

Integrating Sustainability Issues Into Ecology Lessons



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What is Sustainability?

- How would you describe or explain the concept of sustainability?
- What ideas about sustainability might students bring from their everyday lives?
- What are some common sustainability issues students might be familiar with?



Common Sustainability Issues

- **Resource and energy use:** How can a home be made more energy efficient?
- **Water:** How should wastewater be treated before it is released into the environment?
- **Health:** How should research funding be allocated to address global health issues?
- **Biodiversity:** Where should conservation efforts be focused?
- **Food and nutrition:** Should foods be genetically modified?



Why Sustainability?

- More avenues to relevance for students.
- Issues relate to science.
- Sustainable living is where our society is going and will likely continue in the future.
- Sustainability decisions and scientific literacy are closely related - one has the potential to develop and inform the other.



3 Pillars of Sustainability

■ Economic

- People desire the highest standard of living that they can achieve. Economic wealth supports adequate access to health care, jobs, education, etc.

■ Social

- To have a sustainable future, peoples' needs for clean air, water, resources, access to health care, etc must be met equally.

■ Environmental

- The Earth has limited resources which organisms need for survival and healthy life.



Energy Flow Through an Ecosystem

In this activity, students:

- Construct a food web
- Identify trophic roles
- Predict impact of events on the food web
- Construct an energy pyramid



Activity: Energy Flow Through an Ecosystem

Content-based approach

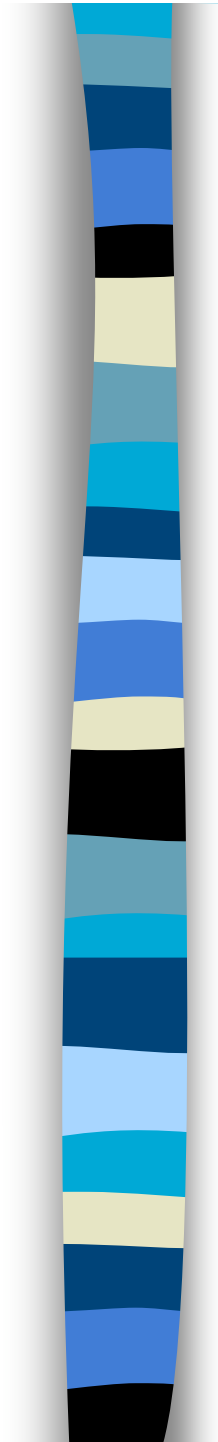
Content: Food webs, energy pyramids

Process: Modeling

Issue-based approach

Content: Food webs & energy pyramids plus potential for:
Trophic cascades,
Resource use/misuse,
Overfishing,
Pollution,
Algal blooms

