



PRINCIPLES OF ECOLOGY

A lush green field with numerous small white flowers in the foreground. A large tree trunk is visible on the right side of the frame. The background is a soft-focus green field. The text "NUTRITION AND ENERGY" is overlaid in the center in a white, bold, sans-serif font.

NUTRITION AND ENERGY

Ecology

Study of the interactions among organisms and between organisms and their environment

Ecologists study the flow of energy through communities to discover nutritional relationships between organisms.

SUNLIGHT is the main energy source for life on Earth.



Autotrophs

Organisms that use sunlight or energy stored in chemical compounds to make food.

Organisms that make their own food are called **producers**.



Photosynthesis

Process used by autotrophs to make food energy from the sun.

Examples: plants, algae, cyanobacteria



Chemosynthesis

Autotrophs that capture chemical energy since they live in places without sunlight

Examples include bacteria found in volcano vents, hot springs, tidal marshes



Heterotrophs

Organisms that rely on other organisms for their energy and food supply; also called **consumers**

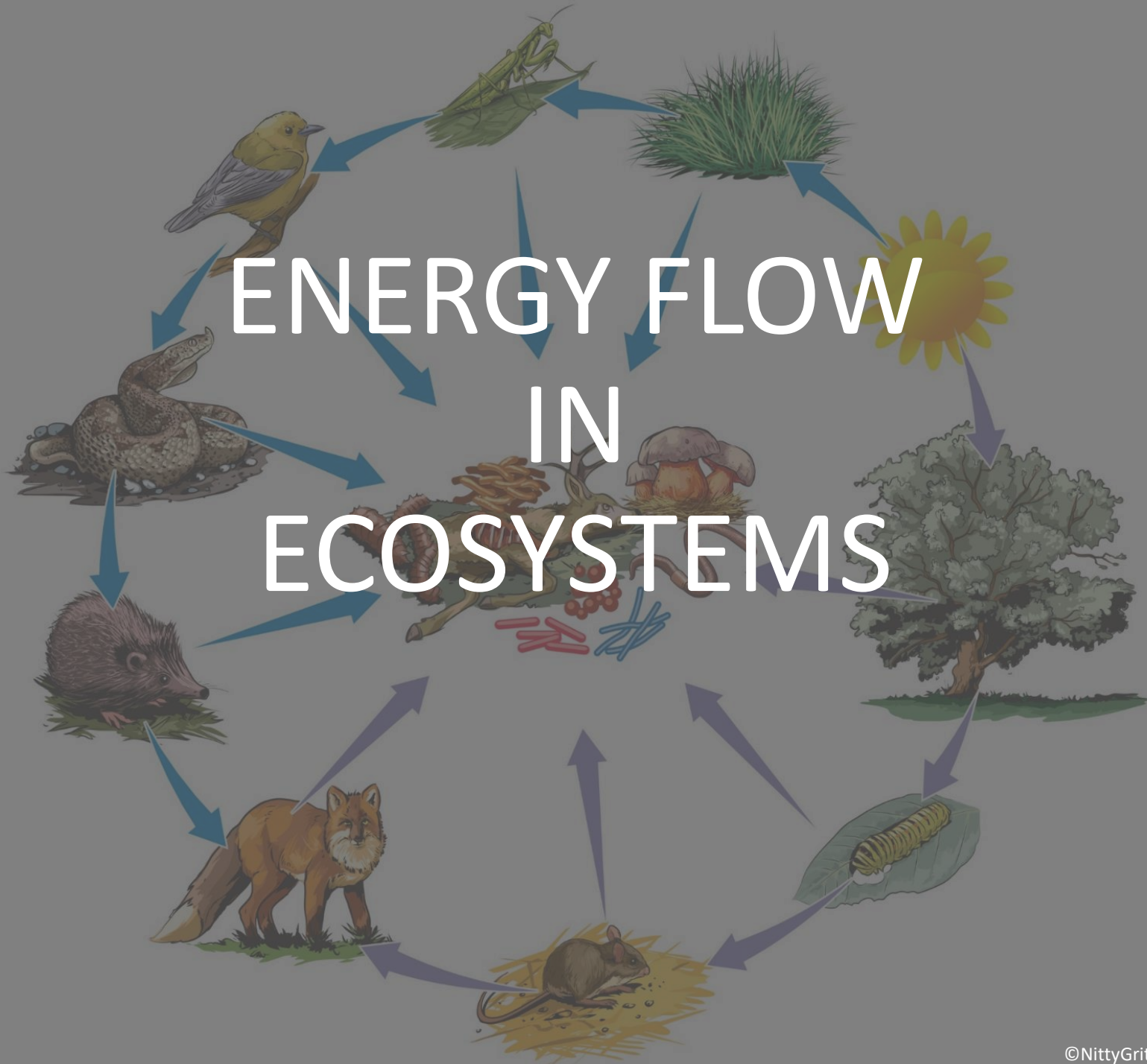
Decomposers — break down wastes organic matter (dead organisms) and return them to the ecosystem

