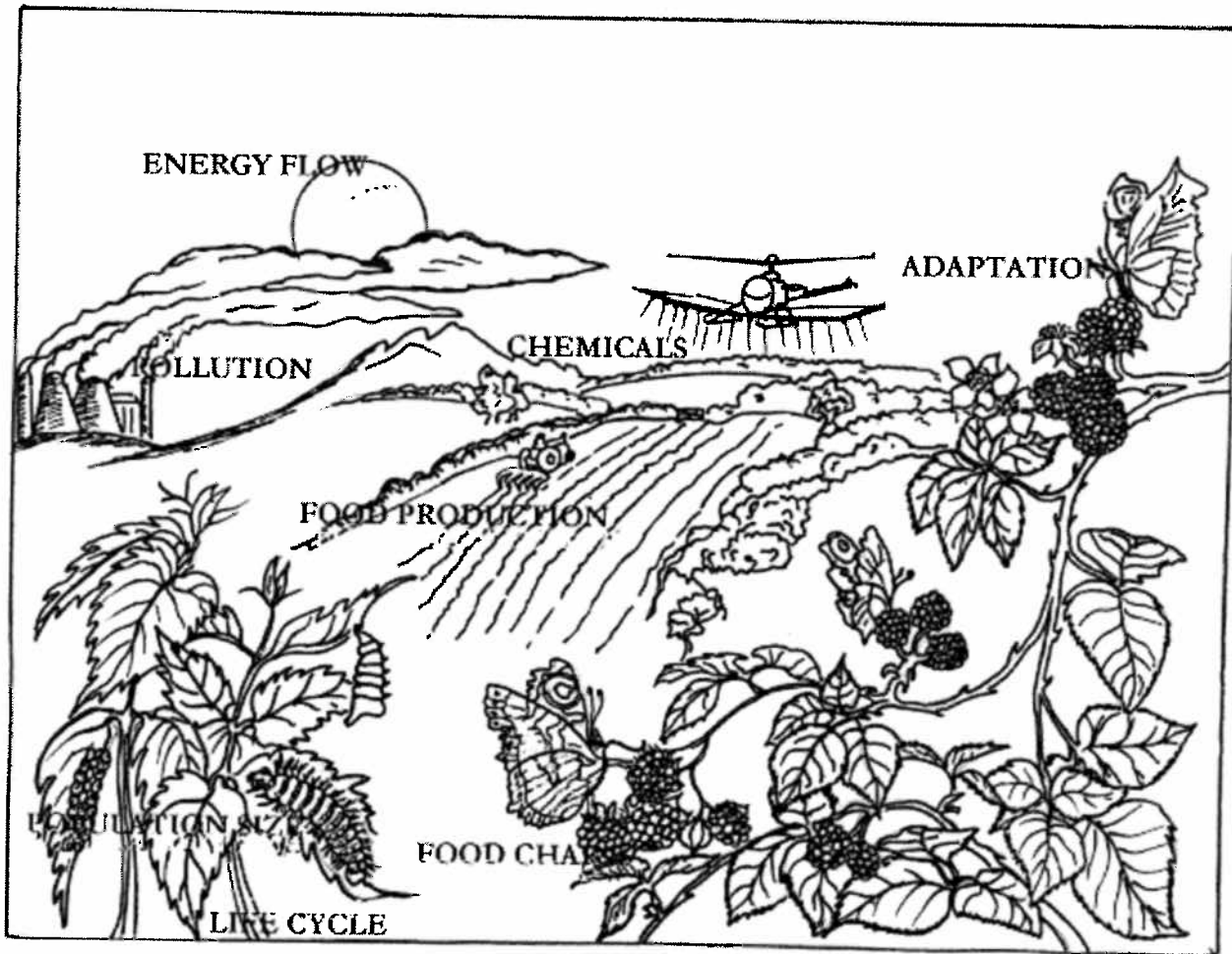


UNIT 2a

ECOLOGY



ECOLOGY – TEST 1

Abiotic factors

Autotroph

Biodiversity

Biosphere

Biotic factors

Carbon/oxygen cycle

Carnivores

Carrying capacity

Climax community

Commensalism

Consumers

Decomposers

Dispersal

Ecosystem

Energy (biomass) pyramid

Equilibrium

Exponential population growth

Food chain

Food web

Habitat

Herbivores

Heterotroph

Interspecies competition

Intraspecies competition

Limiting factor

Logistic population growth

Mutualism

Niche

Nitrogen cycle

Non-renewable resource

Omnivores

Parasitism

Pioneer species

Population

Predator

Prey

Primary succession

Producers

Renewable resource

Scavengers

Secondary succession

Symbiosis

Water cycle

Ecology Objectives

By the end of this unit, you should be able to...

ECOLOGY – TEST I

Section 16-1 Populations

1. Distinguish among the three patterns of dispersal: uniform, random, clumped
2. Contrast exponential vs. logistic population growth
3. Describe factors that influence the carrying capacity and growth rate of populations
4. Predict the consequences of unchecked human population growth

Section 17-1 Ecosystems

1. Define and sequence the terms organism, population, community, ecosystem, biome and biosphere
2. Identify biotic and abiotic factors within an ecosystem
3. Describe ecological succession, making sure to include pioneer organisms, climax community, primary succession & secondary succession

Section 17-2 Energy Flow in Ecosystems

1. Distinguish between producers, primary consumers, secondary consumers and tertiary consumers
2. Create a food chain, predicting how a change in one population will affect other populations in the same food web.
3. Create an Energy Pyramid. Why is the distribution of energy and biomass illustrated as a pyramid?

Section 17-3 Ecosystems Cycle Materials

1. Describe the physical, biological and chemical processes involved in the recycling of molecules in an ecosystem:
 - a. The water cycle
 - b. The carbon/oxygen cycle
 - c. The nitrogen cycle
2. Discuss the four (4) requirements of a stable ecosystem

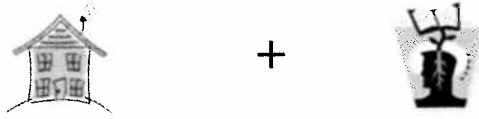
Section 18-1 How Organisms Interact in Communities

1. Define and provide examples of the three (3) symbiotic relationships
 - a. Mutualism
 - b. Commensalism
 - c. Parasitism

Section 18-2 Competition in Communities

1. Contrast the terms habitat and niche
2. Describe the role of competition in determining an organisms' realized niche
3. Explain the importance of biodiversity in an ecosystem

Ecology:



Define...

Organism:

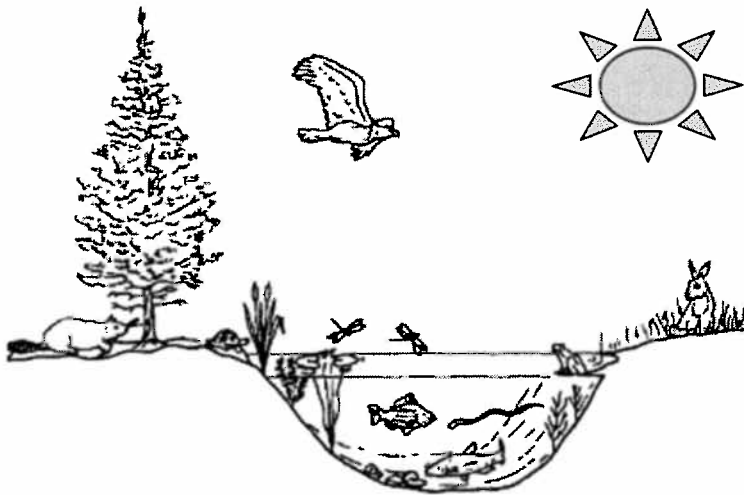
Population:

Community:

Ecosystem:

Biome:

Biosphere:



Habitat: _____

Organization of the Biosphere

I. Abiotic factors:

- A.
- B.
- C.
- D.
- E.

II Biotic factors:

A. Trophic relationships

1. **Autotrophic** nutrition

Autotrophs (a.k.a. _____)

i.e.

