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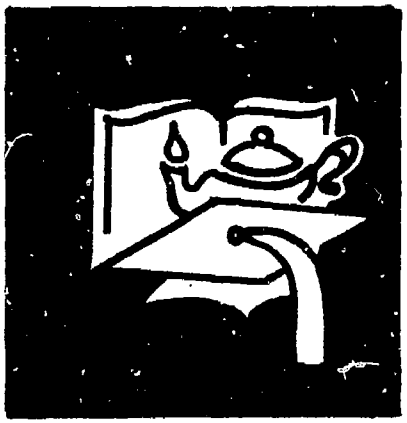
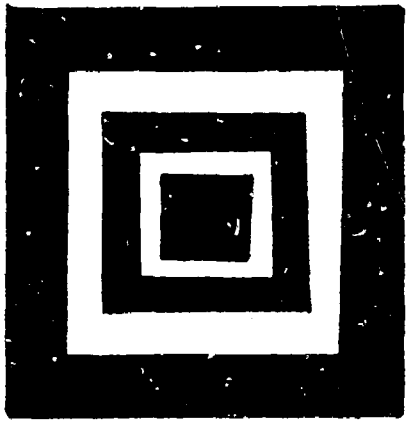
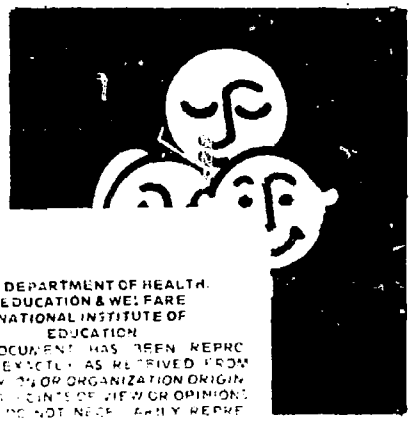
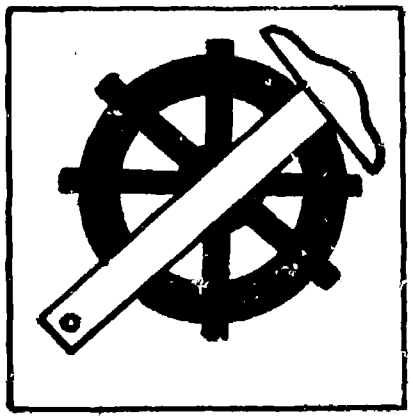
ABSTRACT

The guide is arranged in vertical columns relating curriculum concepts in earth science to curriculum performance objectives, career concepts and career performance objectives, suggested teaching methods, and resource materials. The course for eighth graders attempts to place the curriculum concepts in order of increasing difficulty. Occupational information for 63 different occupations includes job duties, educational requirements, salary range, and employment opportunities. An additional fifteen occupations in the earth sciences are listed. Space is provided for teachers' notes which will be useful when the guide is revised. Appendixes include diagrams, keys to the diagrams, mineral classification tables, audio-visual source information, additicnal sources of career information, selected references, periodicals for career information, and supplementary addresses. (AG)









Career - Curriculum Guide

CAREER EDUCATION CENTER

HARLANDALE INDEPENDENT SCHOOL DISTRICT

3706 ROOSEVELT

SAN ANTONIO, TEXAS 78214

8TH GRADE

EARTH AND LIFE SCIENCE

CAREER EDUCATION CENTER

MR. CHARLES N. BOGGESS, SUPERINTENDENT

MRS. LUCYLLE V. DEASEY, PROJECT DIRECTOR

HARLANDALE INDEPENDENT SCHOOL DISTRICT

SAN ANTONIO, TEXAS

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CURRICULUM GUIDE

EARTH AND LIFE SCIENCE

8th GRADE

Mr. Angelo Russo
Science Consultant

Career Education Center
Harlandale Independent School District
San Antonio, Texas

A C K N O W L E D G E M E N T S

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FOREWORD

"...a book cannot tell you how to be creative. It may cause you to see something differently, or to do something you have not done before, or to understand better what you have been doing all along. At best, a book can only start you off on a way of your own and be a resource to you as you go ahead. It can do little, compared to what you yourself must do."

--Evelyn Wenzel

from "The Come-Alive Classroom" by Cook, Caldwell & Christensen

Dear Teacher:

This curriculum guide has been prepared to help you as you endeavor to fulfill your teaching responsibilities. Please feel free, as you use it, to add your comments, suggestions and constructive criticism in the appropriate column as these will be needed when the guide is revised at the end of the school year. Also any additional resource materials which you think would be beneficial and should be included can be added at your discretion. If I can be of any assistance during the school year, please feel free to contact me at any time.

Mr. Angelo Russo
Science Consultant
Career Education Center
924-8272 or 922-3841

Preface

Meaningful existence is the goal of life in today's world. Living takes on meaning when it produces a sense of self-satisfaction. The primary task of education must be to provide each individual with skills necessary to reach his goal.

When children enter school, they bring with them natural inquisitiveness concerning the world around them. Normal curiosity can be the nucleus which links reality to formal training if it is properly developed. A sense of continuity must be established which places education in the correct perspective. Communities must become classrooms and teachers resource persons. Skills such as listening, problem solving, following directions, independent thinking and rational judgement then can merge into daily living procedures.

In classrooms especially designed to form a bridge between school and the world of work, experiences must be developed. On campus performance in job tasks and skills, following a planned sequence of onsite visitation, will fuse information into reality. Practical relationships developed with those outside the formal school setting will provide an invaluable carry-over of learned skills.

Search for a rewarding life vocation is never easy. Without preparation it becomes a game of chance. With a deliberate, sequential, and planned program of development, decisions can be made based upon informed and educated judgements.

A full range career education program, K-12, will offer opportunities for participants to enter employment immediately upon completion of training, post secondary vocational-technical education, and/or a four-year college career preparatory program.

C. N. Boggess

C. N. Boggess, Superintendent
Harlandale Independent School District

The Career Education Project has been conducted in compliance with the Civil Rights Act of 1964 and is funded by a grant from the U. S. Office of Education and the Texas Education Agency.

Philosophy

It is becoming increasingly apparent that a thorough familiarity with basic scientific principles is necessary to live as an informed citizen in today's highly technological society and those who lack this understanding and appreciation will no doubt contribute little to future scientific progress. One of our primary objectives is to provide all students with not only knowledge in the conceptual domain but also in the affective and psychomotor as well, for we believe in the total development of each child to his fullest potential.

Preparation for life must be as broad as possible so as to allow the individual to possess the necessary information upon which to base his life's decisions. A critical decision, and one not to be taken lightly, is the selection of a life's work. We are attempting, for the first time, to provide not only subject matter preparation but career preparation as well. To be well-versed in a subject and know little about it's usefulness, application and significance is to be ill-equipped for modern living.

Hopefully as the students climb our conceptual ladder in the academic realm they will simultaneously be preparing themselves for a specific career or occupation. Upon graduation from the high school, a clear and definite plan for future endeavors will have already been formulated and the means for the fulfillment of those plans will be evident. Whether they are going to college, a technical school or directly entering the world of work, success will be virtually assured.

In the preparation of this curriculum guide a sincere attempt has been made to place the various curriculum concepts in order of increasing difficulty rather than in the order of their appearance in the textbooks. To facilitate their location in the texts, these concepts are listed in the table of contents along with their location in the text. The textbooks adopted by the Harlandale Independent School District are entitled Focus on Earth Science by Bishop, Lewis and Bronaugh and Focus on Life Science by Heimler and Lockard.

Table of Contents

Note: Page numbers in parentheses indicate location in the textbook.

Table of Contents

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Earth Science

RRICULUM CNCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
EARTH SCIENCE -Introduction -Definition of Earth Science -Origin of the earth -Theories and scientists	The student should be able to: 1. Define accurately the study of the planet earth. --Land masses, seas, and the atmosphere. 2. Explain, using ancient myths, legends and tales, how man first attempted to explain his environment. 3. State, in his own words, the three theories which are put forth to explain the origin of the earth. 4. Match correctly, with 80% accuracy, a list of ten scientists with their theories.	CONCEPT: Relationship of earth study to the occupations in the earth sciences OBJECTIVE: The student should be able to list at least ten different occupations which involve the earth sciences.	<u>OCCUPATIONS IN THE EARTH SCIENCES</u> 1. Geographer 2. Mineralogist 3. Lapidarist 4. Geologist 5. Geophysicist 6. Mining Occupations 7. Seismologist 8. Surveyor 9. Meteorologist 10. Oceanographer 11. Hydrologist 12. Geodesist 13. Cartographer 14. Astronomer 15. Aerospace Engineer

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. From a teacher-prepared list of early scientists, have the students do library reports. Students can be assigned a scientist or draw names. 2. Have the students seek information from the library about early myths which illustrate the ideas of ancient men of science. Reports can be either oral or written. 3. Using a poster board or felt board, define or outline earth science and the major areas of study. Pictures could also be used effectively to illustrate each area of study. 4. Show and discuss the filmstrip entitled The Earth is Born (#201) which is available from the Life Educational Materials Program. Cost=$7.00 5. Using the discussion method, study gravity and the gravitational force of the earth. Include Newton's law of gravitation and have the students solve, as a class exercise, some basic problems involving gravity. **CAREER:** 1. Have a career contest among the students in class to see who can list the most occupations in the area of earth science. A first, second and third place certificate can be awarded to the winners or they may be exempted from a future homework assignment as a prize. 2. Have the students bring in a brief description of an occupation in the earth sciences obtained from a person actually in that occupation. The first ten students to do so may be granted extra credit at the discretion of the teacher.	**CURRICULUM:** ESC REGION 20: Film: #4156 The Earth-It's Structure **CAREER:** SCHOOL LIBRARY OR COUNSELOR'S OFFICE: Dictionary Of Occupational Titles Occupational Outlook Handbook Encyclopedia Of Careers	

URRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
THE EARTH -Shape and size -Layers -Latitude -Longitude -Time zones	The student should be able to: 1. Label each of the major layers of the earth on a cross-sectional diagram and approximate the thickness of each layer. 2. When given two global outlines, draw the lines of latitude on one and the lines of longitude on the other. 3. When given a map of the United States, outline generally the different time zones. 4. Define, in his own words, the following terms: a. meridian b. international date line c. prime meridian d. equator e. axis	CONCEPT: Relationship of latitude and longitude to the work of a cartographer. OBJECTIVE: The student should be able to write a short paragraph stating his reasons for wanting or not wanting to be a cartographer.	CARTOGRAPHER (GEOGRAPHER) 1. Geographers study the spatial characteristics of the earth's terrain, minerals, soils, water, vegetation and climate. Most geographers specialize in one main branch or more of geography. Geographers in the field of cartography design and construct maps as well as compile data from them. About 15% of the 7,000 geographers in 1970 were women. 2. The minimum requirement for beginning positions is a bachelor's degree with a major in the field. New graduates usually find positions connected with making, interpreting or analyzing maps; or in research, either working for the government or in industry. 3. Geographers having the bachelor's dedegree and no experience started at $6,548 or $8,098 a year, depending on their college record. Geographers having one or two years of graduate training could start at $8,098 or $9,881; and those with the Ph.D. could begin at $11,905. 4. The outlook for geographers is expect-to be favorable through the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Using an overhead projector and prepared transparencies, illustrate the layers of the earth. Two such transparencies are available from the Life Educational Materials Program: ES-10509 The Earth's Interior ES-10510 The Earth's Crust 2. Show and discuss the filmstrip entitled The Not-So Solid Earth (#215) available from the Life Educational Materials Program. 3. Have the students bring in pictures for a bulletin board depicting the earth as it is seen from space or the moon. 4. Demonstrate, using a globe, the lines of latitude and longitude. 5. As a class exercise have the students do exercise #9 entitled The Globe in the Workbook for Modern Earth Science which accompanied the previously adopted textbook. 6. Have the students plan a hypothetical jet plane trip to illustrate the change in time zones showing departure and arrival times. 7. Have the students do exercise #11 entitled Longitude and Time and exercise #12 entitled Time Belts in the Workbook for Modern Earth Science which accompanied the previously adopted textbook. **CAREER:** 1. Invite a local cartographer to class to discuss his occupation. One should be available from the city planning department. 2. Have the students write to the American Geographical Society for further career information.	**CURRICULUM:** ESC REGION 20: Film: #4156 The Earth-It's Structure #8230 Latitude, Longitude And Time Zones HARLANDALE AUDIO-VISUAL CENTER: Filmstrip: H-67 Latitude, Longitude And Time **CAREER:** ESC REGION 20: Films: #4389 Map Skills-Using Different Maps Together #4826 Maps Of Our World HARLANDALE AUDIO-VISUAL CENTER: Filmstrips: AA-64 Latitude And Longitude H-68 Maps, Globes And Graphs SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #185 Geographers Occupational Outlook Handbook **WRITE TO:** American Geographical Society Broadway at 156th Street New York, New York 10032	

RICULUM NCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
-Matter -Structure of matter -States of matter -chemical -physical -Mixtures and compounds	The student should be able to: 1. Draw correctly the atomic configurations of at least ten atoms selected by the teacher. 2. Differentiate orally between an atom and a molecule. 3. Draw accurately a sketch which represents what happens to the molecules of a substance when it changes from one state to another. 4. Contrast accurately, in a short paragraph, elements, compounds and mixtures.	CONCEPT: Relationship of the knowledge of matter to the work of a middle school science teacher OBJECTIVE: The student should be able to state orally at least three reasons why he or she would not select science teaching as a life's work.	SECONDARY SCHOOL SCIENCE TEACHER 1. Besides giving instruction, secondary school teachers plan and develop teaching materials, develop and correct tests, keep records and make out reports, consult with parents, supervise study halls and perform other duties. More than one million teachers were employed in public and private secondary schools in 1970-71. 2. In every state, a teaching certificate is required. About 1/3 of the 4-year college course is devoted to a major subject while 1/6 of the time is spent in education courses, including student teaching in an actual school situation. At least one year of graduate training is required for most supervisory and administrative positions. 3. The average annual salary for all classroom teachers in public secondary schools was about $9,540 in 1970-71. In Alaska, California and New Mexico average salaries were $11,400 or more. Teachers of vocational education, physical education, and other special subjects often receive higher salaries than others. 4. A slowing of enrollment growth in secondary schools is expected during the 1970's. Most teaching positions will result, therefore, from the need to replace the large number of women teachers who leave the profession for family responsibilities.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS

CURRICULUM:

1. Using a set of wooden atoms and molecules, demonstrate the physical and chemical properties of matter.

2. Using chalkboard models, teach the structure of the atom. Emphasize the particles and the charges involved.

3. Show and discuss the film entitled Our Friend the Atom which is available from the Harlandale Audio-Visual Center.

4. As a demonstration or class activity do exercise #16 entitled Physical and Chemical Changes in the Workbook for Modern Earth Science which accompanied the previously adopted textbook.

5. Have the students read and write a short summary of the Life Educational Reprint entitled The Nature of the Atom.

6. Show and discuss the filmstrip entitled The Atom which is available from the Life Educational Materials Program.

7. Have a spelling bee type of contest using the chemical symbols. A small prize could be awarded to the winners.

CAREER:

1. Discuss your own experiences as a secondary science teacher and tell the students why you chose this occupation.

2. Have interested students listen to a cassette tape dealing with the occupation of secondary school teacher.

3. Have interested students write to the American Federation of Teachers for further career information.

CURRICULUM:

ESC REGION 20:
- Films: #8603 Electrons At Work
  #8605 Evidence For Molecules And Atoms
  #4852 Explaining Matter-Molecules In Motion
  #4851 Explaining Matter-Chemical Change

HARLANDALE AUDIO-VISUAL CENTER:
- Films: 16-172 The World Of Molecules
- Filmstrips: A-78 Atoms And Molecules
  A-80 Classification Of Matter

CAREER:

HARLANDALE AUDIO-VISUAL CENTER:
- Cassette Tape: Cas T-35 High School Teacher
- Filmstrip: T-85 Education And The Teacher

SCHOOL LIBRARY OR COUNSELOR'S OFFICE:
- SRA Occupational Brief #5 High School Teacher
- Dictionary Of Occupational Titles
- Occupational Outlook Handbook

WRITE TO:

American Federation of Teachers
1012 Fourteenth Street, N W
Washington, D.C. 20005

ICULUM CEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
-Minerals -Characteristics and crystal patterns -Identification of minerals -luster, streak, hardness, etc. -Composition of minerals	The student should be able to: 1. List all of the major characteristics used in identifying minerals. 2. Draw accurately a diagram of each of the six crystal systems. 3. Identify, using the laboratory method, twenty common minerals giving the characteristics of each. 4. State orally the difference between silicates, carbonates and oxides.	CONCEPT: Relationship of mineral study to the work of a mineralogist OBJECTIVE: The student should be able to state orally at least three duties or activities of a mineralogist.	MINERALOGIST 1. Mineralogists examine, analyze and classify minerals, gems and precious stones as well as isolate specimens from ore, rocks or matrices. They also perform physical and chemical tests and make x-ray examinations to determine composition and type of crystalline structure. 2. Young people seeking professional careers in geology should plan to earn an advanced degree. The master's degree is required for beginning research and teaching and for most positions in exploration. 3. New geology graduates with a bachelor's degree earn about $8,650 in private industry. New graduates with a master's average about $10,500 a year. Starting salaries for those with a Ph.D. average about $12,000 a year. 4. Employment for geologists with advanced degrees is expected to be favorable through the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Using a teacher-prepared display, show and discuss the five characteristics of minerals. 2. As a small group exercise display several kinds of rocks and have the students examine and classify them. 3. Have the students perform any of the following laboratory exercises which are located in the Workbook for Modern Earth Science which accompanied the previously adopted textbook: a. Hardness-Exercise 19 b. Specific Gravity-Exercise 20 c. Common Rock-Forming Minerals-Exercise 21 4. As a class demonstration grow some crystals. Then allow the students to grow their own crystals. 5. Have the students make a collection of the common minerals found in the locality. 6. Show and discuss the film entitled John Wesley Powell-Canyon Geologist which is available from the United States Geological Survey. 7. Show and discuss the filmstrip entitled Minerals of the Earth's Crust which is available from Ward's Natural Science Establishment, Inc. **CAREER:** 1. Invite a local geologist from an oil company or local college to class to discuss his work. 2. Have interested students write to the U. S. Geological Survey for further career information.	**CURRICULUM:** ESC REGION 20: Film: #8630 Minerals And Rocks-Stones Of The Earth **CAREER:** SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #184 Geologists Dictionary Of Occupational Titles Occupational Outlook Handbook **WRITE TO:** U. S. Geological Survey Department of the Interior Washington, D.C. 20242	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
GEOLOGY -Rocks and minerals -Igneous rock -origin, texture, classification, and composition -Rock bodies -batholiths, dikes, sills and laccoliths -Volcanism	The student should be able to: 1. Describe briefly but accurately, the origin of igneous rock. 2. When presented with five igneous rocks, identify all of them by the laboratory method. 3. Match correctly, the terms batholith, dike, sill and laccolith with their definitions.	CONCEPT: Relationship of igenous rock and it's formation to the occupations in the oil-producing industry OBJECTIVE: The student should be able to list at least two occupations in the oil industry that he might consider seriously as a life's career.	PETROLEUM GEOLOGIST 1. Petrologists study the structure, composition and history of rock masses. They apply their findings to such fields of investigation as causes of formations, weathering, chemical composition and origin or causes of metamorphosis. Almost 50% of the nearly 29,000 geologists in the United States work for private industry--more than half of them for the petroleum and natural gas industry, and many of the remainder for the mining industry. 2. A bachelor's degree with a major in geology is considered the minimum entrance requirement for a career in geology. A desire to work outdoors, a willingness to travel almost anywhere as well as a good record in high school science and a good scientific imagination are essential. 3. The median salary for geoscientists is $14,900. The beginning salary with a B.S. degree and no experience is about $720 a month. The beginner with a master's degree can expect to earn about $165 more than that. 4. Although in recent years there has been a shortage of openings, the long term outlook is for continuing expansion of career opportunities for those with graduate degrees.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. To introduce the study of rocks, present a teacher-prepared bulletin board illustrating the cycle of rock changes as it appears on page 86 of the textbook. 2. Show and discuss the filmstrip entitled Materials of the Earth's Crust to teach the origin, texture, mineral composition and special characteristics of common igneous rocks. 3. Show and discuss the film entitled Eruption of Kilauea which is available form the United States Geological Survey. 4. Have the students do laboratory exercise #20 entitled Igneous Rocks in the Workbook for Modern Earth Science which accompanied the previously adopted textbook. 5. At the end of the study of igneous rocks, have the students take a lab practicum in which they attempt to identify common igneous rocks. **CAREER:** 1. Ask a petroleum geologist from a local oil company to come to class to discuss his work. 2. Have interested students write to the American Geological Institute for further career information. 3. Have interested students use SRA Occupational Brief #184 to prepare a report on the work of a geologist.	**CURRICULUM:** ESC REGION 20: Film: #8809 Rocks That Originate Underground HARLANDALE AUDIO-VISUAL CENTER: Film: 16-349 Rocks for Beginners **CAREER:** SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #184 Geologists Dictionary Of Occupational Titles Occupational Outlook Handbook **WRITE TO:** American Geological Institute 2201 M Street N W Washington, D.C. 20037	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
-Sedimentary rock -Weathering -Clastics and non-clastics -Fossils	The student should be able to: 1. Differentiate orally or in writing, to the satisfaction of the teacher, between the various types of sedimentary rock and describe briefly the formation of each. 2. List the products of weathering and explain how each is formed. 3. Compare clastics with non-clastics and list at least two examples of each. 4. State orally and accurately, the difference between fossils.	CONCEPT: One occupation which uses rock related materials is that of marble setter or tile setter. OBJECTIVE: The student should be able to list at least two reasons why he would or would not like to be a marble or tile setter.	MARBLE SETTER, TILE SETTER AND TERRAZZO WORKERS 1. Craftsmen in each of these trades work primarily with the materials indicated by their job title. These workers are usually assisted by a helper who mixes mortar or cement, sets up scaffolds, supplies the setter with materials, grouts the joints after the setting is completed and cleans up afterward. These setters are employed mainly in new building construction and in the large metropolitan areas. About 30,000 of these employees were working in 1970. 2. A 3-year apprenticeship program is the best way to learn each of these trades according to those in the field. Substantial numbers of setters, however, learn their skills as helpers or by instruction from experienced craftsmen. A high school education or it's equivalent is desirable and after 6000 hours of on-the-job training one is qualified. 3. Union minimum hourly wage rates for terrazzo workers averaged $6.46; for marble setters, $6.29; and for tile setters, $6.08; on July 1, 1970. 4. Employment in this occupation is expected to increase moderately through the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have the students bring in pictures for a bulletin board displaying the different types of weathering including caves, cracks in the pavement, trees and plants growing through rocks, etc. 2. Have the students do laboratory exercise # 21 entitled Sedimentary Rocks in the Workbook for Modern Earth Science which accompanied the previously adopted textbook. 3. Have class demonstration and discussion using a display of fossils prepared by the teacher. 4. At the conclusion of the study of sedimentary rocks have the students take a lab practicum in which they attempt to identify many different sedimentary rocks. 5. As a class exercise have the students make fossils from plaster of Paris or wax and clay 6. Show and discuss any of the following filmstrips which are available from the Life Education Materials Program: a. Reptiles Inherit the Earth (#205) b. Age of Mammals (#206) CAREER: 1. Invite a local mason or tile setter to class to display some of his tools and equipment and to discuss his work. 2. Have interested students write to the Bricklayers, Masons and Plasterers' International Union for further career information.	CURRICULUM: ESC REGION 20: Films: #8630 Minerals And Rocks--Stones Of The Earth #8639 Rocks That Form On The Earth's Surface CAREER: Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: Bricklayers, Masons and Plasterers' International Union of America 815 15th Street N W Washington, D.C. 20005	

RRICULUM ONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
-Metamorphic rock -Origin, formation and composition of metamorphic rock -Foliated and non-foliated rocks	The student should be able to: 1. State orally what is meant by metamorphic rock. 2. Match correctly the following terms with their definitions: a. migmatites b. thermal metamorphism c. dynamic metamorphism d. contact metamorphism 3. When given five metamorphic rocks, identify all of them by the laboratory method. 4. When presented with a list of five foliated rocks, state orally a use of each one.	CONCEPT: Relationship of the different types of rock and it's formation to the occupation of a heavy machine operator OBJECTIVE: The student should be able to list at least one advantage and one disadvantage of being a heavy machine operator.	HEAVY MACHINE OPERATOR 1. These engineers operate and maintain various types of powerdriven construction machinery. These include power shovels, cranes, derricks, hoists, pile drivers, concrete mixers, paving machines, trench excavators, bulldozers, tractors and pumps. An estimated 310,000 operating engineers were employed in 1970. 2. Most authorities recommend completion of a three year apprenticeship as the best way to qualify as a journeyman operating engineer. This apprenticeship usually consists of at least 6,000 hours of on-the-job training. 3. Wages vary according to the machine being operated, the type of construction and the location of the job. Crane operators, who generally are among the highest paid machinery operators, had minimum hourly rates ranging from $4.70 in Birmingham, Alabama to $8.35 in Trenton, New Jersey. 4. Employment of construction machinery operators is expected to increase rapidly through the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Using the filmstrip entitled Metamorphic Rocks available from Ward's Natural Science Establishment Inc., introduce the unit on the origin and composition of metamorphic rocks. 2. Using a diagram drawn on the chalkboard, explain the cycle of changes which rocks undergo to become metamorphic, sedimentary and igneous. 3. Have the students do laboratory exercise #25 entitled Metamorphic Rocks in the Workbook for Modern Earth Science which accompanied the previously adopted textbook. 4. As a class exercise present groups of students with samples of metamorphic rock and have them separate them into foliated and nonfoliated rocks. 5. As a class exercise have a spelling bee type of contest using common geological terms. Winners can be presented with a certificate or prize of some sort. 6. Have the students each make a collection of all three types of rocks studied. CAREER: 1. Invite a local heavy machine operator to class to discuss his occupation. 2. Have interested students listen to and report on the magnetic tape entitled Your Future as a Construction Machinery Operator. 3. Have interested students read and report on SRA Occupational Brief #285 entitled Construction Machinery Operators.	CURRICULUM: ESC REGION 20: Film: #8639 Rocks That Form On The Earth's Surface CAREER: HARLANDALE AUDIO-VISUAL CENTER: Magnetic Tape: MT-208 Your Future As A Construction Machinery Operator SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #285 Construction Machinery Operators Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: Associated General Contractors of America 1957 E Street N W Washington, D.C. 20006	

ICULUM ICEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
-Ores -Metals nonmetals in the earth -Gems	The student should be able to: 1. When given a list of twenty elements, correctly state, with 85% accuracy, whether they are metals or nonmetals. 2. List at least three nonmetallic ores and give the industrial use of each. 3. State orally the reason some stones are classified as precious while others are classified as semiprecious. 4. When presented with a list of gems, identify with 90% accuracy, the source of each gem.	CONCEPT: Relationship of the knowledge of gems and precious stones to the work of a jeweler or lapidarist OBJECTIVE: The student should be able to state orally why he would or would not enjoy being a jeweler or lapidarist.	JEWELER 1. Jewelers are skilled craftsmen who make or repair rings, pins, necklaces, bracelets, and other precious jewlery. They create jewelry from metals such as gold, silver, and platinum, and set precious and semiprecious stones. 2. Young persons learn the jewelry trade either by serving a formal apprenticeship or through informal on-the-job training while working for an experienced jeweler. Formal apprenticeship in this trade takes from three to four years. This apprenticeship is supplemented by trade school instruction in design, quality of precious stones, chemistry of metals and other related subjects. 3. National earnings data are not available for jewelers and jewelry repairmen. However, information from retail jewelry stores and repair shops indicated that beginning pay for jewelers and repairmen ranged from $80 to $120 a week in 1970; experienced workers earned up to $250 weekly. 4. Employment opportunities for jewelers and jewelry repairmen are expected to show little change through the 1970's. However, several hundred openings will arise annually because of retirements and deaths among experienced workers.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Using a set of sixty colored mineral photographs available from Eckert Mineral Research, have the students identify minerals, ores and gems presented by the teacher. 2. Have a lapidarist visit the class to demonstrate how stones are polished and cut. 3. As a demonstration illustrate the various properties of metals and make a comparison to nonmetals. 4. Have the students do a library report on a metal or a non-metal selected from a teacher-prepared list of topics. 5. Have the students write to any of the ore companies in the State of Texas or the United States and give a brief report on the information gained. Several of these companies are listed in the appendix. 6. Show and discuss the film entitled The Minerals Challenge which is available form the Bureau of Mines. 7. As an outside project have the students attend the local gem show which is generally held in March of each year. **CAREER:** 1. Invite a local jeweler to class to show some of the kinds of work he does and to discuss his career. 2. Have interested students write to the Gemological Institute of America for further career information.	**CURRICULUM:** ESC REGION 20: Film: #4128 Conserving Our Mineral Resources Today **CAREER:** SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #200 Jewelers Dictionary Of Occupational Titles Occupational Outlook Handbook **WRITE TO:** Gemological Institute of America 11940 San Vincente Boulevard Los Angeles, California 90049	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
-Fuels -Coal, oil and natural gas	The student should be able to: 1. List and compare, in a short paragraph, the basic kinds of coal. 2. Explain orally how petroleum, coal and natural gas are formed and deposited beneath the surface of the earth. 3. Name at least four products which rely upon petroleum for their manufacture. 4. Discuss, in a short paper, what is meant by the energy crisis. Also tell what may be done to solve this problem.	CONCEPT: Relationship of the knowledge of the mineral fuels to the work in mining occupations OBJECTIVE: The student should be able to state orally at least two reasons why he would or would not want to be a miner.	<u>MINING OCCUPATIONS</u> 1. The mining industry is a major supplier of the basic raw materials and energy sources required for industrial and consumer use. The mining aspect of this industry is the smallest division, employing about 620,000 wage and salary workers in 1970. About 43% of these workers are employed in the exploration and extraction of crude oil and natural gas. Coal mining accounts for about 23% of the industry's workers and quarrying and nonmetallic mineral mining nearly 19%. The remainder are employed in mining metal ores. 2. Nearly 70% of all workers in mining are employed in blue-collar jobs such as miners and mine laborers, mining machine operators and truck and tractor drivers. The industry's white collar employees are divided nearly equally among three occupational groups--professional and technical, clerical and managerial workers. Workers in the mining industry have a wide range of education. Most workers in nonprofessional jobs begin as helpers. 3. In 1970 earnings of nonsupervisory employees in oil and gas exploration averaged $153.87 a week, or $3.75 an hour. This compares with average earnings of $133.75 weekly or $3.36 an hour for all production workers in manufacturing establishments. 4. Employment in mining is expected to decline slowly through the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Make a class display illustrating the different types of coal along with the uses of each. 2. Have the students research the areas where coal, oil and natural gas are found and ask them to draw a diagram illustrating their findings. 3. Have the students collect newspaper and magazine articles dealing with the energy crisis. An award or prize can be given to the student collecting the most articles. 4. Using library reference materials or other sources, have the students prepare a list of man-made products made from fuels such as plastics, rubber, etc. **CAREER:** 1. Show and discuss the film entitled Roughnecks which is available from Region 20. 2. Have interested students research and report on SRA Occutional Brief #51, #207, and #194 which deal with miners and mining occupations. 3. Have interested students write to the American Mining Congress for further career information.	**CURRICULUM:** ESC REGION 20: Film: #4157 The Earth-Resources In It's Crust **CAREER:** ESC REGION 20: Film: #8946 Roughnecks SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #51 Coal Miners SRA Occupational Brief #207 Mining Engineers SRA Occupational Brief #194 Mining Workers, Metal Dictionary Of Occupational Titles Occupational Outlook Handbook **WRITE TO:** American Mining Congress 1200 Eighteenth Street N W Washington, D.C. 20036	

RICULUM NCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
METEOROLOGY -Atmospheric composition and structure -troposphere, ionosphere, etc. -Air pressure and velocity	The student should be able to: 1. List the names and percentages of the four major gases found in the atmosphere and indicate the uses of each. 2. Contrast, in a short paragraph, the operation of an aneroid barometer with a mercury barometer. 3. Compare and contrast the five layers of the atmosphere and list the characteristics of each layer.	CONCEPT: Relationship of the atmospheric layers to the work of an air traffic controller OBJECTIVE: The student should be able to list two reasons why he or she would consider being an air traffic controller.	AIR TRAFFIC CONTROLLER 1. Air traffic controllers give instructions, advice and information to pilots by radio to avoid collisions and minimize delays as aircraft fly between airports. When directing aircraft, traffic controllers must consider weather, geography, the amount of traffic, as well as the size, speed and other characteristics of aircraft. 2. Controllers enter the field through the Federal Civil Service system after passing both physical and written examinations. Applicants are given approximately 9 weeks of formal training after which they qualify for a basic air traffic control certificate. At an FAA center, they receive additional classroom instruction and on-the-job training. Only after they have the demonstrated ability to apply procedures and use equipment under pressure and stress may they work as controllers. This usually takes 2-3 years. 3. Depending on the amount of traffic and the length of time on the job, air traffic controllers can earn between $827 and $1,480 a month. In addition, traffic controllers are eligible for wage increases at prescribed intervals. 4. Total employment of air traffic controllers is expected to increase moderately through the 1970's despite the greater use of automated equipment.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Using a transparency or a chalkboard drawing have students prepare a notebook drawing of the five layers of the atmosphere indicating the chemical composition of each layer. 2. Using any or all of the following audio-visual materials, discuss the atmosphere and it's composition: a. Filmstrip: Canopy of Air (#204) available from the Life Educational Materials Program. b. Reprint: Canopy of Air (#37) also available from the Life Educational Materials Program. c. Transparency: How Air Was Created (#ES-10515) Transparency: How Air Is Replenished (#ES-10516) available from the Life Educational Materials Program. 3. Have the students, using their textbooks or other sources, prepare a chart of the atmosphere showing the temperatures and composition of gases by percentage. 4. Have the students do laboratory exercise #58 entitled The Atmosphere in the Workbook for Modern Earth Science. **CAREER:** 1. Invite a local air traffic controller to class to discuss his occupation. 2. Show and discuss any of the filmstrips dealing with the careers found at the airport. 3. Have interested students write to the Air Traffic Control Association for further career information.	**CURRICULUM:** ESC REGION 20: Films: #4155 The Earth-It's Atmosphere **CAREER:** HARLANDALE AUDIO-VISUAL CENTER: Filmstrips: BB-57 Metropolitan Airport BB-58 Air Passenger Service BB-59 Air Cargo Service BB-60 Air Safety BB-61 Airport Workers BB-62 Community Airport SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #345 Air Traffic Controllers Dictionary Of Occupational Titles Occupational Outlook Handbook **WRITE TO:** Air Traffic Control Association 525 School Street S W Washington, D.C. 20024	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
-Elements of heat -Conduction, convection and radiation -Solar radiation -Seasons	The students should be able to: 1. Contrast, in a short paragraph, the terms conduction, convection and radiation. 2. Indicate on a global map the different zones such as the north temperate zone, south temperate, etc. 3. Write a sentence using each of the following terms correctly: a. temperature b. centigrade c. fahrenheit 4. Explain orally, to the satisfaction of the teacher, what causes the seasons.	CONCEPT: Knowledge of heat transfer is important to the heating serviceman. OBJECTIVE: The student should be able to list two reasons why he would or would not consider being a heating serviceman.	HEATING MECHANIC 1. Heating mechanics work on heating equipment used in homes, offices, schools and other buildings. Major occupations in this field are furnace installer, oil burner mechanic and gas burner mechanic. Many workers are skilled in more than one of these trades. These mechanics work mainly for dealers and contractors who specialize in selling and servicing heating equipment; fuel oil dealers; and gas utility companies. 2. Most heating mechanics start as helpers and acquire their skills by working for several years with experienced mechanics. As helpers gain experience, they are given progressively more complicated tasks. A growing number of employers prefer high school graduates with mechanical aptitude, an interest in electricity and a good physical condition. 3. In 1970 straight-time hourly rates for skilled mechanics ranged from about $3.25 to $7.00. Skilled mechanics earned between two and three times as much as unexperienced helpers. Rates of pay for helpers and mechanics depended on factors such as level of skill, type of equipment worked on and geographic area. 4. Employment of heating mechanics is expected to increase very rapidly through the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. As a teacher demonstration illustrate the three different types of heat transfer. 2. Show and discuss the filmstrip entitled The Sun's Awesome Impact (#220) which is available from the Life Educational Materials Program. 3. As a teacher demonstration and using a globe, illustrate the causes of the four seasons. 4. Show and discuss the filmstrip entitled Causes of the Seasons which is available from ESC Region 20. 5. Have the students plan and develop a bulletin board which depicts the different zones of the earth indicated by different colors. CAREER: 1. Have interested students do a research report about the occupation of heating mechanic using the Dictionary of Occupational Titles and the Occupational Outlook Handbook. 2. Have interested students write to the National Fuel Oil Institute for further career information. 3. Invite a local heating mechanic to class to discuss his occupation.	CURRICULUM: HARLANDALE AUDIO-VISUAL CENTER: Film: 16-107 The Nature Of Heat Filmstrips: K-51 How We Measure Heat K-53 Heat And Temperature-Molecular Energy CAREER: SCHOOL LIBRARY OR COUNSELOR'S OFFICE: Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: National Fuel Oil Institute Education Department 60 East 42nd Street New York, New York 10017	

RRICULUM ONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
GENERAL ATMOSPHERIC CIRCULATION -Air circulation -Wind systems -easterlies, westerlies, polar winds, etc. -Weather systems -fronts, thunder-storms, tornadoes, hurricanes and mon-soons -Local climate	The student should be able to: 1. Define or contrast, in a short statement, weather and climate. 2. When given a global out-line, indicate with arrows the locations and direc-tions of the major wind systems. 3. Read and interpret, to the satisfaction of the teacher, a weather map. 4. Compare, using tempera-tures, wind directions and velocities, local climatic changes on a daily or weekly basis.	CONCEPT: Relationship of wind and weather systems to the work of an airline officer OBJECTIVE: The student should be able to describe, in a short essay, the instruments and work of an airline officer.	AIRLINE PILOT OR COPILOT 1. Both captain and copilot must do a great deal of planning before their plane may take off. They confer with the company meteorologist about wea-ther conditions and they prepare a flight plan along a route and at alti-tudes which offer conditions for a safe, fast and smooth flight. The copilot plots the course and computes the flying time between various points. Before take-off they check the operation of all the engines and instruments. 2. To do any type of commercial flying, pilots and copilots must be licensed by the FAA. To qualify for a license, applicants must be at least 18 years old and have at least 200 hours of flight experience. Before a person may receive any license or rating, he must pass a physical examination and a written test given by the FAA cover-ing subjects such as principles of safe flight operations, Federal avi-ation regulations, navigation, radio operation and meteorology. 3. Captains and copilots are among the highest paid wage earners in the Nation. Those employed by scheduled airlines averaged about $30,000 to $37,000 a year although their earn-ings depend on factors such as the type, size and speed of the planes they fly, the number of hours of flight time and their length of ser-vice. 4. A rapid rise in the employment of pilots is expected through the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS

CURRICULUM:

1. Using a globe illustrate air circulation to the class. Be sure to include the Cariolis force.

2. Using the chart entitled Winds of the Earth conduct a class discussion about the major wind systems. This chart is available from Scott, Foresman and Co., Dallas, Texas. (Chart #A2464)

3. Have the students do laboratory exercise #59 entitled Winds in the Workbook for Modern Earth Science.

4. Have the students watch the local daily TV forecast and make a list of all the symbols used by the meteorologist.

5. As a class demonstration, show how various weather instruments such as a barometer, rain gauge and anemometer are used.

6. Have the students do any of the following laboratory exercises in the Workbook for Modern Earth Science:
   a. #62 Air Masses
   b. #63 Station Models

CAREER:

1. Invite a local airline pilot or copilot to class to discuss his job.

2. Have interested students listen to a magnetic tape or a cassette tape dealing with occupations in the airline industry.

