



Module 3

Biodiversity Conservation



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UP Department of Broadcast Communication
UP National Institute for Science and Mathematics Education Development



UP COLLEGE OF MASS COMMUNICATION
DEPARTMENT OF BROADCAST COMMUNICATION



DZUP EskweKalikasan: Para sa kabataan, kapaligiran, at bayan

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Preface

Para sa bayan, kalikasan, at kabataan? Kayang-kaya!

The project **DZUP EskweKalikasan: Para sa kabataan, kapaligiran, at bayan** is a publicly-funded initiative of the academe, with support from the government and advocates, that aims to contribute to the initiatives to integrate climate change knowledge and concepts about the Philippine environment in formal education.

According to the Climate Change Commission (n.d.), “the Philippines is one of the countries at greatest risk from present and projected climate-related hazards such as tropical cyclones, floods, landslides, and droughts.” These teaching modules were designed to encourage students with a comprehensive examination of the issues confronting the environment. Recognizing the curriculum visions and the objectives of inquiry-based teaching and learning that are adopted and promoted by the Philippine Basic Science Education Curriculum, these modules go beyond increasing public awareness of the environment’s significance in sustaining life on Earth to examining the effects of human actions in the protection or degradation of the environment.

Results of the early studies of Belland, Glazewski, and Richardson (2012) claim that issue-based learning is closely linked with evidence-based learning. It is thus appropriate to use scientific argumentation to implement these modules. Embedded in the modules is the provision for students’ opportunities to deeply engage in evidence-based scientific argumentation while simultaneously developing their critical thinking and communication skills. Thus, the basic components of scientific argumentation such as **claim, evidence, and justification** were strategically presented in the teaching modules. The modules, identified in the Curriculum Entry Points section, can be used in the following Senior High School Core Curriculum Subjects: Earth and Life Science or Earth Science; Understanding Culture, Society, and Politics; and Disaster Readiness and Risk Reduction.

These modules use multimodal learning to create an engaging and exciting learning environment that recognizes diverse learning styles. The concepts and issues presented in each lesson are mirrored in the podcast “*Kayang-kaya!*” to supplement classroom discussion using aural storytelling. Case studies that highlight local experiences while recognizing the various contexts that surround environmental issues, particularly climate change, are made available so the students can better grasp the environmental challenges that we are facing and be acquainted with examples of adaptation and mitigation measures that are currently being practiced.

DZUP EskweKalikasan aims to contribute to the wider discussion of environmental issues and the impacts of climate change and disasters in our everyday life, and to enrich conversations about sustainable living, sustainable development, and mindful consumption. These modules aim to be of utmost help for teachers to supplement their resources in their implementation of the Senior Science Education Curriculum.



The Project

DZUP EskweKalikasan: Para sa kabataan, kapaligiran, at bayan is an on-air and online modular educational project about the environment for the youth. The UP Department of Broadcast Communication (CHED Center of Excellence for Broadcasting) and DZUP 1602 (the official radio station of UP Diliman) spearheaded the project with funding support from the Philippine Government under the General Appropriations Act for Fiscal Year 2019 through the initiative of the Office of Senator Loren Legarda. The UP Diliman Office of the Chancellor also provided additional funding support.

Ten modules were conceptualized and developed in collaboration with the UP National Institute for Science and Mathematics Education Development (UP NISMED).

- Module 1.** The Environment and Me
- Module 2.** The Philippine Environment
- Module 3.** Biodiversity Conservation
- Module 4.** Sustainable Living
- Module 5.** Climate Change
- Module 6.** Waste Management
- Module 7.** Management of Environmental Resources
- Module 8.** Environment and Disasters
- Module 9.** Renewable Sources of Energy
- Module 10.** The Youth, the Nation, and the Environment

Each of the teaching modules comes with a **Kayang-kaya!** podcast and an episode of **Go Teacher Go sa DZUP EskweKalikasan (GTG sa DZUP Eskwe)**.

The **Kayang-kaya!** podcast, developed and produced by the UP Department of Broadcast Communication, chronicles the adventure of three Senior High School students residing in Brgy. Luntian, as they seek to understand and uncover the issues confronting the environment.

Meanwhile, DZUP EskweKalikasan and UP NISMED's radio program Go Teacher Go, collaborated to produce **GTG sa DZUP Eskwe**, video guides for teachers in implementing the modules in their classes. **GTG sa DZUP Eskwe** also discusses tips on how to adjust the modules into different modes of learning, i.e. blended, online, remote, etc. All the teaching modules and other learning resources are available for download at www.dzup.org/eskwekalikasan.



How to use this module

The modules promote inquiry-based teaching and learning through scientific argumentation and were designed to encourage students to appreciate Mother Nature and examine the issues confronting our environment. Each module is composed of the following sections:

Introduction Page / Table

This page contains the general information about the teaching module and its corresponding podcast. These include the following: **module number** and **title**, **podcast topic**, main question in the podcast, **synopsis** of the podcast, and the **teaching module objectives**.

Curriculum Entry Points

The curriculum entry points serve as guides for the educators in the appropriate use of the teaching module. This will help the educators identify the student **grade level**, **subjects**, and **subtopics** that this material can be applied to, as well as the **content standard**, **performance standard**, and **learning competencies** from the Department of Education's curriculum guide. This part also contains the **prerequisite concepts** based on students' prior knowledge from previous grade levels.