2. **Heterotrophic** nutrition:

Heterotrophs (a.k.a. _____)

i.e.

a. Herbivores:

i.e.



b. Carnivores:

i.e.



c. Omnivores:

i.e.



d. Scavengers:

i.e.



e. Decomposers:

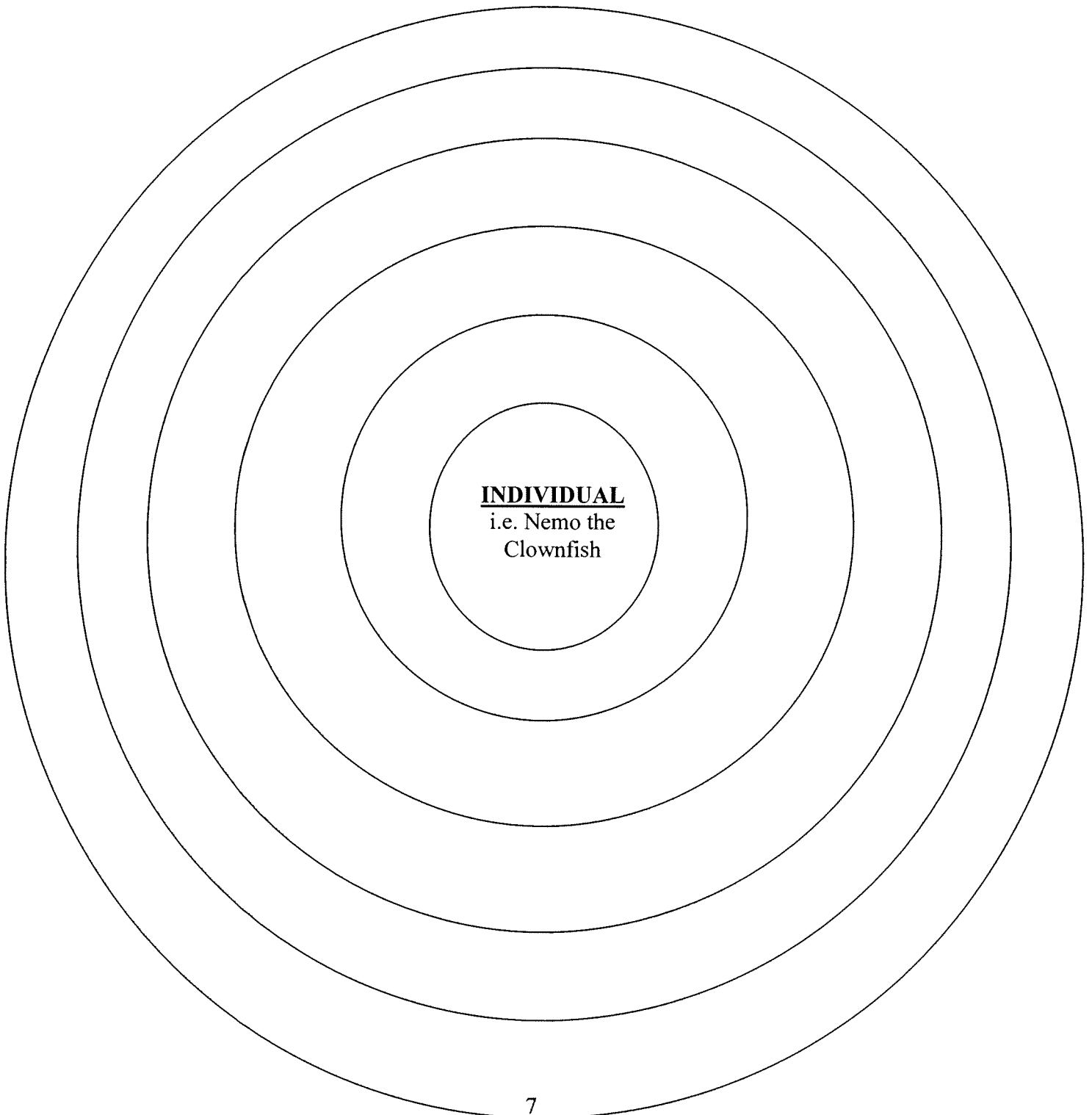
i.e.



Directions

You will watch a clip from the Disney film *Finding Nemo*. Inside the appropriate circle on the diagram:

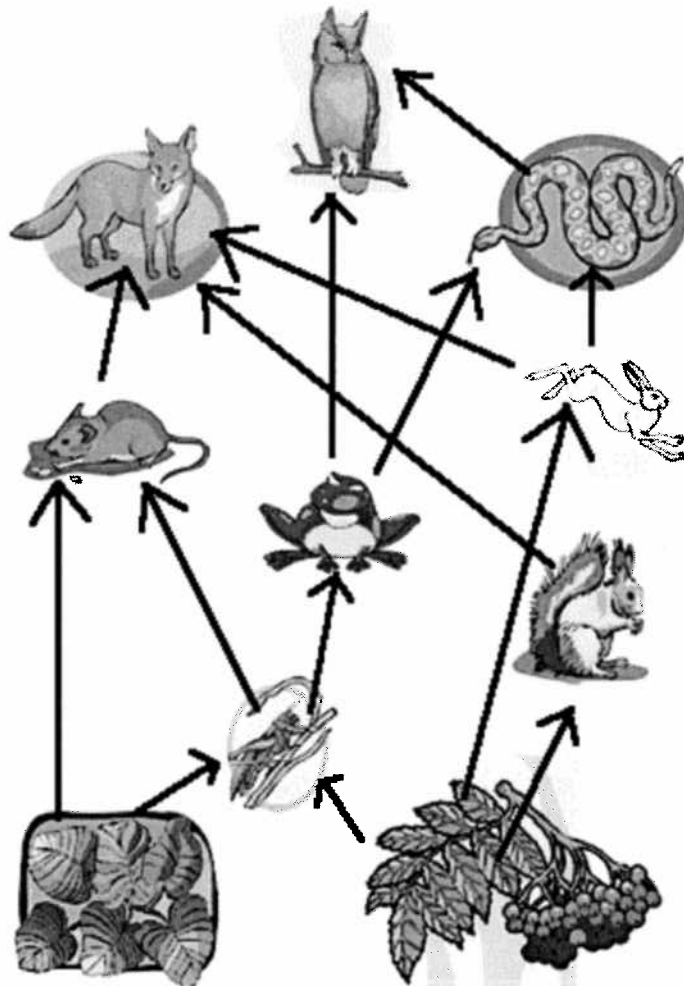
- Label the appropriate level of ecological organization (Community, Ecosystem, Population, etc...)
- Give a **SPECIFIC** example(s) from the clip you viewed in class.
- You may write anywhere within the levels.
- The first one is done for you.