Ex. bacteria & fungi

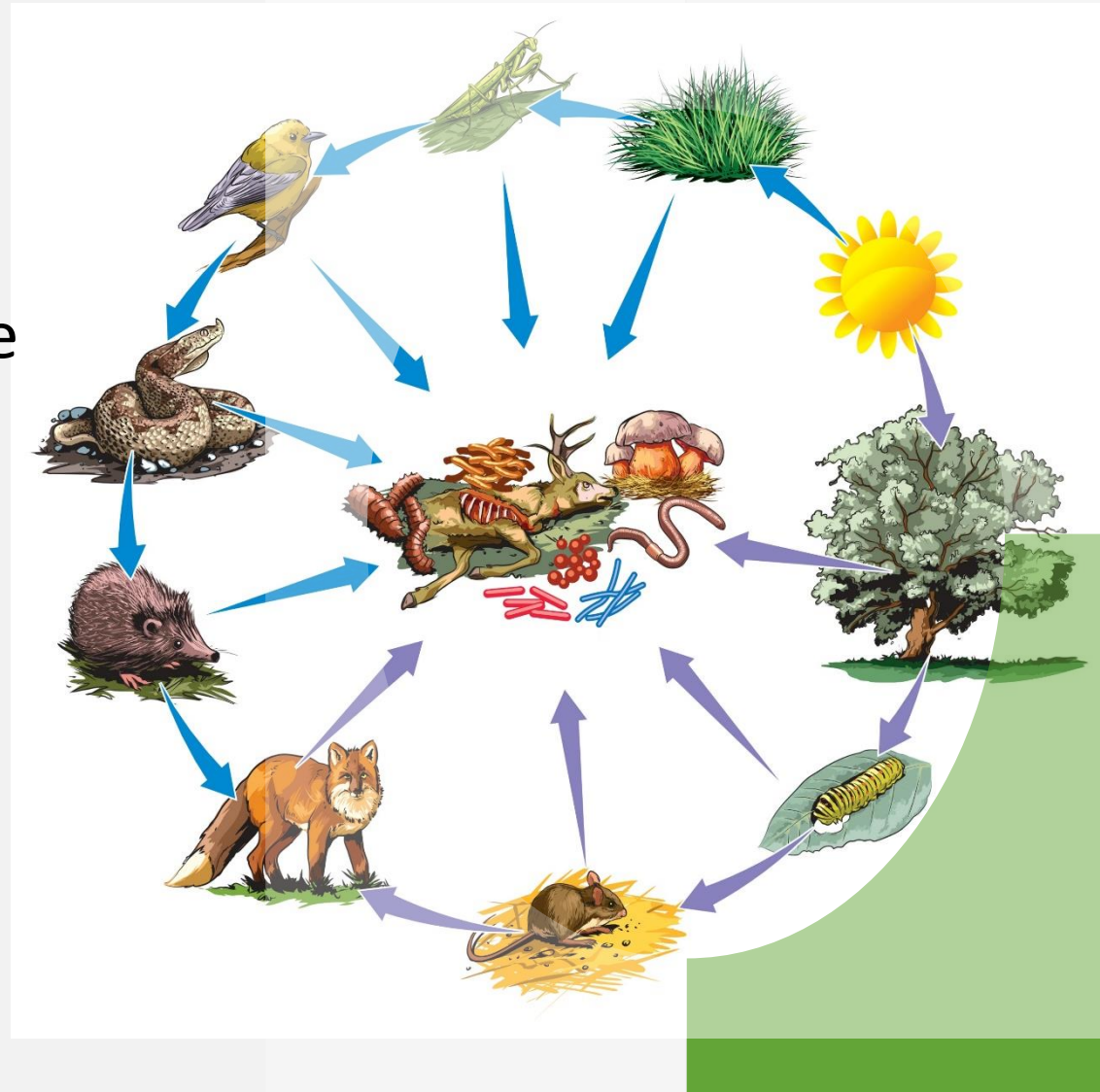
Heterotroph	Description	Examples
Herbivore		
Carnivore		
Omnivore		
Detritivore/Decomposer		

What do they eat (meat, veggies, both, decaying matter), and give examples of each.

ENERGY FLOW IN ECOSYSTEMS



Energy flows through an ecosystem in one direction from the sun or chemical compounds to **autotrophs (producers)** and then to various **heterotrophs (consumers)**.