Teaching and Learning Process

The teaching and learning process guides the teacher in inquiry-based teaching using argumentation. This section identifies the **teaching approach**, and the **materials** that will be used to teach this module. The modules adopt the guided inquiry-based approach through argumentation as a teaching approach. It is composed of two major parts: the **lesson procedure** proper and the **assessment**. Embedded in the lesson procedure in each module is the eliciting of the three main components of argumentation: claim, evidence, and justification. They are placed differently depending on how the concepts are formed whether inductively or deductively. Assessment is used in the module in three ways: for learning (formative assessment), as learning (on-going), and of learning (summative assessment).

Related Concepts

This part contains the science and other related concepts and their contextualized definitions depending on how they were used in the modules.

References

This contains all the references used by the writers in writing the modules. The educators may revisit these references for additional information.

Activity Sheets / Worksheets

Activity sheets may include **case studies** and **guide questions** to answer while listening to the podcast or for presentation purposes, and other types for individual and group activities.

Answer Keys

The activity sheet/worksheet in each module comes with the corresponding answer key that can help the educators in assessing the student outputs.



Teaching Module

Module No. and Title	Module 03. Biodiversity Conservation
Podcast Topic	Philippine Native and Endemic Trees and Reforestation
Main Question	Ano ang kahalagahan ng pagtatanim ng puno sa tao at sa kapaligiran?
Podcast Synopsis	<p>Barangay Luntian will be having a tree planting activity, and Kali, Naya and Alab are interested to join. However, they are worried that invasive tree species like Mahogany might be planted. They consult an expert on the different types of species - native, endemic, exotic, and invasive, and their environmental impacts. They also go to Kapitan Tina to confirm their concern. They find out that she has consulted experts and will not be planting invasive tree species. The friends give their full support to the project. In this episode, they also realize the importance of trees in our lives.</p> <p><i>Magkakaroon ng treeplanting activity sa Barangay Luntian, at planong sumali ng magkakaibigang sina Kali, Naya, at Alab dito. Pero nababahala silang baka invasive species ang itinatanim. Makakausap nila ang isang eksperto tungkol sa kung ano nga ba ang pinagkaiba ng native, endemic, exotic, at invasive species at epekto ng mga ito sa kalikasan. Hahanapin nila si Kapitan Tina para malinawan at malalaman nilang hindi naman pala invasive species ang itatanim. Ibibigay ng tatlo ang kanilang suporta sa proyekto at mapagninilayan nila ang kahalagahan ng mga puno sa ating buhay.</i></p>
Podcast Objectives	<p>After listening to the podcast, the learners should be able to:</p> <ol style="list-style-type: none">1. differentiate native, endemic, exotic and invasive species;2. identify some examples of native, endemic, exotic, and invasive species;3. explain the importance of trees and forests in the ecosystem;4. explain the interconnection of humans to trees and forests; and5. cite ways that should be considered and remembered when doing tree planting activities.
Teaching Module Objectives	<p>(Adapted from the DepEd curriculum guides)</p> <p>At the end of this lesson, the learners should be able to:</p> <ol style="list-style-type: none">1. describe how unifying themes (e.g., structure and function, evolution, and ecosystems) in the study of life show the connections among living things and how they interact with each other and with their environment;2. describe the principles of the ecosystem; and3. understand how human activities affect the natural ecosystem

Curriculum Entry Points

Grade Level: Grade 11/12 (Earth and Life Science)

Content: Interaction and Interdependence

Content Standard	Performance Standard	Learning Competency
<p><i>The learners demonstrate an understanding of:</i></p> <ol style="list-style-type: none"> 1. the principles of the ecosystem; and 2. how human activities affect the natural ecosystem. 	<p><i>The learners shall be able to:</i></p> <p>prepare an action plan containing mitigation measures to address current environmental concerns and challenges in the community.</p>	<p><i>The learners:</i></p> <ol style="list-style-type: none"> 1. describe the principles of the ecosystem (S11/12LT-IVhj-28); and 2. describe how the different terrestrial and aquatic ecosystems are interlinked with one another (S11/12LT-IVhj-30).

Prerequisite Concepts

1. Ecosystem (Grade 3)
 - living things depending on their environment for food, air, and water to survive
2. Living Things and Their Environment: Biodiversity and Evolution (Grade 3)
 - different kinds of living things found in different places
3. Ecosystem (Grade 4)
 - beneficial and harmful interactions occurring among living things and their environment as they obtain their basic needs
4. Living Things and Their Environment: Biodiversity and Evolution (Grade 4)
 - animals and plants living in specific habitats
5. Living Things and Their Environment: Biodiversity and Evolution (Grade 8)
 - species as producers of fertile offspring
 - biodiversity as the collection of variety of species living in an ecosystem
6. Living Things and Their Environment: Biodiversity and Evolution (Grade 9)
 - extinction of species as they fail to adapt to changes in the environment

7. Ecosystem (Grade 10)
 - human activities and other organisms impacting the ecosystems
 - biodiversity influencing the stability of ecosystems
8. Living Things and their Environment: Biodiversity and Evolution (Grade 10)
 - natural selection producing a succession of diverse new species

Teaching Process

Teaching Approach	Inquiry-based approach through argumentation
Materials	<ol style="list-style-type: none"> 1. Podcast file 2. PowerPoint Presentation 3. Worksheets 4. meta cards 5. markers 6. coloring materials <p><i>(Please visit www.dzup.org/eskwekalikasan to access the podcast, PowerPoint and/or student's worksheet.)</i></p>

Activity in the Previous Session:

1. Distribute copies of the podcast and worksheet to each student in the class.
2. Instruct the students to listen to the podcast, and answer the questions in the worksheet.
3. Ask them to list down the trees found in their respective communities, and bring that list in the next session.