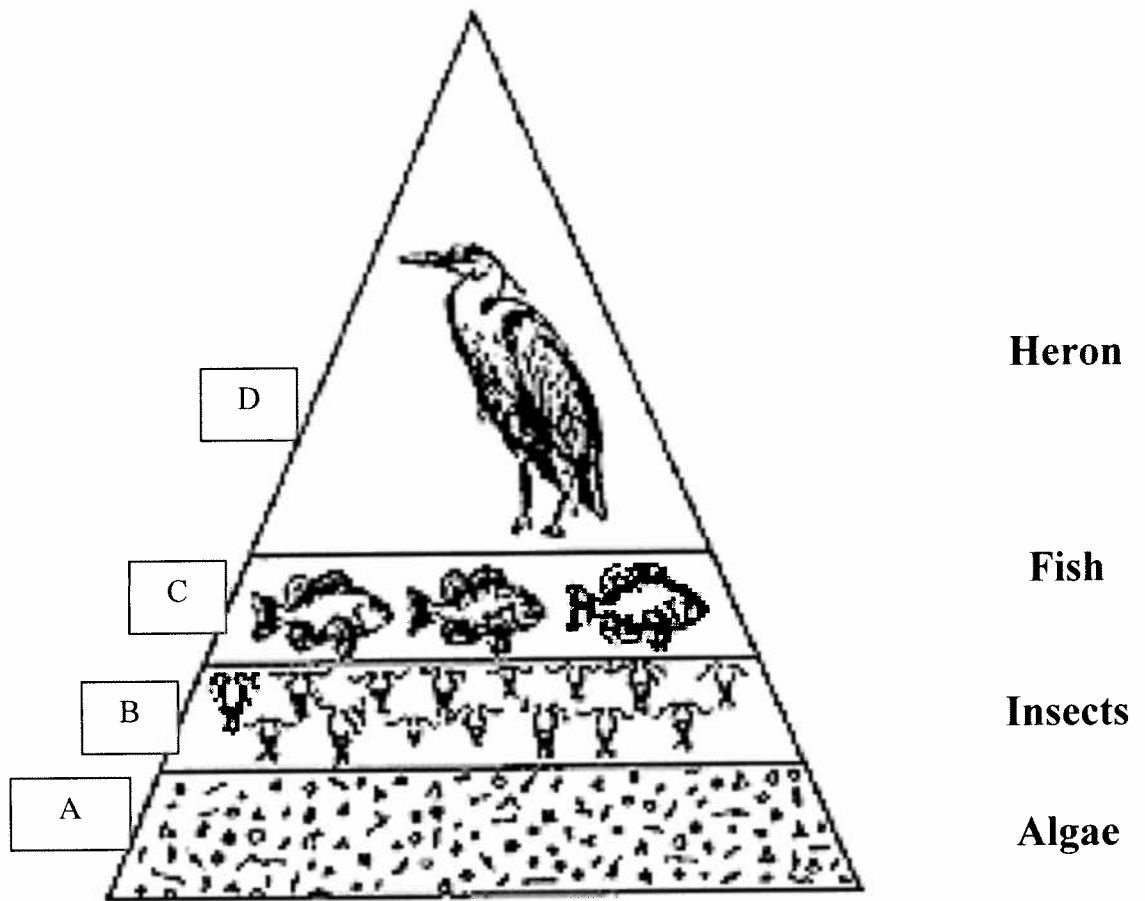
3. Food Chains and Webs

Food Chain:

Food Web:



4. Energy (Biomass) Pyramid



A.
B.
C.
D.

Why is it a pyramid??? _____

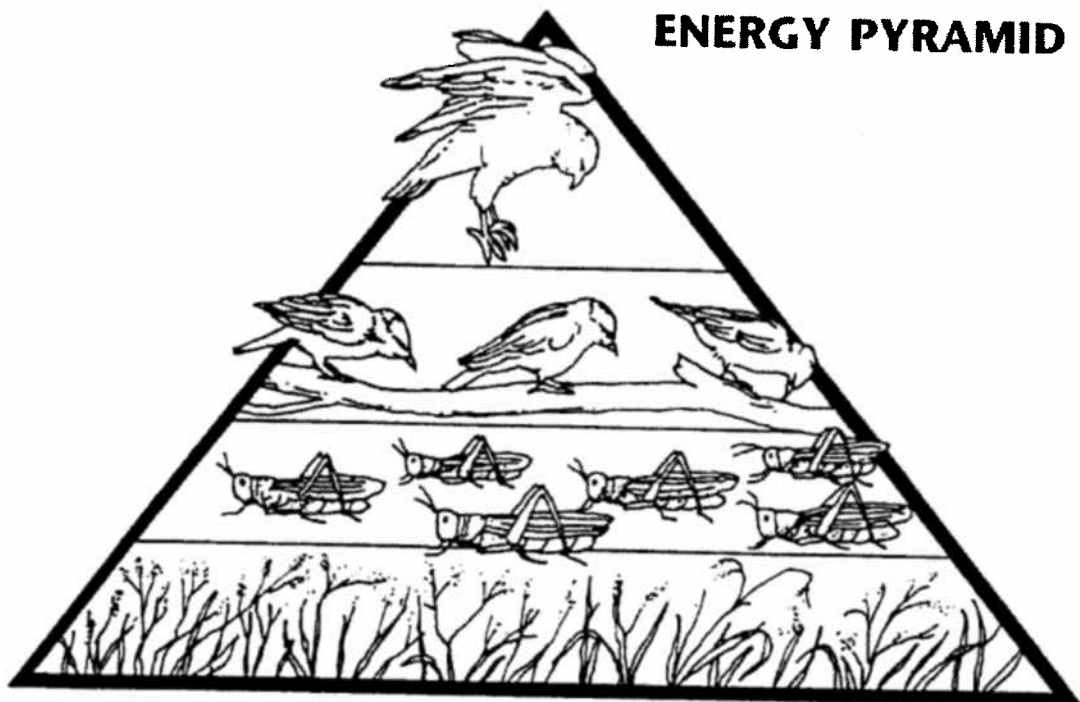
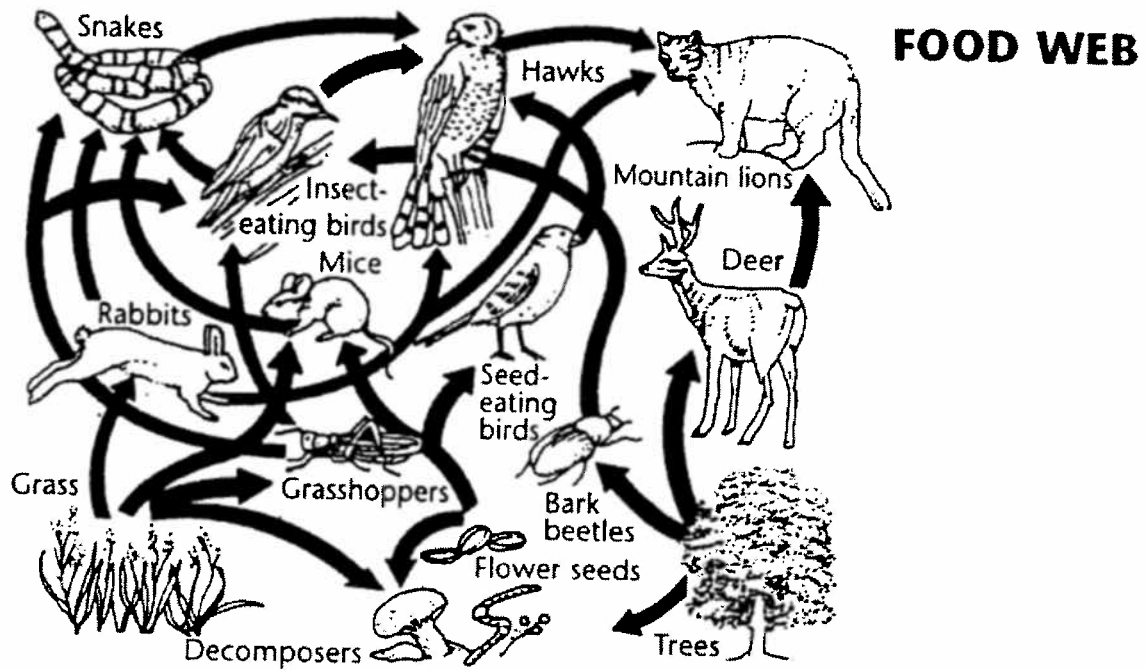
Super tricky question of the week:

You are a farmer with one field of 100 acres of corn. Which will feed more people: eating the corn directly of using the corn to feed cows that you will then eat. Why? _____

TRANSPARENCY 35

Life and the Environment

LIFE AND THE FOOD WEB/ ENERGY PYRAMID



TRANSPARENCY 35

Life and the Environment

Chapter 18

LIFE AND THE FOOD WEB/ENERGY PYRAMID

1. Describe a food chain within the pictured food web.

2. Compare a food web with a food chain.

3. Identify the producers in the food web.

4. What are the plant-eating consumers shown in this food web?

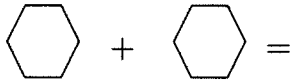
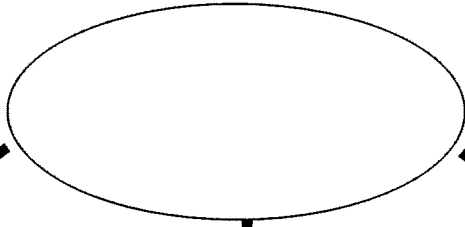
5. What are the carnivores shown in this food web?

6. Every stage is eventually returned to which final stage?

7. Why are there fewer organisms as you move toward the top of the energy pyramid?

8. If the number of grasshoppers is reduced, what may happen to the other members of the energy pyramid?

B. Symbiosis:



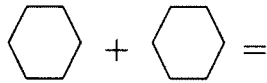
One organism _____

The other _____

i.e.

1)

2)



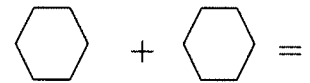
One organism _____

The other _____

i.e.

1)

2)



One organism _____

The other _____

i.e.

1)

2)

C. Competition

For what resources do organisms compete?