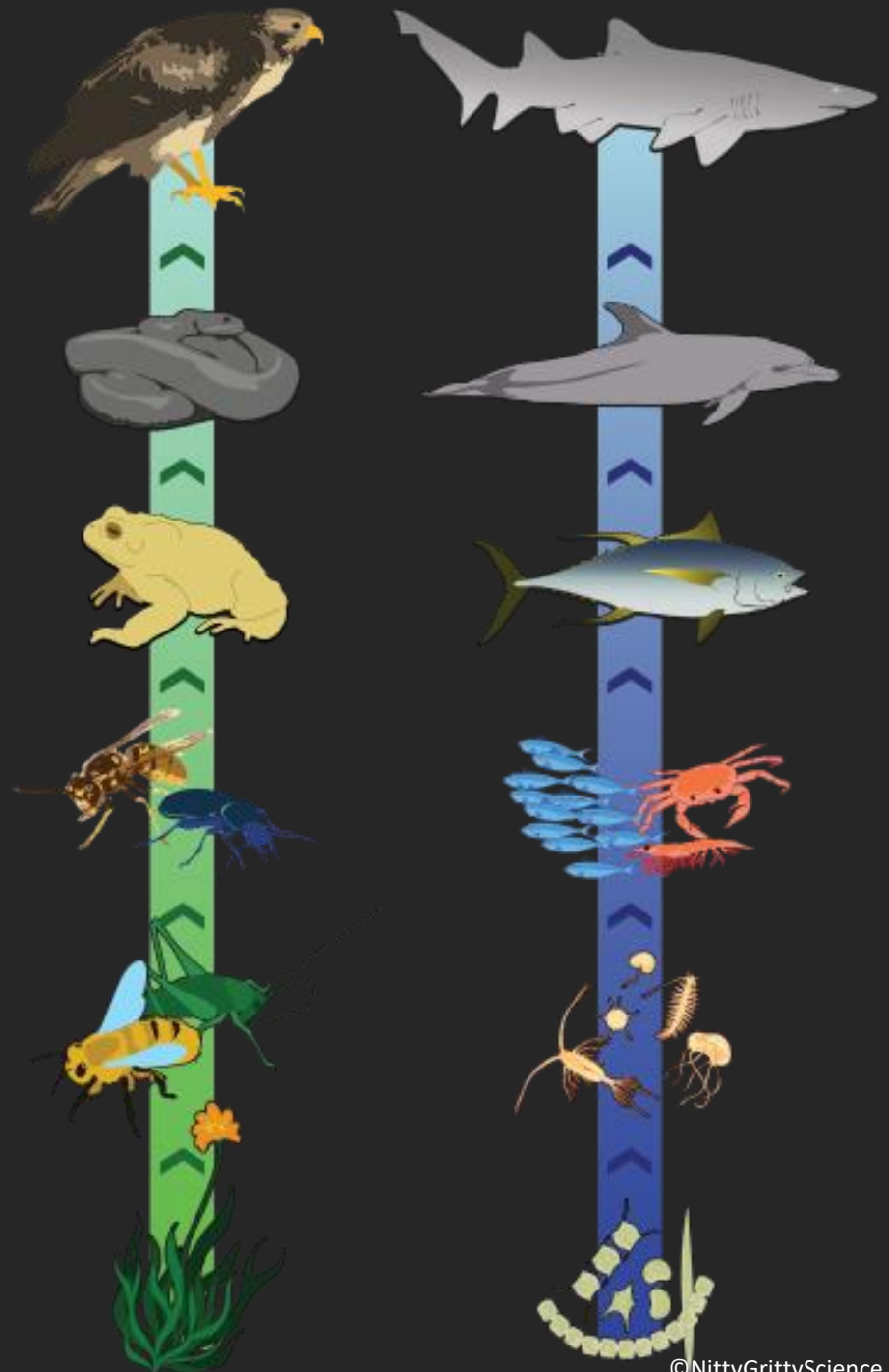
Food chains

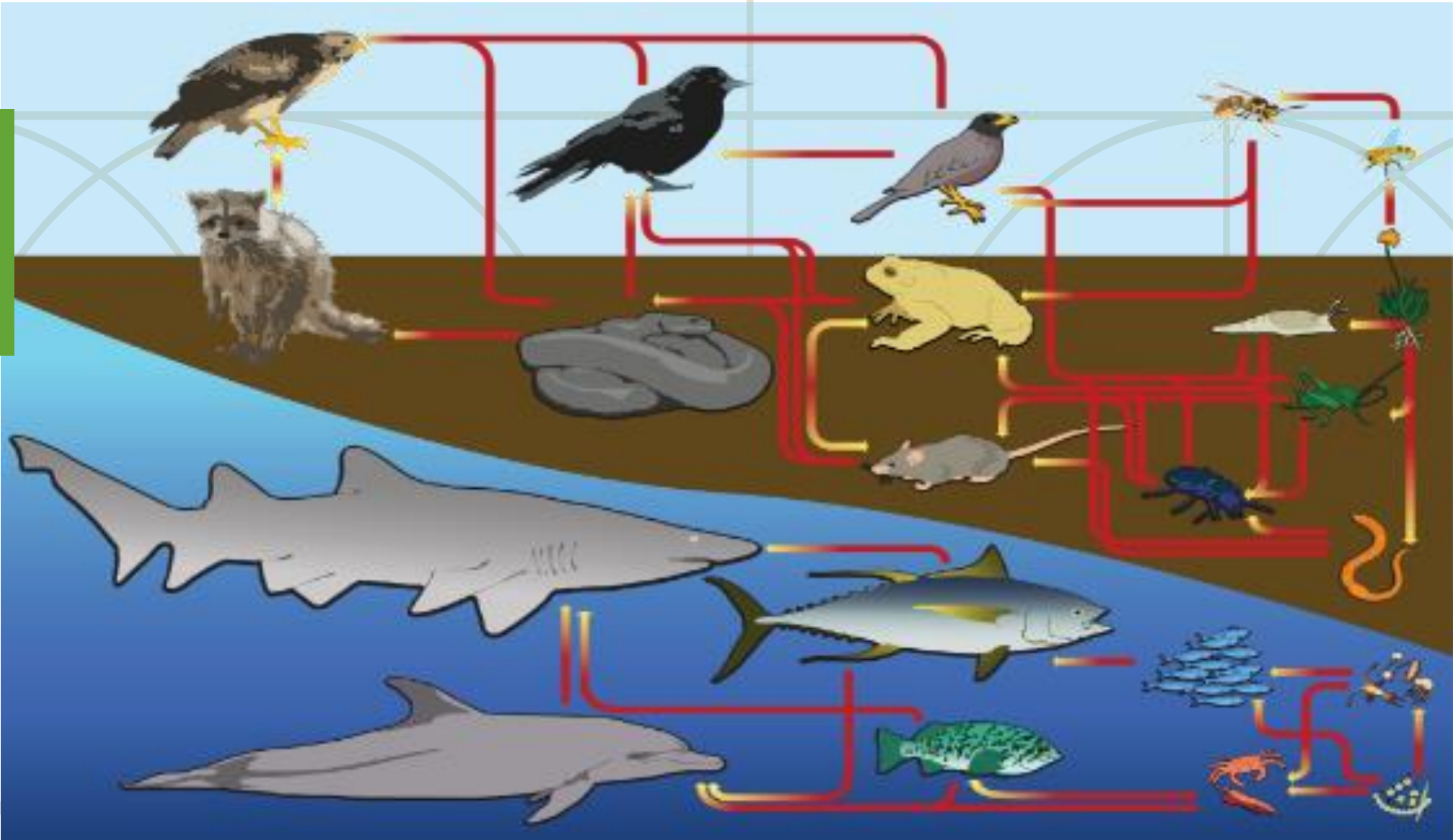
show how matter and energy move through ecosystem in a series of steps showing which organisms transfer energy by eating and being eaten.



Food chains

Each organism in a food chain represents a feeding step, or trophic level, in the transfer of matter and energy.

