

Discovery Science Library

The Basics: Life Science

Teacher's Guide

Grade Level: 6–8

Curriculum Focus: Life Science

Lesson Duration: Three class periods

Program Description

From DNA and viruses to seed dispersal and the circulatory system, introduce middle school students to a wide variety of life science topics with these segments drawn from Discovery Channel School's award-winning series.

Lesson Plan

Student Objectives

- Discuss the topics covered under the term “life science.”
- Create a poster illustrating the elements of the food chain on the Serengeti in Tanzania.
- Write an accompanying paragraph describing the organization of the food chain.

Materials

- *The Basics: Life Science*
- Computer with Internet access
- Poster board
- Markers and colored pencils

Procedures

1. Begin the lesson by reviewing the topics covered under the term “life science.” To spur conversation, remind students that this area of science relates to all the organisms on Earth, what they look like, where they live, their characteristics, and how some organisms relate to each other. After this brief introduction, students may suggest the following topics:
 - Plants
 - Animals and the habitats in which they live
 - The human body
 - Microorganisms
 - Advances in medicine

2. Tell students they will focus on one life science topic – the relationship between plants and animals in the ecosystem of Serengeti, in Tanzania, Africa. Ecosystem is the term used to describe an ecological community of living things interacting with their environment.
3. Ask students to watch the segments entitled “Predator and Prey” and “Grasslands” in *The Basics: Life Science* and to pay close attention to information about the food chain, which is the relationship of plants and animals based on what animals eat.
4. After viewing, have students work in groups of three to illustrate the elements of the food chain on the Serengeti. Each group will draw a picture of the food chain and write a description that includes the following details:
 - A definition of a food chain
 - A summary of the organisms in the food chain, clearly describing who eats whom
 - Definitions of the terms “herbivore,” “carnivore,” and “scavenger” and how these terms help explain a food chain
5. Give students time in class to work on their projects or let them finish the assignment as homework.
6. During the next class period, ask each group to share its poster and description. Then discuss what students have learned from this project. How does describing an ecosystem in terms of the food chain help clarify the roles its organisms? How does it make the behavior of animals easier to understand?

Assessment

Use the following three-point rubric to evaluate students’ work during this lesson.

- 3 points: Students were highly engaged in class and small-group discussions and produced a clear and accurate poster and description, with all the requested components.
- 2 points: Students participated in class and small-group discussions and produced an adequate poster and description, with most of the requested components.
- 1 point: Students participated minimally in class and small-group discussions and produced an incomplete poster and description, with few or none of the requested components.

Vocabulary

carnivore

Definition: An organism that eats mostly animals

Context: Cheetahs and hyenas are two carnivores that live on the Serengeti, in Tanzania.



ecosystem

Definition: A system made up of an ecological community of living things interacting with their environment , especially under natural conditions

Context: The Serengeti, in Tanzania, Africa, is a large and complex ecosystem.

food chain

Definition: A series of organisms in which each uses the next, usually lower, member of the series as a food source

Context: On the Serengeti, the grasses are at the bottom of the food chain, followed by the gazelles and wildebeest, which eat the grass, and the cheetahs and hyenas, which eat the gazelles and the wildebeest.

herbivore

Definition: An animal that eats mostly plants

Context: Zebras and wildebeest are herbivores that migrate across the Serengeti in search of fresh grass.

predator

Definition: An animal that hunts other animals for food

Context: Cheetahs are masterful predators, able to run quickly over short distances to overtake their prey.

prey

Definition: An animal often hunted by other animals

Context: Herbivores are often the prey, while carnivores are the predators.

scavenger

Definition: An organism that usually feeds on dead or decaying matter

Context: The hyena is usually a predator, but it becomes a scavenger if it finds a dead animal.

Academic Standards

Mid-continent Research for Education and Learning (McREL)

McREL's Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education addresses 14 content areas. To view the standards and benchmarks, visit <http://www.mcrel.org/>.