Process: Modeling



Fox

Acorns

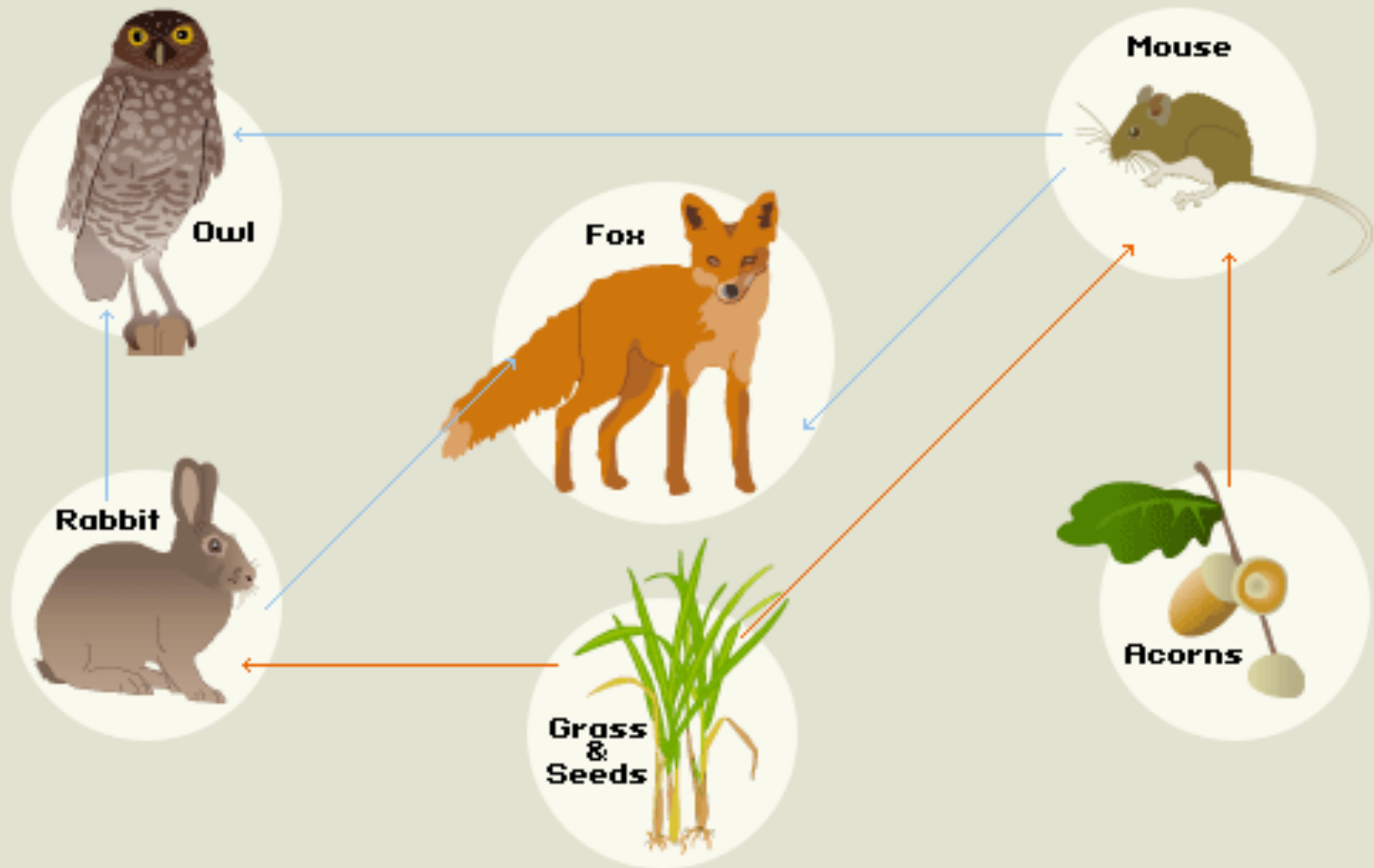
