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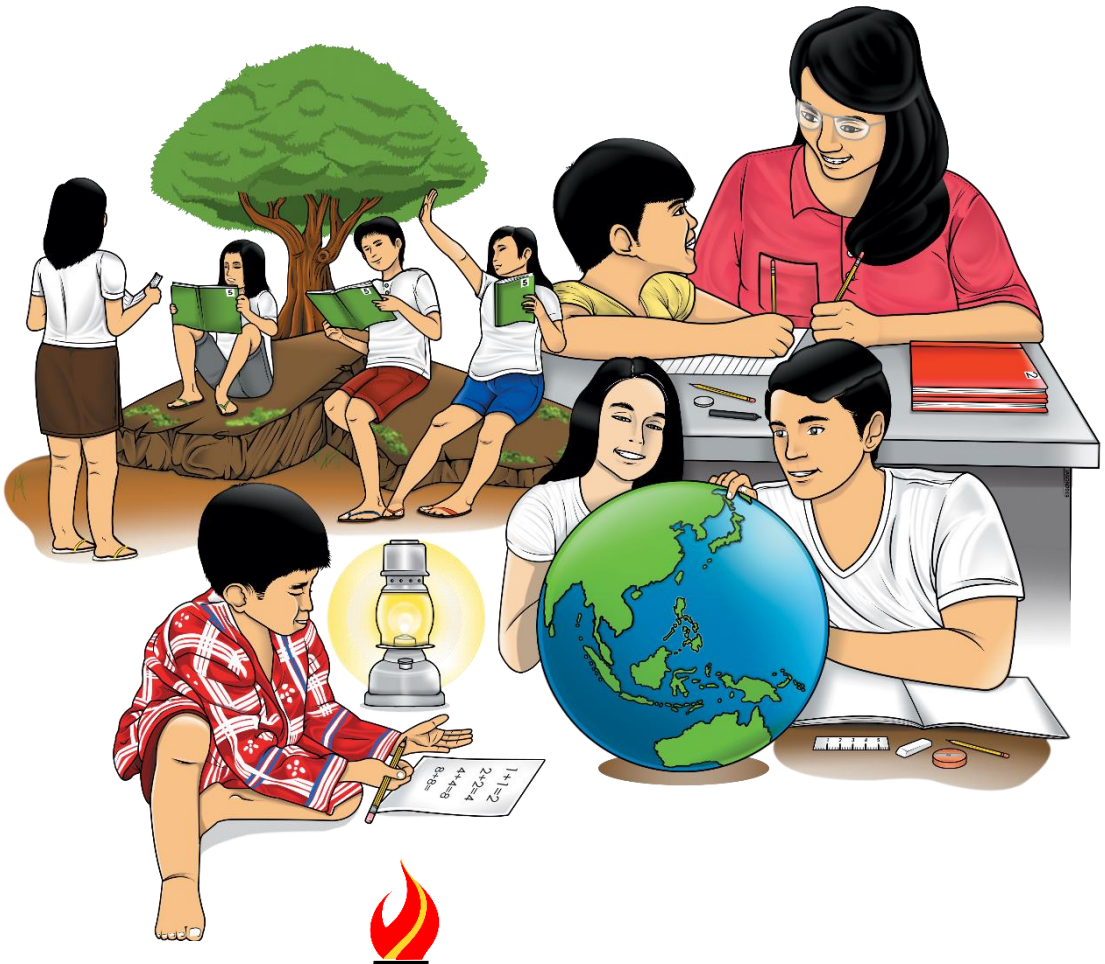
DEPARTMENT OF EDUCATION

Science
Quarter 1- LIVING THINGS
Module 4: Biodiversity and Evolution



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Science
Quarter 1- LIVING THINGS
Module 4: Biodiversity and Evolution

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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-by-step 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

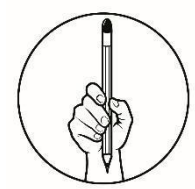
This module was designed and written with you in mind. It is here to help you master Biodiversity and Evolution. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow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

The module focuses on achieving this learning competency:

Relate species extinction to the failure of populations of organisms to adapt to abrupt changes in the environment. (S9LT-Ie-f-30)

After going through this module, you are expected to:

1. Measure species distribution using a mathematical way of expressing the amount of biodiversity and species distribution in a community;
2. Determine the pattern of population distribution;
3. Explain the probable causes of species extinction;
4. Explain the local and global environmental issues that contributed to species extinction;
5. Make a multimedia presentation of a timeline of the extinction of representative microorganisms, plants, and animals.



What I Know

Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. Which one of the following expresses the index of diversity in a mathematical way?
    A. The vastness or area of an ecosystem
    B. The species distribution in a community
    C. The distance between two different ecosystems
    D. The population of a given species per unit area

2. Which is the correct formula in calculating population density?
    A. D = population/area
    B. D = population x area
    C. D = number of runs/total population
    D. D = number of runs x total population

3. Which pertains to organisms that no longer exist at the present time, but have existed in the past?
    A. Exotic
    B. Extinct
    C. Endemic
    D. Endangered

4. Which pertains to the process of introducing unnatural chemicals that contaminate the air, soil, and seas?
    A. Pollution
    B. Acidification
    C. Eutrophication
    D. Neutralization

5. Which of the following causes of extinction is directly brought about by human activity?
    A. Glaciation
    B. Overharvesting
    C. Cosmic radiation
    D. Volcanic eruptions

6. Which pertains to the largest number of individuals in a species that an environment sustains for a long period of time?
    A. Biodiversity
    B. Limiting factor
    C. Carrying capacity
    D. Population density

7. Which refers to species of organisms whose population is so low that it has a great tendency to become extinct?
   A. Endangered
   B. Endemic
   C. Exotic
   D. Threatened

8. Which is the process of introducing unnatural chemicals that contaminate the air, soil, and seas?
   A. Acidification
   B. Eutrophication
   C. Neutralization
   D. Pollution

9. The amount of sunlight in a forest ecosystem determines the kind and population of plants and trees that could thrive and survive to maintain balance in the said ecosystem. Which refers to the "amount of sunlight" as mentioned above?
   A. biodiversity
   B. limiting factor
   C. carrying capacity
   D. population density

10. Which is NOT a cause of deforestation?
   A. typhoons
   B. soil erosion
   C. kaingin system
   D. conversion of forests to agricultural lands

11. Which is NOT a common reason for a species to go extinct?
   A. Random mutation in DNA
   B. Habitat loss and destruction
   C. New disease is introduced to a population.
   D. New predators moving into or introduced into an area.