3. Have interested students write to the Airline Pilot's Association International for further career information.

CURRICULUM:

ESC REGION 20:
Films: #8596 Climates Of North America-From The North Pole To The Tropic Of Cancer
#2065 The Great Weather Mystery
#8287 North America-The Continent
#8634 Origins Of Weather

HARLANDALE AUDIO-VISUAL CENTER:
Films: 16-596 Lightening And Thunder
16-13 Atmosphere And It's Circulation
Filmstrip: H-70 Air And The Weather

CAREER:

HARLANDALE AUDIO-VISUAL CENTER:
Cassette Tape: Cas T-39 Commercial Pilot
Cas T-28 Stewardess
Magnetic Tape: MT-255 Your Future As A Commercial Airlines Pilot

SCHOOL LIBRARY OR COUNSELOR'S OFFICE:
SRA Occupational Brief #31 Airline Pilots

WRITE TO:

Airline Pilot's Association International
1329 E Street, N W
Washington, D.C. 20004

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
-Cloud formation -Types of clouds -Mechanism of precipitation	The student should be able to: 1. Explain orally how clouds are formed. 2. Draw a sketch depicting the different types of clouds such as cirrus, cumulus, stratus, etc. 3. When given an outline of the United States indicate the five rainfall zones from east to west. 4. Define, in his own words, such terms as front, relative humidity and isobar.	CONCEPT: Relationship of clouds and precipitation to the work of a weatherman OBJECTIVE: The student should be able to write a short paragraph about the training required to be a meteorologist.	WEATHERMAN (METEOROLOGIST) 1. Meteorologists attempt to describe and understand the atmosphere's constituents, motions, processes and influences. Synoptic meteorologists (weather forecasters) are the largest group of specialists in this field. They interpret current weather information and make short and long-range forecasts for specific regions. Some still prepare and analyze weather maps but most interpret data from computers. 2. A bachelor's degree with a major in meteorology is the usual minimum educational requirement. For research and teaching and for many top-level positions in other meteorological activities, an advanced degree is essential. 3. In 1970 meteorologists with a bachelor's degree and no experience could start in Federal government service at $8,292 or $10,258 a year. Those with a master's could start at $10,258 or $11,526 a year. 4. The employment outlook for civilian meteorologists is expected to be favorable through the 1970's. In addition to opportunities resulting from the rapid growth expected in this profession, several hundred new meteorologists will be needed to replace those who transfer to other fields, retire or die.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have the students bring in pictures of various types of cloud formations to be used for a bulletin board. Those bringing in the most pictures in a given time may be awarded extra credit at the discretion of the teacher. 2. Take the students outside the school building to identify different cloud formations. Have them sketch the types they see in their notebooks. 3. Show and discuss the filmstrip entitled Castles in the Sky which is available from Ward's Natural Science Establishment, Inc. 4. As a class demonstration, use a prism to illustrate how rainbows are formed. 5. Divide up the class bulletin board into the different types of precipitation and have the students bring in pictures of the different types. Teams can be selected. The team with the most illustrations and pictures can be awarded a prize of some sort. CAREER: 1. Invite a local weatherman to class to talk about careers in meteorology. 2. Show and discuss the film entitled Weather Scientists which is available from the Harlandale Audio-Visual Center. 3. Have interested students research the career of weatherman using SRA Occupational Brief #256 available in the school library or counselor's office. 4. Have interested students write to the American Meteorological Society for further career information.	CURRICULUM: ESC REGION 20: Films: #4816 The Clouds Above #8732 What Makes Clouds? HARLANDALE AUDIO-VISUAL CENTER: Film: 16-175 What Makes Rain? CAREER: HARLANDALE AUDIO-VISUAL CENTER: Film: 16-381 Weather Scientists SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #256 Meteorologists Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: American Meteorological Society 45 Beacon Street Boston, Mass. 02108	

RRICULUM ONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
-Hydrologic cycle -Composition of the ocean	The student should be able to: 1. Explain, in a short paragraph, the hydrologic cycle and why it is significant. 2. Prepare a list of the most common elements in solution in sea water derived from land deposits, water, and the atmosphere. 3. Explain, in his own words, what is meant by desalination.	CONCEPT: An important resource of the ocean is it's supply of valuable fish used for food. A commercial fisherman contributes much to our food supply. OBJECTIVE: The student should be able to describe, in a short paragraph, the advantages and disadvantages of being a commercial fisherman.	COMMERCIAL FISHERMAN 1. A fisherman's life varies according to the kind of prey he seeks. Offshore or deep-sea fishermen may remain at sea or on rather large vessels for weeks at a time, depending on how large their catch is or whether their ship has refrigeration to store the catch temporarily. Fishermen may have to work for hours in the salty spray, and the work of loading, packing and sometimes cleaning the fish can be very strenuous. When not fishing, fishermen usually have other duties aboard the ship. 2. Courage, expert seamanship, mechanical ability, physical strength and a good business sense are the primary requirements for the fisherman today. Although there are no formal educational requirements for fishermen, there is an increasing enrollment in special short courses such as general seamanship, navigation, meteorology, communications, boatbuilding and maintenance, scientific commercial fishing and marketing. 3. The seasonal nature of the job makes it hard to estimate yearly earnings. Captains can earn $15,000 a year or more; fishermen in a good year can earn more than $10,000. 4. Fishing is still a big industry, but it has been declining in recent years. It is hoped that measures to reverse this trend will be successful.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have students draw a sketch of the hydrologic cycle in their notebooks. They can use their textbooks as a reference. 2. Have the students do laboratory exercise #55 entitled The Earth's Water in the Workbook for Modern Earth Science. 3. Have the students do the small group experiments dealing with the hydrologic cycle found on page 205 in the textbook. 4. As a laboratory exercise have the students boil sea water and attempt to recover and measure the salt in it. 5. Using a feltboard create a display illustrating the chemical composition of sea water along with the percentages of each element. 6. Have the student write to the Dow Chemical Co, Freeport, Texas to ask for information about how magnesium is taken from the sea. 7. Have students do a research report dealing with the most recent efforts of desalination. 8. Show and discuss the film entitled The Restless Sea which is available from the Bell Telephone Company. CAREER: 1. Invite a commercial fisherman to class to discuss his work. 2. Have interested students research the occupation of fisherman using SRA Occupational Brief #49. 3. Have interested students write to the National Fisheries Institute for further career information.	CURRICULUM: HARLANDALE AUDIO-VISUAL CENTER: Film: 16-236 The Water Cycle CAREER: SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #49 Fishermen Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: American Tunaboat Association 1 Tuna Lane San Diego, California 92101 National Fisheries Institute 1225 Connecticut Avenue, N.W. Washington, D.C. 20036	

RRICULUM ONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
ADVANTAGES OF THE OCEAN AS A HABITAT FOR LIVING ORGANISMS -Ocean life -Food chains	The student should be able to: 1. Use the following terms correctly in a sentence: a. plankton b. benthos c. nekton 2. Draw a schematic diagram of a food chain found in the ocean. 3. List at least two reasons why the ocean is such a favorable habitat for many animals.	CONCEPT: Relationship of ocean life to the work of a marine biologist OBJECTIVE: The student should be able to list the minimum requirements to become a marine biologist and state why he would or would not like to be one.	MARINE BIOLOGIST 1. The marine biologist studies marine organisms, their development and their adaptations. He is concerned with the physiological and biochemical processes in marine organisms and the relationships between them and their environment, both biotic and physical. 2. The minimum educational requirement for employment as a marine biologist is almost always a college degree. Employment possibilities expand, both in civil service and institutional positions, for those who hold a master's degree. The marine biologist must be able to work alone and without supervision as well as be able to work as part of a team when necessary. In addition, he must record and analyze data, write reports and papers, and be able to present his reports and findings in talks to groups. 3. Pay rates for beginners in the occupation vary from the pre-doctoral fellowship stipend of about $3,400 a year (half-time work) to $7,456 a year for a full time entry worker in government. University professors and research marine biologists receive from $18,000 to $26,000 a year. 4. Marine biology is a scientific area in which vast and rapid growth is probable. Increased exploration of the sea will require the services of many new workers in this field.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have the students prepare a bulletin board depicting the three types of ocean life-plankton, nekton, and benthos. 2. As a class project, construct a food chain of the ocean. Drawings made by the students of plant and animal life could be used in the chain. 3. Have the students bring in pictures of products which are produced from the sea. Examples: agar, cuttlebone, etc. 4. Show and discuss the filmstrip entitled Creatures of the Sea available from Life. CAREER: 1. Invite a local marine biologist to class to discuss his work. 2. Have interested students research the occupation of marine biologist using Occupational Brief # 188 entitled Oceanographers. 3. Have interested students write to the American Institute of Biological Sciences for further career information.	CURRICULUM: HARLANDALE AUDIO-VISUAL CENTER: Film: 16-17 Beach And Sea Animals CAREER: SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #188 Oceanographers Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: American Institute of Biological Sciences 3900 Wisconsin Ave., N.W. Washington, D.C. 20016	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
OCEANOGRAPHY -Size and shape of the ocean basins -Ocean floor -mapping with sonar and radar -Trenches, ridge and faults -Deep-sea deposits sediment, ooze, reefs	The student should be able to: 1. Define correctly the following terms: a. continental shelf b. continental slope c. trench d. abyssal plain e. rift zone f. volcanic peaks g. ridges 2. Describe orally how the depth of the ocean is determined using echo sounding and seismographic surveys. 3. Describe, in a short paragraph, what deep-sea deposits include.	CONCEPT: Relationship of the knowledge of the ocean basins to the work of a geological oceanographer OBJECTIVE: The student should be able to describe at least two activities engaged in by a geological oceanographer.	GEOLOGICAL OCEANOGRAPHER 1. Some oceanographers may collect and study data on the ocean's tides, currents, waves, mountain ranges and valleys. They also may study its temperature, density, and acoustical properties; its sediments; its sub-bottom; its shape; its interactions with the atmosphere, and marine plants and animals. 2. The minimum educational requirement for beginning professional positions is the bachelor's degree with a major in oceanography, biology, a geoscience, one of the other basic sciences, math or engineering. For higher level positions, graduate training is required. 3. Oceanographers in 1970 having the bachelor's degree and no experience could begin at $8,292 or $10,258 a year. A person with a master's degree could start at $10,258 while a person with a Ph. D. could begin at $13,096. 4. Employment opportunities for those having advanced degrees in oceanography--especially the Ph. D. degree--are expected to be favorable through the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS

CURRICULUM:

1. Have the students draw a sketch of the ocean basin labeling the major features such as the shoreline, the continental shelf, the continental slope, etc.

2. Prepare a bulletin board of all the terms used in the unit on oceanography. Have the students make construction paper cut-outs of the features studied and add them to the bulletin board.

3. Use a number of the suggestions contained in the Teacher's Ocean Science Study Kit. This is available from the U.S. Naval Oceanographic Office, Washington, D.C.

4. Using a blank teacher-prepared chart of the oceans and major seas, have the students complete the chart with reference to size, shape, depth, unusual features, etc.

5. Have the students do laboratory exercise #56 entitled Construction of a Profile of the Atlantic and Pacific Oceans in the Workbook for Modern Earth Science.

6. Have each student prepare an oral report on some book, article or story related to the sea.

7. Show and discuss the filmstrip entitled The Miracle of the Sea or Coral Reef. These are available from Life.

CAREER:

1. Invite a geological oceanographer from a local college to class to speak about his work.

2. Have interested students write to the American Society of Limnology and Oceanography for further career information.

CURRICULUM:

ESC REGION 20:
Films: #2026 Challenge Of The Oceans-Oceanography
#8106 The Earth-It's Oceans
#2136 Oceanography At Work-Diamonds Under The Sea
#2198 Treasure Under The Sea

HARLANDALE AUDIO-VISUAL CENTER:
Filmstrips: C-44 Miracle Of The Sea
C-99 Plants And Animals Under The Sea
K-92 Wealth In The Ocean

CAREER:

ESC REGION 20:
Film: #4181 Exploring The Ocean

SCHOOL LIBRARY OR COUNSELOR'S OFFICE:
SRA Occupational Brief #188 Oceanographers

Dictionary Of Occupational Titles

Occupational Outlook Handbook

WRITE TO:

American Society of Limnology and Oceanography
W. K. Kellogg Biological Station
Hickory Corners, Michigan 49060

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
CIRCULATION OF OCEAN WATER -Local currents -Waves and tides -Ocean and tidal currents	The student should be able to: 1. Differentiate, using a drawn diagram, between spring tides and neap tides. 2. Compare in a short statement, deep water waves and shallow water waves. 3. Draw a picture of a wave and correctly label the following: a. crest b. trough c. wave length d. wave base 4. From a prepared map label the major ocean currents of the world.	CONCEPT: Relationship or ocean waves and tides to the merchant marine occupations OBJECTIVE: The student should be able to list at least two advantages and two disadvantages of a career in the merchant marines.	MERCHANT MARINE OCCUPATIONS 1. The U.S. Flag Merchant Fleet employed about 42,000 officers and seamen in mid-1970, more than 90% of whom were on freighters and tankers. About one-fourth of the jobs are filled by officers. The remaining jobs are filled by skilled, semiskilled and unskilled seamen. 2. No educational requirements are established for jobs in the merchant marine industry, but a good education is a definite advantage. Formal officer training is conducted at the U.S. Merchant Marine Academy at 5 State academies, and through programs operated by trade unions. 3. Earnings aboard American flag deep-sea ships are the highest of any Nation in the world. In few other industries can an ambitious young man with a high school education or less do so well financially: A seaman can receive base and overtime earnings of nearly $800 a month, in addition to free food and lodging. Most officers earn over $1,100 a month. 4. Except during periods of war and national emergency, there has been a long-term decline in the number of men and vessels in our merchant marine, and more of the same is expected through the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have the students do the laboratory exercise entitled Ocean Currents in the Workbook for Modern Earth Science. 2. Show and discuss the filmstrip entitled Mighty Currents of the Sea. This is available form Life. 3. Have the students keep a log of the tides in their notebooks for a week. 4. Show and discuss the film entitled Ocean Tides-Bay of Fundy which is available form ESC Region 20. CAREER: 1. Show and discuss the film entitled Navigation-Tool of Discovery which is available from ESC Region 20. 2. Have interested students read SRA Occupational Brief #53 entitled Merchant Seamen. 3. Invite a merchant seaman to class to discuss his occupation.	CURRICULUM: ESC REGION 20: Films: #8805 Ocean Tides-Bay of Fundy #8769 Tides Of The Ocean-What They Are And How The Sun And Moon Cause Them #8814 Waves On Water HARLANDALE AUDIO-VISUAL CENTER: Film: 16-399 Tides Of The Ocean CAREER: ESC REGION 20: Film: #8697 Navigation-Tool Of Discovery SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #53 Merchant Seamen Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: National Maritime Union of America 36 Seventh Ave. New York, New York 10011	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
SHORE LINES AND THE OCEAN FLOOR: -Shore deposits -Beaches and barrier islands	The student should be able to: 1. Define, in his own words, the terms barrier, lagoon, spit, and bar. 2. On a map of the United States or of North America, locate barrier islands in the Atlantic Ocean and the Gulf of Mexico.	CONCEPT: Relationship of shorelines to the work of a longshoreman OBJECTIVE: The student should be able to list at least two duties or activities of a longshoreman.	LONGSHOREMAN 1. There now about 60,000 longshoreman in the U.S. They are usually hired as members of a crew accustomed to working together since teamwork is most important in this job. Today much of the loading and unloading of cargo is done by machines but some still involve heavy hand labor. 2. The most important characteristics the dock worker should have are alertness and a willingness to cooperate with others. The beginning longshoreman learns his work on the job. It is work which demands a great deal of physical strength and endurance. The manner of getting a permanent job as a longshoreman varies according to past customs, but usually union membership is a necessity. 3. The hourly earnings of longshoreman vary according to the area in which they work. Most longshoremen's salaries on the west coast are in excess of $9,000 yearly. 4. Job opportunities for longshoremen depend partly on world trade activity. While the current employment level seems fairly stable, competition for unskilled jobs of all kinds is increasing.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have a class discussion concerning the origin of the shorelines, beaches and barrier islands. 2. Have the students locate and label some of the barrier islands of the Atlantic Ocean and the Gulf of Mexico. 3. Show and discuss the film entitled The Beach-A River of Sand which is availbale form ESC Region 20. CAREER: 1. Invite a local longshoreman to class to discuss his work. If one is not available, perhaps a retired dock worker could be used. 2. Have interested students write to the International Longshoremen's & Warehousemen's Union for further career information. 3. Have interested students do a research report on this career using the SRA Occupational Brief or the Occupational Outlook Handbook.	CURRICULUM: ESC REGION 20: Film: #8792 The Beach-A River Of Sand CAREER: SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #104 Longshoremen and Stevedores Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: International Longshoremen's & Warehousemen's Union (Independent) 150 Golden State Ave. San Francisco, California 94102.	

RRICULUM ONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
-Artesian water, springs and seeps -Zone of saturation -Movement of ground water -Composition of water -Water tables -Underground water and limestone deposits	The student should be able to: 1. Distinguish, in a short paragraph, between zone of aeration and zone of saturation. 2. Differentiate orally, to the satisfaction of the teacher, between artesian water, springs and seeps. 3. Use correctly in a sentence the following terms: a. aquifer b. geyser c. water table d. mineral springs e. hot spring 4. Explain briefly and orally, the difference between hard and soft water.	CONCEPT: Water is perhaps the most important compound in nature. To insure delivery of an adequate supply for consumption is part of the job of a water meter repairman. OBJECTIVE: The student should be able to list at least two duties of a water meter repairman.	WATER METER REPAIRMAN 1. This worker disassembles, cleans, adjusts and repairs water meters. He may test for accuracy of recording both residential and large capacity meters in industrial plants. He may also at times install meters and read them as well. 2. Metermen begin their jobs as helpers in the meter testing and meter repair departments of utility companies. A basic knowledge of electricity is desirable. About four years of on-the-job training are required before one becomes fully qualified. Some companies have a formal training program for this occupation. 3. The average daily hourly earnings for metermen depend of the type of job they have and the area of the country in which they work. The following table indicates average salaries per hour: District representative.....$5.18 Meterman A.....$4.97 Meterman B.....$4.44 4. Some job openings will occur each year to replace those leaving this occupation but in general, opportunities will probably be limited.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS

CURRICULUM:

1. Using an overhead transparency or a chalkboard drawing, illustrate water under the surface of the earth.

2. Prepare a class display depicting different types of soils and rocks that compose water tables.

3. Place the names of the different types of underground water sources on a bulletin board and have the students bring in pictures of each type. A prize can be awarded to the students who bring in the most pictures.

4. Bring in samples of water with varying degrees of hardness. Have the students experiment to discover the effect of this water on grease, soap, etc. Demonstrate how hard water can be softened.

5. Have the students do a research report on one of the following topics:
   a. geysers
   b. aquifers
   c. water tables
   d. mineral springs
   e. hot springs, etc.

6. If possible conduct a field trip to caves, caverns and other sources of underground water.

7. Have the students bring in newspaper articles dealing with the problems of the Ranch Town Aquifer.

CAREER:

1. Invite a local meter repairman to class to discuss his job.

2. Have interested students do a research report about this career using the Dictionary of Occupational Titles or the Occupational Outlook Handbook.

CURRICULUM:

ESC REGION 20:
Film: #8693 The Edwards Story

HARLANDALE AUDIO-VISUAL CENTER:
Films: 16-636 Geysers And Hot Springs
16-236 The Water Cycle

CAREER:

SCHOOL LIBRARY OR COUNSELOR'S OFFICE:

Dictionary Of Occupational Titles

Occupational Outlook Handbook

Encyclopedia Of Careers

WRITE TO:

International Brotherhood of Electrical Workers
1200 15th Street N.W.
Washington, D.C. 20005

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
WATER MASSES AND CIRCULATION -Erosion and runoff -Streams, rivers, and lakes -River deposits -Glaciers -origin and location -Glacial deposit	The students should be able to: 1. List at least five factors which affect runoff. 2. State orally the difference between arid, semi-arid and humid regions. 3. Draw a schematic diagram of a river in each of the following stages: a. youth b. maturity c. old age 4. Differentiate, in a short paragraph, between alpine, valley, piedmont and continental glaciers. 5. Indicate on a map of North America the area covered by the last glacier.	CONCEPT: Relationship of rivers and streams to the work of a hydrologist OBJECTIVE: The student should be able to list at least two activities of a hydrologist.	HYDROLOGIST 1. Hydrologists are concerned with the surface and underground waters of the earth. They map and chart the flow and disposition of sediments; measure alterations in water volume; and collect data on the forms and intensity of precipitation; and the disposition of water through evaporation and ground absorption. Some hydrologists study glaciers and their sedimentation. 2. A strong interest in the physical and earth sciences is essential for this occupation. Four years of college, with a bachelor's degree in geophysics, is usually required for most positions. For higher level teaching and research positions, the master's degree or Ph. D. is desirable. 3. Geophysicists earn from $8,200 to $14,000 a year depending on their degrees and experience. 4. The demand for geophysicists is expected to increase moderately and the opportunities for employment are expected to be favorable.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. As a class or group project, have the students illustrate the types of glaciers and glacial deposits by making paper mache or clay models. 2. Have the students prepare a bulletin board by bringing in pictures and photos showing glaciers and the effects of glaciers. 3. Have the students do any of the following laboratory exercises in the Workbook for Modern Earth Science: a. #43 Effects of Glaciation b. #44 Continental Glaciation c. #45 Valley Glaciation d. #46 Glaciated Mountains e. #34 Weathering f. #35 Erosion g. #36 Drainage Areas h. #47 Wind Action 4. Show and discuss the filmstrips entitled Weathering & Erosion and Streams and Rivers which are available from Ward's Natural Science Establishment, Inc. CAREER: 1. Invite a local hydrologist to class to discuss his occupation. 2. Have interested students research the careers in geophysics using the Dictionary of Occupational Titles or the Occupational Outlook Handbook. 3. Have interested students write to the Society of Exploration Geophysicists for further career information.	CURRICULUM: ESC REGION 20: Films: #4815 Erosion #8604 Erosion-Leveling The Land #8796 Evidence For The Ice Age HARLANDALE AUDIO-VISUAL CENTER: Films: 16-314 Glaciers 16-77 The Great Lakes (How They Were Formed) 16-192 Work Of Rivers CAREER: SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #331 Geophysicists Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: Society of Exploration Geophysicists Box 3098 Tulsa, Oklahoma 74101	

RICULUM NCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
CRUSTAL FORMATION -Diastrophism -Continental drift and other theories -Internal forces -tension, compresion and shearing forces -Buoyancy -Isostacy	The student should be able to: 1. Write an acceptable definition of diastrophism and list at least two examples. 2. Explain, in his own words, the theory of continental drift. 3. State, in his own words, the other theories which explain diastrophism. 4. Match correctly with their definitions such terms as a. cohesive force b. tension c. compression d. shearing e. buoyancy f. isostasy 5. Draw a schematic diagram illustrating the difference between compression, tension and shearing.	CONCEPT: Relationship of rock structures to the work of a geophysical prospector OBJECTIVE: The student should be able to list at least two duties or responsibilities of a geophysical prospector.	GEOPHYSICAL PROSPECTOR 1. The geophysical prospector studies the structure of subsurface rock formations to locate petroleum deposits, using such testing instruments as the seimsmograph, gravimeter, magnetometer and other electrical devices to measure various characterstics of the earth. He prepares charts, profiles, or subsurface maps and helps determine desirable locations for drilling operations. He may also oversee field crews drilling shallow boreholes in designated terrain and collecting soil samples for chemical analysis. 2. A bachelor's degree with a major in geophysics or a related specialty qualifies young persons for many beginning jobs, especially in exploration. For specialties other than exploration, and for the more responsible positions, graduate education usually is required. 3. In private industry in 1970 new graduates having bachelor's degrees typically recieved average starting salaries of $8,650 a year. New graduates having master's degrees averaged $10,500 a year to start. Beginning salaries for those who have doctor's degrees averaged $12,000 a year. 4. Employment opportunities for new graduates having degrees in geophysics are expected to be good through the 1970's. Opportunities will be best for those having the master's or doctor's degree.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Introduce this unit by telling ancient Roman and Greek myths on how mountains were formed. 2. Have the students bring in as many pictures as they can which depict the effects of earthquakes. Place them on the class bulletin board. 3. Using cut-out wooden blocks marked with lines, illustrate the effect of internal earth forces on the crust of the earth. 4. As a class exercise have the students cut out the outlines of the various continents from a world map and have them attempt to fit them together to illustrate the continental drift theory. 5. List the major theories of diastrophism on the chalkboard. Through a teacher-directed discussion have the students list the major points of each theory. CAREER: 1. Invite a geophysical prospector to class to discuss his work. 2. Have interested students write to the American Geophysical Union for further career information.	CURRICULUM: ESC REGION 20: Film: #8288 Through #8293 North American Regions Series HARLANDALE AUDIO-VISUAL CENTER: Film: 16-257 Earth's Changing Surface CAREER: SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #331 Geophysicists Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: American Geophysical Union 2100 Pennsylvania Avenue, N W Washington, D.C. 20037	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
-Dissected mountains -rock structure -Mountain formation -structural -block fault -volcanic -Fractures, folds and faults	The student should be able to: 1. Compare structural mountains and block fault mountains. 2. Draw diagrams illustrating the 3 types of volcanoes. 3. Differentiate, in a short statement, between anticlines and synclines.	CONCEPT: Relationship of the knowledge of crustal movements, stress and tension to the work of a structural engineer OBJECTIVE: The student should be able to write a short essay on the importance of structural engineering.	CIVIL ENGINEER 1. Civil engineers design and supervise the construction of roads, harbors, airfields, tunnels, bridges, water supply and sewage systems, and buildings. Major specialties within civil engineering are structural, hydraulic, sanitary, transportation and soil mechanics. Approximately 185,000 civil engineers were employed in the United States in 1970. The majority were employed by Federal, state, and local government agencies and the construction industry. 2. A bachelor's degree in engineering is the generally accepted educational requirement for entrance into engineering positions. As they gain experience, engineers may advance to positions of greater responsibility. Prospective engineers should be able to work as part of a team, be innovative, have initiative and an analytical mind, a capacity for detail and the ability to make decisions. 3. New engineering graduates having the bachelor's degree and no experience earned an average of $10,400 a year in private industry in 1969-70. Master's degree graduates with no experience averaged almost $12,000 a year. Most engineers can expect an increase in earnings as they gain experience. 4. The outlook in civil engineering -- one of the largest and oldest branches of the profession -- is for continued growth.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Using different arrangements of layers of clay, demonstrate to the class how mountains are built as a result of pressure. 2. Have the students make notebook drawings of the different types of mountains. 3. Have the students do any of the following laboratory exercises in the Workbook for Modern Earth Science: a. #26 Physiographic Provinces b. #27 Block Mountains c. #28 Folded Mountains d. #29 Complex Mountains 4. Have the students do research reports on any of the active or inactive volcanoes. 5. Have the students do either laboratory exercise # 32 entitled An Inactive Volcano or #33 entitled An Extinct Volcano in the Workbook for Modern Earth Science. 6. As a group project have the students make a model volcano according to instructions found in Special Project #21 in the Workbook for Modern Earth Science. 7. As a class exercise have the students plot the major volcanoes of the earth on a world map. **CAREER:** 1. Invite a local civil engineer to class to discuss his job. 2. Have interested students listen to the cassette tape entitled Civil Engineer which is available from the Harlandale Audio-Visual Center. 3. Have interested students write to the American Society of Civil Engineers for further career information.	**CURRICULUM:** ESC REGION 20: Films: #8600 The Earth In Change-The Earth's Crust #4154 The Earth-Changes In It's Surface HARLANDALE AUDIO-VISUAL CENTER: Films: 16-579 Rocky Mountains-Continental Divide 16-657 Wings In Grand Canyon 16-190 Mountain Building 16-191 Volcanoes In Action **CAREER:** HARLANDALE AUDIO-VISUAL CENTER: Cassette Tape: Cas T-54 Civil Engineer SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #2 Civil Engineer Dictionary Of Occupational Titles Occupational Outlook Handbook **WRITE TO:** American Society of Civil Engineers 345 East 47th Street New York, N.Y. 10017	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
-Earthquakes -Origin of earthquakes -Seismographs -Effect of earthquakes -Interior of the earth	The student should be able to: 1. Write a sentence in which he uses the following terms correctly: a. epicenter b. primary waves c. secondary waves 2. List the uses of horizontal and vertical seismographs. 3. Explain, in a short paragraph, how scientists have discovered the composition of the layers of the earth. 5. Construct a map showing earthquake centers in the United States and the world.	CONCEPT: Relationship of the knowledge of earthquakes to the work of a seismologist OBJECTIVE: The student should be able to list at least two reasons why he would or would not like to become a seismologist.	SEISMOLOGIST 1. Seismologists study the structure of the earth's interior and the vibrations of the earth caused by earthquakes and manmade explosions. They may explore for oil and minerals, provide information for use in designing bridges, dams, and buildings in earhtquake regions, or study the problems involved in detecting underground nuclear explosions. Seismologists also play and important role in interpreting data received from the seismograph set up on the moon during the Apollo 12 mission. 2. The requirements, salary and outlook for seismologists is the same as for other geologists. This information is found on page 13 of this guide.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Show and discuss any of the following films: a. Alaska Earthquake (available from the U. S. Geological Survey) b. Men, Steel and Earthquakes (available from the American Institute of Steel Construction) 2. Have the students construct models of the seismograph to show how it operates. Use both the regular and horizontal seismograph. 3. Prepare a bulletin board using the warning symbols for land and water earthquakes. 4. Have the students prepare a world and U.S. map depicting the major areas of earthquake activity. Have them indicate the "ring of fire" on the world map. 5. Using the chalkboard show how earthquakes are located and how distances are computed. CAREER: 1. Invite a local seismologist to class to discuss his work. 2. Have interested students write to the American Geological Institute for further career information. 3. Have interested students do a research report using the Dictionary of Occupational Titles and the Occupational Outlook Handbook on the work of a seismologist.	CURRICULUM: HARLANDALE AUDIO-VISUAL CENTER: Film: 16-549 Earthquake CAREER: SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #184 Geologists Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: American Geological Institute 2201 M Street N W Washington, D.C. 20037	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
THE ENVIRONMENT -Atmosphere -Hydrosphere -Lithosphere -Man and energy	The student should be able to: 1. List the gases in the atmosphere necessary to life and what each is needed for in living organisms. 2. Write a brief report on how man can control erosion and pollution of streams, rivers, and oceans. 3. List the various ways that man has changed the lithosphere and how there changes have created problems for man.	CONCEPT: The major concern of the ecologist is the total environment. OBJECTIVE: The student should be able to list at least four problems currently receiving the most attention from ecologists.	ECOLOGIST 1. Ecologists study the relationships among organisms and between them and their environment. They are interested in the effects of such influences as rainfall, temperature and altitude on these organisms. A primary concern of ecologists is the effects of pollution on the growth of organisms as well as the effects of radiation on living systems. 2. Young people seeking preofessional careers in the life sciences should plan to obtain an advanced degree-preferably a Ph. D.-in their field of interest because promotional opportunities for those without graduate training are usually limited. 3. Beginning salaries in 1970 for life scientists ranged from $6,548 to $14,192 depending upon degrees held and academic achievement. Life scientists in colleges and universities earned salaries between $15,800 and $16,500 a year in 1970, according to the limited available information. 4. Outlook for ecologists is expected to be very favorable throughout the 1970's as concern for the environment continues to increase.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have each student keep a folder or notebook collection of environmental materials. Give the students a list of organizations to write to for information. 2. Have a class discussion using any of the following transparencies which are available from the Life Educational Program: a. #350-354 Water Pollution b. #204 Canopy Of Air 3. Have the students collect newspaper and magazine articles and give oral current events reports dealing with the environment. CAREER: 1. Invite a local ecologist to class to discuss his occupation. 2. Show and discuss the filmstrip entitled Some Ecological Consideration which is available from the Harlandale Audio-Visual Center.	CURRICULUM: ESC REGION 20: Films: #8320 Plant-Animal Communities-Physical Environment #4763 The Physical Environment #2229 The World Around Us CAREER: HARLANDALE AUDIO-VISUAL CENTER: Filmstrip: PR-735 Some Ecological Consideration SCHOOL LIBRARY OR COUNSELOR'S OFFICE: Dictionary Of Occupational Titles Occupational Outlook Handbook Encyclopedia Of Careers	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
GEOLOGIC HISTORY -Radioactive decay -Carbon dating -Index fossils -Living forms and the geologic timetable	The student should be able to: 1. Explain, in his own words, how a leaf might be converted into a fossil. 2. Explain, in a short paragraph, how carbon dating is used to estimate the age of a fossil. 3. List the seven periods of the Paleozoic era and indicate the kind of life present during each period. 4. Tell the difference between an era, a period and an epoch.	CONCEPT: Relationship of the knowledge of geologic history to the work of a paleontologist OBJECTIVE: The student should be able to list at least 2 duties of a paleontologist.	PALEONTOLOGIST 1. The paleontologist studies the remains of plants and animals found in geological formations to trace the evolution and development of past life. He recovers and assembles fossilized specimens, notes their positions and classifies them according to their botanical or zoological family and probable age. He also prepares treatises on findings for the furtherance of scientific study or as an aid to the location of natural resources. 2. Young people seeking professional careers in geology should plan to earn an advanced degree. Advancement in college teaching as well as high-level research and adminstrative posts usually requires the Ph. D. degree. 3. Starting salaries range from about $8,650 to over $12,000 depending on educational qualifications. 4. Approximately 23,000 geologists were employed in the U. S. in 1970, almost four percent were women. Opportunities for those having advanced degrees are expected to be favorable through the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have the students do any of the following laboratory exercises in the Workbook for Modern Earth Science: a. #51 Geologic History b. #52 Rock Layers c. #53 Geological Timetable d. #54 Fossils 2. If possible, take the class on a field trip to a geological formation known to have fossils. 3. Using the set of six filmstrips entitled An Introduction To Fossils available from Ward's Natural Science Establishment, have a class discussion of fossils and the geological timetable. 4. Show and discuss the film entitled The Fossil Story or the film entitled Story In The Rocks which can be secured from the Shell Oil Company. 5. Show and discuss the film entitled Grand Canyon which is available from the Harlandale Audio-Visual Center. CAREER: 1. Invite a paleontologist from a local college to class to discuss this occupation. 2. Have interested students do a research report using the Dictionary of Occupational Title and the Occupational Outlook Handbook on the field of paleontology. 3. Have interested students write to the American Geological Institute for further career information.	CURRICULUM: ESC REGION 20: Film: #8336 Radioactivity #8794 Cave Dwellers Of The Old Stone Age CAREER: SCHOOL LIBRARY OR COUNSELOR'S OFFICE: Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: American Geological Institute 2201 M Street, N W Washington, D.C. 20037	

RICULUM NCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
-Geology of the local area	The student should be able to: 1. List, in writing, at least two significant geological features found in the local area. 2. Name two major mountain ranges which are closest to his local area and briefly investigate the history of one of the ranges.	CONCEPT: Relationship of the local land area to the work of a surveyor OBJECTIVE: The student should be able to describe accurately, in his own words, the work of a surveyor.	SURVEYOR 1. Surveyors play an important part in the construction of highways, airfields, bridges, dams and other structures, by providing information on measurements and physical characteristics of construction sites. They also locate land boundaries, assist in setting land valuations, and collect information for maps, charts, and plates. In 1970 approximately 17,000 land surveyors were registered. 2. The most common method of preparing for work as a surveyor is through a combination of post-secondary school courses in surveying and extensive on-the-job training in survey techniques and in the use of survey instruments. High school graduates having no formal training in surveying also may enter the field, usually starting as rodmen. 3. The majority of party chiefs earned between $8,000 and $11,000 per year, while some surveyors in high level positions earned more than $12,000. 4. Opportunities for surveyors are expected to increase rapidly in the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Combine all of the previous materials studied in Earth Science and have the classes plan a one day field trip on a Saturday to the major geological formations in the San Antonio and hill country area. It is important to have students and parents in on the planning of the trip. 2. Obtain geological information on the Chisos and Fort Davis Mountains from the Sul Ross University Geology department and the West Texas Geological Society or the Bureau of Economic Geology. Using a teacher-prepared outline, have students investigate the origin and geology of one or both of these mountain ranges. **CAREER:** 1. Have interested students listen to the magnetic tape entitled Your Future As A Surveyor. 2. Have interested students do a research report using SRA Occupational Brief #260 entitled Surveyors. 3. Invite a local surveyor to class to discuss his work. Perhaps he can be persuaded to bring some of his tools and equipment and show how it is used.	**CURRICULUM:** ESC REGION 20: Film: #8693 The Edward's Story **CAREER:** ESC REGION 20: Film: #8839 Measuring In Astronomy -How Big, How Far HARLANDALE AUDIO-VISUAL CENTER: Magnetic Tape: MT-270 Your Future As A Surveyor SCHOOL LIBRARY OR COUNSELOR's OFFICE: SRA Occupational Brief #260 Surveyors Dictionary Of Occupational Titles Occupational Outlook Handbook **WRITE TO:** American Congress on Surveying and Mapping 733 Fifteenth Street, N W Washington, D.C. 20005	

RICULUM NCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
ASTRONOMY -Origin of the earth -near-collision hypothesis -nebular hypothesis -dust cloud theory -Gravitational attraction -Our solar system and beyond	The student should be able to: 1. State, in his own words, the three theories which are put forth to explain the origin of the earth. 2. Draw a diagram depicting all the major bodies in our solar system in their proper relative positions. 3. Write, using the proper symbols, Newton's law of gravitation.	CONCEPT: Relationship of the size, shape and gravitational field of the earth and the work of a geodesist OBJECTIVE: The student should be able to write a short essay dealing with the work of a geodesist.	GEODESIST 1. Geodesists study the size, shape and gravitational field of the earth. Their principal task is the accurate mapping of the earth's surface with the aid of orbiting satellites. Geodesists study the earth's surface by determining positions, elevations, and distances between points, measuring the intensity and direction of gravitational attraction and determining the distribution of mass within the earth. 2. The bachelor's degree is considered the minimum educational requirement for entrance into this occupation. A graduate degree is essential for advancement to top-level positions. 3. Starting salaries range from $8,650 to $12,000 a year depending upon degrees earned. The annual salary of earth scientists in 1970 was $14,900. Only 10% of the earth scientists earned less than $10,000 and about 10% earned more than $23,000 a year. 4. Very rapid growth is expected in the field of geophysics through the 1970's. Federal government agencies and the petroleum and mining industries will need all kinds of geophysicists for exploration activities, which are expected to expand in the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. To introduce the unit, have the students make a list of of the things they especially would like to know about the universe and astronomy. 2. From a teacher-prepared list of myths about the universe, stars, and constellation patterns, have the students select one and make an oral report to the class. 3. Take the students to the San Antonio College Planetarium and have them view one of their presentations. 4. Have the students prepare a chart in their notebooks showing famous astronomers, the date they lived, discoveries and accomplishments. 5. Have the students, as an individual project, make a model of the solar system using appropriate materials. CAREER: 1. Invite a geodesist to class to discuss his career. 2. Have interested students view the filmstrip entitled Studying An Area Through Maps which is available from the Harlandale Audio-Visual Center. 3. Have interested students write to the American Geophysical Union for further career information.	CURRICULUM: ESC REGION 20: Films: #4156 The Earth-It's Structure #4776 What Is Space? CAREER: HARLANDALE AUDIO-VISUAL CENTER: Filmstrips: G-6 Reading Physical Maps G-8 Studying An Area Through Maps SCHOOL LIBRARY OR COUNSELOR'S OFFICE: Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: American Geophysical Union 2100 Pennsylvania Ave., N.W. Washington, D.C. 20037	

RICULUM NCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
-Sun and the planets -Solar radiation -Comets, meteors, meteorites, etc.	The student should be able to: 1. Draw a diagram of the sun labelling the layers and other features. 2. Explain orally how the energy of the sun is produced. 3. Explain, in a short paragraph, transmutation. 4. Prepare a data table of the planets giving basic information about each planet. 5. Differentiate orally between meteors, meteorites, meteoroids and comets.	CONCEPT: Relationship of the sun and planets to the work of an astronomer OBJECTIVE: The student should be able to list three general educational requirements for becoming an astronomer.	ASTRONOMER 1. Astronomers study the structure, extent and location of the universe. They collect and analyze data on the sun, moons, planets and stars, and attempt to determine the sizes, shapes, surface temperatures, chemical composition, and motions of these bodies and make studies of the gases and dust between them. They compute planet positions, calculate the orbits of comets and artificial satellites and make statistical studies of stars, galaxies, and cosmic radiation. 2. Young people seeking professional status in astronomy should plan on obtaining the Ph. D. Although the bachelor's degree is adequate preparation for some entry jobs, astronomers without graduate work usually find that opportunities are limited. 3. Beginning astronomers having the Ph.D. could enter Federal Government service at a salary of $13,096 or $14,192 a year depending on their college record. Astronomers with a bachelor's degree could begin at $8,292 or more; those having some graduate study could begin at $10,258 a yaer. 4. The outlook is for a rapid growth of this small profession through the 1970's. However, because it is a small profession, the number of job openings in any one year will not be large.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Using the set of six filmstrips entitled the Solar System and Beyond, discuss the size, shape and color of the sun and planets. This is available from Ward's Natural Science Establishment, Incorporated. 2. Have the students do any of the following laboratory exercises in the Workbook for Modern Earth Science: a. #2 The Stars b. #3 The Sun c. #4 The Planets 3. Show and discuss the film entitled Our Mr. Sun which is available from the Bell Telephone Company. 4. Show and discuss the film entitled The Flaming Sky-Auroras which is available from McGraw-Hill. 5. Show and discuss the filmstrip entitled Meteors, Comets and Asteroids which is available from Ward Natural Science Establishment, Incorporated. CAREER: 1. Invite an astronomer from a local college to class to discuss his career. 2. Have interested students do a research report using SRA Occupational Brief #213.	CURRICULUM: ESC REGION 20: Films: #4860 Planets In Orbit - The Laws Of Kepler #2182 The Sky Is Falling #8744 Solar Radiation, Sun Earth's Ray #4546 Space Science - Comets, Meteors And Planetoids #8309 Space Science - The Planets HARLANDALE AUDIO-VISUAL CENTER: Films: 16-185 How Many Stars 16-154 Sun And How It Affects Us Filmstrips: B-45 Thru B-50 The Earth And It's Neighbors In Space Series C-70 Thru C-79 Space And The Atom Series Mi-13 Solar System H-64 The Solar System And The Universe CAREER: SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #213 Astronomers Dictionary Of Occupational Titles	

