

### Follow-up Activities

- Have students create a three-column bulletin board, showing examples of and describing the following symbiotic animal relationships:
  - Parasitism
  - Commensalism
  - Mutualism
- As a functional writing (or debating) activity, have students pick one of these topics, defending or disputing the issue in writing:
  - It is appropriate for lions to hunt and kill zebras, antelopes and other prey...
  - It is appropriate for humans to hunt and kill deer...
  - If it were not for humans, the interdependent relationships in ecosystems would be in balance...
- Play "Interdependency Jeopardy." Divide the class into teams of 3-5 students. Make sure all the students have time to review the concepts that will be covered in the game, and give them time each day to research examples of animal interdependency and prepare questions. After a week of preparation, collect the questions, review them and add them to the list. Then separate the class into groups of three teams and give points for each correct answer. Have the rest of the class decide if the answers are correct.

### Internet Resources

- [www.oaklandzoo.org/atoz/atoz.html](http://www.oaklandzoo.org/atoz/atoz.html)  
This site contains images of all the animals in the Oakland Zoo as well as text that describes the relationships these animals would have in the wild.
- [powayusd.sdcoe.k12.ca.us/mtr/ConflictYellowstoneWolf.htm](http://powayusd.sdcoe.k12.ca.us/mtr/ConflictYellowstoneWolf.htm)  
An inquiry-based activity that encourages students to reflect on interdependency and find evidence to support the reintroduction of wolves into Yellowstone National Park.
- [www.nwf.org/nwf/wildlifeweek/1999/edguide.pdf](http://www.nwf.org/nwf/wildlifeweek/1999/edguide.pdf)  
A printable teacher's guide designed to teach about the interconnectedness of species in an ecosystem.
- [www.nationalgeographic.com/parasites/splashframe.html](http://www.nationalgeographic.com/parasites/splashframe.html)  
The life cycle of a parasite is illustrated, and in the gallery, seven other parasitic relationships are explained.
- [www.sd5.k12.mt.us/glaciareft/wild8-12.htm](http://www.sd5.k12.mt.us/glaciareft/wild8-12.htm)  
Students solve an ecological mystery involving bighorn sheep and parasitism.

### Suggested Print Resources

- Forsyth, Adrian. *How Monkeys Make Chocolate*. Firefly Books, Inc., NY, NY; 1995.
- Mason, Cherie. *Everybody's Somebody's Lunch Teachers Guide*. Tilbury House, Gardiner, ME; 1998.
- Silverstein, Alvin. *Symbiosis (Science Concepts)*. Millbrook Press, Brookfield, CT; 1998.

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## Animal Interdependency

### Grades 5-8

Students in grade 5-8 classrooms possess a wide range of background knowledge. Student response to this video program is sure to be varied, so the teachers for these grades need all the help they can get! This guide has been designed to help science teachers in grades 5-8 by providing a brief synopsis of the program, pre-viewing and follow-up questions, activities, vocabulary and additional resources.

**Before Viewing:** Extensive research tells how important it is for the teacher to discover what the students know — or think they know — about a topic, before actually starting a new unit. Therefore, after prompting discussion with the pre-viewing questions, lead your class to create a "Everything We Think We Know About..." list. You may also wish to preview key vocabulary words, and have students raise additional questions they hope will be answered.

**After Viewing:** Have your students share video excerpts that fascinated or surprised them, then challenge your students to prove or disprove the accuracy of the facts they put on their "Everything We Think We Know About..." list. Discuss what else they learned and use the follow-up questions and activities to inspire further discussion. Encourage students to research the topic further with the Internet and reading resources provided.

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## Program Summary

Every living creature on the planet is connected to, and dependent on, every other creature in some way. We know that in every ecosystem, there is a complex relationship among the living and non-living elements: sunlight, air, water, soil, plants and animals. Much can be learned from studying the interdependencies among the animals within those ecosystems.

Organisms are dependent upon each other for fulfilling such basic needs as food, shelter, defense and even reproduction. Energy is transferred from one organism to another, in the form of food, through a relationship known as a food chain. The sun's energy is passed from plants, or producers, to animals, or consumers. Decomposers insure that the energy returns to the plants to begin the cycle over again. Because organisms often eat more than one type of plant or animal, food chains intertwine to form complicated food webs.

