

What Is a Living Thing?: Teacher's Guide

Grade Level: 3-5

Curriculum Focus: Life Science

Lesson Duration: One to two class periods

Program Description

How do biologists classify a new species found in the Galápagos Islands? Segments cover the characteristics that scientists employ to group all plants and animals. *Classification of Living Things* – Explains the system that is based on shared physical characteristics and internal structures. *Characteristics of Living Things* – Highlights seven key functions – movement, sensitivity, respiration, nutrition, growth, excretion, and reproduction. *Classification of Plants* – Takes into consideration how plants absorb water, if they have seeds, and whether they bear flowers. *Classification of Animals* – Looks at different features each animal possesses, such as skeletal structure and method of breathing.

- Classification of Living Things (5 min.)
 - Characteristics of Living Things (5 min.)
 - Classification of Plants (5 min.)
 - Classification of Animals (6 min.)
-

Onscreen Questions

- What information might scientists use to group animals and plants into different species?
 - What are the six kingdoms of classification?
 - What criteria do scientists use to determine an organism's kingdom?
 - How do you think scientists define life?
 - What are the seven processes all living things must have?
 - How might the environment affect a plant's physical characteristics?
 - What criteria do scientists use to classify plants?
 - What similar characteristics might determine animal classification?
 - How do skeleton types and temperature regulation classify animals?
-

Lesson Plan

Student Objectives

- Identify common characteristics of living organisms.
- Define scientific classification.
- Explain how specific organisms are classified.

Materials

- *What Is a Living Thing?* video and VCR, or DVD and DVD player
- Paper and pencils
- Science textbooks, encyclopedias, other Library resources
- Computer with Internet access (optional)

Procedures

1. Begin the lesson by discussing living organisms. Ask your students to tell you what separates a living thing from a nonliving thing. Talk about the characteristics living things share, which is to perform functions necessary to sustain life: movement, sensitivity, respiration, nutrition, growth, excretion, and reproduction.
2. Ask students to think about familiar living organisms: trees, humans, snails, and germs. What do they have in common? How are they different from one another? How do we group them? Tell the class that scientists use taxonomy, a system of scientific classification, to organize all living organisms into groups based shared characteristics. Ask students why scientists might separate living things into categories.
3. Have students fold a sheet of white paper into four even vertical rows. At the top of each row have them write the initials K, W, L, and Q. On a sheet of butcher paper, the overhead projector, or a white board, make a similar chart. Inform students that K stands for "know," W stands for "want to know," L stands for "what I learned," and Q stands for "questions I still have."
4. Have students write everything they know about scientific classification in the column marked K. Make sure they understand that this is not a test, and they will not be graded on what they know or if they make an error. Allow a few minutes to finish writing.
5. Ask for volunteers to share what they wrote. Discuss the information with the class to see if they agree with it, and if so, include it on the class chart.
6. Now have students think about what they would like to learn about classifying living organisms. Give them a few minutes to write in the W column. Discuss what students wrote and include common ideas on the class chart.
7. Tell students that they will watch a program about living organisms and taxonomy. While watching, they should write information they learn about living organisms and taxonomy in the L section of their chart. Play *What is a Living Thing?*, and make sure students are writing on



their charts. Segments are entitled "Classification of Living Things," "Characteristics of Living Things," "Classification of Plants," and "Classification of Animals."

8. After viewing the program, talk about what students wrote in the L column. Look at the class chart and discuss items in the K row. Ask students if any of these statements are incorrect? Look at the W column and discuss whether the show answered any of the class statements. Write answers in the L section of the class chart, as well as new information learned.
9. Talk about what the students would still like to know about scientific classification. Have them write their questions in the Q column, and then discuss the questions. On the class chart, write the questions that most students have.
10. Divide the class into groups of three to five. Have each group find the answers to three or more questions in the Q column. Students may use library or Internet resources. Give students time in class to research their answers or assign as homework. The following Web sites have useful information on scientific classification:
 - ♦ <http://nmml.afsc.noaa.gov/education/taxonomy.htm>
 - ♦ <http://anthro.palomar.edu/animal/default.htm>
 - ♦ <http://homeworktips.about.com/library/weekly/aa101999.htm>
 - ♦ <http://library.thinkquest.org/11771/english/hi/biology/taxonomy.shtml>
11. Have students share their research with the class. Add new information to the L column of the class chart. Discuss how scientific classification groups living organisms. Ask students follow-up questions: What are similarities among plants? What are similarities among animals? What are the necessary functions an organism performs to be considered a living thing?

Assessment

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

- **3 points:** Students created legible, complete KWLQ charts that showed great thought and comprehension of scientific classification; successfully researched answers to three or more questions; and gave a clear explanation of how specific organisms are classified.
- **2 points:** Students created mostly legible, complete KWLQ charts that showed some thought and comprehension of scientific classification; successfully researched the answer to one or two questions; and gave a somewhat clear explanation of how specific organisms are classified.
- **1 point:** Students created illegible or incomplete KWLQ charts that lacked thought and comprehension of scientific classification; were unsuccessful in researching answers to any questions; and were unable to explain how specific organisms are classified.

