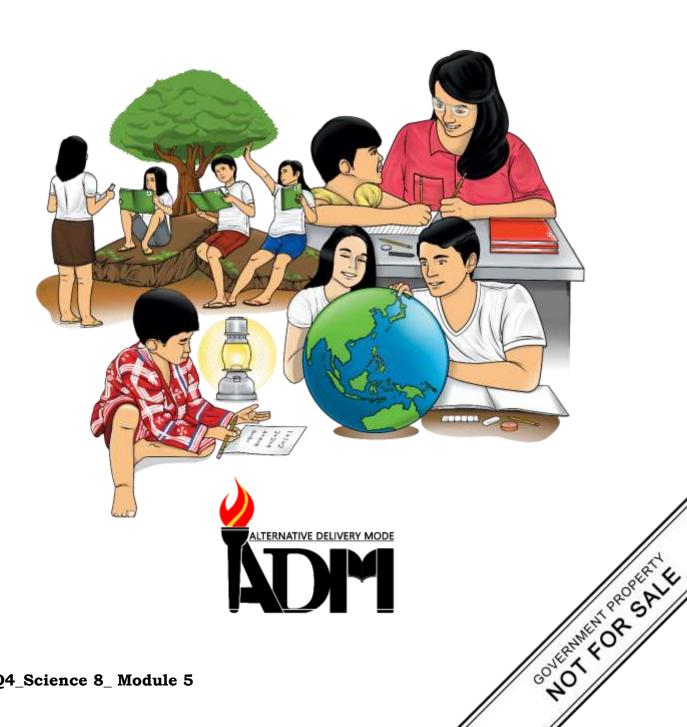




# Science

# Quarter 4 – Module 5: **Species Diversity**



Science – Grade 8
Alternative Delivery Mode
Quarter 4 – Module 5: Species Diversity
First Edition, 2020

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# Science Quarter 4 – Module 5: Species Diversity



# **Introductory Message**

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-bystep as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.



# What I Need to Know

This module was designed and written with you in mind. It is here to help you master species diversity. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the learner's material you are now using.

#### This module contains:

• **Lesson 1** – Species Diversity

After going through this module, you are expected to:

- 1. define species diversity,
- 2. demonstrate an understanding of the species diversity as a distinct group of organisms that reproduces in terms of richness and evenness and dominance, and
- 3. explain the concept of a species. (MELC Week 4 S8LT-IVg-19)



# What I Know

**Directions:** Choose the letter of the correct answer. Write your answers on a separate sheet of paper.

- 1. What is called a distinct group of organisms of the same kind?
  - A. Community
  - B. Genes
  - C. Population
  - D. Species
- 2. Which of the following BEST describes biodiversity?
  - A. endangered species
  - B. variety of all life on earth
  - C. different kinds of plants in the ecosystem
  - D. number of the same species in a given area
- 3. Which level of biodiversity has an important role in maintaining the balance of the ecosystem?
  - A. Genetic diversity
  - B. Species diversity
  - C. Biological diversity
  - D. Ecosystem diversity
- 4. Which species concept characterizes that same species has the ability to mate with one another?
  - A. Biological
  - B. Ecological
  - C. Phylogenetic
  - D. Typological
- 5. Which most likely results if a forest is converted into roads?
  - A. Habitats for many species are destroyed.
  - B. Some of the animals migrate to other areas.
  - C. Soil quality increases in the deforested area.
  - D. Some plants and animals might be endangered.
- 6. What is the purpose of every species on earth?
  - A. reproduce and die
  - B. divide and conquer
  - C. survive and conquer
  - D. survive and reproduce