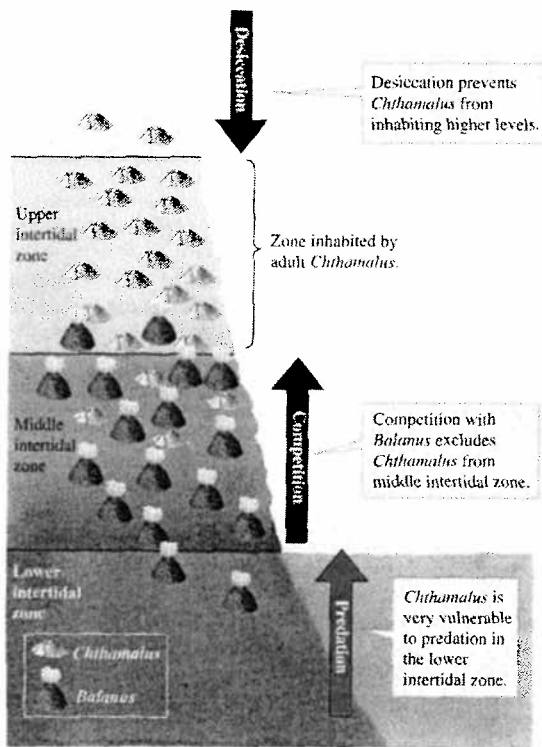
* _____
* _____

* _____
* _____

There are 2 types of competition...

- Intraspecies competition:
- Interspecies competition:

i.e. i.e. *Chthamalus* & *Balanus*



So the “_____” an organism has in its environment is its _____:

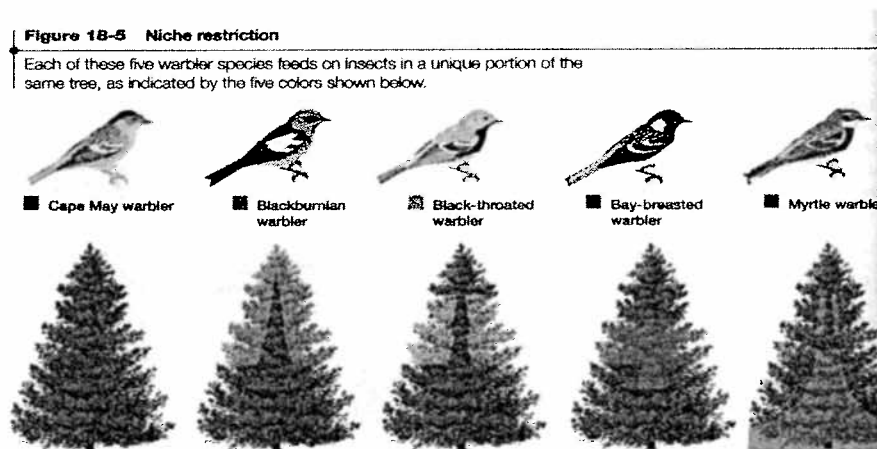
Fundamental Niche:

i.e.

Realized Niche:

i.e

Niche overlap:



D. Predator Prey Cycles

1. Predator:

2. Prey

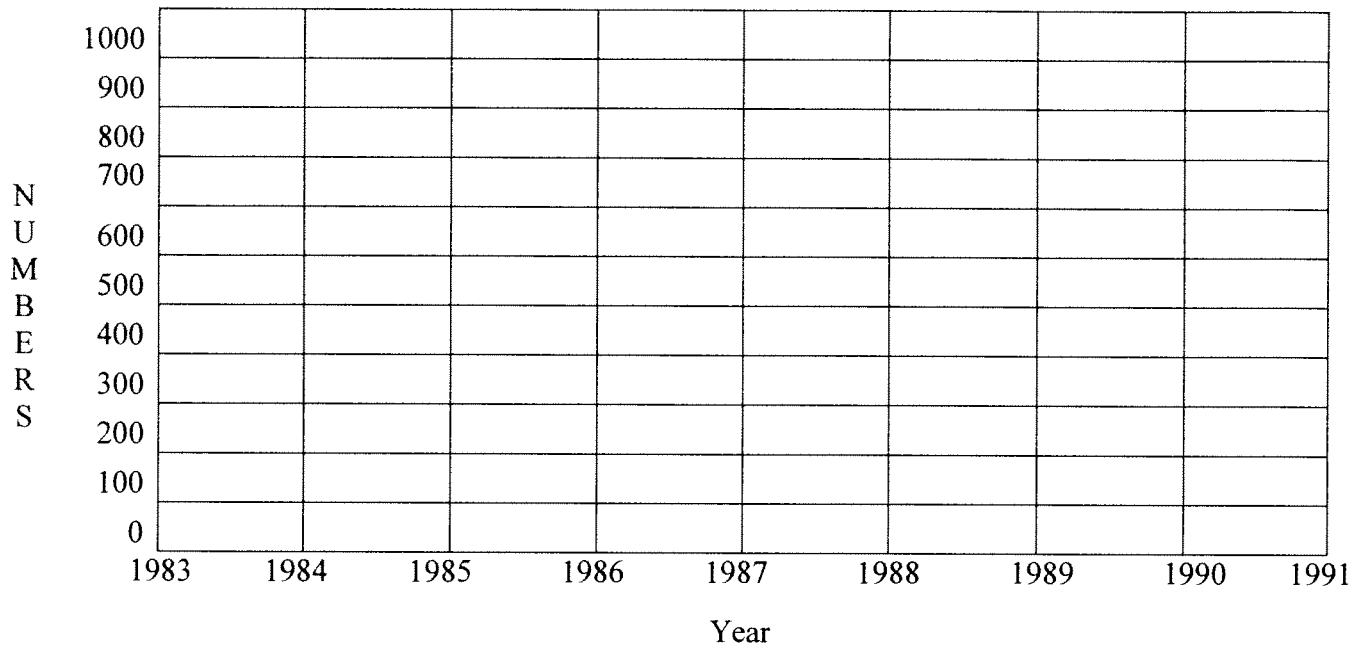
What would you hypothesize happening to the number of prey as the number of predators increases?

(In other words, as available food decreases, what happens to those organisms that feed on that food?)

As prey decreases, the number of predators should _____

Now, **Graph** this data

Year	Number of mice (___)	Number of Foxes (---)
1983	1050	200
1984	800	425
1985	426	581
1986	730	300
1987	980	153
1988	620	399
1989	380	548
1990	680	403
1991	1010	255



How would you describe the graph?? _____

II. Population: _____

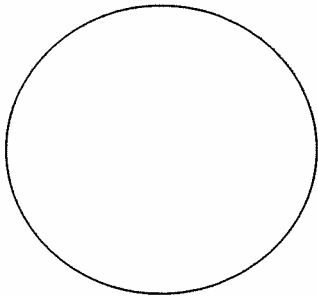
3 Key Features

A. Population Size:

B. Population Density

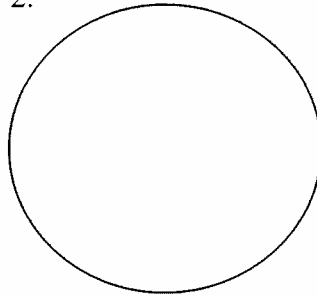
C. Dispersal

1.



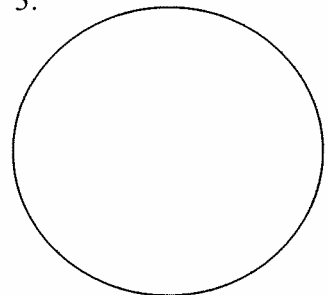
Aggregate ()

2.

