



Science Unit: *Plants and Ecosystems*

Lesson 5: *Fun with Food Chains Amusons-nous avec les Chaînes Alimentaires*

School Year: 2006/2007

Developed for: Queen Elizabeth Annex Elementary School, Vancouver School District

Developed by: Sara Harbord (scientist), Joanne Lloyd & Karine Pharand (teachers)

Grade level: Presented to grades 2-3; appropriate for grades 1 – 7 with age appropriate modifications ; Présenté au niveau de la 2^e et 3^e année; approprié aux niveaux de la 1^{re} à la 7^e année en y apportant les modifications nécessaires.

Duration of lesson: 1 hour and 20 minutes

Objectives

1. Learn about how energy is passed between organisms.
2. Learn about the elements of a food chain and the proper terms for organism involved.

Background

Food chains describe how energy is passed from organism to organism in an ecosystem. Essentially, all organisms (all living things) in an ecosystem are connected by food or energy. Plants get their energy from the sun and make their own food (primary producers). Some animals eat exclusively plants for their energy and are called primary consumers or herbivores. Some animals get energy from eating other animals (secondary consumers). Secondary consumers can either be omnivores, animals that eat both plants and animals, or carnivores, animals that only eat other animals. Decomposers end every food chain since they are the organisms that feed on the dead remains of both plants and animals. These plants and animals fit together in a food chain, a veritable who-eats-who in an ecosystem. Each food chain is only as strong as the weakest link. If one species in the food chain is disturbed, then every other species in that food chain will also be disturbed.

Vocabulary

<u>Food Chain</u>	The transfer of energy between species in a given ecosystem. (The link between primary producers and consumers).
<u>Primary Producer</u>	An organism that makes food, usually by photosynthesis (taking the sun's energy, water and carbon dioxide to make sugar). These are often plants.
<u>Primary Consumer</u>	An organism that gets its energy from eating primary producers (or plants), also called herbivores.
<u>Secondary Consumer</u>	An organism that gets its energy from eating other consumers, also called carnivores.
<u>Herbivore</u>	An organism that gets its energy from eating plants (also called a primary consumer).
<u>Omnivore</u>	An organism that gets its energy from eating both plants and animals.
<u>Carnivore</u>	An organism that gets its energy from eating animals (also called a secondary consumer).



Vocabulaire

<u>Chaîne alimentaire</u>	Le transfert d'énergie entre les espèces d'un écosystème donné. (Le lien entre les producteurs primaires et les consommateurs.)
<u>Producteur primaire</u>	Un organisme qui crée de la nourriture, habituellement par la photosynthèse (utilisant l'énergie du soleil, l'eau et le dioxyde de carbone pour les transformer en sucre) Il s'agit souvent de plantes.
<u>Consommateur primaire</u>	Un organisme qui se procure son énergie en mangeant des producteurs primaires (ou plantes), aussi appelé herbivores
<u>Consommateur secondaire</u>	Un organisme qui se procure son énergie en mangeant d'autres consommateurs, aussi appelé carnivores.
<u>Herbivore</u>	Un organisme qui se procure son énergie en mangeant des plantes (aussi appelé consommateur primaire).
<u>Omnivore</u>	Un organisme qui se procure son énergie en mangeant des plantes et des animaux.
<u>Carnivore</u>	Un organisme qui se procure son énergie en mangeant des animaux (aussi appelé consommateur secondaire).

Materials

For Activity 1 (see activity instructions below)

- Face paint in five colours (including red, green and yellow)
- life cards in red, green and yellow
- handouts

Matériaux

Pour l'activité 1 (voir les directives ci-dessous)

- maquillage 5 couleurs (incluant rouge, vert, et jaune)
- cartes de survie rouges, vertes et jaunes
- feuilles accompagnant l'activité

In the Classroom

Introductory Discussion

1. HOOK: Go over a poster of a simple forest food chain.
2. TO REVIEW:
 - a. The elements of a food chain.
 - b. The importance of each part of a food chain.
 - c. The delicate balance that exists between elements of a food chain.