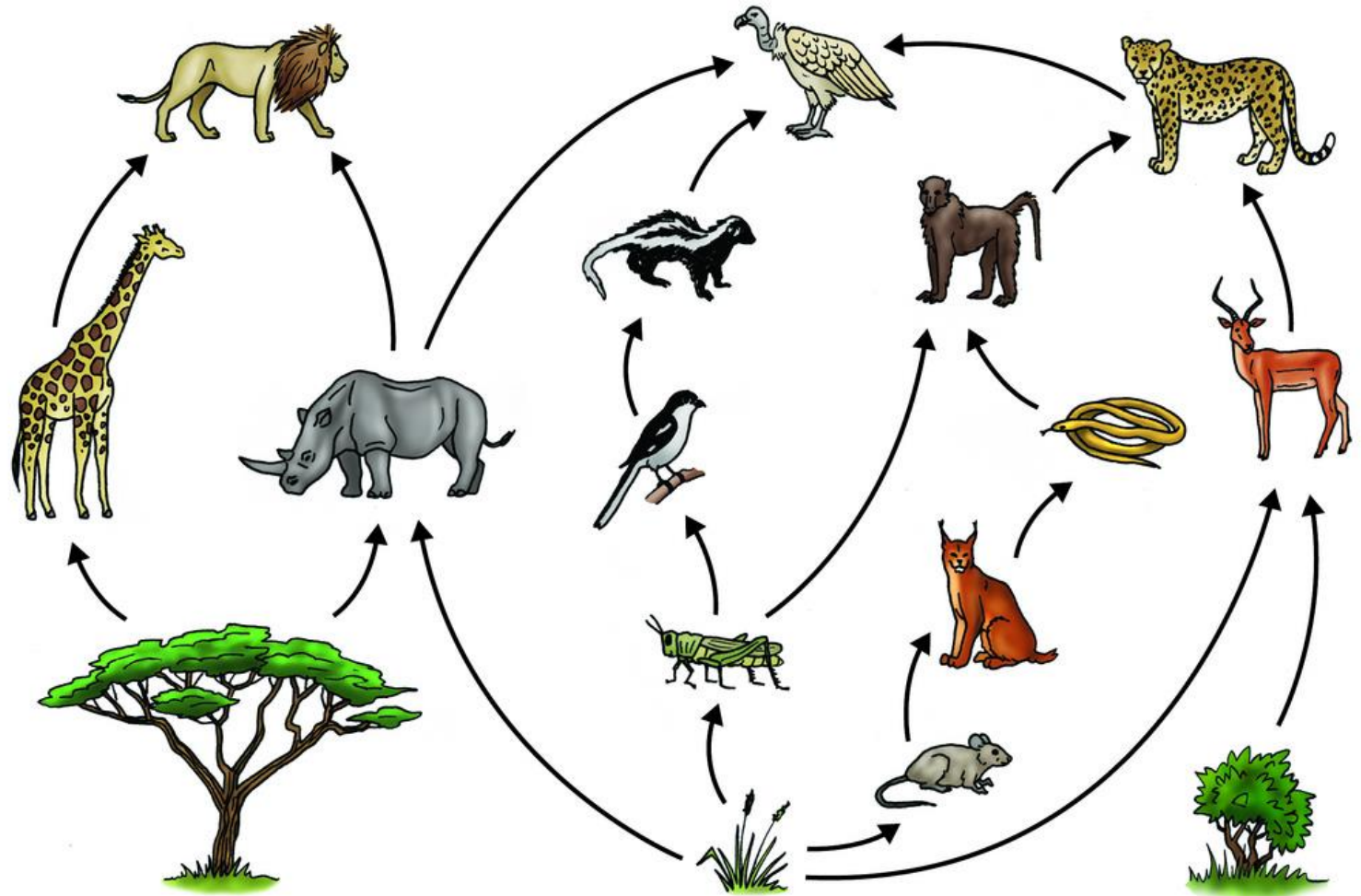




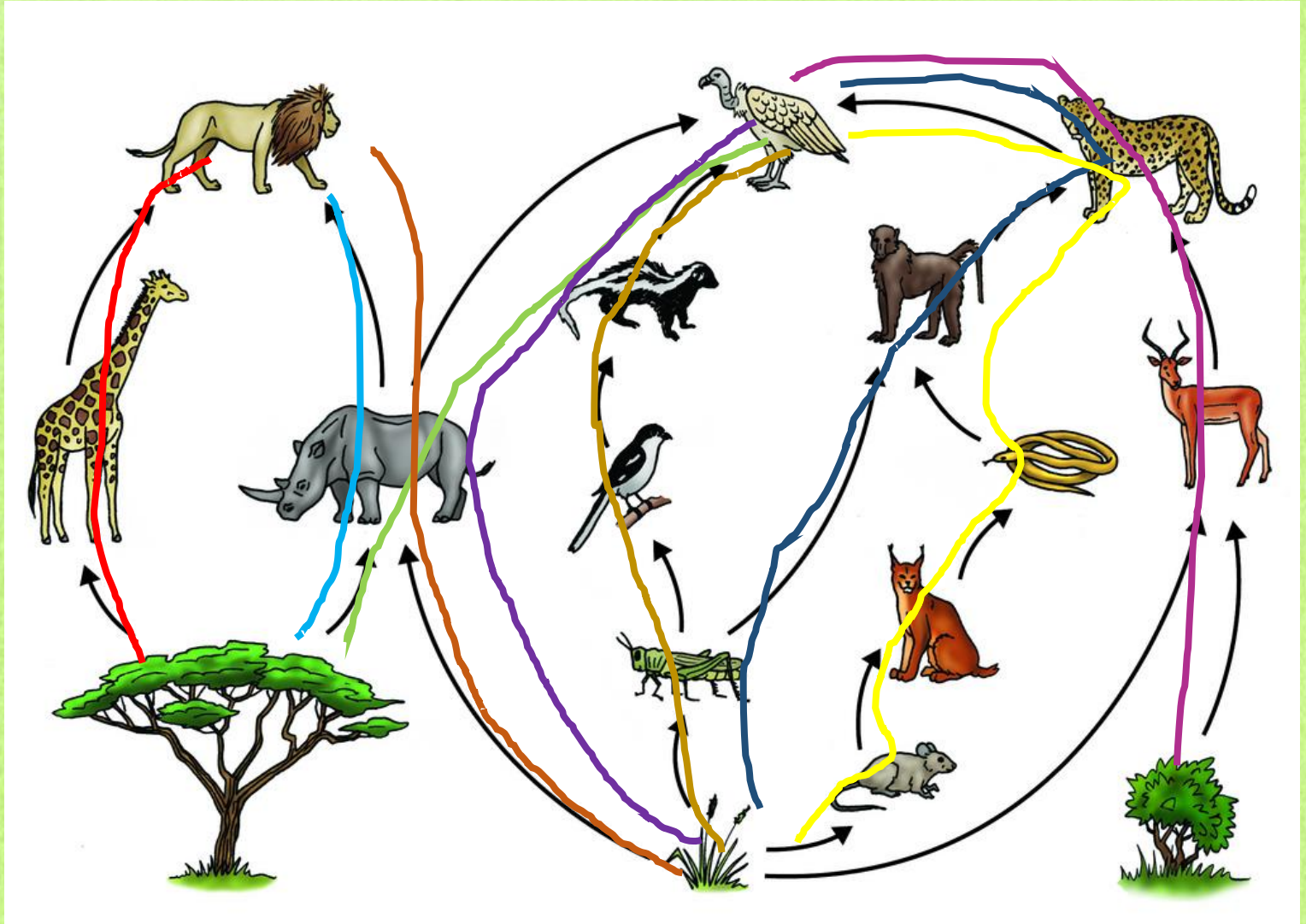
Food webs

Models that show all possible feeding relationships at each trophic level in a community; links all food chains in an ecosystem together.

How many food chains can you find in this food web?