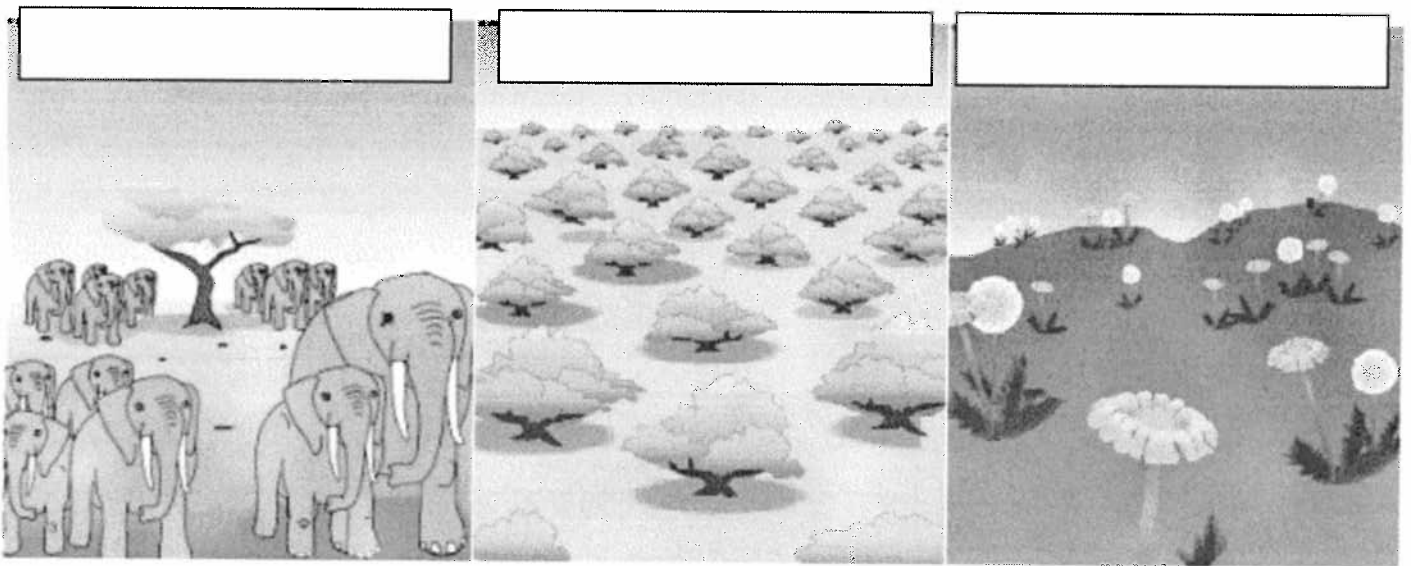


Uniform

3.



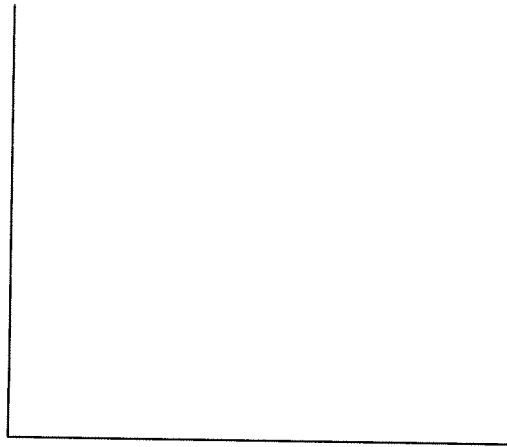
Random



D. Population Growth

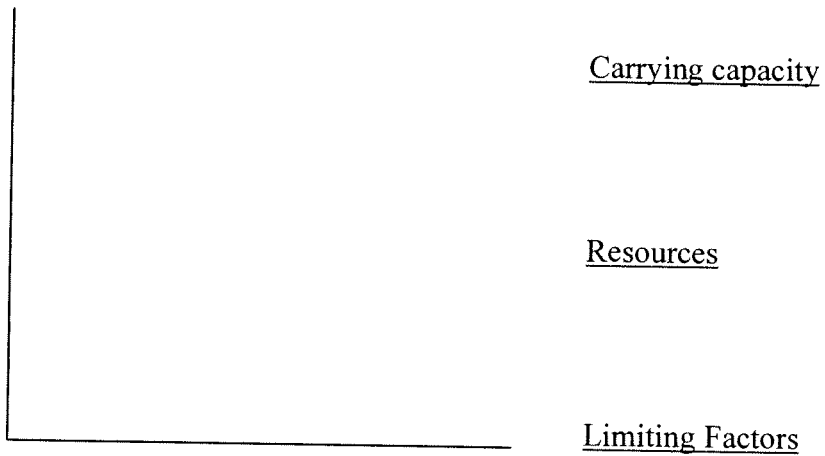
GROWTH = _____ - _____

1. Exponential Growth



CAN EXPONENTIAL GROWTH CARRY ON FOREVER?? _____

2. Logistic Growth



Human Population

Today = _____

_____ births - _____ deaths = _____ people added per SECOND!!!!

WHY???

1 -

2 -

3 -

Doubling Time (time it takes to double the entire population size)

<u>Time</u>	<u>Population</u>	<u>Doubling Time</u>
1650 – 1850	.5 billion – 1 billion	_____ years
1850 – 1930	1 billion – 2 billion	_____ years
1930 – 1975	2 billion – 4 billion	_____ years
1975 – 2045	4 billion – 8 billion	_____ years

** Doubling time _____ in _____ countries

Earth's "K" (carrying capacity) is ~ _____ billion (approximately)

CURRENTLY, Earth has EXPONENTIAL / LOGISTICAL growth. (circle one)

How do large populations cause **STRESS** on an ecosystem?

1 –

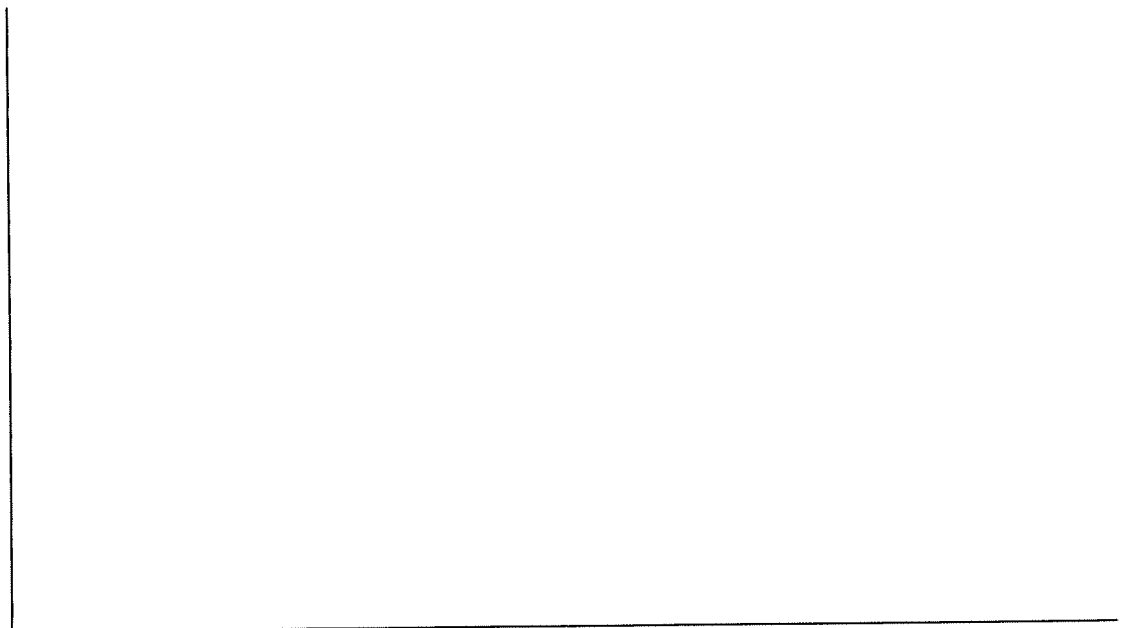
2 –

3 –

4 –

5 –

IF we don't balance our growth



Chapter

4

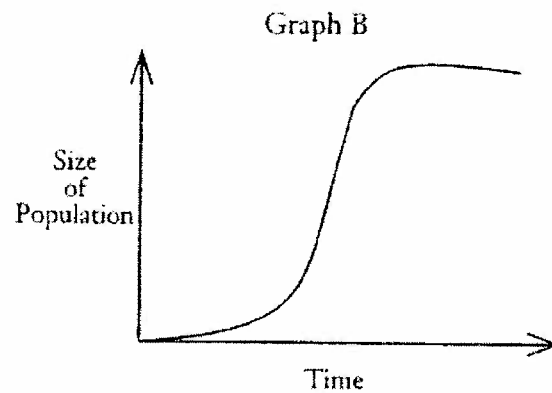
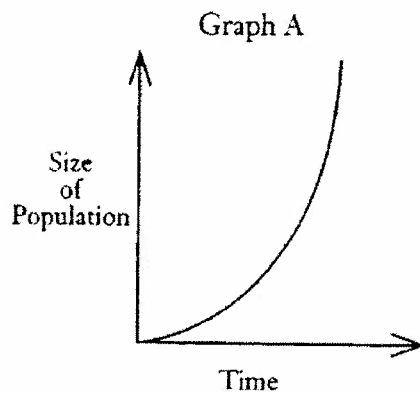
Population Biology

Reinforcement and Study Guide

Section 4.1 Population Dynamics

In your textbook, read about the principles of population growth.

