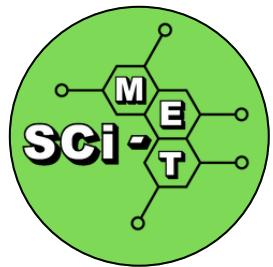


# 4



# SCIENCE

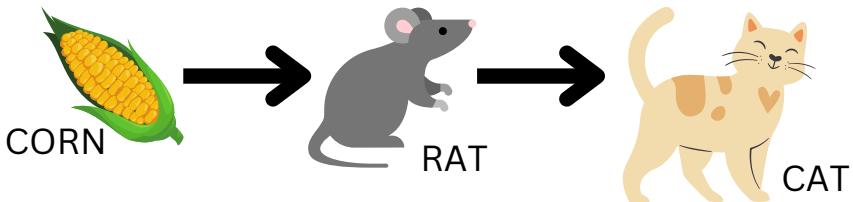
## Quarter 2: Food Chains



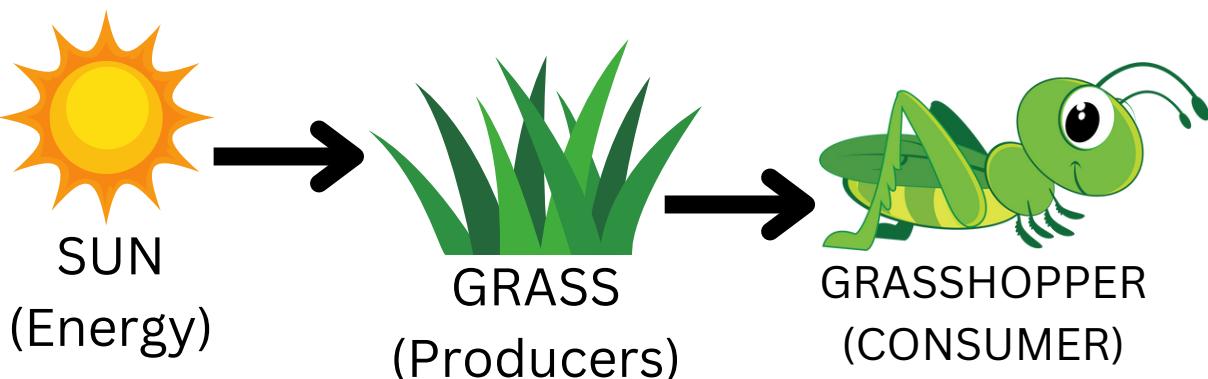
# Food Chains

Are you aware that **living organisms** require **energy** to **grow, breathe, reproduce**, and move? That energy cannot be created from nothing and must be distributed through the ecosystem? Is the sun the main source of energy for practically every **biosphere** on **Earth**?