Grass

Mouse

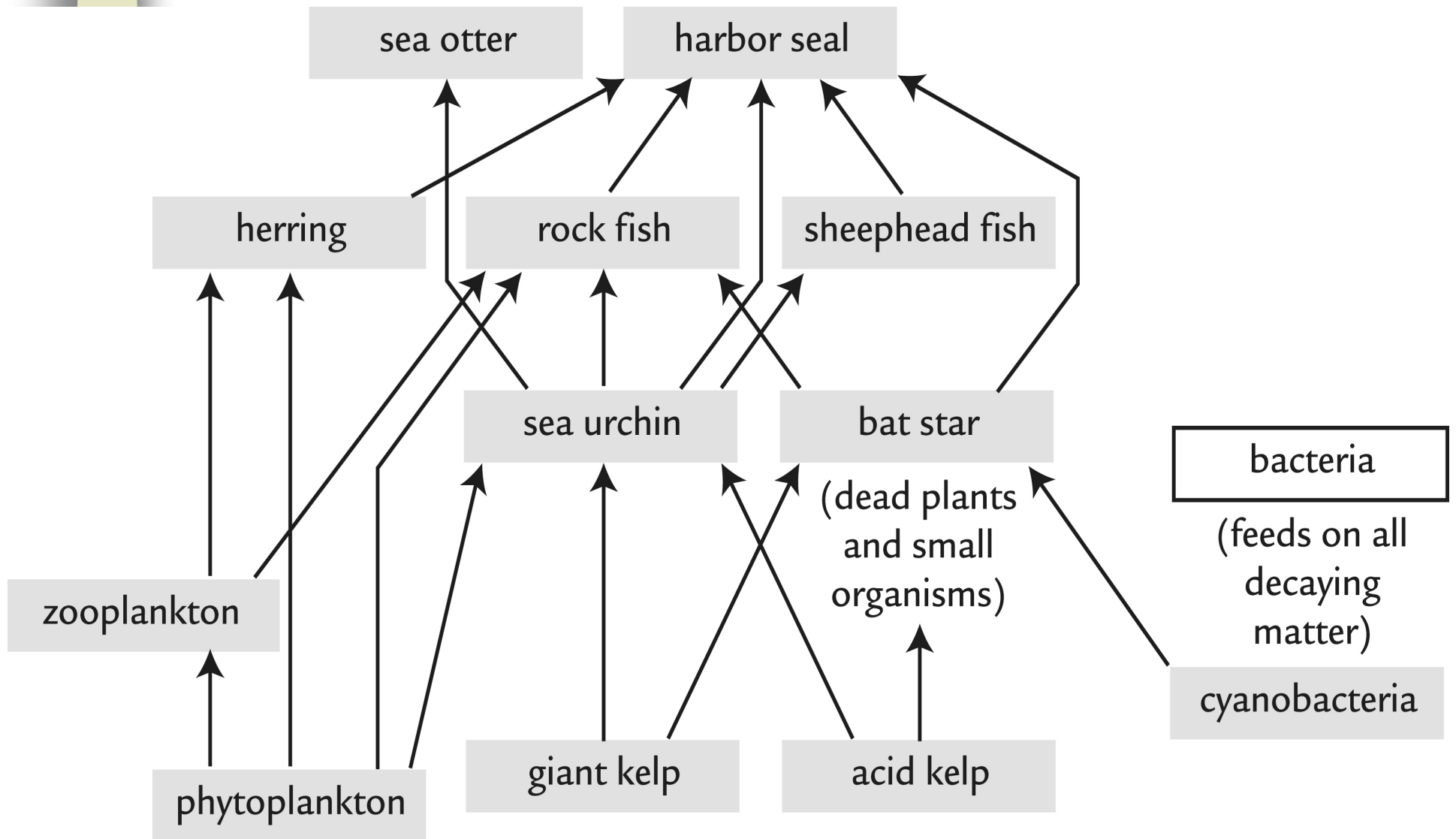
Owl