9

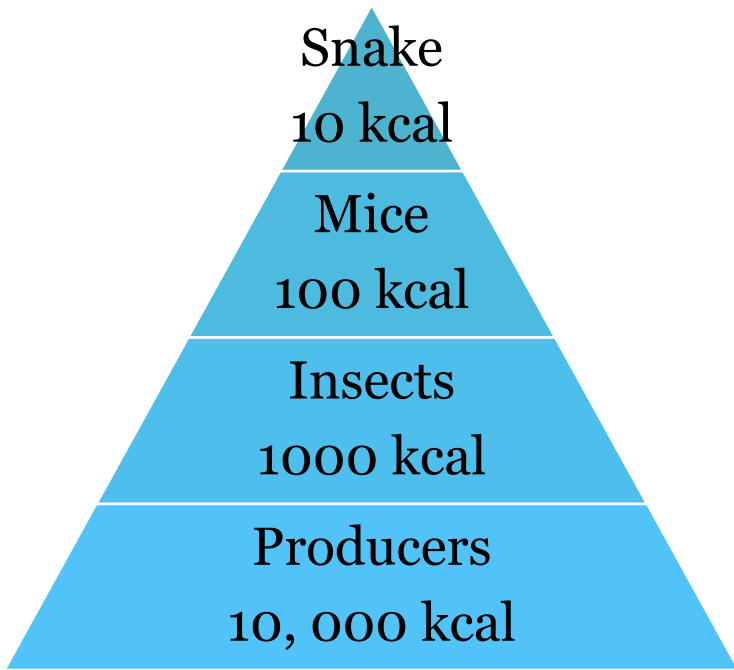




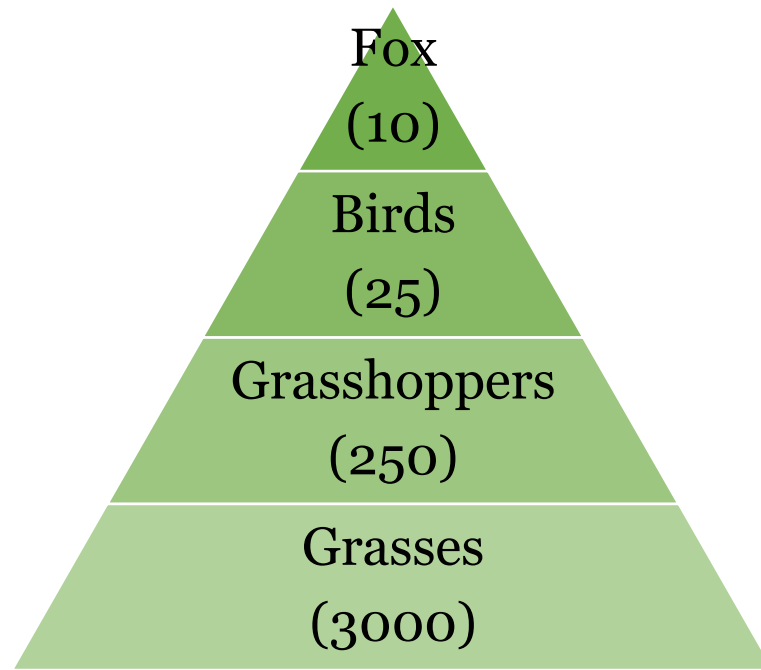
Biological pyramid



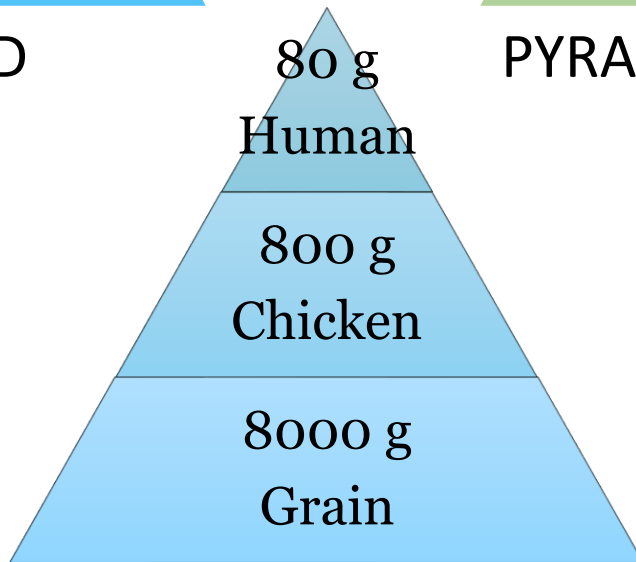
Diagram that shows amounts of energy or matter at each trophic level; three different types:



