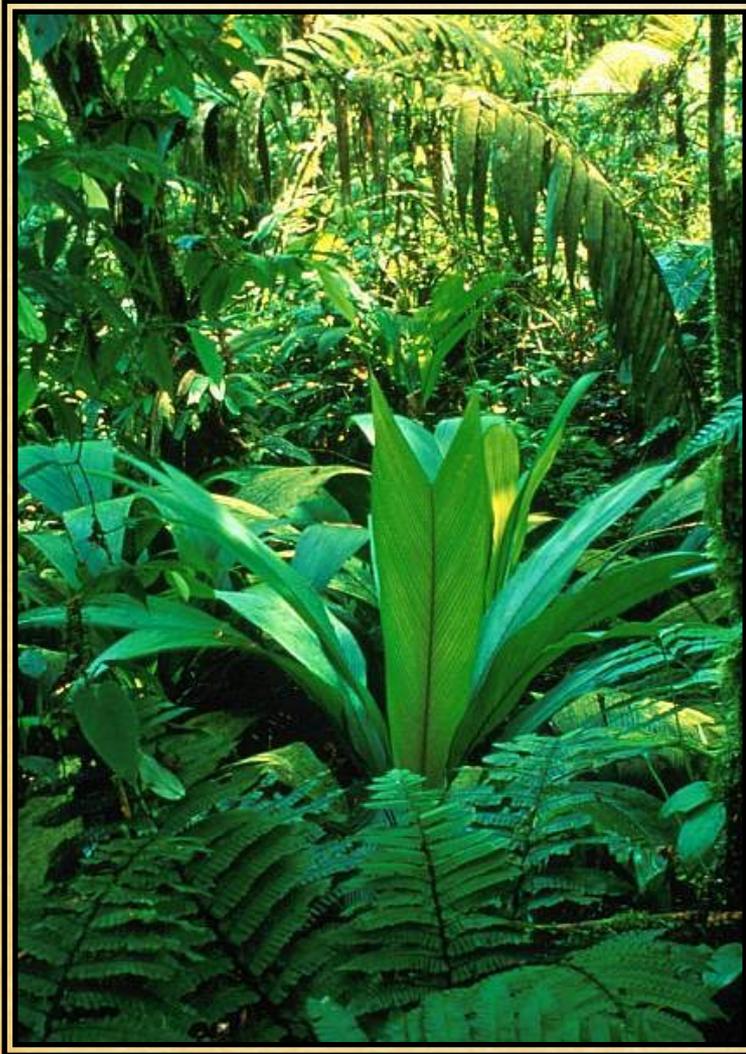


# Indian Leaf Butterfly

If you were an ecologist, what might you want to learn about this animal?

- What types of animal's prey on this butterfly.
- How it camouflages itself?
- What it eats?





# Biomes and Ecosystems

The rain forest is a biome.

What are the five major biomes?