I. LESSON PROCEDURE

A. Introduction

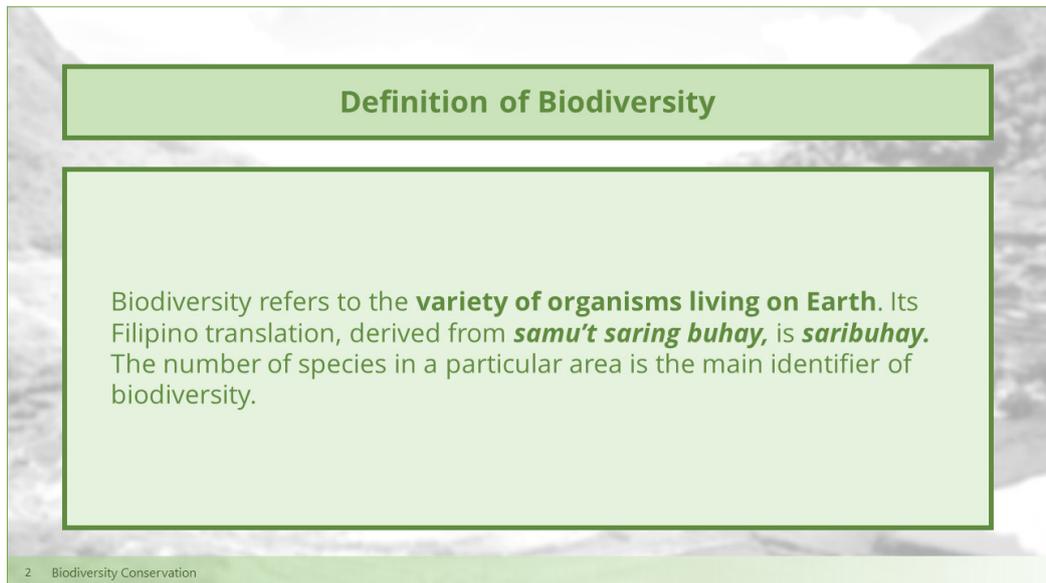
1. **Recall.** The teacher may ask, *"Based on your learning on Living Things and Their Environment, can you recall the meaning of biodiversity?"* The teacher will elicit answers from the students.

Possible Answer:

Biodiversity refers to the variety of organisms living on Earth. Its Filipino translation, derived from "samu't saring buhay," is "saribuhay." The number of species in a particular area is the main identifier of biodiversity. The Philippines, having many species of plants, animals, bacteria, fungi, and other types of organisms, is considered as one of the megadiverse countries in the world.

2. Show **SLIDE 2** (Definition of Biodiversity).

SLIDE 2



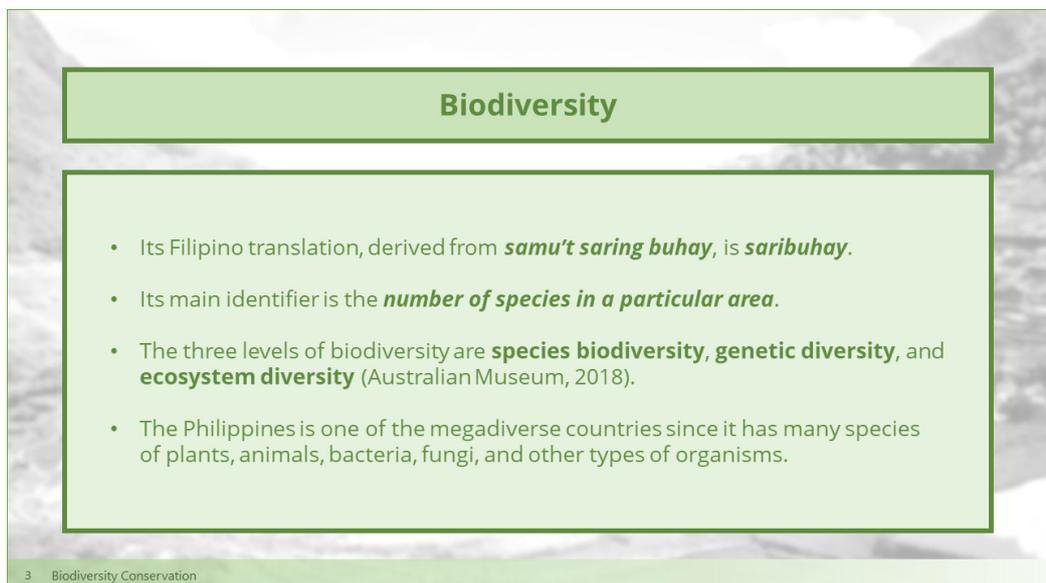
Definition of Biodiversity

Biodiversity refers to the **variety of organisms living on Earth**. Its Filipino translation, derived from *samu't saring buhay*, is *saribuhay*. The number of species in a particular area is the main identifier of biodiversity.

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3. Show **SLIDE 3** (Biodiversity).

