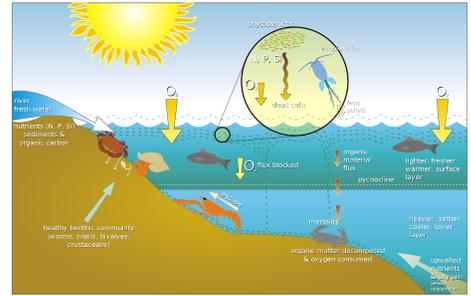


Name: KEY Per: _____ Date: _____

Ecosystems and Relationships

Quizlet - Ecosystem and Relationships



1. List two biotic and abiotic factors pictured in the aquatic ecosystem and describe how one of them might affect the other.

<p>Abiotic Factors:</p> <ol style="list-style-type: none"> 1. Sun 2. Temperature 3. Oxygen 	<p>Biotic Factors</p> <ol style="list-style-type: none"> 1. Fish 2. Crabs 3. Bacteria
<p>How might one affect the other? Cold water temperatures would result in slower activity for most organisms.</p>	

2. Put the following terms in order by size: community, organism, population, biosphere, ecosystem, cell.
 Cell, organism, population, community, ecosystem, biosphere.

3.

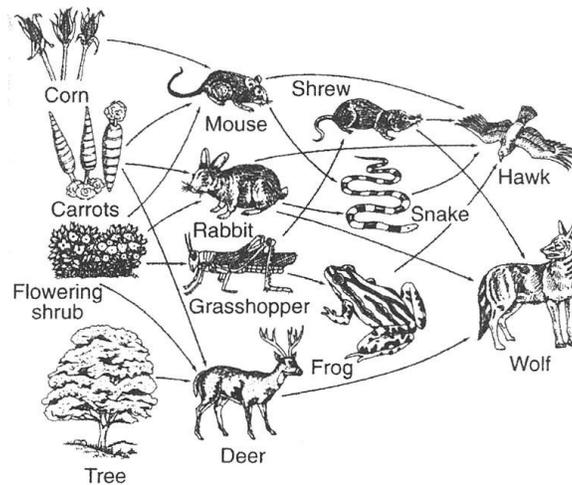
Community or Population? (fill-in below)	
Population	One type of a species in a particular area.
Community	All the living things in a particular area.
<p>What does an ecosystem include that community alone does not?</p> <p>An ecosystem would include not only the biotic factors at play (animals, plants, etc.) but it would also take into consideration all of the abiotic factors (temperature, light intensity, etc) and how these two impact each other.</p>	

4. How can these two bird species live in the same tree? HINT: This is niche related.

One explanation might be that they have distinctly different responsibilities and/or roles as it relates to their habitat. For example, one might only consume the seeds of the tree where the other only consumes the foliage of the tree. Thus, they can coexist without competing for the same resources.



View the following Food web and fill-in the table.



5.

Trophic (feeding) Level	Species examples
Producer	Tree, Flowering Shrub
Primary Consumer (herbivore)	Grasshopper, Rabbit
Secondary Consumer (eats herbivores)	Frog, Shrew
Tertiary Consumer (eats carnivores)	Wolf, Hawk

6. If wolves became extinct which would happen FIRST:

- Deer, rabbit and shrew would increase in population
- Deer, rabbit and shrew would decrease in population
- Shrubs, trees, carrots and corn would decrease in population

7. If wolves became extinct which would happen LATER in time:

- Deer, rabbit and shrew would increase in population
- Deer, rabbit and shrew would decrease in population
- Shrubs, trees, carrots and corn would decrease in population

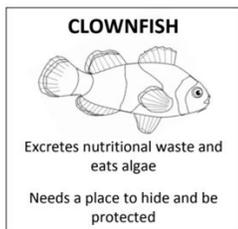
8. What would happen if there was a drought affecting the producer population?

It is possible that all levels of the food web would be negatively impacted. Since there is less food for herbivores their populations might decrease. If this were to occur, there would be less food for secondary consumers thus resulting in a decrease in their populations as well. This might have a cascading effect up to the top level consumers.

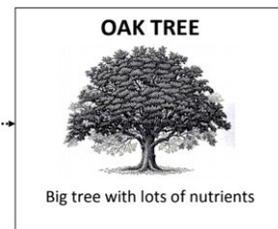
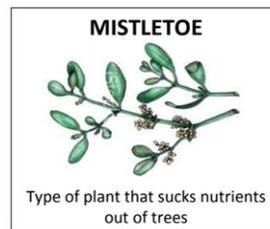
9. Define the following biotic relationships by matching the columns.