- 7. Which level of biodiversity includes the available habitat in an area?
  - A. Marine diversity
  - B. Species diversity
  - C. Genetic diversity
  - D. Ecosystem diversity
- 8. What is the significance of species diversity?
  - A. Species sometimes interact with the environment.
  - B. Species do not interact with the environment.
  - C. Species interact with their environment and perform certain functions.
  - D. Species minimize interaction with environment and perform certain functions.
- 9. Which ecosystem has an abundance of species but with low species diversity?
  - A. A virgin forest
  - B. a meadow with wildflowers
  - C. a farm of thousands of roses
  - D. an island with many rare birds and insects
- 10. Which ecosystem is characterized with low species diversity?
  - A. marsh ecosystem covered by grasses
  - B. forests park, wetland, and freshwater ecosystems
  - C. the population of frogs which has a wide variety of skin colors
  - D. rainforest with the different species interacting with one another
- 11. Organisms belong to the same species if they\_\_\_\_\_.
  - A. breed
  - B. look similar
  - C. look and act the same
  - D. breed and produce offspring
- 12. Which of the following is an example of species diversity?
  - A. River, Ponds, Lakes
  - B. Marine, Estuary, Marsh
  - C. Anaconda, Cobra, Python
  - D. Carabao, Eagle, Gumamela
- 13. Which describes a population?
  - A. similar species in different area
  - B. same species in the same geographic area
  - C. several species in the same geographic area
  - D. several species along with their abiotic factors in a small area

#### 14. Which has the highest species evenness?

Species	Community 1	Community 2	Community 3	Community 4
1	20	41	20	10
2	20	2	20	10
3	10	2	20	0
4	0	2	20	10

- A. Community 1
- B. Community 2
- C. Community 3
- D. Community 4
- 15. Which can be BEST considered to have high species diversity?
  - A. Grasslands
  - B. Marsh
  - C. Ponds
  - D. Tropical Forests

Lesson

# **Species Diversity**

**Species diversity** pertains to the number of species and abundance of every species in a given community. Today, millions of different species of living organisms are identified and named while more species remain to be discovered. Some of them live in your body, some outside your body and others in remote places that you cannot see, in short, in every corner of the world. These organisms differ in sizes, shapes, and colors. It includes the tiniest and simplest bacterium to the complex like a giant blue whale weighing up to 160 tons. Each species has a part to play, and this is the reason why diversity of species is essential.



# What's In

#### **Activity 1. Word Hunt**

**Directions:** Find the 10 words associated to genetics. Words may appear straight across, backward straight across, up and down, down and up, or diagonally. Write your answers on a separate sheet of paper.

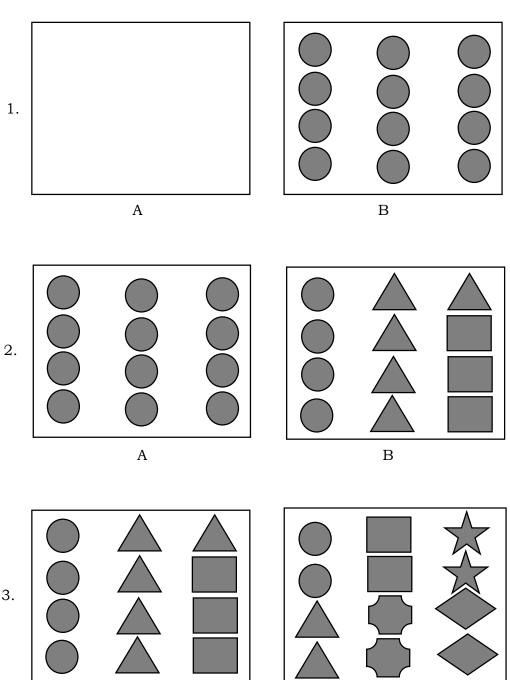
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Н	E	W	L	C	T	T	L	0	N	T	M	В	S
P	M	E	R	A	U	Q	s	T	E	N	N	U	P



# Activity 2. Which is better?

A

**Directions:** Choose which of the two illustrations in every number is better according to your personal preference. Write your answers on a separate sheet of paper.



В



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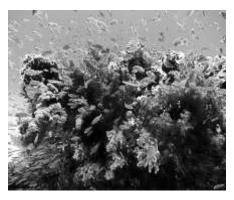
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Α

В



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A

В



6.

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Source:https://pixabay.com/photos/zebras-animals-wildlife-mammal-322092/

Α

В



**Biodiversity** is coined from the words "biological diversity". It describes how varied living things are in a certain area - plants, animals, fungi, and microorganisms as well as the community they form and the habitat they are living in. An organism is part of biodiversity; their produce are source of food, medicine, clothing, shelter and energy. They also play an important role in sustaining balance in the ecosystem. A group of organisms makes a population with the basic unit known as **species**. A particular kind of species of living things is typically recognizable, being distinctly different from one another.

Biodiversity can be classified and measured according to variations: genetic diversity, ecosystem diversity, and species diversity. It includes the diversity within species, and between different species living on land, freshwater, and marine ecosystem. The loss of one species affects other species in an ecosystem. It can cause an ecological imbalance that affects the function and the interrelation of living things.

There are levels of biodiversity namely: Genetic diversity, Ecosystem diversity, and Species diversity. **Genetic diversity** pertains to the difference in the genetic composition of each organism e.g. Beagle, Shih Tzu, German Shepherd, Doberman are all the same species but they differ in the variety of their genes. **Ecosystem diversity** concerns the different kinds of places where organisms live and the interconnections that bind these organisms together e.g. lakes, rivers, ponds are all freshwater ecosystems. Estuary, salt marsh, coral reefs are all marine ecosystems. **Species diversity** deals with the different kinds of organisms e.g. dragonflies, sunflowers, dogs are all different species.

#### **Species Diversity**

Species diversity talks about the difference within species or difference between similar species. A species is the fundamental unit of diversity. It is an individual not a class, nor a genera. It will take long enough to develop another trait if a group of individuals remains isolated from the rest of its species. Geographical isolation is a very good example wherein physical barriers such as glaciers or mountain ranges cause some members of a species to become separated from the main group and develop different traits over time.

Species diversity pertains to the number of species and abundance of every species in a specific community. It reflects the richness and evenness of abundance of species in a certain place. **High diversity** places consist of numerous kinds of species. **Low diversity** places may be highly populated but may not be diverse. The more variety of species in a place, the more diverse it is. Evenness of abundance of species means that not only one or two kinds of species are numerous in a place. All

the other species present should be similarly numerous. The species in an ecosystem perform certain functions. Currently, more than one million different species of living organisms are identified and named while more species remain to be discovered.

#### The Species Concept

There are three ideas that support what species are, namely:

- 1. **Typological Species Concept** defines species as a group whose members share certain characteristics that distinguish them from other species;
- 2. **Biological Species Concept** considers species as a distinguished group of populations whose members are capable of interbreeding successfully and are reproductively isolated from the other groups to produce fertile offspring. There is tremendous morphological variation within *Homo sapiens*. (See Fig. 1). In contrast, some species are very similar morphologically but cannot interbreed such as the Eastern (left) and Western meadowlark (right), which have behavioral isolation (See Fig. 2).

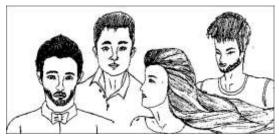


Figure 1. Morphological variation within *Homo sapiens*.

Illustrated by: Jame-Son G. Jubane

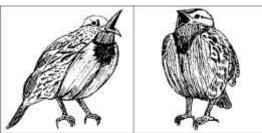


Figure 2. Morphologically similar but cannot interbreed.

Illustrated by: Jame-Son G. Jubane

Reproductive isolation is a natural mechanism of preventing different species from producing viable offspring. In the case of artificial breeding, involving two species from different populations, by law of reproductive isolation, the resulting hybrid is incapable of developing into a viable, fertile adult. Figure 3 shows a **liger** which is a cross-breed of a male lion and a female tiger, found at Everland amusement park, South Korea. Reproductive isolation prevents a liger from producin offspring.

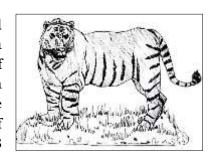
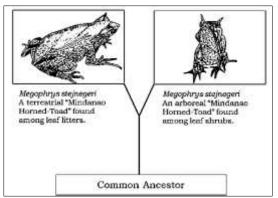


Figure 3. Panthera leo x Panthera tigris, cross-breed male lion and a female tiger Illustrated bu: Jame-Son G. Jubane

3. **Phylogenetic Species Concept** - defines species as a group of organisms with a shared, unique genetic history. It uses this concept to classify species by looking at a group whose members come from a common ancestor and have shared a unique evolutionary history, possessing a combination of certain defining, or derived traits.



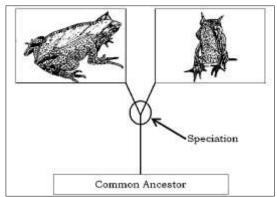
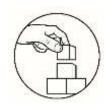


Figure 4. Habitat Isolation of Frog Resulting to Speciation

Illustrated by: Jame-Son G. Jubane

Two kinds of *Megophrys stejnegeri* came from a common ancestor and had similarities in horn and length of its tympanic membrane; however, it branched out into different colors and habitat isolation which allowed speciation, formation of new species, because of habitat difference as shown in figure 4.



# What's More

#### **Measures of Diversity**

Species richness is the simplest measurement of species diversity. It relates to the number of species inhabiting a given area or habitat as shown in figure 5.

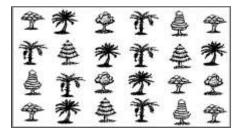


Figure 5. Species Richness

Species evenness measures how many individual organisms belong to each species. It refers to the similarity in numbers or equal abundance of species in a particular area. Figure 6 shows 5 individuals for each species.

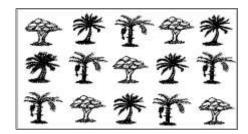


Figure 6. Species Evenness
Illustrated by: Julius Harry A. Enriquez

Species dominance refers to a dominant species distributed across a given area. Figure 7 shows that one species has the most number of individuals compared to other species.

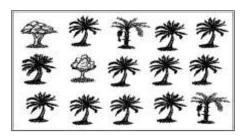


Figure 7. Species Dominance
Illustrated by: Julius Harry A. Enriquez

#### **Activity 3. Let Us Specify!**

**Directions:** Compare the diversity of the organisms in Community A and Community B by filling up Table 1 below. Answer the questions that follow. Write your answers on a separate sheet of paper.

**Community A** consists of five (5) different species with a total of 50 individuals. Each species has 10 individuals.

**Community B** also consists of five (5) different species with a total of 50 individuals. Two species that consist of 10 members each while others consist of 4 members, 6 members, and 20 members.

**Table 1**. Diversity of Organisms

Com	nunity A	Community B		
Species	Abundance of Individuals	Species	Abundance of Individuals	
1		1		
2		2		
3		3		
4		4		
5		5		
TOTAL	50	TOTAL	50	

#### Question:

1.	Compare the species diversity of the two communities based on the table
	above.
	a. Which community has a great variation in dominance?

b. Which community has a greater evenness?

c. Which community has greater species diversity?

#### **Activity 4. Count Me!**

**Objective:** After performing the activity you are expected to demonstrate understanding about species richness, evenness and dominance.

Materials: Pictures of different kinds of seeds



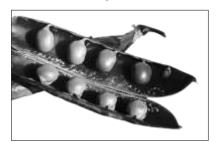
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В



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C



Source: https://pixabay.com/photos/peapod-pea-pod-green-vegetables-5343491/1569252/

D



Source: https://pixabay.com/photos/peanutsshell-food-delicious-1735486/1569252/

#### **Procedures:**

- 1. Consider that all these seeds in the pictures are mixed and packed for sale.
- 2. Count the number of bits of each kind of seeds in the pictures. Record the data.

#### **Questions:**

In the activity you have performed, the different kinds of nuts represent the different species in a community.