SLIDE 3



Biodiversity

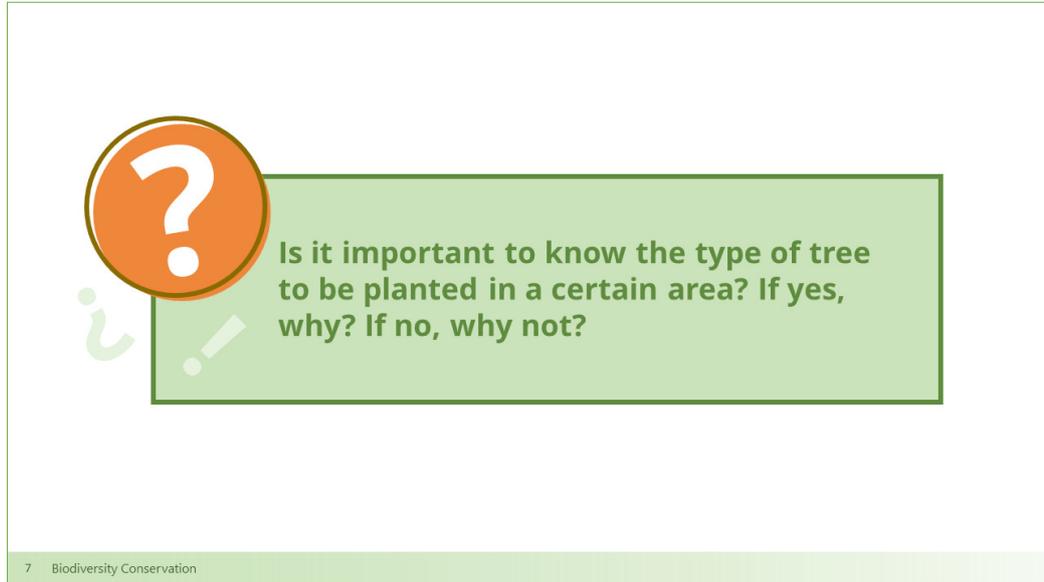
- Its Filipino translation, derived from *samu't saring buhay*, is *saribuhay*.
- Its main identifier is the **number of species in a particular area**.
- The three levels of biodiversity are **species biodiversity, genetic diversity, and ecosystem diversity** (Australian Museum, 2018).
- The Philippines is one of the megadiverse countries since it has many species of plants, animals, bacteria, fungi, and other types of organisms.

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Is it important to know the type of tree to be planted in a certain area? If yes, why? If no, why not?

2. Show **SLIDE 7** (Argumentative Statement).

SLIDE 7



Concept Development / Eliciting Evidence

Segment 2: Kwentuhan with Expert (Mr. Ali Omengan, Board of Justice and Programs – Head, Philippine Native Plants Conservation Society Incorporated) [TIMESTAMP: 03:40–09:38]

3. Recall the second segment of the podcast, Kwentuhan with Expert (Mr. Ali Omengan, Board of Justice and Programs - Head, Philippine Native Plants Conservation Society Incorporated). Discuss the answers to the following questions:

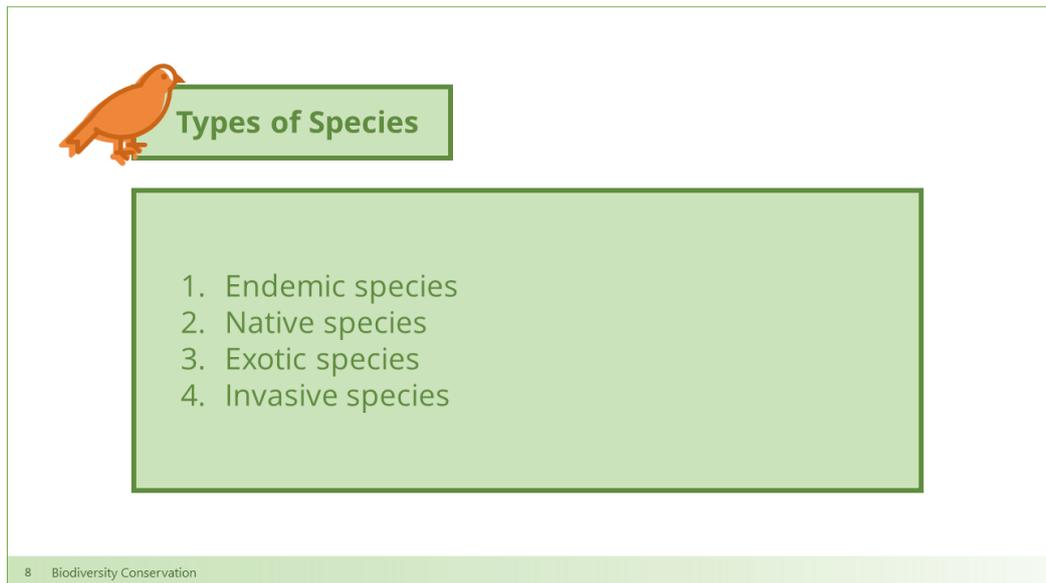
- **Question 1: What are the different types of plant species mentioned in the podcast?**

Possible Answer:

Types of Species	Characteristics
Endemic species	<ul style="list-style-type: none"> • species present only in a particular area or locality
Native species	<ul style="list-style-type: none"> • present in a particular area or locality but also present in adjacent localities or areas
Exotic species	<ul style="list-style-type: none"> • introduced or non-native in area
Invasive species	<ul style="list-style-type: none"> • exotic or non-native species in a particular area • can cause negative or harmful impacts on the local ecosystem

4. Show **SLIDES 8 to 12** (Types of species mentioned in the podcast).

SLIDE 8



Slide 8 features a title box with an orange bird icon and the text "Types of Species". Below the title is a large green box containing a numbered list of four species types: 1. Endemic species, 2. Native species, 3. Exotic species, and 4. Invasive species. The slide number "8" and the text "Biodiversity Conservation" are located in the bottom left corner.

