10

SCIENCE
QUARTER 3
Week 7

CapSLET

Capsulized Self-Learning Empowerment Toolkit

Schools Division Office of Zamboanga City
Region IX, Zamboanga Peninsula
Zamboanga City

"Unido, Junto avanza con el EduKalidad *Cree, junto junto puede!"*

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SUBJECT & GRADE/LEVEL	Science 10	QUARTER	3	WEEK	7	DAY	dd/mm/yyyy
TOPIC	Ecosystem Stability						
LEARNING COMPETENCY	11. Explain how species diversity increases the probability of adaptation and survival of organism in changing environment. **(S10LTIIh-41)**						

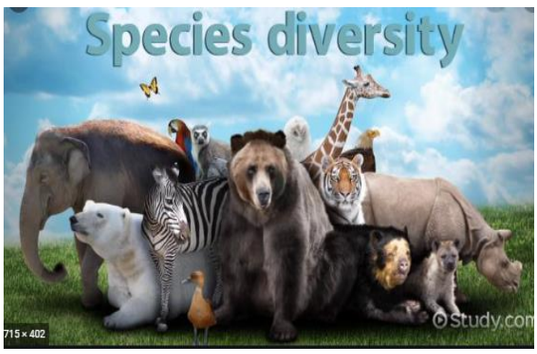
IMPORTANT: Do not write anything on this material. Write your answers on a separate sheet. **Do not forget to answer all the Self-Assessment Questions (SAQs).**

UNDERSTAND

Ecosystem Stability

If you observe the world, it is easy to see that some animals and plants are alike in the way that they look and in the things they do, and others are quite different from one another.

What is the difference between Biodiversity and Species diversity?



- ✓ **Biodiversity** refers to a variety of life on Earth today that consist of many millions of distinct biological species, the diversity of genes in the species together with the places where they are found, as deserts, forests and coral reefs.
- ✓ **Species Diversity** is the number of species in a site or habitat.

Did You Know That. . .

It is amazing to know that according to scientists, there are more than 117 million species of plants, animals, and other microorganisms as of 2010 that have been discovered and named; while they also believe that there are millions more that are unknown. There are many more species, especially in the world's rain forests and oceans that have not been discovered yet.

In the table are the numbers of species known and currently exist in the world.

Table 1: Current Number of Species in the World

Category	Total
Vertebrate Animals	**62,305**
Invertebrate Animals	**1,305,250**
Plants	**321,212**
Others	**51,563**
Total Species	**1,740,330**

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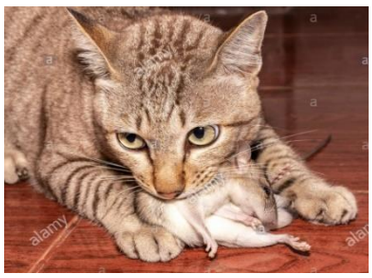
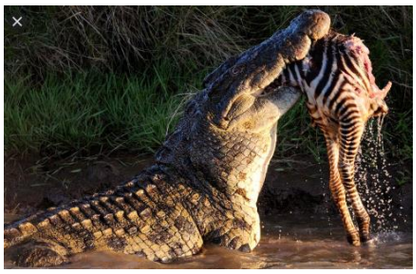
The different plants and animals, and other forms of life interact with each other in so many different ways. Many species of plants and animals have evolved depending on one another, so that when one species becomes extinct, the other species could be extinct too.

TRIVIA

Certain types of organisms are ***keystone species***, which perform unique function in the ecosystem. Keystone species exist only in limited numbers but their impact on the environment is great. They help control the population of other species by eating the sick and old members. Examples of keystone species are sharks and alligators, and cats which help regulate the population of rats that may bring diseases. Often, the decline of a keystone species can have tremendous impact in the ecosystem such as population explosion, population crashes or extinction of other species.





SAQ-1: *How does adaptation increase the chances of survival for an organism?*
SAQ-2*:* *What effect do keystone species have on an ecosystem?*

An ecosystem is stable when it has the ability to maintain structure and function over long period of time despite disturbance and population sizes of species, and their interactions. The structure of an ecosystem refers to the physical and geological landscape. The function of an ecosystem pertains to the processes involved in natural balance such as water and nutrient cycling or biomass productivity.

To achieve stability, an ecosystem must fulfil two components- resistance and resilience. An ecosystem shows **resistance** when its structure and functions stay normal despite changes in the environment. An ecosystem has **resilience** when it can regain its normal structure and function after a disturbance. Ecologists believe that ecosystems, which demonstrate high degree of stability, may have different combinations of resilience and resistance to allow them to withstand external changes. Most ecologists agree that ecosystem with highly diverse species are more likely to stabilize than when biodiversity is low.

Today, no ecosystem is stable because of massive disruption from human intervention such as human population growth, habitat destruction, pollution, agriculture, hunting and fishing and natural causes like climate change, changes in the sea levels and currents, acid rain, invasive species and migration.

The Philippine Biodiversity

According to Dr. Terrence Gosliner, the leader of the 2011 Biodiversity expedition, the Philippines was regarded as one of the diversity hotspot in the world. This means that the country is one of the world's biologically richest but has the most threatened ecosystems.

The Philippines has high species diversity in some groups of organism and a very high level of endemism. Endemic species is a species which is only found in a given region or location or location and nowhere else in the world.