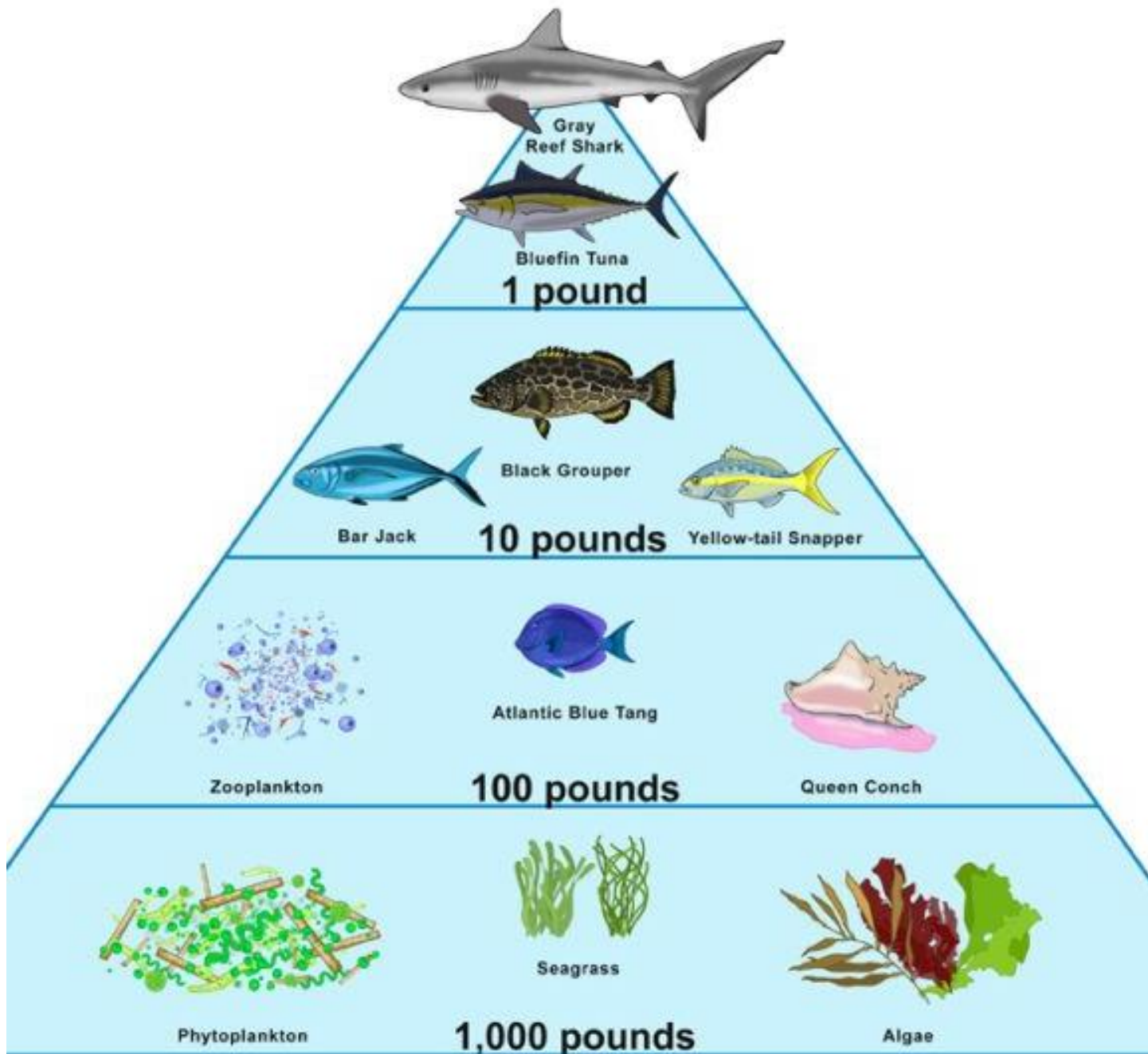
ENERGY PYRAMID



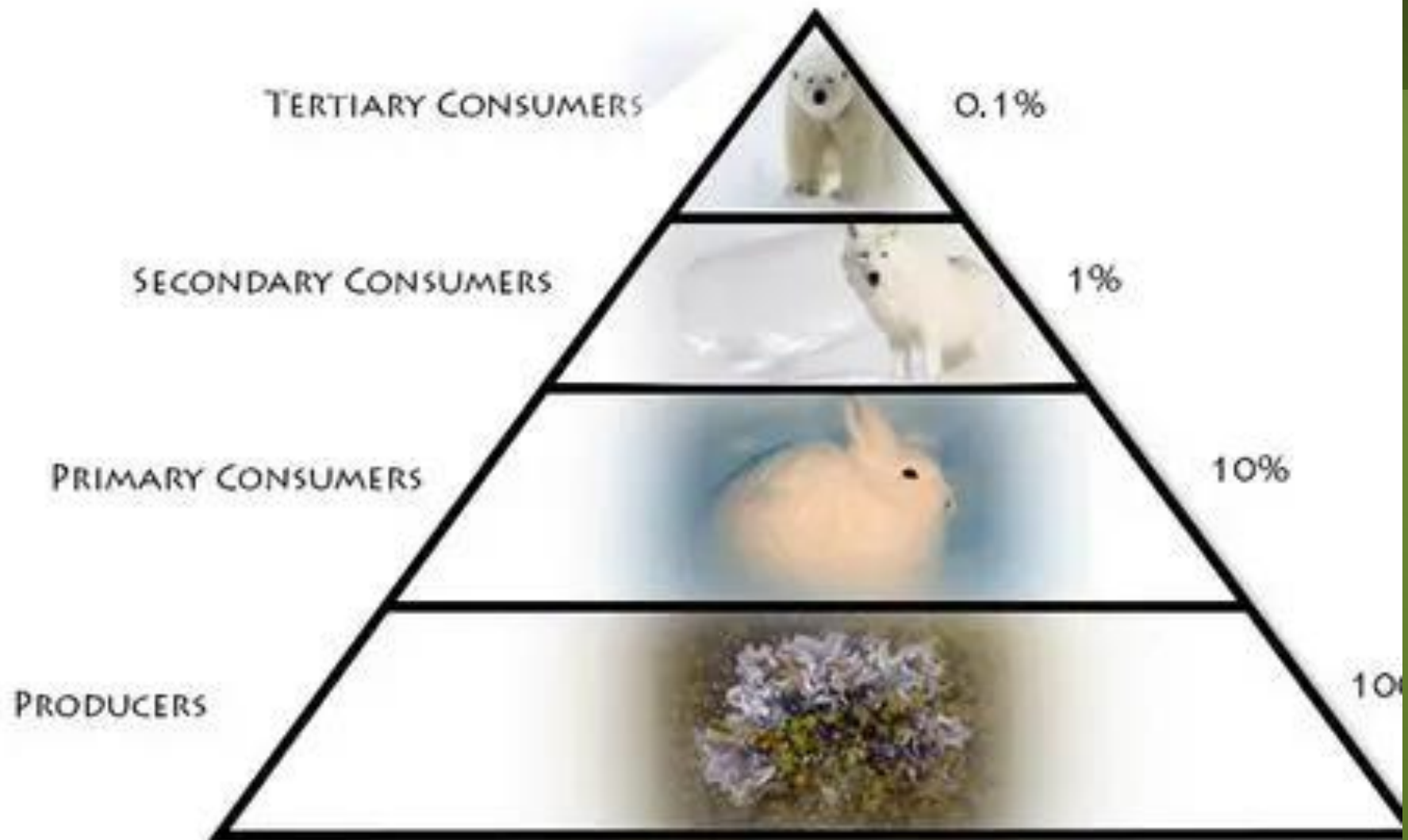
PYRAMID OF NUMBERS

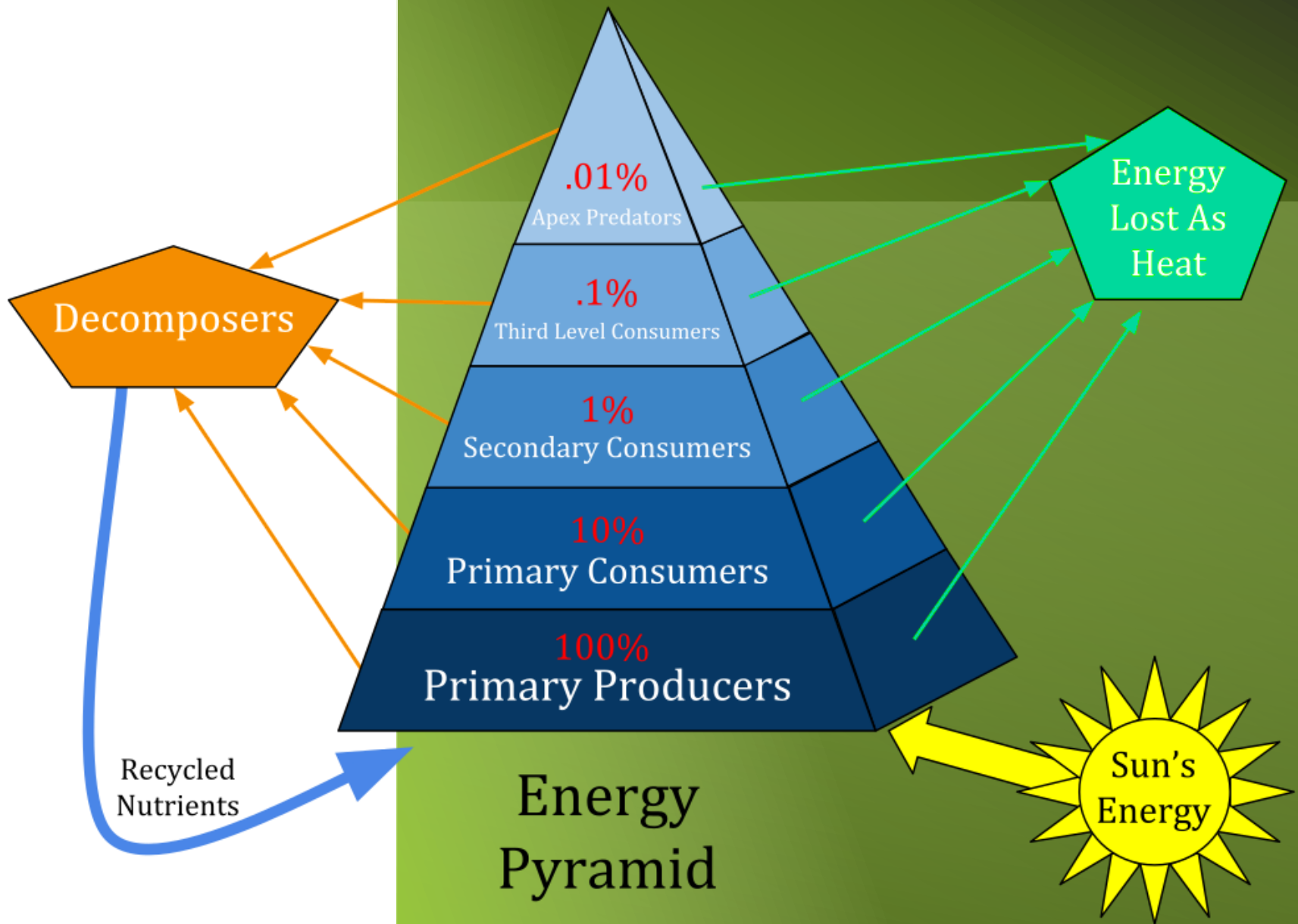


BIOMASS PYRAMID



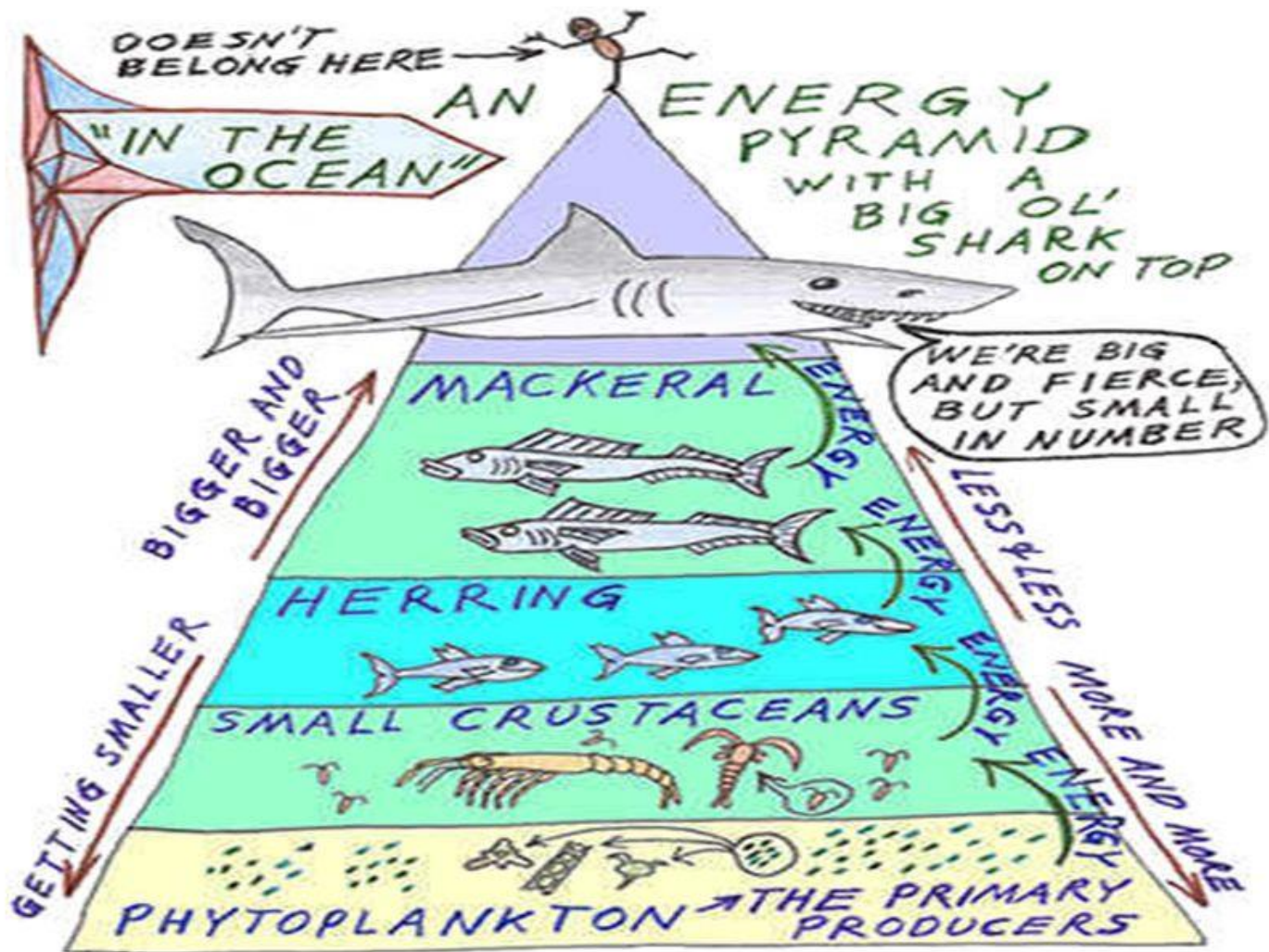
FOOD PYRAMID





Energy Pyramid

Ocean Pyramid



Biotic and Abiotic Factors

Biotic factors are living, while abiotic factors are non-living.





Biotic factors

All the living organisms in an environment

Abiotic factors