RRICULUM ONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
ORIGIN OF THE MOON -Properties -Surface features -Stars and galaxies -magnitude -kinds of stars -Milky Way	The student should be able to: 1. Draw correctly a diagram showing an eclipse of the sun and an eclipse of the moon. 2. Define accurately the following terms: a. maria b. rill c. rays d. crater 3. Summarize, in a paragraph, the life history of a star. 4. Differentiate, in a short statement, between a star and a planet. 5. Classify stars, in written form, by color, brightness and name.	CONCEPT: Relationship of the stars and the moon to the work of an astronaut OBJECTIVE: The student should be able to list at least three reasons why he would or would not like to become an astronaut.	ASTRONAUT 1. Astronauts conduct experiments while in space flight and on the moon. They also conduct tests and gather information on the spacecraft itself to develop new ideas in the design and navigation of the vehicle. Extensive groundwork is done prior to and during launchings. Once in orbit, the spacecraft is handled much as a pilot would control his airplane. He is in constant contact with various tracking stations to help him complete a safe and successful flight. 2. There are three basic requirements to become an astronaut. The candidate must be a jet pilot with many hours of experience; he must be a college graduate with a bachelor's degree in engineering, the physical, or biological sciences; and he must be a citizen of the United States, a maximum of six feet tall and be under 35 years of age at the time of selection. Astronauts must also pass specific tests devised by the space program. 3. It is assumed that astronauts earn at least as much as test pilots. Information regarding exact salaries of astronauts, however, is classified. 4. Because of the nature of the program at the current time, including the great expense, there is no need for a large number of astronauts.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS

CURRICULUM:

1. Have the students read and do a research report using Life Educational Reprint #10 entitled To The Moon And Back.

2. Have the students do either of the following laboratory exercise in the Workbook for Modern Earth Science:
   a. #5 The Moon
   b. #6 Eclipses

3. Have the students make a collection of pictures and photographs of space activities in their notebooks.

4. Have the students do Special Project #7 entitled Photographing Star Trails in the Workbook for Modern Earth Science.

CAREER:

1. Show and discuss any of the films listed under the Career heading in the next column.

2. Have interested students write to the National Aerospace Education Council for further career information.

CURRICULUM:

ESC REGION 20:
Films: #8650 A Trip To The Planets

CAREER:

HARLANDALE AUDIO-VISUAL CENTER:
Films: 16-591 American On The Moon
16-202 American In Orbit (Glenn)
16-245 Mission-22 Orbits
16-201 U.S. Space Pioneer (Shepherd)

SCHOOL LIBRARY OR COUNSELOR'S OFFICE:

Dictionary Of Occupational Titles

Occupational Outlook Handbook

Encyclopedia Of Careers Vol. II

WRITE TO:

National Aerospace Education Council
806 15th Street, N.W.
Washington, D.C. 20005

RRICULUM ONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
TIME, PLACE AND NAVIGATION -Revolution about the sun -Rotation of the earth	The student should be able to: 1. Differentiate, by means of a diagram between precession and nutation. 2. Define orally the following terms: a. sidereal year b. solar year c. month d. sidereal day 3. Distinguish orally between revolution and rotation.	CONCEPT: Relationship of the measurement of time to the work of a watchmaker or watch repairman OBJECTIVE: The student should be able to list at least two duties or activities of a watchmaker.	WATCHMAKER 1. Watchmakers are skilled craftsmen who clean, repair and adjust watches, clocks, chronometers and other time devices. The development of interchangeable mass-produced parts has lessened the repairman's need to make parts by hand. However, he must frequently adjust factory-made parts for complicated timepieces to insure proper functioning. 2. Many young people prepare for this trade through courses given in private watch repair schools, public vocational schools or post-high school training. There generally are no specific educational requirements for entrance into any of the approximately 40 watch repair schools, although most students have graduated from high school. 3. Earnings of watch repairmen in entry jobs generally ranged anywhere from $90 to $120 a week and depended on industrial ability and place of employment. Watch repairmen who are in business for themselves usually earn considerably more than those who are paid a salary. 4. Little or no change is expected in the employment outlook for watchmakers and repairmen. However, hundreds of job openings will arise annually from the need to replace experienced workers who retire, die or transfer to other areas of work.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Demonstrate using models how the earth revolves around the sun and how the moon revolves around the earth. 2. Have the students do a research report dealing with the various ways man has attempted to keep time from the earliest time to the atomic clock. 3. Show and discuss the film entitled About Time which is available from the Bell Telephone Company. CAREER: 1. Invite a local watchmaker or watch repairman to class to discuss his career. 2. Have interested students do a research report using SRA Occupational Brief # 179 entitled Watch Repairman. 3. Have interested students write to the American Watchmakers Institute for further career information.	CURRICULUM: ESC REGION 20: Films: #4739 How To Measure Time #8263 Measurement In Physical Science #4564 The Story Of Measuring Time-Hours, Minutes, Seconds CAREER: SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #179 Watch Repairman Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: American Watchmakers Institute 3810 Harrison Avenue Cincinnati, Ohio 45211	

RICULUM NCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
ROCKETS, GUIDED MISSILES AND SATELLITES	The student should be able to: 1. Draw a simplified diagram illustrating the basic principle involved in the propulsion of a rocket. 2. List the sections of the spacecraft which carries men to the moon and give the basic function of each section. 3. Name at least one satellite which is currently in space and state its particular mission.	CONCEPT: Relationship of rockets and missiles to the work in the spacecraft manufacturing industry OBJECTIVE: The student should be able to at least three occupations in the spacecraft manufacturing industry.	SPACECRAFT MANUFACTURING 1. The "aerospace" industry is among the largest and most rapidly changing industries in the United States. Some 1.25 million people were working in this industry in 1970, many of whom were scientists, engineers and technicians. About half of these workers, however, were in plant jobs such as sheet-metal work; machining and tool fabrication; assembly, installation, inspecting and testing; materials handling; maintenance and custodial work. 2. Training requirements for plant jobs vary from a few days of on-the-job instruction to several years of formal apprenticeship. Besides on-the-job instruction, classroom training in related subjects is often included. 3. Plant workers' earnings in this industry are higher than in most other manufacturing industries. In 1970, the average weekly salary of workers in plants making aircraft and parts was $168.92. 4. By 1980, employment in this industry is expected to be slightly higher than in 1970. In addition, thousands of job openings will occur annually to replace workers who leave the industry.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have the students write to NASA in Houston, Texas for materials on the U.S. space program. 2. As a class project, have the students each make a model of a space vehicle or rocket and label all of the component parts. 3. Have the students make notebook drawings of the space vehicles used in the U.S. space program so far. CAREER: 1. Have interested students view and listen to the tapes with accompanying records dealing with occupations in the aerospace industry. 2. Have interested students do a brief report on occupations in this industry using SRA Occupational Brief #81.	CURRICULUM: ESC REGION 20: Films: #2172 Science In Space #4769 Space Probes - Exploring Our Solar System HARLANDALE AUDIO-VISUAL CENTER: Films: 16-346 Rockets And Satellites 16-201 U.S. Space Pioneer 16-380 Way Stations In Space Filmstrips: C-80 Thru C-83 Space And Space Travel Series Record W/Filmstrip: PR-469 Story Of The First Lunar Landing CAREER: HARLANDALE AUDIO-VISUAL CENTER: Filmstrip W/Records: PR-785 Careers In Materials Engineering: The Aerospace Age PR-786 Your Future In Engineering Technology SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #81 Aerospace Industries Manufacturing Workers	

RRICULUM ONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
INSTRUMENTS FOR STUDYING THE UNIVERSE	The student should be able to: 1. List at least three instruments used by astronomers in their study of the universe. 2. Compare, in a short paragraph, a radio telescope with an optical telescope. 3. Describe the use of each of the following instruments: a. spectroheliograph b. coronograph c. television camera d. photometer	CONCEPT: Relationship of precision instruments to the work of an instrument repairman OBJECTIVE: The student should be able to state orally why he would or would not like to be an instrument repairman.	INSTRUMENT REPAIRMAN 1. Instrument repairmen maintain complex industrial and scientific instruments that measure, record or control many variables such as heat, electricity, pressure and others. They also service a number of instruments used in fields like nuclear energy, oceanography, medicine, dentistry, optics and photography. Almost 95,000 instrument repairmen were working in 1970. 2. At least four years of on-the-job training and study is usually needed to become a fully qualified instrument man. They generally are selected from production employees or hired as trainees and may learn their trade informally or through formal apprenticeship programs. 3. Many instrument repairmen received between $2.93 and $4.77 an hour in 1970. Those who specialized in electronic instruments often received higher salaries. 4. The number of instrument men is expected to rise very rapidly through the 1970's because the use of instruments is expected to increase substantially for a wide variety of scientific, industrial and technical purposes.

RRICULUM ONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
LIFE SCIENCE INTRODUCTION -Experimentation and discovery -Scientific method -Fields of science	The student should be able to: 1. Differentiate, in a short statement, between a hypothesis, a theory and a law. 2. List and explain the major steps of the scientific method. 3. When presented with a problem by the teacher, outline a possible experiment to investigate it. 4. List, in writing, at least ten important fields of science related to living organisms.	CONCEPT: Relationship of the scientific method to the work of an experimental psychologist OBJECTIVE: The student should be able to discuss, in a short paragraph, the duties and activities of an experimental psychologist.	EXPERIMENTAL PSYCHOLOGIST 1. Psychologists administer and interpret psychological tests, collect research experiments, and perform administrative duties. In addition, they may teach in colleges, help counsel students or handicapped persons, or act as school psychologists or counselors. About 40,000 psychologists were employed in 1970. About one-fourth were women. 2. The Ph.D. degree is needed for many entrance positions and is becoming increasingly important for those interested in advancement. Psychologists wishing to enter independent practice must meet certification or licensing requirements in an increasing number of states. 3. Starting salaries for those with a master's degree averaged about $9,600 a year in 1970. Beginning salary for those having the doctorate was about $10,900 annually. The median salary for all psychologists was approximately $15,000 in 1970. 4. Employment opportunities for those who have the doctorate degree are expected to be excellent through the 1970's. Those holding master's degrees will be in demand, but not as much as those having the Ph.D. degree.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have the students prepare a list of all of the scientific achievements that have occurred in the past five years. 2. Using the discussion technique, introduce the concept of scientific theories, laws and hypotheses. Have each student attempt, as a homework assignment, to give at least two examples of each. 3. Conduct a simple class experiment or demonstration and have the students write it up using a standard outline provided by the teacher. This outline will be used for all future experiments and demonstrations. 4. Have the students do laboratory exercise 1-1 entitled The Characteristics of an Experiment in the laboratory manual. This manual is titled Laboratory Exercises for the Life Sciences and accompanied the previously adopted textbook. CAREER: 1. Invite an experimental psychologist to class to discuss his career. Perhaps he can be persuaded to bring along some of materials and equipment that he uses in his work. 2. Have interested students do a research report using SRA Occupational Brief #137 entitled Psychologists. 3. Have interested students write to the American Psychological Association for further career information. 4. Take interested students on a field trip to the School of Aerospace Medicine and have them interview some of the experimental psychologists who are working there.	CURRICULM: ESC REGION 20: Film: #4639 What Is Science? HARLANDALE AUDIO-VISUAL CENTER: Filmstrip: The Scientist - His Way, Your Way CAREER: SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #137 Psychologists Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: American Psychological Association 1200 Seventeenth Street N.W. Washington, D.C. 20036	

RRICULUM ONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
FIELDS OF STUDY OF LIVING THINGS -Kinds of biologists -Famous life scientists and their contributions	The student should be able to: 1. List at least ten kinds of biologists and tell briefly what kind of work each one does. 2. When presented with a list of 20 "ologies", tell which are life sciences and which are physical sciences. 3. Match correctly the names of ten life scientists with their fields of study.	CONCEPT: Relationship of the various fields of scientific study to the work of a college professor OBJECTIVE: The student should be able to list at least 2 reasons why he would or would not choose college teaching as a profession.	COLLEGE PROFESSOR 1. About 720,000 teachers were employed in the nation's colleges in the fall of 1970. Teaching duties include preparing and delivering lectures; leading class discussions; directing graduate students; preparing tests and instructional materials; and checking and guiding assignments. In many 4-year colleges the usual teaching load is 12-15 hours per week. In addition, many college teachers conduct or direct research, write for publications, or aid in college administration. 2. To qualify for most beginning positions applicants must have at least the master degree. A number of states insist on state certification to teach in public 2-year colleges. A doctor's degree is required particularly for advancement in the life and physical sciences, psychology, social sciences, philosophy and religion. 3. Median salaries of college teachers by rank were: 1. Professor $16,799 2. Associate Professor $12,985 3. Assistant Professor $10,698 4. Instructor $ 8,416 4. College teaching opportunities are expected to be good for those having doctoral degrees or having completed all requirements for the doctorate except the dessertation. The outlook will also be favorable for those having the master's degree, particularly in 2-year colleges.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. From a teacher-prepared list of life and physical sciences, have the students look up the prefix to determine it's origin or meaning. 2. Assign the name of a famous scientist to each student in class. Have the students do a research report about the scientist. On report day place the chairs in a circle and have each student play the role of that scientist. Encourage other class members to ask questions. Chairs can also be arranged in a circle according to when each scientist did his work. (chronological order) 3. Prepare a bulletin board illustrating the different kinds of biologists or life scientists using the poster series entitled Great Biologists which is available from J. Weston Walsh Publishing Company. CAREER: 1. Invite a college professor to class to discuss his work. 2. Have interested students listen to and report on the cassette tape entitled Professor which is available from the Harlandale Audio-Visual Center. 3. Have interested students do a research report using SRA Occupational Brief #183 entitled College Teachers, the Dictionary of Occupational Titles and the Occupational Outlook Handbook. 4. Have interested students write to the American Association of University Professors for further career information.	CURRICULUM: ESC REGION 20: Films: #4068 Biology In Today's World Filmstrips: A-89 Thru A-94 Great Names In Biology CAREER: HARLANDALE AUDIO-VISUAL CENTER: Cassette Tape: Cas T-39 Professor SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #183 College Teachers Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: American Association of University Professors 1 Dupont Circle Washington, D.C. 20036	

RRICULUM ONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
SCIENTIFIC TOOLS -Measurement and the metric system -Microscope and it's use -Laboratory safety	The student should be able to: 1. Label all the parts of a microscope when presented with a diagram of one. 2. Differentiate between the terms qualitative and quantitative. 3. List, in writing, the correct name and proper symbol for each of the standard units in the metric system. 4. List at least five rules of laboratory safety and give the reason for each one. 5. Pass, with 90% accuracy, a short quiz on laboratory safety.	CONCEPT: Relationship of scientific tools and measurement to the work of an FBI agent OBJECTIVE: The student should be able to list at least three scientific tools used by the FBI in criminal investigation.	FBI AGENT 1. The FBI is a fact-gathering and fact-reporting agency and its special agents function primarily in investigations. It helps other law-enforcement agencies by making its crime laboratory, fingerprint files and other scientific facilities available to them. Its crime lab receives samples of hair, cloth, sand, blood-stains, paper, bullets and other evidence for analysis. Highly skilled FBI scientists using high powered instruments can uncover very valuable information. 2. To be eligible for appointment, an applicant must be a male citizen of the U.S. and between 23 and 40 years of age. He must be at least 5 feet 7 inches and in top physical shape. He must be a graduate of an accredited resident law school or accounting school. The law training must have been preceded by at least 2 years of undergraduate college work. After acceptance each newly appointed agent is given 14 weeks of training before being assigned to a field office. 3. Starting salaries in 1968 for agents was $8,821 annually. The top salary for regular field agents was about $17,500 while those in supervisory and administrative positions received higher salaries. 4. The rate of turnover in the FBI is very low. Most men who enter this field make it their life's work. Therefore a substantial increase in the future number of agents is not expected.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Demonstrate the care and use of the microscope to the class. 2. Have the students do laboratory exercise 2-1, The Microscope and It's Use, in the lab manual entitled Laboratory Exercises for Life Science which accompanied the previously adopted textbook. 3. Prepare a class bulletin board displaying the different types of microscopes. Use the set of posters entitled Microscopes-Yesterday and Today which are available from the J. Weston Walsh Publishing Company. 4. Have the students make notebook drawings of examples of the different metric units. CAREER: 1. Invite a policeman or FBI agent to class to discuss his training and his work. 2. Have interested students listen to either the cassette tape entitled the Policeman or the magnetic tape entitled Your Future as a Policeman/Policewoman which are available from the Harlandale Audio-Visual Center. 3. Show and discuss the filmstrip entitled Police and Police Protection which is available from the Harlandale Audio-Visual Center. 4. Have interested students write to the Federal Bureau of Investigation for further career information.	CURRICULUM: ESC REGION 20: Films: #8623 Measurement In Physical Science #8269 The Metric System CAREER: HARLANDALE AUDIO-VISUAL CENTER: Cassette Tape: Cas T-29 Policeman Magnetic Tape: MT-265 Your Future As A Policeman/Policewoman Filmstrips: T-82 Police And Police Protection SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #55 FBI Agents Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: Federal Bureau Of Investigation Department of Justice Washington, D.C. 20535	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
ORIGINS OF LIFE -Spontaneous generation -Characteristics of life -Life activities	The student should be able to: 1. Relate, in a short paper, how the theory of spontaneous generation was disproved. 2. Discuss briefly, in his own words, at least two theories which attempt to explain the origin of life on earth. 3. List, in written form, the contributions of each the following scientists to the discredit of spontaneous generation: a. Needham b. Spallanzani c. Redi d. Pasteur	CONCEPT: One of the aspects of all living organisms is death. Careers in mortuary science offers many opportunities for those who are interested. OBJECTIVE: The student should be able to list at least two requirements necessary to become an embalmer.	EMBALMER 1. An embalmer, who may be hired just for his services or who may be a funeral director as well must know the apparent and positive signs of death. He cleans the body, conforming to state law, and disinfects and preserves it by using certain specified chemicals. With cosmetics and other materials the embalmer attempts to give the deceased a life-like appearance, then clothes the body and situates it in the casket. He may also help arrange the room in which the casket is placed. 2. The minimum age for a funeral director requires that applicants be 21 years of age. Most states also require that embalmers be a resident of the state and at least a high school graduate. Almost half of the states require one of two years of preprofessional training before entering into an accredited college of mortuary science if one wishes to be a funeral director. Also embalmers and prospective morticians must pass a state exam and have completed one or two years of internship under a licensed embalmer. 3. In 1967 the average salary of the funeral home owner was reported to be $11,690 plus a profit margin of $51 per funeral. Salaries of apprentices start at about $75 to $100 per week. 4. Approximately 2000 new funeral service licenses are needed each year. Well-trained embalmers and funeral directors are and will continue to be needed.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Prepare a bulletin board showing the following: a. Animals-divide this group into protists, invertebrates and vertebrates. b. Plants-divide this group into Spore Former, Gymnosperms, Angiosperms, etc. c. Inanimate Materials of the Earth Each heading should be so placed as to allow the addition of names and pictures as the course progresses. 2. Using transparencies or chalkboard drawings, trace the experiments of Needham, Spallanzani and Pasteur. 3. As a homework assignment, have the students write a one page paper on the subject "What is Life"? CAREER: 1. Invite a funeral director or embalmer to class to discuss his training and his work. 2. Have interested students do a research report on mortuary science careers using the Dictionary of Occupational Titles and the Occupational Outlook Handbook. 3. Have interested students visit a funeral home and interview the workers there about their jobs. 4. Have interested students write to the National Funeral Directors Association for further career information.	CURRICULUM: ESC REGION 20: Film: 8298 Origin Of Life CAREER: SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #132 Embalmers And Funeral Directors Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: National Funeral Directors Assoc. 135 West Wells Street Milwaukee, Wisconsin 53203	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
LIVING THINGS -Distinguishing and naming living things -Classification -kingdom, phylum etc. -man's place among organisms	The student should be able to: 1. When presented with 10 different specimens and a suitable key, identify at least eight of them correctly. 2. List, in the correct order, the seven categories of classification. 3. State orally, the correct classification of man.	CONCEPT: Relationship of the knowledge of classification to the work of a medical records librarian OBJECTIVE: The student should be able to list at least two duties of a medical records librarian.	MEDICAL RECORDS LIBRARIAN 1. Medical record librarians plan, prepare, maintain, and analyze records and reports on patients illnesses and treatments. They may assist in research projects; compile statistics; make summaries of medical records; develop systems for storing and retrieving information; and train assisting personel. They usually represent their department at staff meetings and may be called to testify in court. About 13,000 medical record librarians were employed in 1970. In addition, about 41,000 other personnel were working in this field. 2. Most approved medical record librarian educational programs last 4 years and lead to a bachelor's degree. One year certificate programs also are available for those who already have a bachelor's degree. Graduates in medical record science are eligible to take the examination given by the American Medical Record Associations. Upon passing this exam, they receive professional recognition as Registered Record Librarians. 3. Salaries of medical record librarians are influenced by the location, size, and type of employing institution, as well as by the responsibilities of . . the position. Newly graduated librarians generally began at $6,548 a year in 1970; those with high academic records were eligible to begin at $8,098. 4. Opportunities are expected to be favorable in the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. As a class exercise in classification, have the students sort a box full of screws, nails, bolts and washers. Have them indicate the basis for their classification. 2. Prepare a bulletin board displaying the names of the three kingdoms along with their major divisions. Have groups of students compete to see which one can bring in the greatest number of pictures for the bulletin board display. 3. Have each student complete a classification chart in their notebooks on the following: cat, dog, common insects, man, and other familiar animals and plants. 4. Have the students play the classification card game. See Ideas and Investigations in Science published by Prentice-Hall. (Teacher's manual-page 72) 5. Have the students do laboratory exercise 6-1, Classification in the lab manual entitled Laboratory Exercises for Life Science which accompanied the previously adopted textbook. CAREER: 1. Ask a medical records librarian to come to class to discuss his or her occupation. 2. Have interested students listen to the cassette tape entitled Librarian which is available from the Harlandale Audio-Visual Center. 3. Have interested students visit a local hospital to interview the medical records librarian. 4. Have interested students write to the American Medical Records Association for further career information.	CURRICULUM: ESC REGION 20: Films: #4114 Classifying Plants And Animals #2367 Dr. Leaky And The Dawn Of Man #2194 The Systematic Scientist CAREER: HARLANDALE AUDIO-VISUAL CENTER: Cassette Tape: Cas T-41 Librarian Filmstrip T-86 The Library And The Librarian SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #145 Medical Record Librarians Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: American Medical Record Association 211 East Chicago Avenue Chicago, Illinois 60611	

RICULUM NCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
MATTER AND ENERGY -Classification of matter -Organic and inorganic compounds -Temperature -Physical and chemical changes	Tha student should be able to: 1. Distinguish, in a short written paragraph, between organic and inorganic compounds. 2. Read accurately a Fahrenheit and a Centigrade thermometer and convert readings from one scale to the other. 3. When presented with a list of common substances used in the laboratory, classify each as to elements, compounds or mixtures.	CONCEPT: Relationship of organic compounds to the work of an organic chemist OBJECTIVE: The student should be able to list at least three activities or duties of an organic chemist.	ORGANIC CHEMIST 1. The organic chemist conducts experiments on substances of which the essential element is carbon. He does this to develop and improve materials and products and to uncover scientific facts. He frequently combines organic compounds to make new substances or to duplicate substances found in nature. He often carries out and participates in experiments designed to develop and improve, by chemical nature, the color, texture and strength of paint, rubber, wood, dye and other organic compounds and by-products. 2. Organic chemists are required to have a minimum of a bachelor's degree and should have a master's degree if advancement in this field is contemplated. Training leading to the bachelor's degree in chemistry is offered by about 1,000 colleges and universities throughout the country. 3. Salaries for chemists range from $9,400 annually to $15,000 a year depending upon educational achievement and experience. Some chemists, about 10%, earned as much as $24,000 in 1970. 4. The employment outlook for this field is expected to be favorable throughout the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. As a demonstration, illustrate using common laboratory materials, elements, compounds and mixtures. 2. Have students prepare a small scrapbook of pictures of organic and inorganic materials. 3. Using a large poster-drawn thermometer, illustrate how temperature is measured in the English and Metric systems. Each day a different student can read and post the temperature using both scales. 4. Demonstrate the difference between a physical change and a chemical change using such exercises as boiling water, heating iron and sulfur, burning a candle, etc. CAREER: 1. Invite an organic chemistry teacher from a local college or an organic chemist from industry to class to discuss his or her job. 2. Have interested students do a research report using SRA Occupational Brief #66 entitled Chemists and the Dictionary of Occupational Titles.	CURRICULUM: ESC Region 20: Films: #4851 Explaining Matter-Chemical Change #4852 Explaining Matter-Molecules In Motion HARLANDALE AUDIO-VISUAL CENTER: Filmstrips: A-80 Classification Of Matter CAREER: SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #66 Chemists Dictionary Of Occupational Titles Occupational Outlook Handbook	

RRICULUM ONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
PROTOPLASM AT WORK -Fundamental cell functions -Cell structures -RNA and DNA -ATP and ADP -Diffusion and omosis -Organization in cells, tissues, organs, systems, and organisms	The student should be able to: 1. Label correctly a diagram of a "typical" animal or plant cell and give the function of each structure. 2. Draw and label a diagram of DNA showing only the major components. 3. Differentiate, in a short paragraph, between a tissue, organ and organ system.	CONCEPT: Relationship of cell structure and function to the work of biochemist OBJECTIVE: The student should be able to list at least four specific activities engaged in by a biochemist.	BIOCHEMIST 1. Biochemists study the chemical compositions of living organisms. They identify and analyze the chemical processes related to biological functions such as reproduction, muscular contraction and metabolism. They investigate the effects on organisms of such substances as foods, drugs and hormones. Biochemists analyze chemical compounds, investigate the causes and cures of disease, or develop diagnostic procedures. About 11,000 biochemists were employed in the U.S. in 1970. 2. The minimum requirement for beginning positions is the bachelor's degree with a major in biochemistry or chemistry. Graduate training is required for most entrance positions in research and teaching. 3. In 1970, the average earnings for all biochemists with a bachelor's degree was $10,800; for those having a master's degree $12,500; and for those having a Ph.D., $15,800. 4. Employment opportunities are likely to be favorable through the 1970's. Although biochemistry is a relatively small profession and job openings will not be numerous in any one year, the number of graduates with degrees in this field also is fairly small and will probably remain so.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Using transparencies, construct a word and picture representation of a typical plant and animal cell. Have the students write the name of each structure and give it's function as it is discussed by the teacher. 2. Construct a large felt board or wall display of a typical cell as parts are observed in the laboratory. Have the students make enlarged paper models of each cell structure and add them to the display. Colored yarn can lead to the functions of each of the parts. 3. As a class demonstration, illustrate osmosis and diffsion using a semipermeable membrane and sugar water or corn syrup, potassium permanganate in water, etc. 4. Have the students do a laboratory exercise in which they view different kinds of cells. They can be taught to make their own slides or they can use commercially prepared slides. Have the students make notebook drawings of their observations. 5. Have the students make notebook drawings starting with cells and going through the levels of organization until a complete organism is shown. CAREER: 1. Invite a biochemist to class to discuss his work. Perhaps he can bring some of the materials he uses in his job. 2. Have interested students listen to the cassette tape entitled Research Scientist which is available from the Harlandale Audio-Visual Center. 3. Have interested students write to the American Chemical Society for further career information.	CURRICULUM: ESC REGION 20: Films #4834 The Cell - Structural Unit Of Life HARLANDALE AUDIO-VISUAL CENTER: Filmstrips: K-79 Enzymes - The Spark Plugs Of Life K-82 DNA Code Of Life K-83 ATP - Packet Of Energy CAREER: HARLANDALE AUDIO-VISUAL CENTER: Cassette Tape: Cas T-34 Research Scientist SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #131 Biochemists Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: American Chemical Society 1155 Sixteenth Street, N.W. Washington, D.C. 20006	

RICULUM NCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
REPRODUCTION FOR SPECIES SURVIVAL -Cell division and growth -Phases of mitosis -Asexual reproduction -Regeneration -Sexual reproduction -Pregnancy and childbirth -Embryology and development	The student should be able to: 1. Draw a labeled schematic diagram representing the five phases of mitosis. 2. Distinguish, in a short statement, between sexual and asexual reproduction. 3. Describe, in a short paper, what occurs during the menstrual cycle. 4. Discuss orally what occurs at childbirth.	CONCEPT: Relationship of reproduction and childbirth to the work of a pediatrician OBJECTIVE: The student should be able to list two advantages and disadvantages of becoming a pediatrician.	PEDIATRICIAN 1. The pediatrician plans and carries out medical care for children from birth through adolescence. He examines patients, prescribes and administers medicines and immunizations, and performs a variety of the usual medical duties. 2. Students who plan to enter medicine as a career will follow the following course: -four years of college -four years of medical school -one or two years of internship -two to 5 years of residency The prospective physician's very special requirment is a strong desire to practice medicine. Unless he is sincerely interested for reasons other than status or a large financial income, he is not likely to be able to stand the very long training program. 3. The average salary (net) earned by self-employed physicians, in 1960 was $32,170 after payment of expenses but before payments of income tax. 4. Opportunities for physicians will be good in 1970's despite the fact that, in 1968, only slightly more than half of all students applying to medical schools were accepted.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS

CURRICULUM:

1. Using a transparency or set of mitosis models, illustrate the five main phases of cell division. Stress the location and changes that the chromosomes undergo rather than a step-by-step change in the cell.

2. As a laboratory exercise, have the students view slides of mitosis and attempt to identify as many phases as possible.

3. Prepare a bulletin board display using the following headings: binary fission, regeneration, spore production and budding. Have the students make drawings of each of these processes and place them appropriately.

4. Bring in some frog eggs and have the students watch them daily for changes in development. Have them record these changes in their notebooks.

5. Show and discuss the filmstrip entitled Life Before Birth which is available from the Life Educational Program.

6. Have the students prepare a chart showing the gestation periods of various common animals.

CAREER:

1. Invite a local pediatrician to class to discuss his training and his work.

2. Have interested students listen to the cassette tape entitled Physician which is available from the Harlandale Audio-Visual Center.

3. Have interested students ask for an appointment to interview a local pediatrician in his office.

4. Have interested students write to the American Academy of Pediatrics for further career information.

CURRICULUM:

ESC REGION 20:
Films: #8867 Animal Reproduction
#2337 Embryonic Development - The Chick
#2338 The Embryonic Development Of Fish
#8711 Frog Development - Fertilization To Hatching
Filmstrips: K-81 Development Of Embryos

CAREER:

HARLANDALE AUDIO-VISUAL CENTER:
Cassette Tape: Cas T-37 Physician

SCHOOL LIBRARY OR COUNSELOR'S OFFICE:
SRA Occupational Brief #375 Pediatricians

Dictionary Of Occupational Titles

Occupational Outlook Handbook

WRITE TO:

American Academy of Pediatrics
1801 Hinman Avenue
Evanston, Illinois 60204

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
LOWER PLANTS -Algae and fungi -Yeasts, molds and lichens -Mosses and liverworts -Ferns	The student should be able to: 1. List the five kinds of algae based on their characteristic colors. 2. Explain, in his own words, the possible econmic significance of algae if they are someday used to help solve the world's food shortage problem. 3. Draw a schematic sketch of the slime mold life cycle. 4. Define, in his own words, the following terms: a. parasite b. saprophyte c. symbiosis d. zygospore e. spore f. hyphae g. lichen h. stolon	CONCEPT: Relationship of the knowledge of the lower plants to the work of a sewage plant operator OBJECTIVE: The student should be able to outline briefly, at least two activities of a sewage plant operator.	SEWAGE PLANT OPERATOR 1. Sewage plant operators perform many routine tasks including reading meters, operating screening devices, making minor equipment repairs and sampling wastewater at various stages of the treatment process. Operators may also oil equipment, clean tanks, fill out forms and handle complaints as well as be responsible for some housekeeping duties. 2. Entry jobs do not require special training, and most workers in this occupation learn their skills on-the-job. New workers usually start as helpers and are assigned to work under the direction of another. Most employers, however, prefer to have applicants with at least a high school diploma. 3. Earnings of operators ranged from $5,000 to $11,000 a year in 1971. Some foremen earned up to $12,000 annually and some chief operators in large cities earned as much as $22,000 a year. 4. Employment opportunities for operators are expected to increase rapidly through the 1970's. This is because of the construction of new water treatment plants and because of the expansion of existing plants to cope more effectively with water pollution.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. As a student project, have the class make a collection of various lower plants. Encourage the students to collect the samples and bring them to class properly labeled, preserved, and in some cases, dried. 2. Have the students do laboratory exercise 5-2, Characteristics of the Simple Plants-Algae, Fungi, Yeasts and Mushrooms, in the lab manual entitled Laboratory Exercises for Life Science which accompanied the previously adopted textbook. 3. Using transparencies or chalkboard drawings, discuss the life cycles of slime molds, mosses and ferns. Have the students draw these life cycles in their notebooks. 4. Show and discuss the film entitled Fungus Plants which is available from the Harlandale Audio-Visual Center. CAREER: 1. Invite a local sewage plant operator to class to discuss his job. 2. Have interested students visit a local treatment plant and interview the workers there. 3. Have interested students do a research report using the Dictionary of Occupational Titles and the Occupational Outlook Handbook. 4. Have interested students write to the Water Pollution Control Federation for further career information.	CURRICULUM: HARLANDALE AUDIO-VISUAL CENTER: Films: #16-218 Fungus Plants CAREER: SCHOOL LIBRARY OR COUNSELOR'S OFFICE: Dictionary Of Occupational Titles Occupational Outlook Handbook. WRITE TO: Water Pollution Control Federation 3900 Wisconsin Avenue, N.W. Washington, D.C. 20016	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
SEED PLANTS -Roots, stems and leaves -Photosynthesis	The student should be able to: 1. State orally, the basic functions of the roots, stems, and leaves of a seed plant. 2. Define accurately the following terms: a. xylem b. phloem c. guard cells d. angiosperm e. cambium f. gymnosperm g. perennial h. parenchyma i. annual j. stomate 3. Write correctly, the raw materials and end products of photosynthesis using symbols and words when possible.	CONCEPT: Relationship of the seed plants and photosynthesis to the work of a gardener or groundskeeper OBJECTIVE: The student should be able to list at least two advantages to being a gardener or groundskeeper.	GARDENER OR GROUNDSKEEPER 1. Gardeners and groundskeepers take care of gardens, lawns, ornamental plants and trees. The groundskeeper may be in charge of laying out the garden and lawn himself, take care of an existing lawn, or he may care for a greenhouse or conservatory. Gardeners are responsible for preparing soil and making plantings at the proper times of the year. Trimming plants, cutting flowers, and removing leaves and other litter from the grounds are also part of his work. 2. Many employers are not concerned about the education of their garderners so long as they can read and write English. As in most work, however, the applicant with additional education has a distinct advantage over others. Little formal preparation is currently available and some employers provide on-the-job training under experienced gardeners. 3. Earnings vary a great deal in this work, according to locality and the particular job. Salaries range from a low of less than $2 an hour for part-time work to more than $780 a month for work in supervision. 4. Future prospects are not outstanding but young men with a talent for gardening will find that it can provide a satisfying living. Those with experience will always be needed.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Bring a complete plant to class and enclose it in a plastic bag. As new roots begin to grow, have the students look for root hairs, new stems, tissues and leaves. Have them record their observations by drawing the progress of the plant in their notebooks. 2. Have the students grow plants from seeds prior to beginning this unit. After they have sprouted, have the students wash the soil from the roots and examine them. Have them compare monocot and dicot roots at this time. 3. Have the students bring in as many different types of stems as they can find. Also bring in stems from pecan or walnut trees to show the kinds of tissues present in new and old growth. Have the students look up the functions of each of the different kinds of tissues. 4. Have the students collect, press and identify twenty different kinds of leaves from the local area. 5. Show and discuss the film entitled Riddle of Photosynthesis which is available from the Atomic Energy Commission. 6. Have the students do any of the following lab exercises in the lab manual entitled Laboratory Exercises for Life Science which accompanied the previously adopted textbook: a. 4-1 The Trapping of the Sun's Energy and the Manufacture of Food by a Green Plant b. 4-2 Entry of Raw Materials Utilized in Photosynthesis c. 4-3 Nature of Chlorophyll CAREER: 1. Invite a professional gardener or groundskeeper to class to talk about his work. 2. Have interested students write to the Golf Course Superintendents Association for further career information.	CURRICULUM: ESC REGION 20: Films: #2286 Photosynthesis #4764 Plant Motions - Roots, Stems, Leaves #2169 Role Of Green Plants HARLANDALE AUDIO-VISUAL CENTER: Films: 16-545 Angiosperms 16-94 Leaves 16-95 Life Of A Plant 16-427 Photosynthesis: Chemistry Of Food Making 16-126 Plant Growth 16-139 Roots Of Plants Filmstrip W/Record: Q-60 - Roots And Stems Q-61 - Leaves And Their Work CAREER: SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #330 Gardeners And GroundsKeepers Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: Golf Course Superintendents Assn. of America 3158 Des Plaines Avenue Des Plaines, Illinois 60018	

RICULUM NCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
FLOWERING PLANTS -Flowers -Pollination and fertilization -Seeds and germination -Selective breeding and cross-breeding	The student should be able to: 1. Label correctly and completely, a diagram of a complete flower and state the function of each part. 2. Distinguish orally between self pollination cross-pollination. 3. Label correctly a monocot and a dicot seed. 4. Name at least five fruits or vegetables which have been improved by means of selective breeding.	CONCEPT: Relationship of plant breeding to the work of an ornamental horticulturist OBJECTIVE: The student should be able to list at least two activities engaged in by an ornamental horticulturist.	ORNAMENTAL HORTICULTURIST 1. The ornamental horticulturist propagates, raises, and markets flowers and crops for commercial purposes; propagates, plants, and cares for ground cover and trees in parks; and landscapes public and private areas. Professionals in this field generally specialize in floriculuture, arboriculture, nursery products or landscape development. 2. The most important quality the ornamental horticulturist can possess, regardless of his specialty, is a sincere desire to work with nature in the creation of beauty. People who hire ornamental horticulturists prefer graduates from a two-year college granting the Associate in Applied Science degree. However, it is very possible in most of these areas to obtain an entry job with a good high school background coupled with practical experience. 3. In the early 1970's graduates of two-year technical programs earned from $115 to $140 a week. Generally they work a 40-hour week. Fringe benefits usually include hospitalization, insurance coverage, retirement benefits and educational assistance. 4. The broad field or ornamental horticulture is presently growing at a tremendous rate. Increasing population, an affluent society and movement to the suburbs has increased demand for well-grown ornamental plants.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS

CURRICULUM:

1. Using a chart or model, illustrate the parts of a flower and give the function of each part.

2. Have the students do laboratory exercise 5-4, Characteristics of Flowering Plants, in the lab manual entitled Laboratory Exercises for Life Science which accompanied the previously adopted textbook.

3. Show and discuss the filmstrip entitled Wild Flowers of Texas which is available from the Texas Highway Department.

4. Have the students attempt to germinate some seeds to determine the effects of such factors as darkness, light intensity, temperature and various chemicals on the process.

5. Have the students collect and bring in pictures of as many hybrid fruits and vegetables as possible for display on the class bulletin board.