A. Mutualism	1. One member of the relationship is harmed, other is helped Parasitism
B. Commensalism	2. Both members in the relationship benefit. Mutualism
C. Parasitism	3. One member of the relationship is hunted by the other for food Predator-Prey
D. Predator-Prey	4. Both organisms are harmed searching for resources etc. Competition
E. Competition	5. One member in the relationship is helped and the other has no effect. Commensalism

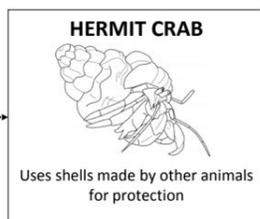
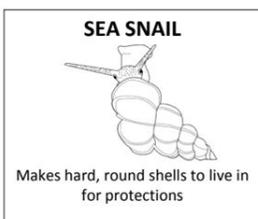
10. Label each of the relationships pictured below:



Mutualism



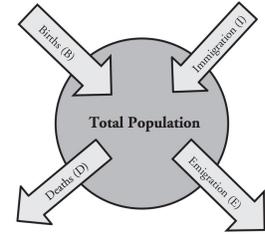
Parasitism



Commensalism

Population Ecology Review

Quizlet - Population Ecology



1. What are some factors that affect population size? (there are 4) Explain their effects.

Population Size Factor	Definition	Effect on Population Size (increases, decreases, stays the same)
1. Natality/Birth Rate	The number of organisms born into a given population.	Increase
2. Mortality/Death Rate	The number of organisms that die in a given population	Decrease
3. Immigration	The movement of organisms into a given area.	Increase
4. Emigration	The movement of organisms out of a given area.	Decrease

2. How is population density calculated? Sample Problem: A small farming community in Texas covers 14 square kilometers. There are 420 individuals who live within the town limits. What is the population density of this community? **Formula for density** = Number of organisms/area

Population density is calculated by dividing the number of organisms present by the unit of area in which they are located.

$$PD = 420 \text{ individuals} / 14 \text{ sq. km}$$

$$PD = 30 \text{ individuals/sq. km}$$

3. If there are 50 macroinvertebrates per square foot of stream and the area of the stream sampled is 10 feet long by 10 feet wide how many macroinvertebrates are estimated to exist in this stream?

$$\text{Formula for Population Size} = (\text{area}) \times (\text{density})$$

$$\text{Area} = L \times W$$

$$\text{Area} = 10 \text{ ft} \times 10 \text{ ft}$$

$$\text{Area} = 100 \text{ sq. ft}$$

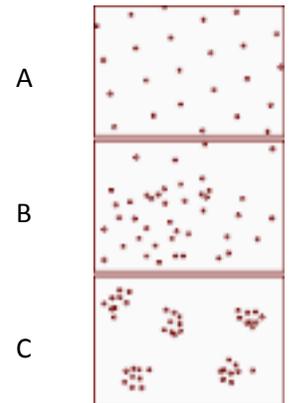
$$\begin{aligned} \text{Population Size} &= 100 \text{ sq.ft} \times 50 \text{ macroinvertebrates/sq. ft} \\ &= 5000 \text{ macroinvertebrates} \end{aligned}$$

4. Describe the types of population dispersion patterns and give examples of each.

Population Dispersion Pattern	Description	Examples
Uniform or Even	- Recognizable pattern - Even spacing between organisms	-Corn field -Apple Orchard -Geese flying in a "V" formation
Random	- No recognizable pattern -Uneven spacing between organisms	-Deer in a forest -Trees in a forest -Snakes in a desert
Clumped	- Small or Large groupings of organisms in distinct areas.	- Herds of elephants - Schools of fish

5. A student estimates population size by using random sampling for each of the three populations seen to the right. Which population will give the estimate population value closest to the actual value and therefore will be the most accurate? Why?

Population pattern A will provide the most accurate estimate of the actual population because it is a uniform arrangement. When using random sampling, this pattern provides the student with data from each of her sampling trials regardless of which area she samples from. Choice C (clumped) would provide her with the least accurate estimate due to the fact that she could possibly sample areas that have no organisms present thus skewing her data to appear lower than the actual population size.



6. One of the small islands off the coast of Ecuador experiences a bloom of plant growth especially providing seeds for birds. Only 2 finches (bird species) emigrate from the area while 15 finches fly in from other islands where food is scarce. Because the finches are thriving and doing well there are 25 new birds born while only 8 die. What is the overall effect on population size? See formula below.

Population Growth = (Births + Immigration) - (Deaths + Emigration)

$$PG = (25 + 15) - (8 + 2)$$

$$PG = +30$$

The overall effect on the population of finches in this example would be a net growth of 30 individuals.

7. In order to estimate the population of rabbits in North Carolina, ecologists originally marked 10 rabbits and then released them back into the population. Over a 5 year period, rabbits were trapped and their numbers recorded. Using the formula below estimate the size of the rabbit population. What type of method was used: Random sampling or Mark and Recapture? Use formula provided below.

$$\text{Estimated Population Size} = \frac{(\text{total number captured}) \times (\text{number originally marked})}{(\text{total number recaptured with mark})}$$

Year	Total Rabbits Captured	Number recaptured with Mark
1980	10	1
1981	14	1
1982	12	1
1983	9	0
1984	4	2
Total	49	5

EPS = $\frac{49 \times 10}{5}$ = 490/5 = 98 rabbits. This is an example of the Mark and Recapture method.