Types of Species

1. Endemic species
2. Native species
3. Exotic species
4. Invasive species

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SLIDE 9



Slide 9 is divided into two main sections. On the left, the title "Endemic Species" is followed by a definition: "Endemic species are those species present only in a particular area or locality." On the right, there are two images with captions. The top image shows a blue, string-like plant with the caption "Jade vine (Strongylodon macrobotrys)". The bottom image shows pink flowers with the caption "Ground orchids (Paphiopedilum spp.)". At the bottom of the slide, there are source URLs for the images. The slide number "9" and the text "Biodiversity Conservation" are in the bottom left corner.

Endemic Species

Endemic species are those species present only in a particular area or locality.

Jade vine
(*Strongylodon macrobotrys*)

Ground orchids
(*Paphiopedilum spp.*)

Sources:
[Online image], (n.d.), https://live.staticflickr.com/7913/46292748664_acdefb2d70_b.jpg
[Online image], (n.d.), <https://us.123rf.com/450wm/nipastock/nipastock1703/nipastock170300115/73860280-soft-focus-of-paphiopedilum-charlesworthii-is-a-species-of-plant-in-the-orchidaceae-family.jpg?ver=6>

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SLIDE 10

Native Species

Native species are present in particular but also in adjacent localities or areas.



Attenborough's Pitcher Plant (*Nepenthes attenboroughii*)

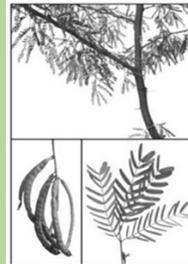
- It is a carnivorous pitcher plant native to the Victoria massif of Palawan.
- The World Conservation Union (IUCN) classifies the plant as Critically Endangered for its restricted distribution and plant poaching.

Sources:
Sawe, B. E. (2017, April 25). Native Plants Of The Philippines. World Atlas. <https://www.worldatlas.com/articles/native-plants-of-the-philippines.html>
[Online image]. (n.d.). <https://img.yumpu.com/37143729/1/500x640/nepenthes-attenboroughii-new-england-carnivorous-plant-society.jpg>

SLIDE 11

Exotic species

Exotic species are those species that are introduced or non-native in area.



Acacia trees



Kaimito or Star Apple

Sources:
https://lh3.googleusercontent.com/proxy/sy1PvjRtQ4a5i0JhAGcb_wuLxd09VdYDld2qgXmVRX9ZE9KPQRXBQ78Nayp8KhkNDHA_TwtqXcGyLbADm4
[Online image]. (n.d.). https://images-na.ssl-images-amazon.com/images/I/71u3AD7XTL_AC_5X450_.jpg

SLIDE 12

Invasive species

Invasive species are exotic species proven to pose negative impacts on the local ecosystem.



Mahogany



Water Hyacinth

Sources:
https://i3.googleusercontent.com/proxy/9y1PJFtQ4s5QjAGcb_wuLxd09VdYDl2qgXmVRX9ZE9iPQRXEQf8Nstyp8KhkNOHA_TwqKcGyLbADm4
 [Online image], (n.d.). https://images-na.ssl-images-amazon.com/images/I/71u3AD7XTL_AC_SX450_jpg

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5. Continue the discussion with the questions below:

- **Question 2: Given these types of species, how can you say that a tree is native or endemic to the Philippines?**

Possible Answer:

A tree can be considered as native or endemic to the Philippines if it is present in the area for at least hundreds of years. Therefore, the tree is already well-adapted to the area and has its own niche or role. Take note that the endemism of a particular species requires a specified location; this means that a tree that is endemic to Samar Island may be considered as exotic in Luzon because Samar and Luzon are two distinct islands or areas.

- **Question 3: What is your basis for saying so?**

Possible Answer:

Trees are endemic or native when: (1) they can thrive in a particular area without disturbing the surrounding ecosystem—that means killing nearby plant species; (2) if they are strong and sturdy to withstand typhoons or strong winds, that means it has already adapted to its environment, including the weather conditions; and (3) when native animals refuse to feed on these trees.

6. Ask the students to list the trees that are present in their communities.

- **Question 4: Are those trees native in your communities? Use the link below as reference:**

Possible Answer: *(Students' answers may vary.)*

Use the link below as reference:

- a. <https://caintaplantnursery.com/our-products/philippine-indigenous-plants/>
- b. <https://www.forestfoundation.ph/wp-content/uploads/2020/08/Field-Guidebook-on-the-Native-Trees-within-the-Quirino-Forest-Landscape.pdf>

7. Continue the discussion with the questions below:

- **Question 5: What would happen if the trees in your community disappeared?**

Possible Answers:

- There will be fewer source of food and lumber for shelter.
 - There will be an imbalance in the ecosystem, which means that native animals will lose their habitat and food source, that will result in disappearance of these animals as well and the possibility of increase in pests in the absence of predators.
 - The climate of the area will change. Trees generally cool down the environment, thus hotter temperatures can be expected.
 - The air and water will become more polluted.
 - Frequent occurrences of soil erosion, landslides, and flooding.
 - There will be less or no protection from harsh weather.
- **Question 6: What can we do to lessen the loss of native trees in your community?**

Possible Answers:

- Protect and take care of existing native trees.
- Replace invasive species with native trees.
- Educate ourselves on the kinds of native trees in the area, and plant more of them.
- Conduct proper and strict implementation of laws and policies on taking care and protection of the environment, more specifically on native trees.