6. Show and discuss the film entitled Acres of Corn which is available from the Modern Talking Picture Service.

CAREER:

1. Invite a horticulturist to class to discuss his occupation.

2. Show and discuss the film entitled Vocations In Agriculture which is available from ESC Region 20.

3. Have interested students write to the American Horticultural Society for further career information.

4. Have interested student visit a local nursery and interview the people who work there.

CURRICULUM:

ESC REGION 20:
Films: #8613 Flowers At Work
#8359 Secrets Of The Plant World
#4767 Seed Dispersal

HARLANDALE AUDIO-VISUAL CENTER:
Films: 16-315 Growth Of Seeds
Filmstrips W/Records:
Q-58 Thru Q-65 Seed Plants Series
Q-58 a) The Major Kinds Of Seed Plants
Q-59 b) Their Uses (Seed Plants)
Q-62 c) How Flowers Make Seeds
Q-63 Seeds And Their Dispersal
Mi-16 Parts Of A Flowering Plant

CAREER:

ESC REGION 20:
Films: #8937 Vocations In Agriculture
#2053 The Farmer- Feast Or Famine

SCHOOL LIBRARY OR COUNSELOR'S OFFICE:
SRA Occupational Brief #376 Horticulturists

WRITE TO:

American Horticultural Society
901 North Washington Street
Alexandria, Virginia 22314

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
BACTERIA AND VIRUSES -Culturing and staining -Structure of bacteria -Virus structure -Protozoans	The student should be able to: 1. Differentiate orally between aerobic and anaerobic bacteria. 2. Describe accurately the procedure to be followed when culturing bacteria. 3. List, in proper order, the steps in the Gram stain. 4. Compare, in tabular form, ameba, euglena and paramecium in regard to their various life functions.	CONCEPT: Relationship of micro-organisms to the work of a bacteriologist OBJECTIVE: The student should be able to give at least one reason why he would or would not choose bacteriology as his life's work.	BACTERIOLOGIST 1. The bacteriologist studies the growth, structure, development and basic characteristics of bacteria and other microorganisms. He isolates and makes cultures of significant bacteria in prescribed media and identifies microorganisms by microscopic examination. The bacteriologist also makes chemical analyses of substances produced by bacteria on organic matter. 2. For most jobs in the field, a bachelors of science degree is the minimum requirement. Advancement is usually best for those professionals with advanced degrees. 3. The average annual salary for biological scientists was $15,000 in 1970. Only 10% earned less than $8,700 a year, and about 10% earned $26,000 or more. 4. Employment in the life sciences is expected to increase rapidly through the 1970's. However, along with the growing number of job openings, the number of life science graduates also is expected to increase. As a result, sharp competition is expected for the more desirable positions.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have students either make their own slides or have them view commercially prepared slides of the simple types of bacteria. 2. Have the students bring in magazine pictures of viruses and bacteria to be displayed on the class bulletin board. 3. Conduct a demonstration to illustrate the methods and techniques used in the culturing and incubation of bacteria. 4. Have the students do laboratory exercise 10-1, Man's Efforts to Understand Disease, in the lab manual entitles Laboratory Exercises for Life Science which accompanied the previously adopted textbook. 5. Using overhead transparencies discuss the structure, movement and cellular organization of the various types of protozoans. 6. Have the students bring in samples of water from ponds, stagnant pools and roadside ditches to view the variety of protozoans usually present in such samples. Perhaps some of the students can be encouraged to attempt to culture some of these organisms. 7. Have the students make notebook drawings of the various protozoans viewed under their microscopes from the samples they supplied themselves. CAREER: 1. Invite a microbiologist from a local college to class to discuss his work. 2. Have interested students visit the microbiology department of a local hospital to discuss the work done there by the employees. 3. Have interested students write to the American Society for Microbiology for further career information.	CURRICULUM: ESC REGION 20: Films: #8863 Life In A Cell #4349 Life In A Cubic Foot Of Soil #8721 Paramecium, Euglena And Ameba HARLANDALE AUDIO-VISUAL CENTER: Films: 16-632 Life In A Cubic Foot Of Air 16-16 Bacteria - Friend And Foe 16-354 Bacteria - Lab Study 16-551 Microbes And Their Control 16-375 Microscopic Life In The Soil 16-132 Protozoa (One-Celled Animals) 16-397 The World Of Little Things CAREER: SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #338 Microbiologist Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: American Society for Microbiology 115 Huron View Boulevard Ann Arbor, Michigan 48103	

URRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
LOWER ANIMALS -Invertebrates -Less well-known organisms and their importance	The student should be able to: 1. Classify correctly at least twenty familiar invertebrate animals into their proper phylum. 2. List at least four characteristics of invertebrates. 3. Describe at least two methods of controlling the population of the less desirable animal pests (e.g. insects).	CONCEPT: Relationship of the major class of arthropods to the work of an entomologist OBJECTIVE: The student should be able to discuss, in a short written paragraph, why he or she would or would not like to be an entomologist.	ENTOMOLOGIST 1. An entomologist studies insects and their relation to plant and animal life. He identifies and classifies all species of insects and aids in the control and elimination of harmful pests as well as develops new and improved insecticides. He developes the means to encourage the growth and spread of beneficial insects, including bees and those which are used as food by birds and fish. He also studies insect distribution and habitats and often makes recommendations to prevent the importation and spread of harmful types. 2. Young people contemplating a career in the life sciences should plan to obtain an advanced degree, preferably a Ph.D. degree. The advanced degree is required for the higher level college teaching positions and for independent research. Training leading to a bachelor's degree with a major in one of the life sciences is offered by almost all colleges and universities. 3. Salaries for scientist's in the life sciences are dependent upon the degrees held and the experience one has had. Those working in colleges and universities average about $16,000 a year in 1970. 4. Employment in this field is expected to increase substantially in the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have each student prepare a research report dealing with any two invertebrates. 2. Have the students make an insect collection. Be sure each of their specimens is properly classified and labeled. 3. Have the students dissect an earthworm as a representative of one of the most highly developed invertebrates. 4. Show and discuss any of the following films: a. Spider Engineers which is available from the Harlandale Audio-Visual Center. b. City of the Bees which is available from the Moody Institute of Science. 5. Have interested students make an ant farm and have them make daily observations. CAREER: 1. Invite a local entomologist to class to discuss his work. 2. Have interested students visit a pest control establishment to interview some of the workers there. 3. Have interested students write a research report dealing with the occupation of entomologist.	CURRICULUM: ESC REGION 20: Films: #8090 The Crayfish #8616 The Fresh Water Pond #8204 The Invertebrates HARLANDALE AUDIO-VISUAL CENTER: Film: 16-352 Insects CAREER: SCHOOL LIBRARY OR COUNSELOR'S OFFICE: Dictionary Of Occupational Titles Occupational Outlook Handbook	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
HICHER ANIMALS -Classes of vertebrates -Life cycles -Mammalian development	The student should be able to: 1. Correctly classify at least twenty-five common animals into the five classes of vertebrates. 2. List at least six characteristics all vertebrates have in common. 3. Dissect properly a fish or frog and identify all of the major body structures. 4. Trace the development of mammals through the three lines of development.	CONCEPT: Relationship of the common animal species to the work of a small animal veterinarian OBJECTIVE: The student should be able to describe, in a short paper, the requirements and preparation necessary to become a veterinarian.	VETERINARIAN 1. Veterinarians diagnose, treat and control numerous diseases and injuries among animals. They also perform surgery on animals, prescribe and administer drugs, medicines, serums and vaccines. In addition, they give advice on the care and breeding of animals. About 25,000 veterinarians were employed in 1970; only 2% were women. 2. A license is required in all states and to obtain it an applicant must have the degree of Doctor of Veterinary Medicine. In addition, a graduate from a veterinary school must pass a State Board exam and, in a few states, must have some practical experience under the supervision of a licensed veterinarian. The minimum requirement for the D.V.M. is 2 years of pre-veterinary work folfowed by 4 years of study in a college of veterinary medicine. 3. Experienced veterinarians working for the Federal Government generally earned between $13,500 and $26,700 a year. The income of veterinarians in private practice usually is higher than that of other veterinarians. Newly graduated veterianarians without experience earned $10,539 in the Federal Government in 1970. 4. Employment opportunities are expected to be good for veterinarians through the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Display pictures of the common game fish found in Texas Gulf waters along with a brief description of each. See bulletin #33 entitled Food and Game Fishes of the Texas Coast which is available from the Texas Parks and Wildlife Department. 2. Have each student prepare a poster depicting some of the poisonous snakes found in Texas. Refer them to bulletin #31 entitled Poisonous Snakes of Texas which is also available from the Texas Parks and Wildlife Department. 3. As a laboratory exercise, have the students dissect either a fish or a frog using a suitable lab sheet prepared by the teacher. 4. Have the students make a collection of pictures of birds from newspapers and magazines. They can divide up their scrapbooks into aquatic birds, game birds, and birds of prey. 5. Have each student select an order of mammals and make a collection of pictures of animals belonging to that order. **CAREER:** 1. Invite a local veterinarian to class to discuss his job. 2. Have interested students visit a local animal hospital to interview some of the people working there. 3. Have interested students write a research report using the Occupational Outlook Handbook and SRA Occupational Brief #139 entitled Veterinarians. 4. Have interested students write to the American Animal Hospital Association for further career information.	**CURRICULUM:** ESC REGION 20: Films: #2017 Birds And Mammals #8283 Nature's Strangest Creatures HARLANDALE AUDIO-VISUAL CENTER: Film: 16-378 The Frog Filmstrips: D-36 Through D-41 Forests Of Tropical America Series **CAREER:** HARLANDALE AUDIO-VISUAL CENTER: Cassette Tape: Cas T-30 Veterinarian SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #139 Veterinarians Dictionary Of Occupational Titles Occupational Outlook Handbook **WRITE TO:** American Animal Hospital Assn. P.O. Box 1304 Elkhart, Indiana 46514	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
HUMAN BODY -Anatomy -Skeletal and muscular systems -Voluntary and involuntary muscle	The student should be able to: 1. Label all of the major bones of the human body when given a diagram of the skeleton. 2. List the three kinds of muscle tissue and give an example of where each is found in the body. 3. List at least five kinds of joints and give an example of each. 4. Define, or discuss, in his own words, the following terms: a. ossification b. synovial fluid c. antagonistic	CONCEPT: Relationship of the human anatomy to the work of an artist OBJECTIVE: The student should be able to discuss, in a short paper, why he would or would not like to be an artist.	COMMERCIAL ARTIST 1. Commercial artists create the formats of magazines and other publications, direct mail advertising, television commercials and other communications media. Some specialize in fashion drawings, greeting card illustrations or in technical sketches for industry. Many work as freelance artists selling their work to anyone and a few teach in art schools. About 60,000 commercial artists were employed in 1970, of these about two-fifths were women. 2. Artistic ability is the most important qualification for success in commercial art in addition to specialized training in the techniques of commercial and applied art. Fine arts courses in painting, sculpture and architecture are desirable and sometimes essential for advancement. Training can be acquired in an art school or institution that specializes in commerical art. The course of study usually takes 2 or 3 years and leads to a certificate upon graduation. 3. Employment opportunities for talented and trained commercial artists is expected to be favorable through the 1970's. Young people with only average ability probably will face competition for beginning jobs and will have limited opportunity for advancement.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS

CURRICULUM:

1. Using the discussion method, give a brief introduction to the development of the human body. Have the students make a comparison of their present height, weight and torso length to those measurements when they were born.

2. Using a chart or a model of the human skeleton, drill the students until they know all of the major bones of the body.

3. Have the students do either of the following laboratory exercises:
   a. #7.2 The Skeletal System in the laboratory manual entitled Laboratory Excrcises for Life Science.
   b. #36 Them Bones, Them Bones in the lab manual entitled Life Science-A Learning Strategy for the Laboratory.

4. Issue each student two outlines of the skeletal system. Have the students label one with all of the names of the bones and on the other have the students sketch in the major muscles of the body.

5. Using a live frog, have the students expose and study the muscle action of the gastrocnemius muscle when it is stimulated.

6. Using a preserved frog, have the students expose and study as many body and leg muscles as possible.

CAREER:

1. Invite a local commercial artist or the art teacher to class to discuss art as an occupation.

2. Have interested students view the film entitled Changing Art in a Changing World which is available from ESC Region 20.

3. Have interested students listen to the cassette tape entitled Commercial Artist which is available from the Harlandale Audio-Visual Center.

CURRICULUM:

HARLANDALE AUDIO-VISUAL CENTER:
Films: 16-355 About The Human Body
16-398 Human Body: Muscular System
16-298 Muscles And Bones Of The Body
16-146 The Skeleton
16-250 Spinal Column

CAREER:

ESC REGION 20:
Film: #8470 Changing Art In A Changing World

HARLANDALE AUDIO-VISUAL CENTER:
Films W/Records: PR-744 Thru PR-748 Artist Series
Cassette Tape: Cas T-42 Commercial Artist

SCHOOL LIBRARY OR COUNSELOR' OFFICE:
SRA Occupational Brief #65 Commercial Artists

Dictionary Of Occupational Titles

Occupational Outlook Handbook

WRITE TO:

American Institute of Graphic Arts
1059 Third Avenue
New York, New York 10021

RICULUM NCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
CIRCULATORY SYSTEM -Arteries, veins and capillaries -Blood and lymph -Clotting and blood types	The student should be able to: 1. Label correctly, a diagram of the human heart. 2. Differentiate orally between the structure and functions of arteries veins and capillaries. 3. List at least three functions of the blood. 4. Define accurately the following terms: a. hemoglobin b. Rh factor c. universal r d. universal recipient e. lymph f. antibodies	CONCEPT: Relationship of the circulatory system to the work of a practical nurse OBJECTIVE: The students should be able to list the requirements necessary for becoming a practical nurse.	LICENSED PRACTICAL NURSE 1. Licensed practical nurses help in caring for persons physically or mentally ill. Under the direction of physicians and registered nurses, they provide nursing care requiring technical knowledge but not the professional training of a registered nurse. Some of the duties include: taking temperatures and blood pressures, changing dressings, administrating certain medicines, bathing bed patients, and helping them in other ways. About 370,000 licensed practical nurses were employed in 1970. The great majority were women. 2. All states require licensing. These licenses are issued only to those who have completed a course of instruction in practical nursing and who have also passed a licensing examination. Young persons seeking a career in this field usually must have completed at least 2 years of high school training including both classroom instruction and clinical practice. 3. Licensed practical nurses received starting salaries of about $110 a week in 1970. Many hospitals and institutions give licensed practical nurses periodic pay increases as experience is gained. 4. Opportunities in this occupation should be favorable in the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. As a class exercise, have the students perform the following activities: a. determine the pulse rate of one another before and after moderate exercise. b. determine the number of heartbeats per minute. c. listen to the sounds of the heart through a stethoscope. 2. Give each student an outline of the human circulatory system. Have each student color and label all of the major arteries and veins. They can use a red pencil for arteries and a blue one for veins. 3. Have the students observe capillary flow in the tail of a live goldfish. Various stimulants and depressants can be used to illustrate their effects. 4. Show and discuss the film entitled Hemo the Magnificant which is available from the Bell Telephone Company. 5. Obtain an EKG from a cardiologist and make a display on the bulletin board. Indicate how the EKG is read. 6. Have the student dissect and study a beef heart to learn about its structure and major vessels. CAREER: 1. Invite a licensed practical nurse to class to discuss his or her work. 2. Have interested students listen to a cassette or magnetic tape dealing with nursing. 3. Have interested students go to a local hospital to interview a nurse. 4. Have interested students write to the ANA-NLN Nursing Careers Program for further career information.	CURRICULUM: ESC REGION 20: Films: #4465 Phagocytes - The Body's Defenders HARLANDALE AUDIO-VISUAL CENTER: Films: 16-80 Heart And Circulation 16-68 Mechanisms Of Breathing 16-345 Work Of The Blood CAREER: HARLANDALE AUDIO-VISUAL CENTER: Cassette Tape: Cas T-45 Nurse Magnetic Tape: MT-261 Your Future As A Licensed Practical Nurse SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #119 Licensed Practical Nurse Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: ANA-NLN Nursing Careers Program American Nurses' Association 10 Columbus Circle New York, New York 10019	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
EXCRETORY SYSTEM -Skin and kidneys -Skin derivatives -hair and nails -Respiratory system	The student should be able to: 1. Label correctly, a diagram of a cross-section of human skin. 2. Define correctly or give the function of each of the following: a. ureter b. cortex c. medulla d. nephron e. bladder f. pelvis g. urethra h. diabetes 3. List at least four functions of the human sking. 4. Label correctly a diagram of the respiratory system and give the function of each part.	CONCEPT: Relationship of the skin and hair to the work of a barber OBJECTIVE: The student should be able to state orally why he would or would not consider barbering as a career.	BARBER 1. Barbers care for the hair, face and scalp. They may give hair and scalp treatments, shaves, facial massages and shampoos. Their primary duty, however, is to satisfactorily cut the hair of each of their customers. Those who own or manage a shop have the additional respeonsibilities of ordering supplies, paying bills, keeping records and hiring employees. About 180,000 barbers were employed in 1970 and more than half owned and operated their own shops. 2. To obtain the required state license, a candidate must have graduated from a state approved barber school. All but a few states require the beginner to take an examination for an apprentice license; then, usually after working 1 or 2 years as an apprentice, he takes a second examination for his license as a registered barber. Training is offered in many public and private schools. The courses usually last 6 to 11 months and include from 1,000 to 2,000 hours of instruction and practice. 3. Weekly earnings of experienced barbers (including tips) generally ranged from $150 to $175 in 1970. Some barbers who owned their own shops earned more than $250 a week. Apprentices usually earned $85 to $125 a week. 4. Employment of barbers is expected to grow slowly through the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Using the textbook as a guide, have the students draw and label the skin and the kidney. 2. Have the students trace the excretory systems in a number of animals which have been previously studied in class. Include such animals as the earthworm,the frog and the grasshopper. 3. As a demonstration, illustrate the mechanics of breathing. This can be done using a bell jar, a Y-tube and a rubber sheet. 4. Have the students compile a table showing the heartbeat and respiration rate of a number of animals selected by the teacher. 5. Have the students trace the path of air through the respiratory system using a cut-away diagram supplied by the teacher. CAREER: 1. Invite a local barber to class to discuss his work. Perhaps he can be persuaded to give a free haircut as a demonstration of his talents. 2. Have interested students visit a barber school and interview some of the trainees. 3. Have interested students listen to the magnetic tape entitled Your Future in Beauty Culture which is available from the Harlandale Audio-Visual Center. 4. Have interested students write to the Associated Master Barbers and Beauticians of America for further career information.	CURRICULUM: ESC REGION 20: Films: #8862 Your Skin HARLANDALE AUDIO-VISUAL CENTER: Films: 16-30 Care Of Hair And Nails 16-227 The Human Hair 16-187 Work Of The Kidneys CAREER: HARLANDALE AUDIO-VISUAL CENTER: Magnetic Tape: MT-214 Your Future In Beauty Culture (for both sexes) SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #162 Barbers Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: Associated Master Barbers And Beauticians of America 219 Greenwich Road Charlotte, North Carolina 28211	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
DIGESTIVE SYSTEM -Parts of the digestive system -Mouth and teeth, stomach and intestines -Associated organs of the digestive system	The student should be able to: 1. List, in proper order, the parts of the alimentary canal and give the basic function of each part. 2. Define or discuss briefly each of the following terms: a. villi e. peristalsis b. valve f. lacteal c. enzyme g. pyloric valve d. bile 3. Write a brief paper dealing with the proper care and cleaning of teeth.	CONCEPT: Relationship of the mouth to the work of a dentist OBJECTIVE: The student should be able to list at least two reasons why he would or would not like to become a dentist.	DENTIST 1. Dentists who are in general practice must have a broad knowledge of their field. When a patient enters, he must carefully examine him to determine mouth diseases or other dental conditions that may require correction. The dentist often uses x-rays in making his examinations. His primary duty is the treatment and restoration of decaying teeth to a healthy condition. Frequently he must extract teeth which cannot be saved. For those who have lost all, or some, of their teeth, dentist can design and fit complete or partial dentures. 2. Students wishing to become dentists usually must have a B.S. degree before beginning the professional curriculum. Dental schools admit only those students whose scholastic records are better than average. Only 40% percent of the applicants in 1966-67 were accepted in the nation's 49 dental schools. Also all applicants must take a performance or aptitude test which measures not only intellectual aptitudes but the ability to read scientific information with understanding and manual dexterity. 3. In 1968, the majority of dentists had net annual incomes between $12,000 and $25,000. Many earn much more than that. 4. About 111,000 dentists will be needed by 1975 to maintain even the present-day standards of health.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS

CURRICULUM:

1. Have the students draw a sketch of the human digestive system being sure to label all of the parts including associated structures. Have them indicate the function of each of the parts on the drawing.

2. Have the students complete a table showing the digestive enzymes, their locations in the digestive tract and the substances upon which they act.

3. Have the students test for sugar and starch in their own samples of saliva using Fehlings A and B solutions and iodine.

4. Have the students do laboratory exercise 7.1, The Digestive System, in the lab manual entitled Laboratory Exercises for Life Science which accompanied the previously adopted text.

CAREER:

1. Invite a dentist to class to talk about his training and his work.

2. Have interested students listen to the cassette tape entitled Dentists which is available from the Harlandale Audio-Visual Center.

3. Have interested students write to the American Association of Dental Schools for further career information.

CURRICULUM:

ESC REGION 20:
Films: #4048 Balance Your Diet For Health And Appearance
#8186 The Human Body - Nutrition And Metabolism

HARLANDALE AUDIO-VISUAL CENTER:
Films: 16-610 Food That Builds Good Health
16-46 Digestion Of Foods
16-474 The Digestive System
16-62 Foods And Nutrition

CAREER:

HARLANDALE AUDIO-VISUAL CENTER:
Cassette Tape: Cas T-26 Dentist

SCHOOL LIBRARY OR COUNSELOR'S OFFICE:
SRA Occupational Brief #68 Dentists

Dictionary Of Occupational Titles

Occupational Outlook Handbook

WRITE TO:

American Association of Dental Schools
211 East Chicago Avenue
Chicago, Illinois 60611

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
NERVOUS SYSTEM -Brain and spinal cord -The senses	The student should be able to: 1. Label correctly a cross-sectional diagram of the brain and spinal cord. Alongside each label, give the function of each part. 2. Distinguish orally between a sensory and a motor neuron. 3. Define accurately each of the following terms: a. dendrites b. axon c. cell body	CONCEPT: Relationship of the brain and spinal cord to the work of a chiropractor OBJECTIVE: The student should be able to relate, in a short paper, the activities and responsibilities of a chiropractor.	CHIROPRACTOR 1. Chiropractic is a system of treatment based on the principle that one's health is determined mainly by his nervous system. Chiropractors treat their patients primarily by manipulation of parts of the body, especially the spinal column. Most chiropractors use x-rays; water, light and heat therapy; and prescribe diet exercise and rest. They do not use drugs or surgery in their treatment of patients. About 16,000 chiropractors were employed in 1970; about 9% were women. 2. Most states require a license and success on a state board exam. Usually a 4-year chiropractic course following high school must be completed and upon graduation the Doctor of Chiropractic degree (D.C.) is granted. Most newly licensed chiropractors either set up a new practice or purchase an established one. Some begin on salaries until they acquire the necessary funds to establish their own practice. 3. Experienced chiropractors generally averaged yearly incomes from $14,000 to $28,000 in 1970. 4. The employment picture for chiropractors is expected to be favorable through the 1970's, although only a slight increase in services is expected.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have the students do laboratory exercise 8.2, Man's Nervous System, in the laboratory manual entitled Laboratory Exercises for Life Science which accompanied the previously adopted textbook. 2. Bring to class a section of the cow's spinal cord and vertebral column obtained from a meat packing house and have a class discussion on how these structures are a part of the nervous system. 3. Divide the class up into pairs and have one student from each pair, as a homework assignment, prepare a sealed shoe box with several items inside. The next day have each of the other students in each pair attempt to guess what is in the box using his senses. The same type of exercise can be done using odors or sounds with the students blindfolded. 4. Show and discuss the film entitled Exploring the Human Nervous System which is available from the Harlandale Audio-Visual Center. 5. Show and discuss the film entitled Gateways to the Mind which is available from the Bell Telephone Company. CAREER: 1. Invite a local chiropractor to class to discuss his work. 2. Have interested students do a research report using the SRA Occupational Brief #288 entitled Chiropractors and the Occupational Outlook Handbook. 3. Have interested students write to the American Chiropractic Association for further career information.	CURRICULUM: HARLANDALE AUDIO-VISUAL CENTER: Films #16-423 Exploring The Human Nervous System #16-204 The Human Brain #16-109 The Nervous System #16-114 The Nose CAREER: SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #288 Chiropractors Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: American Chiropractic Association 2200 Grand Avenue P.O. Box 1535 Des Moines, Iowa 50306	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
THE EYE AND EAR -Autonomic nervous system -Endocrine system	The student should be able to: 1. When presented with a diagram of the eye or ear, label it correctly and give the function of each part. 2. List at least three functions or activities of the autonomic nervous system. 3. List at least five endocrine glands along with the hormone or hormones produced by them.	CONCEPT: Relationship of the knowledge of the eye the work of an optometrist OBJECTIVE: The student should be able to list at least two duties of an optometrist.	OPTOMETRIST 1. Optometrists make tests to determine vision problems and the presence of eye diseases and abnormalities. They prescribe vision aids including regular and contact lens, corrective eye exercises and other optical treatments that do not require drugs or surgery. Most supply the eye glasses prescribed as well as do minor repairs on eye glasses. 2. A license is required to practice optometry in all states. Applicants for licenses must be graduates of an accredited school of optometry and pass the state board exam. At least 6 years of college are required to become an optometrist. All schools of optometry grant the degree of Doctor of Optometry (O.D.) 3. In 1970, beginning salaries of new graduates in this field ranged about $10,000 to $12,000 a year. The average net income of those with experience was about $25,000. 4. The employment outlook for new optometry graduates is expected to be favorable through the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Using a large chart of the eye and the ear, point out all of the major parts and discuss the function of each of them. 2. As a class exercise, have the students dissect a calf or beef eye in order to see the relationship of all of the structures. 3. Have the students engage in a contest to see who can build the best model of the eye or the ear. 4. Have the students do the experiment entitled Eye Pupil Changes which is found on page 352 of their textbook. 5. Have the students write to the Sonotone Corporation for a colored sectional diagram of the ear. CAREER: 1. Invite a local optometrist to class to discuss his training and his work. 2. Have interested students listen to the record and view the filmstrip entitled Cptical Technician which is available from the Harlandale Audio-Visual Center. 3. Have interested students prepare a written report on the occupation of optometrist using the SRA Occupational Brief #34 entitled Optometrists and the Occupational Outlook Handbook. 4. Have interested students write to the American Optometric Association for further career information.	CURRICULUM: ESC REGION 20: Films: #8864 Animals Hear In Many Ways #4731 Eyes And Vision HARLANDALE AUDIO-VISUAL CENTER: Films: 16-182 The Ears And Hearing 16-53 Endocrine Glands 16-186 Eyes And Their Care Filmstrips: K-78 How Hormones Control The Body CAREER: HARLANDALE AUDIO-VISUAL CENTER: Filmstrips W/Records: PR-700 (AA-44) Optometric Assistant PR-700 (AA-45) Optical Technician SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #34 Optometrists Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: American Optometric Association 7000 Chippewa Street St. Louis, Missouri 63119	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
KEEPING HEALTHY -Diseases -Koch's postulates	The students should be able to: 1. List at least two methods of natural defense against disease used by the body. 2. Differentiate orally between acquired immunity and passive immunity. 3. Explain, in his own words, the four basic postulates put forth by Koch.	CONCEPT: Relationship of injuries and disease to the work of a hospital attendant OBJECTIVE: The student should be able to discuss, in a short paragraph, why he would or would not like to be a hospital attendant.	HOSPITAL ATTENDANT 1. Under the direction of registered nurses and licensed practical nurses, hospital attendants contribute to the comfort and care of patients. Women attendants are called nursing aides and men are often know as orderlies. Nursing aides answer patients' bell calls and deliver messages, serve meals, feed patients, make beds, and bathe or dress patients. They also may give massages, take temperatures, transport patients and set up medical equipment. An estimated 830,000 attendants were employed in 1970; more than four-fifths were women. 2. Although some employers hire persons with less than a high school education, graduates are usually preferred. Hospital attendants generally are trained after they are hired. Training may last several days or may continue over a period of a few months depending on the institution and the attendant's aptitude for the work. 3. Weekly earnings of hospital attendants averaged $80.50 in state and local hospitals in early 1969. Those working in Veteran's Administration hospitals began at $89 a week in 1970. 4. Employment of hospital attendants is expected to increase rapidly through the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have each student give an oral report on a disease assigned by the teacher. They should research the causes, symptoms, history and prevention of these diseases. Be sure that the reports are brief and to the point so as to conserve time. 2. Have the students make a notebook collection of current events articles from magazines and newspapers dealing with modern medical achievements. 3. Have the students, using Koch's postulates, outline how the cure for a disease is discovered. 4. Show and discuss the film entitled The Story of Doctor Lister which is available from the Modern Talking Picture Service. CAREER: 1. Invite a local hospital attendant to class to discuss his or her occupation. 2. Have interested students listen to the record and view the filmstrip entitled Working in a Hospital which is available from the Harlandale Audio-Visual Center. 3. Have interested students visit a hospital and interview a hospital attendant. 4. Have interested students write to the American Hospital Association for further career information.	CURRICULUM: ESC REGION 20: Films: #4820 The Traitor Within HARLANDALE AUDIO-VISUAL CENTER: Films: 16-60 First Aid On The Spot CAREER: HARLANDALE AUDIO-VISUAL CENTER: Filmstrips W/Record: PR-706 (AA-56) Working In A Hospital PR-699 (AA-42) Nurse's Aide F-79 The Nurse's Aide SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #236 Hospital Attendants Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: American Hospital Association 840 North Lake Shore Drive Chicago, Illinois 60611	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
DISEASE DEFENSES -Vaccination, antibiotic's, and chemotherapy -Vectors of disease	The student should be able to: 1. Define, in his own words, the following terms: a. epidemic b. vaccination c. immunity d. antibiotic 2. List the seven symptoms which may indicate the presence of cancer. 3. Name at least three disinfectants commonly found in the home. 4. List at least four antibiotics along with the diseases treated by each.	CONCEPT: Relationship of antibiotics and chemotherapy to work in the drug industry OBJECTIVE: The student should be able to list at least one reason why he would or would not want to work in this industry.	DRUG INDUSTRY OCCUPATIONS 1. In 1970, about 150,000 employees were working in the drug industry. Most of these workers were in drug plants which typically employ large numbers of employees. Some of the specific jobs include pharmaceutical operators, compounders, pill and tablet coaters, testers, ampoule fillers as well as many other workers in administrative, clerical, sales or scientific positions. 2. Training requirements for jobs in the drug industry range from a few hours of on-the-job training to years of preparation for professional workers. 3. Earnings of plant workers in this industry are higher than the average for manufacturing industries. Production workers in the industry averaged $143.37 for a 40 hour week. National wage data are not available for individual occupations in the drug industry. 4. Drug manufacturing employment is expected to grow rapidly through the 1970's creating several thousand job openings annually.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have the students construct a chart illustrating all of the diseases which can be controlled by vaccination. 2. Have the students request free materials from the local American Cancer Society office. Have a class discussion on the seven danger signs of cancer, methods of treatment and current research in this field. Note: Use overhead transparencies provided free to teachers from the American Cancer Society. 3. Show and discuss the film entitled Unseen Enemies which is available from the Shell Oil Company Film Library. 4. Have a class discussion dealing with the vaccinations which are required for those attending public schools and for those wishing to travel outside the United States. CAREER: 1. Invite a worker from the drug industry to class to discuss opportunities in this field. 2. Have interested students write a report on occupations in the drug industry using SRA Occupatioanl Brief #172 and the Occupational Outlook Handbook. 3. Have interested students write to the National Pharmaceutical Council for further career information.	CURRICULUM: ESC REGION 20: Films: #4254 The Housefly And It's Control SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #172 Drug Manufacturing Workers Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: National Pharmaceutical Council, Inc. 1030 15th Street N.W. Washington, D.C. 20005	

RRICULUM ONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
IMPORTANCE OF GOOD HABITS ON HEALTH -Tobacco -Alcohol and narcotics -Safe living	The students should be able to: 1. Explain orally what is meant by a stimulant, a depressant and a narcotic. 2. List at least 2 physiological effect of tabacco on the human body. 3. Use correctly in a sentence the following terms: a. barbiturate b. amphetamine c. hallucinatory 4. Discuss, in a short paragraph, the possible effects of LSD on behavior and human heredity.	CONCEPT: Relationship of alcohol tobacco and narcotics to the work of an IRS agent OBJECTIVE: The student should be able to list at least two requirements necessary for becoming an IRS agen as well as a reason why he would or would not like to pursue this line of work.	INTERNAL REVENUE AGENT (ALCOHOL AND TOBACCO TAX INSPECTOR) 1. This work involves inspecting distilleries breweries, wineries, cigar and cigarette manufacturing plants, liquor companies and related establishments. The inspector analyzes the records of these establishments to check their tax payments and/or to determine if they are complying with federal manufacturing regulations. 2. Four years of college-level study are required for this job. After appointment this agent will enter a six-month internship to train for the work. 3. Agents with a bachelor's degree may start at $10,012 a year; those with a master's begin at $10,819 a year. Agent trainees usually earn promotions to bring their salaries to $12,615 a year in one to two years. Over 50% of the agents employed have incomes which range from $12,600 to $17,500 a year. 4. There are between 1500 and 2000 openings for internal revenue agents each year. These figures are likely to increase in the future due to many additional taxpayers.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Show and discuss the film entitled Smoke or Not to Smoke which is available from the American Cancer Society. 2. Have the students do any of the following laboratory exercises in Ideas and Investigations in Science by Wong and Dolmatz: a. Effects of Drugs on Blood Flow in a Capillary of a Goldfish (Page 145-Teacher's manual). b. Effects of Smoking (Page 157-Teacher's manual). 3. Have a representative from the narcotics division of the local police force visit the class to talk about the legal implications of using drugs. 4. Have the students do laboratory exercise 10.2, Control and Prevention of Disease, in the lab manual entitled Laboratory Exercises for Life Science which accompanied the previously adopted textbook. 5. Using a special chart, assign the names of several drugs to a group of students. Have each group report orally to the class on the symptoms and dangers of these drugs. A chart is available from the Bureau of Narcotics and Dangerous Drugs entitled Terms and Symptoms of Drug Abuse. CAREER: 1. Invite a narcotics, tobacco or alcohol revenue agent to class to discuss his occupation. 2. Have interested students listen to the magnetic tape entitled Your Future in the Internal Revenue Service which is available from the Harlandale Audio-Visual Center. 3. Have interested students write to the Internal Revenue Service for further career information.	CURRICULUM: ESC REGION 20: Films: #8687 A Breath Of Air #8178 Hooked #4972 Smoking And You HARLANDALE AUDIO-VISUAL CENTER: Films: 16-310 Drug Addiction 16-527 Narcotics - The Inside Story 16-565 Narcotics - Why Not 16-302 Alcohol And The Human Body 16-573 None For The Road Filmstrips W/Records: PR-350 LSD: The Acid World PR-354 Tabacco And Alcohol: The $50,000 Habit Records W/Filmstrips: Marijuana: What Can You Believe CAREER: HARLANDALE AUDIO-VISUAL CENTER: Magnetic Tape: MT-281 Your Future In The Internal Revenue Service SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #335 Internal Revenue Agents Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: Internal Revenue Service Department of the Treasury Washington, D.C. 20224	

URRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
NUTRITION -Vitamins -Food nutrients -Calories	The student should be able to: 1. State accurately the function of each of the groups of nutrients. 2. List at least three diseases which are caused by the lack of a vitamin. 3. Prepare a proper diet of meals for a period of a week. 4. Define or discuss, in a short statement, each of the following terms: a. nutrient b. calories c. amino acid d. minerals	CONCEPT: Relationship of food and proper diet to the work of a chef or cook OBJECTIVE: The student should be able to list the duties and responsibilities of a chef or cook.	CHEF OR COOK 1. The nature of a cook's job depends somewhat on where he works. His duties also depend on the size of the establishment since there may be one cook who prepares all the food or many cooks helpers who share the work. The cook decides on the size of the food portions served, plans menus and also purchases food supplies. In addition, he has the responsibility of seeing to it that the dishes served taste good and are attractive. Approximately 740,000 cooks and chefs were employed in 1970. 2. Most cooks--particularly those who work in small eating places--acquire their skills on the job while working as kitchen helpers. Many cooks acquire higher paying positions and new cooking skills by moving from restaurant to restaurant. Some go into business as caterers or owners while others may become instructors at vocational schools and other institutions. 3. Average straight-time hourly earnings for cooks and chefs ranged from $2.02 to $4.65 in 1970. Wages vary greatly according to geographic location and the type of establishment. In large restaurants and hotels chefs and cooks earn considerably more. Those with national reputations may make more than $25,000 a year. 4. Employment in this field is expected to increase moderately through the 1970's as new food establishments open.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have the students collect food fad statements from television and newspapers. Have them analyze these statements for factual knowledge. 2. Have a contest to see who can collect the most diet plans from magazines, newspapers and other sources. 3. Have the students make a chart showing the nutritional values of common foods. Cereal packages, some canned items and other foods now give this information. 4. Have the students do laboratory exercise 7.1, The Digestive System, in the lab manual entitled Laboratory Exercises for Life Science which accompanied the previously adopted text. 5. Have the students plan a 1200 and a 2800 calorie menu for a day. 6. Have the students write a short paper on "How You Can Starve on Three Meals a Day". CAREER: 1. Invite a cook or chef to class to discuss his work. Perhaps he can be persuaded to demonstrate some of his talents. 2. Have interested students do a research report using the SRA Occupational Brief #115 entitled Cooks and Chefs and the Occupational Outlook Handbook. 3. Have interested students write to the Council on Hotel, Restaurant and Institutional Education for further career information.	CURRICULUM: ESC REGION 20: Films: #2085 Ingestion And Digestion HARLANDALE AUDIO-VISUAL CENTER: Film: 16-62 Foods And Nutrition CAREER: SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #115 Cooks and Chefs Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: Council on Hotel, Restaurant and Institutional Education Statler Hotel Ithaca, New York 14850	

RICULUM NCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
INHERITANCE -Dominant and recessive -Hybrids -Mendel's laws -Sex determination -Sex-linked traits -Mutation	The student should be able to: 1. Solve at least eight out of ten simple genetics problems in which dominance, recessiveness, incomplet dominance, and sex-linked traits are involved. 2. Discuss, in a short paper, the experiments performed by Medel along with his conclusions. 3. Construct a pedigree for a trait found in his family. 4. Write a brief paper about the presence of mutations in a population.	CONCEPT: Relationship of the laws of inheritance to the work of a dairy production technician OBJECTIVE: The student should be able to state orally why the work of a dairy production technician.	DAIRY PRODUCTION TECHNICIAN 1. The dairy production technician breeds and raises dairy cattle for production of milk and milk products. As the dairy industry has become more specialized, there has been a heavy reliance upon trained dairy technicians to mix their dairy rations, to provide advice concerning breeding selections and to keep and interpret records as they apply to feeding, culling and the selection of herd replacements. 2. High school graduation is required for becoming a dairy production technician, and more and more dairy farms are hiring people with at least two years of college. A sound background in the biological sciences as well as a real desire to work with animals is a necessity to be successful in the occupation. Licensing is not required in most dairy production jobs. Artificial inseminators, however, must complete a 10 day training session. 3. Beginning salaries for these technicians range from $6,500 to $8,000 a year. Fringe benefits may also include room and board, laundry, milk and sometimes a meat supply. 4. In the early 1970's two to four jobs were available for each graduate, and the indication is that this will not change.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Using the lecture method, introduce the unit on genetics. Be sure to include a discussion of the necessary terminology and of the importance of this unit. 2. Demonstrate the proper methods for the solution of genetics problems involving dominant and recessive traits, sex-linked characteristics and incomplete dominance. 3. Have the students do laboratory exercise 9.2, The Study of How Inheritance Occurs, in the lab manual entitled Laboratory Exercises for Life Science. 4. Have the students prepare a book report on the life of Gregor Mendel or Luther Burbank. 5. Show and discuss the filmstrip entitled Heredity which is available from the Harlandale Audio-Visual Center. CAREER: 1. Invite a worker from a local dairy to class to discuss the opportunities in this field. 2. Have interested students visit a dairy to learn about the various jobs available in the industry. 3. Have interested students write to Dairy Research, Inc. for further career information.	CURRICULUM: ESC REGION 20: Films: #8335 Radiation In Biology - An Introduction HARLANDALE AUDIO-VISUAL CENTER: Filmstrips: K-77 Heredity SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #214 Dairy Technologists Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: Dairy Research, Inc. 120 Eastman Bldg. Arlington Heights, Illinois 60004	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
MAN'S IMPROVEMENT OF LIVING THINGS -Heredity -Plant breeding -Animal breeding -Pedigrees	The student should be able to: 1. Use correctly in a sentence, the following terms: a. purebred b. hybrid vigor c. blending 2. List at least three kinds of animals produced by selective breeding and alongside each, state what favorable characteristic was being sought. 3. Construct a pedigree for a trait found in his or her family. 4. List at least five kinds of plants that are a result of improved breeding.	CONCEPT: Relationship of animal breeding to the work of a livestock farmer or cattleman OBJECTIVE: The student should be able to write a short paper on what it would be like to be a livestock farmer.	LIVESTOCK FARMER 1. A livestock farm is a good choice for someone interested and skilled in working with livestock and mechanical equipment. Practically all of the regular labor on most livestock farms is provided by the operator and his family. 2. To be successful a young man needs to appraise his aptitude, interests, experience, knowledge and skill in handling livestock and machinery. He must also consider his labor supply and his financial resources. 3. The livestock farmer's income is not well distributed throughout the year and it is also not likely to be uniform from year to year. Also income is dependent upon the type of livestock involved. Some income information can be found in the Occupational Outlook Handbook. (page 584) 4. Although the number of farms is decreasing, some rewarding and desireable opportunities occur from time to time in agriculture and related pursuits.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have the students compile a list of as many plant and animal hybrids as they can find in the literature and show how each has contributed to the well-being of mankind. 2. Show and discuss the film entitled Acres of Corn which is available from the Modern Talking Picture Service. 3. Have students secure a seed catalogue and draw pictures of several hybrid flowers and vegetables. 4. Have the class conduct a survey as to which students possess such features as a widow's peak, attached ears or the different blood types. 5. Show and discuss the film entitled Mystery of Life which is available from ESC Region 20. CAREER: 1. Invite a local cattleman or livestock farmer to class to discuss his occupation. 2. Have interested students visit a local ranch and discuss the jobs which are available there. 3. Have interested students prepare a report using the SRA Occupational Brief entitled Cattlemen which is available in the school library or counselor's office. 4. Have interested student write to the American Hereford Association for further career information.	CURRICULUM: ESC REGION 20: Films: #2115 Mystery Of Life CAREER: HARLANDALE AUDIO-VISUAL CENTER: Films: 16-689 Cattleman: A Ranchers Story Filmstrips: M-97 The Story Of Agriculture And Stock Raising SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #42 Cattlemen Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: American Hereford Association Hereford Drive Kansas City, Missouri 64105	