1. Aquatic (water)
2. Desert
3. Forest
4. Grassland
5. Tundra

# Biomes Subdivided into Subcategories

## *Type of Forests*



*Tropical Forest*



*Temperate Forest*



*Coniferous Forest*

## *Examples*



*Rainforest - Amazon*

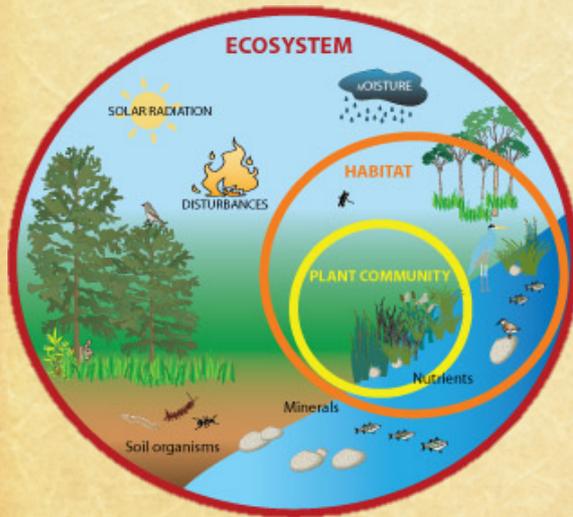


*Bamboo Forest - Hawaii*



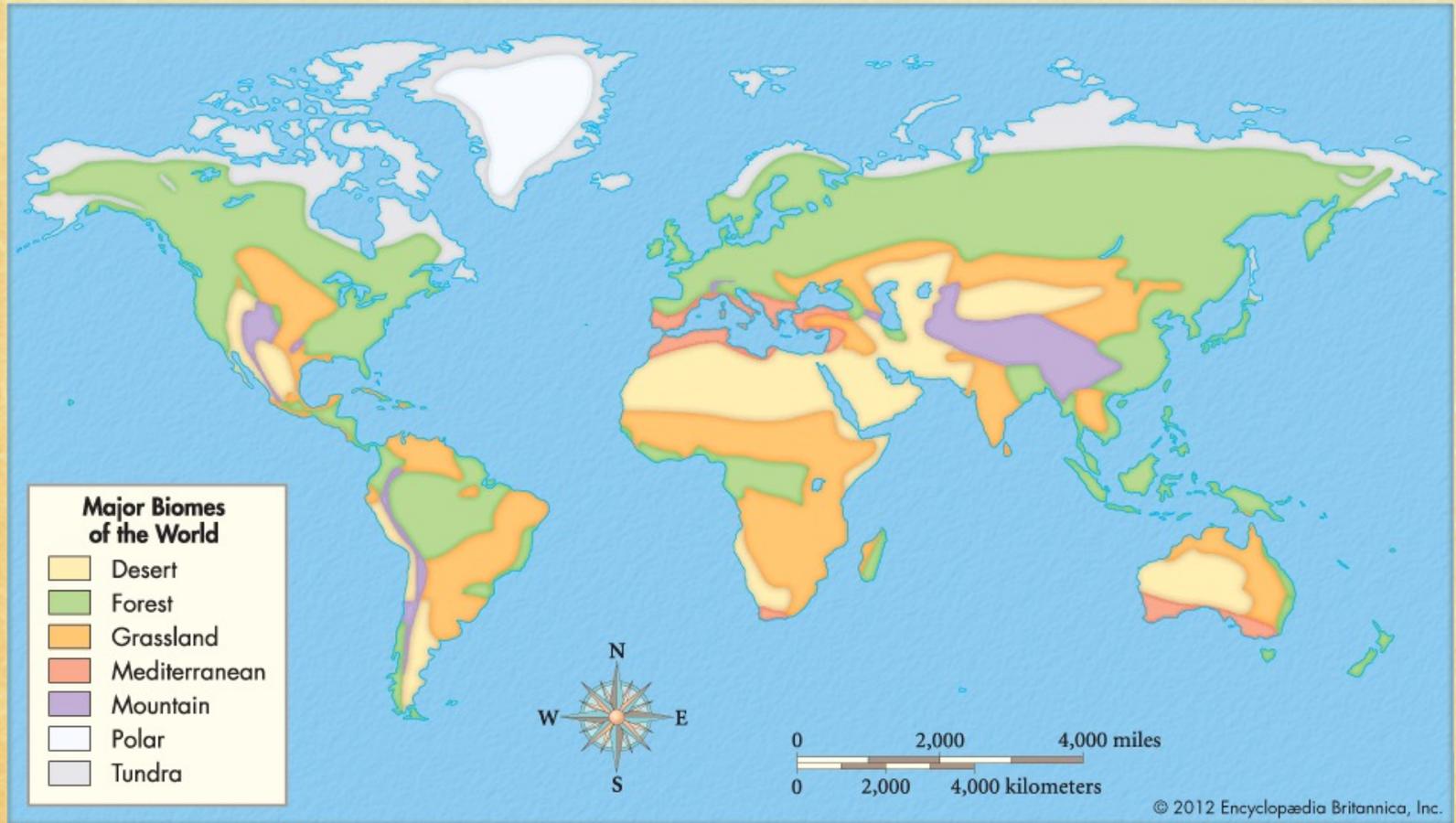
*Taiga Forest - Canada*

# Biomes and Ecosystems



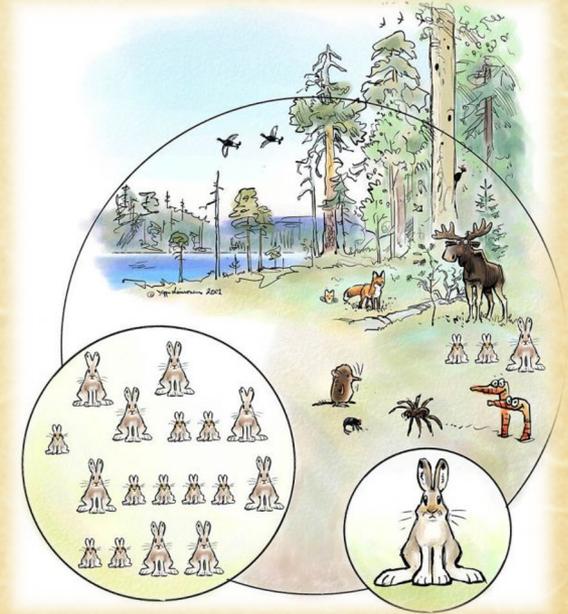
- ◆ Think of a biome as a group of similar ecosystems from across the world.
- ◆ Ecosystems are smaller than biomes.
- ◆ **Ecosystems**: made up of living community and nonliving things that interact in the same area.

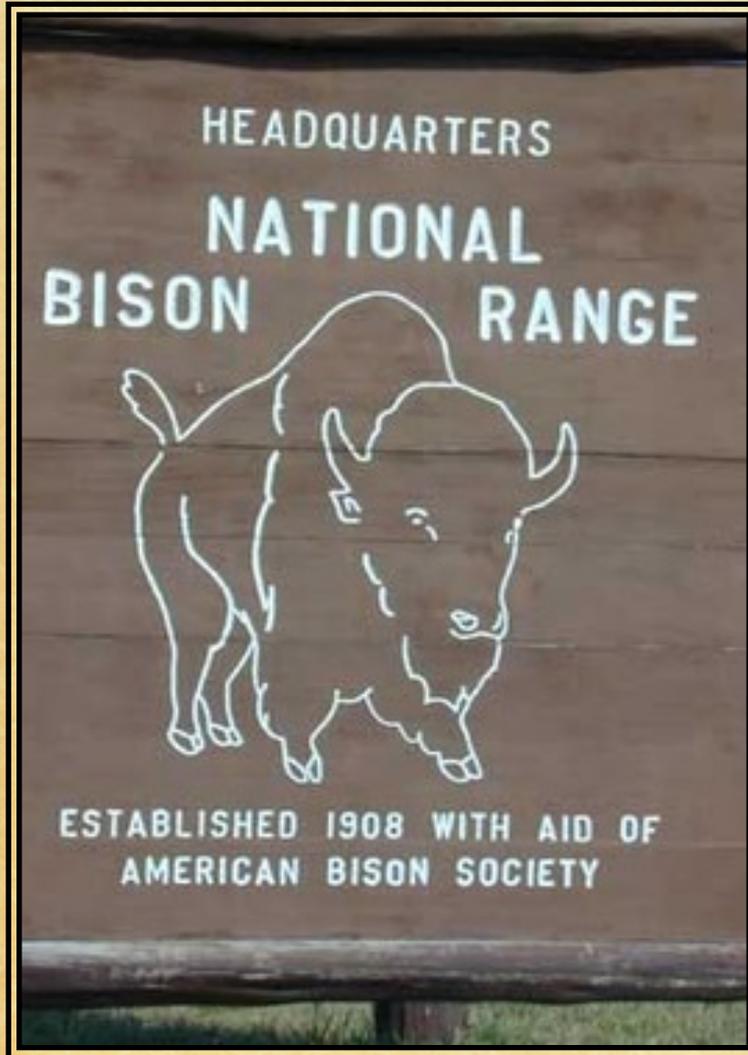
# Biomes and Ecosystems



# Communities and Populations

- ◆ Ecologist might want to study an area that is smaller than a biome or an ecosystem.
- ◆ They may focus on a community.
- ◆ **Community**: different groups of organisms living and interacting with each other in the same area at the same time.
- ◆ **Populations**: groups of individuals of the same species in each area.





# National Bison Range in Montana

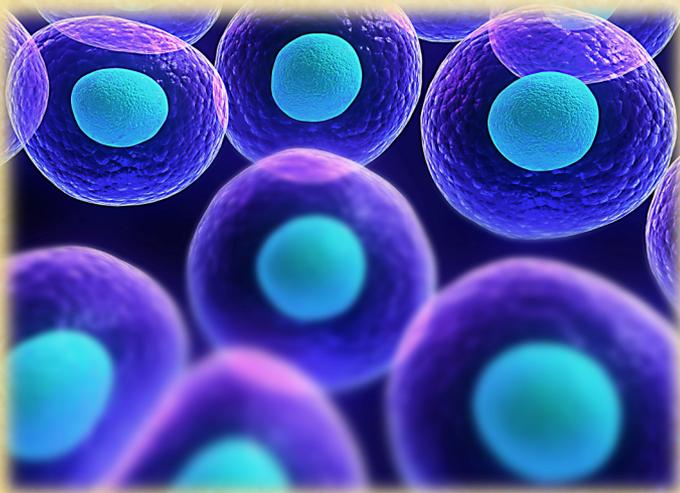
Home to a community of many things, including:

- Bison
- Deer
- Coyotes
- Ground Squirrels
- Hawks

How do you think these populations interact with each other?

# Complex Organisms

- ◆ Even simple organisms are very complex.



- ◆ The more scientists learn about the cell the more they realize it is so complicated that they cannot build one.
- ◆ However, there are many more organisms that are even more complex and diverse.

# Complex Organisms

- ◆ It is difficult to think of the complexity of nature without thinking about the designs and features of the living things on Earth.





## Frill Neck Lizard of Australia

- One of nature's fascinating designs.
- Has a large frill of skin around its head.
- Frill stays folded against the head and neck of the lizard.



## Frill Neck Lizard of Australia

- However, the frill will extend when the lizard is threatened.
- Believed the frill is used to help the lizard communicate with other lizards.
- Even can run on its hind legs.

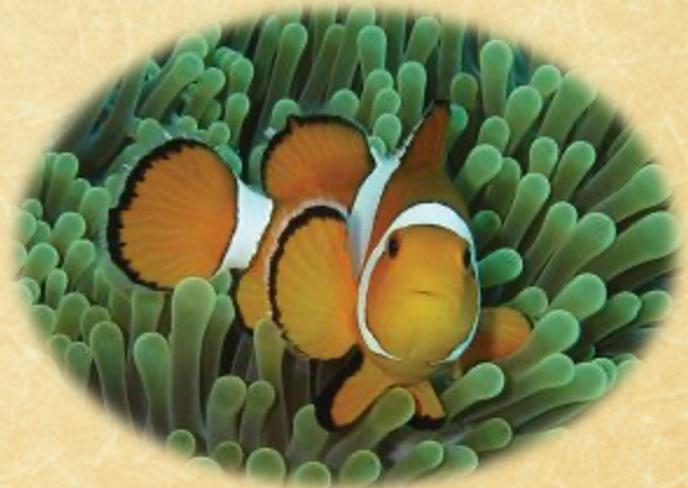


## Titan Arum “Corpse Lily”

- Sends off a sickening, rotten-meat smell.
- Can grow to about 9.8 ft.
- Has a fleshy pink color .
- Its temperature is about the same as a human body.

# Interaction Among Species

- ◆ God did not create living things to live alone.
- ◆ Ecologists have learned of many ways' species interact.
- ◆ **Symbiosis**: interaction of two different species living close together.
- ◆ Three types of symbiosis.





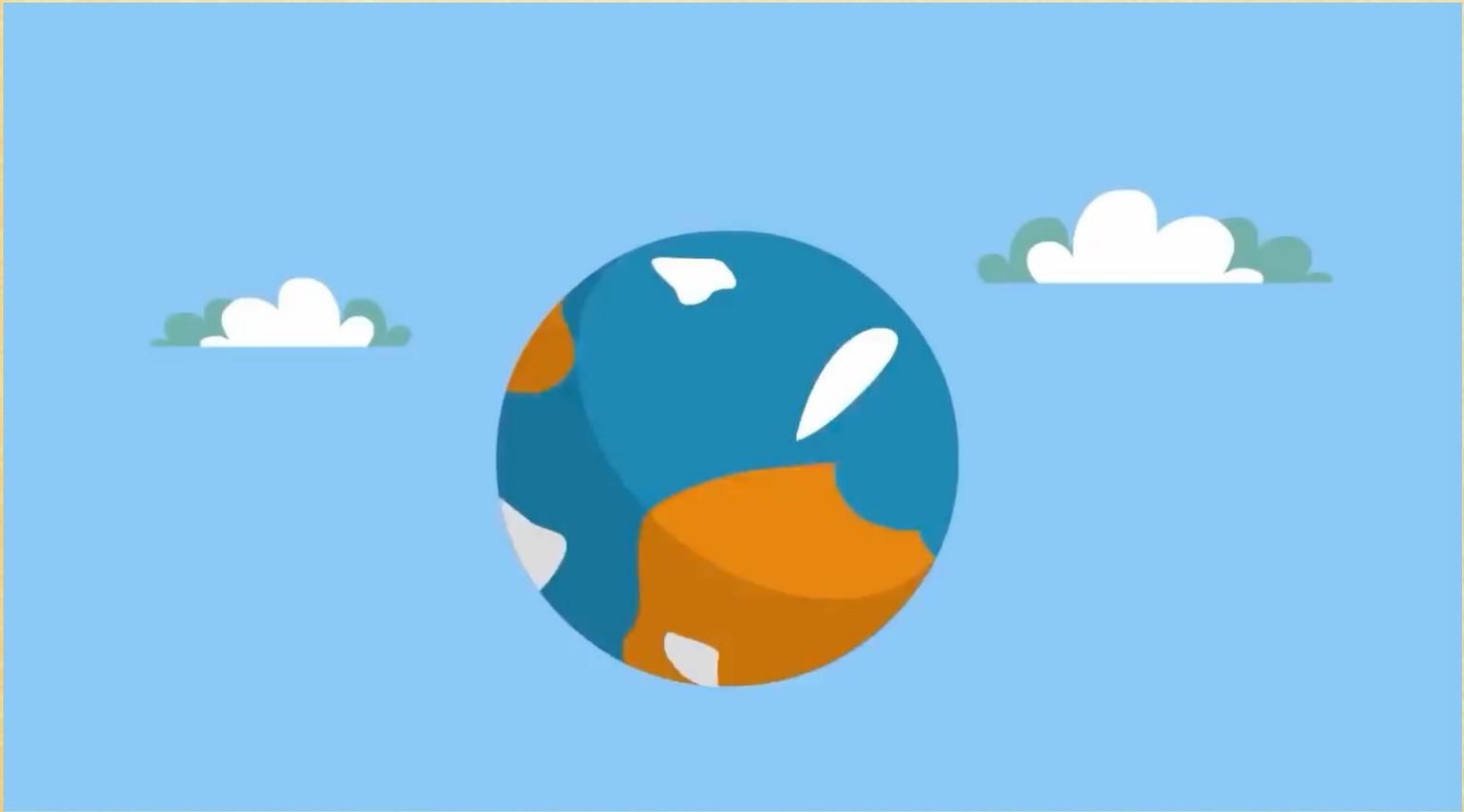
# Types of Symbiosis

**Mutualism**: interactions between species where both benefit

Example:

- Flowers provide nectar for the bees.
- Bees help to pollinate the flowers.

# Mutualism





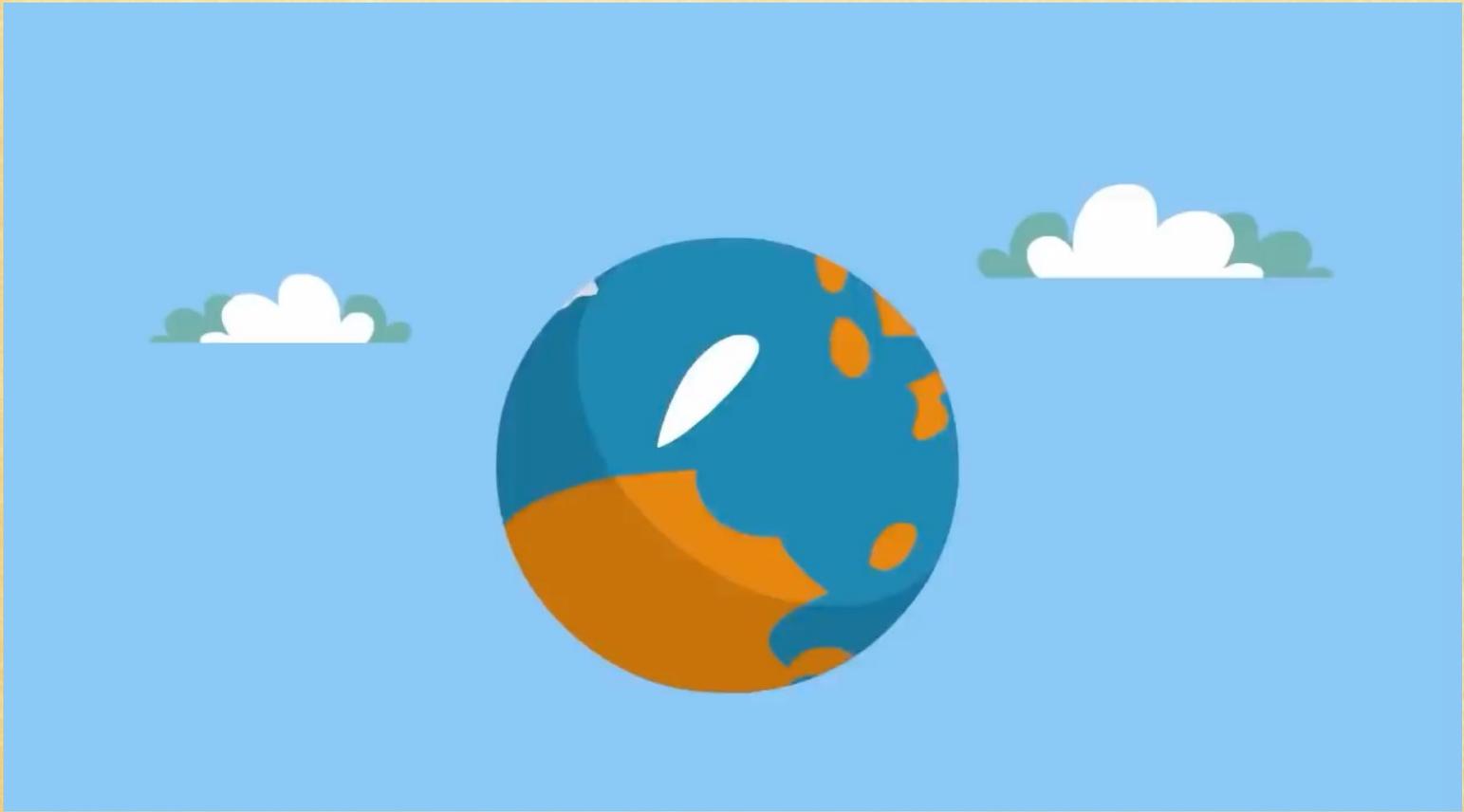
# Types of Symbiosis

Commensalism: one species benefits and the other has no gain or loss

Example:

- Tree provides shelter to the bird and their nest
- Bird doesn't help or harm the tree

# Commensalism





# Types of Symbiosis

**Predation:** one species is harmed and the other benefits

**Parasitism:** parasites that harms the body of a host

Example:

- Parasitic mites invade the body of a bee and gets nutrients
- Bee loses nutrients and eventually dies

# Parasites



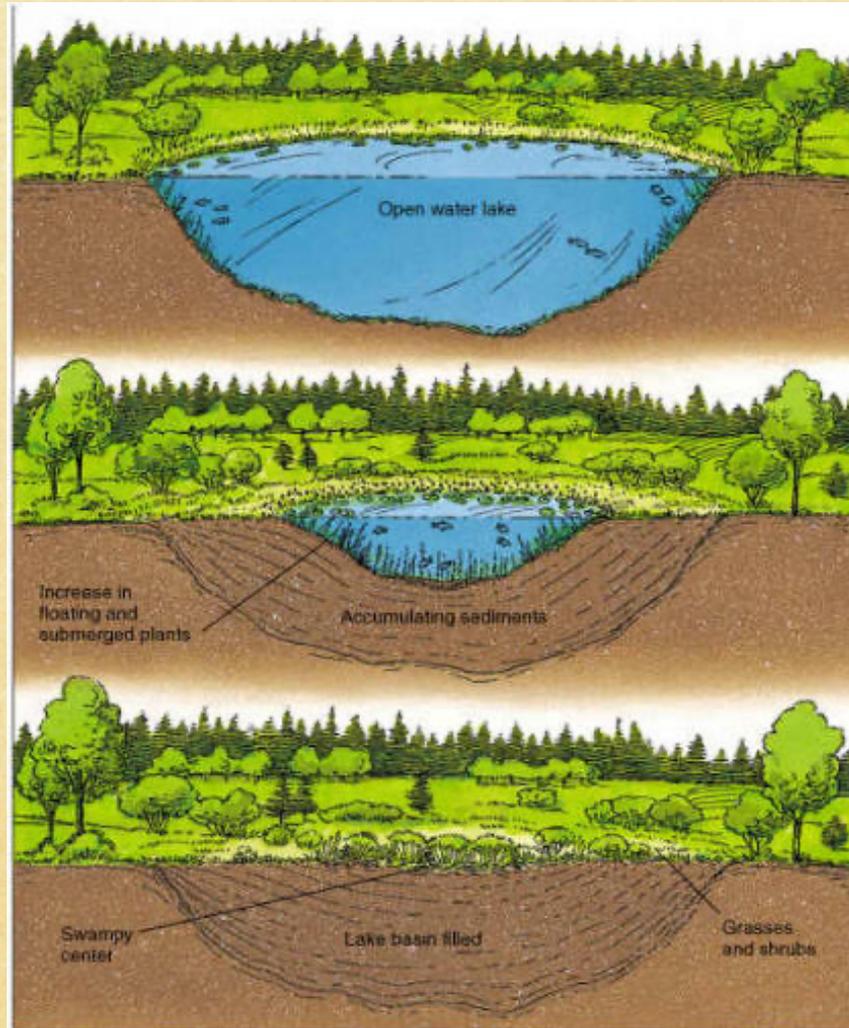
# Ecological Succession

- ◆ What happens to a forest that was burned with fire?
- ◆ A damaged environment goes through a natural process called ecological succession.



- ◆ **Ecological Succession**: gradual replacement of one type of community by another through a series of changes

# Ecological Succession Pond to Meadow



# Types of Ecological Succession

- ◆ Two types of ecological succession:
  - ◆ Primary Succession
  - ◆ Secondary succession

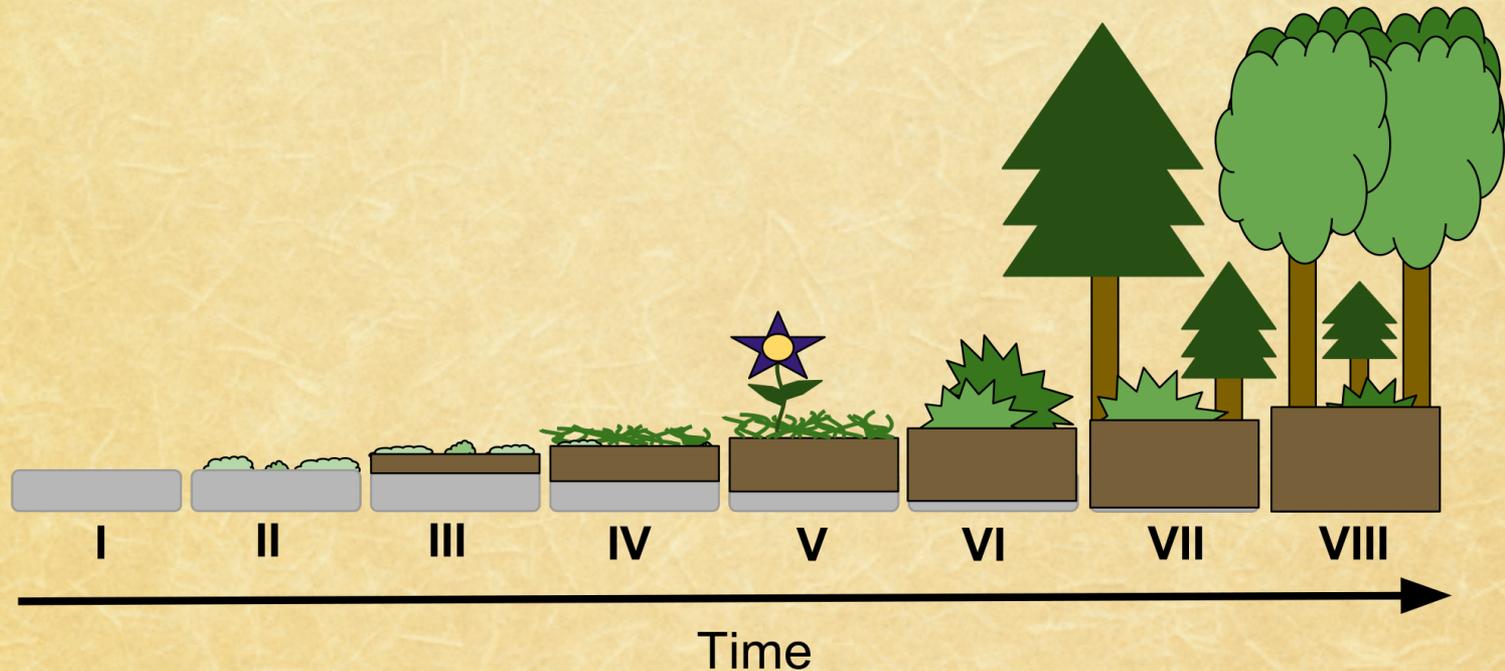


# Primary Succession

- ♦ **Primary Succession**: development of plant and animal communities in an area where living things have never lived before.
- ♦ **Pioneer Species**: first species to appear on the new land.
  - ♦ Usually mosses and lichens
- ♦ Pioneer Species make soil by breaking down rock and becoming part of the soil when they die.

# Primary Succession

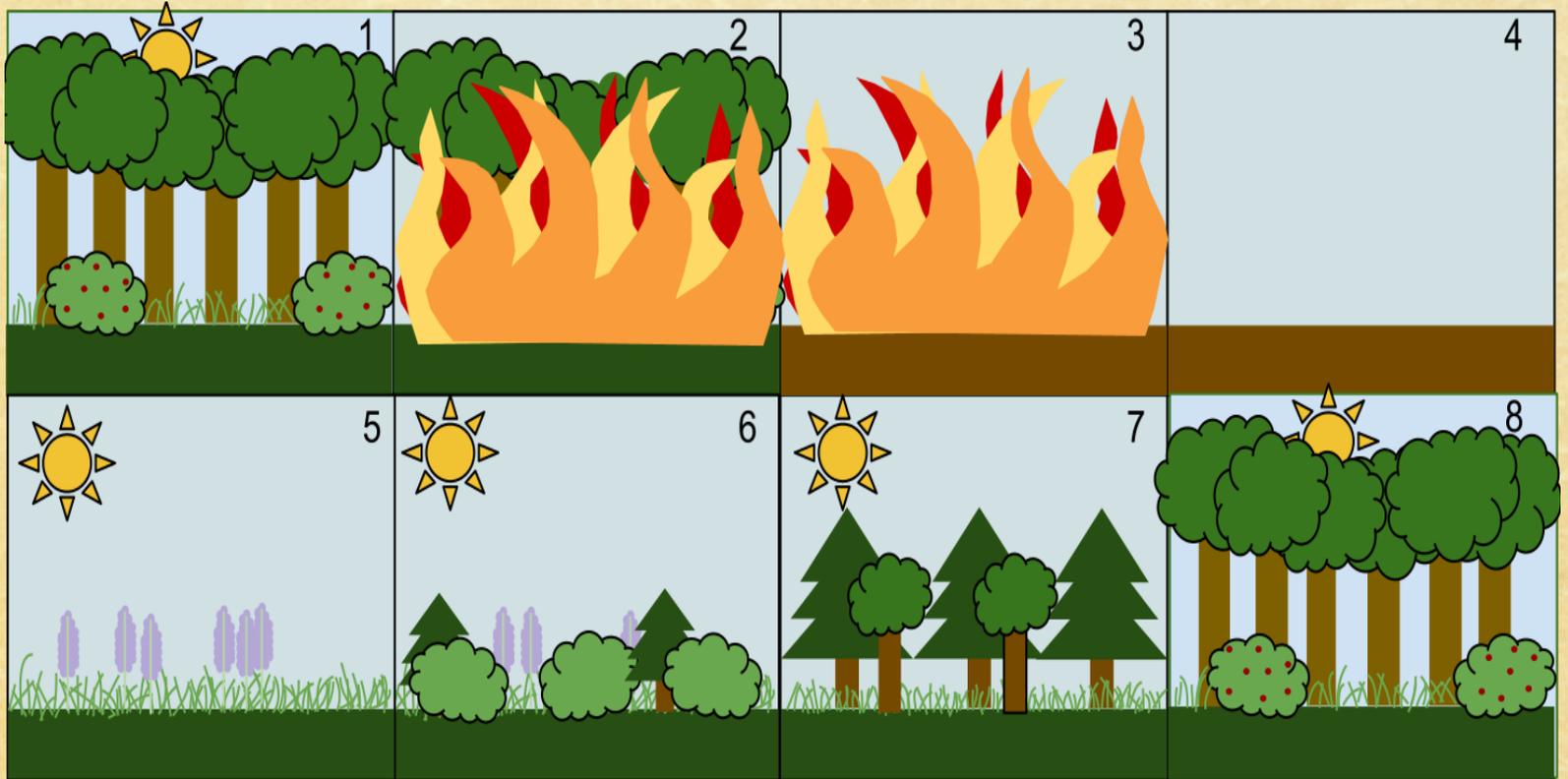
- ◆ Slowly grasses and small plants, small shrubs, and trees start to grow.
- ◆ Climax Community: the community is now stable.



# Secondary Succession

- ♦ **Secondary Succession**: re-growth of a community in an area that has soil and was recently inhabited by living organisms.
- ♦ Occurs after hurricanes, fires, landslides, floods, logging, farming, grazing, etc.
- ♦ Regrowth occurs more quickly during secondary succession.
- ♦ Pioneer species are typically grasses and fast-growing plants.

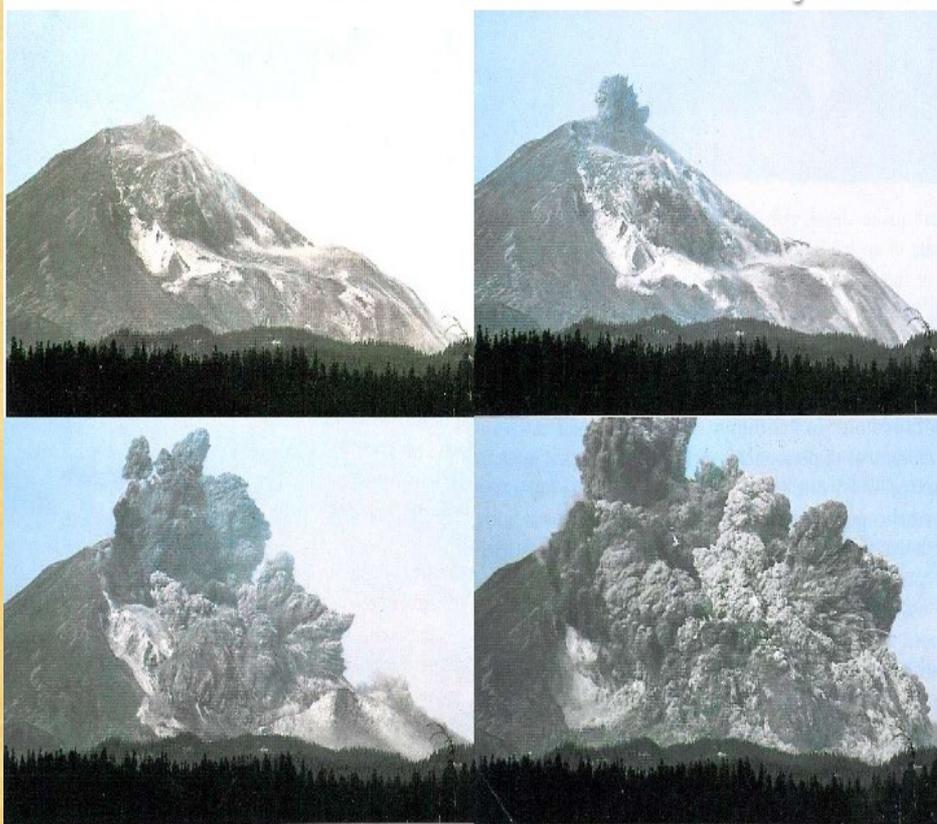
# Secondary Succession



# Ecological Succession



# Mount St. Helen



- ◆ Volcano in Washington
- ◆ Erupted in 1980
- ◆ Resulted in widespread devastation of plants, animals, and the land itself

# Mount St. Helen

- ◆ North of volcano, area was covered with ashes up to 131 ft. thick
- ◆ This was the site for primary succession



# Mount St Helen



- Pioneer species was the purple-and-blue-flowered lupines.
- They made certain nutrients that the soil did not have before
- They grew and helped create soil on the rocky surface
- In other areas the devastation was not as great so secondary succession occurred



## Mount St. Helen

Now, over 30 years later, succession around Mount St. Helen's region is still progressing.