This lesson plan addresses the following national standards:

- Life Science--Understands the relationships among organisms in their physical environment
- Language Arts – Viewing: Uses a range of strategies to interpret visual media



National Academy of Sciences

The National Academy of Sciences provides guidelines for teaching science in grades K–12 to promote scientific literacy. To view the standards, visit this Web site:

<http://books.nap.edu/html/nses/html/overview.html#content>.

This discussion guide addresses the following science standards:

Grades 5-8

- Life Science: Structure and function in living systems; Regulation an behavior
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Support Materials

Develop custom worksheets, educational puzzles, online quizzes, and more with the free teaching tools offered on the Discoveryschool.com Web site. Create and print support materials, or save them to a Custom Classroom account for future use. To learn more, visit

- <http://school.discovery.com/teachingtools/teachingtools.html>
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DVD Content

This program is available in an interactive DVD format. The following information and activities are specific to the DVD version.

How To Use the DVD

The DVD starting screen has the following options:

Play Video—This plays the video from start to finish. There are no programmed stops, except by using a remote control. With a computer, depending on the particular software player, a pause button is included with the other video controls.

Video Index—Here the video is divided into sections indicated by video thumbnail icons; brief descriptions are noted for each one. Watching all parts in sequence is similar to watching the video from start to finish. To play a particular segment, press Enter on the remote for TV playback; on a computer, click once to highlight a thumbnail and read the accompanying text description and click again to start the video.

Standards Link—Selecting this option displays a single screen that lists the national academic standards the video addresses.

Teacher Resources—This screen gives the technical support number and Web site address.



Video Index

Segment 1: How Plants Grow (7 min.)

Observe a wide range of plants living in many parts of the world. Learn about the function of each part of a plant and find out how plants develop.

Pre-viewing question

What do you know about plants?

Answer: Some students may know about the parts of a plant and their functions.

Post-viewing question

What single characteristic differentiates plants from animals?

Answer: Plants can make their own food, and animals cannot.

Segment 2: Seed Dispersal (4 min.)

Observe seeds traveling by wind, on water, through the air, and in the fur of animals. Discover why it is important that seeds germinate in different places.

Pre-viewing question

Have you observed seeds traveling from one place to another?

Answer: Answers will vary.

Post-viewing question

Why is it important for seeds to have the ability to travel to different places?

Answer: Seeds need proper conditions to germinate, including water, oxygen, and the right soil temperature. They have a better chance of landing in a place with these conditions if they can travel

Segment 3: Adaptation (3 min.)

Travel to the Galápagos Islands and discover the significance of animal adaptations. Check out finches with different-size beaks and cormorants that are expert divers.

Pre-viewing question

What do you think the term “adaptation” means?

Answer: Students may know that an adaptation is a change that has occurred over time helps increase an organism's chances of survival.

Post-viewing question

How have the finches' different-size beaks improved their chances for survival?

Answer: The finches with different-size beaks do not compete for the same food, which grows in different places.

Segment 4: Predator and Prey (3 min.)



Learn about the links in the food chain in the Serengeti, in Tanzania. Observe grazers on the plains and watch lions and cheetahs capture their prey.

Pre-viewing question

What is a predator?

Answer: Answers may include that a predator hunts other animals for food.

Post-viewing question

What elements make up a food chain?

Answer: The food chain is made up of plants, animals that eat plants, and predators, or animals that eat other animals. In the Serengeti, the gazelles eat grasses, and the large predators eat the gazelles.

Segment 5: Grasslands (11 min.)

Travel to the Serengeti, in Tanzania, and observe the relationship between herbivores, carnivores, and scavengers. Find out how herbivores protect themselves from the large carnivore predators.

Pre-viewing question

Describe the meanings of the terms “herbivore,” “carnivore,” and “scavenger.”