Segment 3: Alam mo ba? (The importance of trees and forests) [TIMESTAMP: 09:40-12:58]

1. **Activity.** Recall the third segment of the podcast, Alam mo ba? (The importance of trees and forests). Divide the class into five groups.
2. Provide students with small pieces of cartolinas (meta cards) and markers. Let them write their answers to Questions 7-10 on the meta cards.

- **Question 7: What are the contributions of trees to humans, to other species, and to the ecosystem?**

Possible Answer:

Contributions of trees to humans:

- Trees provide the raw materials for many products such as rattan, pulp, paper, plywood, and lumber.
- Trees provide shade, recreational purposes, cultural value, and historical value.
- Trees provide oxygen.
- Trees provide an energy source, fruits, oil, and rubber.

Contributions of trees to other species:

- Trees serve as habitat for many animal species and a few plant species like orchids.
- Trees provide food for other species.
- Trees provide oxygen to animal species.

Contributions of trees to the ecosystem:

- Trees prevent erosion, siltation, and flooding.
- Trees are the main organisms of forests.
- Trees serve as carbon storage preventing climate change.

• **Question 8: Why do we need to conserve them?**

Possible Answer:

Trees provide a lot of ecosystem and economic services. They provide raw materials, food, oil, and other products. They regulate the climate by acting as carbon storage. They prevent soil erosion and flooding. They serve as habitat for other organisms. Basically, we live partly because of them; hence, we need to conserve them.

• **Question 9: Why do people cut trees?**

Possible Answer:

People cut down trees for different reasons. They cut down trees to get lumber, wood, or other products. They cut trees to convert the land for agricultural, residential, or commercial purposes, and for safety reasons.

• **Question 10: What shall we do to conserve our native trees?**

Possible Answer:

We can conserve trees by protecting our forests, by controlling logging activities and tree cutting, and by planting trees.

3. Given the questions written on the board, ask each group to place the meta cards with their answers to each question on the board. Review their answers, and let the whole class discussion. Let the students understand and become aware of the importance of trees to the environment and humanity.
4. To summarize their answers, show **SLIDE 13** (Importance of trees).

SLIDE 13

Importance of trees

To humans, trees provide

- the raw material for many products such as rattan, pulp, paper, plywood, and lumber,
- shade, recreational purposes, cultural value, and historical value,
- oxygen, and
- an energy source, fruits, oil, and rubber.

To other species, trees

- serve as habitat for many species,
- provide for other species, and
- provide oxygen to other species.

To the ecosystem, trees

- prevent erosion, siltation, and flooding,
- are the main organisms of forests, and
- serve as carbon storage preventing climate change.

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5. Ask the class if they have questions about the third segment of the podcast yet to discuss. If there are any, discuss these with the class.

Segment 6: Policy Feature (RA 10176 or Arbor Day Act) [TIMESTAMP: 16:35–18:30]

1. Recall the sixth segment of the podcast, Policy Feature (RA 10176, or Arbor Day Act). The teacher will reiterate that this segment is all about the Arbor Day Act.
2. Show **SLIDE 14** (Summary of Arbor Day Act).

SLIDE 14

Summary of Arbor Day Act

Ang Republic Act No. 10176 o "**Arbor Day Act of 2012**" o "**Tree Planting Day**" ay isang batas na **naglalayong protektahan at isulong ang karapatan ng bawat mamayan para sa isang malinis at mayamang kalikasan**, kaya kinikilala ang kahalagahan ng mga puno sa kapaligiran.

Kinakailangang magtulungan ang gobyerno at ang mamamayan upang alagaan ang ating likas na yaman, sa pamamagitan ng nationwide tree-planting activities at pagbibigay ng mabisang hakbang sa pag-aalaga at pagpapanatili ng mga ito.

Isinusulong ng batas na lahat ng mga pinuno ng mga lalawigan, lungsod, at barangay ay kailangang magproklama ng Arbor Day. Hinggil dito, lahat ng mamamayang hindi bababa sa 12 taong gulang at may karampatang lakas ay kinakailangang magtanim ng isang puno bawat taon. Ang pagpili ng araw ay dapat naayon sa tamang panahon o season ng mga uri ng puno sa kani-kanilang lugar.

Bagama't isinabatas ito noong 2012, hindi lahat ay sumusunod dahil sa kakulangan ng mahigpit na pagpapatupad.

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3. Provide students with copies of the Arbor Day Act. Ask the class the following questions:

- **Question 13: What is the Arbor Day Act all about?**

Possible Answers:

- It is a law that mandates LGUs to conduct annual arbor day or tree planting day.
- The law requires every citizen at least 12 years old to plant a tree every year.
- It recognizes the importance of tree planting for the Nation.

- **Question 14: Why is it important to know about the Arbor Day Act?**

Possible Answers:

- It makes us realize that there is an actual law mandating every individual to plant a tree each year. However, the proper implementation of the law is lacking.
- It gives us a sense of responsibility toward the environment.
- It can motivate people to remind or hold public officials responsible for their duty to implement the laws.