Vocabulary

adaptation

Definition: The process by which a living organism conforms to its environment

Context: A species' adaptations over time improve its chance of survival.



organisms

Definition: Any living things that can act or function independently

Context: Organisms live in the upper levels of the atmosphere and deep in the oceans.

photosynthesis

Definition: Process through which light energy, water, and carbon dioxide are converted to carbohydrate and oxygen in the presence of chlorophyll

Context: To be classified as a plant, an organism makes its own food through photosynthesis.

species

Definition: A classification of related living organisms that can freely interbreed without complications

Context: The bald eagle was once an endangered species.

taxonomy

Definition: The science of classifying plants and animals into species and logical groups of species

Context: Scientists use taxonomy to group living organisms.

Academic Standards

National Academy of Sciences

The National Science Education Standards provide guidelines for teaching science as well as a coherent vision of what it means to be scientifically literate for students in grades K-12. To view the standards, visit <http://books.nap.edu>.

This lesson plan addresses the following science standards:

- Life Science: Characteristics of organisms; Organisms and environments; Diversity and adaptations of organisms

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:

- Science – Life Sciences: Understands relationships among organisms and their physical environment, Understands biological evolution and the diversity of life
 - Language Arts – Viewing: Uses viewing skills and strategies to understand and interpret visual media
-

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>
-

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 four parts (see below), indicated by video thumbnail icons. Watching all parts in sequence is similar to watching the video from start to finish. Brief descriptions and total running times are noted for each part. 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.

Curriculum Units – These are specially edited video segments pulled from different sections of the video (see below). These nonlinear segments align with key ideas in the unit of instruction. They include onscreen pre- and post-viewing questions, reproduced below in this Teacher's Guide. Total running times for these segments are noted. To play a particular segment, press Enter on the TV remote or click once on the Curriculum Unit title on a computer.

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

I. Classification of Living Things (5 min.)

All living things are categorized in a system of scientific classification. Learn the criteria scientists use to classify organisms and see how an organism gets its scientific name.

II. Characteristics of Living Things (5 min.)

What is the difference between a living organism and a non-living object? Examine the seven key processes that separate all living things from inanimate objects.



III. Classification of Plants (5 min.)

The plant kingdom is one of six categories that classify all living things, but not all plants are alike. Explore the criteria that scientists use to classify plants.

IV. Classification of Animals (6 min.)

Learn about the invertebrates and vertebrates that make up the animal kingdom and discover similarities and differences among animal groups and species.

Curriculum Units

1. Scientific Classification

Pre-viewing question

Q: What do living things have in common?

A: Answers will vary.

Post-viewing question

Q: What characteristics are shared by organisms classified in the two bacteria kingdoms?

A: All the living things in the Archaeobacteria and Eubacteria kingdoms are simple one-celled organisms.

2. Criteria for Classification

Pre-viewing question

Q: Why is scientific classification important?

A: Answers will vary.

Post-viewing question

Q: What do the two words in a scientific name stand for?

A: The first word in a scientific name is an organism's genus; the second is the species.

3. Defining Life

Pre-viewing question

Q: What separates a living organism from a non-living thing?

A: Answers will vary.

Post-viewing question

Q: Which of the seven life processes do you think is most important? Explain your answer?

A: Answers will vary.

4. Vascular vs. Nonvascular

Pre-viewing question

Q: What do you know about plants?

A: Answers will vary.



Post-viewing question

Q: What is the difference between vascular and nonvascular plants?

A: The difference is in how a plant absorbs water. A vascular plant has roots, a stem, leaves, and vascular tissue that carries water and dissolved minerals throughout it. A nonvascular plant has no roots, so it absorbs water through its surfaces.

5. Gymnosperms and Angiosperms

Pre-viewing question

Q: Why do you think some plants produce seeds with protective coverings?

A: Answers will vary.

Post-viewing question

Q: What is the difference between angiosperms and gymnosperms?

A: Gymnosperms and angiosperms are subdivisions of vascular seed plants, but their seeds differ. Angiosperm seeds are enclosed in a seed case; gymnosperm seeds are not enclosed. Most known plants are angiosperms, including all flowering plants.

6. Invertebrate

Pre-viewing question

Q: Name some invertebrates.

A: Correct answers include jellyfish, sponges, worms, snails, crabs, spiders, and insects.

Post-viewing question

Q: Name some invertebrate phyla, or groups.

A: Answers include mollusks (soft-bodies with outer shells), echinoderms (spine-covered skin and internal bony skeletons), arthropods (outer skeleton, jointed appendages, and segmented bodies).

7. Vertebrate

Pre-viewing question

Q: What separates different groups of vertebrates?

A: Answers will vary.

Post-viewing question

Q: What similarities do humans have with other mammals?

A: Like all mammals, humans have a covering of hair and a backbone, and females produce milk to feed their young.