Refer to Graphs A and B below. Answer the following questions.



1. What type of population growth is shown in Graph A? Explain this type of growth.

2. Which graph shows the most likely growth of a squirrel population living in a forest? _____

3. Which graph shows a population's growth under ideal conditions? _____

4. Why don't populations of organisms grow indefinitely?

Use each of the terms below just once to complete the passage.

grows	carrying capacity	below	births
above	under	deaths	exceed

The number of organisms of one species that an environment can support is called its (5) _____. If the number of organisms in a population is (6) _____ the environment's carrying capacity, births (7) _____, deaths and the population (8) _____. If the number of organisms rises (9) _____ the carrying capacity of the environment, (10) _____ will exceed (11) _____. This pattern will continue until the population is once again at or (12) _____ the carrying capacity.

The snowshoe hare is a primary source of food for the Canadian lynx. Explain how the lynx population size changes when the hare population increases.

Explain how the change in the lynx population size affects the hare population.

What is the relationship between the lynx and the hare called?

When does competition decrease the size of a population?

III. Change in Ecosystems

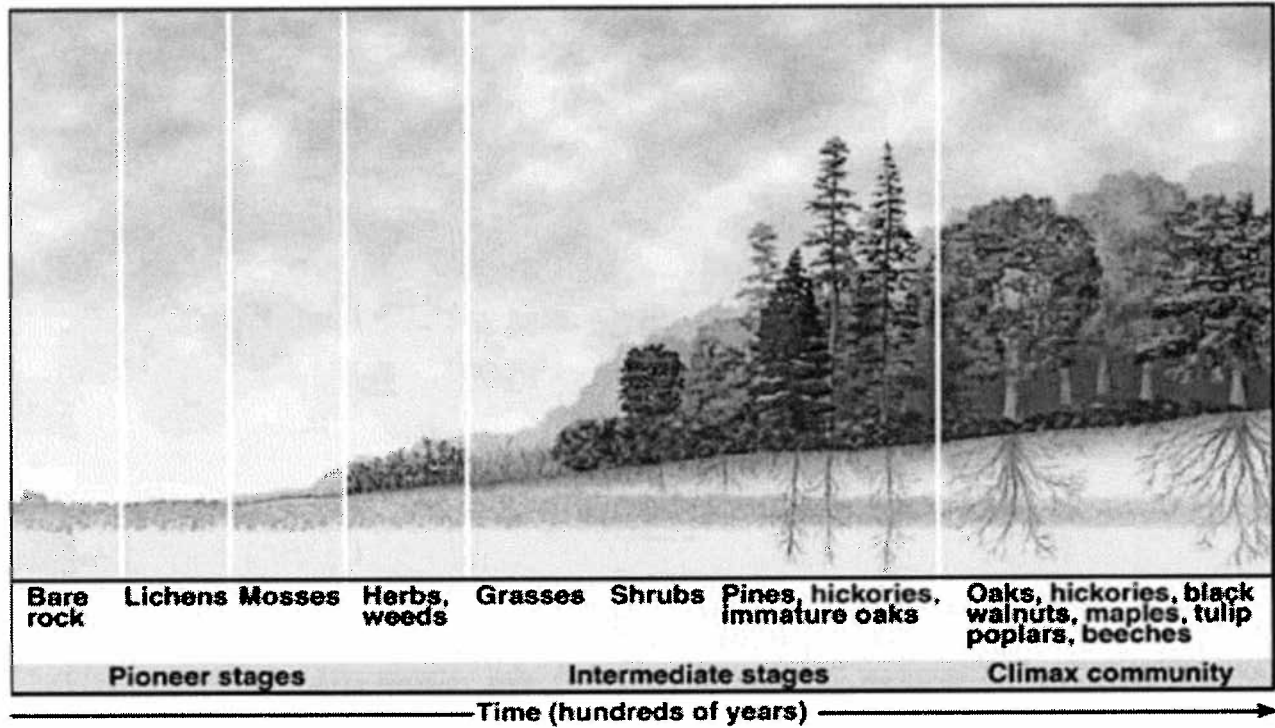
A. Succession:

1. Primary

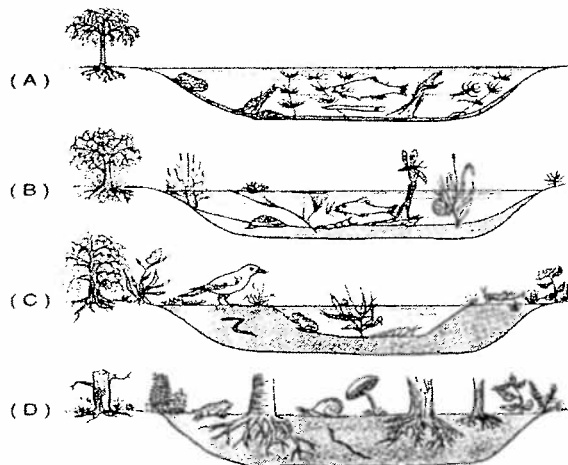
ON LAND

tion or display.

Primary succession



IN LAKES / PONDS



- A.
- B.
- C.
- D.

2. Secondary Succession



B. Species Involved in Succession

1. Pioneer Species

2. Climax Community

What is the name of the climax community you live in?

In order for an ecosystem to be stable (resist change), the ecosystem MUST,...

1)

2)

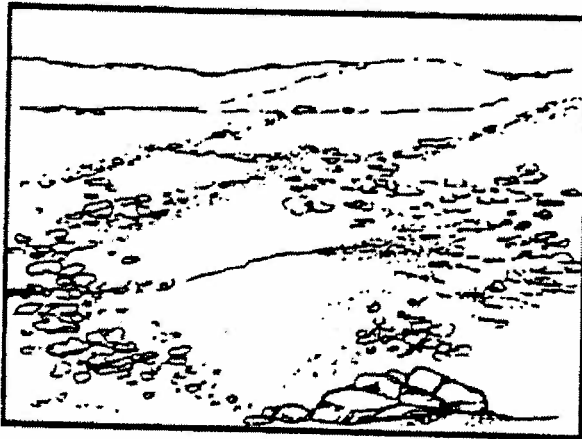
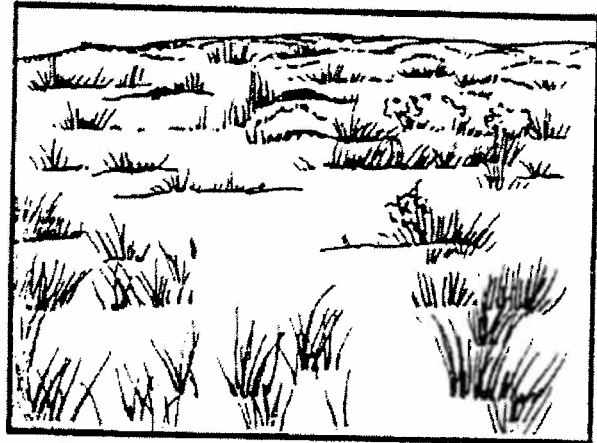
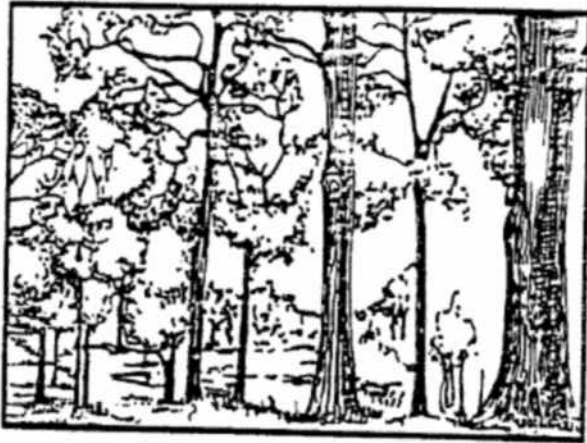
3)

4)

SUCCESSION

In your textbook, read about succession in a land community in Section 31:2.

1. These diagrams of succession are not in the correct order. Show the correct order by writing the numbers 1 to 4 on the blanks below the diagrams.