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The table below shows the number and recent endemism of each taxonomic group.

Table 3.2: Diversity and Endemism

Taxonomic Group	Species	Endemic Species	Percentage Endemism
Plants	9,253	6,091	65.8
Mammals	167	102	61.1
Birds	535	186	34.8
Reptiles	237	160	67.5
Amphibians	89	76	85.4
Freshwater Fishes	281	67	23.8

Source: Conservation International (2007). Biodiversity Hotspots-Philippine Accessed from http//www.biodiversityhotspots.org/philippines/pages/biodiversity.aspxlast Oct.4,2011

Let's Practice! ***(Write your answer on the separate sheets)***

Directions:
A. Identify whether the picture represent *high biodiversity* or *low biodiversity*,
B. Tell whether the organisms have *better* or *low chances of survival* in the ecosystem,
C. Identify whether the ecosystem is *stable* or *unstable*; and
D. Explain the chances of survival and adaptation of organisms based on the picture.

1. 	A. B. C. D.
2. 	A. B. C. D.
3. 	A. B. C. D.
4. 	A. B. C. D.

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REMEMBER

Key Points

- ✓ Biodiversity refers to a variety of life on Earth today that consist of many millions of distinct biological species, the diversity of genes in the species together with the places where they are found, such as deserts, forests and coral reefs.
- ✓ Species Diversity is the number of species in a site or habitat.
- ✓ Organisms in the ecosystem interact with each other and each perform unique function.
- ✓ High biodiversity = Stable Ecosystem
  Low Biodiversity = Unstable Ecosystem
- ✓ Stable Ecosystem has the ability to maintain structure and function over long period of time despite disturbance and population sizes of species, and their interactions.
- ✓ Most ecologists agree that ecosystem with highly diverse species are more likely to stabilize than biodiversity is low. Ecosystems with many kinds of species support more complex interactions and thus provide alternative niche.

TRY

Directions: Read and understand the following questions carefully, then encircle the letter of the correct answer.
(Answer on the Learner's Activity and Assessment sheets)

1. Which statement/s defines biodiversity
   I. extinct species
   II. the variety of species on Earth
   III. non-renewable resources
   IV. the rate of species decline

a. I only c. II only
b. II and III d. I and IV

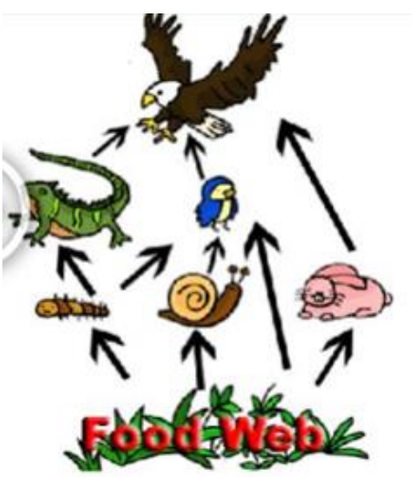
2. Biodiversity can affect the _____ of ecosystems and the _____ of populations.

   a. Sustainability and stability.
   b. Stability and sustainability
   c. Life and existence
   d. Existence and life

3. If a species is found on one island and nowhere else in the world, what is that species said to be in that island?

   a. Native
   b. Rare
   c. Endemic
   d. Exclusive

For item 8, refer to the food web below:



8. What would happen to the population size of blue birds if the snails were wiped out by a disease?

   a. It will increase
   b. It will decrease
   c. It will remain the same
   d. Cannot be predicted

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4. What might be the reaction of a botanist who discovered a new plant in the mountains of Zamboanga City?

a. They would be happy to find biodiversity because that leads to ecosystem stability.
b. They would be upset because biodiversity leads to ecosystem stability.
c. They would worry about plants competing for limited resources like water.
d. They would be happy because that means water is nearby.

5. What is the significance of species diversity?

a. Species interacts with its environment and thus perform certain functions.
b. Species minimize with its environment and thus perform certain functions.
c. Species never interacts with the environment.
d. Though species interacts with the environment it does not perform any functions.

6. How will increasing species diversity affect an ecosystem?

a. It increases the efficiency and productivity of an ecosystem.
b. It increases only the efficiency and not productivity of an ecosystem.
c. It does not increase the efficiency and productivity of an ecosystem.
d. It only increases the productivity of an ecosystem.

7. Which bet explains why many kinds of plants and animals can live together in an ecosystem?

a. The plants and animals are all part of a food chain and depend on each other to live.
b. Plants and animals are interdependent of one another.
c. One species may overpopulate, killing all plant life.
d. Overpopulation of a species results in biodiversity.

9. Which statement best explain how species diversity affects the survival of organism?

a. The more diverse the species, the greater is the chance of coping with environmental variability thus, the chance of survival is less.
b. The more diverse the species, the chance of adapting to the changes in the environment is great, thus chance of survival is also great.
c. The more diverse the species, the lesser is the chance of coping with environmental variability, thus chance of survival is great.
d. The less diverse the species, the greater is the chance of coping with environmental changes, thus increasing the chance of survival.

10. Which of the following organisms is endangered?

a. More diverse buffalo population that is adapted to their environment.
b. Less diverse cheetah population that are so superbly adapted to their environment.
c. Camel population in the desert that has adapted to survive in hot climate.
d. Diverse carabao population that was able to cope with their environment.

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