- **Question 15: In general, how can the Arbor Day Act help in the conservation of trees and biodiversity?**

Possible Answer:

The proper and strict implementation of the Arbor Day Act will increase the number of native trees and the forest area in the country. It will result in a healthier ecosystem because it can increase the biodiversity of native animals as well. There will be more food, safer habitats, and a healthier environment for them.

- **Question 16: In the past, what are the problems with the tree planting activities conducted in the Philippines?**

Possible Answers:

- Poor planning and lack of research before the implementation of activity
- Planting of wrong or inappropriate seedlings in a specific area, for example, planting invasive species like mahogany
- Planting in the wrong season which can inhibit the growth of particular trees
- Inadequate or no post-care plans after planting the seedlings

4. Ask the students to read some news and feature articles about the previous tree planting activities in the Philippines. The teacher may say, "Identify the problems of previous tree-planting programs in the Philippines based on the following news and feature articles:

- a. Panti, L. T. (2019, December 27). Gov't reforestation program failed to meet 80% of its targets – COA. GMA News. <https://www.gmanetwork.com/news/news/nation/720323/govt-reforestation-program-failed-to-meet-80-of-its-targets-coa/story/>
- b. Ramos, M. (2015, April 24). COA: P75B tree-planting project of DENR a failure. Inquirer.net. <https://newsinfo.inquirer.net/687426/coa-p7b-tree-planting-project-of-denra-failure>
- c. The Manila Times. (2014, August 10). DENR must stop destroying our forests. <https://www.manilatimes.net/2014/08/10/opinion/editorial/denr-must-stop-destroyingforests/118026/>
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SLIDE 15

Summary of the tree-planting problems based on the news and feature articles

Problems based on the articles

For the National Greening Program (NGP)

- There was lack in planning and mishandling of funds.
- They did not conduct mapping and planning or surveying of the planting areas.
- The delay in the delivery of seedlings resulted in untimely planting.
- There was no partner organization to help monitor the plantations in some planting sites.
- The majority of trees being planted are exotic, like mahogany, gmelina, and rubber—trees that are fast-growing but less adaptive to the Philippine environment.
- The project focused more on the economic development and livelihood of farmers rather than reforestation.

The other articles showed how invasive species, like mahogany, affect the biodiversity in an ecosystem.

15 Biodiversity Conservation

5. Show **SLIDE 16**. Elicit answers from students.

SLIDE 16



How do we address these problems?

16 Biodiversity Conservation

- **Question 17: How can we address these problems?**

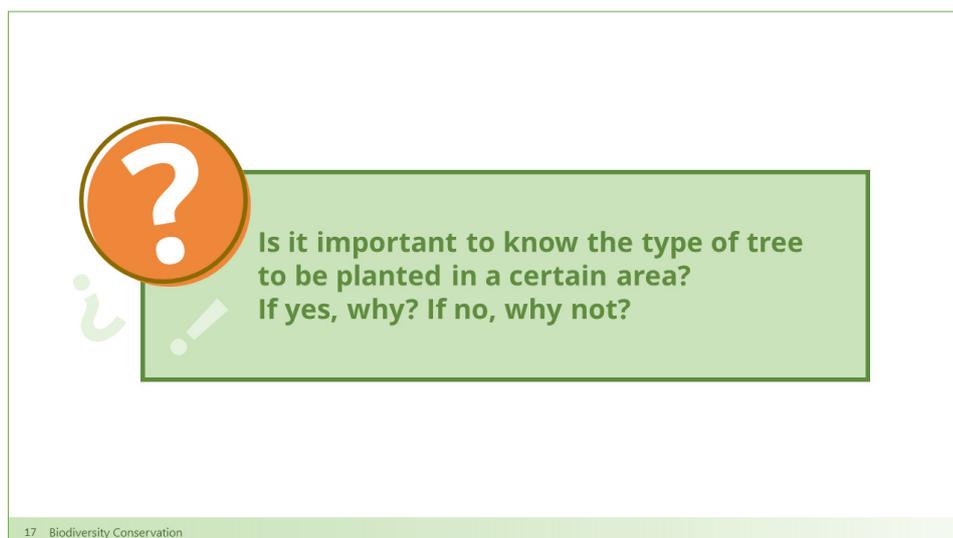
Possible Answers:

- The people, mostly government officials, should understand the concept of biodiversity and the importance of native trees in the ecosystem.
- Government officials should consult ecologists and experts in planning and conducting tree planting activities. Most importantly, they should listen to them.
- In tree-planting activities, proper planning and implementation are important. It includes surveying and mapping the area, knowing the right kind of seedlings to plant, how and when to plant them, and of course, monitoring and ensuring that they grow healthy.

Concluding Statements for Justification

1. Show the argumentative statement once again: **SLIDE 17** (Argumentative Statement)

SLIDE 17



2. The teacher will elicit ideas from the students based on the discussions. It is to establish a consensus on the importance of trees and knowing the types of trees to plant in a certain area. The guide questions below will serve as the basis of the concluding statement.
 - Why is it important to know the different types of species of trees?
 - What factors determine the types of trees to be planted in a given area?

C. Reflection

1. With the same groupings, ask each group to draft a comprehensive action plan for a tree planting activity to be held in an area near the school. Ask each group to take note of the considerations in tree planting.

