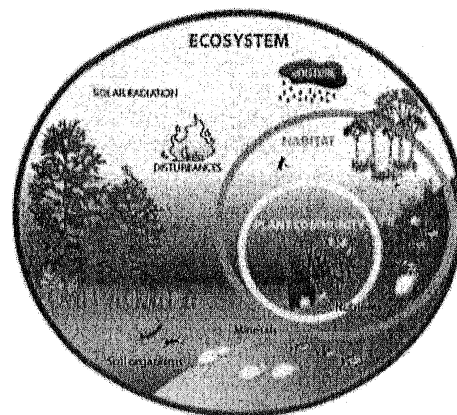


UNIT 13: ECOSYSTEMS AND COMMUNITIES

Objectives

1. I can identify the causes of climate.
2. I can explain how the Earth's temperature range is maintained.
3. I can identify the Earth's three main climate zones.
4. I can explain how biotic and abiotic factors influence an ecosystem.
5. I can identify the niche of a given organism.
6. I can identify interactions that occur within communities.
7. I can describe how ecosystems recover from a disturbance.
8. I can explain what microclimates are and describe a microclimate found in Michigan.
9. I can identify the factors that govern aquatic systems.
10. I can identify the characteristic features of several different aquatic ecosystems.



Vocabulary

- Abiotic factor
- Aphotic zone
- Benthos
- Biotic factor
- Bog
- Climate
- Coastal ocean
- Commensalism
- Coral reef
- Detritus
- Ecological succession
- Estuary
- Greenhouse effect
- Habitat
- Kelp forest
- Lake effect
- Mangrove swamp
- Marsh
- Microclimate
- Mutualism
- Niche
- Parasitism
- Photic zone
- Phytoplankton
- Pioneer species
- Polar zone
- Predation
- Primary succession
- Resource
- Secondary succession
- Swamp
- Symbiosis
- Temperate zone
- Tropical zone
- Weather
- Wetland
- Zooplankton

Unit 13 Warm-ups

Climate Notes (SECTION 4-1)

To complete this at home go to glscience.weebly.com and click on the link to bio b and then the online textbook

Point of Focus: Organisms seek a habitat with a specific set of conditions to meet their particular needs. What produces the wide range of environmental conditions that shapes the communities in which organisms live?

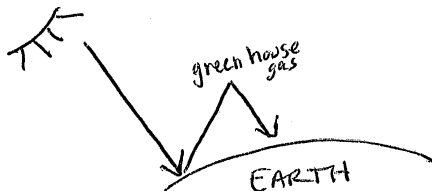
Climate

- **Weather** – Condition of Earth's atmosphere at a particular time + place
- **Climate** – Average year after year conditions of temp and precip. in a particular place.
- What is the difference between weather and climate in an ecosystem?
Weather is daily – right now! Climate is the average, seasonal changes etc.
 - Some of the factors that cause climate
 - trapping of heat by the atmosphere
 - Latitude
 - transport of heat by wind and ocean currents
 - amount of precipitation that results
 - Shape and elevation of land masses
- What drives Earth's weather and climate?

Energy from the sun!

Trapping of Heat by the Atmosphere

- Our biosphere has a natural insulating blanket called the atmosphere.
- Which chemicals in the atmosphere are responsible for trapping heat? Carbon dioxide, methane + Water vapor
- Why do we call this the greenhouse effect? Greenhouse gases trap heat from the sun just like glass in a greenhouse.
- **Greenhouse effect** – A natural process in which heat energy is trapped by greenhouse gases.
- Draw a picture in the space below of how this works.



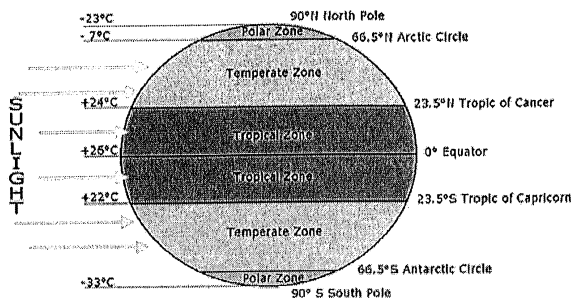
- What would our planet be like without this natural insulating greenhouse effect?
Earth would be 30°C cooler (freezing!!)

Latitude

- What does the tilt of Earth's axis cause? Climate Zones
- What area's climate is least affected by the tilt? Tropical Zones

- What area's climate is most affected by the tilt? **Polar Zones**
- Why is it cooler toward the poles? **Sun strikes at a very low angle (less direct sunlight)**
- Why does Earth have 3 main climate zones?

Due to unequal heating of Earth's surface



Zone	Latitude Range	Climate
Polar (US!)	66.5° - 90° N + S latitudes	Cold year round
Temperate	66.5° - 23.5° N + S latitudes	Hot summers + cold winters 4 seasons
Tropical	Between 23.5°N and 23.5°S	Hot year round.

