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**Ecosystem** - A community of living organisms interacting with one another and with the nonliving components of the environment they inhabit.

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### Levels of Ecological Organization

Level 1	Individual ( A Moose)
Level 2	Population (Herd of Moose)
Level 3	Community: (Herd + Birds + Squirrels + etc)
Level 4	Ecosystem : Living + nonliving components in the environment

1.1

**10.1 Interactions within Ecosystems**  
**Trophic Relationships:** *Please write this.*  
 The feeding connections among the living organisms in an ecosystem (a food chain)

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**Autotrophs:**

- plants, algae & certain bacteria.
- Make their own food. (turn inorganic matter into organic matter)
- Eg plants make sugar through photosynthesis.

Plants

Phytoplankton (algae)

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**Producers**

- Autotrophs
- Put energy into the food chain.
- At the bottom of the food chain.

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**Consumers**

- Heterotrophs
- Feed on other living organisms and/or their products (eggs, fruit, other animals)

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**Consumers**

- **First order (or primary) consumers:**
  - Herbivores (eat plants)
  - feed on producers
  - eg: a deer eats grass, birds eat seeds
- **Second order consumers:**
  - Carnivores (eat meat)
  - feed on first order consumers
  - eg: a wolf eats a deer, a cat eats a bird
- **Third order consumers:**
  - feed on second order consumers
- **Fourth order consumers:**
  - feed on third order consumers etc. etc.

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**Omnivores:**


- Consumers that eat several orders at once.
- Ingest both plants & animals
  - bears eat berries & fish
  - humans eat grain & meat

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**Decomposers – organisms that feed on the waste & remains of other living organisms.**

- Feed on detritus (dead organic matter)
  - fallen leaves,
  - dead wood,
  - animal remains, etc)
- Break down organic matter into inorganic matter.
- Considered heterotrophs.
- Eaten by consumers
  - worms,
  - bacteria,
  - insects



**10.2 Ecosystem Dynamics**

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**Material and Energy Flow**

- the exchange of matter and energy:
  - from one organism to another
  - between those organisms & their environment.

**Law of conservation of Mass**

- Matter cannot be created or destroyed it can only be transferred.


*The energy from the sun goes into the sugar that is made by the plants.  
Animals eat the plants.  
Decomposers eat their waste and make soil.  
Plants use the nutrients in the soil to make the sugar again*



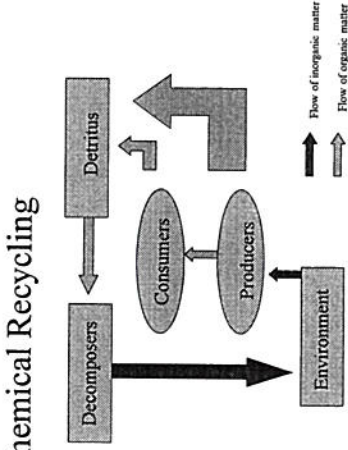
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**Chemical recycling**

- Decomposers make inorganic matter available in an ecosystem by breaking down organic matter.
- Producers combine it with the sun's energy.
- Consumers & producers pass it onto the decomposers



**Chemical Recycling**




Flow of inorganic matter

Flow of organic matter

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### 10.3 Biomass & Primary Productivity

**Biomass** = the total mass of organic matter in an ecosystem



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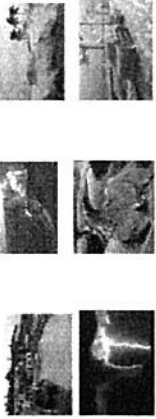
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- **Primary productivity:**
  - The amount of new biomass made by producers
- Factors affecting productivity:
  - Light
  - Amount of water
  - Essential nutrients (carbon, nitrogen, phosphorus, and potassium)
  - Climate

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### 10.4 Disturbances

- Events that could damage the ecosystem.
  - Can eliminate organisms.
  - Can alter the availability of resources.
- E.g. *flooding, storms, oil spills, volcanic eruptions*

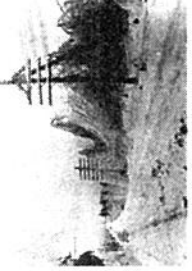


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### Natural Disturbances

- Events triggered by environmental phenomena (non human)
  - storm churning waters = surface + subsurface waters to mix
- *volcanic eruptions,*
- *drought,*
- *flood,*
- *forest fires,*
- *frost,*
- *freezing rain & heat waves*



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### Human Disturbances

- We are a major threat to ecosystems.
  - individual acts like littering to large scale projects.
  - E.g. logging, mining, oil spills, housing projects, industries, pollution, etc.



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### Ecological Succession

**Ecological succession** – the series of changes that occur in an ecosystem after a disturbance and that continue until the balance of the ecosystem is restored.

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