

Lesson 2

Threats to Biodiversity

Focus Question

How can the decline of a single species affect an entire ecosystem?

New Vocabulary

background extinction

mass extinction

natural resource

overexploitation

habitat fragmentation

edge effect

biological magnification

eutrophication

invasive species

Review Vocabulary

food web: a model representing the many interconnected food chains and pathways in which energy and matter flow through a group of organisms

Extinction Rates

- The gradual process of species becoming extinct is called **background extinction**.
- Stable ecosystems can be changed by the activity of other organisms, climate changes, or natural disasters.
- The natural process of extinction is not what concerns scientists.
- Scientists are concerned about the increasing rate of extinctions. The current rate of extinction is about 1000 times the normal background extinction rate.

Extinction Rates

- Some scientists predict that one-third to two-thirds of all plant and animal species will become extinct during the second half of this century.
- **Mass extinction** is an event in which a large percentage of all living species become extinct in a relatively short period of time.

Factors That Threaten Biodiversity

- Anthropogenic changes to the environment are changes induced by human activity. They include habitat loss, pollution, the introduction of invasive species, overexploitation, and climate change.
- These changes can disrupt an ecosystem and threaten the survival of some species.

Factors That Threaten Biodiversity

- Humans are changing conditions on Earth faster than new traits can evolve in some species to cope with the new conditions.
- Evolving species might not have the natural resources they need.
- **Natural resources** are all materials and organisms found in the biosphere, including minerals, fossil fuels, nuclear fuels, plants, animals, soil, clean water, clean air, and solar energy.

Factors That Threaten Biodiversity

Overexploitation

- One of the factors that is increasing the current rate of extinction is **overexploitation**, or excessive use, of species that have economic value.