RRICULUM ONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
FUTURE OF THE BIOLOGICAL SCIENCES -Evidence of past changes -Evolution theory and natural selection -Challenges of unsolved problems in science -Evolution	The student should be able to: 1. List at least two example of fossils. 2. Name the five major eras of geologic history in correct chronological order. 3. State, in his own words, the theory of evolution. 4. Explain, in his own words, what is meant by natural selection and name the four factors which contribute to it. 5. List at least three unsolved problems in biology. 6. Name at least two things he can do to help solve some of these problems.	CONCEPT: Relationship of the unsolved problems in biology to the work of a science writer OBJECTIVE: The student should be able to write a short essay on what it would be like to be a science writer.	SCIENCE WRITER 1. Science writers not only write about what scientists are doing but also offer criticisms of specific programs. They work wherever scientists are gathered to conduct and discuss their research. A great number of research institutions are located in metropolitan areas, so it is not surprising that most science writers work in large urban centers. Over half of the science writers in the United States are engaged in public relations, with about 15% working for newspapers. This occupation often involves attending meetings of various scientific organizations. Science writers must look over a large amount of very technical materials and then carefully report about it in terms an average reader can understand. 2. Many science writers in the past succeeded with only high school training and a talent for writing. Today most people in this field are college graduates with degrees in journalism, liberal arts or science. 3. Journalism graduates usually start at salaries up to $8,500 a year. Top science writers on metropolitan newspapers may earn as much as $25,000 or more depending on skill and experience. 4. Science writing will be an important job as long as science remains a significant aspect of American life.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have the students bring in as many fossils as they may possess for a class display. Perhaps the class can go on a field trip to a local area where fossils are known to exist. 2. Have a class discussion dealing with the different theories of evolution and explain how each theory adds to the total concept of evolution. 3. Show and discuss the filmstrip entitled Evolution and Extinction which is available from the Harlandale Audio-Visual Center. CAREER: 1. Invite a science writer to class to discuss his occupation. Perhaps one from a local newspaper would be available and willing. 2. Have interested students do a research paper using the SRA Occupational Brief entitled Science Writers and the Occupational Outlook Handbook which are available from the school library or counselor's office. 3. Have interested students listen to the cassette tape entitled Technical Writer which is available from the Harlandale Audio-Visual Center. 4. Have interested students write to the National Association of Science Writers for further career information.	CURRICULUM: HARLANDALE AUDIO-VISUAL CENTER: Filmstrip W/Record: PR-735 (BB-73) Evolution And Extinction CAREER: HARLANDALE AUDIO-VISUAL CENTER: Cassette Tape: Cas T-35 Technical Writer SCHOOL LIBRARY OR COUNSELOR'S OFFICE: SRA Occupational Brief #370 Science Writers Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: National Association of Science Writers P.O. Box H Sea Cliff, New York 11579	

RICULUM NCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
ANIMAL AND PLANT RELATIONSHIPS -Ecology -Living things and the environment -Conditions for life -Community boundaries -Energy sources for survival -Life zones -Individual and collective adaptations	The student should be able to: 1. Define, in his own words, the following terms: a. ecology b. biosphere c. community d. niche 2. List at least four conditions necessary for life to be maintained. 3. Explain what is meant by a food chain. 4. List at least two adaptations of different animals that have helped them to survive.	CONCEPT: Relationship of the environment and growing organisms to the work of the ecologist OBJECTIVE: The student should be able to list at least three areas which are the concern of the ecologist.	ECOLOGIST 1. Ecologists study the relationships among organisms and between them and their environment. They are interested in the effects of such influences as rainfall, temperature and altitude on these organisms. A primary concern of ecologists is the effects of pollution on the growth of organisms as well as the effects of radiation on living systems. 2. Young people seeking professional careers in the life sciences should plan to obtain an advanced degree-preferably a Ph.D.-in their field of interest because promotional opportunities for those without graduate training are usually limited. 3. Beginning salaries in 1970 for life scientists ranged from $6,548 to $14,192 depending upon degrees held and academic achievement. Life scientists in colleges and universities earned salaries between $15,800 and $16,500 a year in 1970, according to the limited available information. 4. Outlook for ecologists is expected to be very favorable throughout the 1970's as concern for the environment continues to increase.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have the students make a scrapbook collection of either articles or pictures which they find in magazines and newspapers. 2. Have a contest to see who can write the best essay on "Why the Environment is Important". 3. Have the students write to the Environmental Protection Agency for information on how they can contribute to the efforts to curb pollution. 4. Take the class outdoors and have them mark off a square yard of ground and observe and record all of the living things they see. 5. Show and discuss the film entitled Life in the Desert which is available from the Harlandale Audio-Visual Center. 6. Show and discuss the film entitled The World Around Us which is available from ESC Region 20. CAREER: 1. Invite a local ecologist to class to discuss the kind of work he is involved in. 2. Show and discuss the filmstrip entitled Some Ecological Consideration which is available from the Harlandale Audio-Visual Center. 3. Have interested students do a research report on the occupation of ecologist using the Occupational Outlook Handbook.	CURRICULUM: ESC REGION 20: Films: #4919 The Big Green Caterpillar #4803 Man Makes A Desert #2229 The World Around Us HARLANDALE AUDIO-VISUAL CENTER: Films: 16-347 Life In The Desert CAREER: HARLANDALE AUDIO-VISUAL CENTER: Filmstrips: PR-735 (BB-73) Some Ecological Consideration SCHOOL LIBRARY OR COUNSELOR'S OFFICE: Dictionary Of Occupational Titles Occupational Outlook Handbook Encyclopedia Of Careers	

RICULUM NCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
SURVIVAL OF THE FITTEST -Balance of nature -Population problems	The student should be able to: 1. Define accurately, the following terms: a. stable population b. unstable population c. immigration d. emigration e. succession f. climax community 2. Make a population count of a small local area. 3. Define, in a short statement, what is meant by population.	CONCEPT: Relationship of populations to the work of a demographer OBJECTIVE: The student should be able to list at least two responsibilities of activities of a demographer.	DEMOGRAPHER 1. Demography is a specialized field of sociology. The demographer is a population specialist who collects and analyzes vital statistics related to population changes, such as birth, marriages, and deaths. He conducts surveys utilizing sampling techniques, evaluates the reliability of sources of data and writes reports describing the limitations on data usability by management, scientists and others. 2. A master's degree with a major in sociology usually is the minimum requirement for employment as a sociologist. Those with this degree may qualify with many administrative and research positions, provided they have training in research methods and statistics. 3. The median salary for sociologists in 1970 ranged from $12,200 to $16,200 a year. Many sociologists supplement their salaries with earnings from other sources, such as summer teaching and consultant work. 4. Employment opportunities for sociologists having the Ph.D. are expected to be quite favorable during the 1970's. Those having only the master's degree will probably continue to experience considerable competition.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS

CURRICULUM:

1. As a population exercise, have the students observe and count the different types of life on a vacant lot near their home. Observations should be made for several days and at different times of the day.

2. If possible, schedule a field trip to a wildlife preserve or protected area near the school. Have the students look for signs of wildlife including dens, roosts, tracks, evidence of feeding and indications of struggles. Upon returning to the classroom, have the students write up a report of their findings.

3. Show and discuss the film entitled Animal Predators and the Balance of Nature which is available from ESC Region 20.

4. Show and discuss the film entitled Nature's Half Acre which is available from the Harlandale Audio-Visual Center.

CAREER:

1. Invite a demographer from a local college to class to discuss his work.

2. Show and discuss the film entitled Standing Room Only which is available from ESC Region 20.

3. Have interested students interview a sociologist to learn about the kind of work they do.

4. Have interested students write to the American Sociological Association for further career information.

CURRICULUM:

ESC REGION 20:
Films: #4931 Animal Predators And The Balance Of Nature
#8702 Hot Dry Desert

HARLANDALE AUDIO-VISUAL CENTER:
Films: 16-576 Nature's Half Acre

CAREER:
Filmstrips W/Records
PR-734 (BB-70)
Population Statistics
PR-734 (BB-71)
Population Trends

ESC REGION 20: #2138 Standing Room Only
#8637 Population Ecology
#2151 Population Ecology

SCHOOL LIBRARY OR COUNSELOR'S OFFICE:
SRA Occupational Brief #367
Sociologists

Directory Of Occupational Titles

Occupational Outlook Handbook

WRITE TO:

American Sociological Association
1722 N Street N.W.
Washington, D.C. 20036

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
CONSERVATION OF NATURAL RESOURCES -Limitations of biological resources -Soil and forest conservation -Pest control and the protection of wildlife	The student should be able to: 1. Define or discuss accurately the following terms: a. weathering b. erosion c. crop rotation d. contour plowing belts e. strip cropping f. shelter g. reforestation 2. List at least two major causes of forest fires along with at least two methods of preventing them. 3. Name at least three methods that can be used to protect our natural wildlife.	CONCEPT: Relationship of soil and forest conservation to the work of a forester OBJECTIVE: The student should be able to write a short essay dealing with the work of a forester.	FORESTER 1. Foresters manage, develop and protect our valuable lands and their resources. They plan and supervise the harvesting and cutting of trees, safeguard forests from fire, protect our wildlife and manage water sheds, camps, parks and grazing land. Foresters usually specialize in one area of work such as timber and wildlife management, outdoor recreation, and forest economics. About 22,000 persons were employed as foresters in the United States in 1970. 2. A bachelor's degree with a major in forestry is the minimum educational requirement for those seeking professional careers in the field. Graduates often work under the supervision of experienced foresters before advancing to responsible positions in management or research. 3. Foresters with a bachelor's degree start at about $6,548 or $8,098 a year, depending on their academic record. Those with graduate credits could earn from $8,098 to $14,192 a year. 4. Employment opportunities should remain fairly good through the 1970's.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS

CURRICULUM:

1. Have the students make a collection of newspaper articles dealing with the conservation of natural resources. A bulletin board display can be created from these articles.
2. Have the students collect pictures from magazines and newspapers illustrating the different types of erosion.
3. Show and discuss any of the films available from ESC Region 20 dealing with conservation.
4. Have a contest to see who amongst the students can create the most original poster dealing with conservation.
5. Have the students prepare a research report on one of the animals on the endangered species list.

CAREER:

1. Invite a forester to class to talk about opportunities in his field.
2. Have interested students listen to the tape entitled Forester which is available from the Harlandale Audio-Visual Center.
3. Have interested students prepare a research paper on the occupation of forester.
4. Have interested students write to the Society of American Foresters for further career information.

CURRICULUM:

ESC REGION 20:
Films: #4127 Conserving Our Forest Today
#4128 Conserving Our Minerals
#4129 Conserving Our Soil Today

HARLANDALE AUDIO-VISUAL CENTER:
Films: 16-601 Our Part In Conservation
16-291 What Is Ecology?
Filmstrips: W/Records:
AA-50 Thru AA-55 Conservation Series
PR-736 (BB-74) Pesticides
A-96 Thru A-100 Conserving Our Natural Resources Series

CAREER:

HARLANDALE AUDIO-VISUAL CENTER:
Filmstrips: CC-12 The Paper Industry: Trees In The Forest
Cassette Tape: Cas T-46 Forester

SCHOOL LIBRARY OR COUNSELOR'S OFFICE:
SRA Occupational Brief #50 Foresters

Dictionary Of Occupational Titles

Occupational Outlook Handbook

WRITE TO:
Society of American Foresters
1010 Sixteenth Street N.W.
Washington, D.C. 20036

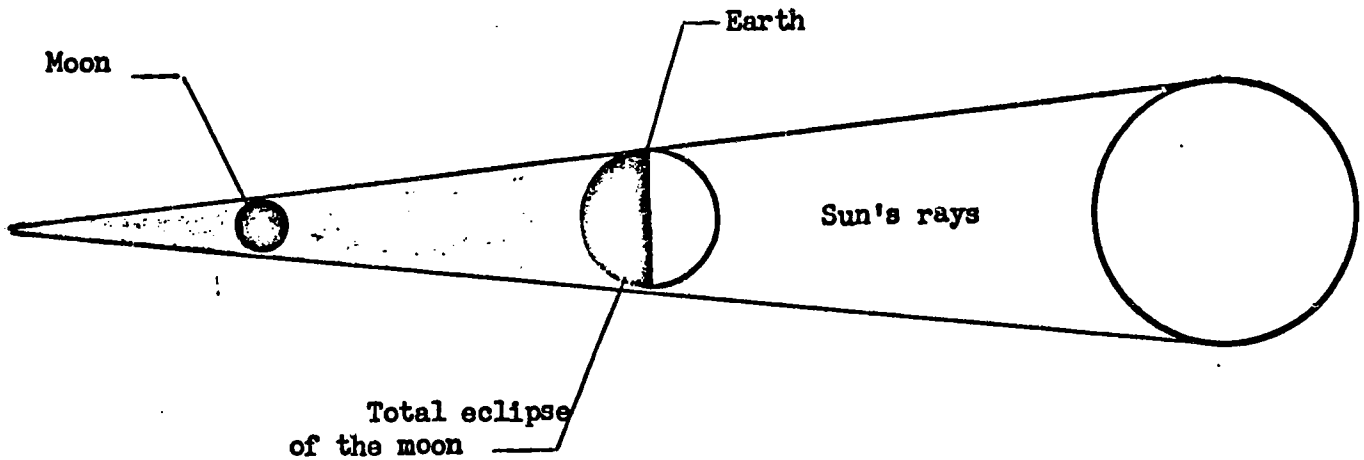
RRICULUM ONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
WATER CONSERVATION AND POLLUTION -Air pollution -Water pollution	The student should be able to: 1. Discuss, in a short essay, the importance of preventing water and air pollution. 2. Draw a schematic diagram of a modern sewage plant and state generally how it operates. 3. List at least three methods of reducing air pollution.	CONCEPT: Relationship of pollution to the work of a city planner OBJECTIVE: The student should be able to name at least three duties or responsibilities of an urban planner.	URBAN PLANNER 1. Urban planners develop programs for the growth of overall communities. They attempt to cure urban problems like deteriorating business, traffic congestion, inadequate recreational facilities, shortage of space for industrial development, air pollution, poor transportation and inadequate urban parking. About 8,000 people were employed as planners in 1970. 2. The most desirable background for a career in urban planning is the master's degree. Usually at least 2 years of graduate work in city planning are required for most entrance level postions. 3. Inexperienced planners with only a bachelor's degree had starting salaries between $8,300 and $11,000 a year in 1970. Beginning salaries for those possessing the master's degree were between $9,300 and $12,300 a year. 4. Opportunities for graduates having professional training in city and regional planning are expected to be good through the 1970's.

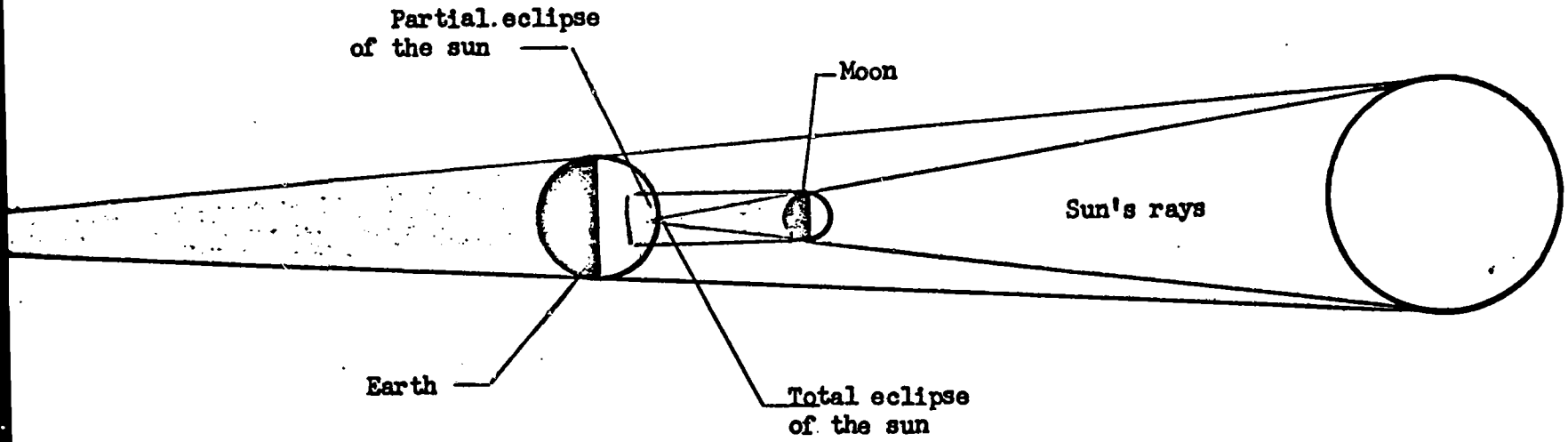
SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have the students each make a collage using pictures dealing with all of the different types of pollution. 2. Have the students contact local and national organizations in order to obtain information concerning the environment. 3. Have a speaker from the City Water Board or the Texas Parks and Wildlife Department come to class to talk about water problems in the area. 4. Show and discuss the film entitled To Clear the Air which is available from ESC Region 20. 5. Show and discuss the filmstrip entitled Pollution which is available from ESC Region 20. CAREER: 1. Invite a representative from the city planning department to class to discuss his career. 2. Show and discuss the film entitled A City and It's People which is available from ESC Region 20. 3. Have interested students write to the American Institute of Planners for further career information.	CURRICULUM: ESC REGION 20: Films: #4327 Land Forms And Human Use #8692 To Clear The Air #4130 Conserving Our Water Resources Today Filmstrips W/Record: PR-736 (BB-75) Pollution CAREER: ESC REGION 20: Films: #8895 A City And It's People #8275 Middle Atlantic Seaboard - Great Cities - Megaloplis SCHOOL LIBRARY OR COUNSELOR'S OFFICE: Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: American Institute of Planners 917 15th Street N.W. Washington, D.C. 20005	

CURRICULUM CONCEPT	CURRICULUM PERFORMANCE OBJECTIVE	CAREER CONCEPT AND CAREER PERFORMANCE OBJECTIVE	CAREER INFORMATION
EFFECT OF INCREASED SCIENTIFIC KNOWLEDGE AND DATA ON MAN AND HIS ENVIROMENT	The student should be able to: 1. List a least three areas of scientific endeavor in which knowledge has greatly increased in the past twenty years. 2. Describe at least three scientific inventions or improvements that have occurred within his own brief lifetime.	CONCEPT: Relationship of increased knowledge and data to the career opportunities in computer technology OBJECTIVE: The student should be able to describe in a short paragraph, at least three reasons why he would or would not like to be a programmer.	COMPUTER PROGRAMMER 1. Programmers generally are responsible for writing instructions to be inserted into a particular computer. These programs vary with the type of problem. Usually he prepares a flowchart which is a diagram of his program. After the program is prepared and coded, he runs it through the computer for testing and debugging. He must also write a set of operating procedures for use during processing runs. 2. A college degree in math or science is desirable for those working in special industries or for the government. However, a considerable number of people with liberal arts degrees have been successful in programming. A programer should have an alert, analytical mind that will not accept standard solutions and long answers. Prospective programmers are often required to take special tests to see if they have the high degree of reasoning ability required. 3. Junior programmers averaged $7000 a year in 1967 while senior programmers averaged $8,750 a year. Supervisory positions paid about $10,000 annually. 4. Programming at present is a most promising field for qualified individuals. Computer technology is still developing and computers of the future will be more complex than those in use today. This means tomorrow's programmers will have to be more skilled.

SUGGESTED TEACHING METHODS	RESOURCE MATERIALS	TEACHER'S COMMENTS
CURRICULUM: 1. Have each student interview at least three older citizens and gather information concerning significant events which occurred during their lifetimes. Then have the students do the same for their own lifetimes and make a comparison. 2. Have each student prepare a research paper on the achievements of the space program. 3. Have the students bring in pictures for a bulletin board illustrating achievements in modern technology. CAREER: 1. Invite a computer programmer to class to discuss his training and his work. 2. Have interested students listen to the cassette tape entitled Computer Programmer. 3. Have interested students listen to the magnetic tape entitled Your Future in Data Processing. 4. Have interested students do a research paper dealing with computers and computer training. 5. Have interested students write to the Association for Computer Machinery for further career information.	CURRICULUM: ESC REGION 20: Film: #4068 Biology In Today's World CAREER: HARLANDALE AUDIO-VISUAL CENTER: Cassette Tape Cas T-30 Computer Programmer Magnetic Tape MT-211 Your Future In Data Processing (for both sexes) SCHOOL LIBRARY OR COUNSELOR'S OFFICE SRA Occupational Brief #281 Programmers Dictionary Of Occupational Titles Occupational Outlook Handbook WRITE TO: Association for Computing Machinery 211 East 43rd Street New York, New York 10017	

Appendix


Moon
Earth
Sun's rays
Total eclipse
of the moon


Partial eclipse
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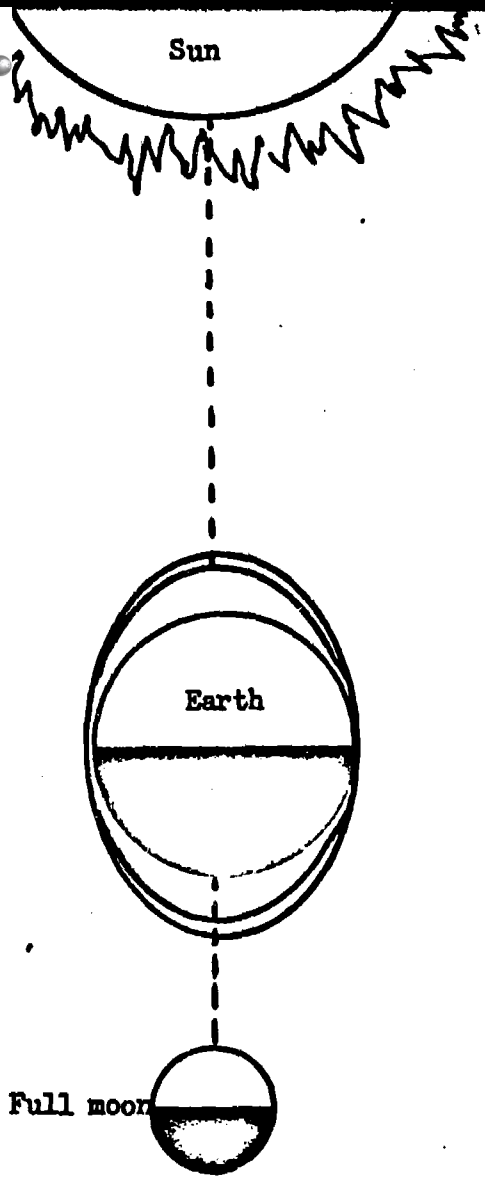
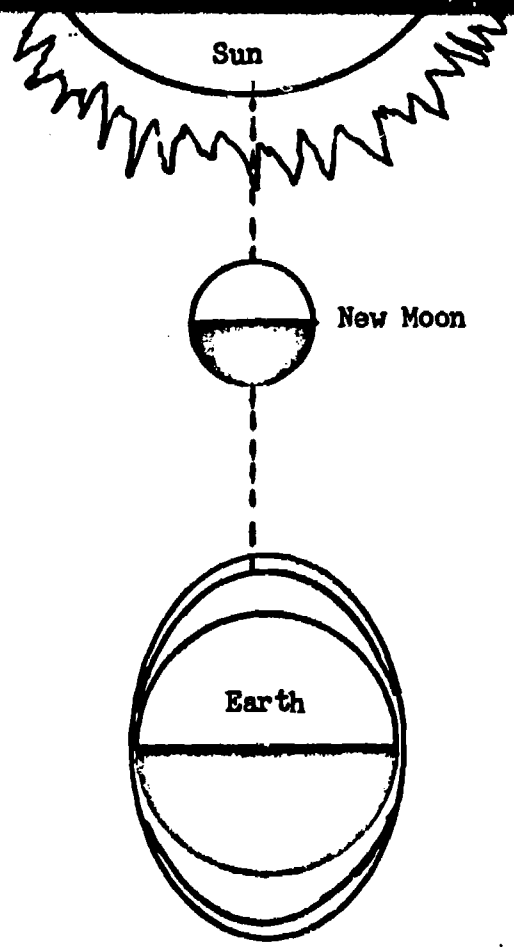
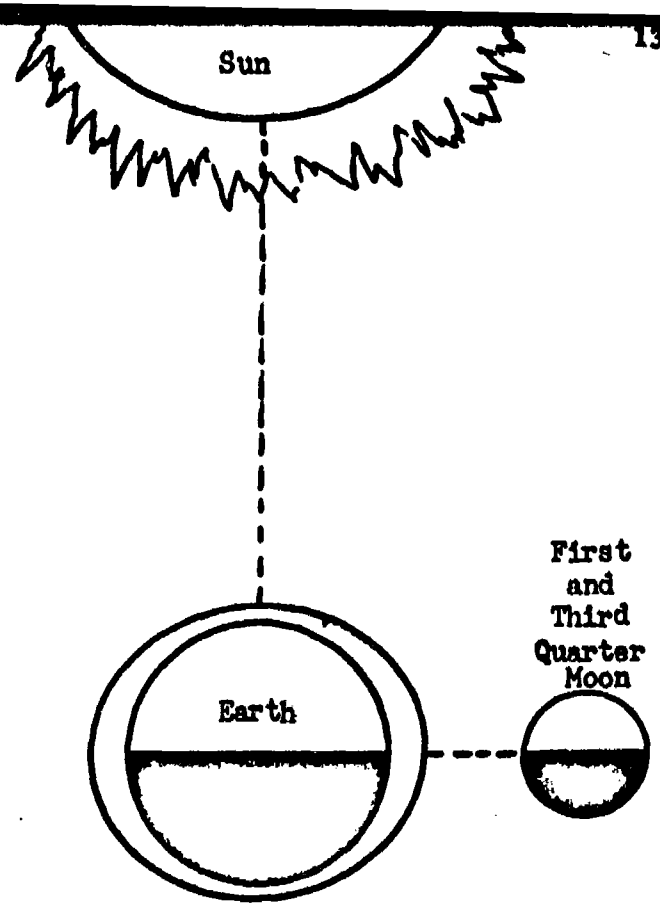
Sun's rays
Earth
Total eclipse
of the sun



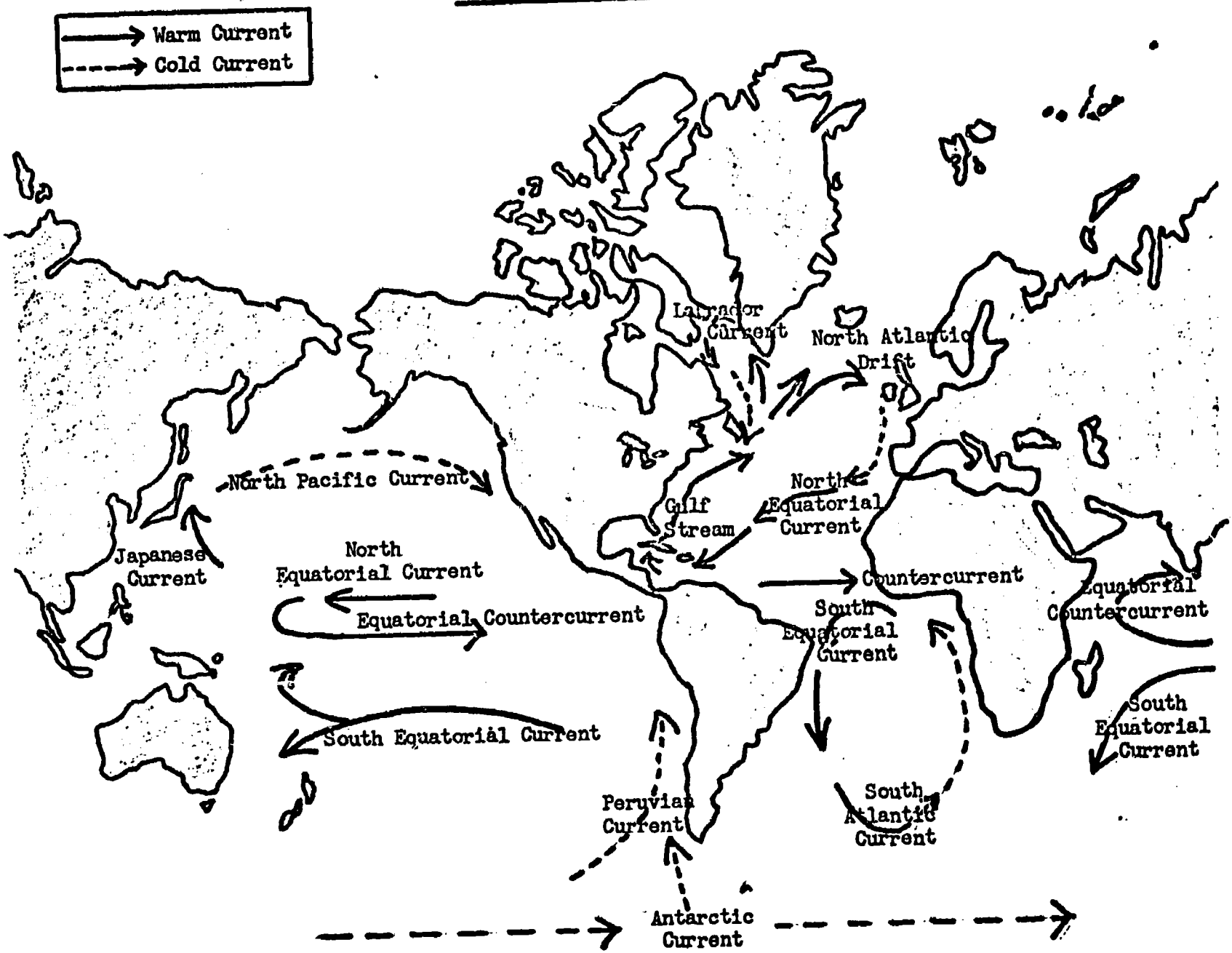
Spring tides



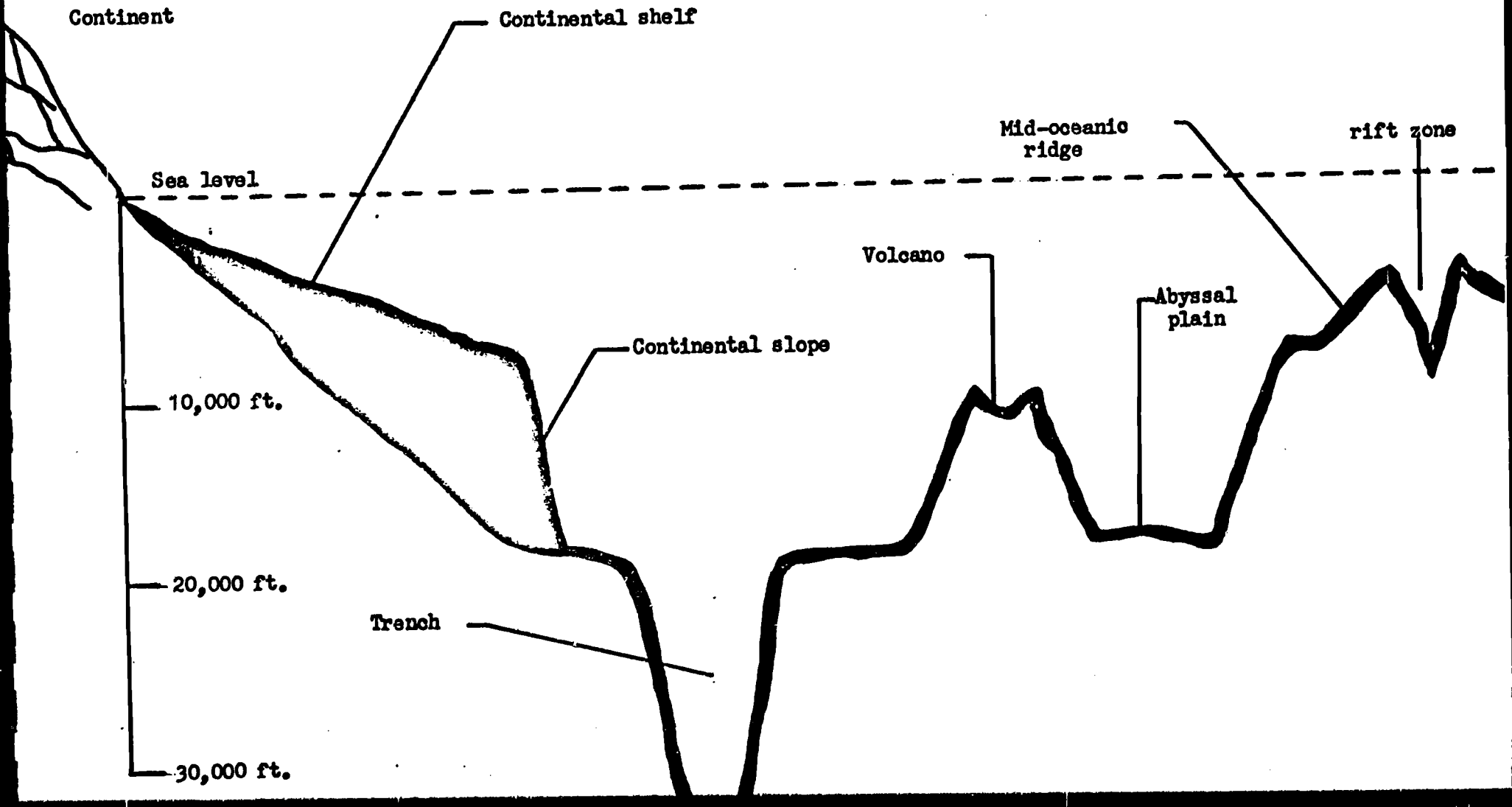


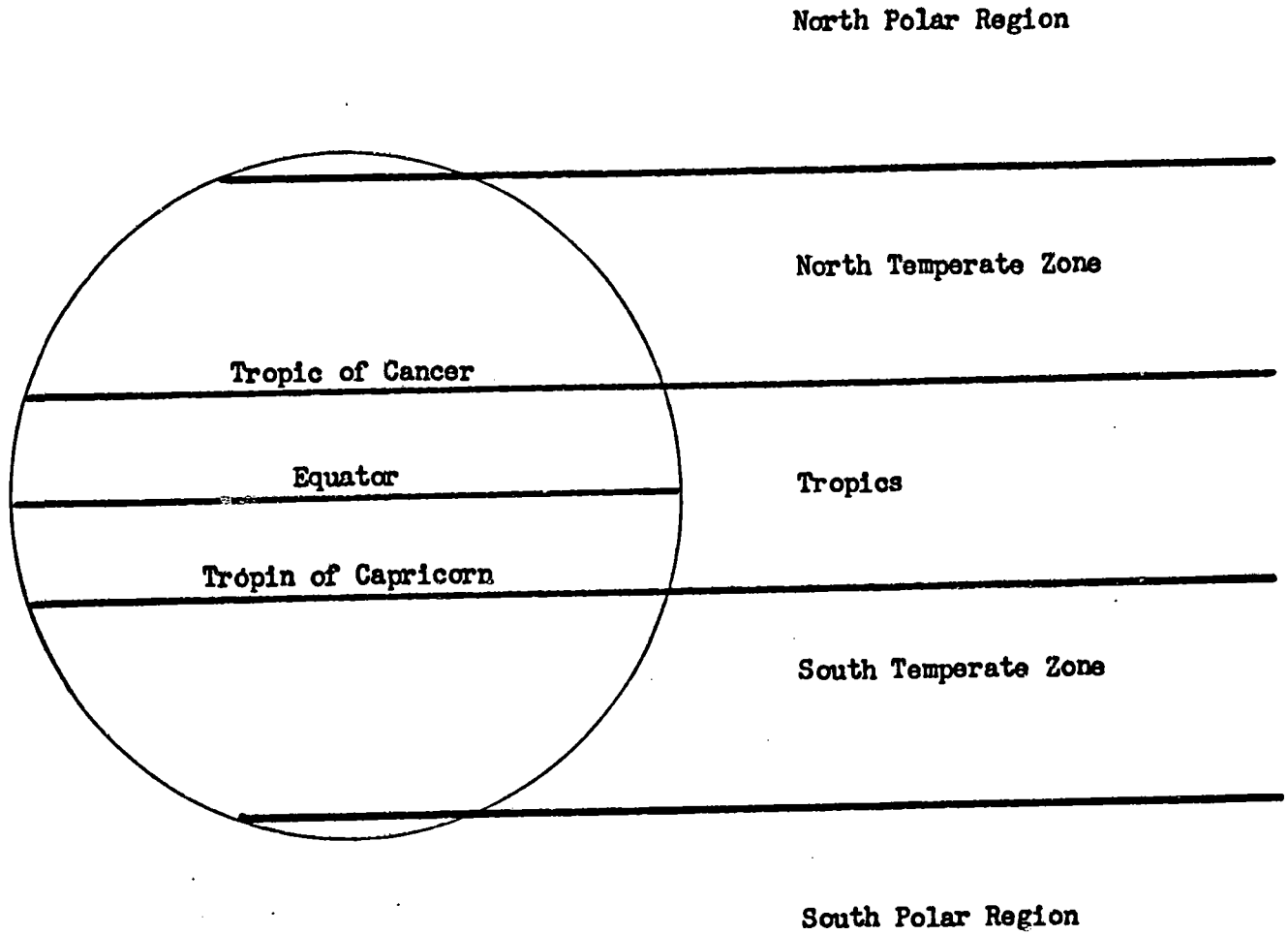
Neap tide

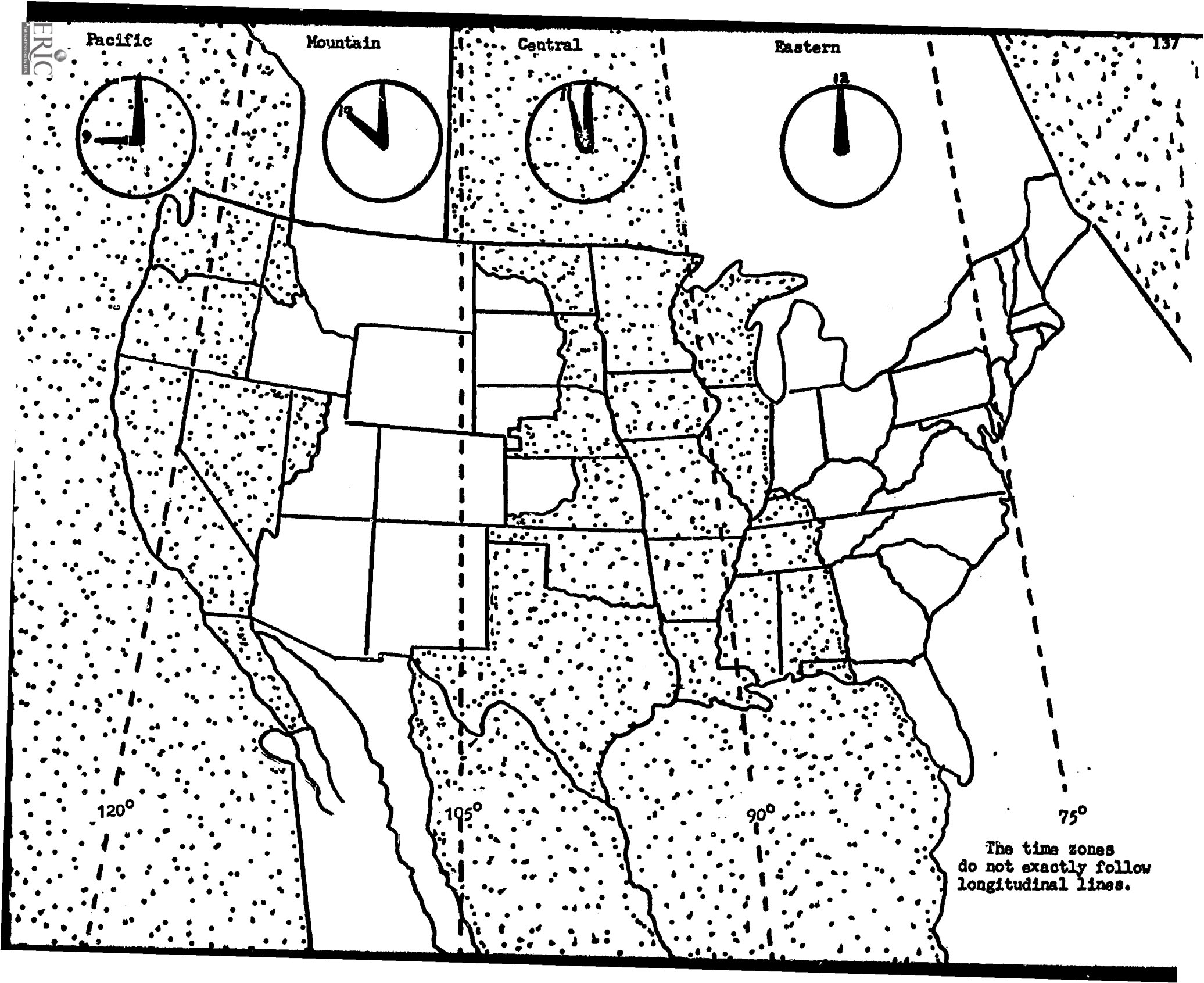
OCEAN SURFACE CURRENTS



THE OCEAN FLOOR




North Polar Region
North Temperate Zone
Tropic of Cancer
Equator
Tropics
Tropin of Capricorn
South Temperate Zone
South Polar Region


Pacific
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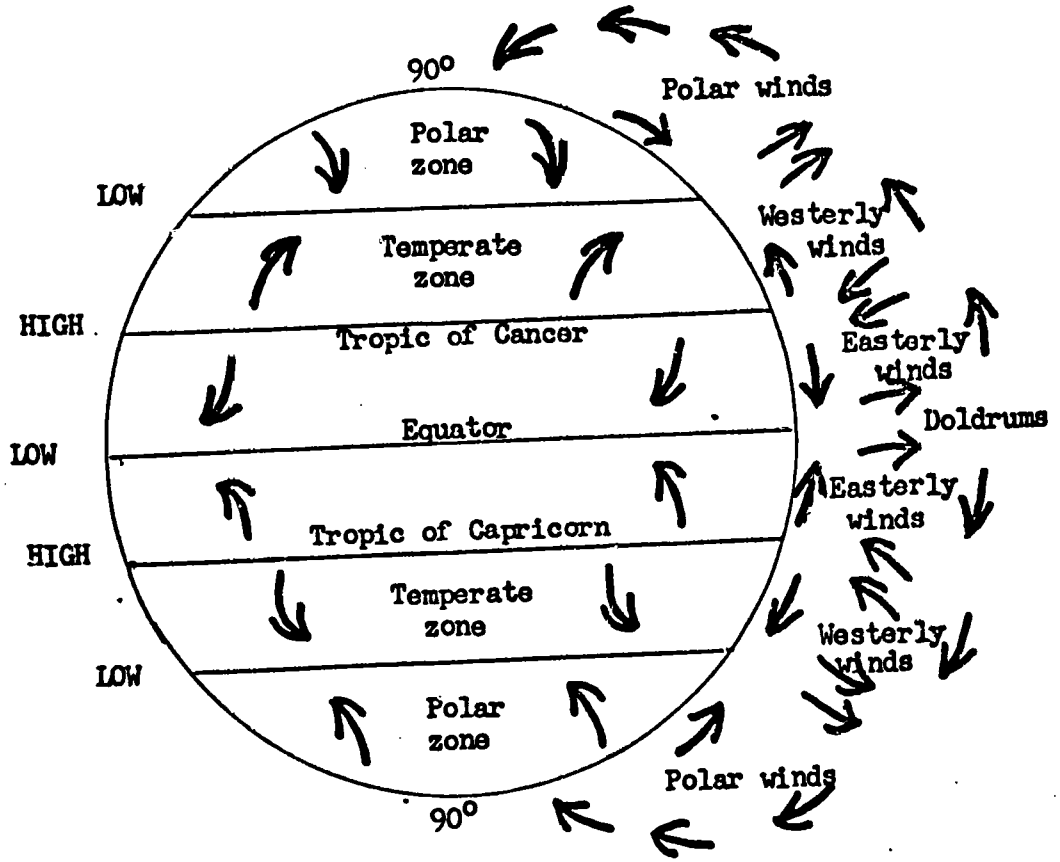
90°
75°
The time zones do not exactly follow longitudinal lines.