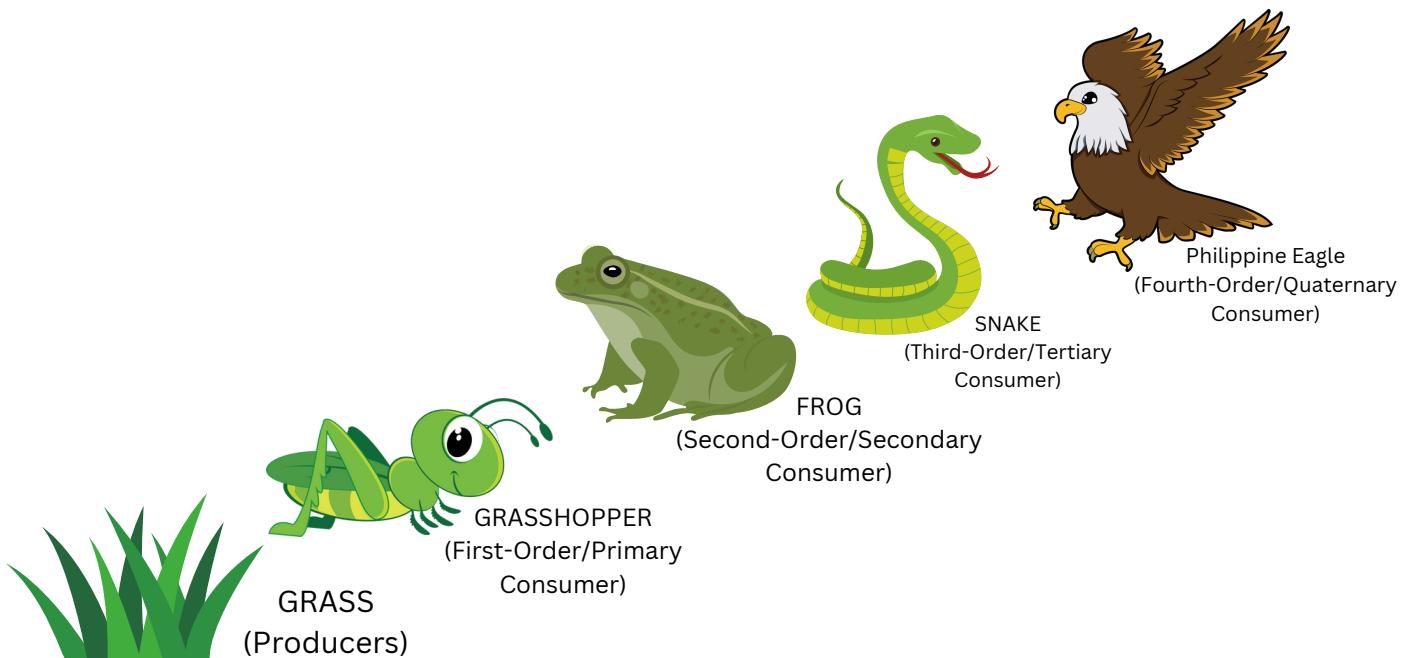
The transfer of energy between **organisms** is **linear**. The sun supports both autotrophs (like grain and grass) and heterotrophs (like chickens and grasshoppers). **Autotrophs** make food by utilizing sun energy. **Heterotrophs**, or consumers, cannot manufacture their own food and must rely on plants and animals for existence. The types of species in an **ecosystem** control the flow of energy. The **food chain** is a feeding process that starts with producers and concludes with the largest consumer.



The **sun** is the primary source of energy in a **community**. **Plants** use sunlight, **carbon dioxide**, and **water** to produce food through **photosynthesis**. Plants can create and produce their own energy, hence the term "**producers**". When an animal, such as a grasshopper, eats plants, it **absorbs** some of their energy.

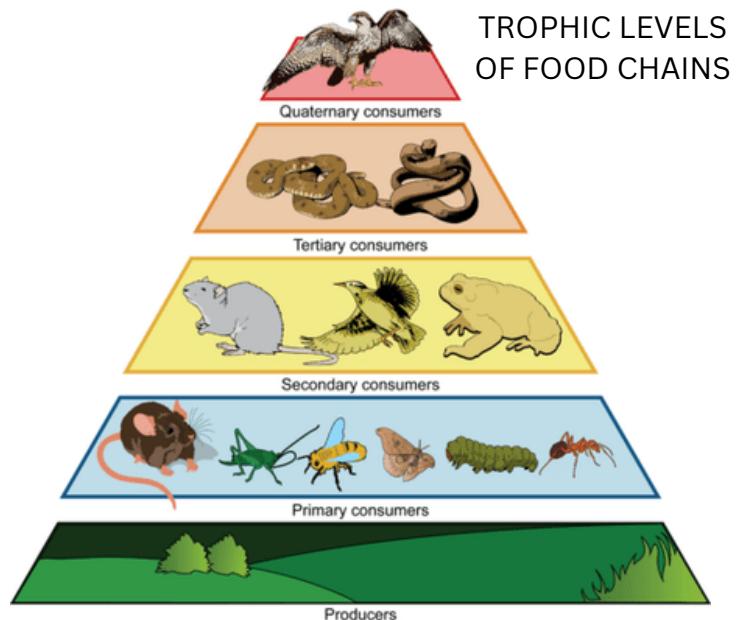
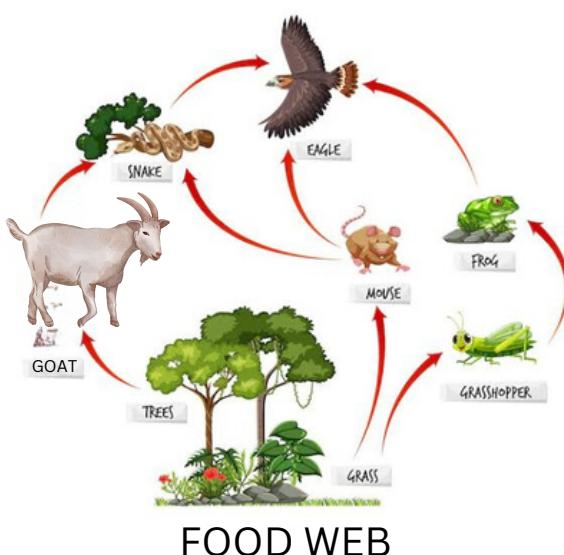