3. SCIENCE ACTIVITY:

Activity 1: Food Chain Game

Purpose of Experiment: To see how different animals interact with one another and their environment



SCIENTIST IN RESIDENCE PROGRAM

Methods:

This game is like a more complex version of tag, where different types of animals are always “it”. The students can be one of three things:

1. **Herbivores:** this will be the most abundant group (reflecting what happens in nature), they will also have the most life cards. An herbivore will lose a life card when tagged by an omnivore or a carnivore. (they will be **green**)
2. **Omnivores:** this group will have significantly less life cards than the herbivores. They can tag an herbivore and take one of their lives. They can also lose a life card when tagged by a carnivore. (they will be **yellow**)
3. **Carnivores:** this group will only have one life card. They can tag an herbivore or an omnivore and take one of their lives. They cannot lose life cards to any other student. (they will be **red**)

There will also be adults involved in this game. The adults can be one of three things:

1. **Negative Human Influence:** One adult can represent actions humans take that negatively impact the environment and consequently the animals living there (e.g. clear-cutting, unsustainable building, oil spills). This adult can take lives from any animals.
2. **Natural Disasters:** One adult can represent natural disasters that change an environment (e.g. forest fires, major storms). This adult can take lives from any animals.
3. **Positive Human Influence:** One adult can represent positive things that humans do to protect an environment and the animals living there (e.g. conservation groups, sustainable living). This adult can give life cards back to students that run out of lives during the game. In our game, the students answered questions relating to the whole unit on plants and ecosystems in order to get an extra life.

Set-up prior to activity:

1. **Supplies needed:** for the game you will need:
 - a. Five different colours of face paint including green, yellow, and red (if students are allergic to face paint, have an alternative such as arm bands available).
 - b. Life cards: these are pieces of paper in red, green and yellow that the students will carry around with them on a string. You can also use beads or chips.
Herbivores: 15 life cards each
Omnivores: 5 life cards each
Carnivores: 1 life card each
 - c. Survival collection card: (see handout at end of document) Each student will have a “survival card” that will have categories such as water, food and shelter.
 - d. Survival stations: (see handout at end of document) Survival stations will be hidden around the schoolyard. Each student will take their “Survival Card” to each station and stamp their card. This represents all of the different things an animal needs in order to survive in an environment.

Instructions

1. Divide the students into three groups: herbivores, omnivores and carnivores. You want to have many herbivores, some omnivores and very few carnivores (a 15:5:1 ratio works well).
2. Paint the students faces in the appropriate colour (green=herbivore, yellow=omnivore, red=carnivore)
3. Give each student the appropriate number of life cards (see above)
4. Give each student a “Survival Card”. Instruct the students that they will need to fill up the card with stamps that they will find at stations hidden around the schoolyard.



SCIENTIST IN RESIDENCE PROGRAM

5. Send the herbivores out into the game first. After a minute, send out the omnivores. After another minute, send out the carnivores.
6. Half-way through the game, send out the adults.
7. Rules for the students:
 - a. An animal cannot be tagged when visiting a “Survival Station” or when in the vicinity of a station. Essentially, the stations are like a home-free.
 - b. If a student is visiting the adult acting as the “Positive Human Influence” they cannot be tagged. This person is also a “home-free”.
 - c. Once an animal has lost one life, no other predator can take a life from that animal for sixty seconds.
 - d. The students must remain within the boundaries set by the teachers.

Optional Questions:

1. What is a herbivore? (animal that eats only plants)
2. What is an omnivore? (animal that eats plants and animals)
3. What is a carnivore? (animal that only eats other animals)
4. What is always part of a food chain? (sun, plants)
5. What are plants in a food chain? (primary producers)
6. What is a food chain (a group of plants and animals that are connected by what they eat)

Closure Discussion

After the game, meet up with the class to discuss the results. Some important questions:
How many animals were able to get their whole card stamped?
How many animals had lives left at the end of the game?
Why do you think that there are so many herbivores and so few omnivores and carnivores?

References

1. Burnie, David. 1991. How Nature Works: 100 Ways Parents and Kids Can Share the Secrets of Nature. Pages 34-35, The World of Plants and Fungi. Reader's Digest Association Inc. ISBN: 0895773910
2. Silverstein, A., Silverstein, V. and Silverstein Nunn, L. 1998. Food Chains. Science Concepts. Twenty-First Century Books. ISBN: 076133002X Millbrook Books.
3. Zwinenberg, A.J. and Van Gelder, J. 1983. Encyclopédie de la nature alphabétique et systématique. Pages 40-41. Chantecler.
4. http://en.wikipedia.org/wiki/Food_chain Wikipedia, the free encyclopedia [Information about food chains]

Extension of Lesson Plan

1. (Before the lesson): Make food chain mobiles that illustrate how a food chain works.

