

The Case of the Arctic's Missing Ice

Activity Guide for Students: Web of Changes

Directions for students: Food chains and food webs help us visualize how energy and matter move among trophic levels in an ecosystem. Use the Arctic ecosystem described in the article "[The case of the Arctic's missing ice](#)" to answer the following questions.

1. Create a simple food web for the Arctic ecosystem described using examples from the article. Include at least 10 organisms, and use arrows to show the direction of energy flow between organisms. Identify the roles of different organisms (as outlined below). Some organisms may have more than one role.

- Producer
- Primary consumer
- Secondary consumer
- Tertiary consumer
- Omnivore
- Scavenger
- Detritivore
- Decomposer

2. What factors affect the stability and carrying capacity of this Arctic ecosystem?

3. Choose one factor listed above and predict how a change in that factor over time could lead to a disruption in the stability of organisms mentioned in your food web.

4. Pick one organism and graph the predicted population change over time due to the disruption you've chosen. Determine a possible mathematical model for this change.

5. Propose a simple observational study to test your model. (Assume you have enough resources, funding and time. You do not actually have to do any experiments.)

Directions for students continued: Now relate the information, examples and answers given about the Arctic ecosystem to a local ecosystem using the prompts and questions that follow.

6. Research and choose a local ecosystem. Create a more comprehensive food web for your local ecosystem. It should include:

At least 25 organisms (be sure to include some examples of plants, fungi and bacteria)

Arrows to show the direction of energy flow between organisms

All the trophic levels at which organisms feed:

Producer

Primary consumer

Secondary consumer

Tertiary consumer

Omnivore

Scavenger

Detritivore

Decomposer

7. What factors affect the stability and carrying capacity of this ecosystem?

8. What factors are currently disrupting your chosen ecosystem, or may disrupt it in the future?

9. Choose one of these potential disruptors and predict the cascade of effects over time for one organism in the food chain.