The non-living parts of the environment ex. climate, wind, nutrient availability, soil and sunlight

Biotic factors

the living components
of the environment/ecosystem



Protists



Fungi



decomposers



Animals



Bacteria



Plants



archaea



producers



Consumers





pH

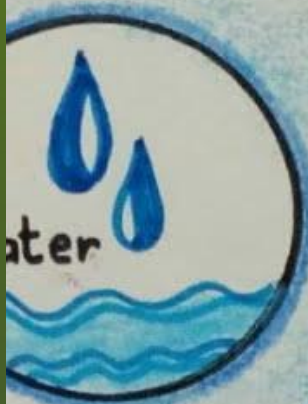


flooding



°C

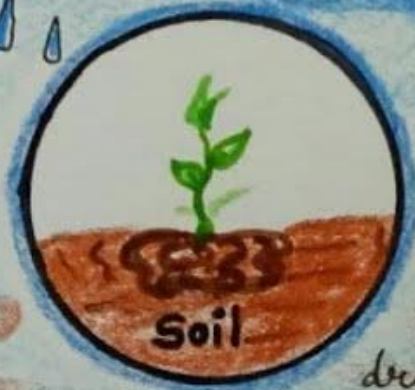
Abiotic factors
the non-living components of
the environment



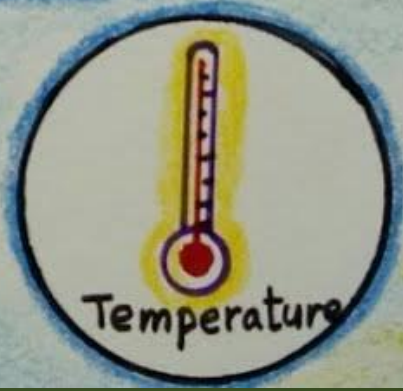
H₂O



°F



°C



Heat

zing

drought

Biotic Vs. Abiotic

Biotic

Organic Matter
Living Things
Oysters
Blue crabs
Zooplankton
Phytoplankton
Jellyfish

Vs

Abiotic

Climate
Nonliving Things
Sunlight
Temperature
Nutrient Enrichment
Humidity
Soil

Biotic and Abiotic

Biotic

fox

precipitation

water

fish

bird

wind

rock

sunflower

Abiotic

cactus

bacteria

tree

soil

fungi

rabbit

sunlight

pollution