MAJOR WIND SYSTEMS



Minerals With Metallic Luster

Mineral	Color	Streak	Hardness	Specific Gravity	Shape	Breakage Pattern	Other Properties
Graphite C	Black to gray	Black	1-2	2.3	Hexagonal	Perfect basal cleavage	Greasy, soft, smudges fingers
Hematite Fe_2O_3	Silver gray	Reddish brown	6	5.3	Hexagonal massive	Uneven fracture, no cleavage	Earthy, brittle, source of iron
Pyrite FeS_2	Light brassy yellow	Greenish black	6.5	5.0	Cubic, massive	Conchoidal fracture	Alters to limonite, "fool's gold"
Magnetite Fe_3O_4	Black	Black	6	5.2	Cubic, granular	Conchoidal fracture	Naturally magnetic, source of iron
Galena PbS	Gray	Gray	2.5	7.5	Cubic, massive, granular, fibrous	Cubic cleavage, even fracture (rare)	Source of lead, often with sphalerite (zinc-containing material)
Bornite Cu_5FeS_4	Bronze, yellow, tarnishes to blue or purple	Grayish black	3	5.0	Cubic, massive, compact	Uneven fracture, poor octahedral cleavage	Looks like hard coal
Copper Cu	Copper red, tarnishes to black	Copper red	3	8.1	Cubic, wire-like form	Hackly fracture	Malleable and ductile

Minerals With Nonmetallic Luster

Mineral	Color	Streak	Hardness	Specific Gravity	Shape	Breakage Pattern	Other Properties
Talc $Mg_3(OH)_2Si_4O_{10}$	White, greenish	White	1	2.8	Monoclinic	Cleavage in one direction, thin sheets, uneven fracture	Pearly, scapy, easily cut
Gypsum $CaSO_4 \cdot 2H_2O$	White, gray, brown	White	2	2.3	Monoclinic, massive	Basal cleavage, fibrous fracture	Pearly, silky, dull, glassy
Calcite $CaCO_3$	White	White	3	2.7	Hexagonal, massive	Rhombohedral cleavage, conchoidal fracture	Dull or pearly, releases CO_2 when HCl is added
Fluorite CaF_2	White, green, yellow, purple, red, blue	Colorless	4	3-3.3	Cubic, octahedral	Octahedral cleavage, conchoidal fracture	Glassy to dull, brittle, fluorescent, phosphorescent, twin crystals common
Apatite $Ca_5(Cl,F)(PO_4)_3$	White, yellow, brown, blue, green	White	5	3.2	Hexagonal, massive	Conchoidal fracture	Glassy to dull, brittle, granular
Feldspar (orthoclase)	White to gray, red, green (rare)	Colorless	6	2.5	Monoclinic, massive	Two cleavage planes at 90° conchoidal fracture	Common in igneous rock

Minerals With Nonmetallic Luster (continued)

Mineral	Color	Streak	Hardness	Specific Gravity	Shape	Breakage Pattern	Other Properties
Feldspar (plagioclase) $AlSi_2O_8$	Gray, green, white	Colorless	6	2.5	Monoclinic, massive	Two cleavage planes at 90°, conchoidal fracture	Fine parallel lines on cleavage surface distinguish plagioclase from orthoclase
Garnet $Mg_3Al_2Si_3O_{12}$	Deep yellow-red	Colorless	7.5	3.5	Cubic	Uneven to conchoidal fracture, no cleavage	Glassy, very common mineral
Quartz SiO_2	Colorless through various colors	Colorless	7	2.65	Hexagonal, massive	Conchoidal fracture	Waxy or glassy
Topaz Al_2SiO_4	White, yellow, pale blue, pink	Colorless	8	3.5 to 3.6	Orthorhombic, massive	Perfect basal cleavage, conchoidal fracture	Glassy
Corundum Al_2O_3	Brown, green, pink, red, blue, black, violet	Colorless	9	3.9 to 4.1	Hexagonal, massive	Conchoidal or uneven fracture, no cleavage	Barrel-shaped, dull in some varieties, may sparkle in gem varieties, brittle, often tough

Minerals With Nonmetallic Luster (continued)

Mineral	Color	Streak	Hardness	Specific Gravity	Shape	Breakage Pattern	Other Properities
Tourmaline series $(Na,Ca)(Al,Fe,Li,Mg)_3B_3Al_3(Al_3Si_6O_{27})(O,OH,F)_4$	Black, green, brown, white, red, blue	Colorless	7-7.5	3.0-3.3	Hexagonal, massive	Uneven to conchoidal fracture	Glassy, long direction often has fine parallel lines, brittle
Sulfur S	Yellow	Yellow to white	2.5	2.0	Orthorhombic, massive	Concoidal fracture	Brittle, odor of sulfur, melts easily
Dolomite $CaMg(CO_3)_2$	White to pink to gray, green or black	White	3.5-4	2.8	Hexagonal	Rhombohedral cleavage, conchiodal fracture	Glassy to dull, will bubble with hot acid
Halite NaCl	Colorless, reddish, white, blue	Colorless	2.5	2.1	Cubic	Cubic cleavage, conchiodal fracture	Glassy to dull, salty taste, soluble in water
Hematite (red ocher) Fe_2O_3	Reddish brown to black	Reddish brown	6	5.3	Hexagonal massive	Uneven to conchoidal fracture, no cleavage	Dull to earthy, source or iron

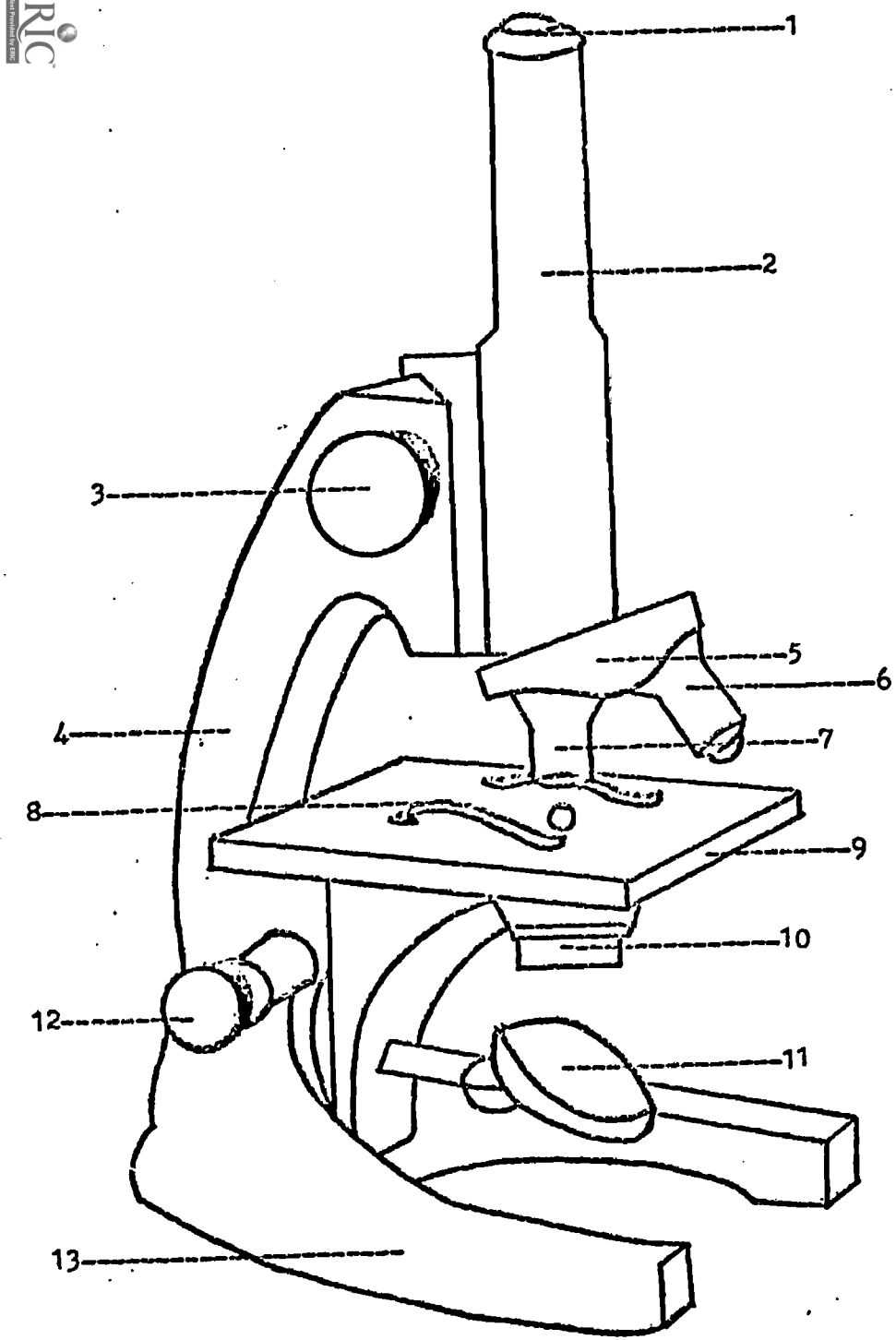
Minerals With Nonmetallic Luster (continued)

Mineral	Color	Streak	Hardness	Specific Gravity	Shape	Breakage Pattern	Other Properties
Limonite (yellow ocher) $2Fe_2O_3 \cdot H_2O$	Yellow, brown, or black	Yellow brown	5.5	4.0	Massive, often powdery	No cleavage, conchoidal to earthly fracture	Dull to glassy, iron-rust appearance, coloring matter of soils
Serpentine $Mg_3Si_2O_5(OH)_4$	White, red green, black, brown, yellow	Colorless	2-5	2.2-2.6	Monoclinic	Concoidal fracture, none to fibrous cleavage	Silky, greasy to waxy
Asbestos (serpentine, chrysotile) $Mg_3Si_2O_5(OH)_4$	Green to yellow green	Colorless	2	2.2	Monoclinic	Fibrous cleavage	Silky, separates into thread-like fibers
Bauxity $Al(OH)_3$	Gray, red white, brown	Gray	1-3	2.0-2.5	Rounded masses	Earthy fracture	Dull, source of aluminum
Hornblend $CaNa(Mg,Fe)_4(Al,Fe,Ti)_3Si_6O_{22}(O,OH)_2$	Green to black	Gray to white	5-6	3.4	Monoclinic	Clevage in two directions, uneven to subconchoidal fracture	Glassy to silky

Minerals With Nonmetallic Luster (continued)

Mineral	Color	Streak	Hardness	Specific Gravity	Shape	Breakage Pattern	Other Properties
Kaolinite $Al_2Si_2O_5(OH)_4$	Red or reddish-brown to white or black	White	2	2.6	Triclinic	Earthy fracture, perfect basal cleavage	Dull, earthy odor, often pliagle, greasy, used in ceramics
Augite $(Ca,Mg,Al,Fe)(Al,Si)_2O_6$	Black to dark green	Colorless	6	3.5	Monoclinic	Cleavage in two directions	Dull, granular
Olivine $(Mg,Fe)_2SiO_4$	Olive green	Colorless	6.5	3.5	Orthorhombic, granular	Imperfect cleavage, conchoidal fracture	Glassy, common in meteorites
Muscovite $KAl_3Si_3O_{10}(OH)_2$	White to light gray	Colorless	2.5	2.8	Monoclinic	Perfect basal cleavage	Plates flexible and elastic, large crystals in pegmatites, member of mica group
Biotite $K(Mg,Fe)_3AlSi_3O_{10}(OH)$	Black to dark brown	Colorless	2.5	2.8-3.4	Monoclinic	Perfect basal cleavage	Plates flexible and elastic, common mineral of pegmatites, member of mica group

The Microscope



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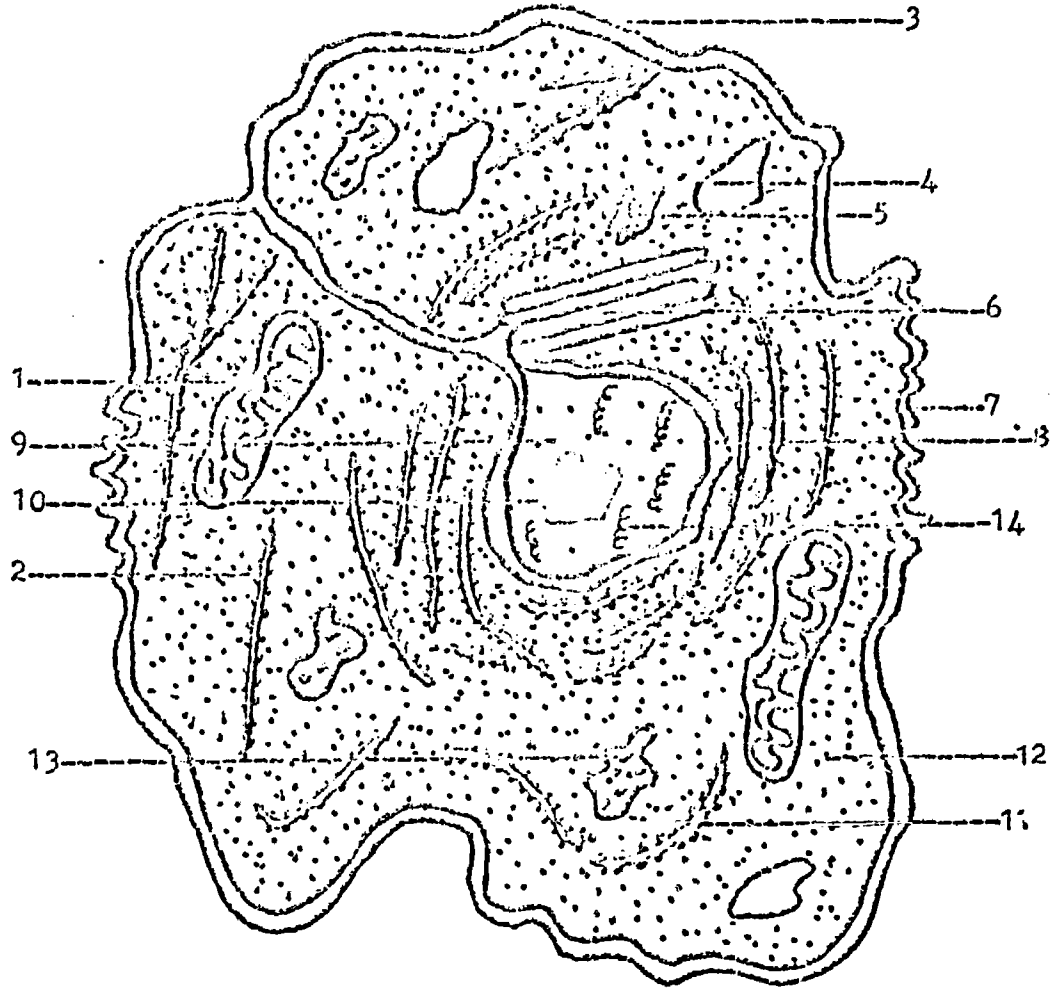
The "Typical" Animal Cell



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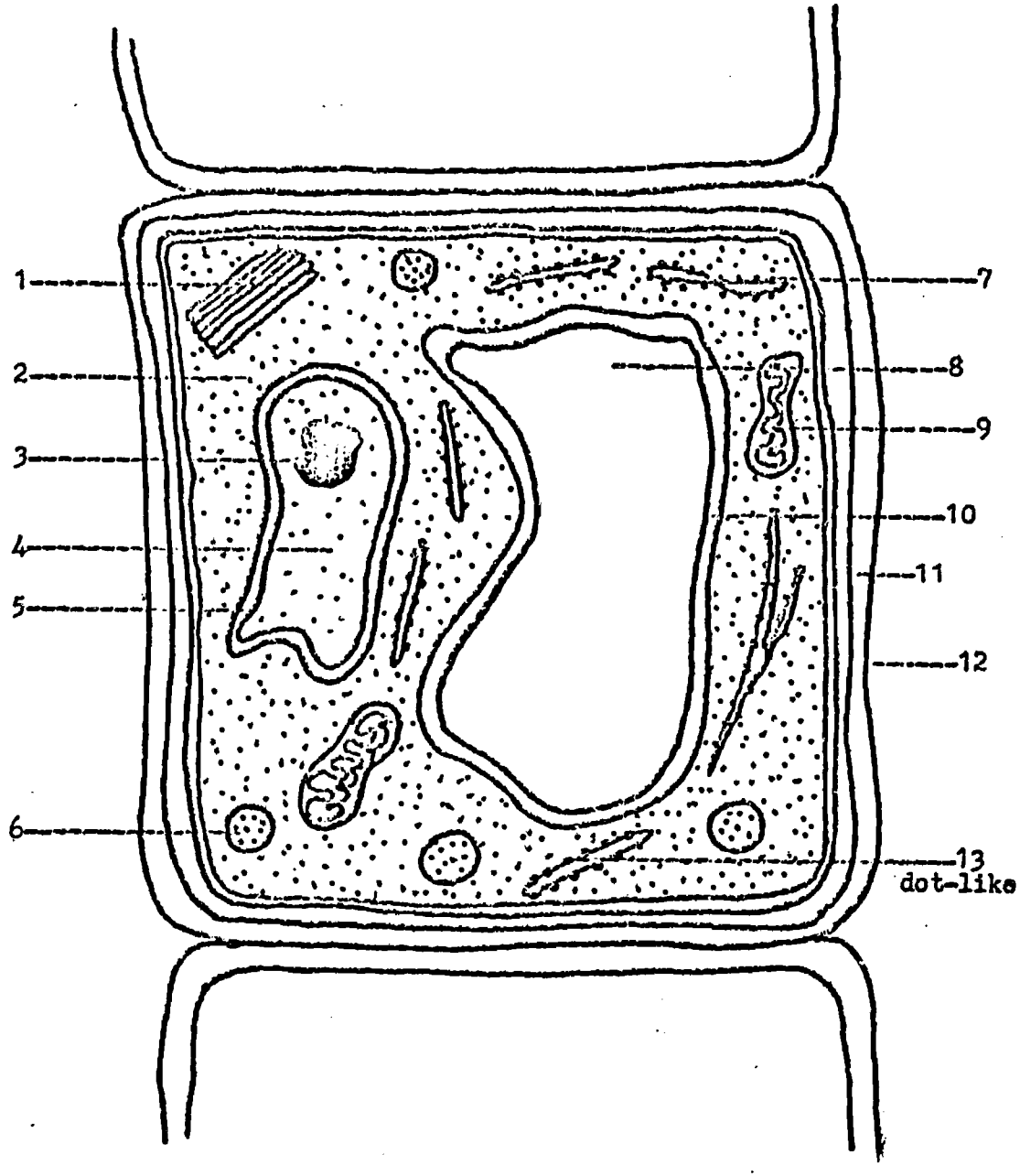
The "Typical" Plant Cell



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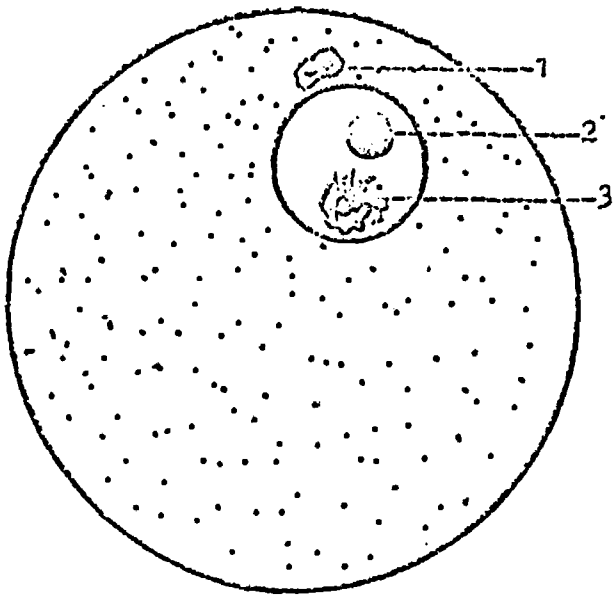
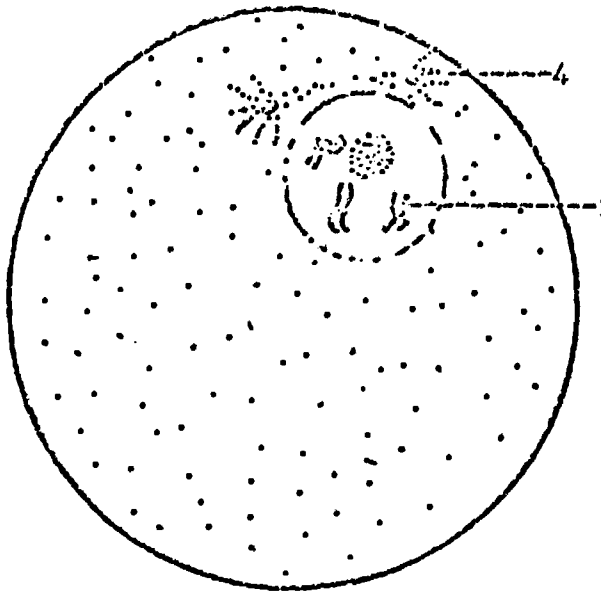
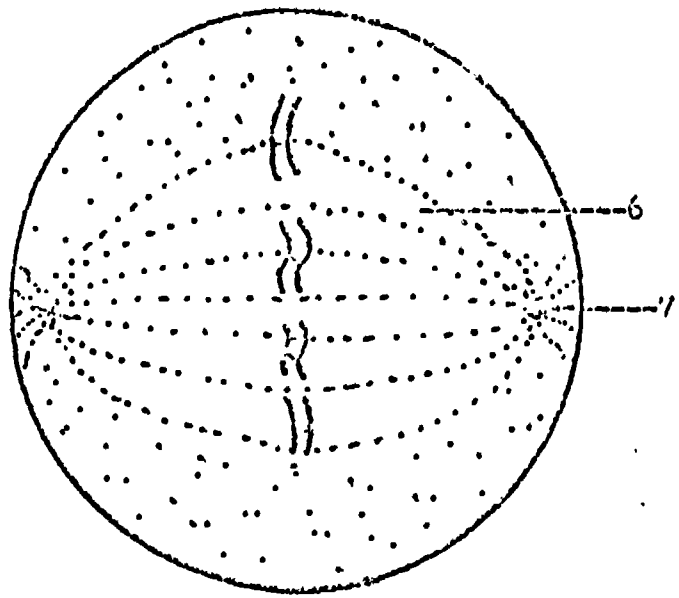
Animal Cell Mitosis



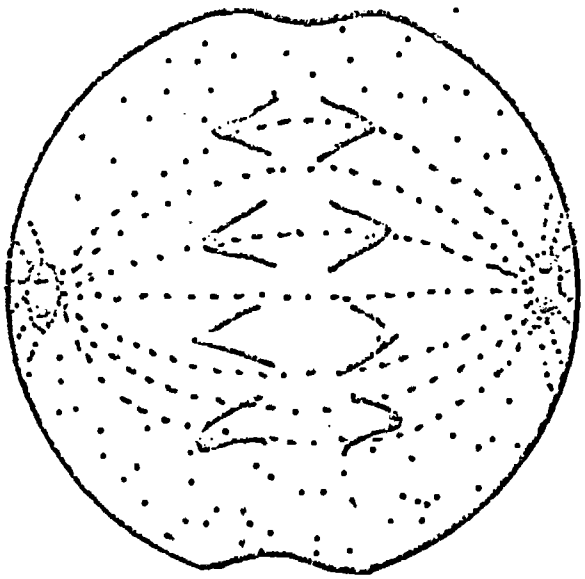
Interphase



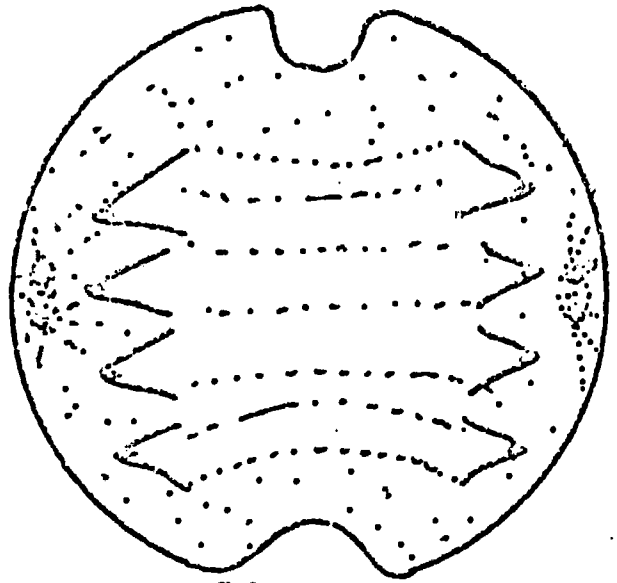
Prophase



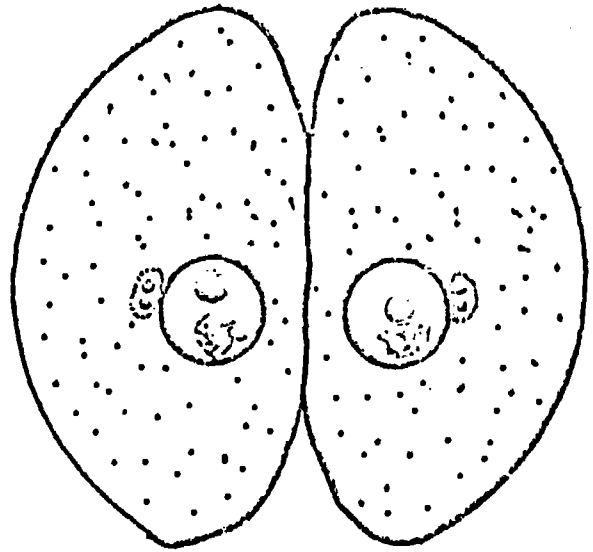
Metaphase



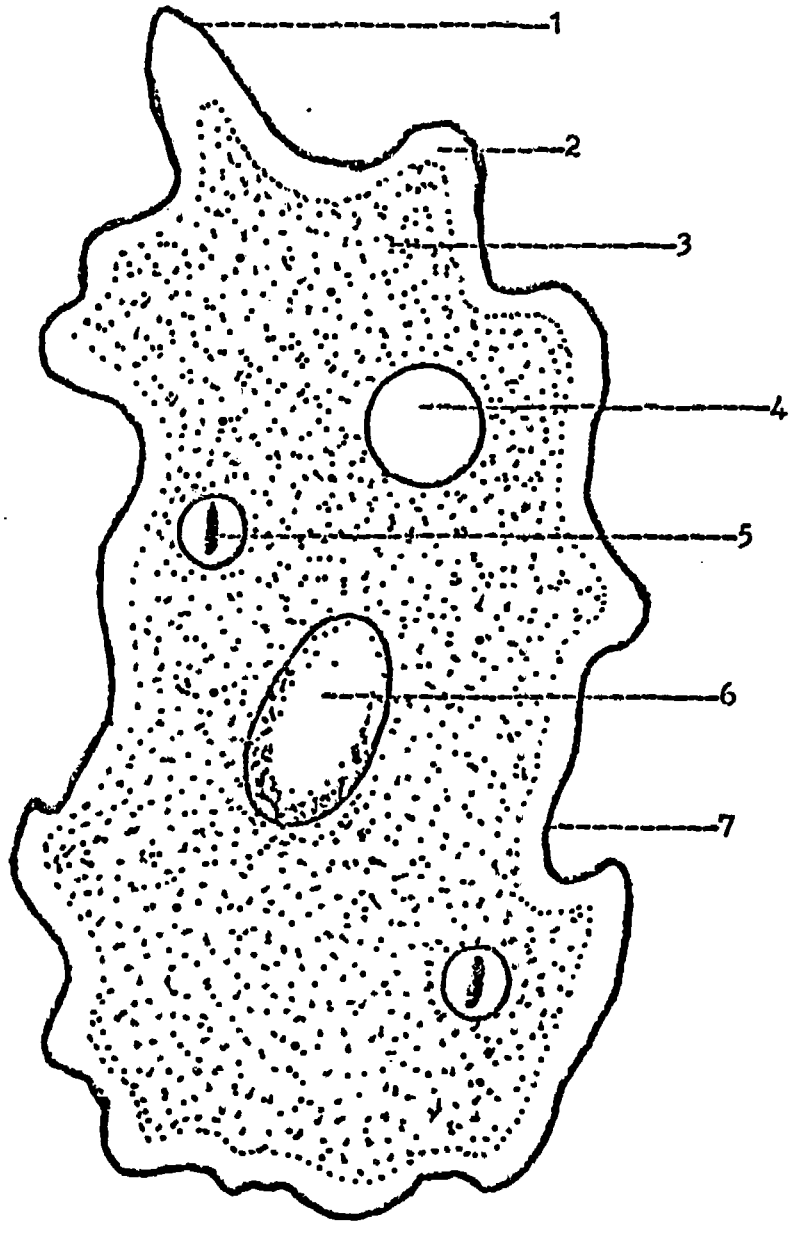
Anaphase



Telophase



Daughter Cells



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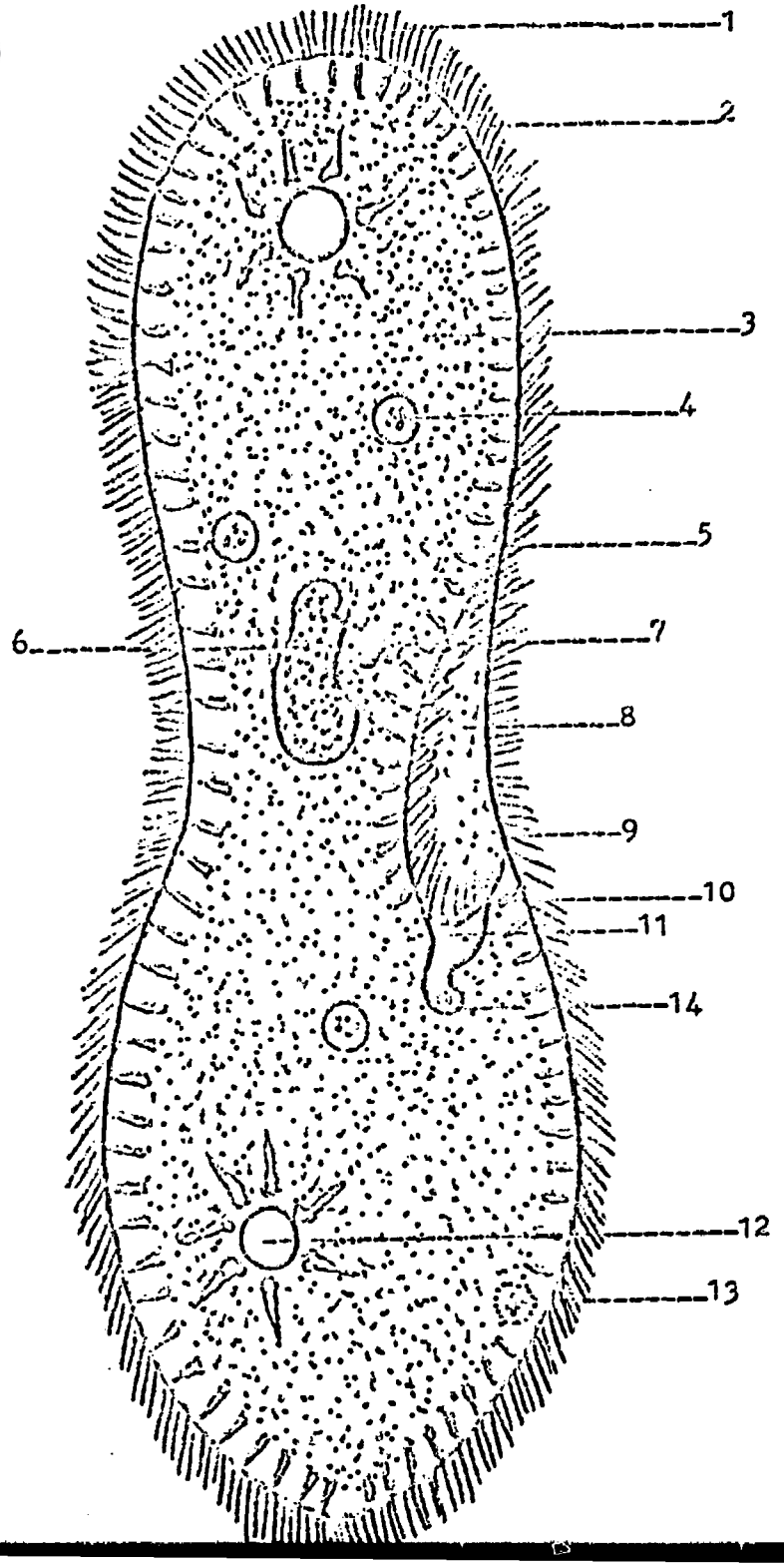

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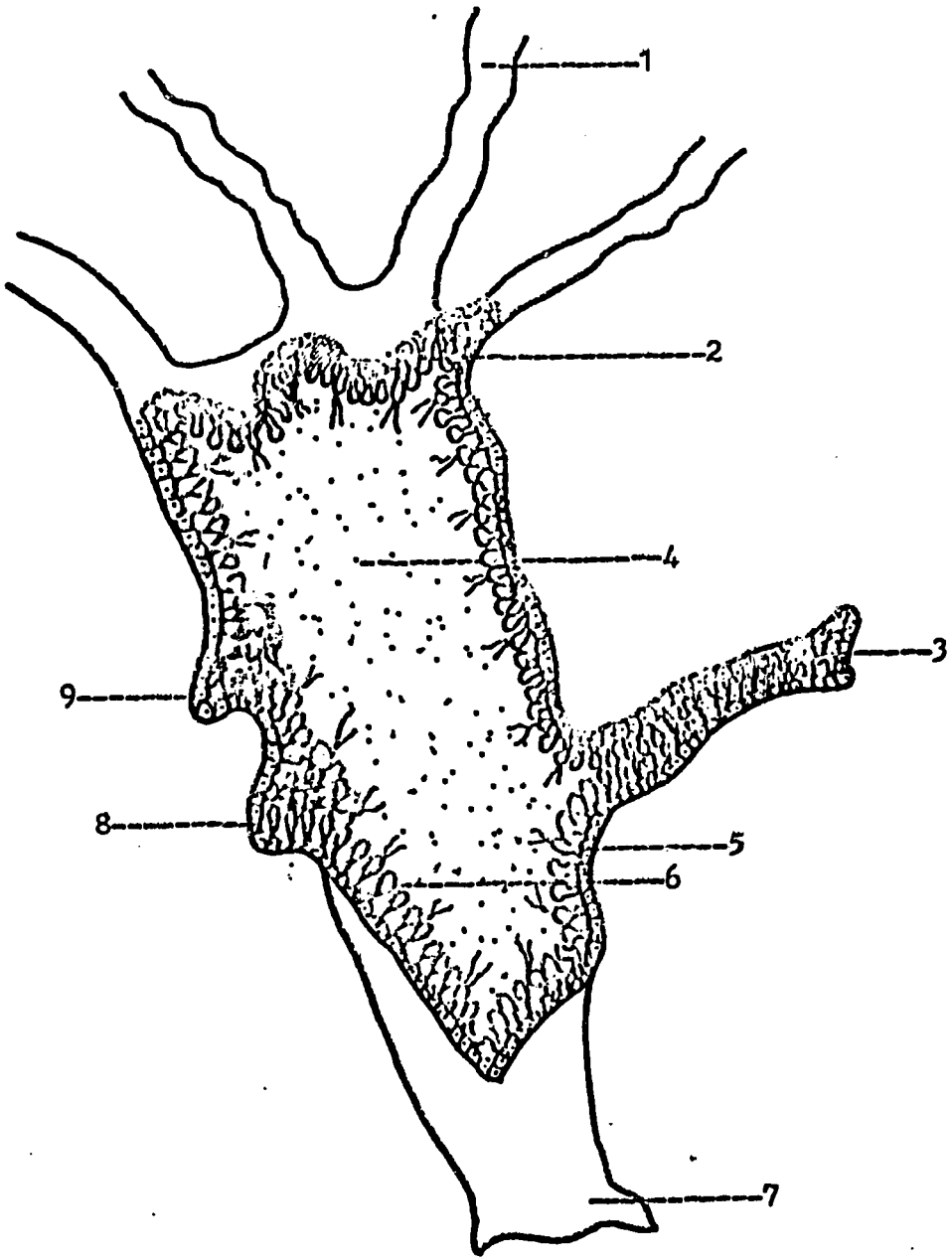
Hydra