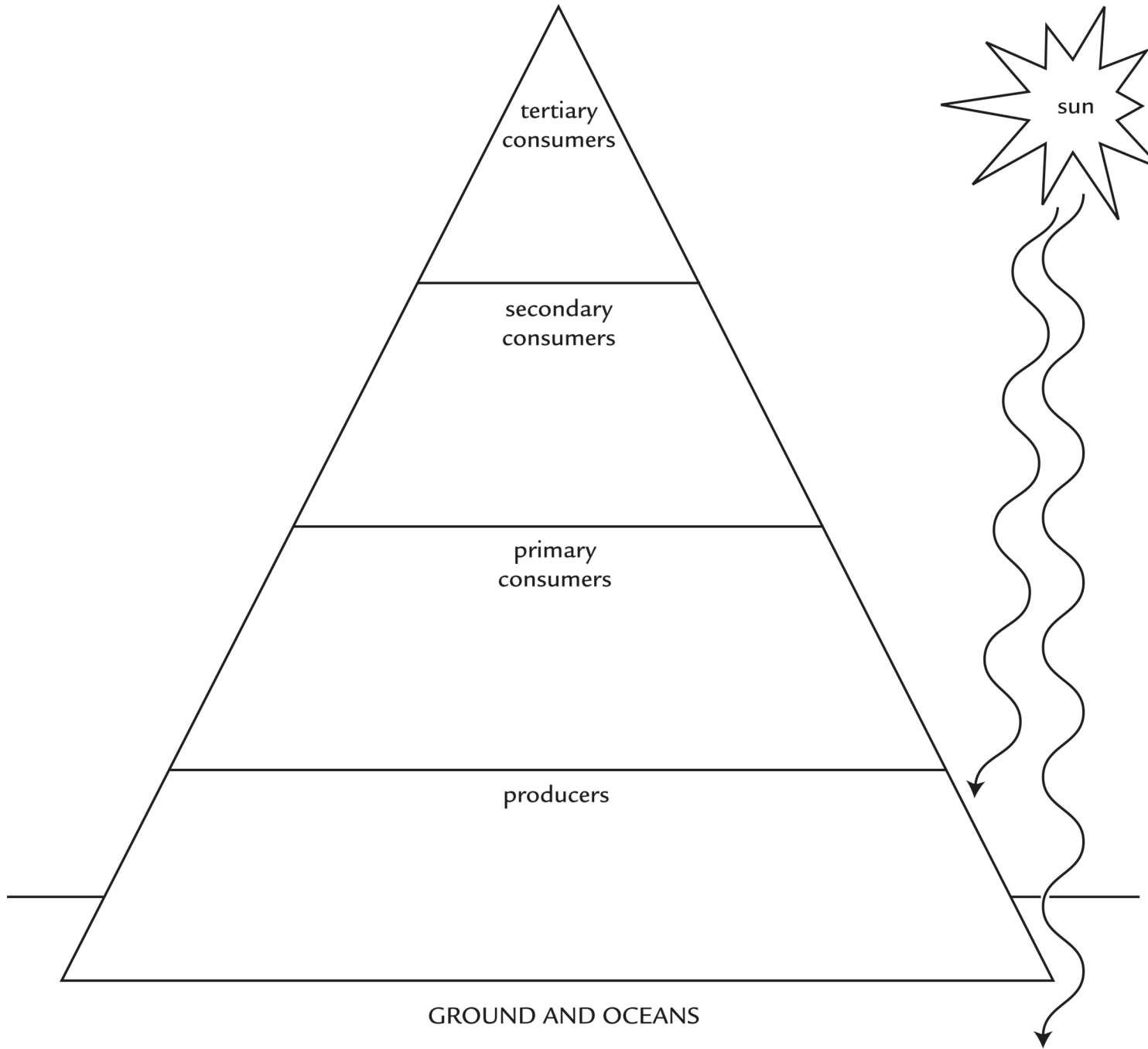
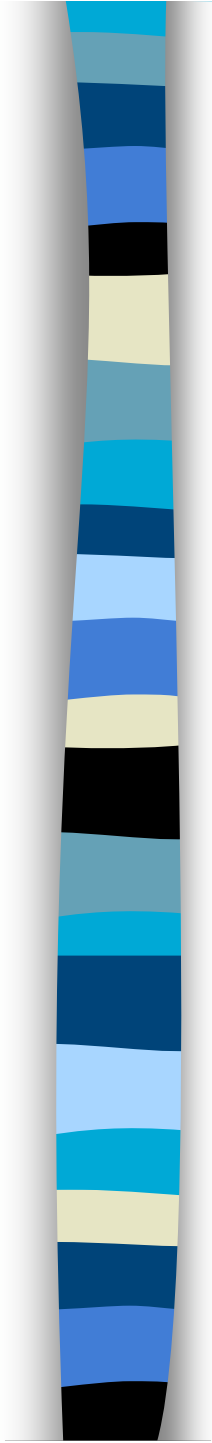
Rabbit