1. What is the species richness of your nut community?

Picture	Kinds of seeds	Number of seeds
A (Species A)		
B (Species B)		
C (Species C)		
D (Species D)		

2. What characterizes your seed community, species evenness or species dominance? Explain your answer.

	Scoring Rubrics			
3 points	Discussions do not have misconceptions and with complete scientific evidence.			
2 points	Discussions do not have misconceptions and with incomplete scientific evidence.			
1 point	Discussions have misconceptions and with incomplete scientific evidence			
0	No discussions at all			



# What I Have Learned

**Directions:** Complete the statement by writing the appropriate word or phrase on the blank. Write your answers on a separate sheet of paper.

1.	The variety among living organisms is known as
2.	Theis the basic unit of classification.
3.	The similarity in abundance of species of a certain community is called
	·
4.	Communities consisting of numerous kinds of species are diverse.

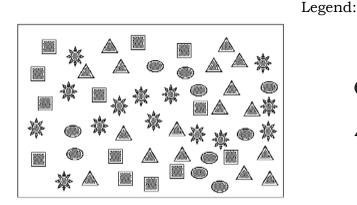
5. A community that may be highly populated but may not be diverse has \_\_\_\_\_ diversity.

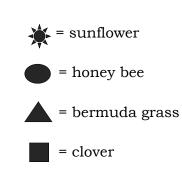


# What I Can Do

# **Activity 5. Let us Compare!**

**Directions:** Study the illustration below about species diversity in a garden and answer the questions that follow. Write your answers on a separate sheet of paper.





#### **Questions:**

1.	Which species in the garden community has the:
	highest number?
	lowest number?
2.	What conditions would change if one of the species is lost?
3.	Describe the importance of species diversity in maintaining the balance of ecosystem.

Scoring Rubrics for Nos. 2 and 3			
3 points	Discussions do not have misconceptions and with complete scientific evidence.		
2 points	Discussions do not have misconceptions and with incomplete scientific evidence.		
1 point	Discussions have misconceptions and with incomplete scientific evidence		
0	No discussions at all		

# Activity 6. Explain Me!

**Directions:** Identify and explain which species concept is described in the situations below. Write your answers on a separate sheet of paper.

Situations	Species Concept	Explanation
A male donkey and a female horse produced a mule.		
2. An adult man and woman produced a baby.		
3. A zebra and a horse originate from a common ancestor.		
4. Gorillas, chimps, and humans closely related to orangutans		
5. Siblings share certain characteristics from their parents but they differ from each other.		

	Scoring Rubrics			
3 points	Discussions do not have misconceptions and with complete scientific evidence.			
0				
2 points	Discussions do not have misconceptions and with incomplete			
	scientific evidence.			
1 point	Discussions have misconceptions and with incomplete scientific			
_	evidence			
0	No discussions at all			



**Directions**: Choose the letter of the correct answer. Write your answers on a separate sheet of paper.

- 1. Which describes species diversity?
  - A. A species that live in an area
  - B. An individual of each species on earth
  - C. The number of species that gets extinct each year
  - D. The number of species and individuals of each species in a given area
- 2. Which refers to all living things that live together in a stable community?
  - A. Biosphere
  - B. Ecosystem
  - C. Habitat
  - D. Population
- 3. Which describes ecosystem diversity?
  - A. variety of ecosystems in a given area
  - B. change in an ecosystem that affect how the parts of it interact
  - C. variety of genes within a species or population in a given area
  - D. variety of life in Earth's land, freshwater, and marine ecosystems
- 4. Which type of species concept refers to the sharing of certain characteristics that distinguish them from other species?
  - A. Biological
  - B. Ecological
  - C. Phylogenetic
  - D. Typological
- 5. Which ecosystem shows high species diversity?
  - A. A pond ecosystem populated by a single species of frogs.
  - B. A marsh ecosystem covered by a single species of grasses.
  - C. A desert ecosystem populated only by cacti, camels and armadillo lizards.
  - D. Forests, wetland, and freshwater ecosystems populated by different kinds of species.

