**Pavia National High School**
**Science Department**
**Department of Education**

Detailed Lesson Plan
GRADE 9 BIOLOGY
BIODIVERSITY AND EVOLUTION

## I. Objectives

At the end of the class discussion, the Grade 9 learners must have:

- Described a balance ecosystem.
- Defined population density, limiting factor and carrying capacity.
- Demonstrated changes in the population and its needs and characteristics.
- Identified factors affecting population growth and size.
- Measured population density.

## II. Learning Content

### A. Subject Matter

- Biodiversity and Evolution - Population Density

### B. Content Outline

- Discuss balance ecosystem
- Define population density
- Define limiting factor and carrying capacity
- Factors affecting population growth and size
- Measure population density

### C. Science Concept

- A balanced ecosystem is one in which all living and nonliving things are interacting successfully.if any part of the ecosystem is disturbed, other parts will also be disturbed.
- A population density is the number of individuals per unit area.
- limiting factors are anything that limits the size of a population like certain environmental conditions.
- Carrying capacity is the the maximum population size an environment can support
- The different factors of affecting population growth and size are the availability of food, water, living conditions, light temperature and soil nutrients.

### D. Science Process Skills

- Observing
- Inferring
- Problem solving
- Communicating

### E. Value Focus

- Shows interest in the lesson
- Actively participates in the lesson
- Shows honesty in answering the problems

## III. Instructional Materials

### A. Visual Aids

- Printed images, illustration
- Key Concepts written in Manila paper
- Video clips

**B. References**

- Science 9 Learner's Module, Module 3 pp. 8-11
- Science 9 Teacher's Guide, pp. 39-41

**IV. Lesson Development**

| Lesson Development | Teacher's Activity | Student's Activity | Teacher's Note/Remarks |
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| **Engagement 15 mins** | "Please stand, let us pray"<br><br>"Good morning class."<br><br>"Yesterday we discussed about index of diversity. What is index of diversity?"<br><br>"Why is it that biodiversity is very important?"<br><br>"Very good."<br><br>"Now that you already know how to measure the index of diversity which tells you how diverse are the species in a certain area and the you've already realized the importance of biodiversity, lets now proceed to our next topic which is about measuring the population density."<br><br>"But before that, I have a video to show to you."<br><br>"It is about hunting and what happens to the population of boar when they are being hunted."<br><br>"Pay attention to the screen and take down notes." | The students stand in attention to pray.<br><br>"Good morning Ma'am"<br><br>"Index of Diversity is a mathematical way of expressing the amount of biodiversity and species distribution in a community."<br><br>"Because a community having a diverse species will more likely withstand environmental changes."<br><br>The students takes down notes | The teacher will ask a volunteer to lead the prayer.<br><br>A student will volunteer to recite. |
| **Exploration 10 mins** | "As you can see, I have here an illustration depicting the distribution patterns of the different populations."<br><br>"What you're going to study the three patterns of population then, using the formula for computing population density, calculate the density of each population.<br><br>Density = $\frac{NumberOfIndividuals}{SizeOfArea}$<br><br>"Count the total number for each population. Record the number in the table.<br>"Do you know how to count how many runs are there?"<br><br>"Do it in a one whole sheet of pad paper."<br><br>"Understood?"<br><br>"Start now." | "Yes Ma'am" | After watching the video, the teacher will let the students work on an activity related to measuring index of diversity.<br><br>"Students' activity will be gathered and the teacher will be the one to check it." |

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| **Explanation**<br>**20 mins** | "We're you able to finish your activity?." | "Yes Ma'am" | |
| | "What you have measured earlier is the population density." | | |
| | "Do you know what is the difference between a population size and population density? | "A population size can have the same number of individuals in a population but when we say population density, we are referring to the number of individuals per unit area." | The teacher will call a name to answer. |
| | "Very good." | | |
| | "That's why except from counting the number of individuals, you also solved for the total measurement of the area in order for you to get the population density." | | |
| | "What is the importance of knowing the population density?" | "it is important in monitoring if the area can support the number of population living in it." | |
| | "What do you think will happen if the resources in that specific area will not be enough to supply the needs of the species of animal living on it?" | "There will be a competition for food and if the supply will not be enough, they will starve and eventually die." | |
| | "Very good." | | |
| | "But there are other factors that contributes to the differences in population density."<br>"What is the first factor in our list?" | "Moving in and out of the ecosystem." | The teacher will post the key concepts on the board. |
| | "What happens when a population moves in and out of the ecosystem?" | "Population sizes change when new members move into the ecosystem. They decrease when members move out of an ecosystem." | |
| | "Do you understand?" | "Yes Ma'am" | |
| | "What is the second factor?" | The birth rate and death rates can also affect a population size." | |
| | "Very good." | | |
| | "And anything that limits the size of a population like certain environmental conditions are called limiting factors." | | |
| | "what are the examples of limiting factors?" | "The availability of food, water, living conditions, light temperature and soil nutrients." | |
| | "Very good." | | |
| | "The maximum population size an environment can support is called its carrying capacity. If the The birth rate and death rates can." | | |
| | "Do you have any clarifications?" | "None Ma'am" | |
| | "Understood?" | "Yes" | |
| **Elaboration**<br>**10 mins** | "Life depends on life. Animals can not exist without green plants. Living things create niches for other living things." | | |
| | "The living conditions must ideal for their survival." it is important for them so that they will not go extinct." | | |
| **Evaluation**<br>**5 mins** | Essay:<br><br>1. Explain the relation of the population density to the survival of an organism. | | The teacher will let the students answer the questions in an essay form to freely express their thoughts. |

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| | ”10 points” | | |

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