A food web



Voila! Sample Food Web





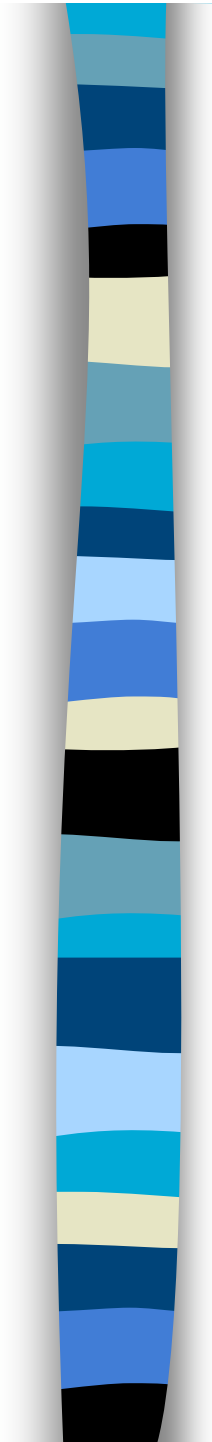
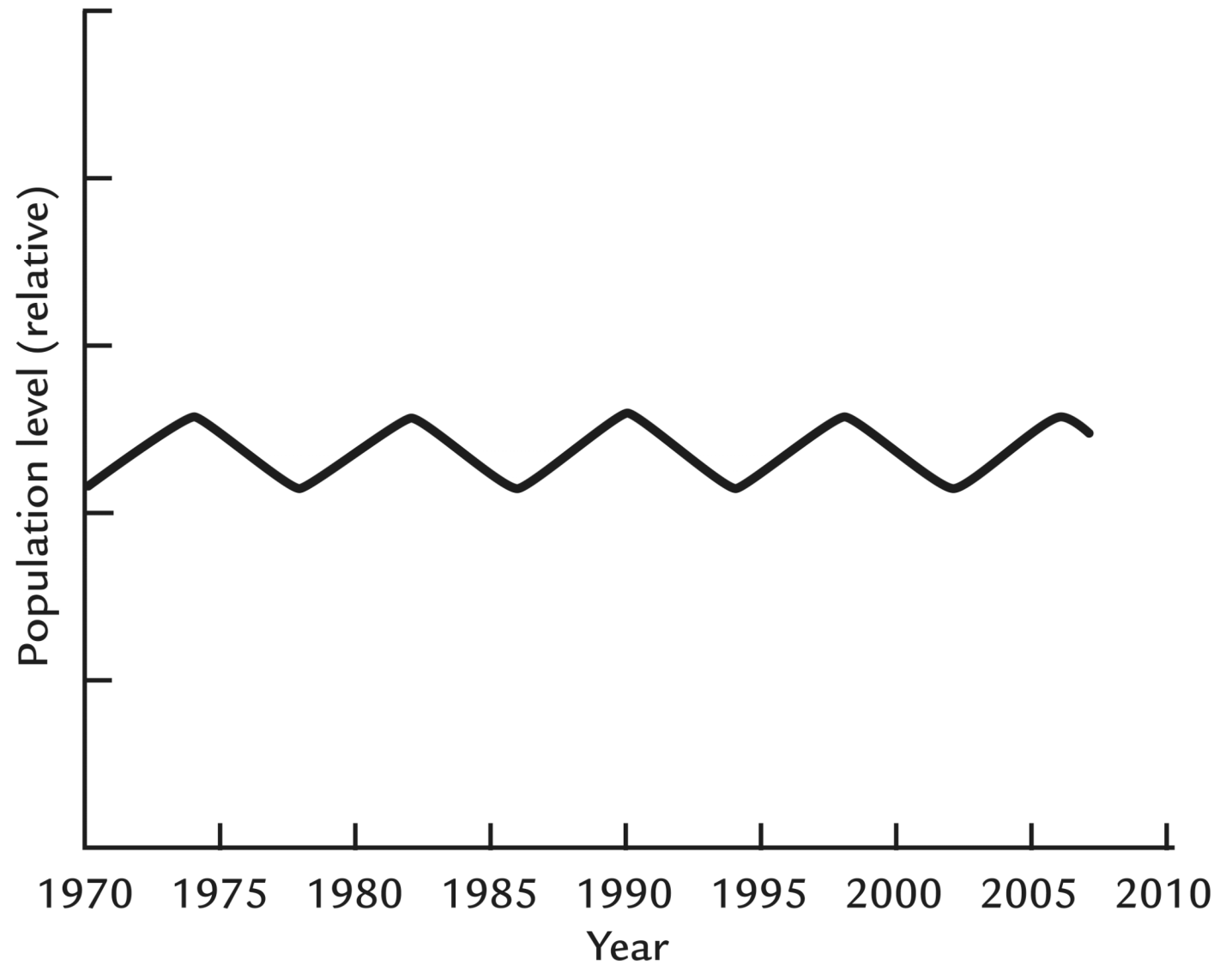