12. Which is NOT a consequence of cutting down trees?
   A. floods
   B. soil erosion
   C. eutrophication
   D. decrease in wildlife resources

13. Muro-ami is a fishing practice in South East Asia that makes use of which material?
   A. dynamite
   B. electrical current
   C. spears and arrows
   D. encircling net together with pounding devices

14. What type of biodiversity pertains to the variations of genes in a species?
   A. species diversity
   B. genetic diversity
   C. ecosystem diversity
   D. all of the above

15. Which factor has a tendency to increase population density?
   A. limited food supply and diseases
   B. limited space and higher birth rate
   C. higher death rate due to a calamity
   D. presence of a greater area for organisms to live

Lesson 1 Biodiversity and Evolution

In the previous module, you have learned the different patterns of Non-Mendelian inheritance and the locations of genes in the chromosomes. In this module, you will learn that a balanced ecosystem means a lot. The well-being of a biological system is sustained by its plants and different creatures. At this point, when species become endangered, it can compromise balancing biodiversity of our ecosystem and may trigger the loss of other forms of species. You will focus on how to measure the index of biodiversity and population density; you will also explain and discuss the causes of species extinction, its local and global environmental issues that contributed to species extinction, and the timeline of extinction of organisms.

Here are some key questions for you to ponder after finishing this module:

1. What is biodiversity?
2. What are the factors that affect the balance in biodiversity?
3. What causes species extinction?
4. How do the changes in the environment affect the continued survival of the species?
5. What are the local and global issues that contribute to species extinction?

What's In

Let's recall your understanding of concepts of Biodiversity and Evolution. Write **T** if the statement is true and **F** if the statement is false. Use a separate sheet of paper to answer the questions.

_____1. All the organism or species on Earth have already been identified.

_____2. Once the population of species increases or decreases in size it affects the balance of the ecosystem.

_____3. Human activities are among the causes of species extinction.

_____4. Geologic timescale is a scale used to represent and show the existence and extinction of organisms.

_____5. The extinction of species does not give the earth harmful effect.

What's New

Analyze the given picture below. Give five (5) reasons why we experience imbalance in biodiversity. Use a separate sheet of paper to answer the question.

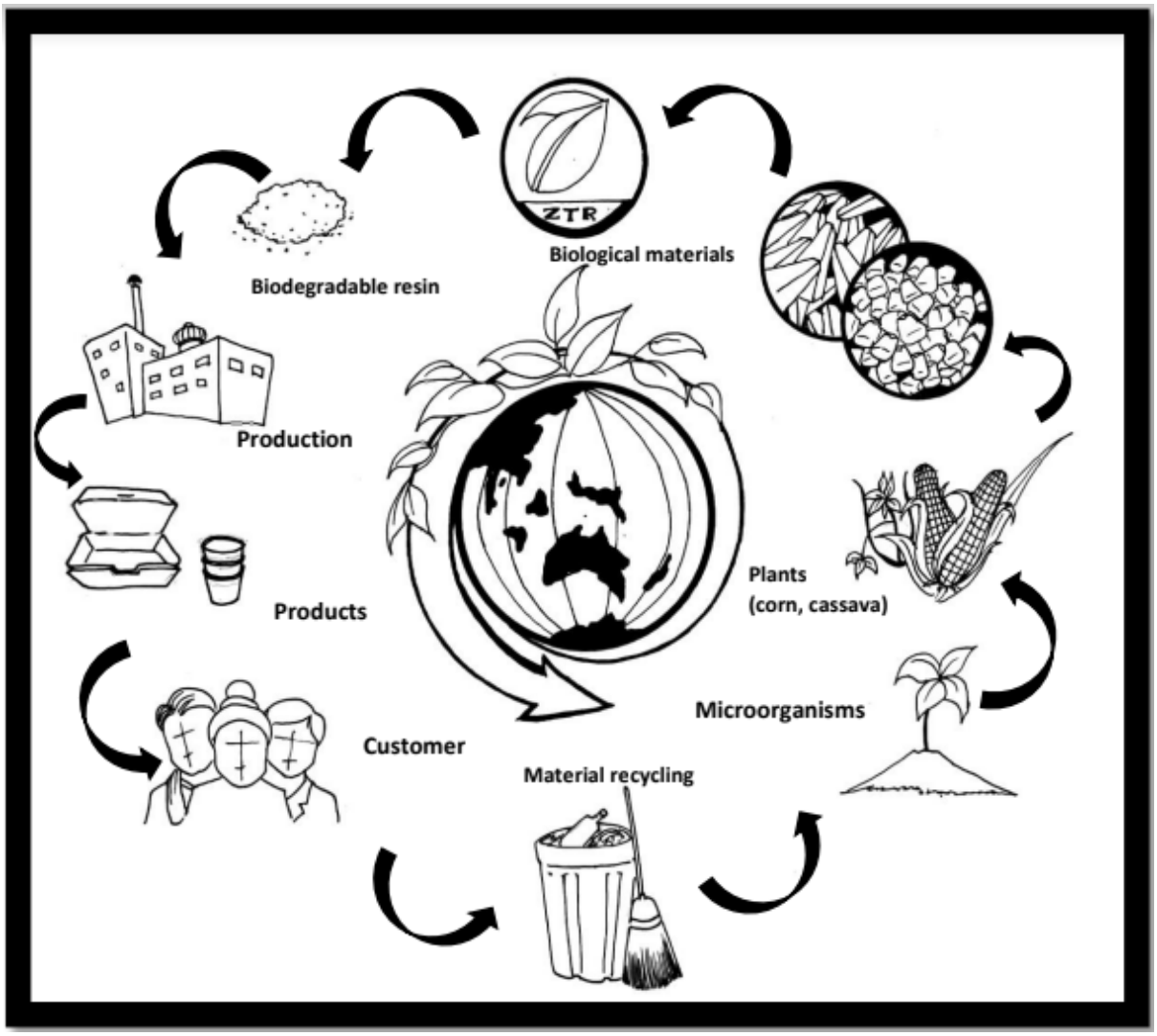
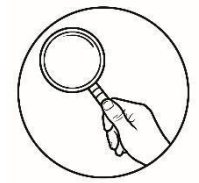


Figure1. Ecological Imbalance



What is It

Biodiversity and Evolution

Biodiversity is the term used to describe the number and variety of life found on Earth. Biodiversity has three types: genetic, species, and ecosystem.

A. **Genetic diversity** pertains to the variation of genes within species.
B. **Species diversity** pertains to the variety and abundance of species within a region.
C. **Ecosystem diversity** is the variation among groups of organisms in different physical settings.

All parts of the ecosystem are interacting with one another. If one of its components experienced changes and it doesn't adapt to its new environment or situation it may probably die and lessen in numbers. The **population** pertains to the number of organisms of the same species living in the same region while **communities** are composed of different organisms living in the same region.

What will happen if one population in an area increase? Will it affect the distribution of space and food? Fortunately, changes in population may give a big impact on the balance of biodiversity index.

Biodiversity Index is a scale of the diversity of plant and animal species in a given area. It is a widely used tool for estimating the complexity, stability, and thus general health of an ecosystem. It is expressed with the equation of:

$$\textbf{Biodiversity Index} = \frac{\text{Total \# of different Species}}{\text{Total \# of Living Items}}$$

Populations of an organism can change and varies over time. This is due to the different limiting factors occurring in the situation. **Limiting factors** are usually described as lack of particular resources like the availability of food, water, and space. Some of the other reasons are predation, diseases, and migration. Light, temperature, and soil nutrients are also limiting factors because they help to identify what kind of organism lived in a certain area. Increasing the number of population size that an area can support is called **carrying capacity**. It is the size of a biological species that can be sustained in a specific environment, given all the available resources. If the carrying capacity reaches its maximum point, the organism in that area will die because not all of their needs can be met.

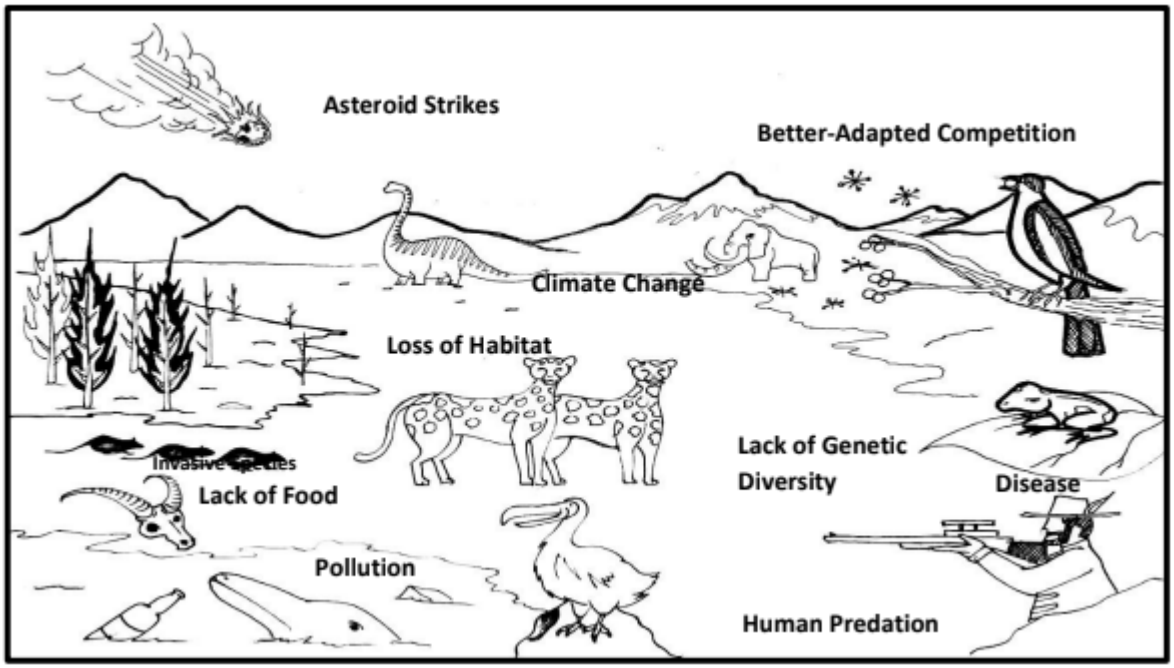
When the number of species decreases in size, and only a few remain, that species is considered as **endangered** and possibly becomes extinct in the future. Some examples of endangered animals in the Philippines are tarsier in Bohol, Philippine eagle, Philippines freshwater crocodiles, tamaraw in Mindoro, and Philippine naked-backed fruit bat in Cebu. If animals of a particular species are vulnerable at risk in terms the number of population of its kind, it is said to be

threatened. **Extinction** happens if the last member of that species is gone like dinosaurs.

But what are the different causes of species extinction? It can be a natural cause or man-made.

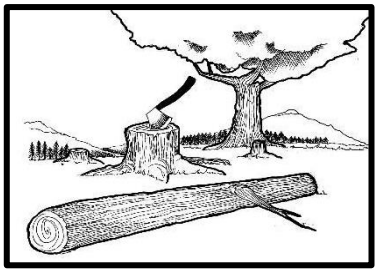
Natural Causes of Species Extinction

1. **Climate change-** the sudden changes in the earth's temperature.
2. **Land Development-** conversion of land into residential area or building.
3. **Acid precipitation-** is a result of air pollution.
4. **Diseases/Epidemic-** infectious diseases or virulent infectious diseases cause the change in biological populations.
5. **Meteoric impact/Cosmic radiation-** extinction happens when a massive asteroid or meteor hits the surface of the earth.
6. **The spread of Invasive species-** it can change the abundance of diversity or the food web in an ecosystem by destroying and replacing its natural value and number.

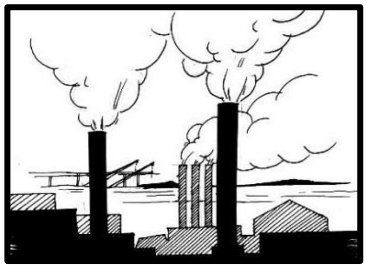


Man-Made Causes of Species Extinction

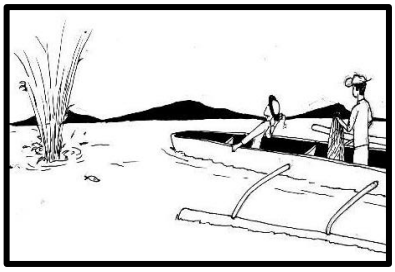
1. **Deforestation-** illegal logging, kaingin farming
2. **Pollution-** either air or water pollution.
3. **Destruction of Coastal Resources-** this is caused by using dynamite in fishing, muro-ami, and the conversion of beach into residences, and overharvesting of fishes.



Deforestation



Pollution



Destruction of Coastal resources

These environmental conditions and issues can affect both local and global perspectives and can create a big impact in sustaining the ecological balance of the earth. But on the other side, if an organism continues to live for more than a year and continues to adapt to its changing environment, it will still exist and somehow undergo evolution.

Evolution describes the gradual change of organisms from one state to another. It deals with the first appearance of organisms and studies how they survive and change through the course of time. Geologists constructed a timetable of the earth's history which is called geologic timescale. **Geologic timescale** is a timetable of the earth's history. In this scale, the earth's history is divided into major divisions called eras.

A. **Paleozoic era (prehistoric life) –** the existence of marine invertebrates; the development of marine life.

B. **Mesozoic era (middle life) –** the existence of largest creatures.

C. **Cenozoic era (recent life) –** the existence of warm-blooded animals and humans.

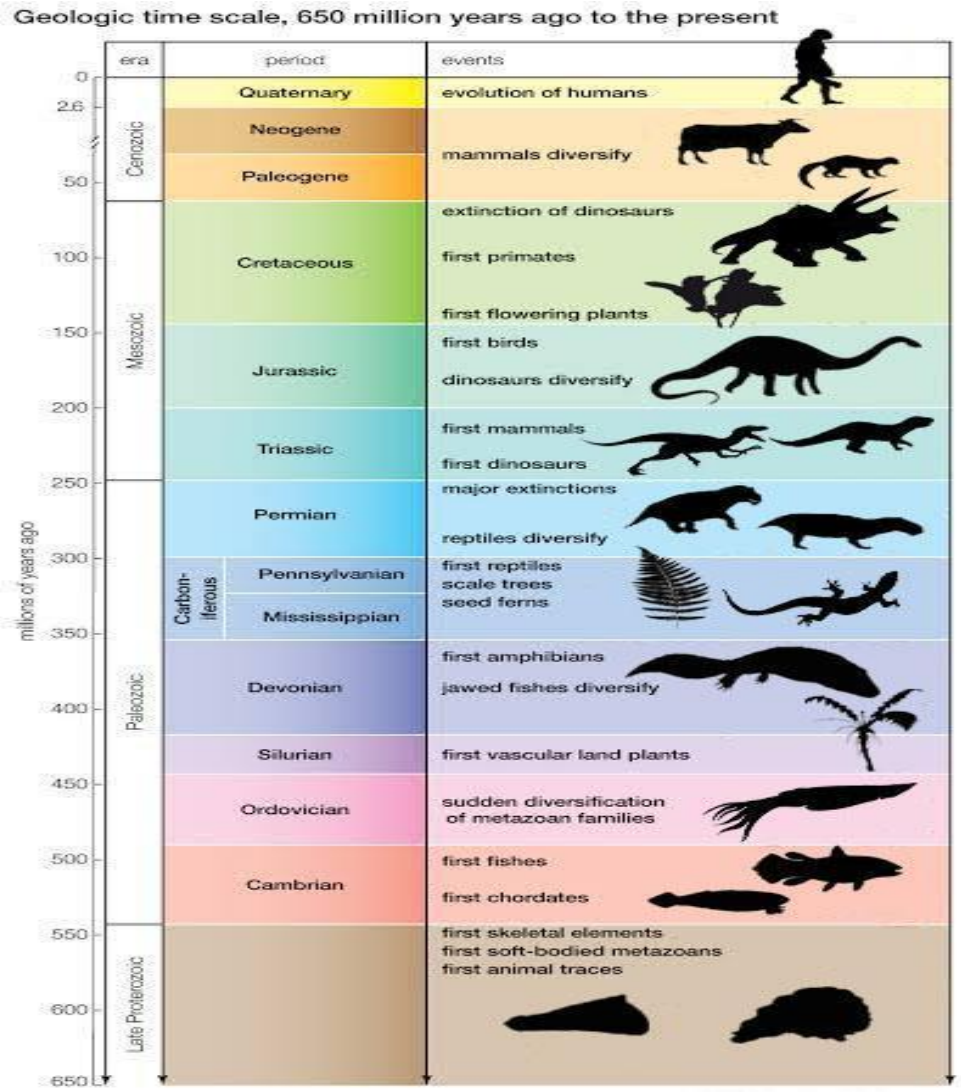
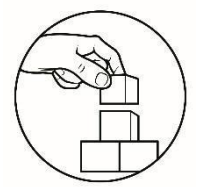


Figure 2 Geologic Time Scale



What's More

ACTIVITY 1: OUTDOOR EXPEDITION

Explore the vicinity of your house or garden. List down all the living organisms you will see based on their category. Write the total number of species and total item on the space provided, and lastly, answer the following questions and calculate biodiversity index using the equation given. Write your answer on a separate sheet of paper.

TREE	TREES Total Species: _____ Total Item: _____
PLANTS	PLANTS Total Species: _____ Total Item: _____
ANIMALS	ANIMALS Total Species: _____ Total Item: _____
INSECTS/BUGS	INSECT/BUGS Total Species: _____ Total Item: _____

Guide Questions:

1. Which species has the greatest total in number?
2. Which species has the lowest total in number?
3. Calculate the biodiversity index using the given formula below:

$$\textbf{Biodiversity Index} = \frac{\text{Total \# of different Species}}{\text{Total \# of Living Items}} = \frac{\qquad}{\qquad}$$

Rubric for the activity

CATEGORY	4	3	2	1
Accuracy	All parts of the activity are completed with accuracy and effort.	Most part of the activity is completed with accuracy. Therefore, more effort could have been made.	Several part of the activity is not completed with accuracy and minimal effort was given.	Students did not complete the activity with accuracy and failed to show adequate effort.
Overall	The student demonstrated a hard work ethic and was enthusiastic with completing his/her work.	The students worked hard on most part of the activity and showed some enthusiasm towards the project.	The students showed minimal work and enthusiasm.	The student did not show work or enthusiasm.

ACTIVITY 2: FULL OF SPACE

Study the five patterns of population distribution in Figure 1. Count the total number for each population and record the data in the table below. After that, calculate the density of each population using the equation below. Write your answer on a separate sheet of paper.

Figure 1 Organisms live with lot area of 100 square meters (m^2).

Figure 1 Organisms live with lot area of 100 square meters (m^2).

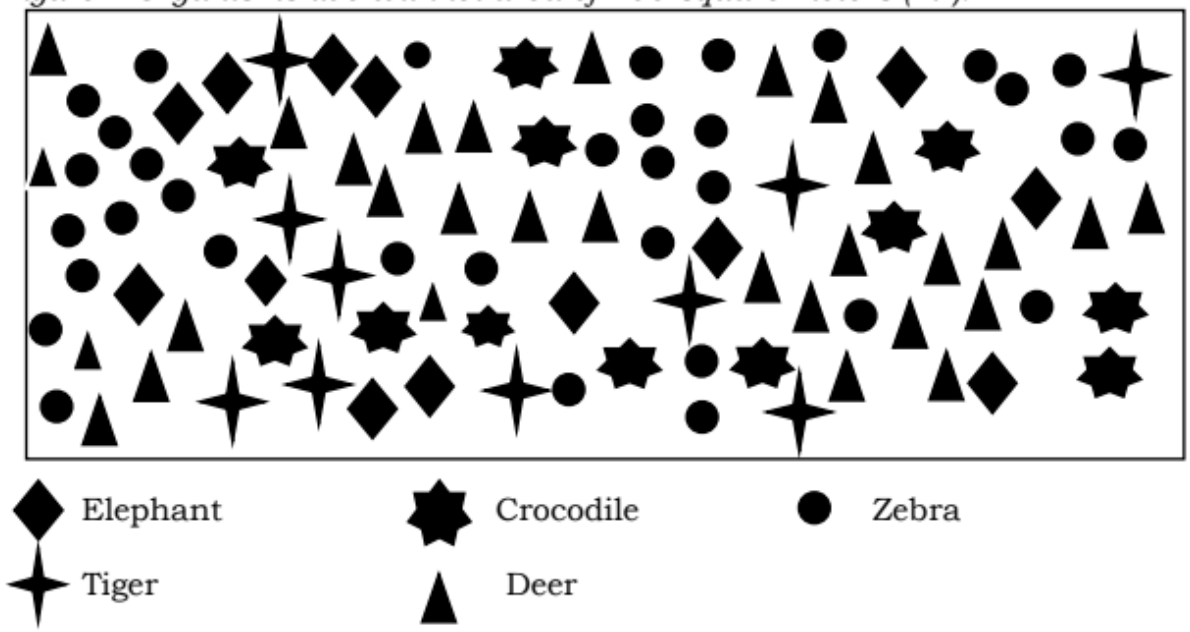


Table 1: Population Density

Population	Number of Organisms	Density

Guide questions:

Compare the distribution patterns of the five populations then answer the following.

1. Which population has the greatest density?
2. Infer from recorded data and write the possible causes for the difference in the population density.
3. What conditions could change the density of any of the population?
4. Calculate the biodiversity index using the given formula below:

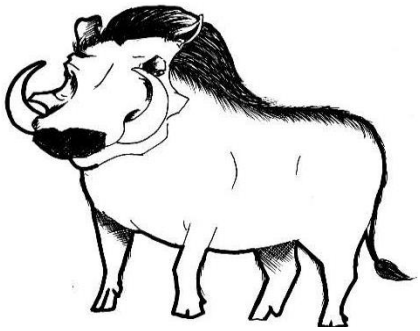
$$\text{Density} = \frac{\text{No. of Individuals}}{\text{Size of Area}} =$$

ACTIVITY 3: CAUTION! CAUTION! OH SPECIES EXTINCTION

A. Take a look at the given pictures of species below. Identify whether this specie is **EXTINCT** (last member of that species dies), **ENDANGERED** (population of that species is very low), or **THREATENED** (if that species is declining rapidly). Write your answer on a separate sheet of paper.

1. 

TAMARAW

2. 

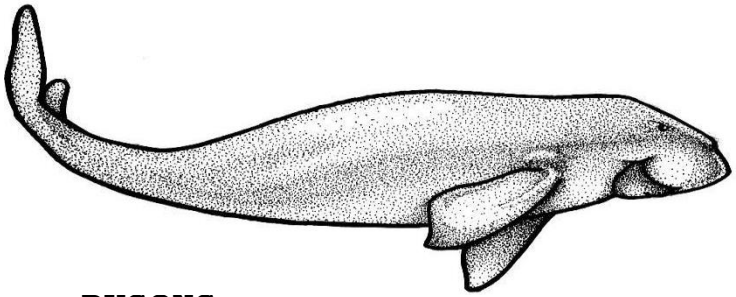
WARTY PIG

3. 

TARSIER

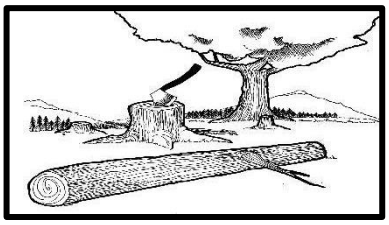
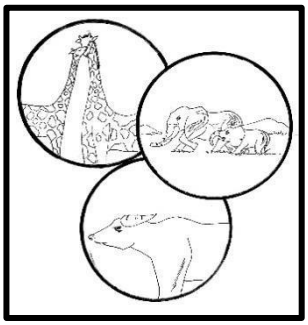
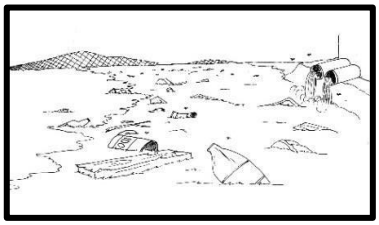
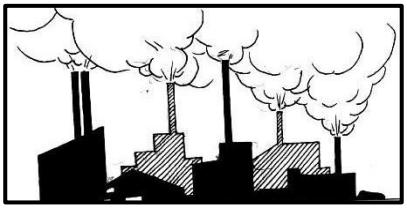
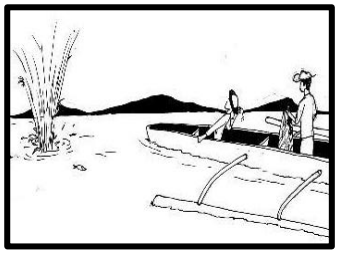
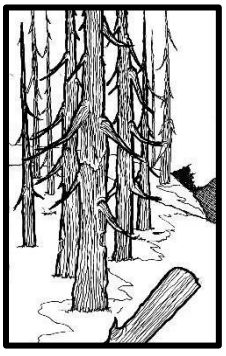
4. 

PHILIPPINE EAGLE

5. 

DUGONG

B. The following pictures show the causes of species extinction. Match the picture on column A with its correct description on column B. Write your answers on a separate sheet of paper.

COLUMN A		COLUMN B
1.		**Air Pollution**
2.		**Destruction of Coastal Resources**
3.		**Wildlife depletion**
4.		**Acid Precipitation**
5.		**Deforestation**
6.		**Water Pollution**

C. Read and analyze the given statements carefully. Choose from the box the cause of extinction being described in each statement. Write your answer on a separate sheet of paper.

Deforestation	Air pollution
Wildlife depletion	Acid precipitation
Water pollution	Destruction of Coastal Resources

_____1. As a consequence of cutting down trees, we experience soil erosion, floods, and a decrease in wildlife resources.

_____2. Fishkill usually happens when there is an increase in the concentration of organic nutrients that comes from garbage and factories.

_____3. The numbers of species decrease because of habitat loss caused by invasion of human to its natural habitat.

_____4. Cars burn fuel and factories emit harmful gases like carbon dioxide, nitrogen oxides, and hydrocarbons that contribute to the increasing temperature within the earth's surface.

_____5. Overharvesting, damaged mangrove areas, dynamite fishing, and muro-ami are the causes of marine life destruction.

_____6. It is a result of air pollution mostly from factories and motor vehicles.

ACTIVITY 4: THE GREAT IMPACT

Decode the word(s) or phrase that describes the local and global environmental issues that contribute to species extinction. Use the number given, and then encode the letter on the space provided per item number. Write your answer on a separate sheet of paper.

A	B	C	D	E	F	G	H	I	J	K	L	M
1	2	3	4	5	6	7	8	9	10	11	12	13

N	O	P	Q	R	S	T	U	V	W	X	Y	Z
14	15	16	17	18	19	20	21	22	23	24	25	26

1) 16-15-12-12-21-20-9-15-14

_____

2) 8-21-14-20-9-14-7

_____

3) 7-5-14-5-20-9-3-19

_____

4) 4-9-19-5-1-19-5-19

_____

5) 9-14-22-1-19-9-22-5 19-16-5-3-9-5-19

_____ _____

6) 4-5-19-20-18-21-3-20-9-15-14- 15-6 8-1-2-9-20-1-20

_____ ___ _____

7) 3-12-9-13-1-20-5 3-8-1-14-7-5

_____ _____

8) 3-8-1-14-7-5-19 9-14 12-1-14-4-19-3-1-16-5

_____ ____ _____

9) 6-9-19-8-9-14-7

_____

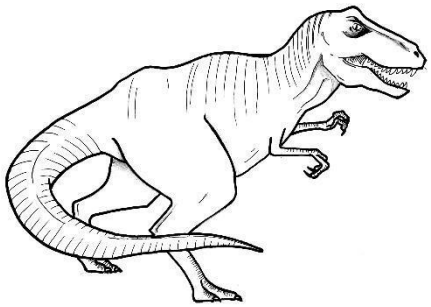
10) 15-22-5-18 8-1-18-22-5-19-20-9-14-7

_____ _____

ACTIVITY 5: PAST PRESENT EXTINCTION

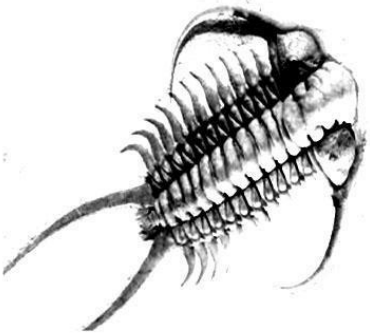
Identify the era of the given animals below. Write whether it's a **PALEOZOIC**, **MESOZOIC**, or **CENOZOIC** era. Write your answer on a separate sheet of paper.

1. Dinosaurs



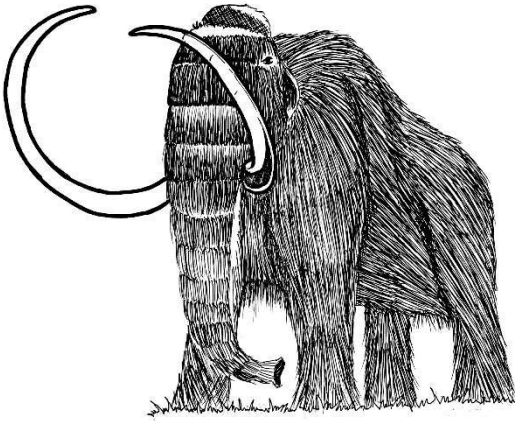
2. Fern

3. Trilobite



4. Cycas

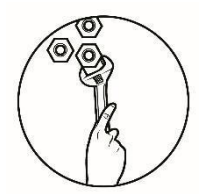
5. Wolly mammoth



What I Have Learned

Write the word that correctly completes the statement. Write your answer on a separate sheet of paper.

1. _____ is the term used to describe the number and variety of life found on Earth.
2. There are three (3) types of diversity. These are: _____ diversity, _____ diversity and _____ diversity.
3. _____ of ecosystem pertains to the number of organisms of the same species living in the same region.
4. _____ are composed of different organisms living in the same region.
5. _____ is a scale of diversified plant and animal species at a given area.
6. _____ are usually described as lack of particular resources like the availability of food, water, and space.
7. _____ is the size of a biological species that can be sustained in a specific environment, given all the available resources.
8. When the number of species decreases in size, and only a few remain, that species is considered as _____.
9. If animals of a particular species are vulnerable at risk in terms of the number of population of its kind, it is said to be _____.
10. _____ can change the abundance of diversity or the food web in an ecosystem by destroying and replacing its natural value and number.
11. _____ is caused by using dynamite in fishing, muro-ami, the conversion of beach into residences, and overharvesting of fishes.
12. _____ happens if the last member of that species is gone like dinosaurs.
13. _____ describes the gradual change of organism from one state to another
14. _____ is a timetable of the earth's history.
15. _____ is the existence of warm-blooded animals and humans.



What I Can Do

It's Good to be True!

Write **TRUE** if the statement is correct but if it's **FALSE**, *change the underlined word or group of words* to make the whole statement true. Write your answer on a separate sheet of paper.

_____1. Limiting factors are environmental conditions that keep a population from decreasing in size and help balance the ecosystem.

_____2. A species is endangered when its population is low which is nearly extinct.

_____3. The carrying capacity is affected by changes in the environment.

_____4. Population is a group of organisms of the same species living in a certain place.

_____5. Biodiversity refers to the variety of life in the area.

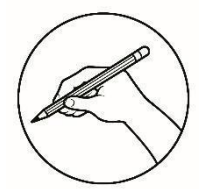
_____6. Evolution is a branch of life science that describes the rapid change of organisms from one state to another.

_____7. Migration refers to the survival of a new species into an already occupied area.

_____8. Human actions have resulted in habitat loss and degradation that have accelerated the rate of extinction.

_____9. Biological magnification is the buildup of pollutants in organisms at high tropic levels in a food chain.

_____10. The Mesozoic era is marked by the existence of largest creatures.



Assessment

Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. Which is NOT an example of an endangered species?
   A. Tarsier B. Dodo bird
   C. Mouse deer D. Monkey- eating eagle

2. Which do you think is the biggest problem faced by endangered species?
   A. Food B. Water
   C. Climate change D. Human activities

3. Which situation illustrates the relationship between a limiting factor and population density?
   A. When birth rate is greater than death rate, population increases.
   B. When the population in a given area increases, the population density also increases.
   C. Population sizes change with the number of births or when organisms move out of an ecosystem.
   D. When the population of goats and cows in a field increases rapidly, there may not be enough food for each of them.

4. Which could be a probable cause of increase in the population of preys in an environment?
   A. destruction of prey habitats
   B. lower birth rate than death rate of preys
   C. calamities and rampant spread of diseases
   D. decrease in the population of their predators

5. How does habitat degradation cause extinction of species?
   A. It kills acid intolerant species.
   B. It leads to spread of diseases that exterminate species.
   C. It leads to diminishing resources which increases competition among species.
   D. It leads to existence of shallow gene pools that promote massive inbreeding.

6. What do woolly mammoth, Dodo, and Great Auk have in common?
   A. They are all extinct.
   B. They are all mammals.
   C. They are all threatened species.
   D. They are all endangered species.

7. Which statements are TRUE?
   I. Introducing a new species in an ecosystem affects the food chain.
   II. Extinction is a natural process that has occurred since the beginning of time.
   III. Human intervention is the most leading cause of animal extinctions in this time.
   A. I and II only C. I and III only
   B. II and III only D. I, II and III

For question 8, refer to the table below:
Species composition of two fields

	Number of individuals	
Flower species	**Field A**	**Field B**
Gumamela	300	10
Cattleya	330	50
Yellow bell	370	940
Total	**1000**	**1000**

8. How will you compare Field A with field B in terms of species richness, total abundance and diversity?
   A. Field A and B have the same species richness, total abundance and diversity.
   B. Field A and field B have the same species richness total abundance, but Field A is more diverse than Field B.
   C. Field A and field B have the same species richness, but Field A has a greater total abundance and is more diverse than Field B.
   D. Field A and Field B have the same greater total abundance, but Field A has greater species richness and is more diverse than Field B.

9. Consider three communities. Each made up of a total of 100 organisms, drawn from combinations of ten species, A to J.

Species composition of three different communities

Species	**Community 1**	**Community 2**	**Community 3**
A	10	72	35
B	9	6	34
C	11	3	31
D	10	3	0
E	8	1	0
F	12	3	0
G	10	4	0
H	11	3	0
I	10	2	0
J	9	3	0
Total	100	100	100

Based on the table above, which statements are correct?
   I. Community 3 has higher species richness than community 1 and community 2.
   II. Community 2 has the same species richness but has a lower diversity than community 1.
   III. Community 1 has the highest diversity because it has the highest species richness and each species has a similar relative abundance.
   A. I and II only
   B. I and III only
   C. II and III only
   D. I, II and III

10. Which could you infer about an ecosystem with high species diversity?
   A. Its food webs are relatively simple.
   B. It has a greater number of successful species and a more stable ecosystem.
   C. The change in the environment would probably have quite serious effects on it.
   D. The environment is quite stressful with relatively few ecological niches and only a few organisms are really well adapted to that ecosystem.

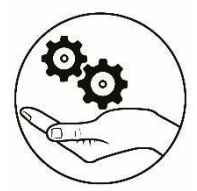
11. Assume two habitats have the same number of species of birds. The first habitat is predominantly one species of bird, with just a few birds of the other species. The second habitat has equal number of all the different bird species found in habitat 1. Will they have the same biodiversity index? If yes, why? If not, which will have the higher biodiversity index, and why?
    A. Yes, because they have equal species richness and species evenness.
    B. Yes, they will have the same biodiversity index because they have the same number of species.
    C. No, habitat 1 has a higher diversity because it is predominantly one species of bird. Diversity index depends on the most number of counts of one species of the organisms found in a community.
    D. No, habitat 2 has a higher diversity because, aside from having the same number of species of birds as habitat 1, it also has equal numbers of each species. Species richness and species evenness are both measures of biodiversity.

12. How does the destruction of coral reefs and mangrove forests contribute to species extinction?
    A. Amount of dissolved oxygen decreases.
    B. Fish predators become massive in number.
    C. Breeding grounds and nurseries of marine species are destroyed.
    D. The oceans and seas become contaminated with heavy metals and other pollutants.

13. Which illustrates how the introduction of new species may lead to extinction?
    A. When a prey species becomes extinct, its predator loses its food source and consequently becomes extinct.
    B. Amphibian populations have been on the decline worldwide caused by fungal infection of their skin which interferes with osmoregulation
    C. When a large predator, the Nile perch, was introduced into Lake Victoria, it caused the extinction of half of the species of fish endemic in it.
    D. When bacteria in a lake increase in number due to continuous decomposition of dead organisms, dissolved oxygen declines, killing all the fishes in it.

14. Deforestation, building of dams, conversion of forest to agricultural lands and urban development could cause species to decrease in number which, eventually, could lead to extinction. How?
    A. They pollute the environment causing species to die.
    B. They cause widespread of diseases which may lead to mass extinction.
    C. They trigger calamities to occur which may cause mass extinction of species.
    D. They destroy the habitat where species live, depriving them the chance to thrive and survive.

15. Which are considered driving forces of extinction?
    I. climate change
    II. Over hunting
    III. Carbon emissions
    A. I and II only C. II and III only
    B. I and III only D. I, II, and III



Additional Activities

Let's Find Out!

A. Find and color the hidden words in the puzzle. Some words are spelled backwards, up, or down. You may copy/reproduce this page and use coloring pen or highlighter in answering. Don't mark this module.

D	E	F	O	R	E	S	T	A	T	I	O	N	U	P
F	N	H	D	F	E	W	H	X	V	B	Y	I	J	O
K	D	D	F	V	H	M	R	U	I	K	B	A	H	L
L	A	E	X	V	C	B	E	D	V	F	R	R	K	L
F	N	U	O	P	J	L	A	X	V	G	F	D	B	U
V	G	H	C	V	N	X	T	X	F	X	F	I	F	T
L	E	X	C	X	V	B	E	X	V	X	N	C	E	I
B	R	F	H	C	R	H	N	X	V	B	C	A	O	O
Z	E	S	F	H	T	B	E	Z	G	N	H	C	P	N
A	D	A	F	V	B	N	D	C	S	G	T	V	L	V
L	I	M	I	T	I	N	G	F	A	C	T	O	R	K
D	B	M	Y	T	I	S	R	E	V	I	D	O	I	B
C	O	M	M	U	N	I	T	Y	G	H	J	Y	E	H
H	J	L	J	P	O	P	U	L	A	T	I	O	N	C
E	X	T	I	N	C	T	I	O	N	L	O	P	B	M

BIODIVERSITY	ENDANGERED	THREATENED
DEFORESTATION	POPULATION	ACID RAIN
EXTINCTION	COMMUNITY	POLLUTION
	LIMITING FACTOR	

B. Identify the term described below. Choose your answer inside the box and write it on a separate sheet of paper.

_____1. It is the term used to describe the number and variety of life found on Earth?

_____2. It means the last individual belonging to a particular species is gone forever.

_____3. It pertains to a population of different species occupying the same geographical area.

_____4. It is the result of using and throwing waste products into the environment.

_____5. It is a result of air pollution mostly from factories and motor vehicles?

_____6. It is a term used once the population of species begins to decline rapidly.

_____7. It refers to the cutting, clearing, and removal of trees.

_____8. It is a term used when the population has become so low that it is possible of becoming extinct.

_____9. It is a group of living things within a certain area that contains all of the same species.

_____10. These are environmental conditions that keep population from increasing in size and help balance the ecosystem.

Answer Key

Additional Activity

A. Key to Correction

D	E	F	O	R	E	S	T	A	T	I	O	N	U	P	
F	N	H	D	F	E	W	H	X	V	B	Y	I	J	O	
K	D	D	F	V	H	M	R	U	I	K	B	A	H	L	
L	A	E	X	V	C	B	E	D	V	F	R	R	K	L	
F	N	U	O	P	J	L	A	X	V	G	F	D	B	U	
V	G	H	C	V	N	X	T	X	F	X	F	I	F	T	
L	E	X	C	X	V	B	E	X	V	X	N	C	E	I	
B	R	F	H	C	R	H	N	X	V	B	C	A	O	O	
Z	E	S	F	H	T	B	E	Z	G	N	H	C	P	N	
A	D	A	F	V	B	N	D	C	S	G	T	V	L	V	
L	I	M	I	T	I	N	G	F	A	C	T	O	R	K	
D	B	M	Y	T	I	S	R	E	V	I	D	O	I	B	
C	O	M	M	U	N	I	T	Y	G	H	J	Y	E	H	

B.

1. Biodiversity
2. Extinction
3. Community
4. Pollution
5. Acid rain
6. Threatened
7. Deforestation
8. Endangered
9. Population
10. Limiting factor

6. Destruction of Habitats
7. Climate change
8. Changes in Landscape
9. Fishing
10. Over Harvesting

Activity 5: Past Present Extinction

1. Mesozoic
2. Paleozoic
3. Paleozoic
4. Mesozoic
5. Cenozoic

What Have I Learned

1. Biodiversity
2. Species, genetic, ecosystem
3. Population
4. Community
5. Biodiversity
6. Limiting factors
7. Carrying capacity
8. Endangered
9. Threatened
10. Spread of Invasive Species
11. Destructio n of Coastal Resources
12. Extinction
13. Evolution
14. Geologic
15. Cenozoic era Cenozoic

What Can I Do

Activity Title: It's Good to be True!

1. Increasing
2. Endangered
3. True
4. True
5. True
6. Gradual
7. True
8. True
9. True
10. True

Assessment

1. B
2. D
3. D
4. C
5. D
6. A
7. D
8. B
9. C
10. B
11. D
12. C
13. C
14. D
15. D

Activity 2: Full of Space

Population	Number of Organisms	Density
Elephant	13	0.13
Tiger	10	0.1
Crocodile	12	0.12
Deer	30	0.3
Zebra	34	0.34

Guide Questions:

1. The distribution pattern of organism varies in number.
2. Zebra population has the greatest density.
3. Answer may include: availability of sunlight, nutrients, water, or food. Presence of other organisms that feed from plants, the available space for each individual animals.
4. Answer may vary. Any change in the factors listed in question 3 could lead to change in population density.

Activity 3: Caution! Caution! Oh Species Extinction

A.

1. Deforestation
2. Wildlife depletion
3. Water pollution
4. Air pollution
5. Destruction of Coastal Resources
6. Acid precipitation

B.

1. 1.Endangered
2. Extinct
3. Endangered
4. Threatened/Endangered
5. Endangered

C.

1. Deforestation
2. Water pollution
3. Wild life depletion
4. Air pollution
5. Destruction of Coastal Resources
6. Acid Precipitation

Activity 4: The Great Impact

1. Pollution
2. Hunting
3. Genetics
4. Diseases
5. Invasive species

What I Know	What I Know	What's New
1. B 11. A	1. F	Answers may vary…
2. A 12. C	2. T	1. Overpopulation
3. B 13. D	3. T	2. Degradation of land
4. A 14. B	4. T	3. Deforestation
5. B 15. B	5. F	4. Mining
6. C		5. Pollution
7. A		
8. D		
9. B		
10. B		

What's More

Activity 1:OUTDOOR EXPEDITION

Answer may vary…

TREE 2 Mango tree, 1 Bayabas tree, 1 Langka tree	TREES Total Species: 3 Total Item: 4
PLANTS 2 Gumamela, 5 Santan, 10 Welcome plant	PLANTS Total Species: 3 Total Item: 17
ANIMALS 2 dogs, 1 cat, 5 pigeons, 3 chicken	ANIMALS Total Species: 4 Total Item: 11
INSECTS/BUGS 1 butterfly	INSECT/BUGS Total Species: 1 Total Item: 1

Biodiversity Index = $\frac{\text{Total \# of different Species}}{\text{Total \# of Living Items}} = \frac{11}{33} = 0.33$

Note: Answers in guide questions may vary.

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