When organisms from different species interact to survive, it is called symbiosis. In the case of parasitism, only one organism, called the parasite, benefits by injuring the other, known as the host. In the case of commensalism, one benefits without harming the other. In the case of mutualism, both organisms benefit from a relationship that helps all members of that community.

Some animal species are so interdependent that individuals cannot survive alone. Bee colonies cooperate to gain food, shelter, protection and to make sure offspring are produced. Without this interdependency, the hive would not survive.

## Vocabulary

The following words are included for teacher reference or for use with students. They are listed in the order in which they appear in the video.

**interdependent** — The term used to describe animals that are reliant on each other for support and survival. All the organisms in an ecosystem are interdependent.

**ecosystem** — A specific habitat including the living and nonliving things existing in it.

**food chain** — An arrangement of feeding relationships that exist between organisms in an ecosystem.

**photosynthesis** — The process through which sunlight energy is trapped by chlorophyll in green plants and chemically combined with carbon dioxide and water to produce sugars and oxygen.

**producers** — Organisms like green plants and algae that produce food using photosynthesis. *(Continued)*

**herbivores** — Animals that consume only plants.

**carnivores** — Animals that consume other animals.

**omnivores** — Animals that consume both plants and animals.

**scavengers** — Animals that feed on the bodies of dead animals.

**decomposers** — Organisms like bacteria, fungi and insects that consume and break down dead plants, animals and waste materials. In this process, energy and nutrients are returned to the soil.

**food web** — The overall arrangement of the many food chains in a given ecosystem, showing interdependencies.

**symbiosis** — The close association between organisms of different species; where at least one organism benefits from the association.

**parasitism** — A symbiotic relationship in which only one creature, the parasite, benefits, while the other, called the host, is harmed. There are internal parasites, like tapeworms (endoparasites) and external parasites, like fleas (ectoparasites).

**commensalism** — A symbiotic relationship in which one creature benefits without harming the other animal.

**mutualism** — A symbiotic relationship in which both organisms benefit.

## Pre-viewing Discussion

Before students generate their list of “Everything We Think We Know About...” for this topic, stimulate and focus their thinking by raising these questions so that their list will better reflect the key ideas in this show:

1. How do animals depend on one another for survival?
2. What makes a relationship interdependent?
3. What is the difference between a food chain and a food web?

After the class has completed their “Everything We Think We Know About...” list, ask them what other questions they have that they hope will be answered during this program. Have students listen closely to learn if everything on their class list is accurate and to hear if any of their own questions are answered.

## Focus Questions

1. How are living things interdependent?
2. What types of animal interdependencies are there?
3. Describe the basic living and non-living elements in an ecosystem.
4. What are producers, and why are they so important?
5. How do plants produce food from the sun's energy?
6. Why do food chains always contain producers and consumers?

*(Continued)*

7. Describe the interdependent relationship between a predator and its prey.
8. What are scavengers, and what role do they play in the interdependent relationships of the animal kingdom?
9. Describe the relationship that all living things have with decomposers.
10. Why is a food web a more accurate representation of interdependent relationships than a food chain?
11. What is a symbiotic relationship?
12. What is parasitism?
13. What is the difference between ectoparasites and endoparasites?
14. What is commensalism? Describe a commensal relationship in the animal world.
15. What is mutualism? Describe a mutualistic relationship in the animal world.
16. What kind of interdependency was seen in the investigation with the two different fish?
17. In what ways are humans and animals interdependent?

## Follow-up Discussion

Research indicates that students will retain their previous misconceptions about a topic, in preference to new information, until they actively recognize and correct their own errors. Therefore, it is important to have your students re-examine the facts/beliefs they put on their “Everything We Think We Know About...” list. It might also be helpful to review the list by marking each entry with a “+” or “-” to show which facts were correct and which were incorrect.

Discussions that ensue from thought-provoking questions provide a good way to assess the overall depth of student understanding. The following are some suggested discussion questions.

1. Humans sometimes create interdependent relationships with animals that would not naturally occur in the wild, as seen in the segment on tigers and pigs in a Thailand zoo. Discuss the pros and cons of establishing such interdependencies.
2. Have students discuss the ways in which they are currently dependent upon others in their lives for meeting life's basic needs. In what ways are they interdependent?
3. Explain this statement from the show: “All the parts of the ecosystem are vital. If any part fails, the whole system can suffer.”