2. Match each diagram to the phrases below. Write the correct number of the diagram on each blank.

a. Climax community _____

d. Few primary consumers _____

b. Weeds begin to appear _____

e. Most animals present _____

c. Soil good for larger plants _____

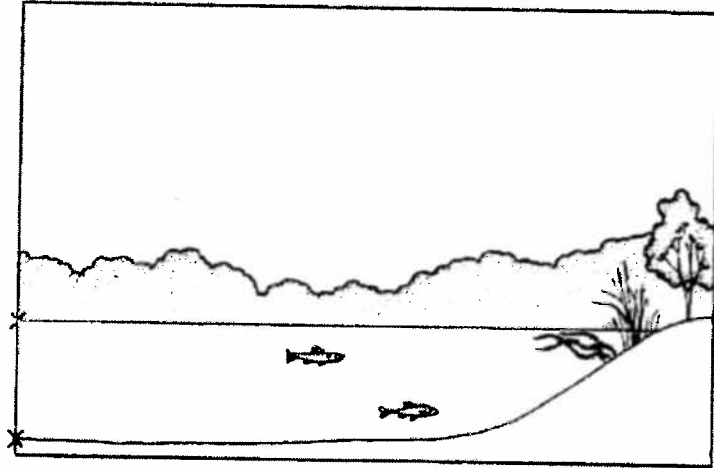
f. Rabbits, mice, and fox might be here _____

SUCCESSION

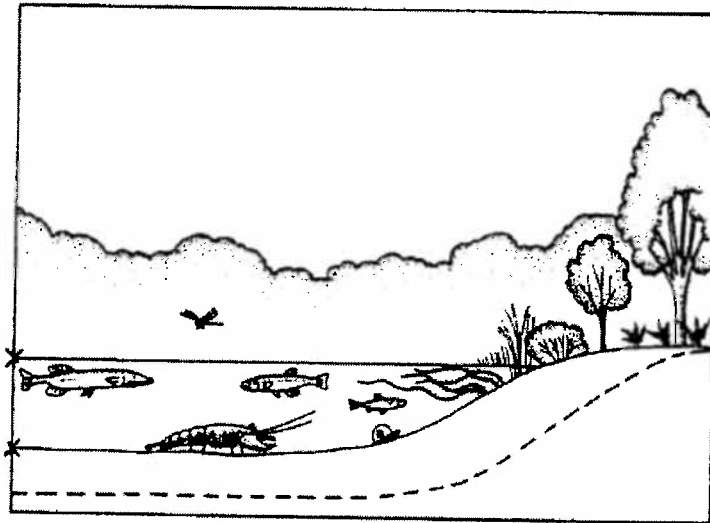
In your textbook, read about succession in a water community in Section 31:2.

3. Examine the diagrams below and the one on the next page. Measure the width and depth of the pond from the center of the X's in each diagram and record your measurements on the table on page 184. Then, answer the questions that follow.

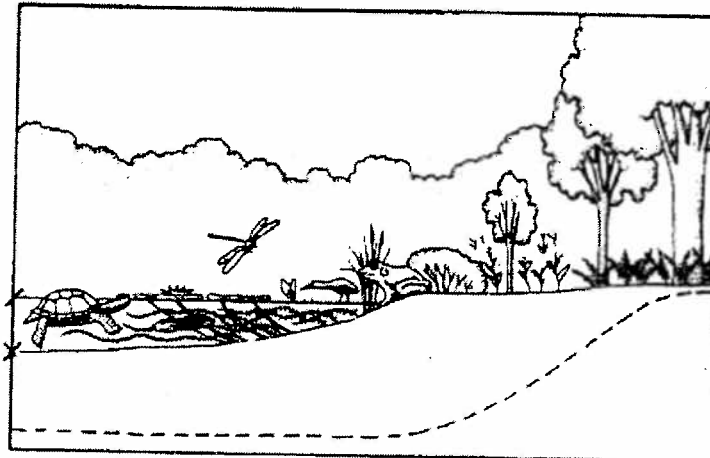
Stage A 1883



Stage B 1899

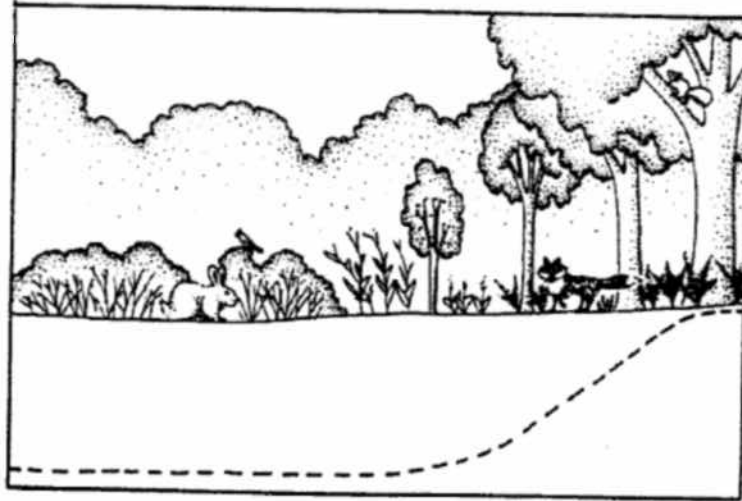


Stage C 1945



SUCCESSION

Stage D 1991



Stage	Year	Pond depth (mm)	Pond width (mm)
A			
B			
C			
D			

4. Describe the changes that take place in pond depth and width as the pond ages. _____

5. How have the numbers and types of animals changed from stage A to stage B? _____

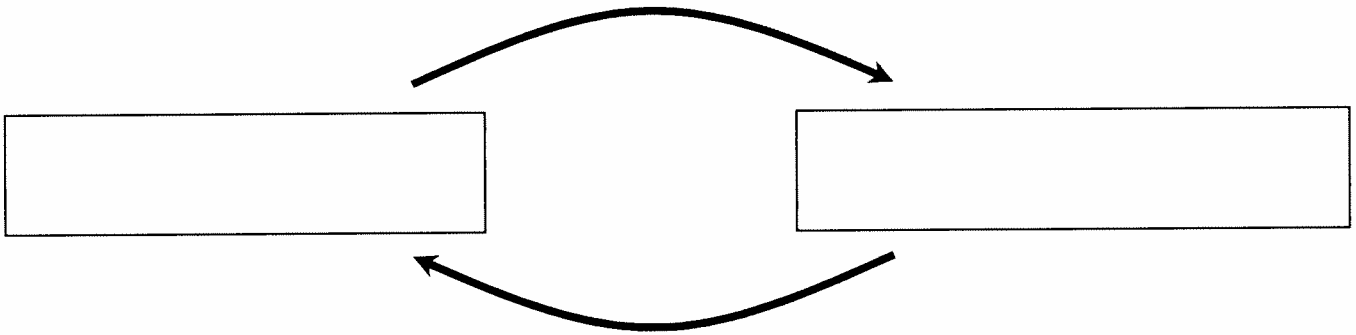
6. a. What has happened to the pond by stage C? _____

- b. How has this event affected the types of animals that are living in the pond? _____