Animals rely on plants for survival because they cannot create their own; this is why they are known as **consumers**. A consumer is any organism that eats other creatures, including producers. **First-order or primary** consumers are organisms that feed directly on producers. An organism that consumes the first-order consumer is referred to as the **second-order or secondary** consumer, and those that devour the second-order consumers are the **third-order or tertiary** consumers also those that consume the third-order consumer are the **fourth-order or quaternary** consumers.



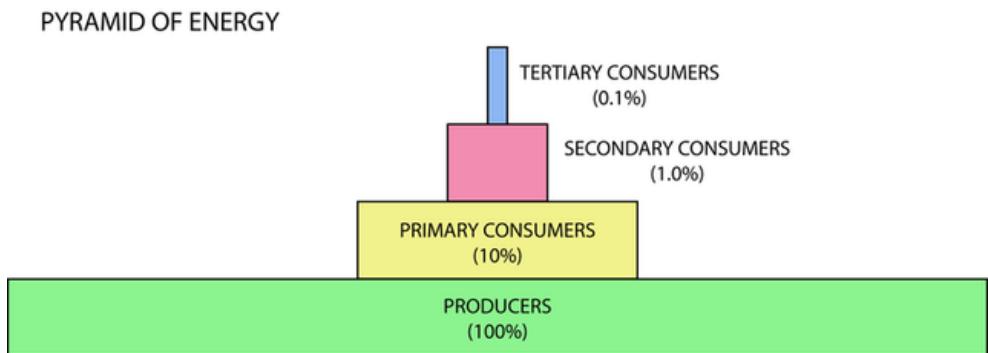
## Trophic Levels and Energy Transfer

**Trophic levels** refer to the various feeding positions within a food chain or web. Producers make up the first trophic level, which is followed by primary consumers, secondary consumers, and so on. A food chain or **food web** typically contains only four or five trophic levels. Humans may belong to the second, third, or fourth trophic levels of food chains or webs.