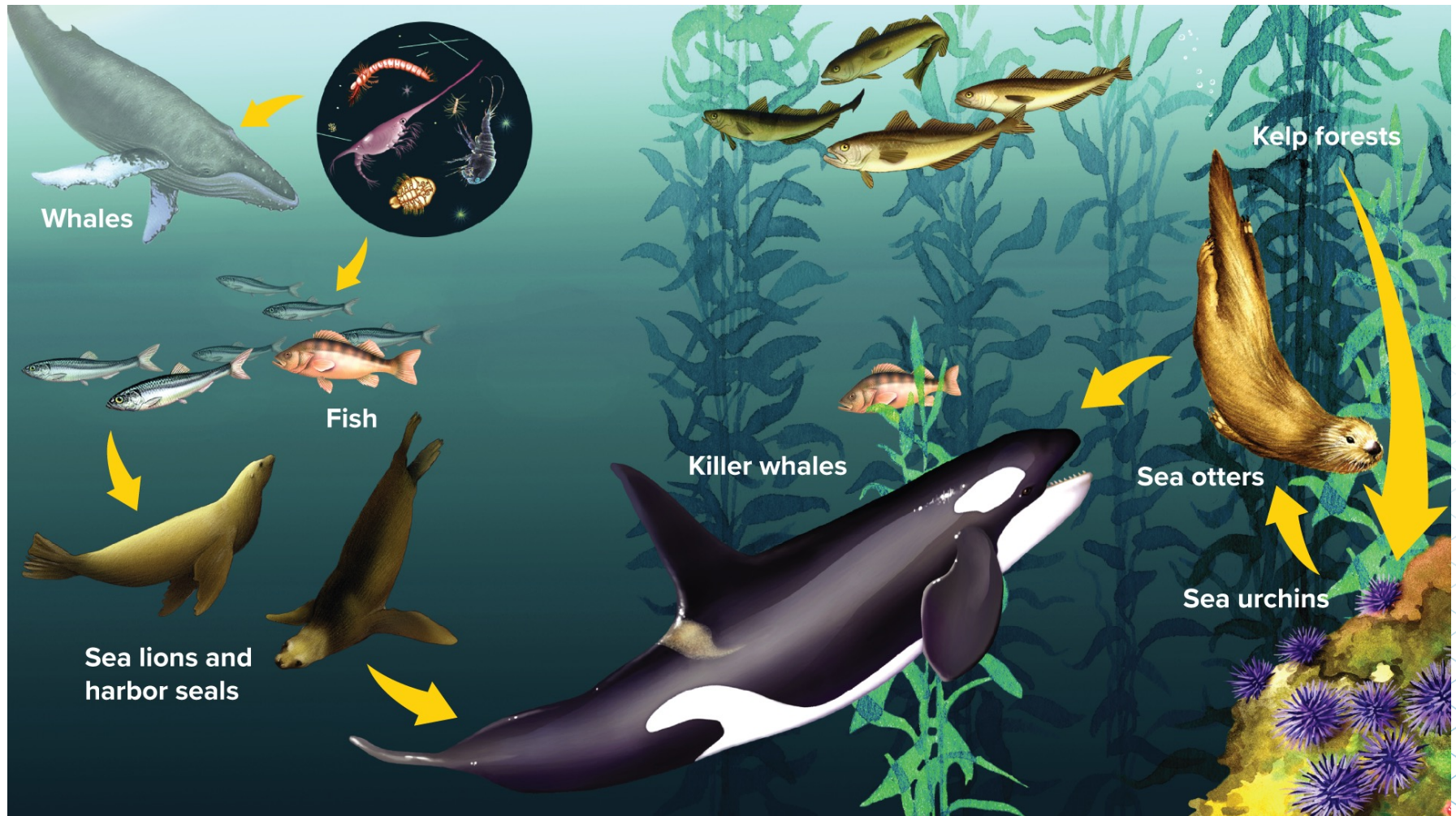
Habitat Loss

- Destruction of habitat, such as clearing tropical rainforests, has a direct impact on global biodiversity.
- Disruption of habitat, such as overfishing, can start a chain reaction and affect an entire ecosystem.

Factors That Threaten Biodiversity

- As illustrated on the next slide, when harbor seal and sea lion populations declined during the 1970s, killer whales ate more sea otters.
- A decline in sea otters led to an increase in sea urchins, which led to a decrease in kelp.

Factors That Threaten Biodiversity

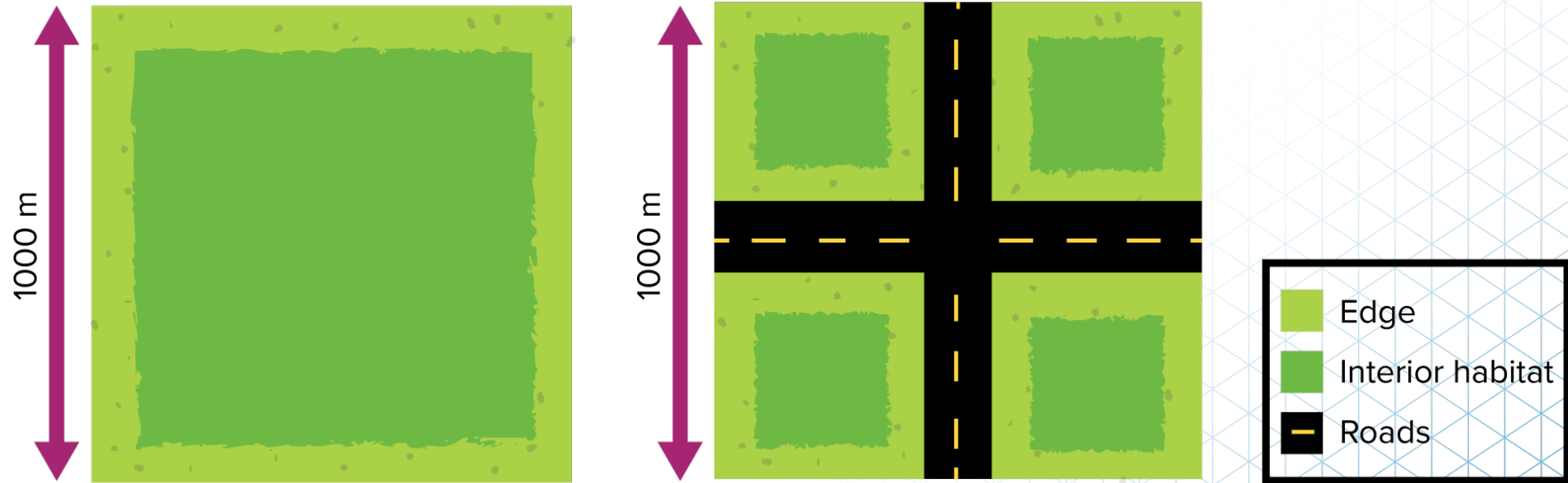


Factors That Threaten Biodiversity

- The separation of an ecosystem into small pieces of land is called **habitat fragmentation**.
- **Edge effects** are different environmental conditions that occur along the boundaries of an ecosystem.

More edges in the habitat increases the percentage of the patch that is edge habitat.

Patch of Habitat



Factors That Threaten Biodiversity

Climate Change

- Species have evolved to live within certain temperatures.
- When these temperatures increase, species that cannot adapt die. This threatens the survival of the species as well as other species that depend on it for survival.
- Scientists predict that climate change will threaten approximately 25 percent of all land species by 2050.

Factors That Threaten Biodiversity

Pollution

- Pollution changes the composition of air, soil, and water.
- **Biological magnification** is the increasing concentration of toxic substances in organisms as trophic levels increase in a food chain or web.

Factors That Threaten Biodiversity

- Acid precipitation occurs after sulfur and nitrogen compounds react with water and other substances in the air to form sulfuric acid and nitric acid.
- Acid precipitation removes calcium, potassium, and other nutrients from the soil, depriving plants of these nutrients.
- **Eutrophication** destroys underwater habitats for some species.
- It occurs when fertilizers, animal waste, sewage, or other substances that are rich in nitrogen and phosphorus flow into waterways, causing extensive algae growth.