

NEWPORT-MESA UNIFIED SCHOOL DISTRICT Course Description

ADVANCED PLACEMENT BIOLOGY

Content covered in Advanced Placement Biology is described in this Course of Study. Based upon student needs, teachers select appropriate materials from the Instructional Materials List and other appropriate up-to-date items. Classroom presentations of course content are determined by the instructor.

Overview:

Advanced Placement Biology is a one-year course equivalent to a college introductory biology course usually taken by biology majors during their first year. General areas included are biochemistry, cells, energy transformation, molecular genetics, heredity, evolution, taxonomy and systematics. Also covered are surveys of the five kingdoms (monerans, protists, fungi, plants, animals), human systems and ecology.

Course of Study Objectives:

- 1. BIOCHEMISTRY:** Students will demonstrate the ability to prepare slides using microtechnique and will understand associated chemical reactions involving atoms, molecules, bonding, functional groups, chemical reactions with coenzymes, cofactors and regulatory processes, carbohydrates, lipids and proteins.
 - 1.1 SUGGESTED STUDENT ACTIVITY:**
 - Associated labs (diffusion and osmosis, molecular biology)
 - Lecture notes
 - Class discussions
 - Textbook
 - 1.2 INSTRUCTIONAL MATERIALS USED:**
 - Textbook
 - Supplementary materials
 - Lab Materials
 - Charts
 - Graphs
 - Student study guides
 - 1.3 TEACHER ACTIVITIES:**
 - Lecture
 - Supervise lab activities
 - Lead discussion
 - Demonstrate lab equipment and techniques
- 2. CELLS:** Students will conduct experiments on cell anatomy, chemistry, physiology, replication and development, and identify the relationships between plant, animal, prokaryotic and eukaryotic cells.

2.1 SUGGESTED STUDENT ACTIVITY:

- Associated lab (enzyme catalysis)

2.2 INSTRUCTIONAL MATERIALS USED:

- Textbook
- Supplementary materials
- Lab Materials
- Charts
- Graphs
- Student study guides

2.3 TEACHER ACTIVITIES:

- Lecture
- Supervise lab activities
- Lead discussion
- Demonstrate lab equipment and techniques

3. ENERGY TRANSFORMATION: Students will produce flow charts tracing the transfer of energy from an inorganic source to an organic base by the use of ATP chemiosmosis and C3 and C4 photosynthesis.**3.1 SUGGESTED STUDENT ACTIVITY:**

- Associated Lab (cell respiration)

3.2 INSTRUCTIONAL MATERIALS USED:

- Textbook
- Supplementary materials
- Lab Materials
- Charts
- Graphs
- Student study guides

3.3 TEACHER ACTIVITIES:

- Lecture
- Supervise lab activities
- Lead discussion
- Demonstrate lab equipment and techniques

4. MOLECULAR GENETICS: Students will demonstrate knowledge of the procedure for reproducing DNA through a semi-conservative process and proteins by translation along with the importance of gene regulation, expression and the effect of mutations, the process of transcription and translation.**4.1 SUGGESTED STUDENT ACTIVITY:**

- Associated Lab (transcription/translation and genetics of drosophila)

4.2 INSTRUCTIONAL MATERIALS USED:

- Textbook
- Supplementary materials
- Lab Materials
- Charts
- Graphs
- Student study guides

4.3 TEACHER ACTIVITIES:

- Lecture
- Supervise lab activities
- Lead discussion
- Demonstrate lab equipment and techniques

5. HEREDITY: Students will observe the inheritance of genetic traits by culturing *Drosophila melanogaster* through several generations, and following the principles of Mendelian genetics, inheritance patterns and human genetic defects.

5.1 SUGGESTED STUDENT ACTIVITY:

- Associated Lab (mitosis/meiosis and genetics of *Drosophila*)

5.2 INSTRUCTIONAL MATERIALS USED:

- Textbook
- Supplementary materials
- Lab Materials
- Charts
- Graphs
- Student study guides

5.3 TEACHER ACTIVITIES:

- Lecture
- Supervise lab activities
- Lead discussion
- Demonstrate lab equipment and techniques

6. EVOLUTION: Students will trace the evolutionary paths of plants and animals and discuss the theories of microevolution and macroevolution over time, stating evidence for evolution, speciation patterns of evolution and use of the Hardy-Weinberg equation.

6.1 SUGGESTED STUDENT ACTIVITY:

- Associated Lab (population genetics and evolution)

6.2 INSTRUCTIONAL MATERIALS USED:

- Textbook
- Supplementary materials
- Lab Materials
- Charts
- Graphs
- Student study guides

6.3 TEACHER ACTIVITIES:

- Lecture
- Supervise lab activities
- Lead discussion
- Demonstrate lab equipment and techniques

7. TAXONOMY AND SYSTEMATICS: Students will learn the principles and procedures of biological taxonomy, be able to use a taxonomic key to accurately identify plant and animal species, and will construct a simple dichotomous key.

7.1 SUGGESTED STUDENT ACTIVITY:

- Associated Lab (preparing and collecting organisms, use of taxonomic keys)

7.2 INSTRUCTIONAL MATERIALS USED:

- Textbook
- Supplementary materials
- Lab Materials
- Charts
- Graphs
- Student study guides

7.3 TEACHER ACTIVITIES:

- Lecture
- Supervise lab activities
- Lead discussion
- Demonstrate lab equipment and techniques

8. SURVEY OF MONERANS, PROTISTS, FUNGI: Students will identify members of the moneran, protista and fungi kingdoms and explain their primary characteristics by the use of phylogeny, adaptations, spore formation and germination, the importance of plant hormones for regulation and response.

8.1 SUGGESTED STUDENT ACTIVITY

- Associated Lab (examining monerans, protists and fungi; practicum)

8.2 INSTRUCTIONAL MATERIALS USED:

- Textbook
- Supplementary materials
- Lab Materials
- Charts
- Graphs
- Student study guides

8.3 TEACHER ACTIVITIES:

- Lecture
- Supervise lab activities
- Lead discussion
- Demonstrate lab equipment and techniques

9. PLANTS: Students will identify various plant species, structures and functions and discuss the flow of materials through their systems. Students will understand the concepts of pollination, fertilization and germination, tropisms and photoperiodicity.

9.1 SUGGESTED STUDENT ACTIVITY:

- Associated Lab (transpiration, plant pigments and photosynthesis, plant structure and functions; practicum)

9.2 INSTRUCTIONAL MATERIALS USED:

- Textbook
- Supplementary materials
- Lab Materials
- Charts
- Graphs
- Student study guides

9.3 TEACHER ACTIVITIES:

- Lecture
- Supervise lab activities
- Lead discussion
- Demonstrate lab equipment and techniques

10. ANIMALS: Students will identify various animals' phyla, classes and orders, and compare and contrast the phylogenic similarities and differences of organisms and their systems. On the cellular level, they will understand tissues, organs and systems, explain gametogenesis development and overall behavior.

10.1 SUGGESTED STUDENT ACTIVITY:

- Associated Lab (circulatory system, system structure and function; practicum)

10.2 INSTRUCTIONAL MATERIALS USED:

- Textbook
- Supplementary materials
- Lab Materials
- Charts
- Graphs
- Student study guides

10.3 TEACHER ACTIVITIES:

- Lecture
- Supervise lab activities
- Lead discussion
- Demonstrate lab equipment and techniques

11.ECOLOGY: Students will learn the principles of ecology, observe and study the ecosystems of natural communities in the field, measure, analyze, compare environmental factors and populations of different habitats, population dynamics, ecosystems and biogeochemical cycles.

11.1 SUGGESTED STUDENT ACTIVITY:

- Associated Lab (behavior habitat selection, dissolved oxygen and primary productivity)

11.2 INSTRUCTIONAL MATERIALS USED:

- Textbook
- Supplementary materials
- Lab Materials
- Charts
- Graphs
- Student study guides

11.3 TEACHER ACTIVITIES:

- Lecture
- Supervise lab activities
- Lead discussion
- Demonstrate lab equipment and techniques

INSTRUCTIONAL MATERIALS**Textbooks:**

Biology, The Study of Life

Invitation to Biology

Modern Biology

Biology, 4th Edition (Campbell) (with Lab Manual & overlay material)

Student Study Guide for Campbell's Biology (Taylor)

Advanced Placement Biology Laboratory Manual (College Board)

Biology, 5th edition (Curtis/Barnes) (with Lab Manual and overlay material)

Audio-Visual Materials:

About time (Film MA2108 and Video VCA375)

Explores the ways in which the lives of man and other organisms are influenced by time.

Acid base indicators (Film MA1588)

Uses the proton-donor theory to interpret the experimental behavior of acid-base indicators. Illustrates, on a modified electrolyte diagram, the changes which take place with buffering action

African Odyssey (Video VCA161)

Conservationists Mark and Delia Owens pursue their scientific studies of lions and brown hyenas in a wildlife park in the South African country of Zambia.

AIDS: Everything you should know (Video VCA343)

Interweaves discussions of social behavior with scientific facts that answers questions about AIDS. Program teaches abstinence as best and only certain protection against the disease.

Alaskan pipe dream: the oil line from the North (Film MA2333)

Explores the impact of the oil pipeline on the ecological well-being of the Alaskan wilderness.

Algae (Rev. ed.) (Video VCA458)

Program examines typical virus forms, assessing their structures and evolutionary development and explains their reproductive processes.

Amazon, land of the flooded forest (Video VCA400)

National Geographic video showing the Amazon River during the wet season. The unusual flooded forest ecosystem is home to a dazzling array of wildlife.

Among the wild chimpanzees (Video VCA433)

National Geographic video looks at two decades of Jane Goodall's work, including her discovery of chimpanzees making and using tools.

And so ends (Film MA2374)

Film is built around a 1911 whaling voyage taken by Robert Cushman Murphy, a prominent naturalist who spent his lifetime trying to prevent the extinction of the whale.

Animal kingdom collection (Exhibit EX137)

Embedment mounts show 12 of the most important phyla in the animal kingdom. Includes: protozoa, sponges, bryozoa, brachiopoda, chordates, arthropoda, mollusca, enchinodermata, etc.

Archeological dating: retracing time (Film MA1793)

Shows how the age of artifacts uncovered in an ancient American Indian pueblo site are determined by such methods as dendrochronology, obsidian hydration, and carbon 14 testing.

Arctic wildlife: struggle for preservation (Film MA2154)

Naturalists Jamie Dailly and Albert Oeming capture live Arctic animals for the preservation of certain endangered species in the Canadian Arctic.

At the crossroads: the story of America's endangered species (Film MA2404)

Explores the struggle for survival engaged in by more than 100 animal species. Presents mistakes of the past which have resulted in the extinction of some species.

The Atom and archaeology (Film MA2204)

Discusses tools of atomic energy that have enabled archaeologists to discover new data about ancient civilizations.

The Back Bay (Film MA1460 and Video VCA490)

Documentary on the natural beauty of the Upper Newport Bay. Interesting study of the ecology of the coastal marshland.

Bacteria (Film MA2546)

Examines the principal forms in which bacteria occur, explores the structure of a bacterial cell, explains its reproductive processes, and documents the importance of bacteria.

Basic ecology series (Films)

Introduces basic concepts in the study of ecology. Illustrates basic ecological principles through the study of a cave and provides historical approach to the ecology of the American prairies.

Cave ecology Film MA1282

Grassland ecology: habitats and change MA1283

Bighorn (Film MA2352)

Portrays the life history and ecology of the Rocky Mountain Bighorn sheep from birth to death, and the relationship of the Bighorn to many other animals in the Rocky Mountain ecosystem.

Biochemistry and molecular structure (Film MA1589)

Discusses the role of molecular structure in determining biological activity.

Biological rhythms: studies in chronobiology (Film MA2469)

Documents experiments designed to discover the source of internal timeclocks, how they affect behavior and efficiency in plants, animals and humans, and how they can be changed.

Biology series [Films and Videos]

Introduces topics in biology -- covering ecology, ecosystems, cell biology, genetics, physiology, behavior, and evolution.

Adaptive radiation: the mollusks MA1553 and VCA457

Angiosperms: the flowering plants MA1554

Bacteria MA1555 and VCA459

Buffalo: an ecological success story MA1516

The Cave community MA1557

The Community MA0400

The Desert MA2089

Diffusion and osmosis MA1774

Distribution of plants and animals MA1558

DNA: molecule of heredity MA1559

Echinoderms: sea stars and their relatives (Rev. ed.) VCA461

Ecology of a hot spring: life at high temperatures MA1359

Evolution of vascular plants: the ferns MA1561

The Eyes and seeing MA1562

The First many-celled animals: the sponges MA1563

The First many-celled animals: the sponges (Rev. ed.) VCA462

Flatworms (platyhelminthes) MA1564 and VCA463

Fungi MA1565

Fungi (Rev. ed.) VCA464

The Galapagos: Darwin's world within itself MA1473

Gene action MA1566

The Grasslands MA1567

The Growth of plants MA1568

Gymnosperms MA1569

Heredity (2nd ed.) MA1028

The High Arctic biome MA2263

Investigating hibernation: the golden-mantled ground squirrel MA1358

The Jointed-legged animals: arthropods MA1570

Meiosis (2nd ed.) MA1025

Mitosis (2nd ed.) MA2264

Origin of land plants: liverworts and mosses MA1571 and VCA465

Parasitism (parasitic flatworms) MA1572 and VCA466

Photosynthesis MA2265

Biology series [cont'd]

The Physical environment MA0401*Plankton and the open sea* MA1573*Population ecology* MA1574*The sea* MA2266*Seed germination* MA1575*Segmentation: the annelid worms* MA1576 and VCA467*Simple plants: the algae* MA1577*The Single-celled animals: protozoa* MA1578*Social insects: the honeybee* MA2267*Stinging-celled animals: coelenterates* MA1579 and VCA460*Succession: from sand dune to forest* MA1580*The Temperate deciduous forest* MA1581*The Tropical rain forest* MA1582*What is a bird?* MA1583 and VCA468*What is a fish?* MA1584 and VCA 469*What is a mammal?* MA1585*What is a reptile?* MA1586 and VCA470*What is an amphibian?* MA0402 and VCA471*What is ecology?* MA1894*Birds of a feather* (Video VCA591)

The African Quelea has a surprisingly complicated life in which critical conditions and timing can cause the death, or birth, of literally millions of birds within a few weeks.

Birth defects: before and after (Slides SLC107)

Medically authenticated set of slides showing serious congenital malformations and the progress which was made after treatment.

Black widow spider (2nd ed.) (Film MA0530)

Shows how to recognize and avoid the potentially dangerous spider. Discusses the life cycle of the black widow and shows ways in which it can be beneficial to man.

Blood: the microscopic miracle (2nd ed.) (Film MA1721)

Scanning electron micrograms and animation provide an accurate look at blood and the role it plays in medicine and modern biology.

The Boundless seas (Film MA2463 and Video VCA377)

Uses animation and live action photography to present information on the physical nature of the ocean and on the utilization of its resources.

California gray whale (Rev.. ed.) (Film MA2486)

Features the biology and history of the gray whale, including documentation of its long migration route.

California nature series (Sound filmstrip FSS548)

Explores the many facets of animal and plant lives, where they are found in California, and how they live. Explains the importance of preserving our natural resources.

Castles of clay (Film MA2500)

Examines the life cycle and ecology of the African termite, its intricate termite hills, and the odd species of animals who prey on the termites and others who make their home within the mound.

Castles of clay (Edited version) (VCA592)

Examines the life cycle and ecology of the African termite, its intricate termite hills, and the odd species of animals who prey on the termites and others who make their home within the mound.

Chapparal: the elfin forest (Film MA0279)

Describes chaparral as a plant community and its role in the interdependence of plant and animal life. Shows what happens when fire destroys the chaparral.

Chastity challenge (Video VCA256)

Presentation by Coleen Kelly Mast teaching chastity from a Biblical perspective.

***A Chemical feast* (Film MA0482)**

Presents an examination of expensive, nonnutritive food supplements and chemical additives. Shows that "creative playfoods" often cost more than chuck steak.

***Cholesterol -- Eat your heart out* (Film MA1908)**

Follows an experiment designed to determine effect of diet on blood cholesterol level of two groups of high school students.

***Classifying living things* (Film MB1030)**

Presents the science of taxonomy -- the science of classifying the many species of living things on earth.

***Clouds over coral reef* (Film MA2130)**

Basically about control of pollution in coastal waters in order not to destroy offshore environments. Discusses specifically the problems in Hawaii.

***Communities of living things* (Film MA1952)**

Covers the six major North American land communities: tropical forest, deciduous forest, desert, grassland, coniferous forest, and tundra. Shows how they support plant and animal life.

***Conquest of giants* (Film MA2378)**

Helps establish the significance of the sequoias in the origin of the conservation ethic. Tells the history of early day California and its relationship to both coast and Sierra sequoias.

***Creatures of the mangrove* (Video VCA033)**

Siarau, a tiny island off the coast of Borneo hosts a complex ecosystem. Shows creatures that have adapted to life between the land and the sea.

***Darwin and the Galapagos series* (Films)**

Explains the Galapagos Islands are dramatic examples of the delicate balance that exists between organisms and their environment. Explores the genius of Charles Darwin and his theories.

Darwin MA2187***Galapagos: islands for evolutionary discovery MA1413******Galapagos: new species from old MA1414******Developing a science fair project* (Sound filmstrip FSS327)**

Discusses science fairs and explains how to develop one using basic research tools and community resources. Shows elements necessary for a good project.

***Dieting: the danger point.* (Film MA1367)**

Examines the physical and psychological dangers of anorexia nervosa and explains how a number of teenagers are willfully starving and overexercising in the pursuit of a slender figure.

***The Dinosaur age* (Film MA1129)**

Discusses the work of paleontologists. Illustrates methods used in locating, uncovering and transporting fossil remains.

***Discover: a science experiment* (Computer software CS117)**

A recent space probe has brought back several new creatures. In this program students become scientists whose job it is to keep the new life forms alive as long as possible.

***Discovering insects, part I: orders* (Film MA1173)**

Insect varieties can be classified into nine basic orders. Helps students learn how to identify and group insects on the basis of wing formation.

***Discovering insects, part II: immature forms* (Film MA1174)**

Close-up photography shows rare glimpses of some immature insects.

***Discovering the cell* (Video VCA704) (added June 23, 1993)**

This National Geographic video uses animation and computer-generated three-dimensional images to highlight information about the cell.

***Diversity of plants (non-seed producers)* (Study print SPS225)**

Illustrates the group of plants which reproduce without the benefit of highly structured organs found in flowering plants.

***Diversity of plants (seed producers)* (Study print SPS226)**

Explores the wonders of nature through fascinating close-ups of plant life - seed bearers.

***A Drop of water* (Film MA1508)**

Explains the water cycle and illustrates the many ways in which water influences living things.

***Eat, drink and be wary* (Film MA1802)**

Gives a critical look at our eating habits and the role advertising plays in food selection.

Ecosystems series (Films)

Adapted from the book, *Living Things and Their Environment* by J.V.A. Conkey, these films describe salient features of particular ecosystems.

Ecosystems: aquatic environment MA0344

Ecosystems: inter-relationships MA0345

Ecosystems: the mountain forest and meadow MA0346

***Elephant* (Video VCA284)**

Illustrates elephant behavior and explores the relationship between elephant and man. Now endangered in Asia and threatened in Africa, the elephant maintains a fragile existence in the wild.

***The Embattled cell* (Film MA1216)**

Presents the dynamics of cell behavior, both normal and cancerous, within the human lung.

***The Energy dilemma* (Film MA1816)**

Gives a good overall view of the problem involving users of energy, power, exhaustible fuels, major pollutants and possible solutions.

***Energy: the nuclear alternative (2nd ed.)* (Film MA1874)**

Presents both sides of the controversies raging over nuclear plant safety following the Three Mile Island accident, and whether nuclear wastes can be disposed of safely.

***Energy: the problems and the future* (Film MA2484)**

Examines the potential of water, wind, earth, and the fire of the sun as possible non-polluting, renewable energy sources. Shows some of these being used in places around the world.

***Erosion: leveling the land* (Film MA1145)**

Examines the surface processes of weathering, erosion and deposition. Studies transference of loosened rock debris from high ground to basin areas, which results in the leveling of land.

***Eternal enemies: lions and hyenas* (Video VCA510)**

National Geographic video tells the story of two species of animals that have long been natural enemies, and dispels many myths about the king of beasts and the evil, scavenging hyena.

***Evidence for the atomic-molecular theory* (Film MA1150)**

Clarifies that matter is composed of molecules and atoms, defines the meaning of an element, a compound and a mixture, and demonstrates chemical reactions of solids, liquids and gases.

***Evidence for the ice age* (Film MA1315)**

Examines geological features which were made by sheets of ice during the ice age. Looks at glacial moraine deposits, polished - striated rock, stray boulders, and abandoned drainage channels.

***Evolution and the origin of life* (Film MA2227)**

Describes the "big bang" theory of the creation of the universe. Presents a comprehensive capsulization of evolution and the origin of life on earth.

***Explaining matter: atoms and molecules* (Film MA1148)**

Shows how atoms combine into molecules to form all materials. Defines and illustrates elements, compounds and mixtures and shows how all matter may be classified into these three groups.

***Explaining matter: chemical change* (Film MA0234)**

Illustrates that a chemical change takes place when atoms from the molecules of two or more materials join with each other to form molecules of entirely different materials.

***Face of the earth* (Film MA0233)**

Portrays Painted Desert, Petrified Forest, Grand Canyon, Zion and Bryce Canyons as illustrations of spectacular geologic formations resulting from the unceasing war between the forces of nature.

***The Fat fighters* (Film MA1801)**

Eight college girls discuss their struggles to lose weight. Psychological reasons for obesity and how viewing one's self objectively can help in permanent weight control is explained.

***Fire* (Film MA0-532)**

Non-narrated, artistic film showing how plant and animal life re-asserts itself after a devastating forest fire.

Fish, moon and tides: the grunion story (Film MA1336)

Describes a unique American fish -- the only fish in the world to spawn on land. Shows the development of the grunion from egg to the hatching stage.

Fish out of water (Film MA0273)

The life cycle of the California grunion shown by time lapse photography. Animated charts describe the grunion's precise timing of the tides for spawning.

For all to enjoy (Film MA1372)

A subtle, tongue in cheek approach to the misuse of our national parks.

From generation to generation: genetic counseling (Slides SLC106)

Explains techniques of genetic counseling. Genetic concepts and patterns of inheritance illustrated by case histories. Discusses Tay-Sachs, sickle cell anemia, Cooley's anemia, etc.

General biology: botany (Transparency TRP129)

14 color transparencies with overlays that illustrate many botanical characteristics. Includes: algae, fungi, angiosperms, stem structure, leaf structure and variations, photosynthesis, etc.

General botany (Study print SPS232)

Depicts various characteristics and cross sections of plants in three dimension: root, stem, bud, leaves and their transformation, flowers, fruits and seeds, etc.

Gorilla (Video VCA026)

Informative and engaging look at the mysterious mountain gorilla of central Africa. In San Francisco, Koko, a lowland gorilla, communicates using American Sign Language.

The Great Barrier Reef (Film MA2173)

Discusses the dilemma of whether or not to introduce new elements into the ecology of the reef in the hope of saving it from a variety of starfish that eats live coral.

The Great dinosaur discovery (Film MA2434)

Follows the work of a paleontologist as he unearths the fossil remains of a new dinosaur (sauropod) larger than any found in the past.

The Greater Sandhill Crane story (Film MB1023)

Traces the intimate story of a pair of cranes courting, nesting, and rearing their young. Shows how researchers have studied and helped this once endangered species.

The Great Whales (Video VCA420)

National Geographic video shows scientists and conservationists as they study and document the anatomy, communication, and migratory patterns of a variety of whale species.

Grizzlies (Video VCA173)

About 900 grizzly bears remain south of the Canadian border. We must learn more about the behavior of these huge and often misunderstood animals if they are to survive.

The Grizzly Bear: a case study in field research (Film MA1251)

Demonstrates various methods used for gathering information on grizzly bears. Shows how studies may save the bear from extinction.

Heritage of splendor (Film MA1461)

Emphasizes the importance of preserving America's great natural resources from the consequences of littering. Narrated by former President Ronald Reagan.

Hibernation and other forms of dormancy (Film MA0232)

Shows the various types of dormancy practiced by certain animals and insects. Includes a sequence showing a ground squirrel as it awakens from hibernation.

The Human body series (Films)

Uses microphotography, endoscopic fiber optics photography and x-rays to show the nine systems of the body, and how the body systems work together.

Circulatory system (2nd ed.) MA1978

Digestive system (2nd ed.) MA1975

Endocrine system MA1979

Excretory system (2nd ed.) MA1997

Muscular system (2nd ed.) MA0561

Nervous system (2nd ed.) MA1980

Reproductive system MA1998

The Human body series (continued)***Respiratory system (2nd ed.)* MA1976*****Skeletal system (2nd ed.)* MA1977*****Systems working together (2nd ed.)* MA1981*****Human Reproduction: Ovulation to Birth* (Video VCA593) (added June 23, 1993)**

Superb microphotography shows release and fertilization of human egg. Shows embryo development until birth.

***The Incredible human machine* (Video VCA027)**

Explores the fascinating microscopic universe that exists within the internal world of the human body, using sophisticated photographic techniques.

***The Infinite voyage - fires of the mind* (Video VCA383)**

Focuses on the mind and the brain. Shows how scientists study the living brain. Program includes dramatic visual scenes of the brain at work.

***The Infinite voyage - the champion within* (Video VCA389)**

Scientists are studying athletes trying to understand how the body works, why bodies gain or lose abilities, and what might be done to prevent or reduce the impact of aging.

***The Infinite voyage - the geometry of life* (Video VCA384)**

Explores the most fundamental building blocks of all life on earth - DNA. Goes beyond the laboratory to give students an exciting look at DNA's impact on the real world around us.

***The Infinite voyage - unseen worlds* (Video VCA381)**

Program gives viewers a look at things as small as the surface of an atom and as large as galactic space. Details state-of-the-art scientific equipment seldom seen outside exotic laboratories.

***Insect collecting* (Filmloop FL272)**

Examples of several methods of insect collecting are shown. Each method fully illustrated.

***Insect mounting* (Filmloop FL273)**

Illustrates methods of mounting several common types and sizes of insects with simple equipment. Close-ups of the actual process are included.

***Insect orders* (Exhibit EX093)**

Nine specimens in a Riker mount illustrate various insect orders.

***Investigating Hibernation: The Golden Mantle Ground Squirrel* (Film MA1358)**

Studies the causes of hibernation and the physiological changes it brings about in the golden-mantled ground squirrel. Shows that animals are born with knowledge and instinct to hibernate.

***An Island in time* (Film MA2090)**

Explores Point Reyes National Seashore to reveal varied ecology and unique geology of this valuable recreational resource. Shows importance of preserving country's coastlands.

***John Muir's High Sierra* (Film MA2235)**

Visualizes selected passages from John Muir's journal of his first trip into the Sierra highlands in 1869. Muir's work made possible the development of our National Parks System.

***Junkdump* (Film MA1343)**

Portrays a day in the life of a family who go about their "normal" activities in the midst of an accumulation of junk. A study of the mounting problem of disposal of solid waste.

***Kodiak Island* (Film MA1920)**

Examines the food chain cycle on Kodiak Island in Alaska where predator and prey have a close relationship.

***Land of the tiger* (Video VCA028)**

Explores the world of the tiger, featuring footage of tigers stalking their prey, caring for their young, swimming, playing and fighting. Shows other animals that share the tigers domain.

***Language of the bee* (Film MA1527)**

Shows some of the experiments which led to the amazing discovery of the language of the bees. Importance of an active, disciplined curiosity in scientific research is emphasized.

Last of the wild series (Films)

Focuses on the preservation of vanishing wildlife. Profiles daily life of an endangered species, showing its evolutionary development, natural surroundings, and prospects for survival.

Dolphins MA2366

Giant constrictors MA2367

The Giraffe MA2365

The Kangaroo MA2368

Zebra and wildebeest MA2369

Learning about animals: the science of zoology (Sound filmstrip FSS7 76)

Defines zoology as a science - the classification of animals, animal anatomy and the physiology of animals. Shows zoologists at work.

Learning about the past: the science of archaeology (Sound filmstrip FSS778)

Defines the science of archaeology, explaining its tools and techniques. Shows archaeologists at work.

Learning about the sea: the science of oceanography (Sound filmstrip FSS779)

Defines oceanography as a science and describes methods of research. Shows oceanographers at work.

Legacy for a loon (Film MB1024)

Describes behavior and life history of the loon including scenes of courtship, nest building, incubation, territorial defense, egg hatching and other animals that are part of the loons environment.

Life cycles (Sound filmstrip FSS166)

Describes stages of amphibian metamorphosis and reptile growth. Shows how mammals grow and change, the lives of birds and the lifespan of fishes.

Life in a tropical forest (Film MA2510)

Surveys the jungles of Cambodia, the Amazon and the Island of Barro Colorado to investigate various forms of animals and plant life found in tropical rain forests.

Life in hot dry lands (California) (Film MA0284)

Describes the fierce battle for survival waged by starving plant life, animals and human beings of the desert who struggle to adapt themselves to a grim existence.

Life in the ocean (Film MA1241)

Describes and illustrates many plants and animals of the California shore, shallow waters and ocean depths, relating them to each other, to the environment, and to similar forms found on land.

The Life of fishes (Sound filmstrip FSS340)

Explores the adaptation of undersea life, the range of undersea life, ecosystems, and survival systems of various fish.

Life on earth series (Videos - each High School has a set)

This captivating series blends scientific data with breathtaking wildlife photography to tell the enthralling story of the development of life.

Program 1 - The Infinite variety

Program 2 - Building bodies

Program 3 - The First forests

Program 4 - The Swarming hordes

Program 5 - The Conquest of the waters

Program 6 - The Invasion of the land

Program 7 - Victors of the dry land

Program 8 - Lords of the air

Program 9 - The Rise of the mammals

Program 10 - Theme and variations

Program 11 - The Hunters and the hunted

Program 12 - A Life in the trees

Program 13 - The Compulsive communicators

***Life on ice* (Video VCA595)**

Extraordinary underwater photography taken in the freezing Arctic Ocean and under massive ice floes follow the food chain of aquatic and terrestrial organisms that have evolved to survive in extreme cold climate.

***Lions of the African night* (Video VCA422)**

National Geographic program that takes a startling look at the behavior of lions as the pride stalks wildebeest, warthog, and zebra in the struggle to fight off hunger. Narrated by Richard Kiley.

The Living Body Series (Videos) (added July 23, 1991)

Accident VCA693

Aging VCA695

Breakdown VCA678

Breath of life VCA685

Coming together VCA690

Decision VCA682

Design for living VCA696

Dream voyage VCA674

Eating to live VCA677

Eyes and ears VCA673

Growth and challenge VCA675

Hot and Cold VCA687

Internal defenses VCA694

Into the world VCA692

Landscapes and interiors VCA671

Life under pressure VCA686

Messengers VCA688

Moving parts VCA680

Muscle power VCA679

Nerves at work VCA681

A New life VCA691

Our talented brain VCA683

Shares in the future VCA689

Skin deep VCA672

Two hearts that beat as one VCA684

Water! VCA67

***The Living cell: an introduction* (Film MA1428)**

Examines the structures and biochemical processes that occur in all living cells. Provides brief background to the discovery of the cell and relates this to the development of the microscope.

***The Living cell: DNA (2nd ed.)* (Film MA1429)**

Illustrates how genetic information contained in the DNA molecule directs the synthesis of proteins in the cell, how information in the DNA molecule is duplicated and passed on to new cells.

***Look before you eat* (Film MA1943)**

Looks at the relationship between eating habits and health. Examines the role of the food industry, fast food chains and vending machines in determining what foods are available.

***The Marine biologist* (Film MA1032)**

Presents scientists at work, permitting the viewer to discover why men and women devote their lives to the study of living things of the sea.

***Marine flowers* (Film MA2474)**

Describes the structures, behaviors and life cycles of coelenterates that have inhabited the seas for at least a billion years. Shows how they live in relationship to other creatures in the seas.

***Mathematics of the honeycomb* (Film MA1380)**

Presents a historical and analytical approach to the honeycomb problem. Shows bees extruding and manipulating wax. Stresses scientific method and bionics.

***Meter, liter and gram* (Film MA1500)**

Introduces the three basic units of the metric systems -- the meter, the liter and the gram.

Explains how other units are derived from these three basic units.

***Miss Goodall and the wild chimpanzees* (Film MA2155)**

Story of Jane Goodall who embarked on a five-year adventure observing the daily lives of wild chimpanzees in an attempt to understand their behavior in relationship to humans.

***Mojave desert: fragile and enduring* (Film MA2146)**

Describes the Mojave Desert and the various kinds of life that exist there. Points out that the desert is vulnerable and easily destroyed by careless people, but is well worth preserving.

***Mollusks and crustaceans of the coastal United States* (CH0 61)**

Mollusks and shellfish from the Atlantic and Pacific Oceans are depicted. Key at bottom of chart gives common and scientific names and in which ocean specimen is found.

***Muscles and bones of the body* (Film MA0153)**

Shows importance of muscles and bones to the internal and external functioning of the human body, how tendons, joints, muscles and bones of the skeleton work smoothly together as a unit.

***Mysteries of mankind* (Video VCA176)**

Scientists use modern technology to search for the elusive early ancestors of modern humans.

***A Nation of spoilers* (2nd ed.) (Film MA1959)**

Discusses the growing disgrace of littering and vandalism of public places and illustrates some of the constructive ways in which young people can improve their communities.

***The Natural history of our world: the time of man* (Film MA2200)**

Traces a series of case studies of animal populations and primitive human cultures that have survived or perished according to their ability to adapt to their environment.

***Nature of life: living things interact* (Film MA1673)**

A stray calf introduces interaction among organisms. The calf is part of a relationship that includes the nitrogen cycle, the carbon cycle, the calcium cycle, parasitism and predation.

***Nutrition: the consumer and the supermarket* (Film MA1887)**

Provides special tips to help the shopper buy for maximum nutritional value at the lowest possible cost.

***Once upon a wilderness* (Film MA1332)**

Shows contrast between American wilderness of a 100 years ago and the environment of today.

Discusses destructive technological alterations wrought by highways and housing developments.

***Panda* (Film MA2558)**

Shows American and Chinese researchers as they work to save the pandas, one of the world's most engaging and elusive animals.

***Penguins of the Antarctic* (Film MA1539)**

Presents emperor and adelic penguins exhibiting their eccentric habits in their Antarctic homeland. Supplies information emphasizing man's positive role in assisting the penguin.

***People of the Amazon* (Film MA2157)**

Highlights the history of the settlement of this area and the life along the Amazon River.

***Photosynthesis and respiration cycle* (Film MA1143)**

Uses animation to show photosynthesis process at microscopic and molecular levels. Discusses the formation of a sugar molecule and explains the concept of releasing energy from food.

***Planet Earth series* (Videos)**

Examines the fundamentals of geophysics, focusing on geologic time, oceanography, climatology, mineral and energy resources, comparative planetology and the earth's future.

Planet Earth: the living machine VCA148

Planet Earth: the blue planet VCA149

Planet Earth: the climate puzzle VCA150

Planet Earth: tales from other worlds VCA151

Planet Earth: gifts from the earth VCA152

Planet Earth: the solar sea VCA153

Planet Earth: fate of the earth VCA154

Planetary construction set: discoveries in science (Computer software CS104)

Graphics packed simulation combines astronomy, physics and biology with experimentation, scientific measurement and classification skills.

The Poisoned sea (Film MA2367)

Carefully documents the response of a complex marine ecosystem to severe sewage pollution and considers methods of repairing the damage.

Pollution: air, land, water, noise (Film MA1346)

Examines the causes and conditions of four types of pollution -- air, land, water, and noise.

Pollution of the upper and lower atmosphere (Film MA1836)

Shows how auto emissions are changing the physical and chemical composition of the atmosphere. Examines the effects these changes have on the earth's climate and man's health.

Pollution solution (Film MA1848)

Discusses how satellites can aid in resolving environmental quality problems, and how they track the path of airborne pollution, and can monitor the dumping of industrial wastes and garbage.

Primal man: battle for dominance (Film MA2392)

Presents the theory that civilization as we know it reflects our submerged and forgotten past.

Shows how man, alone of earth's inhabitants, has the power to reshape himself and his future.

Primal man: the killer instinct (Film MA2393)

Deals with man's instinct for aggression, comparing his patterns of action with animal behavior in the wild. Possibly man's behavior patterns may provide clues to help him cope with his future.

Protective coloration (Film MA1843)

Shows the relationships between an animal's coloration and its habitat and behavior. Discusses camouflage, disguise, warning, coloration and Batesian mimicry.

Protective form and coloration (Exhibit EX094)

Illustrates different adaptations insects have made for protection. Includes: dead leaf butterfly, walking stick, stink bug, Mexican thorn hopper, lace wing, and ambush bug.

Pupfish of the desert (Film MA1741)

Explains how the desert pupfish adapt to environmental changes. Shows the conditions that exist on deserts, especially in isolated areas of Mexico and the southwestern states.

Rain forest (Video VCA430)

National Geographic program presents an astonishing paradox: an ecosystem of spectacular richness sustained by soil unbelievably impoverished. Touches on the destruction of the forest.

The Realm of the alligator (Video VCA035)

This detailed portrait reveals that the alligator, supreme ruler of the peat swamp, is more than cold-blooded and, at night, red eyed -- it is a skilled communicator and even a conscientious parent.

Recycling in action (Film MA1377)

Establishes the need for recycling of solid waste, then shows specifically how certain materials are collected and recycled. Depicts Estancia High School's method of recycling plastics.

Red man and the red cedar (Film MA1644)

Shows how the coastal Indians used the Western red cedar for food, clothing, shelter, transportation and art. Shows relationship of modern Indians to the old culture.

The Redwood trees (Film MA1250)

Provides information about the history, characteristics and ecology of the redwood trees. Shows the socio-economic importance of redwood forests and appreciation of aesthetic value.

The Redwoods (Film MA1280)

Surveys the future of a vanishing forest of *Sequoia sempervirens*, a link to the age of the dinosaurs and a testament to nature's power to create and man's power to destroy.

The Relationship of plants and animals to their environment (Film MA1347)

Shows the relationship of living things to their environment and to each other. Covers environment of six regions: desert, mountain, grassland, forest, cypress swamp, arctic and subarctic.

Reptiles (Film MA1421)

Shows many forms of reptiles from around the world, including the 10-foot monitor lizard of the East Indies and sea snakes on the Great Barrier Reef.

***The Restless sea* (Film MA2112)**

Uses animation to examine various aspects of the sea, including waves and tides, marine life, erosion of land, the nature of the sea bottom, analysis of sea water, and tracing of storms.

***Return of the winged giants* (Film MA1892)**

Tells the history of the Giant Canada Goose and the successful way it has responded to ecological management. Shows the life cycle from spring to fall migration.

***The River must live* (Film MA1275)**

Presents the causes and effects of water pollution and solutions to the problem. Shows an example of what happens when a river is overloaded with more waste than it can absorb.

***Rocky Mountain beaver pond* (Video VCA427)**

National Geographic program shows the beaver as a tireless worker, exceptional parent and highly skilled builder who has earned its reputation as nature's great architect and engineer.

***Save a place for wildlife* (Slides SLC117)**

Explains that maintenance of wildlife habitat is a problem and illustrates various habitats. Depicts some of the traditional ways of fostering habitat and reminds us of the need for preservation.

***Saving our wild animals* (Sound filmstrip FSS720)**

Presents a realistic account of the status of many wild animals, indicating why some have become endangered and what is being done to preserve them.

***Say goodbye: America's endangered species* (Film MA1678)**

Shows how humans are damaging the delicate balance of nature in North America. Rare footage of threatened wild animals challenges us to rethink our role in nature.

***Science fairs* (Film MA1269)**

Objective is to create or increase interest in the study of science through participation in a science fair.

***Science - new frontier series: hungry world* (Film MA1766)**

Examines efforts of scientists to create new foods and improve land productivity. Shows need for changed eating habits and a moderation of population growth in order to avoid a food crisis.

***The Scientific method* (Video VCA348)**

Blending a touch of humor with interesting demonstrations, video shows examples of the scientific method at work in the classroom as well as in professional research and development.

***Scientific method in action* (Film MA1777)**

Defines scientific method, analyzes its six important steps, indicates its historical development and how this method has contributed to the advancement of scientific knowledge.

***The Search for solutions -- a series* (Films and videos)**

Illustrates the variety of means by which scientists in all disciplines may attack problems. Presents nine problem-solving techniques.

The Search for solutions: Adaptation MB1050 and VCA307

The Search for solutions: Context MB1052 and VCA309

The Search for solutions: Evidence MB1047 and VCA304

The Search for solutions: Investigation MB1049 and VCA306

The Search for solutions: Modeling MB1054 and VCA311

The Search for solutions: Patterns MB1048 and VCA305

The Search for solutions: Prediction MB1053 and VCA310

The Search for solutions: Theory MB1055 and VCA312

The Search for solutions: Trial and error MB1051 and VCA308

***Search for the great apes* (Video VCA419)**

National Geographic program features the fieldwork of two dedicated scientists who have sought and found the mountain gorilla and the elusive orangutan.

***A Season in the sun* (Video VCA596)**

East Africa has only two seasons - wet and dry. Program shows how all animals from elephants to snails find ways to survive from season to season. Only the strong of each species will survive.

***Sex respect* (Video VCA347)**

Introduction to the philosophy and need for chastity education from a public health perspective. Advocates abstinence as a solution to the problems of teenage sexuality.

***The Sharks* (Video VCA029)**

Observes sharks around the world and addresses man's fear and hatred of sharks. Offers facts about the shark's anatomy, behavior and vulnerability to people.

***Silent forest* (Film MA1885)**

Beautifully photographed film on the giant kelp beds along the Pacific coastline where thousands of animal species eat, live and die among the towering columns of seaweed.

***Skin: its structure and function* (Film MA1121)**

Examines the functions and structures of skin using scanning electron micrographs and impressive animation. Some skin problems and skin care also discussed.

***Slow as in sloth* (Film MA1381)**

Presents the unusual structure and ecology of the sloth as related factors in its survival. Points to the important relationship between the structure of an animal and its environment.

***Solutions to pollution* (Film MA1348)**

Discusses a few solutions to cleaning up our polluted environment.

***Spiders* (2nd ed.) (Film MA0475)**

Illustrates the distinctive characteristics and habits of spiders, including the spinning of webs and trapping of insects. Shows the marbled spider, the black widow, the tarantula and others.

***Story in the rocks* (Film MA1274)**

Tells how scientists learn about both past and present by studying in rock formations the story of plants and creatures that lived long ago.

***Survival and the senses* (Film MA2491)**

Observations, experiments and animation show how sense organs make animals aware of their environments and determine their behavior. Tells of animal senses which man cannot equal.

***Take time to see* (Film MA0325)**

Presents a musical and visual experience that invites the viewer to leave the pollution and strain and lose himself in nature's glow.

***This land is mine* (Film MA2409)**

Presents a blend of literary excerpts with images they evoke. Portrays the crashing waves of Big Sur immortalized by Robinson Jeffers, Twain's Mississippi, and Teddy Roosevelt's Grand Canyon.

***The Thread of life* (Film MA2113 and Video VCA374)**

Shows the development of the science of genetics, beginning with the cross-pollination experiments by Gregor Mendel through the findings on genes, chromosomes and DNA.

***The Top of the world: taiga, tundra, ice cap* (Film MA1331)**

Suggests what consequences might be should man seek to exploit the natural resources of the northern most area of Canada, Siberia and Alaska, without regard for the balance of nature.

True life adventure series [Disney] (Films and video)

Films in this series deal with a great variety of animal and plant life, their environments, and the survival skills needed for day-to-day living.

The African lion and his realm MA1476

Bear Country MA2003

The Bear family MA1472

Beaver Valley MA2000

The Buffalo: majestic symbol of the plains MA1479

The Deer family MA1484

Elephants and hippos in Africa MA1475

Large animals that once roamed the plains MA1481

Mysteries of the deep MA2038

Nature's half acre MA2004 and VCA235

The Olympic elk MA2070

One day at Teton Marsh MA2071

Pioneer trails, Indian lore and bird life of the plains MA1480

Prowlers of the Everglades MA2079

Seal Island MA2042

Secrets of the ant and insect world MA1138

True life adventure series [Disney] (continued)*Secrets of the bee world* MA1233*Secrets of the plant world* MA1232*Secrets of the underwater world* MA1304*Small animals of the plains* MA1482*Water birds* MA2080*The Weasel family* MA1522*The White wilderness series, part I: the Arctic region and its polar bears* MA2082*The White wilderness series, part II: the lemmings and Arctic bird life* MA2083*The White wilderness series, part III: large animals of the Arctic* MA2084*Wild cat family: the cougar* MA1470*Wild dog family: the coyote* MA1477**The Undersea world of Jacques Cousteau series (Films and video)**

Jacques Cousteau and crew film the fascinating and often dangerous underwater environment of the world's oceans, to study the ecological balance between the sea, animals, plants and man.

Coral jungle MA1319*Desert whales* MA1320*The Green sea turtle* MA1321*Lake Titicaca* MA1322*The Night of the squid* MA1323 and VCA394*Return of the sea elephants* MA1324*Seals* MA1325*Sharks* MA1326 and VCA249*Sunken treasure* MA1327*Those incredible diving machines* MA1328*The Tragedy of the red salmon* MA1740*The Unsinkable sea otter* MA1739*The Water planet* MA1329*Whales* MA1330**Vanishing animals of North America (Sound filmstrip FSS714)**

Discusses extinct animals and others who are becoming endangered. Examines what happens to animals when their environments are harmed and the effects of hunting animals for sport.

Viruses: what they are and how they work. (Video VCA473)

Explains how viruses can invade, alter, and destroy healthy cells. Discusses the viral life cycle, uses of viruses, disease-producing viruses, and antigen-anti-body reactions.

The Wandering dunes (Film MA1889)

Discusses the creation, growth and movement of coastal and desert dunes. Details plant and animal life in the dunes.

Wanted -- alive (Film MA0343)

Shows endangered species of animals and birds. Describes how pollution, use of insecticides, upsetting the balance of nature, along with wanton killing are matters of great concern.

Water birds of the western flyway (Film MA1249)

Identifies several water birds and discusses how adaptation allows many kinds of birds to live together. Describes the interesting nesting activities of a variety of water birds.

Water follies (Film MA0-516)

Animated film shows how common household appliances and routines can waste water. Combines learning and laughter into an excellent vehicle for discussion of water conservation.

Water: fountain of life (Film MA2059)

Uses animation to show the complete water cycle. Includes an explanation of the beginning of life upon the earth and illustrates the processes of evaporation and transpiration.

What's mine is mine (Film MA1727)

Examines the territorial behavior of a variety of animals including lizards, gulls, prairie chickens and wolves.

What's the energy crisis all about (Film MA2384)

Shows experiments in solar, thermonuclear and geothermal systems which can be expanded to provide sufficient energy supplies. Explains how Americans can help in energy conservation.

White throat (Film MA0463)

Visits the Algonquin forest and views the white-throated sparrow in all the sights and sounds of nature. Shows the life of wild creatures, captured on film through many patient hours of waiting.

White Wolf (Video VCA423)

National Geographic journeys to the snow covered slopes of Canada's Ellesmere Island to observe a remarkable pack of white arctic wolves.

Who killed Lake Erie? (Film MA2121)

Presents Lake Erie as an example of man's indifferent destruction of his environment. Shows the pollution of the lake, the results of that pollution and what is being done about it.

Why foods spoil: molds, yeasts, and bacteria (Film MA1151)

Describes molds, yeasts, and bacteria and presents methods of food preservation using heat, cold, and drying. Mentions beneficial and detrimental effects of molds, yeasts and bacteria.

World within worlds (Film MA2559)

Shows how different photographic techniques, such as time-lapse, Kirlian, ultraviolet and micro-photography, can overcome size and time to depict things that were previously invisible.

The Year of the wildebeest (Film MA2557)

Examines the migration of millions of wildebeest in Kenya on their search for grass and water during the dry summer months.

Yellowstone, there is more to see than just Old Faithful. . . (Video VCA231)

Shows the many wonders of Yellowstone National Park - active geysers hot springs, mud volcanoes, miles of rivers and streams, a variety of wildlife and much, much more.