

Populations / Communities

name: SOLUTIONS

- 1) What do individuals living in a population share in common? Water, food supplies, Resources.
- 2) Give 1 example of a Plant population, and 1 example of an Animal population (not mentioned in class).
- Palm trees in Hawaii in 2004 - Caribou living in Canada in 2023
- 3) For each of the following situations, which factor (births, deaths, immigration, emigration) is causing a change in population.
 - a) During the spring season, Geese return to a particular lake. I
 - b) Due to the noises caused by deforestation activities, deer have fled to other areas. E
 - c) Commercial nets have been placed in some B.C rivers to catch Salmon. D
 - d) A Brown bear raises its young B
 - e) Residences of some homes have installed mouse traps. D

- 4) What will happen if mortality rates are greater than birth rates and emigration is greater than immigration in a given population? Population decrease
- 5) The Canadian Department of Oceans and Fisheries wish to determine the population of wild fish living in a particular lake. To do so they first capture and tag 50 fish. Several days later scientists capture 55 fish of which 11 have been tagged.
 - a) What method has been used to determine population size? Capture-Recapture
 - b) What is the population size of wild fish living in this lake?

$$\text{Pop size} = \frac{50 \cdot 55}{11} = \underline{250 \text{ fish}}$$

- 6) a) What are the 2 principal factors that can vary population densities? Availability of food & water
b) What are 2 other factors that have an affect on population densities?
Climate, Predators, Diseases, Natural disasters, Human development
- 7) What type of distribution can be observed in the following situations:
 - a) In a forest, pine trees grow in haphazard locations. Random
 - b) Mushrooms grow in groups on the trunks of trees. clustered
 - c) The Colibris hummingbirds defend their personal territory very aggressively from other hummingbirds. They have the tendency to keep the same distance apart from each other. Uniform
- 8) Which method for determining population size would be best in each of the following:
 - a) Spiders in a forest - Sampling
 - b) Maple trees in a park - Counting
 - c) Squirrels living in a park. - Capture-Recapture
- 9) There is an average of 7 weeds in every 5 m² in a city cemetery. If the cemetery is 6000m².
 - a) How many weeds are there in the entire cemetery?

$$\text{Pop size: } \frac{7 \cdot 6000}{5} = \underline{8400 \text{ weeds}}$$

- b) What is the population density of weeds within the entire cemetery?

$$\frac{8400 \text{ weeds}}{6000 \text{ m}^2} = \underline{1.4 \text{ weeds/m}^2}$$

10) Scientists capture and tag 25 caribou living in the Charlevoix region. A year later scientists capture 39 caribou, of which 15 have previous tags on them.

a) How many caribou make up this population?

$$\text{Pop size} = \frac{25 \cdot 39}{15} = \underline{65 \text{ caribou}}$$

b) If the Charlevoix occupies 3900 km² of area, what is the population density of the caribou?

$$\frac{65 \text{ caribou}}{3900 \text{ km}^2} = \underline{0.017 \text{ caribou/km}^2}$$

11) In the following situations state whether we are dealing with a biotic or abiotic ecological factor, and whether it is a limiting factor or a non-limiting factor. Circle correct answers

a) In a certain community garden, tomatoes don't receive enough sunlight and therefore do not ripen.

Biotic or Abiotic Limiting Factor or Non-Limiting Factor

b) Spider populations have increased due to increases in available food (mosquitoes).

Biotic or Abiotic Limiting Factor or Non-Limiting Factor

c) The current winter has been so cold that a given species has had trouble traveling/moving around.

Biotic or Abiotic Limiting Factor or Non-Limiting Factor

12) Why is it that the population of Lynx living in the Quebec North tends to decrease while the Snowshoe Hare population seems to be low?

less Hare = less food = lynx health = Low population for lynx suffering

13) The South American Rainforest is said to be the most diverse forest in the world. Why would scientist make such a statement?

Many different types of species in that area.

14) In a given forest there are 5000 trees, of which 450 are coniferous. What is the relative abundance of coniferous trees in this forest?

$$\frac{450}{5000} \times 100 = 9\%$$

15) Forest A consists of Maple trees, coniferous trees, and birch trees. Forest B consists solely of coniferous trees. There is the same number of trees in both forests. Which forest has a greater biodiversity?

A → more species

16) True or False:

- a) For there to be competition there must be a limited resource being sought after. **T**
- b) Fish are in competition with each other for the water in the lake. **F**
- c) Neighboring plants are in competition for soil nutrients **T**
- d) For there to be predation one species must die. **F**
- e) Parasites cause no harm to their host. **F**
- f) Bees pollinating flowers is an example of a mutualism. **T**
- g) Humans feeding pigeons in a park is an example of commensalism. **T**

17) The following represents the contents of two aquariums (same sized aquariums). Study the info below:

Individuals in Aquarium A (12)	Relative Abundance of Species in Aquarium A	Individuals in Aquarium B (10)	Relative Abundance of Species in Aquarium B
8 Goldfish	66 %	3 Goldfish	30 %
2 Angel fish	17 %	2 Angel fish	20 %
1 Snail	8 %	0 Snail	0 %
0 Scavenger fish	0 %	2 Scavenger fish	20 %
1 Guppy	8 %	3 Guppy	30 %

- a) What can be said about the species richness: SAME (4 species each)
- b) Fill in the columns for the relative abundance of each species found in each aquarium. ✓
- c) Which of the 2 aquariums has the greater biodiversity? B