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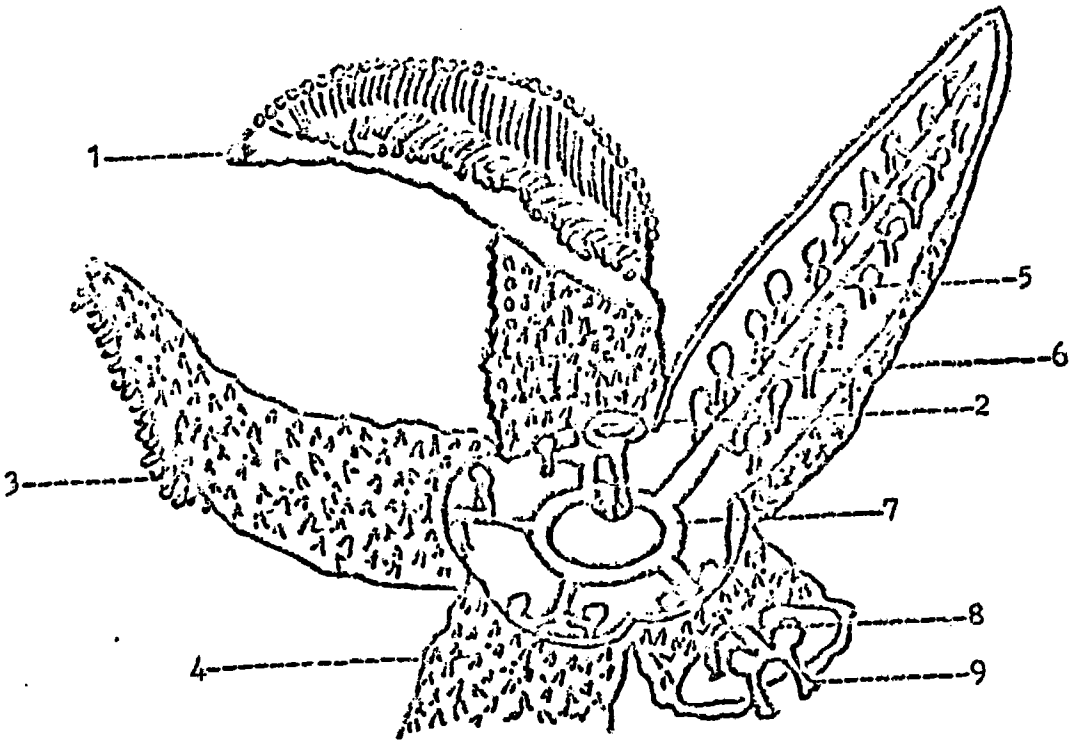
The Starfish



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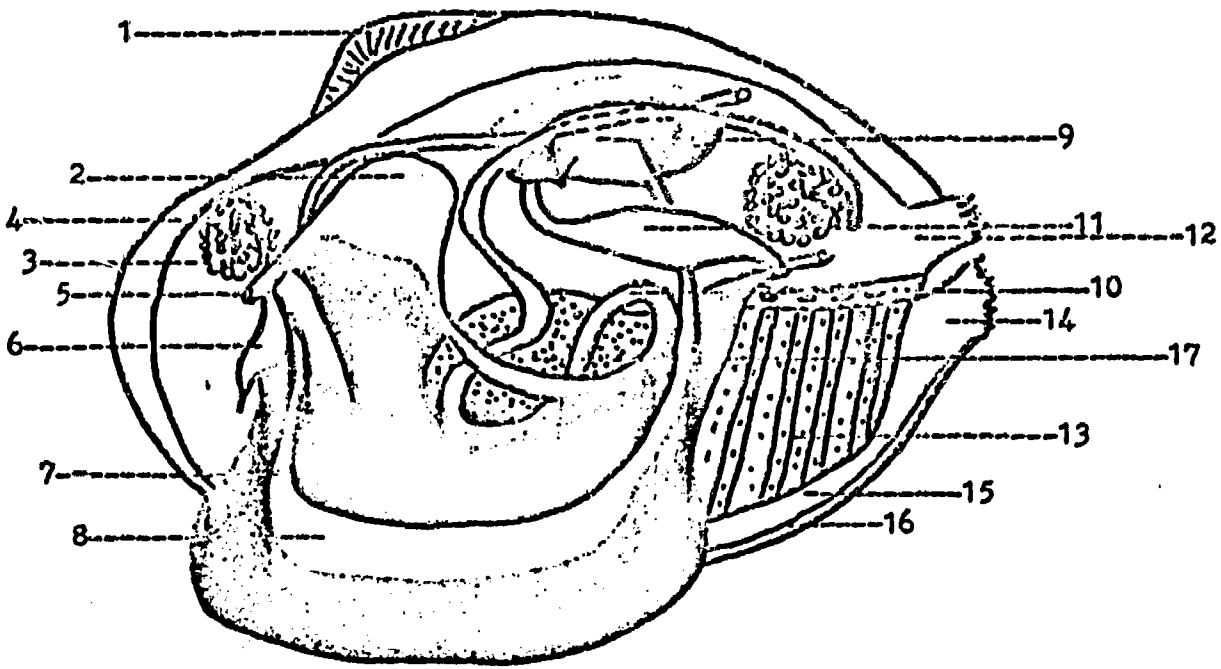
Clam Body Plan



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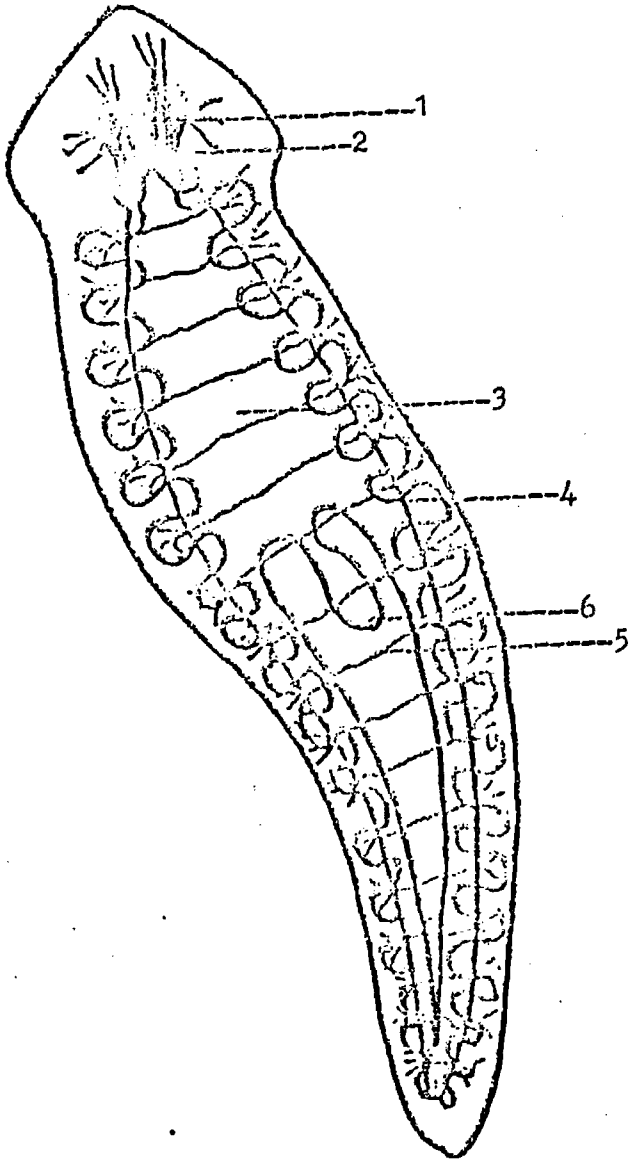
Planaria



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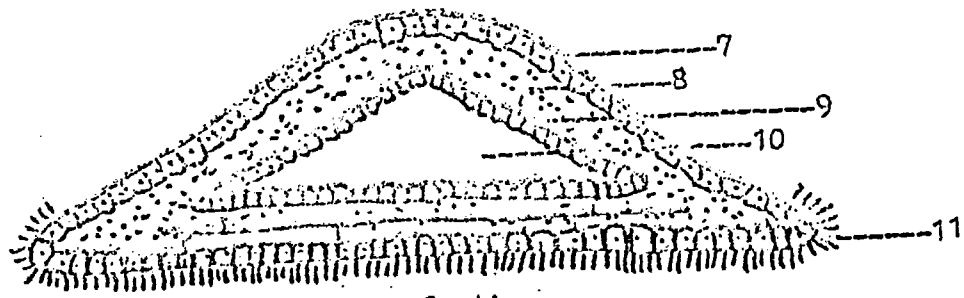
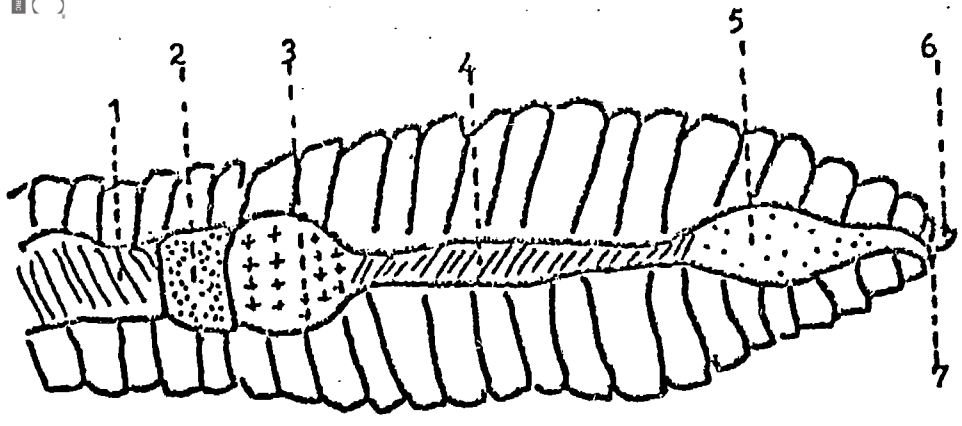
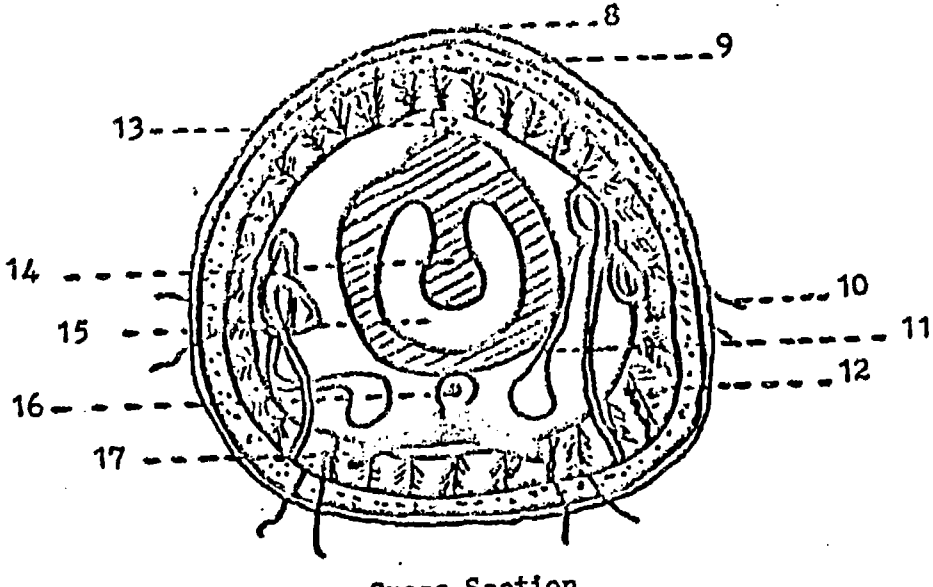


Cross Section

The Earthworm





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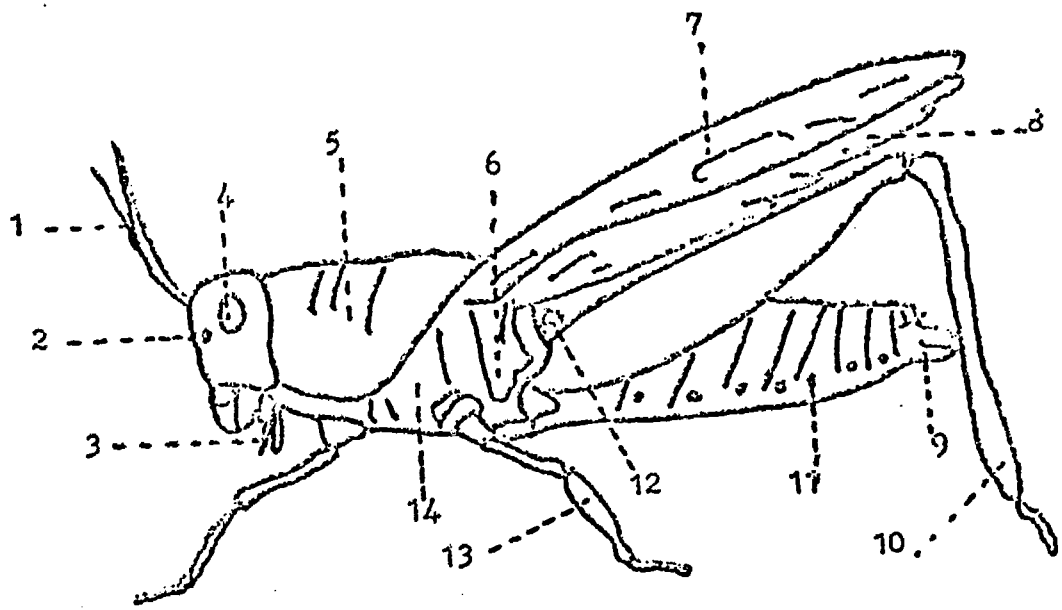
The Grasshopper



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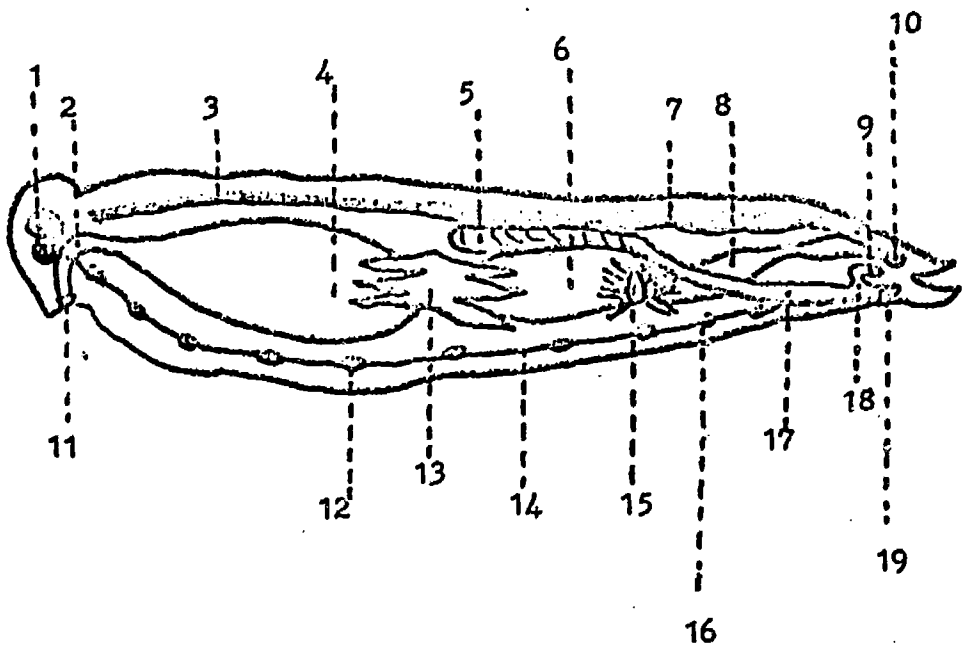

Internal Anatomy

The Grasshopper

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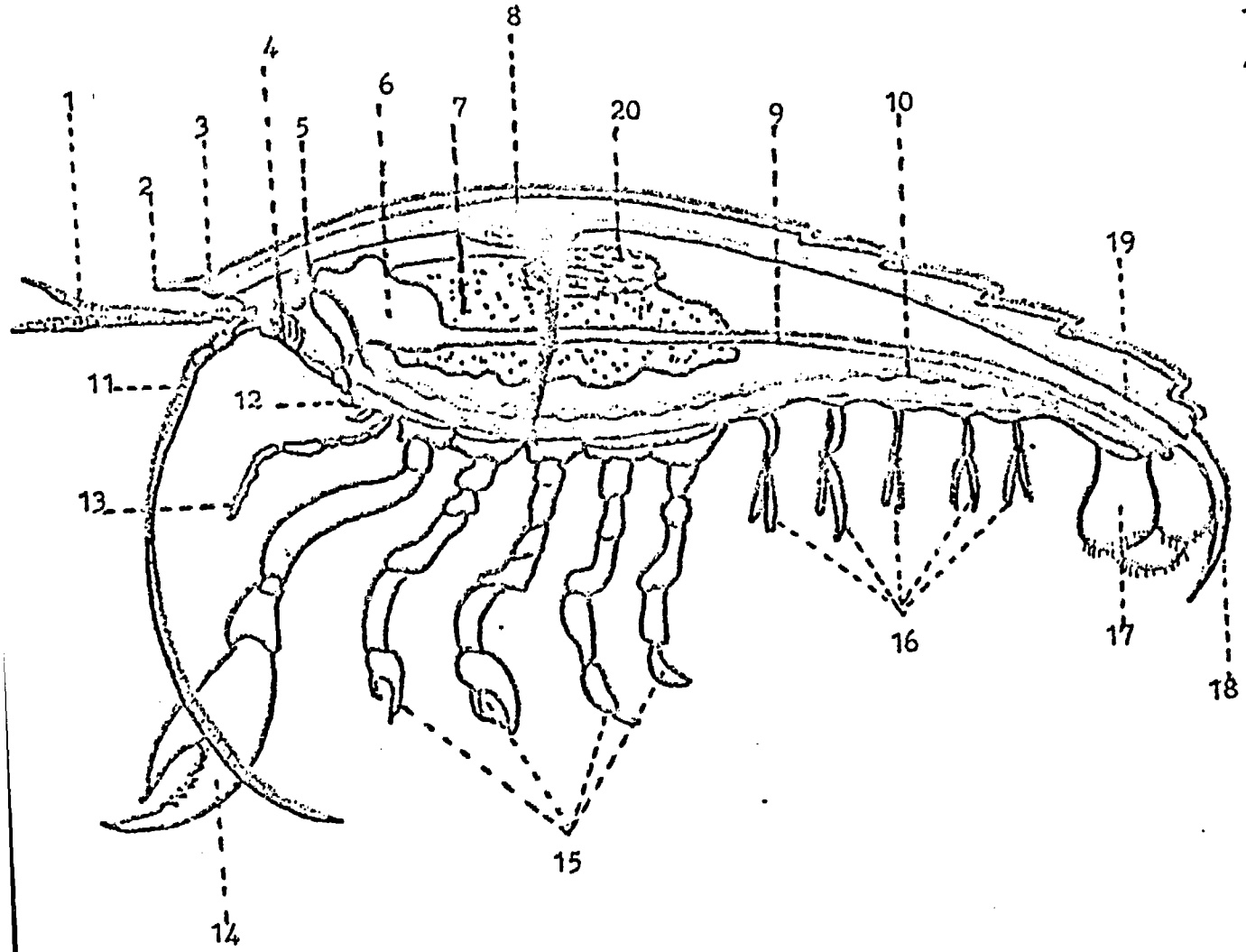
The Crayfish



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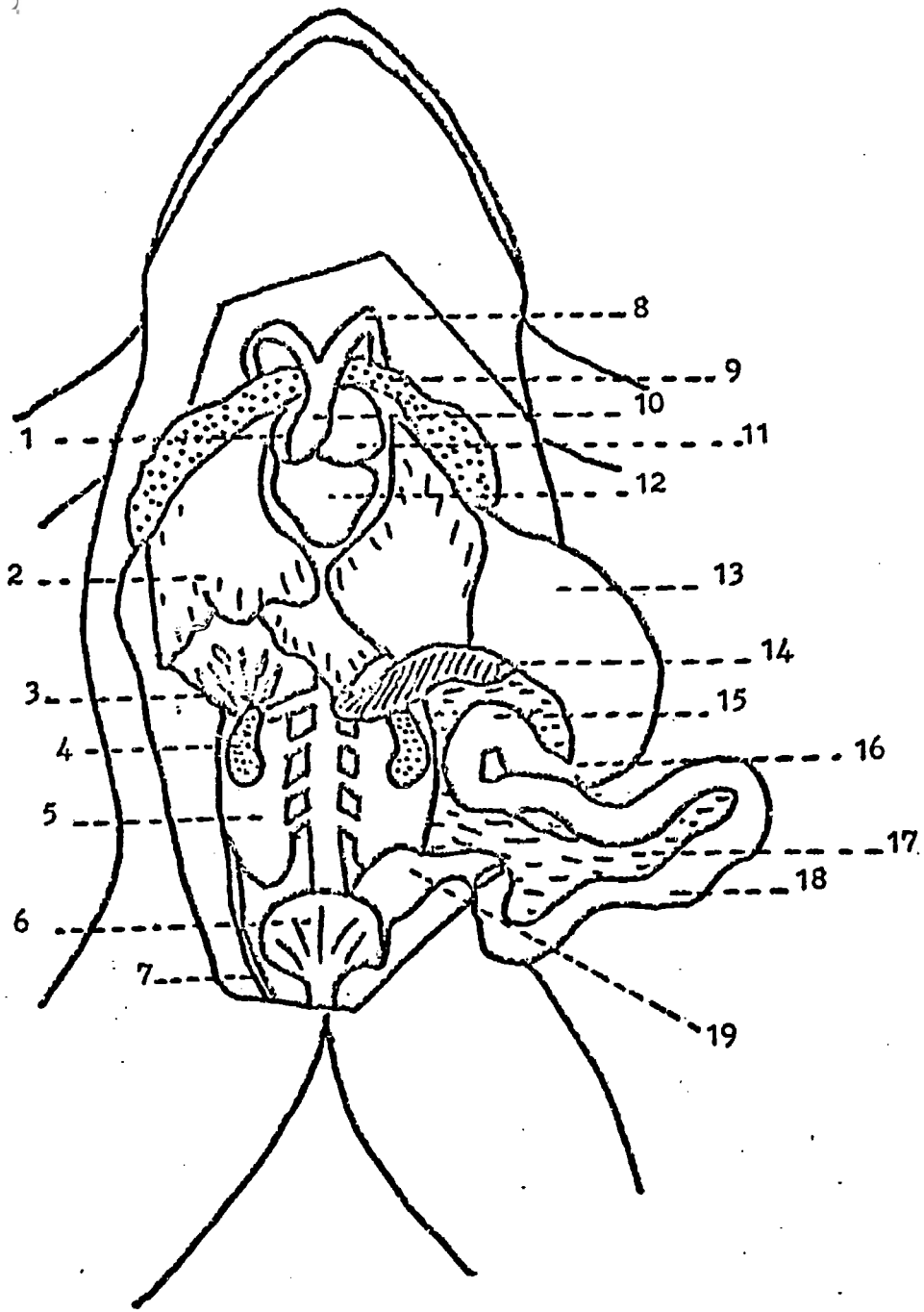
The Frog



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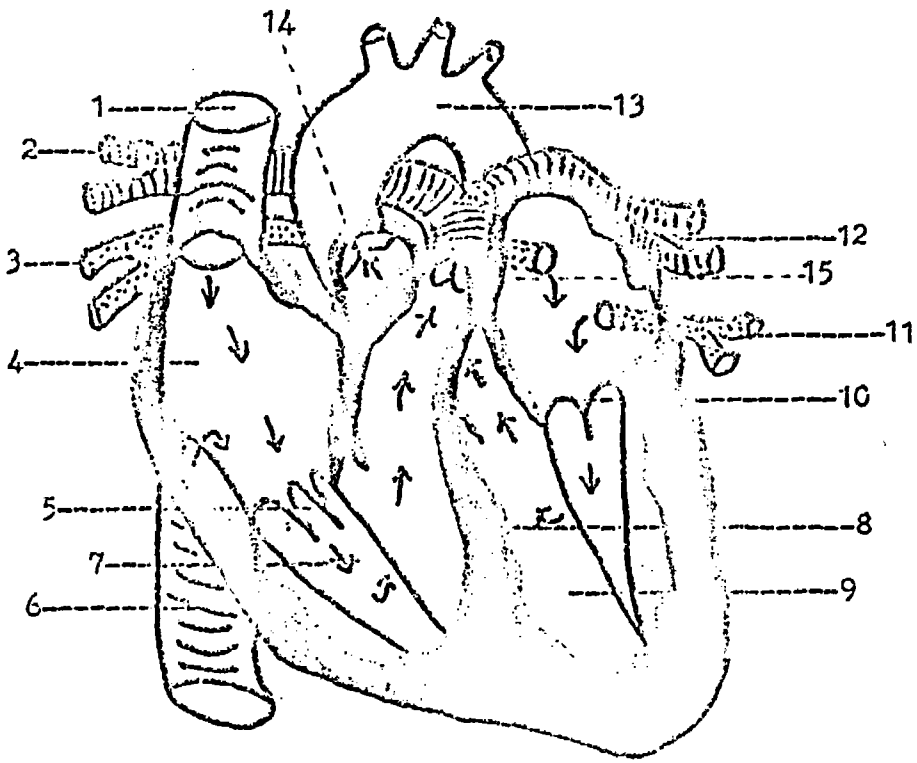
The Human Heart



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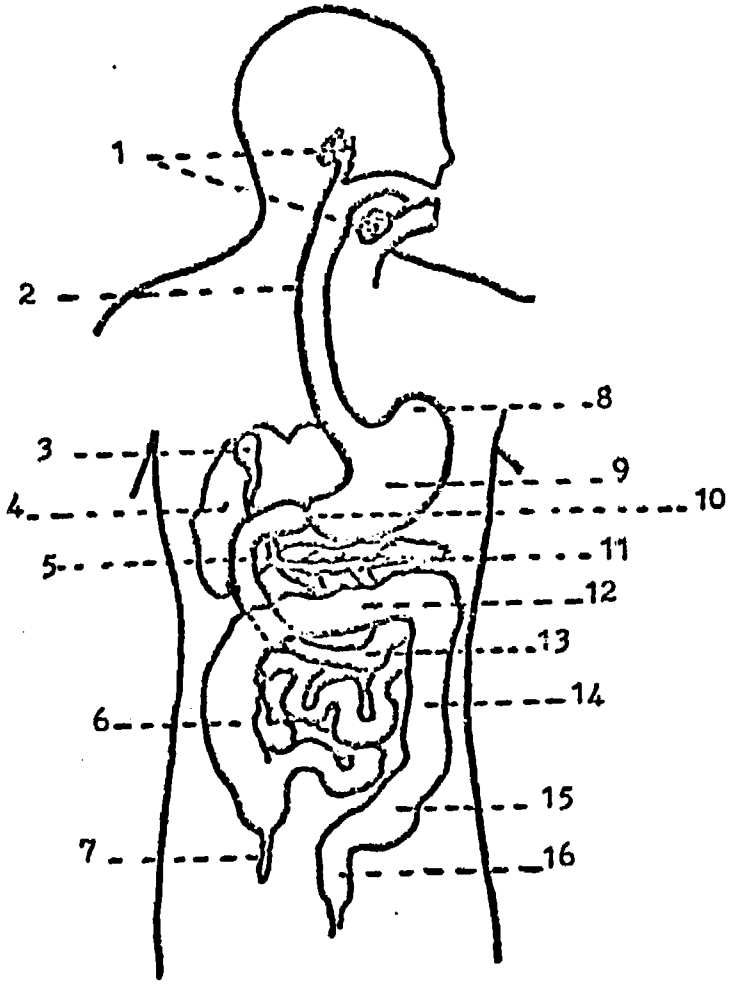

Digestive System

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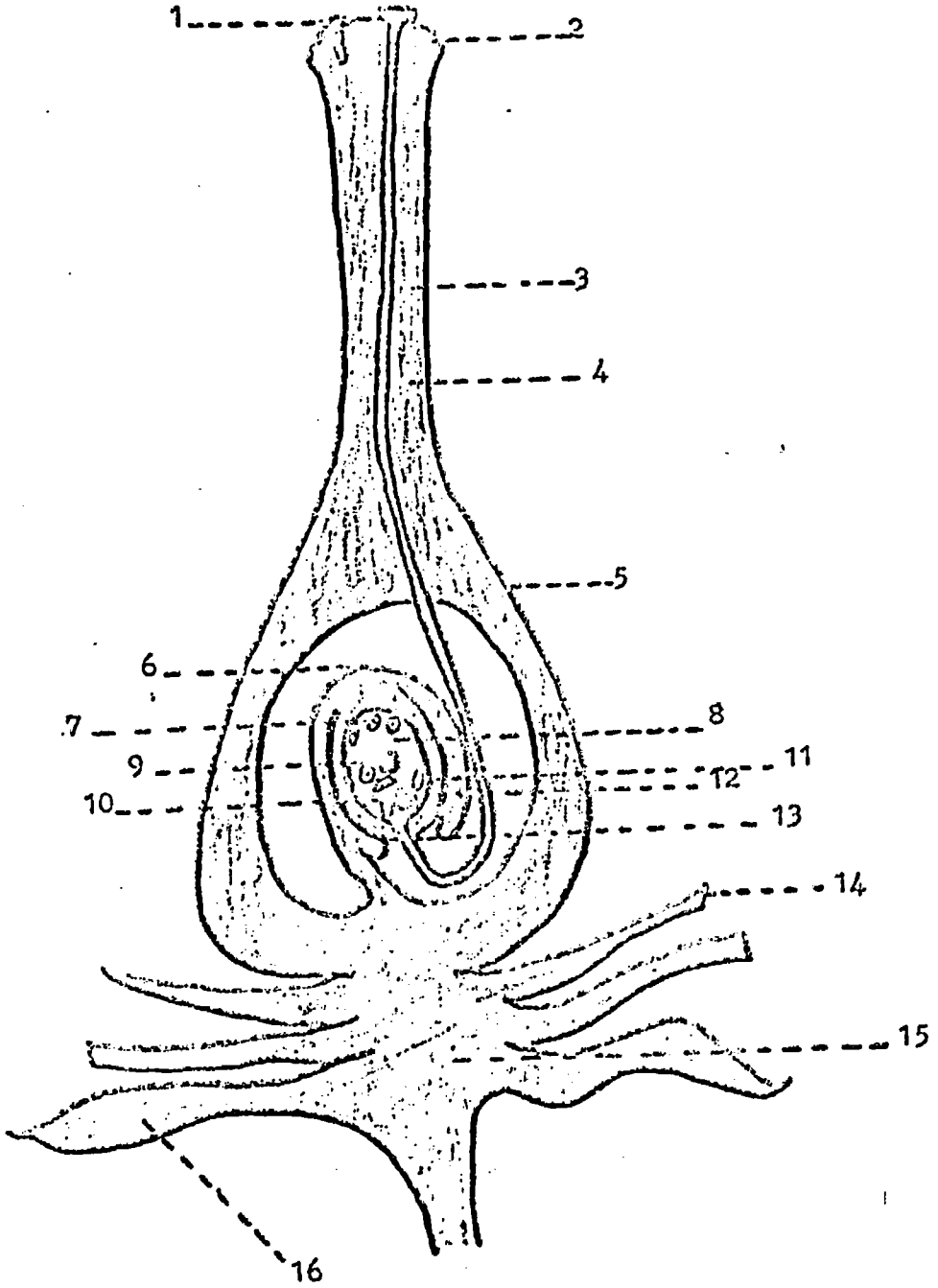
Fertilization



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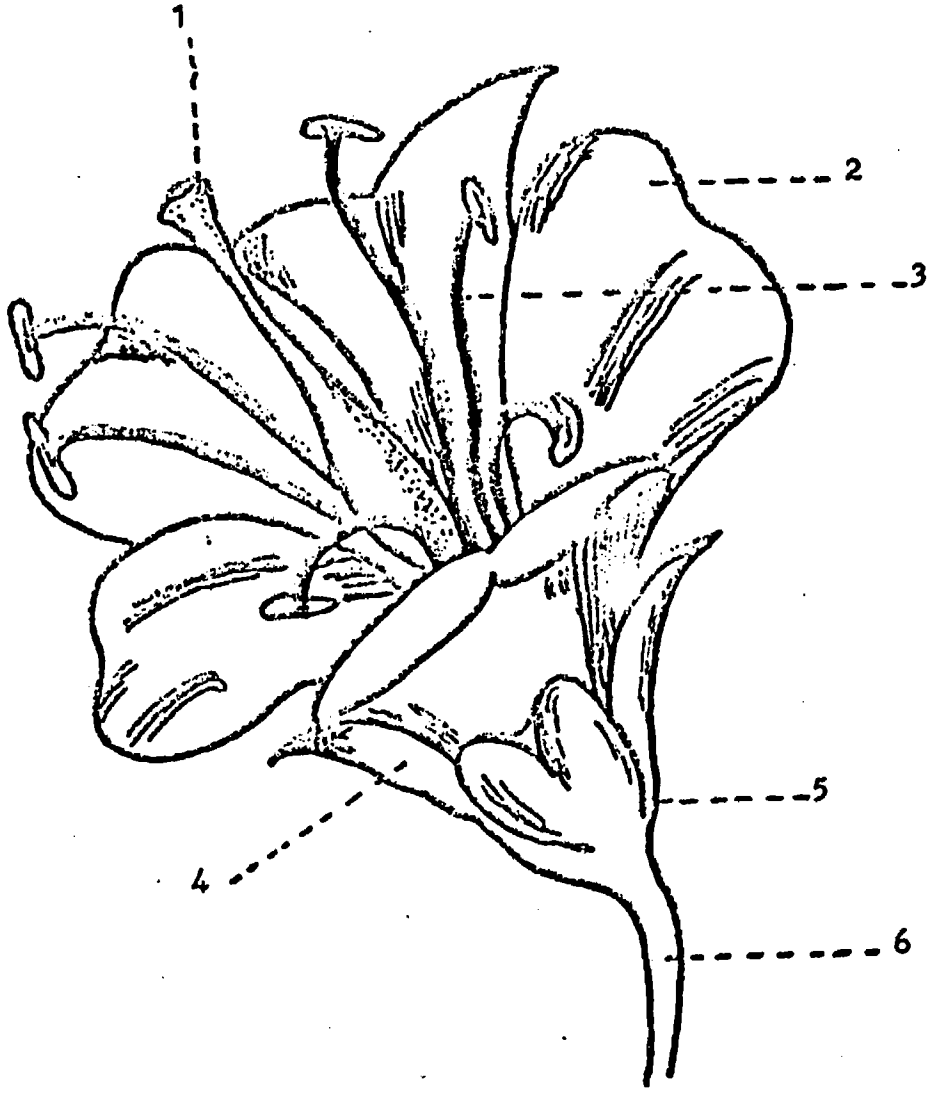
The Complete Flower



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Key To Preceding Diagrams

Microscope

1. eyepiece (ocular)
2. body tube
3. coarse adjustment
4. arm
5. revolving nosepiece
6. high power objective
7. low power objective
8. stage clips
9. stage
10. diaphragm
11. mirror or lamp
12. fine adjustment
13. base

"Typical" Plant Cell

1. Golgi apparatus
2. cytoplasm
3. nucleolus
4. nucleoplasm
5. nuclear membrane
6. chloroplast
7. endoplasmic reticulum
8. vacuole
9. mitochondrion
10. vacuolar membrane
11. cell wall
12. cell membrane
13. ribosome

"Typical" Animal Cell

1. mitochondrion
2. endoplasmic reticulum
3. cell membrane
4. vacuole
5. centrosome
6. Golgi apparatus
7. microvilli
8. nuclear membrane
9. nucleoplasm
10. nucleolus
11. ribosome
12. cytoplasm
13. lysosome
14. chromosome

Animal Cell Mitosis

1. centrosome
2. nucleolus
3. chromatin material
4. centriole
5. double chromosome
6. spindle
7. aster

Hydra

1. tentacle
2. mouth
3. bud
4. gastrovascular cavity
5. ectoderm
6. endoderm
7. basal disc
8. ovary
9. testis

Ameba

1. pseudopod
2. ectoplasm
3. endoplasm
4. contractile vacuole
5. food vacuole
6. nucleus
7. cell membrane

Starfish

1. eyespot
2. sieve plate
3. tube feet
4. spines
5. radial canal
6. lateral canal
7. circular canal
8. ampulla
9. sucker

Paramecium

1. cilia
2. trichocyst
3. endoplasm
4. food vacuole
5. ectoplasm
6. macronucleus
7. micronucleus
8. oral groove
9. pellicle
10. mouth pore
11. gullet
12. contractile vacuole
13. anal pore
14. food vacuole forming

Key To Preceding Diagrams

Clam

1. umbo
2. stomach
3. esophagus
4. anterior adductor muscle
5. mouth
6. palps
7. artery to foot
8. blood sinus
9. heart
10. intestine
11. kidney
12. excurrent siphon
13. gills
14. incurrent siphon
15. mantle
16. shell
17. gonad

Planaria

1. eyespot
2. brain
3. intestine
4. longitudinal nerve
5. transverse nerve
6. mouth
7. ectoderm
8. mesoderm
9. endoderm
10. intestine
11. cilia

Earthworm

1. intestine
2. gizzard
3. crop
4. esophagus
5. pharynx
6. prostomium
7. mouth
8. cuticle
9. circular muscle
10. seta
11. nephridium
12. longitudinal muscle
13. dorsal blood vessel
14. typhlosole
15. intestine
16. ventral blood vessel
17. ventral nerve cord

Grasshopper

1. antenna
2. ocelli
3. mouth parts
4. compound eye
5. prothorax
6. metathorax
7. forewing
8. hindwing
9. ovipositor
10. jumping leg
11. spiracle
12. tympanum
13. foreleg
14. mesothorax

Grasshopper (internal anatomy)

1. brain
2. esophagus
3. blood vessel
4. crop and gizzard
5. ovary
6. stomach
7. heart
8. intestine
9. seminal receptacle
10. anus
11. mouth
12. thoracic ganglion
13. gastric pouch
14. ventral nerve cord
15. Malpighian tubule
16. abdominal ganglion
17. oviduct
18. vagina
19. genital opening

Crayfish

1. antennule
2. rostrum
3. eye
4. green gland
5. brain
6. stomach
7. digestive gland
8. heart
9. intestine
10. ventral nerve cord
11. antennae
12. mandible
13. maxilliped
14. cheliped
15. walking legs
16. swimmerets
17. uropod
18. telson
19. blood vessel
20. gonad

Key To Preceding Diagrams

Frog

1. right auricle
2. lobe of liver
3. fat bodies
4. gonad
5. kidney
6. bladder
7. ureter
8. aortic arch
9. lungs
10. truncus arteriosis
11. left auricle
12. ventricle
13. stomach
14. pancreas
15. duodenum
16. pylorus
17. mesentery
18. small intestine
19. large intestine

Human Heart

1. precava
2. right pulmonary artery
3. right pulmonary vein
4. right auricle
5. tricuspid valve
6. post cava
7. right ventricle
8. septum
9. left ventricle
10. bicuspid valve
11. left pulmonary vein
12. left pulmonary artery
13. aorta
14. semilunar valve of aorta
15. semilunar valve of pulmonary aorta

Human Digestive System

1. salivary glands
2. esophagus
3. gall bladder
4. liver
5. duodenum
6. ascending colon
7. appendix
8. diverticulum
9. stomach
10. pylorus
11. pancreas
12. transverse colon
13. small intestine
14. descending colon
15. sigmoid colon
16. rectum

Fertilization

1. pollen grain
2. stigma
3. pollen tube
4. style
5. ovary
6. ovule
7. antipodals
8. embryo sac
9. will become endosperm nucleus
10. will form zygote
11. synergid
12. integument
13. micropyle
14. petal
15. receptacle
16. sepal

Complete Flower

1. pistil
2. petal
3. stamen
4. sepal
5. receptacle
6. pedicel

SUGGESTIONS FOR TEACHING-LEARNING ACTIVITIES

Below are listed ideas which might be helpful in planning for varied types of teaching-learning situations.