Ecosystems Out of Balance

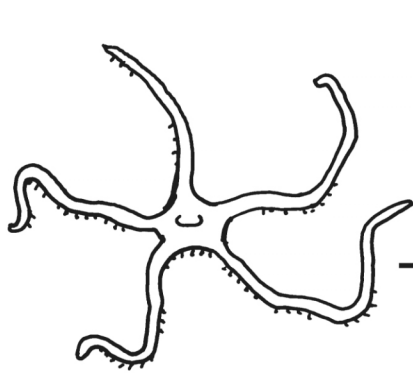
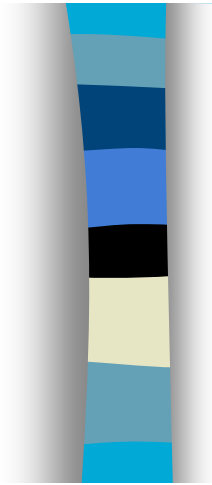
In this activity, students:

- Identify trophic roles
- Examine population graphs
- Relate fishery history to population levels
- Explain trophic cascades

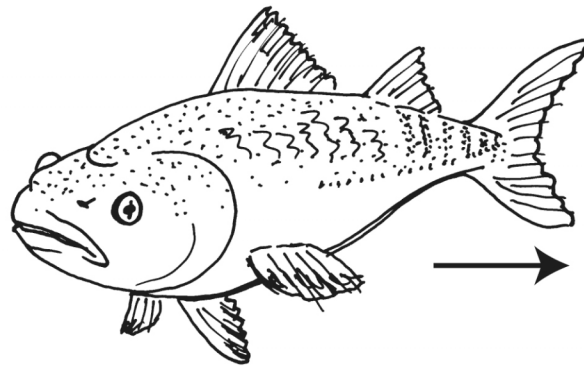
Pacific Halibut Population



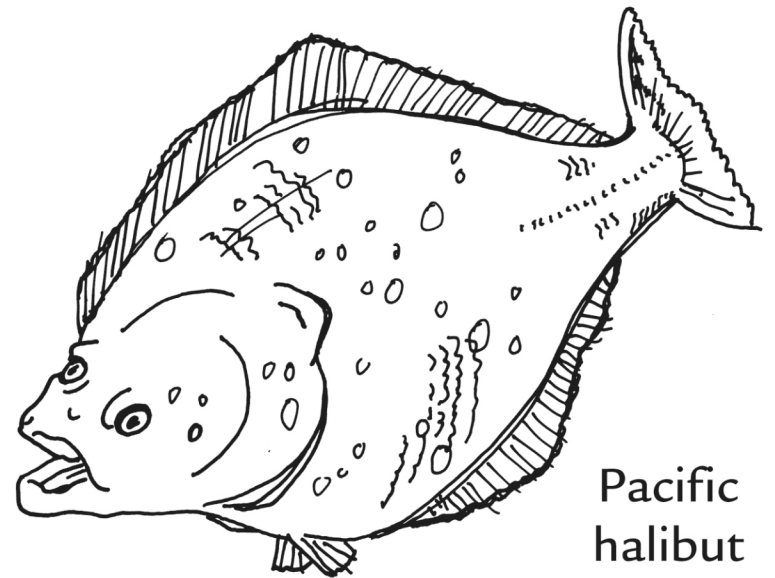
Pacific Halibut Food Chain



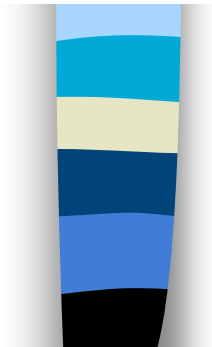
brittle star



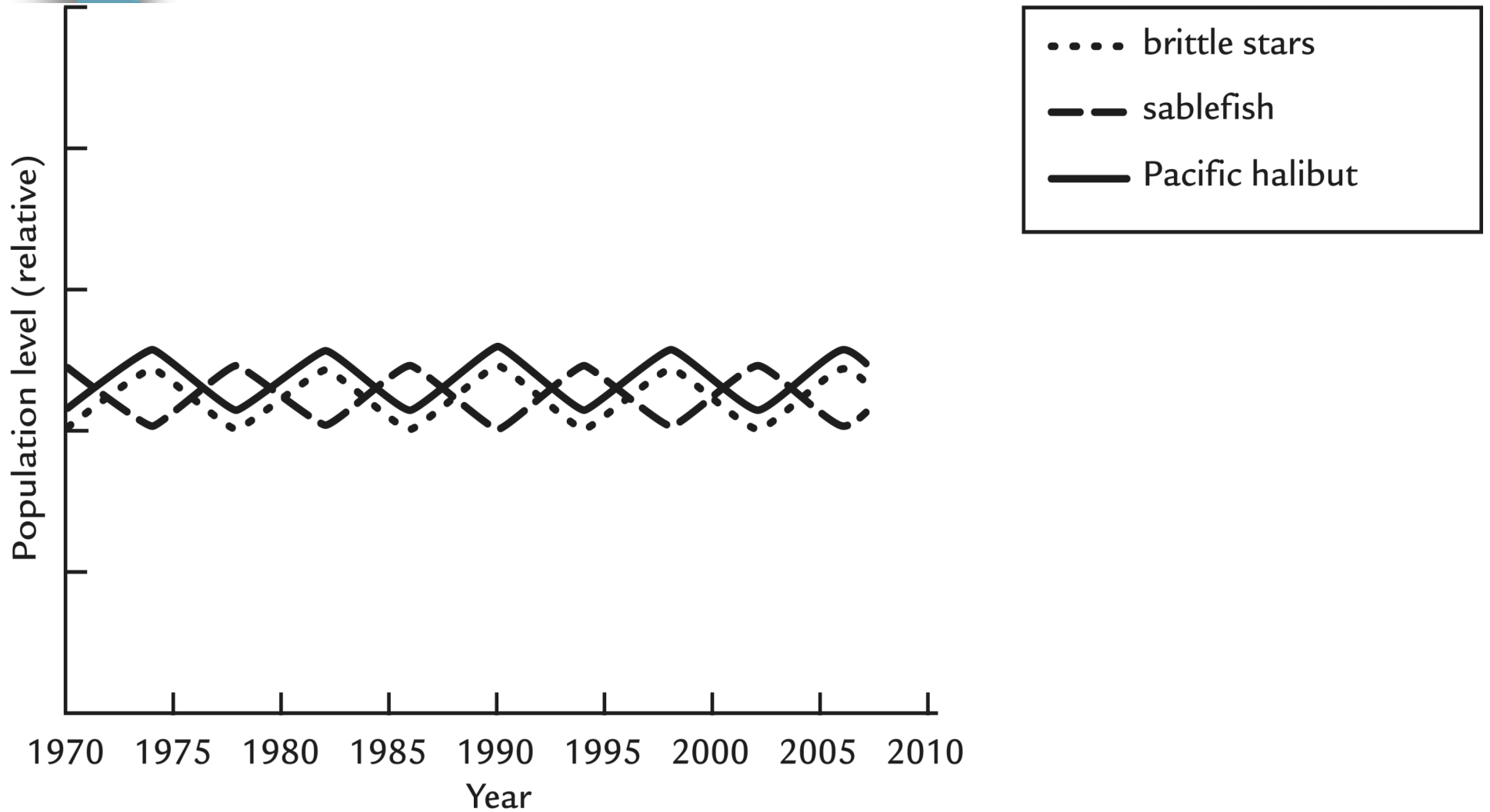
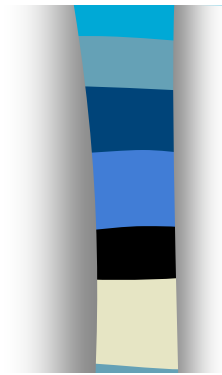
sablefish



Pacific halibut



Pacific Halibut Dominated Ecosystem Graph





Sustainability and Fisheries

- Think about the issue of fisheries in the context of the three pillars of sustainability.
 - Write down elements of the issue that fit into each of the three pillars.
 - Example: cost of fish is part of the “Economic” pillar.



Sustainability and Fisheries

Economic

- Fishermens' jobs
- Importing/exporting fish
- Cost of fish

Environmental

- Ecosystem collapse/alteration

Social

- Equal access to resources (fisheries)
- Distribution of profits (also economic)



Sustainability can be viewed on three levels

- Personal
- Community
- Global

Are the factors you listed in each of the three pillars at the personal, community, or global level?



Examine the following for the activity:

- Content addressed
- Process skills taught
- Ties to the issue of sustainability
 - Three pillars
 - Personal, community, global levels



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SEPUP website

(for this presentation and other information)

<http://www.sepuplhs.org>