7. What has replaced the pond in stage D? _____
8. What word describes these changes in the pond? _____

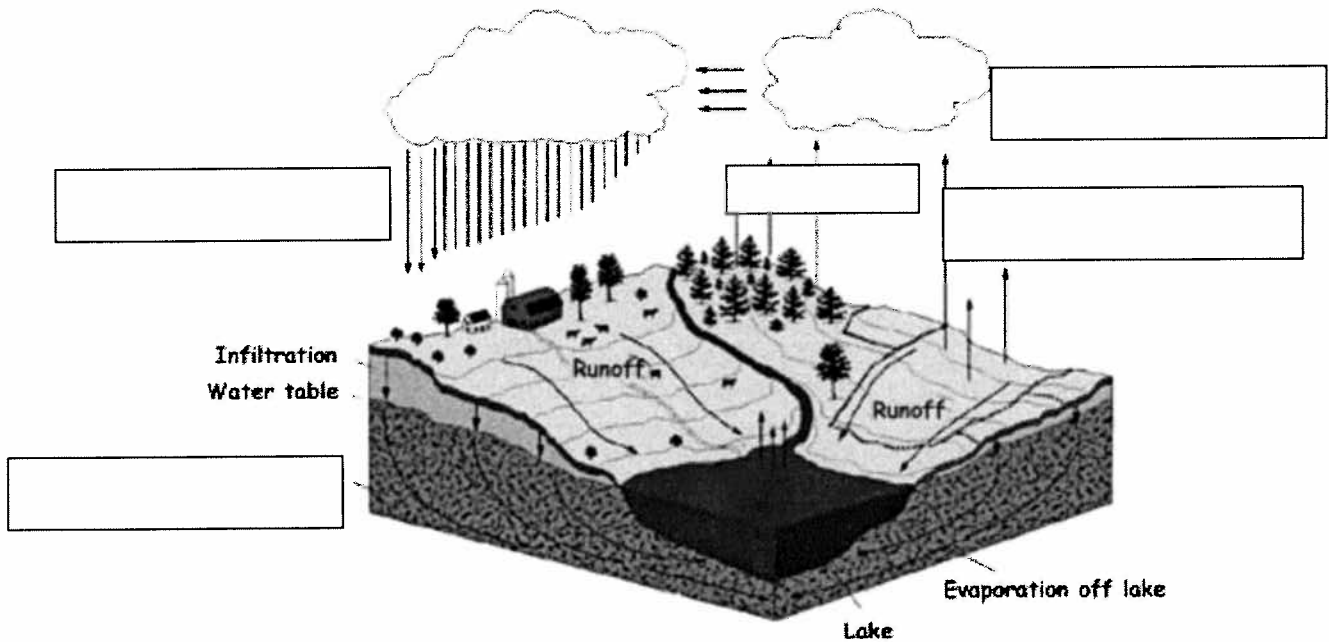
IV. Cycles of Materials

A. The Carbon and Oxygen Cycle

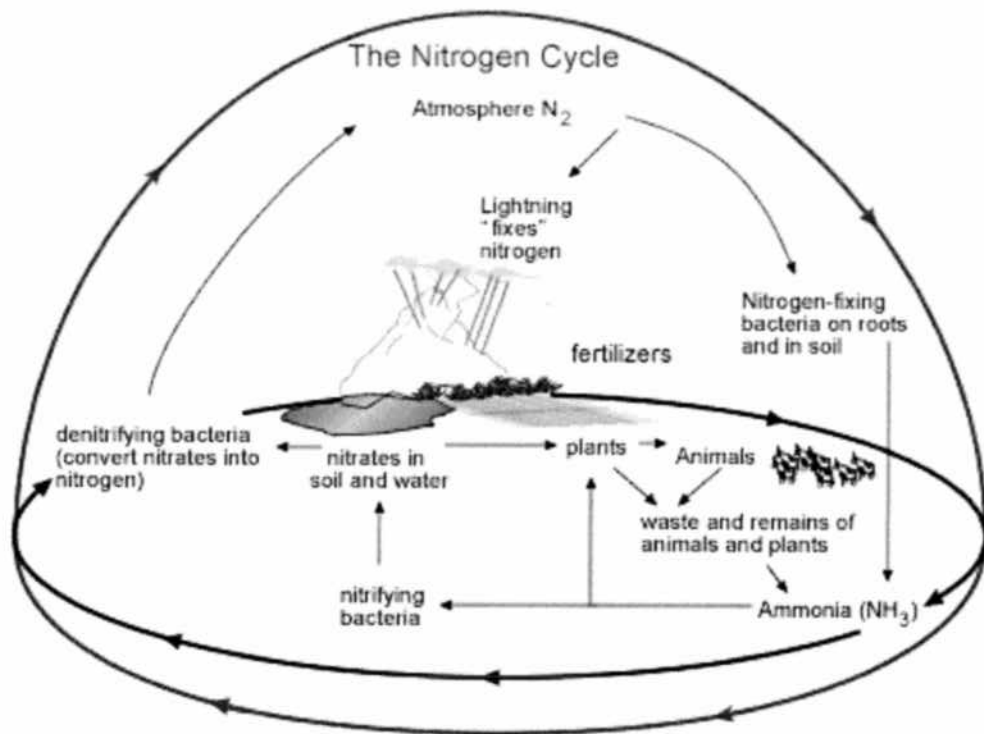


B.

Water Cycle



C. The Nitrogen Cycle



D. Resources

1. Renewable:

2. Non-Renewable:

Mark the following resources with an “N” for non-renewable or an “R” for renewable.

_____ Corn

_____ Solar Energy

_____ Fossil Fuels

_____ Table Salt (NaCl)

_____ Wood

_____ Apples

_____ Iron

_____ Wind Energy

_____ Cotton

_____ Sugar

Second Super tricky question of the week:

Plants could become a nonrenewable resource. **Agree or Disagree?**

Ecosystems

► Section 17-1: What Is an Ecosystem?

Organisms Interact with Each Other and Their Environment

In the space provided, write the letter of the description that best matches the term or phrase.

- | | |
|--------------------------|---|
| _____ 1. ecology | a. the place where a population of a species lives |
| _____ 2. habitat | b. a community and all of the physical aspects of its habitat |
| _____ 3. community | c. the organisms living in a habitat |
| _____ 4. ecosystem | d. the physical aspects of a habitat |
| _____ 5. abiotic factors | e. the different species that live in a habitat |
| _____ 6. biotic factors | f. the study of the interactions of living organisms with one another and with their physical environment |

Ecosystems Support Diverse Communities

Mark each statement below T if it is true or F if it is false.

- _____ 7. An ecosystem is defined by the organisms living in a particular area.
- _____ 8. Biodiversity is a measure of how many different species live in an ecosystem.
- _____ 9. A typical forest, 1 km² in area, has about 10 different species of organisms.
- _____ 10. A typical forest, 1 km² in area, has about 1,000 individual organisms.
- _____ 11. An ecosystem does not include microscopic organisms.
- _____ 12. An ecosystem is completely isolated from organisms living outside of the ecosystem.
- _____ 13. A small patch of farmland cannot be considered an ecosystem.

Ecosystems Change over Time

Read each question, and write your answer in the space provided.

14. What is meant by the term *pioneer species*?

17-1 con't

15. Explain the differences between primary succession and secondary succession.

16. Why is Glacier Bay, Alaska, an example of how ecosystems change over time?

Section 17-2: Energy Flow in Ecosystems

*In the space provided, explain how the terms in each are **DIFFER** in meaning.*

1. producers, consumers

2. trophic level, food chain

3. herbivores, carnivores

4. detritivores, decomposers

Mark each statement below T if it is true or F if it is false.

- _____ 5. Only a few organisms can digest cellulose.
- _____ 6. Omnivores eat both plants and animals.
- _____ 7. There are three trophic levels in every ecosystem.
- _____ 8. A food web consists of all the plants in an ecosystem.
- _____ 9. Humans use bacteria and other microorganisms to digest cellulose.
- _____ 10. The lowest level in the food chain is detritivores.
- _____ 11. Cows are herbivores and consumers.
- _____ 12. Humans are producers.
- _____ 13. Grass is a producer.

Energy Is Lost in a Food Chain

Complete each statement by writing the correct term or phrase in the space provided.

- 14. At each trophic level, the energy stored is about _____ percent of that stored by the organisms in the level below.
- 15. A(n) _____ is a diagram in which each trophic level is represented by a block.
- 16. _____ is the dry weight of tissue and other organic matter found in a specific ecosystem.

► Section 17-3: Ecosystems Cycle Materials

Materials Cycle Between Living and Nonliving Things

Read each question, and write your answer in the space provided.

- 1. What are biogeochemical cycles?

- 2. What are living and nonliving reservoirs?

- 3. What are the most important substances that pass through biogeochemical cycles?

The Water Cycle Is Driven by the Sun

Complete each statement by underlining the correct term or phrase in the brackets.

4. In a tropical rain forest, most of the water in the atmosphere comes from [evaporation / transpiration].
5. Water that falls to the earth as rain or snow and seeps into the soil becomes [soil / ground] water.
6. In the living portion of the water cycle, water is taken up by [animals drinking / the roots of plants].
7. The process by which water evaporates from the leaves of plants is called [respiration / transpiration].

The Carbon Cycle Is Linked to Energy

Read each question, and write your answer in the space provided.

8. How does carbon become part of organic molecules?

9. List three ways carbon atoms return to the nonliving reservoir.

Plants and Bacteria Take Part in the Phosphorus and Nitrogen Cycles

Complete each statement by writing the correct term or phrase in the space provided.

10. Organisms need nitrogen and phosphorus to build _____ and _____.
11. Phosphorus is usually present as _____ in soil and rock.
12. The process of combining nitrogen gas with hydrogen to form ammonia is called _____.
13. Nitrogen-fixing bacteria use _____ to split molecules of nitrogen gas and combine the nitrogen atoms with hydrogen.