2. After drafting their action plans, let each group discuss their plans in the class. Ask the following questions per group:
 - **Question 19: Is your action plan ecologically acceptable? Have you considered planting native and endemic trees?**
 - **Question 20: Have you considered involving the community in your plan?**

II. ASSESSMENT

1. Each group will choose one theme below and make a poster-slogan using cartolinas, markers, and coloring materials.

Theme 1: **Tree-cutting, Illegal Logging, and Deforestation**

Theme 2: **Things to Consider When Planting Trees**

2. All groups will present their outputs through a one-minute pitch.

Related Concepts

1. Biodiversity

- It refers to the variety of organisms living on Earth.
- Its Filipino translation, derived from "samu't saring buhay," is "saribuhay.
- Its main identifier is the number of species in a particular area.

2. Endemic Species

- These are species present only in a specific locality, within political boundaries.

3. Native Species

- These are species present in specific biogeographical regions beyond national/political boundaries.

4. Exotic species

- These species are not native to a specific locality, either introduced intentionally or unintentionally. Besides, they are known as alien or non-native species.

5. Invasive species

- These species are exotic in a specific locality and can cause negative impacts on the ecosystem.

6. Deforestation

- It is the act of removal of trees in a forest or clearing of a part of or the entire forest.

7. Reforestation

- It is the act of replanting of trees in a forest or a clear, open area.

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Module 3 Worksheet

Name: _____ Score: _____

Instruction. Answer the following questions while listening to the podcast.

A. The Different Types of Species

1. What problems did Kali have about the tree planting activity?

2. According to Kali, Alab, and Naya, what trees are not allowed in the tree planting activity? Why?

3. What are the different types of species? Give specific examples of each type.

4. Why is it important to know if the trees to be planted are native, endemic, invasive, or exotic? Why are invasive species not allowed to be used in tree planting activities?

5. If you have questions while listening to the podcast segment, then note them down:

B. The Importance of Trees and Forests

1. What are the contributions of trees to humans?

2. What are the contributions of trees to other species?

3. What are the contributions of trees to ecosystems?

4. If you have questions while listening to the podcast segment, then note them down:

C. Arbor Day Act and things to consider and remember when doing tree planting activities

1. What is the Arbor Day Act? Why do you need to learn this Act?

2. What are the things to consider in tree planting?

3. If you have questions while listening to the podcast segment, then note them down:

Answer Key

Instruction. Answer the following questions while listening to the podcast.

A. The Different Types of Species

1. What problems did Kali have about the tree planting activity?

Ano kaya ang punong itatanim sa tree planting activity ng barangay? Invasive species kaya tulad ng Mahogany?

2. According to Kali, Alab, and Naya, what trees are not allowed in the tree planting activity? Why?

Those trees that are invasive and not native to the area like mahogany trees are of which not allowed in the tree planting activity. Non-native and invasive trees can pose threats to the ecosystem. They can kill other plants and animals. Hence, it will disrupt the food chain and ecological relationships.

3. What are the different types of species? Give specific examples of each type.

- Endemic species are those species present only in a particular area or locality.
Some examples of endemic species in the Philippines are white lauan, Philippine eagle, Palawan peacock, and Philippine tarsier.
- Native species are those present in particular but adjacent localities or areas.
Some examples of native species in the Philippines and nearby Asian countries are narra, mango, binturong, and green sea turtle.
- Exotic species are those species that are introduced or non-native in an area.
Some examples of exotic species introduced in the Philippines from the Americas are cactus, Bermuda grass, and neem tree.
- Invasive species are exotic species proven to pose negative impacts to the local ecosystem.
Some of its examples are mahogany, gmelina, cogon grass, and golden apple snail.

4. Why is it important to know if the trees to be planted are native, endemic, invasive, or exotic? Why are invasive species not allowed to be used in tree planting activities?

Native and endemic tree species are more suitable to use for tree planting because they are more well-adapted to the area. Hence, they are more likely to survive. Invasive or exotic trees may pose threats to the ecosystem. One good example is mahogany; it kills nearby plants. Many native animals do not prefer it also to feed on. Hence, it disrupts the ecological balance.

5. If you have questions while listening to the podcast segment, then note those down:

B. The Importance of Trees and Forests

1. What are the contributions of trees to humans?

- Trees provide the raw material for many products such as rattan, pulp, paper, plywood, and lumber.
- Trees provide shade, recreational purposes, cultural value, and historical value.
- Trees provide oxygen.
- Trees provide energy source, fruits, oil, and rubber

2. What are the contributions of trees to other species?

- Trees serve as habitat for many species.
- Trees provide for other species.
- Trees provide oxygen to other species.

3. What are the contributions of trees to the ecosystems?

- Trees prevent erosion, siltation, and flooding.
- Trees are the main organisms of forests.
- Trees serve as carbon storage preventing climate change.

4. If you have questions while listening to the podcast segment, then note them down:

C. Arbor Day Act and things to be consider and remember when doing tree planting activities

1. What is the Arbor Day Act? Why do you need to learn this Act?

- It is a law that mandates LGUs to conduct annual arbor day or tree planting day.
- The law requires every citizen at least 12 years old to plant a tree every year.
- It recognizes the importance of tree planting to the Nation.

2. What are the things to consider in tree planting?

- Choose the right place where to plant the tree.
- Choose the right time to plant a tree (usually June to September).
- Choose the right tree to be planted in the area.
- Make sure that the tree planted will be taken care of.

3. If you have questions while listening to the podcast segment, then note them down: