

Teacher's Guide For

Core Biology: Animal Sciences

For grade 7 - College

Programs produced by
Centre Communications, Inc. for
Ambrose Video Publishing, Inc.

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Published and Distributed by...
Ambrose Video Publishing, Inc.
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New York, NY 10036
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<http://www.ambrosevideo.com>

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MATERIALS IN THE PROGRAM

Teacher's Guide -This Teacher's Guide has been prepared to aid the teacher in utilizing materials contained within this program. In addition to this introductory material, the guide contains the following:

- Suggested Instructional Notes
- Student Learning Goals
- Test Questions on Blackline Masters A for duplication and handout to students.

INSTRUCTIONAL NOTES

It is suggested that you preview the program and read the related Lesson Plans, Student Goals and Teacher Points. By doing so, you will become familiar with the materials and be better prepared to adapt the program to the needs of your class. You will probably find it best to follow the programs in the order in which they are presented in this Teacher's Guide, but this is not necessary. It is also suggested that the program presentation take place before the entire class and under your direction. As you review the instructional program outlined in the Teacher's Guide, you may find it necessary to make some changes, deletions, or additions to fit the specific needs of your students. After viewing the programs you may wish to copy the Test Questions on Blackline Masters 1A, and distribute to your class to measure their comprehension of the events.

INTRODUCTION AND SUMMARY OF SERIES

Core Biology: Animal Sciences is a new approach to presenting in an exciting way the core principles of Animal sciences. The series is designed to present *Core Biology: Animal Sciences* in a way that promotes successful student learning. Beginning with Aristotle, and the founding of zoology in 350 B.C., *Animal Sciences* traces the development of zoology over the next two millennium, beginning with the classification of animal species in 1735 and continuing through comparative anatomy, the understanding that all animal life comes from eggs, the theory of evolution, the science of animal behavior and ending with the principles of animal communication.

Below is a list of the program and its segments. Using this program, teachers can create a lesson plan to cover the specific issues, themes and the historical figures mentioned.

Core Biology: Animal Sciences

350 B.C. – Aristotle Founds Zoology

1735 – Carlos Linnaeus Begins the Modern Description of Life

1796 - Comparative Anatomy

1826 – All Animal Life Begins with an Egg
1838 – The Cellular basis of Life
1859 - The Theory of Evolution
1969 – The Five Kingdoms of Life
1973 –The Science of Animal Behavior
1998 - Principles of Animal Communication

LINKS TO CURRICULUM STANDARDS

The design for this series includes the following curriculum correlations: National Science Educations Standards, Content Standard C - Life Sciences (Grades 9-12); California State Content Standards for Biology-Life Sciences: Cell Biology, Genetics, Ecology, Evolution and Physiology (Grades 9-12). The content of this series is based more on the historical evolution of these principles and the people involved in discovering them than on problem solving.

SUMMARY OF SERIES PROGRAMS

Program - *Core Biology: Animal Sciences*

The first program examines the turning points in zoology since its founding by Aristotle.

Segment one looks at Aristotle’s way of examining animals.

Segment two shows how Carlos Linnaeus invented the modern classification of life into a system of genus/species.

The development of comparative anatomy and the fact that all animal life is based a single body plan is discussed in Segment three.

Segment four examines the 19th century questions: how many different kinds of life cycles were there in the animal kingdom? And, how did mammalian life begin?

How all life is made up of cells is examined in Segment five.

Charles Darwin’s Theory of Evolution is discussed in Segment six.

The formation of the five kingdoms of life and what they are is shown in Segment seven.

Segment eight investigates the elusive field of animal behavior.

The principles of animal communication are investigated in segment nine.

350 B.C. – Aristotle Finds Zoology

Student Goals - In this *Core Biology: Animal Sciences* segment the students will learn:

- Aristotle’s classifications of animals was the starting point for the modern system of animal classification

- Why Aristotle’s observations of animals were so important
- Aristotle’s detailed observations, precise descriptions and deductive reasoning were the three cornerstones of the scientific method

1735 – Carlos Linnaeus Begins the Modern Description of Life

Student Goals - In this *Core Biology: Animal Sciences* segment the students will learn:

- Carlos Linnaeus published *Systema Naturae* in 1735, that established a universal system of animal classification
- Linnaeus developed a binomial name for each creature, so that every distinct animal has a genus/species name, such as *Canus/lupus* for the gray wolf
- Linnaeus’s most far-reaching innovation was a brilliant six level grouping: Phylum – Class – Order – Family – Genus - Species
- All the major animal phylum

1796 - Comparative Anatomy

Student Goals - In this *Core Biology: Animal Sciences* segment the students will learn:

- A definition of comparative anatomy founded by Baron George Cuvier
- The French naturalist Baron George Cuvier, put forth the startling idea, that the great diversity of forms found among vertebrate animals was based upon a single body plan
- Concepts that came out of the study of comparative anatomy helped scientists understand the evolution of animals
- Cuvier also showed that all animals have the same basic set of internal organs

1826 – All Animal Life Begins with an Egg

Student Goals - In this *Core Biology: Animal Sciences* segment the students will learn:

- Most animals, like the butterfly, have what is called a complex life cycle – more than one stage of development—a larval and an adult stage
- Mammals, birds, reptiles, dinosaurs and some insects pass through what is called a simple life cycle - the embryo inside the egg develops directly into a juvenile form that resembles the adult
- In 1826 German zoologist Karl Ernst von Baer found the first mammalian egg inside a dog, showing all animal lie begins with an egg

1838 – The Cellular Basis of Life

Student Goals - In this *Core Biology: Plant Sciences* segment the students will learn:

- The single lens microscope by the Dutch lens maker Anton van Leeuwenhoek in the last half of the 17th century would lead to answering the questions about plant cells
- English naturalist Robert Hooke gave the name to cells and described them
- All life is cellular life

1859 – The Theory of Evolution

Student Goals - In this *Core Biology: Animal Sciences* segment the students will learn:

- The results of Darwin's observations on the Galapagos islands would form the basis for the most important book in all biological science: *On the Origin of Species*
- Prior to the development of the science of evolution, the common belief held that all major groups of animals had arisen separately
- The first aspect of the science of evolution stated that life only arose once, so that the great diversity of life found today can be traced back to a single beginning
- That life is adapted to its environment

1969 – The Five Kingdoms of Life

Student Goals - In this *Core Biology: Plant Sciences* segment the students will learn:

- The difference between single cellular and multi cellular life
- The break down of life on Earth and how they are spread throughout the five kingdoms of life
- The largest kingdom is that of animals

1973 –The Science of Animal Behavior

Student Goals - In this *Core Biology: Animal Sciences* segment the students will learn:

- At the beginning of the 20th century a debate emerged over animal behavior: was it programmed in from birth, or was it acquired during the life of an individual animal
- Ivan Pavlov demonstrated that at least some animal behavior was learned
- Konrad Lorenz demonstrated that there was both an innate and a learned component to the eventual behavior of advanced animal species
- The four “whys” of animal behavior was developed by Nikolaas Tinbergen to clarify the understanding of animal behavior
- Animal behaviorists Jane Goodall and Jacques Cousteau popularized animal studies through the use of television

1998 - Principles of Animal Communication

Student Goals - In this *Core Biology: Animal Sciences* segment the students will learn:

- At the close of the 20th century, the study of animal communication was still unsolved
- The animal world is alive with constant communication and information exchange, even simple amoeba communicate with each other
- Animals have means of communication that are not readily available to humans because of sensory differences
- The study of animal communication has become the most complex, and perhaps the most remarkable, study in all of biology
- There are many kinds of animal communication that are not understood by science

Answers to Blackline Master 1A Quiz

1- c; 2-d; 3-a; 4-a; 5- From the top down: Phylum, Class, Order, Family, Genus, Species;

6- d; 7- c; 8- b; 9- c; 10- d; 11- b; 12- d; 13- a; 14- a