Transport of Heat by Wind and Ocean Currents

- Explain how wind currents form (be sure to explain how the poles and the equator are important in this process). **Air close to Earth heats up, molecules move faster and spread out. Warm air is less dense so it rises. Up higher the air cools down, molecules slow + it becomes more dense and sinks.**
- Explain how ocean currents form (be sure to explain how the poles and the equator are important in this process). **Cold water near the poles is more dense and sinks + flows parallel to the ocean bottom it rises in warmer regions (upwelling). On the surface wind moves water. Both surface water + temp/density affect + cause ocean currents.**
- Microclimate** - A climate in a small area that differs from the surrounding area.
 - What is a rain shadow? **An area on the leeward side of a mountain that doesn't get rain**
 - What is lake effect snow? **Arctic winds cross warm lakes picking up moisture and dumping precipitation on the leeward side.**
 - Why does the lake effect occur? **Water has a very high specific heat, which means water has to absorb A LOT of energy in order to raise its temperature. Conversely, water has to LOSE A LOT of energy in order to LOWER its temperature. This is why lakes are so cold so far into the summer and so hot late into the fall. In the winter, cold air blows across the warm Great Lakes, picking up moisture, and then dumps it on the land in the form of snow.**

CO₂ Investigation Lab

Question

What effect does CO₂ have on atmospheric temperature?

Predict

1. Which container's atmosphere, control (air) or CO₂ will heat up faster?
2. Which container's atmosphere will reach the highest temperature?
3. Which atmosphere will retain heat longer? Include a reason for your prediction.

Procedure

1. Measure 10 grams of NaHCO₃ (baking soda) and place in the bottom of an Erlenmeyer flask. Repeat for the 2nd flask.
2. Add 30 mL of water to the first flask and label as control. Use the stopper with thermometer apparatus to seal shut the flask.
3. Add 30 mL of vinegar to the second flask and label "CO₂". Quickly use the stopper with thermometer apparatus to seal shut the flask and trap the gas that is generated by the reaction.
4. Record the temperature reading on each thermometer.
5. Turn on the lamp and start a timer. Record data at each interval. At 8 minutes, turn off the light and continue to monitor the temperature of the flasks.

Data

	TURN LIGHT ON				TURN LIGHT OFF			
	0 min.	2 min.	4 min.	6 min.	8 min.	10 min.	Heat increase (8 min. – 0 min.)	Heat decrease (8 min. – 10 min.)
Control								
CO ₂								

Lab Analysis

1. Which container type (control or CO₂) had a greater heat increase?

Why do you think this occurred? (Hint: think about how blankets work.)

2. What did you notice about the rate of heat loss after the lights were turned off when comparing the two environments?

3. How did the heat gained over the first 8 minutes compare to the amount of heat lost during the last 2 minutes?
4. Which container shows a larger greenhouse effect? Why?

Conclusion

Write a well-written paragraph that addresses the investigative question: *What effect does CO₂ have on atmospheric temperature?* Consider the following points in your discussion:

Summarize your prediction and state whether your prediction was accurate.

Why is atmospheric CO₂ necessary to sustain life on the Earth?

Name the phenomenon that was demonstrated by today's investigation:

Niche Notes

A niche is defined as the full range of physical and biological conditions in which an organism lives and the way in which the organism uses those conditions.

Differentiating between terms:

- Habitat is Where the organism lives (its address).
- Niche is ALL other information about How the organism lives (size of house, temperature on thermostat, etc. as well as the its occupation)

Niche includes...

- 1 What it eats
- 2 What eats it
- 3 How it gets food
- 4 Water requirements
- 5 Behavioral Patterns
- 6 How it reproduces
- 7 When it reproduces
- 8 Temperature range
- 9 Precipitation Needs

Example #1 - the niche of a bullfrog

- ① rodents, small turtles, frogs
- ② Birds, otters, fish
- ③ Feeding Strike
- ④ Lives in aquatic regions - needs a lot of H₂O
- ⑤ Aggressive - elevated posture + yellow throat
Congregate in groups of males

Example #2 - the niche of a squirrel

- ① Nuts, acorns, seeds
- ② fox, humans, dogs, cats, snakes
- ③ Gather what falls, stores
- ④ small amounts of H₂O for drinking
- ⑤ Active in daylight, not reclusive
run quickly

Example #3 - the niche of a _____

- ⑥ Females choose the best mate from the chorus (group). Deposits eggs in shallow water
- ⑦ Late May - late July
- ⑧ Temperate - Atlantic Coast
- ⑨ Lots of precip.