1. Interviews
2. Skits
3. Theme writing
4. Bulletin board
5. Debates
6. General discussion
7. Small group discussion
8. Committee work
9. Individual or group study
10. Oral reports
11. Newspaper articles
12. Field trips
13. Movies
14. Filmstrips
15. Slides
16. Overhead or opaque projections
17. Collect want ads
18. Write want ads
19. Employment Commission job lists
20. Exhibits
21. Collect materials
22. Observations
23. Role playing
24. Resource person
25. Brainstorming
26. Games
27. Research projects
28. Demonstrations
29. Prepare lists
30. Radio and Television Programs
31. Projects
32. Illustrations
33. Chalktalks
34. Panel discussions
35. Make files
36. Tests
37. Problem solving
38. Prepare charts and graphs
39. Window displays
40. Write letters
41. Assigned reading
42. Thought problems
43. Prepare speeches
44. Notebooks
45. Lecture

(From Introduction to Vocations, Teacher's Guide, Course Number 799, July, 1965, prepared by H. E. Beam and J. R. Clary, North Carolina)

AUDIO-VISUAL SOURCE INFORMATION

TITLE	TYPE	SOURCE	TIME	COLOR OR B/W
A Breath of Air	16mm	American Cancer Society, Conn. Div.	22 min.	C
A City and It's People	16mm	Film Associate of California	12 min.	C
A Trip to the Planets	16mm	Encyclopedia Britannica Educational Corp.	15 min.	B/W
About The Human Body	16mm	Churchill Films	15 min.	C
Air and the Weather	FS	L. C. Proctor		C
Air Cargo Service	FS	Tom Padgitt Company		C
Air Passenger Services	FS	Tom Padgitt Company		C
Airport Workers	FS	Tom Padgitt Company		C
Air Safety	FS	Tom Padgitt Company		C
Alcohol and The Human Body	16mm	Encyclopedia Britannica Films	14 min.	B/W
American In Orbit (Glenn)	16mm	Castle Films	10 min.	B/W
American on The Moon	16mm	Universal Education and Visual Arts	9 min.	C
Angiosperms	16mm	Encyclopedia Britannica Films	21 min.	C
Animal Predators and the Balance of Nature	16mm	Journal Films	10 min.	C
Animal Reproduction	16mm	Journal Films	17 min.	C
Animals Hear in Many Ways	16mm	Film Associate of California	12 min.	C
Artists Series	FS	Scott Educational		C
Astromony	FS	Filmette		B/W
Atmosphere and It's Circulation	16mm	Encyclopedia Britannica Films	11 min.	B/W
Atoms and Molecules	FS	Svekon Films		C

AUDIO-VISUAL SOURCE INFORMATION

TITLE	TYPE	SOURCE	TIME	COLOR OR B/W
Bacteria-Friend and Foe	FS	Encyclopedia Britannica Films	10 min.	B/W
Bacteria - Lab Study	FS	Indiana University	16 min.	C
Balance Your Diet for Health and Appearance	16mm	Coronet Films	11 min.	C
Beach - A River of Sand, The	16mm	Encyclopedia Britannica Films Corp.	20 min.	C
Beach and Sea Animals	16mm	Encyclopedia Britannica Films	11 min.	C
Big Green Caterpillar, The	16mm	Stanton Films	11 min.	C
Biology In Todays World	16mm	Coronet Films	11 min.	C
Birds and Mammals	16mm	McGraw-Hill Textfilms	28 min.	C
Care of Hair and Nails	FS	Encyclopedia Britannica Films		C
Careers in Fine Arts	FS/Rec.	Educational Dimension Corp.		C
Careers in Illustration	FS/Rec.	Educational Dimension Corp.		C
Careers in Materials Engineering - The Aerospace Age	FS/Rec.	Guidance Associate		C
Cattleman: A Ranchers Story	FS	Encyclopedia Britannica Films Corp.	22 min.	C
Causes of the Seasons	16mm	Coronet Films	11 min.	C
Cave Dwellers of the Old Stone Age	16mm	Encyclopedia Britannica Films	18 min.	C
Cell - Structural Unit of Life, The	16mm	Coronet Films	11 min.	C
Challenge of the Oceans - Oceanography	16mm	McGraw-Hill Textfilms	27 min.	C
Changing Art In a Changing World	16mm	Film Associate of California	21 min.	C
Charting The Universe - With Optical and Radio Telescopes	16mm	Encyclopedia Britannica Films Corp.	13 min.	C

TITLE	TYPE	SOURCE	TIME	COLOR OR B/W
Civil Engineer	Cas.T	Educational Progress Corp.		
Classification of Matter	FS	Encyclopedia Britannica Films		C
Classifying Plants and Animals	16mm	Coronet Films	11 min.	C
Climate	FS	Elementary Science		C
Climates of North America - From The North Pole to the Tropic of Cancer	16mm	Encyclopedia Britannica Films Corp.	17 min.	B/W
Clouds Above, The	16mm	X X X	9 min.	C
Commercial Artists	Cas. T	Educational Progress Corp.		
Commercial Pilot	Cas. T	Educational Progress Corp.		
Community Airport	FS	Tom Padgitt Company		C
Computer Programmer	Cas. T.	Educational Progress Corp.		
Conserving Our Forest Today	16mm	Coronet Films	11 min.	C
Conserving Our Mineral Resources Today	16mm	Coronet Films	11 min.	C
Conserving Our Natural Resources Series	FS/Rec.	Encyclopedia Britannica Films		C
Conserving Our Soil Today	16mm	Coronet Films	11 min.	C
Conserving Our Water Resources Today	16mm	Coronet Films	11 min.	C
Crayfish, The	16mm	McGraw-Hill Textfilms	15 min.	C
Development of Embroys	FS	Popular Science Pub. Co.		C
Digestion of Foods	16mm	Encyclopedia Britannica Films	11 min.	B/W
Digestive System, The	16mm	Encyclopedia Britannica Films	17 min.	B/W
Dr. Leaky and The Dawn of Man	16mm	Encyclopedia Britannica Films Corp.	26 min.	C
Drug Addiction	FS	Encyclopedia Britannica Films	22 min.	B/W

AUDIO-VISUAL SOURCE INFORMATION

TITLE	TYPE	SOURCE	TIME	COLOR OR B/W
Ears and Hearing, The	FS	Encyclopedia Britannica Films	10 min.	B/W
Earth and It's Neighbors in Space Series, The	FS	Encyclopedia Britannica Films		C
Earth - Changes In It's Surface, The	16mm	Coronet Films	11 min.	C
Earth In Change - The Earth Crust, The	16mm	Encyclopedia Britannica Films	16 min.	B/W
Earth - It's Atmosphere, The	16mm	Coronet Films	11 min.	C
Earth - It's Oceans	16mm	Coronet Films	14 min.	C
Earth - Resources In It;s Crust	16mm	Coronet Films	11 min.	C
Earthquake	16mm	Film Associates	14 min.	C
Earth's Changing Surface	16mm	McGraw-Hill Textfilms	12 min.	C
Education and The Teacher	FS	Eye Gate House Inc.		C
Edwards Story, The	16mm	Santra	19 min.	C
Electrons at Work	16mm	Encyclopedia Britannica Films	14 min.	B/W
Embryonic Development - The Chick	16mm	National Film Board of Canada	26 min.	C
Embryonic Development of Fish, The	16mm	National Film Board of Canada	28 min.	C
Endocrine Glands	FS	Encyclopedia Britannica Films	11 min.	B/W
Erosion	16mm	Film Associate of California	11 min.	C
Erosion - Leveling The Land	16mm	Encyclopedia Britannica Films	14 min.	B/W
Evidence For The Ice Age	16mm	Encyclopedia Britannica Films	19 min.	C
Evidence For Molecules and Atoms	16mm	Encyclopedia Britannica Films	19 min.	B/W
Evolution and Extinction	FS/Rec.	Singer/SVE		
Explaining Matter - Chemical Change	16mm	Encyclopedia Britannica Films Corp.	11 min.	C

AUDIO-VISUAL SOURCE INFORMATION

TITLE	TYPE	SOURCE	TIME	COLOR OR B/W
Explaining Matter - Molecules in Motion	16mm	Encyclopedia Britannica Films	11 min.	C
Exploring The Human Nervous System	16mm	Churchill Film Company	23 min.	C
Exploring The Night Sky	16mm	Encyclopedia Britannica Films	11 min.	B/W
Exploring The Ocean	16mm	Coronet Films	11 min.	C
Eyes and Their Care	FS	Encyclopedia Britannica Films	11 min.	B/W
Eyes and Vision	16mm	Encyclopedia Britannica Films	10 min.	B/W
Farmer - Feast or Famine, The	16mm	McGraw-Hill Textfilms	26 min.	B/W
First Aid On The Spot	16mm	Encyclopedia Britannica Films	10 min.	B/W
Flowers At Work	16mm	Encyclopedia Britannica Films	11 min.	C
Food That Builds Good Health	16mm	Coronet Films	11 min.	C
Foods and Nutrition	FS	McGraw-Hill Textfilms		C
Forester	Cas. T	Educational Progress Corp.		
Forests of Tropical America Series	FS	Walt Disney		C
Fresh Water Pond, The	16mm	Encyclopedia Britannica Films	14 min.	B/W
Frog, The	16mm	Encyclopedia Britannica Films	11 min.	C
Frog Development - Fertilization to Hatching	16mm	Universal Education and Visual Arts	12 min.	C
Fungus Plants	16mm	Encyclopedia Britannica Films	9 min.	B/W
Geysers and Hot Springs	16mm	Arthur Barr Producations Inc.	10 min.	C
Glaciers	16mm	Academy Films	14. min.	C
Great Lakes, The (How They Were Formed)	16mm	Encyclopedia Britannica Films	11 min.	C
Great Names in Biology	FS	Encyclopedia Britannica Films		C

AUDIO-VISUAL SOURCE INFORMATION

TITLE	TYPE	SOURCE	TIME	COLOR OR B/W
Great Weather Mystery, The	16mm	McGraw-Hill Textfilms	27 min.	B/W
Growth of Seeds	FS	Encyclopedia Britannica Films	13 min.	C
Heart and Circulation	FS	Encyclopedia Britannica Films		C
Heat and Temperature - Molecular Energy	FS	Popular Science Publication Co.		C
Heredity	FS	Encyclopedia Britannica Films		C
High School Teacher	Cas. T	Educational Progress Corp.		
Hooked	16mm	Churchill Films	20 min.	B/W
Hot Dry Desert	16mm	Bailey	16 min.	C
Housefly and It's Control, The	16mm	Coronet Films	11 min.	C
How Flowers Make Seeds	FS/Rec.	Coronet Films		C
How Hormones Control The Body	FS	Popular Science Publication Co.		C
How Many Stars	16mm	Moody Instruction of Science	11 min.	C
How To Measure Time	16mm	Encyclopedia Britannica Films	11 min.	B/W
How We Measure Heat	FS	Popular Science Publication Co.		C
Human Body: Muscular System	16mm	Coronet Films	13 min.	C
Human Body, The - Nutrition and Metabolism	16mm	Coronet Films	14 min.	C
Human Brain, The	FS	Encyclopedia Britannica Films	11 min.	B/W
Human Hair, The	16mm	Knowledge Builders Film Series	11 min.	B/W
Insects	16mm	Encyclopedia Britannica Films	14 min.	C
Invertebrates, The	16mm	Coronet Films	14 min.	C
Land Forms and Human Use	16mm	Coronet Films	11 min.	C

AUDIO-VISUAL SOURCE INFORMATION

TITLE	TYPE	SOURCE	TIME	COLOR OR B/W
Leaves	16mm	Encyclopedia Britannica Films	11 min.	B/W
Leaves and Their Work	FS/Rec.	Coronet Films		C
Librarian	Cas. T	Educational Progress Corp.		
Library and the Librarian, The	FS	Eye Gate House, Inc.		C
Life in a Cell	16mm	John Colburn Associate, Inc.	14 min.	C
Life in a Cubic Foot of Air	16mm	Coronet Films	11 min.	C
Life in a Cubic Foot of Soil	16mm	Coronet Films	11 min.	C
Life in The Desert	16mm	Encyclopedia Britannica Films	11 min.	C
Life of a Plant	16mm	Encyclopedia Britannica Films	11 min.	C
Lightening and Thunder	16mm	Coronet Films	11 min.	C
LSD: The Acid World	FS/Rec.	Guidance Associates	15 min.	C
Major Kinds of Seed Plants, The	FS/Rec.	Coronet Films		C
Man Makes a Desert	16mm	Film Associates of California	11 min.	C
Marijuana: What Can You Believe	FS/Rec.	Guidance Associates	32 min.	C
Measurement in Physical Science	16mm	Coronet Films	14 min.	C
Measuring in Astronomy - How Big, How Far	16mm	Film Associates of California	12 min.	C
Mechanisms of Breathing	FS	Encyclopedia Britannica Films		C
Metric System, The	16mm	McGraw-Hill Textfilms	13 min.	C
Metropolitan Airport	FS	Tome Padgitt Company		C
Microbes and Their Control	FS	Film Associates		C
Microscopic Life in The Soil	FS	Stanton Films	13 min.	C
Middle Atlantic Seaboard - Great Cities - Megalopolis	16mm	McGraw-Hill Textfilms	16 min.	C

AUDIO-VISUAL SOURCE INFORMATION

TITLE	TYPE	SOURCE	TIME	COLOR OR B/W
Miner, The	16mm	Encyclopedia Britannica Films	20 min.	C
Minerals and Rocks - Stones of the Earth	16mm	Encyclopedia Britannica Films	16 min.	C
Miracle of the Sea	FS	Encyclopedia Britannica Films		C
Mission - 22 Orbits	16mm	Castle Films	8 min.	B/W
Muscles and Bones of the Body	16mm	Coronet Films	11 min.	B/W
Mystery of Life, The	16mm	McGraw Hill Textfilms	25 min.	C
Narcotics - The Inside Story	16mm	Charlie Pacey (Cohill)	12 min.	C
Narcotics - Why Not	16mm	Chas Cahill and Associates	15 min.	C
Nature of Diversity	16mm	McGraw-Hill Textfilms	28 min.	C
Nature of Heat, The	16mm	Coronet Films	11 min.	B/W
Natures Half Acre	16mm	Walt Disney Educational Material Company	33 min.	C
Natures Strangest Creatures	16mm	Disney	16 min.	C
Navigation - Tool of Discovery	16mm	Stanton Films	18 min.	C
Nervous System, The	16mm	Encyclopedia Britannica Films	11 min.	B/W
None For The Road	FS	Aims Instructional Media Services, Inc.	12 min.	C
North America - The Continent	16mm	Coronet Films	17 min.	C
North American Regions - Series	16mm	Coronet Films	14 min.	C
Nose, The	16mm	Encyclopedia Britannica Films	11 min.	B/W
Nurse	Cas.T	Educational Progress Corp.		
Nurses Aide	FS/Rec.	Coronet Films		
Nurses Aide, The	FS/Rec.	Eye Gate House, Inc.		

AUDIO-VISUAL SOURCE INFORMATION

TITLE	TYPE	SOURCE	TIME	COLOR OR B/W
Oceanography at Work - Diamonds Under The Sea	16mm	Coronet Films	25 min.	C
Ocean Tides - Bay of Fundy	16mm	Encyclopedia Britannica Films Corp.	14 min.	C
Optical Technician	FS/Rec.	Coronet Films		C
Optometric Assistant	FS/Rec.	Coronet Films		C
Origin of Life	16mm	McGraw-Hill Textfilms	28 min.	C
Origins of Weather	16mm	Encyclopedia Britannica Films Corp.	13 min.	C
Our Forests	FS/Rec.	Coronet Films		C
Our Grass Lands	FS/Rec.	Coronet Films		C
Our Minerals and Energy Resources	FS/Rec.	Coronet Films		C
Our Soil	FS/Rec.	Coronet Films		C
Our Water and Soil	FS/Rec.	Coronet Films		C
Paper Industry: Trees In the Forest, The	FS	Brandon Films Associates		C
Paramecuim, Euglena and Ameba	16mm	Educational Services	15 min.	C
Parts of a Flowering Plant	FS	Filmette		B/W
Pesticides	FS/Rec.	Singer/SVE		C
Phagocytes - The Body's Defenders	16mm	Sterling Educational Films	10 min.	C
Photosynthesis	16mm	Out of Print	21 min.	C
Physician	Cas. T	Educational Progress Corp.		
Planets in Orbit - The Laws of Kepler	16mm	Encyclopedia Britannica Films Corp.	10 min.	B/W
Plant Growth	16mm	Encyclopedia Britannica Films	11 min.	B/W
Plant Motions - Roots, Stems, Leaves	16mm	Encyclopedia Britannica Films	11 min.	B/W

TITLE	TYPE	SOURCE	TIME	COLOR OR B/W
Plants and Animals Under The Sea	FS	Svekon Films		C
Plants and Their Importance	16mm	Aims Instructional Media Services	11 min.	C
Police and Police Protectors	FS	Eye Gate House, Inc.		C
Policeman	Cas. T	Educational Progress Corp.		
Pollution	FS/Rec.			C
Populations-Ecology	16mm	Encyclopedia Britannica Films	19 min.	B/W
Populations-Ecology	16mm	McGraw-Hill Films	28 min.	C
Populations-Statistics	FS/Rec.	Singer/SVE		C
Population Trends	FS/Rec.	Singer/SVE		C
Professor	Cas. T	Educational Progress Corp.		
Protosynthesis: Chemistry of Food Making	16mm	Coronet Films	13 min.	C
Protozoa (One-Celled Animals)	16mm	Encyclopedia Britannica Films	11 min.	C
Radiation in Biology	16mm	Coronet Films	14 min.	C
Reading Physical Maps	FS	Encyclopedia Britannica Films		C
Rockets and Satellites	16mm	United World Films	13 min.	C
Rocks For Beginners	16mm	Film Context	16 min.	C
Rocks That Form on The Earth's Surface	16mm	Coronet Films	13 min.	C
Rocks That Originate Underground	16mm	Encyclopedia Britannica Films	23 min.	C
Rocky Mountains - Continental Divide	16mm	Arthur Barr Productions	20 min.	C
Role of Green Plants	16mm	McGraw-Hill Textfilms	28 min.	C
Roots and Stems	FS/Rec.	Coronet Films		C
Roots of Plants	FS	Encyclopedia Britannica Films		C

AUDIO-VISUAL SOURCE INFORMATION

TITLE	TYPE	SOURCE	TIME	COLOR OR B/W
Spinal Column	FS/Rec.	Encyclopedia Britannica Films	11 min.	B/W
Standing Room Only	16mm	McGraw-Hill Textfilms	25 min.	C
Stewardess	Cas. T	Educational Progress Corp.		
Story of Agriculture and Stock Raising, The	FS	Encyclopedia Britannica Films		C
Story of Measuring Time - Hours, Minutes, Seconds	16mm	Coronet Films	11 min.	C
Story of the First Lunar Landing	Rec/FS	Doubleday and Company, Inc.		C
Studying and Area Through Maps	FS	Encyclopedia Britannica Films		C
Sun and How It Affects Us	16mm	Coronet Films	11 min.	C
Systematic Scientist, The	16mm	McGraw-Hill Textfilms	24 min.	C
Tabacco and Alcohol - The $50,000 Habit	FS/Rec.	Guidance Associates	18 min.	C
Technical Writer	Cas. T	Educational Progress Corp.		
Their Uses (Seed Plants)	FS/Rec.	Coronet Films		C
Tides of The Ocean	16mm	Academy Films	16 min.	C
Tides of The Ocean - What They Are and How The Sun and Moon Causes Them	16mm	Academy Films	17 min.	C
To Clear The Air	16mm	Universal Education and Visual Arts	20 min.	C
Traitor Within, The	16mm	American Cancer Society, Inc.	11 min.	C
Treasure Under The Sea	16mm	McGraw-Hill Textfilms	24 min.	C
U.S. Space Pioneer	16mm	Castle Films	13 min.	C
Veterinarian	Cas.T	Educational Progress Corp.		
Vocation in Agriculture	16mm	Journal Films	15 min.	C

AUDIO-VISUAL SOURCE INFORMATION

TITLE	TYPE	SOURCE	TIME	COLOR OR B/W
Water Cycle, The	16mm	Encyclopedia Britannica Films	8 min.	B/W
Waves On Water	16mm	Encyclopedia Britannica Films Corp.	16 min.	C
Way Stations In Space	16mm	United World Films	14 min.	C
Wealth In The Ocean	FS	Moody Instruction of Science		C
Weather Scientists	16mm	United World Films	14 min.	C
What Is Ecology?	16mm	Encyclopedia Britannica Films	11 min	B/W
What Is Science?	16mm	Coronet Films	11 min.	C
What Is Space?	16mm	Encyclopedia Britannica Films	11 min.	B/W
What Makes Clouds?	16mm	Encyclopedia Britannica Films	19 min.	C
What Makes Rain?	16mm	Young Americans	10 min.	B/W
Work of Rivers	16mm	Encyclopedia Britannica Films	11 min.	B/W
Work of The Atmosphere, The	16mm	Encyclopedia Britannica Films	11 min.	B/W
Work of The Blood	16mm	Encyclopedia Britannica Films	13 min.	C
Work of The Kidneys	FS	Encyclopedia Britannica Films		C
Working In a Hospital	FS/Rec.	Avid Corp.		C
World Around Us, The	16mm	McGraw-Hill Textfilms	25 min.	C
World of Little Things, The	16mm	Moody Institute of Science	13 min.	C
World of Molecules, The	16mm	Churchill Films	10 min.	C
Your Future As a Commerical Airlines Stewardess	Mag. T	Guidance Associates		
Your Future As a Construction Machinery Operator	Mag. T	Guidance Associates		
Your Future As a Licensed Practical Nurse	Mag. T	Guidance Associates		

AUDIO-VISUAL SOURCE INFORMATION

TITLE	TYPE	SOURCE	TIME	COLOR OR B/W
Your Future As a Policeman/Policewoman	Mag. T	Guidance Associates		
Your Future As a Surveyor	Mag. T	Guidance Associates		
Your Future As an Appliance Serviceman	Mag. T	Guidance Associates		
Your Future in Beauty Culture (For both sexes)	Mag. T	Guidance Associates		
Your Future in Data Processing (For both sexes)	Mag. T	Guidance Associates		
Your Future in Electronics	Mag. T	Guidance Associates		
Your Future in Engineering Technology	FS/Rec.	Guidance Associates		
Your Future in The Armed Forces	Mag. T	Guidance Associates		
Your Future in The Internal Revenue Service	Mag. T	Guidance Associates		
Your Skin	16mm	Film Associates	15 min.	C

ADDITIONAL SOURCES OF CAREER INFORMATION

1. Air Transport Association of America
   1000 Connecticut Avenue, N.W.
   Washington, D.C. 20036

2. American Angus Association
   3201 Frederich Boulevard
   St. Joseph, Missouri 64506

3. American Association of Junior Colleges
   1315 Sixteenth Street, N.W.
   Washington, D.C. 20036

4. American Astronomical Society
   Yale University Observatory
   New Haven, Connecticut 06520

5. American Council on Education
   1 Dupont Circle
   Washington, D.C. 20036

6. American Gas Association, Inc.
   605 Third Avenue
   New York, New York 10016

7. American Geological Institute
   1444 N Street, N.W.
   Washington, D.C. 20005

8. American Medical Association
   535 North Dearborn Street
   Chicago, Illinois 60610

9. American National Cattleowner's Association
   801 East 17th Avenue
   Denver, Colorado 80218

10. American Pediatric Society
    333 Cedar Street
    New Haven, Connecticut 06510

11. American Society of Biological Chemists
    9650 Rockville Pike
    Bethesda, Maryland 20014

12. American Society of Civil Engineers
    345 East 47th Street
    New York, New York 10017

13. American Society for Horicultural Science
    P.O. Box 109
    St. Joseph, Michigan 49085

14. American Society of Photogrammetry
    105 North Virginia Avenue
    Falls Church, Virginia 22046

15. American Society of Planning Officials
    1313 East 60th Street
    Chicago, Illinois 60637

16. American Veterinary Medical Association
    600 South Michigan Avenue
    Chicago, Illinois 60605

17. Association of American Geographers
    1710 Sixteenth Street, N.W.
    Washington, D.C. 20036

ADDITIONAL SOURCES OF CAREER INFORMATION

18. Data Processing Management Association
505 Busse Highway
Park Ridge, Illinois 60068

19. Engineers' Council for Professional Development
345 East 47th Street
New York, New York 10017

20. Environmental Science Services Administration
Rockville, Maryland 10852

21. Federal Aviation Administration
800 Independence Avenue, S.W.
Washington, D.C. 20590

22. International Chiropractors Association
741 Brady Street
Davenport, Iowa 52800

23. International Jewelry Workers' Union
8 West 40th Street
New York, New York 10018

24. International Longshoreman's Association (AFL-CIO)
17 Battery Place
New York, New York 10004

25. International Union of Operating Engineers (AFL-CIO)
1125 Seventeenth Street, N.W.
Washington, D.C. 20036

26. Manufacturing Jewelers and Silversmiths of America
Sheraton-Biltmore Hotel, Room S-75
Providence, Rhode Island 02902

27. Milk Industry Foundation
910 Seventeenth Street, N.W.
Washington, D.C. 20006

28. National Aerospace Education Council
815 Fifteenth Street, N.W.
Washington, D.C. 20006

29. National Association of Gardeners
194 Old Country Road
Mincola, New York 11501

30. National Association for Practical Nurse Education and Service
1465 Broadway
New York, New York 10036

31. National Coal Association
1130 Seventeenth Street, N.W.
Washington, D.C. 20036

32. National Council for Geographic Education
111 West Washington Street-Room 135
Chicago, Illinois 60602

33. National Dairy Council
111 North Canal Street
Chicago, Illinois 60606

ADDITIONAL SOURCES OF CAREER INFORMATION

34. National Education Association
1201 Sixteenth Street, N.W.
Washington, D.C. 20036

35. National League for Nursing
10 Columbus Circle
New York, New York 10019

36. National Restaurant Association
1530 North Lake Shore Drive
Chicago, Illinois 60610

37. National Selected Morticians
1616 Central Street
Evanston, Illinois 60201

38. National Society of Art Directors
115 East 40th Street
New York, New York 10016

39. Office of Educational Programs
and Services
National Aeronautics and Space
Administration
400 Maryland Avenue
Washington, D.C. 20025

40. Pharmaceutical Manufacturers
Association
1155 15th Street, N.W.
Washington, D.C. 20005

41. Professional Air Traffic
Controllers Organization
1725 K Street, N.W.
Washington, D.C. 20006

42. Retail Jewelers of America
1025 Vermont Avenue, N.W.
Washington, D.C. 20005

43. Rural Sociological Society
c/o Department of Rural Sociology
South Dakota State University
Brookings, South Dakota 97006

44. Seafarers International Union of
North America
350 Fremont Street
San Francisco, California 94105

45. Society of Exploration Geophysists
Box 3098
Tulsa, Oklahoma 74101

46. Society of Illustrators
128 East 63rd Street
New York, New York 10021

47. Society for Industrial Microbiology
2000 P Street, N.W.
Washington, D.C. 20036

48. Society of Woman Geographers
1619 New Hampshire Avenue, N.W.
Washington, C.D. 20009

49. System and Procedures Association
24587 Bagley Road
Cleveland, Ohio 44138

50. United Mine Workers of America
900 Fifteenth Street, N.W.
Washington, D.C. 20005

ADDITIONAL SOURCES OF CAREER INFORMATION

51. United States Department of
Health, Education and Welfare
Office of Education
Washington, D.C. 20202

52. United States Geological Survey
Department of the Interior
Washington, D.C. 20242

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PERIODICALS FOR CAREER INFORMATION

1. American Artist
   165 West 46th Street
   New York, New York 10036

2. American Association of University Professors Bulletin
   1 Dupont Circle
   Washington, D.C. 20036

3. American Aviation
   American Aviation Publications, Inc.
   1001 Vermont Avenue, N.W.
   Washington, D.C. 20005

4. American Beef Producer
   801 East 17th Avenue
   Denver,Colorado 80218

5. American Forests
   919 Seventeenth Street, N.W.
   Washington, D.C. 20006

6. American Horticultural Magazine
   901 North Washington Street
   Alexandria, Virginia 22314

7. American Horologist and Jeweler
   2403 Champa Street
   Denver, Colorado 80204

8. American Jewelry Manufacturer
   Sheraton-Biltmore Hotel
   Providence, Rhode Island 02902

9. American Journal of Nursing
   10 Columbus Circle
   New York, New York 10019

10. American Journal of Sociology
    University of Chicago Press
    5750 Ellis Avenue
    Chicago, Illinois 60637

11. American Psychologist
    1200 Seventeenth Street, N.W.
    Washington, D.C. 20036

12. American Sociological Review
    1722 N Street, N.W.
    Washington, D.C. 20036

13. American Teacher
    1012 Fourteenth Street, N.W.
    Washington, D.C. 20005

14. Applied Microgiology
    115 Huron View Boulevard
    Ann Arbor, Michigan 48103

15. Art Direction
    19 West 44th Street
    New York, New York 10036

16. Aviation Week and Space Technology
    McGraw-Hill Publishing Co.
    330 West 42nd Street
    New York, New York 10036

17. Bedside Nurse
    250 West 57th Street
    New York, New York 10019

18. Biochemistry
    1155 Sixteenth Street, N.W.
    Washington, D.C. 20006

PERIODICALS FOR CAREER INFORMATION

19. Bulletin of the Geological Society of America
Box 1719
Boulder, Colorado 80302

20. Casket and Sunnyside
114 East 32nd Street
New York, New York 10016

21. Civil Engineering
345 East 47th Street
New York, New York 10017

22. Coal Age
330 West 42nd Street
New York, New York 10036

23. Computers and Automation
815 Washington Street
Newtonville, Massachusetts 02106

24. Contractors and Engineers
757 Third Avenue
New York, New York 10017

25. Datamation
1630 West Olympic Boulevard
Los Angeles, California 90006

26. Distribution Age
Chilton Company
56th and Chestnut Streets
Philadelphia, Pennsylvania 19139

27. Drug & Cosmetics Industry
101 West 31st Street
New York, New York 10001

28. Drug Trade News
330 West 34th Street
New York, New York 10001

29. Engineering News-Record
330 West 42nd Street
New York, New York 10036

30. Federal Employee
1729 G Street, N.W.
Washington, D.C. 20506

31. Flying
1 Park Avenue
New York, New York 10016

32. Future Teachers of America Newsletter
1201 Sixteenth Street, N.W.
Washington, D.C. 20036

33. Geophysics
Society of Exploration Geophysicists
Box 3098
Tulsa, Oklahoma 74101

34. Geographical Review
Broadway at 156th Street
New York, New York 10032

35. Geotimes
2201 M Street, N.W.
Washington, D.C. 20037

36. Higher Education and National Affairs
1 Dupont Circle
Washington, D.C. 20036

37. Hospitals, Journal of the
American Hospital Association
840 North Lake Shore Drive
Chicago, Illinois 60611

38. Hospitality Magazines
5 South Wabash Avenue
Chicago, Illinois 60603

39. Institutions Magazine
1801 South Prairie Avenue
Chicago, Illinois 60616

40. Instrument and Apparation News
1 Decker Street
Bala Cynwyd, Pennsylvania 19004

41. Instruments and Control Systems
56th and Chestnut Streets
Philadelphia, Pennsylvania 19139

42. International Review of Chiropractic
741 Brady Street
Davenport, Iowa 52800

43. Jeweler's Circular-Keystone
Chestnut and 56th Streets
Philadelphia, Pennsylvania 19139

44. Jeweler's Circular-Keystone
One Decker Square
Bala Cynwyd, Pennsylvania 19004

45. Journal of Air Traffic Control
525 School Street, S.W.
Washington, D.C. 20024

46. Journal of Bacteriology
115 Huron View Boulevard
Ann Arbor, Michigan 48103

47. Journal of Biological Chemistry
428 East Preston Street
Baltimore, Maryland 21202

48. Journal of Dairy Science
113 North Neil Street
Champaign, Illinois 61820

49. Journal of Data Management
505 Busse Highway
Park Ridge, Illinois 60068

50. Journal of Food Science
221 North La Salle Street
Chicago, Illinois 60601

51. Journal of Forestry
1010 Sixteenth Street, NW
Washington, D.C. 20036

52. Journal of Geophysical Research
2100 Pennsylvania Avenue, N.W.
Washington, D.C. 20037

53. Journal of Milk and Food
Technology
P.O. Box 437
Shelbyville, Indiana 46176

54. Journal of Pediatrics
3207 Washington Boulevard
St. Louis, Missouri 63103

55. Journal of Secondary Education
1705 Murchison Drive
Burlingame, California 94011

56. Journal of Taxation
125 East 56th Street
New York, New York 10022

57. Journal of the American Animal Hospital Association
P.O. Box 1304
Elkhart, Indiana 46514

58. Journal of the American Chiropractic Association
2200 Grand Avenue
P.O. Box 1535
Des Moines, Iowa 50306

59. Journal of the American Optometric Association
7000 Chippewa Street
St. Louis, Missouri 63119

60. Journal of the American Pharmaceutical Association
2215 Constitution Avenue, N.W.
Washington, D.C. 20037

61. Journal of the AVMA
600 South Michigan Avenue
Chicago, Illinois 60605

62. Medical Record News
211 East Chicago Avenue
Chicago, Illinois 60611

63. Men's Hairstylist and Barber's Journal
16 West 46th Street
New York, New York 10036

64. Mining Congress Journal
1200 Eighteenth Street, N.W.
Washington, D.C. 20036

65. Modern Jewelers
101 West 11th Street
Kansas City, Missouri 64152

66. National 4-H News
59 East Van Buren Street
Chicago, Illinois 60605

67. National Future Farmer
Future Farmers of America
5630 Mt. Vernon Highway
Alexandria, Virginia 22309

68. National Geographic Magazine
Seventeen and M Streets N.W.
Washington, D.C. 20036

69. National Jeweler
222 Park Avenue South
New York, New York 10003

70. NEA Journal
1201 Sixteenth Street, N.W.
Washington, D.C. 20036

71. Oceanus
Woods Hole Oceanographic Institution
Woods Hole, Massachusetts 02543

72. Pediatrics
1801 Hinman Avenue
Evanston, Illinois 60204

73. Pediatric News
1346 Connecticut Ave. N.W.
Washington, D.C. 20036

74. Photogrammetric Engineering
105 North Virginia Avenue
Falls Church, Virginia 22046

75. Professional Barber
54 West 46th Street
New York, New York 10036

76. Seafarers Log
675 Fourth Avenue
Brooklyn, New York 10032

77. Sea Frontiers
International Oceanographic Foundation
1 Rickenbacker Causeway
Virginia Key, Miami, Florida 33149

78. Sky and Telescope
60 Garden Street
Cambridge, Massachusetts 02138

79. Surveying and Mapping
Box 470, Benjamin Franklin Station
Washington, D.C. 20044

80. The American Funeral Director
1501 Broadway
New York, New York 10036

81. The Astronomical Journal
Yale University Observatory
New Haven, Connecticut 06520

82. The Dispatcher
International Longshoremen's and Warehousemen's Union
150 Golden Gate Avenue
San Francisco, California 94102

83. The Federal Accountant
1523 L Street N.W.
Washington, D.C. 20005

84. The Golf Superintendent
3158 Des Plaines Avenue
Des Plaines, Illinois 60018

85. The Journal of Geography
111 West Washington Street Rm. 1532
Chicago, Illinois 60602

86. The Journal of Practical Nursing
1465 Broadway
New York, New York 10036

87. The Pilot
36 Seventh Avenue
New York, New York 10011

88. The Professional Gardener
194 Old Country Road
Minlola, New York 11501

89. The Professional Geographer and The Annals of the Association of American Geographers
1710 Sixteenth Street N.W.
Washington, D.C. 20009

90. The Southern Funeral Director
770 Spring Street N.W.
Atlanta, Georgia 30309

91. Volume Feeding Management
205 E. 42nd Street
New York, New York 10022

92. Weatherwise
45 Beacon Street
Boston, Massachusetts 02108

93. World Ports and Marine News
Amundsen Publications, Inc.
Southern Building
Washington, D.C. 20005

SUPPLEMENTARY ADDRESSES

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   750 Third Avenue
   New York, New York 10017

2. American Society
   219 East 42nd Street
   New York, New York 10017

   Information Service
   8214 Wurzbach Road
   San Antonio, Texas

3. American Forest Institute
   1619 Massachusetts Avenue, N.W.
   Washington, D.C. 20036

4. American Gas Association, Inc.
   1515 Wilson Boulevard
   Arlington, Virginia 22209

5. American Heart Association
   San Antonio Chapter
   120 E. Martin Street
   San Antonio, Texas

6. American Petroleum Institute
   1801 K Street N.W.
   Washington, D.C. 20006

7. Atomic Energy Commission
   Division of Public Information
   Albuquerque Operation Office
   Office of Information, P.O. Box 5400
   Albuquerque, New Mexico 87103

8. Barre Granite Association
   51 Church Street, Box 481
   Barre, Vermont 05641

9. Bell Telephone Company
   Business Office
   San Antonio, Texas (225-2411)

10. Bethlehem Steel Corporation
    East Building
    E. T. Moffeit, Manager of Advertising
    Bethlehem, Pennsylvania 18016

11. Bureau of Economic Geology
    Austin, Texas 78712

12. Bureau of the Mines
    United States Department of the Interior
    Motion Pictures
    4800 Forbes Avenue
    Pittsburg, Pennsylvania 15213

13. Charles E. Merrill Publishing Co.
    Columbus, Ohio

14. Crowell - Collier Press
    Collier - Macmillian Limited - London
    Exploring Crystals - James Berry

15. Earth Science Education Program
    Box 1559
    Boulder Colorado 80302
    (The Cutting Edge...How to Innovate and Survive Vol. I and II Many teaching methods single copies available)

16. Holt, Rinehart and Winston, Inc.
    New York, New York

17. Life Educational Program, The
    Box 834
    Radio City Station
    New York, New York 10019

18. J. B. Lippincott Company
    Philadelphia, New York
    Book Reference: Crystals Raymond A. Wohlrabe

SUPPLEMENTARY ADDRESSES

19. Modern Talking Picture Service, Inc.
1411 Slocum Street
Dallas, Texas 75207

20. Prentice-Hall
Educational Book Division
Box 900
Englewood Cliffs, N.J. 07632
Ideas and Investigations in Science
Harry K. Wong and Malvin S. Dolmatz

21. Scott, Foresman and Company
Dallas, Texas

22. Shell Oil Company
Shell Film Library
450 North Meridian Street
Indianopolis, Indiana 46204

23. Sonotone Corporation
Saw Mill River Road
Elmsford, New York 10523

24. St. Regis Paper Company
150 East 42nd Street
New York, New York 10017

25. Sul Ross University
Geology Department
Alpine, Texas 79830

26. Texas Highway Department
Travel and Information Division
P.O. Box 5064
Austin, Texas 78763

27. Texas Parks and Wildlife Department
John H. Reagan Building
Austin, Texas

28. United States Borax and Chemical Corporation
Public Relations Department
3075 Wilshire Boulevard
Los Angeles, California 20590

29. United States Department of Justice
Bureau of Narcotics and Dangerous Drugs
3600 Fredericksburg Road
124 Northwest Center Mall
San Antonio, Texas

30. United States Geological Survey
Information Office
Washington, D.C. 20242

31. D. Van Nostrand Co., Inc.
Princeton, New Jersey

32. Ward's Natural Science Establishment, Inc.
P.O. Box 1712
Rochester, New York 14603

33. West Texas Geological Society
P.O. Box 1595
Midland, Texas 79701

34. J. Weston Walsh Publishing Company
Box 658 Main Post Office
Portland, Maine 04104

35. Zinc Institute, Inc.
292 Madison Avenue
New York, New York 10017