What is Biodiversity?

1

- Biological Diversity

Bio = Life

What is Biodiversity?

2

Diversity =

Variety

What is Biodiversity?

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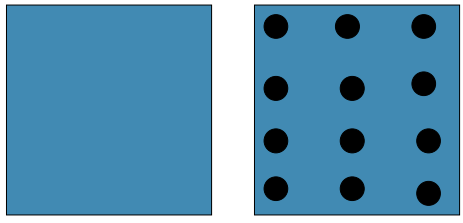
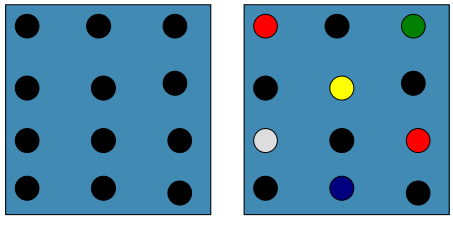
- Biological diversity refers to the number AND variety of life on Earth
- Often more species equals more diversity

Which is more diverse?



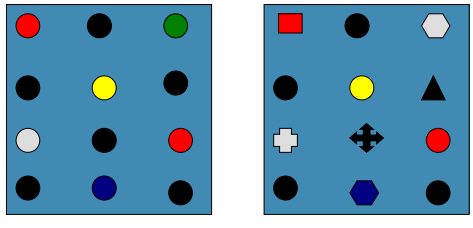
A B

Which is more diverse?



A B

Which is more diverse?



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Levels of Biodiversity

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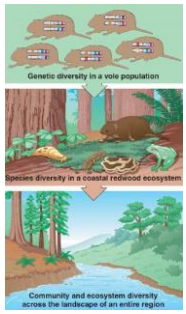
- "The variety of life in all its forms, levels and combinations"
- Includes genetic diversity, species diversity, and ecosystem diversity



1. Genetic Diversity Within Species

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- The variety of genes and combinations of genes within a population
- Critical for species' survival and biodiversity at all levels

1. Genetic Diversity Within Species

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- Not all groups of animals have the same degree of genetic diversity.
- Dog breeds represent the variety of genes in the domestic dog. Kangaroos, meanwhile, are genetically very similar.

2. Species Diversity Within Ecosystems

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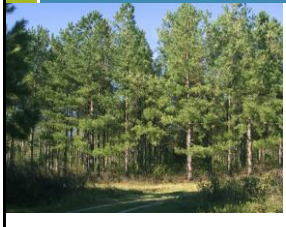
- Refers to the variety of species within a habitat or a region
- Some habitats, such as rainforests and coral reefs, have many species. Others, such as salt flats or a polluted stream, have fewer.

Which has more biodiversity?



A **B**

3. Ecosystem Diversity Within A Region

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- Refers to the variety of ecosystems in a given place
- In SK, this varies from terrestrial grasslands to boreal forest and freshwater to salty water.

Where is Biodiversity greatest?

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- Tends to increase towards the equator
- The richest environments are associated with warmth: tropical rainforests, tropical reefs, and large tropical lakes.

Why is BIODIVERSITY important?

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Importance to Nature

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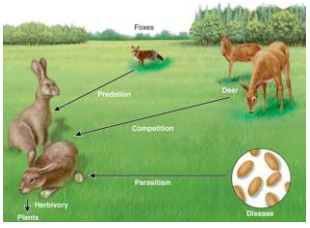
- No species lives in isolation – species rely on each other.
- Animals could not live without green plants. Many flowering plants could not exist without pollinators. Plants are dependent on decomposers to put nutrients back into the soil.

Species Interactions

Three main types of interaction:

1. Predation
2. Competition
3. Symbiosis



1. Predation

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- Consumption of one species by another (includes both carnivore-herbivore and herbivore-producer interactions)
- **Green World Hypothesis**: predators reduce the abundance of herbivores, allowing plants to flourish.
  - This brings attention to the role of top-down forces and indirect effects in shaping ecosystems.

2. Competition

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- Two or more organisms attempting to use the same resource
  - Intraspecific (within a population) vs. interspecific (between different species)

Intraspecific Competition

Interspecific Competition

3. Symbiosis

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- Intimate relationship between members of at least 2 species

Mutualism

Parasitism

Commensalism

3. Symbiosis - Mutualism

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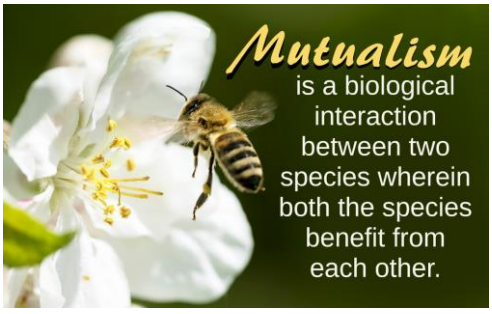

3. Symbiosis - Parasitism

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3. Symbiosis - Commensalism

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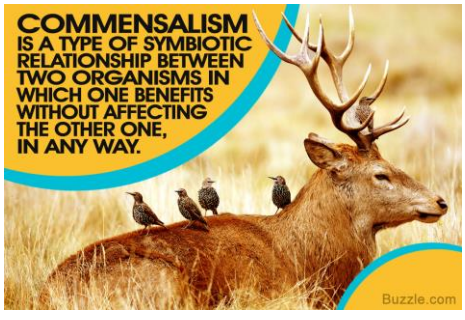

Some Species Are More Equal

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- All species are valuable but some species have stronger interactions than others.
- Called keystone species, the removal of these species will have dramatic effects on the health of the ecosystem.

Keystone Species

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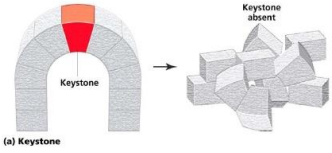
- A species on which many other species largely depend; Loss affects many other species



A "keystone" holds an arch together.

Keystone Species

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- Any organism, from plants to fungi to apex (top) predators, may be a keystone species. They are not always the largest or most abundant species.
- All are, however, organisms that have a huge influence on food webs.

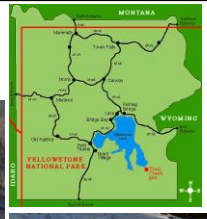
Removal of the keystone sea otter : sea urchins overgraze kelp and destroy the kelp forest community.

Example: Prairie Dog

A total of nine prairie species are dependent upon prairie dogs, including the swift fox, ferruginous hawk, burrowing owl and the golden eagle.

https://www.youtube.com/watch?v=FJLrpYv13JY

Example: Wolves



Wolves control elk population, thus helping to bring back vegetation and increase bird and beaver populations.

https://www.youtube.com/watch?v=HcyL3qp6mZkv13JY

Ecosystem Engineers

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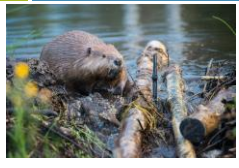

- Organisms that modify, create, and maintain habitat.
- Example: By building dams and creating ponds, beavers create wetland habitats.

Umbrella Species

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- Organisms that cast an umbrella over other species by being more or equally sensitive to habitat changes.

- Their protection provides protection to other species using the same habitat.

- Example: Prairie grouse
  - By protecting the grassland habitat, other species using the same habitat, such as deer, eagles, grasses, and shrubs are also protected.

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Conclusions

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- Biodiversity refers to the variety of life in all its forms, levels and combinations.
- Biodiversity matters because species depend on each other.
- Keystone species play a large role in food webs. Ecosystem engineers and umbrella species play a large role in habitat creation and protection.