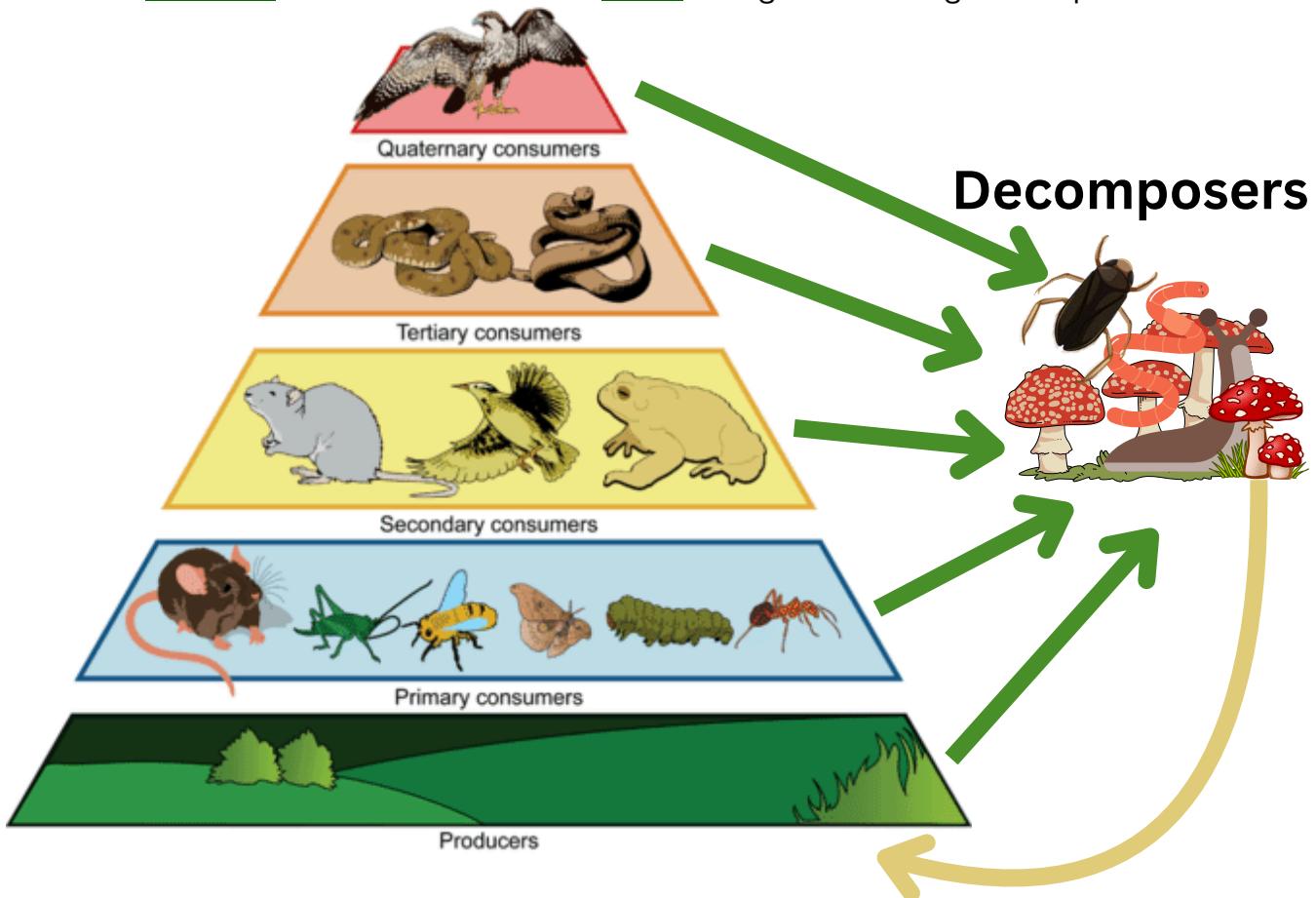


Trophic Level	Where It Gets Food	Example	
1st Trophic Level: Producer	Makes its own food	Plants make food	Snakes eat mice
2nd Trophic Level: Primary Consumer	Consumes producers	Mice eat plant seeds	Hawks eat snakes
3rd Trophic Level: Secondary Consumer		Consumes primary consumers	
4th Trophic Level: Tertiary Consumer		Consumes secondary consumers	

## Biomass



Higher trophic levels have less energy, hence there are typically fewer organisms. Organisms grow larger at higher trophic levels, but their fewer numbers result in less biomass. **Biomass** is defined as the total **mass** of organisms in a given trophic level.



**Decomposers** degrade elements found in dead organisms and garbage at all trophic levels. Organisms such as **detritivores** and **saprotrophs** replenish the ecosystem and consume the majority of the leftover energy. Because of the decline in energy at each trophic level, there is almost little energy remaining. Producers must therefore add energy to ecosystems on a constant basis.



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