8. Contrast the different types of population growth patterns

Population Growth Pattern	Sketch of Graph	Characteristics of Population
Logistical or Logarithmic "S - Curve Model"		<ul style="list-style-type: none"> - limited resources (food, water, space, etc) - Possible disease pressures - Possible predation pressures.
Exponential "J - Curve Model"		<ul style="list-style-type: none"> - Unlimited resources - No disease - No predation <p>Basically, ideal conditions for population growth.</p>

9. What is the difference between a density dependent limiting factor and a density independent limiting factor? **Density Dependent** limiting factors are those "factors" that limit the size of a population and **DEPEND** upon the number of individuals that make up the population. For example, disease is a density-dependent limiting factor because its impact on the size of the population **DEPENDS** upon how many organisms are present. Think about the flu....it spreads more effectively when there are large, dense groups of people.

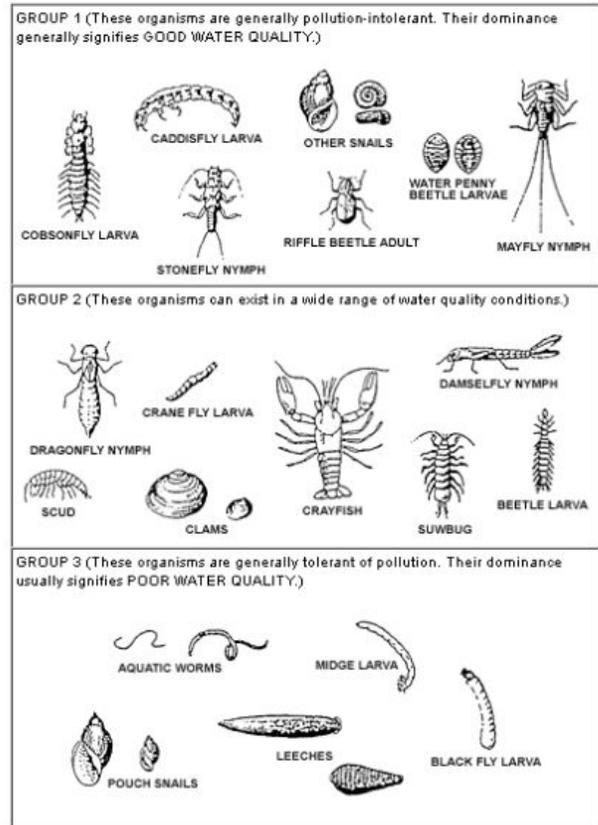
13. Data Regarding Macroinvertebrates in Two areas in Naugatuck Watershed

	Number of Organisms	
	Longmeadow Brook Stream	Naugatuck River, Naugatuck CT
Caddisfly larva	31	8
Midge Larva	17	51
Crane fly Larva	32	28
Scud	20	13
Total Sampled	100	100

Interpret the data for each sampling site. Use data to support statements. When might these samples have been taken?

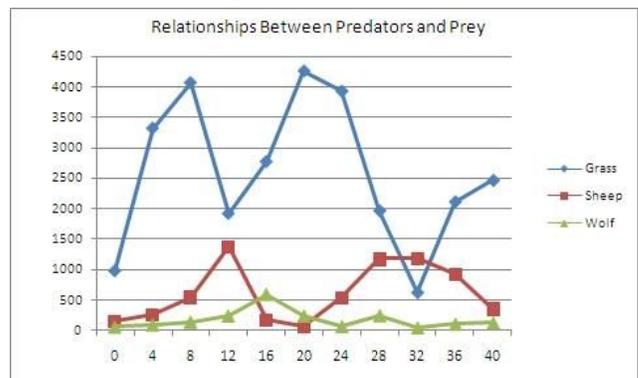
It can be inferred from looking at the data present in the table that the pollution levels in the two collection sites are different. It can also be inferred that the pollution levels found in the Longmeadow Brook are lower than those pollution levels found in the Naugatuck river. This inference is supported by the fact that the Longmeadow Brook holds larger populations of of macroinvertebrates from "Group 1" which are typical bioindicators of "Good Water Quality". Likewise, the Naugatuck river holds larger populations of macroinvertebrates from "Group 3" which are typical bioindicators of "Poor Water Quality".

Macroinvertebrate Taxa Groups



14. Interpret the graph to the right. Describe a relationship between two of the organisms shown.

One relationship that is evident from looking at the graph is that as the population of sheep increase, the population of grasses decrease. This is logical since the sheep feed on the grasses. Secondly, as the population of sheep decrease, the overall population of grasses increases.



15. How might the introduction of an invasive species of plant affect the organisms shown on the graph?

The introduction of an invasive species of plant could negatively impact the population of native grasses that inhabit this ecosystem. The invasive species might outcompete the native species for nutrients and sunlight causing the native species to decline. This decline might impact the primary consumers because they would have a smaller food supply. If the primary consumers were unable to eat and digest the invasive species, they would have to emigrate out of their existing location in order to acquire the necessary nutrients for survival. If they were unable to leave then their population would decrease.