Scientist: _____

Date: _____

Name of Species: _____

SURVIVAL CARD

Animals need more than just food in order to survive. Collect stamps from each "Survival Station". Remember, you need a stamp from each station in order to survive.

Name of Station	Stamp
Water	
Shelter	
Defense	
Keeping Warm	
Getting Food	

Scientifique: _____

Date: _____

Nom d'espèce: _____

LA CARTE de SURVIE

Les animaux ont besoin plus que juste de nourriture pour survivre. Rassemblez les timbres de chaque "station de survie". Rappelez-vous, vous avez besoin d'un timbre de chaque station pour survivre.

Nom de station	Timbre
L'eau	
L'abri	
La défense	
Se tenir au chaud	
Obtenir la nourriture	

Water Station

Water is essential for all living things. Animals (including humans) are mostly made of water. Humans are about 60% water. A human being can only survive a few days without water (but a couple of weeks without food). Water is important to keep body temperature stable, to help body parts move smoothly and to let all the chemical processes in a body (like digestion) happen.

L'eau est essentielle pour toutes les choses vivantes. Une grande partie des animaux (humains y compris) est faite d'eau. Les humains sont faits environ de 60% d'eau. Un être d'humain peut seulement survivre quelques jours sans eau (mais quelques semaines sans nourriture). L'eau est importante pour conserver la température du corps, pour aider les parties du corps à se déplacer et effectuer tous les processus chimiques dans un corps (comme la digestion).

La station d'eau

Shelter Station

Animals live in many different types of homes or shelters, like holes in the ground or in trees, nests, caves and dens. Just like humans, animals need a place where they can feel safe, rest and take care of their children.

Les animaux vivent dans beaucoup de différents types de maisons ou abris, comme des trous dans la terre ou dans les arbres, les nids, les cavernes et les repaires. Juste comme des humains, les animaux ont besoin d'un endroit où ils peuvent se sentir en sécurité, se reposer et prendre soin de leurs enfants.

La station de l'abri

Defence station

Both plants and animals have defences to keep from getting eaten. Many animals travel in

large groups (or herds) for protection. Other plants and animals camouflage themselves to hide from predators with the colour or the pattern of their coat. They might even try to look like the nature around them like the walking stick bug that actually looks like a stick! Some plants and animals release chemicals as a defence (like the skunk).

La station de la défense

Les plantes et les animaux ont des défenses pour empêcher d'être mangé. Beaucoup d'animaux voyagent dans de grands groupes (ou troupeaux) pour la protection. D'autres se

camouflent pour se cacher des prédateurs avec la couleur ou le modèle de leur manteau. Ils pourraient même essayer de ressembler à la nature autour d'eux comme l'insecte de bâton qui ressemble réellement à un bâton ! Quelques plantes et animaux libèrent des produits chimiques comme défense (comme la mouffette).

Keeping Warm Station

Animals have a variety of tricks in order to stay at the right temperature. Some animals have thick coats that protect them against the outside temperature (like the polar bear). Other animals will bury themselves into the ground to stay warm (like frogs). Other

animals will make sure they always live in places that are warm and will move where the nice temperature is (like birds).

la température est clémente (comme des oiseaux).

La station de se tenir au chaud

Les animaux ont une variété de tours pour rester à la bonne température. Quelques animaux ont des manteaux épais qui les protègent contre la température extérieure (comme l'ours blanc). D'autres animaux s'enterreront dans le sol pour rester chauds (comme des grenouilles). D'autres animaux s'assureront qu'ils vivent toujours dans les endroits qui sont chauds et se déplaceront où

Getting Food Station

It's not enough that animals find food. They also have to be able to get it. Some animals have specialized body parts that help them get to the food that they want. For example, some birds have really strong beaks to crack nuts. The giraffe has a really long neck so that it can reach its food (leaves) that are found really high up on trees. A frog's tongue is really sticky to allow it to catch insects.

(les feuilles) qui sont vraiment hautes sur les arbres. La langue d'une grenouille est vraiment collante pour lui permettre d'attraper des insectes.

La station pour obtenir la nourriture

Ce n'est pas suffisant pour les animaux de trouver de la nourriture. Ils doivent également pouvoir l'obtenir. Quelques animaux ont adapté des parties de leur corps qui les aident à obtenir la nourriture qu'ils veulent. Par exemple, quelques oiseaux ont les becs vraiment forts pour fendre des écrous. La giraffe a un cou très long de sorte qu'elle puisse atteindre sa nourriture