- 6. Which describes species?
  - A. living organisms in the same region
  - B. biotic and abiotic factors in an area
  - C. similar organisms that have exactly the same traits
  - D. similar organisms that can mate with another and produce fertile offspring
- 7. The following are human activities that destroy the existence of different species EXCEPT.
  - A. deforestation
  - B. planting trees
  - C. overhunting/fishing
  - D. habitat fragmentation
- 8. Which refers to the similarity in numbers between species in a given area?
  - A. Species dominance
  - B. Species evenness
  - C. Species richness
  - D. Species variability
- 9. Which refers to the number of species in a given area?
  - A. Species dominance
  - B. Species evenness
  - C. Species richness
  - D. Species variability
- 10. Which describes genetic diversity?
  - A. variety of ecosystems in a given area
  - B. variety of all living and non-living things in a given area
  - C. variety of genes within a species or population in a given area
  - D. disturbance in the environment conditions that cause genetic changes to occur in organisms
- 11. Which represents an ecosystem with high species abundance and with high species diversity?
  - A. A rice field
  - B. A banana plantation
  - C. A farm of thousands of sunflowers
  - D. An island with many rare birds and insects
- 12. Which of the following is correct about the interrelatedness of biodiversity and sustainability?
  - A. Biodiversity has nothing to do with sustainability.
  - B. The lower the biodiversity, the greater the sustainability.
  - C. The higher the biodiversity, the greater the sustainability.
  - D. The higher the biodiversity, the less sustainable the ecosystem.

- 13. Which species concept is associated to classifying a group of individuals as species based on shared common ancestor?
  - A. Biological
  - B. Ecological
  - C. Phylogenetic
  - D. Typological
- 14. Which is considered as most diverse community?

Species	Community 1	Community 2	Community 3	Community 4
1	20	33	20	10
2	20	1		10
3	20	1	20	
4	20	1	5	10

- A. Community 1
- B. Community 2
- C. Community 3
- D. Community 4
- 15. Which prediction will happen when hunting and collecting of wildlife animals for trade to help raise economic status of some people continue?
  - A. It decreases the existence of wildlife species.
  - B. It decreases the crimes committed by people.
  - C. It increases the biodiversity of wildlife species.
  - D. It increases the reproduction of wildlife species.



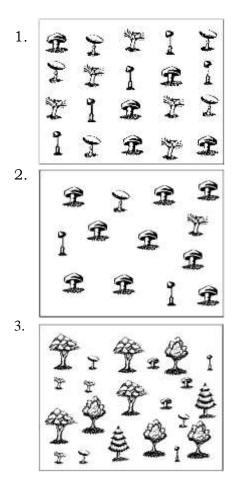
# **Additional Activities**

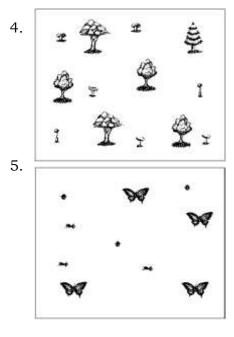
# **Activity 7. Analyzing Species Diversity**

**Directions:** Each illustration shows different species in a community. Choose from the list inside the box the appropriate description of each community. Write the letter of your answers on a separate sheet of paper.

- A. High species richness
- B. High species evenness
- C. Low species evenness

- D. Low species richness
- E. high species dominance
- F. low species dominance





Illustrated by: Julius Harry A. Enriquez



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6. Genotype				
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I. D				
What I Know				

Activity 5  1. Highest number- Bermuda grasa Lowest number- Honey Bee  2. Ecological imbalance diversity ensures austainability for sustainability for keeps the keeps the ecosystem balance.
What can I do
<ol> <li>Biodiversity</li> <li>Species</li> <li>Species evenness</li> <li>High diversity</li> <li>Low diversity</li> </ol>
What I have learned
1. Species dominance because of some factors that could affect like the growing season, type of soil, temperature.
Activity 4  Funds of name Number of name Stander of name of 18 peckers of 18 peace of 18 p
A Community A

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3. A 4. D				
7. E				
Activity 7				
Additional Activities				
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a. Community B b. Community A

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Activity 6

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