M7 Biodiversity and Healthy Society

Biodiversity - condensed phrase of **biological diversity**, multifaceted **topic** covering many **aspects of biological differences**;

supports all life on Earth
variety of life forms at structural levels (**genetic**, **species** and **ecosystem**)
could be defined as **life on earth**

Three Kinds of Biodiversity that are essential to preserve ecological systems and functions:

1	**Genetic Biodiversity** measure of the **variety of versions of the same genes** within individual species
2	**Species Biodiversity** describes the **number of different kinds of organisms** within individual communities or ecosystems
3	**Ecological Biodiversity** **specifies the number of niches, trophic levels, and ecological processes** that capture, sustain food webs and recycle materials within this system **Alt. meaning from the web:** ↳ variety of **ways that species interact** with each other and their environment ↳ variations in plant and animal **species living together and connected by food chains** and food webs

The Importance of Biodiversity

1	Biodiversity provides food and medicines
2	Biodiversity can aid ecosystem stability
3	Aesthetic and existence values are important

Threats To Biodiversity

E.O Wilson summarizes **human threats to biodiversity** as **HIPPO**, which stands for:

Habitat destruction
Invasive species
Pollution
Population of humans
Overharvesting

Earth's Biodiversity Hot Spots

areas that support natural ecosystems that largely intact and where native species and communities associated with these ecosystems are well represented
↳ concept was given **in 1988** by **Norman Myers** of **Oxford University**
↳ areas that cover both extraordinary biologically rich **endemic** plants and animals and are **highly threatened by human actions**

Forest habitat - an example of Biodiversity hotspot as they **persistently face devastation** and **degradation** due to illegal logging, pollution and deforestation

World's most threatened Biodiversity hotspots

identified by **Conservation International**, approximately there are **35 areas around the world** that **qualify as hotspots**

Technological Advancement that Supports Biodiversity

1	**Better mapping and visualization** **Google Earth** is very instrumental in locating organisms in inaccessible regions of earth
2	**Remote Control Photography and Video** **Getting up close and recording the details** and behavior of wildlife in their natural habitat are **essential to learn about the needs** and **risks of endangered species**
3	**Remote Measurement tools** **Stereo-camera system** was developed to get up close, observe and take precise measurements
4	**Conservation Drones** Used for **exposing the top view** of scenic spots for visual entertainment
5	**Gene Sequencing** Used to **identify pathogens**, likewise used to **confirm the grouping of organisms** in a species level

Issues and Concerns Regarding Recent Developments in the Life Sciences and Health in the Philippines

1	Biodegradation
2	Non-communicable diseases
3	Reproductive health/birth control
4	Drug abuse
5	Drug resistance
6	**Birth Defects** children with special needs
7	Organ transplants
8	**Gene Editing** newborn screening human experimentation
9	**Euthanasia** practice of ending the life of a patient **to limit the patient's suffering** ↳ comes from the Greek words "**eu**" (**good**) and "**thanatos**" (**death**)

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⚠ The following are from the discussion and PPT:

Biodiversity - measure of the number of the species

Variety of life on Earth at all of its levels, from genes to ecosystems and the ecological and evolutionary process that sustain it
Biodiversity by Bynum 2012

Importance of Biodiversity

1	Food security and biodiversity
2	Biodiversity is food security
3	Boycott GMOs

4 Important Part of the Ecosystem Diversity

1	**Functional Diversity**
	biological and **chemical processes** such as **energy flow** and **matter recycling** needed for the survival of species communities, and ecosystem
2	**Ecological Diversity**
	variety of **terrestrial and aquatic ecosystems** found in an area or on the earth
3	**Genetic Diversity**
	variety of **genetic material** within a species or a population
4	**Species Diversity**
	number and abundance of species present in different communities

Hedyotis papafranciscoi

recently discovered plant species **endemic to the Philippines**
↳ was found in the **Mount Madja-as in**, located in **Antique**
↳ named in honor of **Pope Francis**, with the epithet '**papafranciscoi**' reflecting this tribute

Philippine Crocodile (Crocodylus mindorensis)

also known as **Mindoro Crocodile**, **freshwater species** found in rivers, lakes, marshes, and ponds, mainly on the islands of Luzon and certain parts of Mindanao, including **Agusan del Norte**

Saltwater Crocodile (Crocodylus porosus)

this species is the **largest living crocodile**, growing up to 6 meters in length that inhabits both freshwater and saltwater areas such as rivers, coastal zones, mangroves, and estuaries
↳ present in southern parts of the Philippines, including Mindanao and Palawan

Lolong - was a massive **saltwater crocodile (Crocodylus porosus)** captured in Bunawan, Agusan del Sur
↳ named after **Ernesto 'Lolong' Coñate**

Ectopistes migratorius

known as **passenger pigeon**, was a bird species native to North America

Flowerpeckers

small birds primarily found in tropical and subtropical regions, including the Philippines where unique species like the **Philippine flowerpecker (Dicaeum Philippine)** and **black-bibbed flowerpecker (Dicaeum melanothorax)** are **endemic**
↳ play a vital role in their ecosystems by **contributing to pollination** and **seed dispersal**, helping to maintain ecological balance within their habitats

Endemic - refers to species or condition that's native to and restricted to specific geographic area

Genetically Modified Organism (GMO)

any organism such as plants, animals, or microorganisms whose **genetic material has been altered using genetic engineering techniques**
↳ modification often **done to enhance certain traits**, such as resistance to pests, tolerance to herbicides, or improved nutritional content
↳ commonly used in agriculture to **increase crop yields** and **reduce needs for chemical pesticides**

Example of GMO:

1	**Bt-Corn**
	type of genetically modified corn that has been **engineered to express a protein** from the bacterium **Bacillus thuringiensis (Bt)** that **acts as an insecticide**
2	**Rainbow Carica Papaya**
	genetically modified (GMO) cultivar of papaya that has been **engineered for resistance to papaya ringspot virus (PRSV)**
3	**Herbicide-tolerant glyphosate (Roundup Ready) Soybean**
	genetically modified soybean variety that has been **engineered to be resistant to glyphosate**, the active ingredient in many herbicides, including the popular Roundup brand

Non Food Use of GMO

Bluerose
designed to produce blue petals, achieved through the incorporation of specific genes from other plants blue color comes from: **Flavonoid 31**: pigment contributing to the blue coloration **Hydroxylase 51**: enzyme involved in the production of anthocyanins, which give color to flowers

Pros and Cons of the GM technology

Benefits

1	Genetic manipulation of pest resistance and herbicide resistance
2	Plant disease resistance
3	Bioenergy production
4	Salt, drought, cold and heat tolerance
5	Improvement of crop yield and quality
6	Molecular pharming of carbohydrates, lipids and protein
7	Non-agricultural industrial product generation

Issues and concerns

1	**Health**
	Allergenicity
	Creating antibiotic-resistant bacteria
	Creating super-weeds
2	**Environmental**
	Impact on biodiversity
	Effects on ecosystems
	Transfer of foreign gene from GM to non-GM plants

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Disclamer

This document might have some typos
If you see one, tell Drew :>
Some information here could be incorrect, if you suspect one, please do double-check