- ⑥ Sexual reproduction / mother feeds young
- ⑦ warm seasons for reproduction
- ⑧ seasonal warm + cold temps
- ⑨ Lots of precipitation

Finding a New Niche

A species of insect has been accidentally introduced from Asia into the North American forest. The success of this organism depends on its ability to find a suitable habitat, that is, one with the proper abiotic conditions for all of its life stages. The larval stage is very sensitive to changes in temperature, humidity and light conditions. Exposure to situations outside the tolerance limits of this species results in a high mortality rate. Data showing the influence of the three variables on the larva are presented in the table below. The data for each variable was obtained while the other two variables were kept constant at optimum conditions.

Variables Affecting Larva Mortality Rate

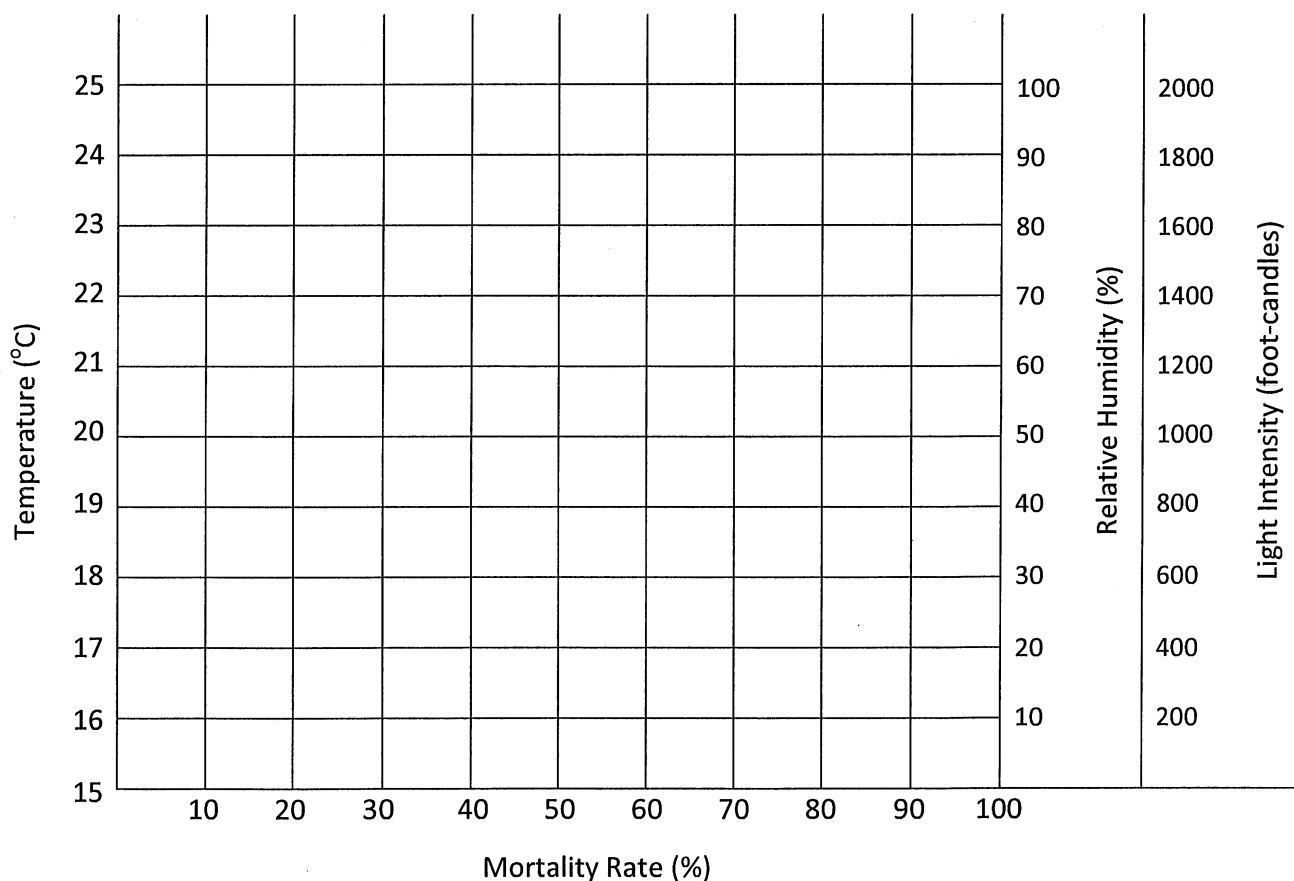
Mortality (%)	Temperature (°C)	Mortality (%)	Relative Humidity (%)	Mortality (%)	Light Intensity (foot-candles)
100	15	100	0	0	200
80	16	100	10	0	400
30	17	100	20	10	600
10	18	90	30	15	800
0	19	70	40	20	1000
0	20	50	50	20	1200
0	21	0	60	90	1400
0	22	0	70	95	1600
20	23	0	80	100	1800
80	24	10	90	100	2000
100	25	80	100	---	---

Directions/Questions

1. Color the mortality rate vs. temperature portion of the data table yellow.
2. Plot the mortality rate vs. temperature data in yellow. Connect your data points with a smooth fitting curve and shade the area inside the curve yellow.
3. What is the optimum temperature range for insect larva survival?
4. Color the mortality rate vs. relative humidity portion of the data table red.
5. Plot the mortality rate vs. relative humidity data in red. Connect your data points with a smooth fitting curve and shade the area inside the curve red.
6. What is the optimum humidity range for insect larva survival?
7. Mark the area on the graph that represents the optimum conditions for insect larva survival when considering both temperature and humidity. Do this with black dotted lines.
8. What happened to the optimum temperature range when you added the humidity factor?
9. Color the mortality rate vs. light intensity portion of the data table blue.
10. Plot the mortality rate vs. light intensity data in blue. Connect your data points with a smooth fitting curve and shade the area inside the curve blue.

11. Circle, in black, the area on the graph that represents the optimum conditions for insect larva survival when all three factors (temperature, relative humidity and light intensity) are considered.
12. What is the optimum temperature, relative humidity and light intensity for insect larva survival when all three factors are considered at once.
13. One spring morning while the larva were feeding in the open, the temperatures dropped to 18 °C and a strong wind lowered the relative humidity to 40%. The light intensity was 400 foot-candles. Which factor had the greatest influence on insect mortality?
14. Suggest a habitat that may suit this insect.
15. What **other** factors contribute to the survival of terrestrial organisms in a new environment?

Effect of Temperature, Relative Humidity, and Light Intensity on Mortality Rate of Insect Larva



Biotic vs. Abiotic Factors

What does the prefix bio- mean? living

The prefix a- in front of a word means not or non.

Therefore, biotic factors are living factors and abiotic factors are non living factors in an ecosystem.

What are some examples of biotic factors?

eagle, bacteria, grass, flower, vulture, butterfly

What are some examples of abiotic factors?

rocks, soil, precipitation, mountains, nutrients (O_2 , N_2 , P)

Aquatic Ecosystems

Freshwater Ecosystems	Marine Ecosystems
<ul style="list-style-type: none"> • flowing-water • wet lands • standing water • estuaries 	<ul style="list-style-type: none"> • Intertidal • Coastal Ocean • Coral Reefs • open Ocean • Benthic Zone

How to classify aquatic ecosystems

- Based on the abiotic factors that affect them:

- Temperature

- Flow (how fast the water is moving)

- Depth (light penetration)

- Chemistry (dissolved chemicals- salts, nutrients, O_2)

Flowing-water ecosystems

- Organisms in these ecosystems are well adapted to the rate of flow of the water. List some of those adaptations.

- Streamlined body

- Suckers to anchor to rocks

- hooks to attach to plants

- Why isn't there much plant life at the source of a stream/river?

They originate in mountains and hills where there is little soil at the source.

Standing-water ecosystems

- Why is it necessary for standing water ecosystems to have some water circulation?

To help distribute heat, oxygen & other nutrients.

- What is it called when there is no water circulation? Describe a body of water that has no circulation.

Stagnant

- Microorganisms in standing water ecosystems are called plankton.
 - There are two types, phytoplankton and zooplankton. What do you know about these organisms based on their names?

phyto - plant-like algae Zoo - animal-like = eats phytoplankton

Wetlands

- An ecosystem where water covers the soil or is present near the surface of the soil for at least part of the year.
- Water can be flowing or standing, and fresh, salty or brackish. (some what salty + fresh)
- Why are wetlands so very important? Breeding grounds for insects, fish, migratory birds.

Bogs:

- From in kettle holes, which are depressions where water collects.
- Dominant plant species: Moss
- Characteristic feature: very acidic water

Marshes:

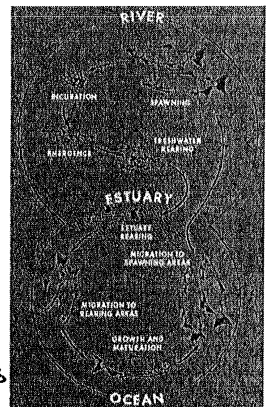
- Location: Along rivers where flooding occurs
- Dominant plant species: Grasses, rushes, cattails
- Why are marshes such important ecosystems?
- Breeding grounds for birds.

Swamps:

- Water moves slowly through swamps which look like flooded forests.
- Dominant plant species: trees
- Why are swamps such important ecosystems?
- Natural Filtration systems for water.

Estuaries:

- Form where the rivers meets the Sea, therefore the water is brackish. (mix of fresh + salt water.)
- The producers in an estuary are: plants, algae, photo + chemosynthetic bacteria
- The producers are not eaten by the consumers directly, they turn into detritus or decaying organic matter, which is eaten by clams, worms, and sponges. Since these organisms consume detritus, they are called detrivores.
- Why are estuaries such important ecosystems?
- Support a huge biomass + are the breeding grounds for fish + shellfish
- Which states rely on estuaries as a major part of their economy? Maryland, Rhode Island



Mangrove Swamps:

- Location: Bays + Estuaries in coastal regions

Salty Dominant plant species: mangroves - salt tolerant trees + seagrass

- Why are mangrove swamps such important ecosystems?

Valuable nurseries for fish + shellfish

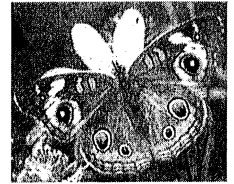
Marine Ecosystems

- Photic zone – light penetrates to a depth of about 200m or 8000ft. Photosynthetic producers exist in this zone.
- Aphotic zone – permanently dark. The only producers that exist in this zone are chemosynthetic.
- Scientists also divide the ocean into zones based on depth and distance from shore.
- **Intertidal zone:**
 - In The Tide
 - Organisms in the intertidal zone must be tough! They are battered by waves and strong currents, exposed to huge changes in temperature, are submerged in water part of the day and exposed to air and sunlight. Some of the organisms that live in the intertidal one are: Snails, sea urchins, seastars, They ARE TOUGH!
- **Coastal Ocean :**
 - Extremely productive ecosystems found along all shores.
 - Coastal ocean ecosystems fall completely within the photic zone.
 - A particularly interesting producer found in the coastal ocean is kelp, which can grow up to 50cm per day.
- **Coral Reef :**
 - Named for the coral animals that make up the structure.
 - Found in the warm shallow waters of coastal tropical oceans.
 - One of the most diverse and productive environments on the Earth.
(Sometimes referred to as the "rain forest" of the sea.)
- **Benthic Zone:**
 - The ocean floor from the coastal ocean out through the open ocean.
 - Benthos - organisms dwelling in the benthic zone such as:
 - Organisms here depend on dead matter from the photic zone (producers) to fall to the ocean floor. This classifies these organisms as detritivores.
- **Open Ocean:**
 - Begins at the end of the continental shelf and extends outward.
 - Open ocean covers 90% of the surface of the world's oceans.
 - If you were on a boat in the middle of the ocean you may look around and not see a single living thing. So, why is the open ocean the most productive ecosystem on the planet?
It is enormous! Photosynthetic algae are the producers for an enormous amount of fish, octopus, ect.

Community Interactions

Predation

- In nature you have to be creative in order to survive. The following are some creative ways that predators have of luring in their prey, and some interesting ways that prey avoid being lunch!
- Mimicry**
 - Many butterflies, moths and fish have eyespots. These are spots that look like eyes so that predators are distracted. A butterfly is more likely to survive an attack to the wing than an attack to the head.
 - The harmless milk snakes and king snakes of the new world have the same colored stripes as the venomous coral snakes, so predators will avoid both. The snakes can often be distinguished using the old scout saying "Red against yellow: kill a fellow. Red against black: friend to Jack."
- Camouflage**
 - The uroplatus gecko is a master of disguise. Circle the gecko in the pic.
 - Think of some other organisms that utilize camouflage:
Stick bug, chameleon, arctic hare
- Luring prey**
 - The anglerfish is capable of bioluminescence which is caused by bacteria living inside the fish that can actually produce light. The anglerfish also has an appendage that acts as a lure to its prey.



Competition

- Every species has its own niche in nature. The niche is the ecological role of the species, and the range of conditions in which the species can live.
- The degree to which the niches overlap each other indicates the strength of the competition.
 - Example: A species of finch feed on seeds 1-5mm in length, a species of sparrow in the same area feed on seeds 3-7mm in length. NICHE OVERLAP !!! Discuss with your table partner several possible outcomes for this scenario. Pick the one that you think is most likely and write it down.

Symbiosis

- A relationship where two species live closely together.
- Mutualism** - Both species benefit
 - Yucca and Yucca Moth:
 - How does the moth benefit from this relationship?
Has a location to lay eggs - gets food from plant
 - How does the plant benefit from this relationship?
moth pollinates the plant

- Lichens – a fungus / algae association
 - How does the fungus benefit from this relationship?

Get food from the algae

- How does the algae benefit from this relationship?

Get protection from temp + light

- Commensalism – one species benefits, the other species is neither harmed nor helped
 - Many species of birds have commensalistic relationships with large mammals.
 - While the mammals are walking they disturb insects which the birds eat.

- Parasitism – one species (host) harmed, the other species is parasite (benefits)



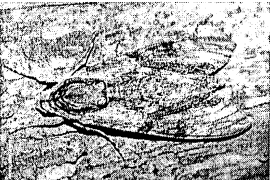
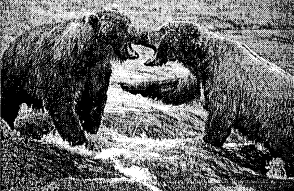

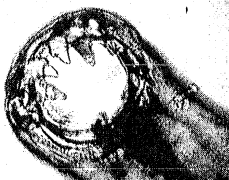
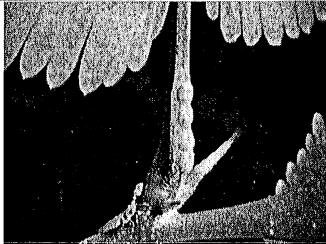
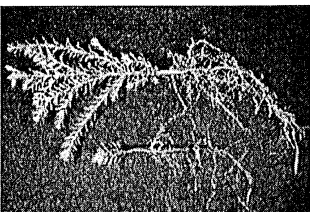
- Host challenge: resist the parasite
- Parasite challenge: overcome the host's defense / move to another
- How can a parasite be transmitted to other organisms? host,
 - vertically – parent to offspring
 - horizontally – direct contact (air, water)
- Describe the relationship between humans and bedbugs.

Bed bug = parasite feeds on human blood

Human = host

Community Interaction Examples

The following are some examples of things we just learned. Identify what each is an example of.

<p>The dorsal fin of the remora is specially modified to form a sucking apparatus that is used for attachment to the host (shark). The remora benefits by saving energy due to its limited swimming and obtains food scraps when its host is feeding. The shark is not helped or harmed.</p>		
<p>Poison-arrow frogs are poisonous. Predators will know this so they will stay away from frogs with the poison-arrow coloring. Another frog species may not be poisonous, but by looking like the poison-arrow frog, they avoid predation.</p>		
<p>Some insects can easily hide among leaf litter or by blending into trees.</p>		
<p>Bears all need food and shelter. Here are bears fighting for those things.</p>		
<p>The monarch butterfly (top) tastes horrible. The viceroy butterfly (bottom) tastes just fine, but because it looks like the monarch, predators stay away from it.</p>		
<p>The hookworm attaches itself to the intestines of a host and feeds off of the host's blood.</p>		
<p>Acacias have swollen thorns, which ants can carve out into a nest. Leaf petioles have nectaries which secrete carb-rich nectar. Ants attack herbivores (insects, grazing animals and even people). Ants chew other plants which grow around acacias, preventing these plants from shading acacias, suppressing growth, and eliminating fire risks.</p>		
<p>Plants use micorrhizal extensions into the soil for increased nutrient acquisition because the hair-like extensions from the root offer a lot more surface area, so there are more places for the absorption of nutrients. Micorrhizae use the plant as a source of carbon (sugar) for growth.</p>		

Succession Notes (PAGES 94-97)

To complete this at home go to glscience.weebly.com and click on the link to bio b and then the online textbook

Succession changes ecosystems

- **Ecological succession** – The series of predictable changes that occur in a community over time.

There are two types of succession:

Primary succession – Succession that occurs where no soil is present.

- When does primary succession occur? When there is no soil present (BARE ROCK) Volcanic Rock, Parking lot, newly expose rock.
- **pioneer species** – The 1st species to populate an area (moss/lichens)
- Describe the most common pioneer species and how they help primary succession to occur.

Lichens can grow on bare rock + break down the rock creating soil.

Secondary succession – Succession following a disturbance that destroys the community but leaves soil

- What causes secondary succession to occur?
Forest fires (lightening), abandoned farmland
- Compare and contrast primary and secondary succession.

Primary = No Soil Secondary = Soil
Both Succession

Ecologists used to think that succession was an orderly and predictable process. Today they realize that random, unpredictable events may influence which species succeed and which die off after a disturbance.

- What are some abiotic factors that could influence species moving into a newly disturbed area undergoing secondary succession?
- What types of human activities can disturb an ecosystem and cause succession?
- Are the human activities listed above biotic or abiotic factors?

Read pages 96 and 97 about whale-fall succession. What are the pioneer species in this example of succession?

Bacteria

The Succession Game

_____ is a series of predictable _____ that occur in an ecosystem over _____. Old organisms _____ making room for new ones. Early stages of succession are _____ by some sort of _____, such as a flood, clear-cutting, or _____. We are going to model succession occurring in a forest in Northern Michigan. Follow the directions below to play the game. Play as many games as you can in the time allotted. Answer the questions during your first round.

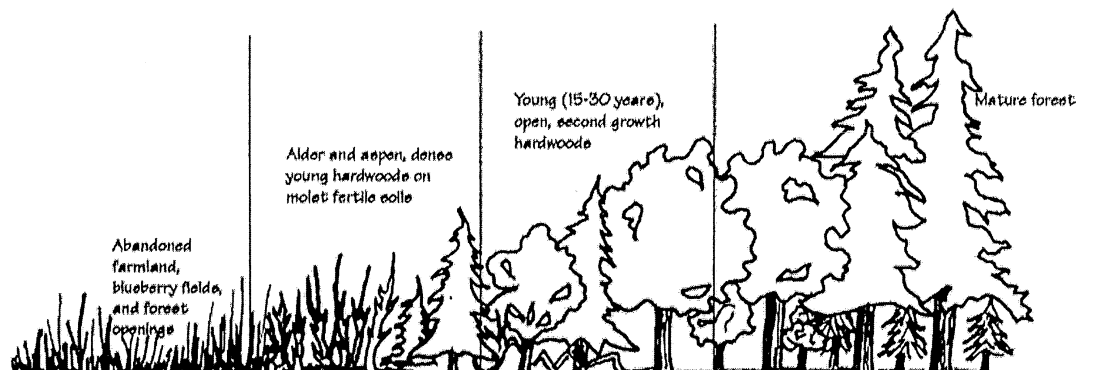
SEQUENCE
1 : Grass 2 : Shrub 3 : Small tree 4 : Large tree and remove one grass 5 : Large tree and remove one shrub 6 : Forest Fire

Directions:

1. Set up: Place the game board in the middle of the table. Each player should have their own color of game pieces.
2. Roll the die. If you roll a 1 you may place a piece of grass on the game board and roll again. If you do not roll a 1 your turn is over and play proceeds to the left.
3. Once you have rolled a 1 your goal is to roll a 2, and so on. If you roll the next number in the sequence, then your turn continues and you may roll again.
4. Prior to placing a large tree in the forest, a player may place a plant in the forest that they have already played. For example: a player is trying to roll a 3, but gets a 2 instead. That player can place a shrub on the game board, but they may not roll again.
5. Once there is one large tree on the game board, no more grasses or shrubs can be played unless they are a part of a player's sequence.
6. When there are at least 4 trees on the game board and a player rolls a 6 (fire!) out of sequence, that player must remove the two largest plants on the board (signifying a small fire). If your plants are removed you must start again in your sequence from the highest piece on the board.
7. When a 6 is rolled in sequence a forest fire occurs and the round is over. Count up the points you have earned. Only plants that are on the game board at the time of the forest fire count.
 - a. Grass/weeds – 1PT
 - b. Shrub – 2PTS
 - c. Small tree – 3PTS
 - d. First large tree – 4 PTS
 - e. Second (third, fourth, etc.) large tree – 5 PTS
 - f. Fire Starter – 6PTS

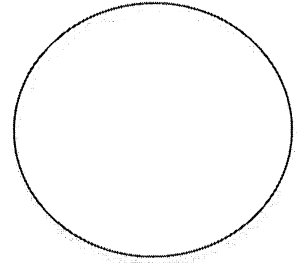
Questions:

1. Is this game an example of *primary* or *secondary* succession? How do you know?
2. What are the **pioneer species** in this ecosystem?
3. Why does it make sense to remove grass when a large tree is placed on the board?
4. Which species make up your community early in the game?
5. Which species make up your community late in the game?
6. We used only a few plant species to model the process of succession. What other species might we see during the early part of your game?
7. What other species might we see towards the end of your game?
8. Once the dominant plant species shifts to evergreens, the soil changes. How does the soil change? How does this affect the other species in this ecosystem? (HINT: You will have to research this online)



Unit 13 Study Guide

1. Compare and contrast weather and climate.
2. How do wind currents form?
3. Which of the following contribute to Earth's climate?
 - a. The unequal heating of Earth's surface
 - b. The transport of heat by wind and ocean currents
 - c. The organisms that live in each region
 - d. The shape and elevation of land masses
 - e. The soil chemistry in a given area
4. In the circle provided draw and label the 3 main climate zones and give a brief description of the climate in each.
5. What does the atmosphere do for the Earth?
6. Describe the Greenhouse Effect.
7. What are the three major greenhouse gases?
8. Water has a very (high/low) _____ specific heat, which means it has to absorb a (large/small) _____ amount of energy in order to raise its temperature. This is why lakes take so long to heat up in the _____ and cool down in the _____. Describe the microclimate in Michigan that depends on this property of water:
9. What are some biotic factors that could affect the size of a fox population?
10. What are some abiotic factors that could affect the size of a plant population?
11. List at least 10 things that you would include when describing an organism's niche.
12. What happens to the level of competition between two organisms as their niches overlap?
13. Give an example of niche overlap.
14. Describe the conditions necessary for an area to be defined as a "wetland."



15. List the three freshwater wetlands, and give the dominant plant species for each.

16. In general, why are all wetlands so very important?

17. Which type of wetland has very acidic water?

18. Where is the photic zone located?

19. What type of producer exists in the photic zone?

20. Describe the aphotic zone.

21. What type of producer exists in the aphotic zone?

22. Describe the location of each of the following marine zones:

- a. Open ocean
- b. Coastal ocean
- c. Benthic zone
- d. Intertidal zone

23. Define ecological succession:

24. What is the difference between primary and secondary succession?

25. List some disturbances that can cause a primary succession.

26. List some disturbances that can cause a secondary succession.

27. What is a pioneer species?

28. In nature, what do organisms compete for?

29. Complete the following table:

Symbiotic Relationship	Definition	Example
Mutualism		
Commensalism		
Parasitism		

<p>The average year-after-year conditions of temperature and precipitation in a particular region.</p>	<p>Many organisms that live in the benthic zone and many organisms that live in estuaries are detritivores because they rely on particles of dead matter to fall from the surface of the water called...</p>	<p>A phenomenon that happens in the winter when cold winds move across long expanses of warmer lake water, providing energy and picking up water vapor which freezes and is deposited on the leeward shores as snow.</p>	<p>A new pack of wolves moves into a prairie and is decimating the population of rabbits. This is an example of a _____ affecting an ecosystem.</p>
<p>A volcano explosion covers an area of land. Over a long period of time the ecosystem recovers in stages. This is called...</p>	<p>The zone on the Earth that has a moderate climate and lies between 66.5° N and 23.5° N, and 23.5° S and 66.5° S latitudes.</p>	<p>Organisms that live on the ocean floor are referred to as ...</p>	<p>The warm, shallow waters of coastal, tropical oceans have extremely diverse and productive ecosystems, where coral animals make up the structure.</p>
<p>Coastal ocean community where the dominant plant species can grow up to 50 cm per day (WOW)!</p>	<p>The upper layer of the ocean (up to 218 yards deep) where photosynthesis can take place due to the penetration of light.</p>	<p>A natural situation in which heat is retained in Earth's atmosphere by carbon dioxide, water vapor, methane and other gases.</p>	<p>Bogs, marshes and swamps are all _____ because there is water either covering the soil or near the surface of the water for all or part of the year.</p>
<p>Marine zone that extends from the low tide mark to the continental shelf.</p>	<p>The polar bear lives in the arctic tundra that is cold and completely covered in snow most of the year. Lichens are the dominant plant species, and seals, walrus and wolves are some of the dominant animal species. This was a description of the polar bear's ...</p>	<p>Bed bugs and tapeworms are examples of this. They benefit and their host is harmed.</p>	<p>A forest fire raged through a national park, destroying the communities but leaving the soil intact. The ecosystem recovers over a long period of time. This is an example of...</p>

Precipitation, temperature, soil or water chemistry, rocks, humidity, light intensity, are all nonliving things that affect an ecosystem.	A wetland whose dominant plant species are salt-tolerant trees with large, exposed root systems which help maintain the coastline by protecting it from erosion.	A climate within a small area that differs significantly from the climate of the surrounding area, such as the lake effect from the Great Lakes here in Michigan.	A lion eats a gazelle. This is an example of...
Tiny animals that feed off of phytoplankton in aquatic ecosystems.	Gradual change in an ecosystem following a disturbance, such as fire, drought, hurricane, tornado, whale fall, etc.	The full range of physical and biological conditions in which an organism lives (habitat) and the way in which an organism uses those conditions.	Relationship in which two species live closely together.
A wetland characterized by thick mats of moss and acidic water.	A wetland found alongside rivers where tall grasses are the dominant plant species.	A wetland characterized by a slow-moving river through a forest.	The Remora attaches to the bottom of a shark. The Remora gets a free ride and scraps of food when the shark eats. The shark is neither helped nor harmed by the remora. This is an example of ...
Algae and other small photosynthetic organisms found near the surface of the ocean. They form the base of most marine ecosystems.	Condition of Earth's atmosphere at a particular time and place.	The Earth's zones that receive the least direct sunlight, leaving them with a cold climate year round. They lie above 66.5° N and below 66.5° S latitude.	The zone of the Earth that receives the most direct sunlight. It lies between 23.5° N and 23.5° S latitudes.

<p>The zone of the ocean in which the only producers are chemosynthetic because there is no light penetration.</p>	<p>A fish eats the ticks off of a hippo. The fish benefits from the source of food and the hippo benefits from tick removal. This is an example of...</p>	<p>Lichens, a fungus/algae association, are the first organisms to inhabit a newly exposed surface because they break down rock into soil. Therefore, lichens are a</p>	<p>Water, nutrients, light, food and space are all examples of _____ that are necessary to life.</p>
<p>These serve as spawning and nursery grounds for many fish species, wetlands formed where the river meets the sea.</p>			