TASK Teaching Alaskans... ...Sharing Knowledge

National Science Foundation WHERE DISCOVERIES BEGIN GK-12 Program

ALASKA DISCOVERY LESSON

Adaptations and Ecology in the Arctic
Lesson 4 - Arctic Food Chains
What are food chains and food webs and how do they apply to arctic ecology?

Developer's Name: Corinne Munger

Check all subject areas your lesson addresses.

☒ Life Sciences ☐ Physical Sciences ☐ Mathematics ☐ Earth Sciences

☐ Other (please specify) _____

Select all grades / educational levels that apply to this lesson:

☐ K ☐ 1st ☐ 2nd ☐ 3rd ☐ 4th ☐ 5th ☒ 6th ☐ 7th ☐ 8th

What is the objective of this Alaska Discovery Lesson?
Students will identify plants as primary producers in food webs, recognize the relationship between producers and consumers in food webs, and learn how this applies to arctic ecosystems by creating their own arctic food web.

Enter keywords that others can use to find your lesson in the TASK database.
Use commas between keywords.
Food webs, food chains, arctic ecology, feeding relationships, powerpoint presentation

Duration of lesson: 1 hours 15 minutes

What background or foundational information will a teacher need to have prior to this lesson?
Teacher should understand basic concepts of food chains and food webs. Almost all background information is included in presentation so teacher should review presentation before showing it to class.

How does the lesson address/follow the learning cycle model?
Students gear up with a brief discussion, explore and generalize throughout the presentation, and apply and interpret by creating their own arctic food webs.

List the Grade Level Expectation(s) from the June 2005 Alaska Content Standards addressed by this lesson.
(6)SC3.2

How are School District curriculum guidelines addressed by this lesson?
This lesson addresses the ecosystems life science concept in the district's science curriculum guidelines.

How does this lesson pertain to Alaska issues?
This lesson teaches concepts of feeding relationships, which are relevant to all ecological systems. It relates to Alaska specifically by instructing students to create an arctic food web.

List the supplies, materials and/or equipment needed to complete this lesson (consider consumables, non-consumables, locations, etc.)
PowerPoint Presentation file: ArcticAdaptationsAndEcology-Lesson4-Arcticfoodwebs.ppt
Ability to give PowerPoint presentation in classroom
Food chain handouts
Food chain key

LESSON

Students will learn about how primary producers, primary consumers, and secondary consumers fit into ecological systems. They will then apply this knowledge to make a food web of arctic organisms.

Gear up:

Begin by leading a quick class discussion. Ask students what a food chain is and how humans might fit into a food chain.

Investigate:

Students will participate in an interactive PowerPoint presentation. The presentation has an accompanying handout ("Food Chains 1-3) that the students fill out throughout the presentation using information presented on the slides. The handout generally progresses in the same order as the presentation.

The presentation further engages students with blue question slides. These slides have a blue background and display questions that the students compete to answer. Call on students who raise their hand first and award points to groups or individuals as desired. Answers to most questions are presented on the following slide and are also often answers to questions on handout. Some blue question slides ask the meaning of a particular word and do not have the answer on the next slide (e.g. "What does produce mean?" and "What does expend mean?"). These serve to help clarify and to build vocabulary.

Apply and generalize:

After completing presentation and handout, students apply these concepts to arctic organisms, which ties the lesson into the arctic ecology unit. A common error students make when making their own foodwebs is to draw arrows in food web backwards. Remind students that arrows show direction of energy flow (from producer to primary consumer to secondary consumer).

Reflect (Evaluate):

Encourage students to continue thinking about and discussing where humans fit into different food webs and how we affect and are affected by aspects of ecological systems.

List files for upload (complete lesson plan, presentation, worksheet, data file, or other document files), and/or submit CD or disk containing the files with this Alaska Discovery Lesson.

PowerPoint presentation file "ArcticAdaptationsAndEcology-Lesson4-Arcticfoodwebs.ppt"

Name:_____

Food Chains

Directions: Fill out the following sheet based on today's presentation about food chains.

A food chain is a way to describe the _____

_____.

Organism:

A feeding relationship describes_____

_____.

Which organisms are able to use energy directly from the sun to make their own food?

Through what process do primary producers make food?

Consume:

Herbivores are also known as _____ consumers.

Carnivores are also known as _____consumers.

The arrows between each item in a food chain point from the _____

to the _____.

There are never more than _____steps in a food chain.

Biomass:

If a wolf eats 10 pounds of musk oxen meat in one day, how much of that meat will become wolf biomass? Hint: remember that each step up the food chain is only 10% efficient.

Due to the energy loss at each transfer up the food chain, there are a lot more organisms _____ in the food chain than _____.

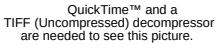
What are animals that eat both plants and animals called?

A food _____ shows a series of interconnecting food chains.

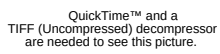
Can you make a food web showing the feeding relationships between arctic organisms?

Directions: Use the following pictures and information about food sources to draw arrows between the arctic organisms. Remember, the arrows between each item in the chain always point in the direction of energy flow- in other words, from the food to the one eating the food.

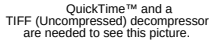
Arctic organism	**Food**
Wolf	Caribou, musk oxen, arctic hares, lemmings, arctic fox
Caribou	Plants (grass and lichen)
Lemming	Plants (berries, lichens, seeds)
Arctic fox	Lemmings, hares,
Polar bear	Seals, lemmings, arctic fox
Arctic hare	Plants (willow)
Musk oxen	Plants (grass, lichen, willow)



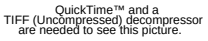
Musk oxen



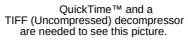
Wolf



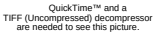
Polar bear



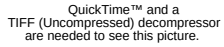
Caribou



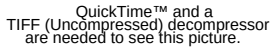
Lemming



Arctic fox



Arctic plants



Arctic hare

Name*: Key*

Food Chains

Directions: Fill out the following sheet based on today's presentation about food chains.

A food chain is a way to describe the *feeding relationships between different organisms*.

Organism: *An organism is a living creature, such as a plant or animal.*

A feeding relationship describes *who is eating what in a particular habitat*.

Which organisms are able to use energy directly from the sun to make their own food?
Plants

Through what process do primary producers make food?
photosynthesis

Consume:
To eat, drink, use, or buy.

Herbivores are also known as *primary* consumers.

Carnivores are also known as *secondary* consumers.

The arrows between each item in a food chain point from the *food* to the *feeder*.

There are never more than *four* steps in a food chain.

Biomass:
The weight of a living organism.

If a wolf eats 10 pounds of musk oxen meat in one day, how much of that meat will become wolf biomass? Hint: remember that each step up the food chain is only 10% efficient.
The wolf will gain one pound of wolf biomass.

Due to the energy loss at each transfer up the food chain, there are a lot more organisms *lower* in the food chain than *up at top.*

What are animals that eat both plants and animals called?
Omnivores

A food *web* shows a series of interconnecting food chains.

Food Chains Key

Can you make a food web showing the feeding relationships between arctic organisms?

Directions: Use the following pictures and information about food sources to draw arrows between the arctic organisms. Remember, the arrows between each item in the chain always point in the direction of energy flow- in other words, from the food to the one eating the food.

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