Answer: A herbivore eats plants; a carnivore hunts live animals; and a scavenger eats dead animals.

Post-viewing question

Why do the herbivores migrate across the plains?

Answer: As wildebeest, zebras, and other herbivores consume the grass in one area, they travel to another in search of more. Their migration also corresponds to the change in the seasons.

Segment 6: DNA (3 min.)

Find out what DNA is and how it helps solve crimes. Learn about a well-known conviction that was refuted because of DNA evidence.

Pre-viewing question

What does “DNA” stand for?

Answer: DNA stands for deoxyribonucleic acid, which contains a cell’s genetic information.

Post-viewing question

How did DNA evidence challenge a conviction?

Answer: The 1954 conviction of Dr. Sam Shepherd, found guilty of murdering his wife, was overturned when evidence showed that his DNA did not match the DNA at the scene of the crime.

Segment 7: Cancer Cells (4 min.)

Learn the latest discoveries about cancer, including the treatments available.



Pre-viewing question

What do you know about cancer?

Answer: Answers will vary; some students may know that it is the result of uncontrolled growth of cells.

Post-viewing question

How do doctors treat cancer?

Answer: Treatments include radiation and chemotherapy, which kill the cancer cells. But these treatments also kill healthy cells. Scientists are experimenting with targeted therapies that activate the immune system to attack the tumors.

Segment 8: Viruses: Introduction (3 min.)

Learn what viruses are, why they can be deadly, and how different kinds affect the human body.

Pre-viewing question

What viruses are you familiar with?

Answer: Answers will vary.

Post-viewing question

What are two examples of viruses, and what parts of the body do they affect?

Answer: The cold virus affects the respiratory system, and hepatitis affects the liver.

Segment 9: Bacteria: Tiny Talents (3 min.)

Check out the diverse forms of bacteria and where they live on Earth. Discover how people are putting bacteria to work to help bleach paper and clean up bodies of water.

Pre-viewing question

Where are bacteria found?

Answer: Answers will vary; some students may say in the soil, in the water, and in the human body.

Post-viewing question

What are two ways that bacteria have been put to work to help people?

Answer: Paper manufacturers are using bacteria instead of chlorine to bleach paper, and companies that use cyanide to extract gold from ore use bacteria to consume cyanide that runs into nearby streams.

Segment 10: Hormones (3 min.)

Learn about hormones, including where they are produced, and the roles they play in the human body.

Pre-viewing question

What do you know about the endocrine system?

Answer: Answers may include that the endocrine system is responsible for the production of hormones, or chemicals that regulate activities in the body.

Post-viewing question

What is the fight-or-flight response?

Answer: It is a natural response to stress in which the adrenal glands release hormones that help people respond to danger. When additional oxygen flows into the blood, people become more alert, and they respond quickly to signs of trouble. An individual also is more attentive and more efficient. The body stays in this state until the danger has passed.

Segment 11: The Circulatory System (6 min.)

Watch as an athlete pushes his body to the limit to become an Olympic competitor. Discover why a healthy heart is essential to this task, and learn how the circulatory system works.

Pre-viewing question

What are the parts of the circulatory system?

Answer: The heart, arteries, veins, and blood make up the circulatory system.

Post-viewing question

Why is strong heart function essential to good athletic performance?

Answer: The faster the heart beats, the faster blood circulates throughout the body, enabling the muscles to work extremely hard. Athletes train so that their heart can safely pump blood quickly throughout the body.

Segment 12: Fighting the Flu (5 min.)

Observe the flu virus enter the nasal passages, and see how the body fights back. Watch how cells in the immune system work, and learn about the role of vaccines.

Pre-viewing question

What part of the body fights infection?

Answer: The immune system fights infection.

Post-viewing question

How do T cells and B cells work together to help the body fight off infection?

Answer: T cells identify the pathogen, and B cells produce antibodies, chemicals that help destroy the pathogen. The immune response begins when these cells are activated.