POPULATION DYNAMICS

Biology, Grade 12 University Preparation, SB14U

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DESCRIPTION

In this learning activity, students will conduct a model population census by taking advantage of "species" present in their own local environment. Students will analyze and compare results to develop an understanding of the complexities associated with species and ecosystem management. They will explore different variables and factors contributing to population dynamics.

CURRICULUM LINKS - BIOLOGY, GRADE 12, UNIVERSITY PREPARATION, SB14U

Overall Expectations: A1, F1, F2, F3
Specific Expectations: A1.1, A1.5-A1.11, F2.1, F2.3, F3.1-3.3

## PLANNING NOTES

Background Information

The population dynamics of an ecosystem and the determination of the current state of a species population dictate whether or not a species is ''at risk''. Conducting a population census is one method ecologists use to evaluate the state of a species. Once a population is deemed at risk, recovery efforts can range from habitat restoration to relocation to the management of other species such as predators. Each of these efforts can itself impact the population dynamics of species other than the one they are intended to benefit.

Materials

- Notebooks
- Pencils
- *Species and Objects to Count* (Appendix 1)

Recommended Class Time

2-3 periods
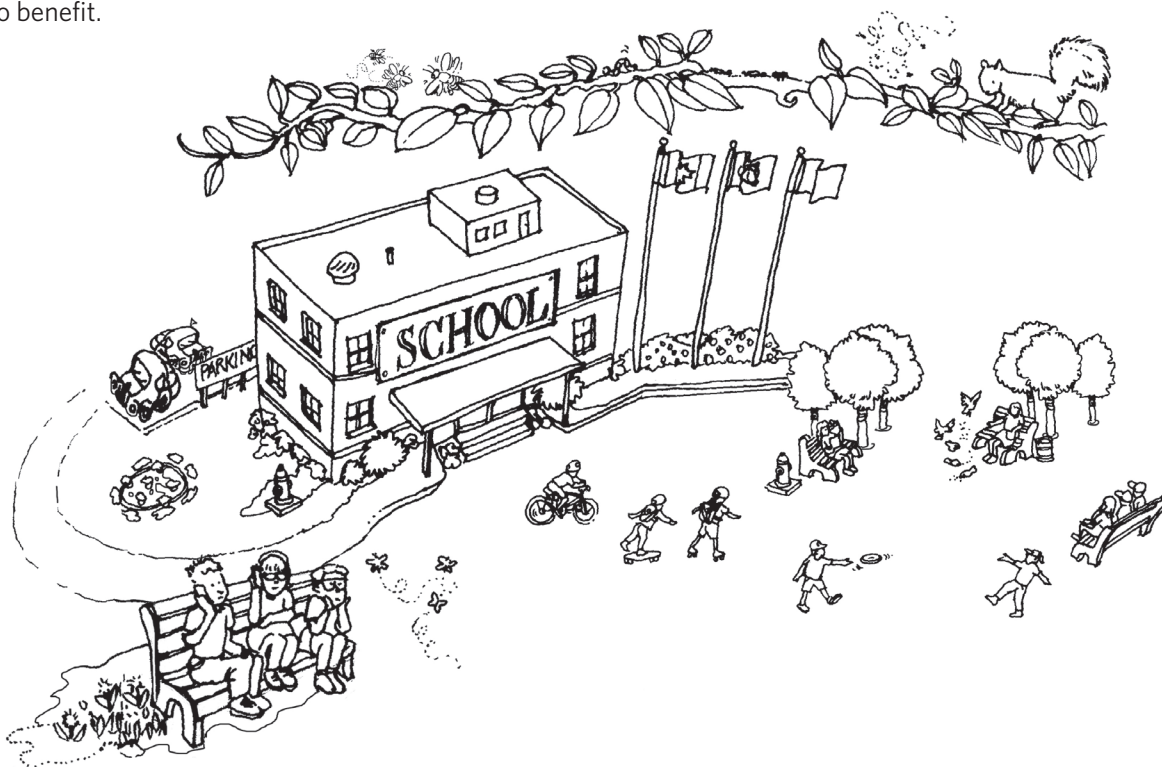
TEACHING/LEARNING STRATEGIES ....

Set Up
- Prior to the lesson, print out *Species and Objects to Count* (Appendix 1) and cut it into individual slips of paper. If needed, adapt the items to best suit your environment. You can either opt to distribute a unique item per student or to duplicate some of the items. By duplicating items, you can compare and contrast methods and results between the students which can serve to further highlight the difficulties inherent in species counting.

- Note that if the weather does not permit outdoor learning, this activity could be completed indoors by providing appropriate species to count.

Ignite
1. Explain to students that they will be counting different species/objects and ensure that they all have a slip of paper with their species written down. Ask them to consider the mobility of their species/objects and how that will impact their counting strategy. Discuss different ways that students could count their species (i.e. walking the perimeter of the area, remaining stationary, etc.) and outline the limits of the "study area".

2. Give students enough time to develop a strategy for performing their census and recording their information. Ask students to predict how many of their species/objects they will find in the designated study area.

3. Encourage student to share their counting strategies with a partner and give advice on ways to improve their methods.

Explore
1. Take students outside or to the study area and give them 15 to 20 minutes to perform their count and record the results.

2. Discuss student results after the activity by having each student briefly present their count and strategy to a partner or small group.

Reflect
1. As a whole class, discuss the following questions:
   - How did your knowledge of the species impact your strategy for counting?
   - Did you find more or less than you had predicted? Why or why not?
   - Are there any natural or artificial barriers/incentives which may have influenced the presence of a species in the study area?
   - How can you ensure that you did not double-count a species? What strategies do ecologists use to conduct accurate population censuses?

2. Introduce population census techniques such as mark-and-capture and explain the benefits of different techniques.

3. Ask students if they would use a different counting strategy to track their species/objects or would they repeat their method? Would this change if they were looking for a different species? Why or why not? Discuss what variables might affect differences in census results from one day to the next.

4. Repeat the census and compare results. Why might results be different? Was one census more accurate? Why?

EXTENSION ....

At Home Census: Will census results will change in a different area? Ask students to complete the same census at home and then compare the results to their original census. Students can also compare their at home results and discuss contributing variables.

APPENDIX ....

- *Species and Objects to Count* (Appendix 1)

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Benches/picnic tables	Parking signs
Blue cars	Cars
Birds	Butterflies
Cars that are not blue	People riding bicycles
People wearing hats	People wearing glasses
People talking on cellphones	Squirrels
Pigeons	Fire Hydrants
Flags	Airplanes
Caterpillars	People wearing white shoes
People wearing backpacks	Leaves
Trees	Dandelions
Flowers	Bicycles
Ants	Earthworms
Mosquitoes	Bees