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Title of Study: A TEACHING GUIDE FOR NINTH GRADE GENERAL SCIENCE

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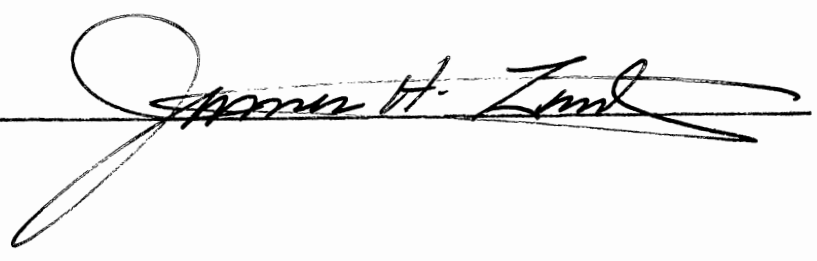
Scope of Study: General science became a part of the curriculum in the early part of the century to satisfy the needs of those students who had to leave school before taking the high school science courses. Its secondary function was a foundation for later study. This report is concerned with the present role of general science in the modern secondary school, and its need for imporvement to meet the aims for such a course in a modern secondary school. This report presents a teaching guide in four parts (1) a general outline of the course, (2) laboratory activities, (3) supplementary material composed of industrial literature and audio-visual materials, and (4) a bibliography of outside reading.

Findings and Conclusions: Although the course is a composite of several courses, it is taught as though it were one course with each major subject treated as a unit. These units are correlated in such a way as to present the science of the environment. There is an abundance of industrial literature available to illustrate the use of the basic scientific principles. The addition of these materials to the curriculum gives an effective, modern science course for all students.

ADVISER'S APPROVAL 

A TEACHING GUIDE FOR NINTH GRADE GENERAL SCIENCE

By

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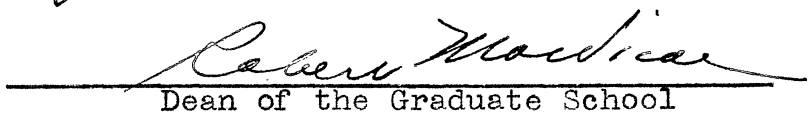

Dean of the Graduate School

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Preface

This report is an attempt to develop a flexible plan for the ninth grade general science classes. The classes usually have from twenty to thirty-five students, giving a heterogenous group of student interests and abilities. In some cases it is necessary to hurriedly cover material or skip it altogether because of delays as a result of the slow students or a small minority of students interested. This report is an attempt to overcome this situation by incorporating industrial literature, audio-visual aids, and extensive outside reading into the regular curriculum. The faster, more advanced students will be able to select extra work according to any special interests and at the same time participate in the normal classroom activities without becoming bored. In the same manner, the average student is able to develop special interests and gain knowledge of the basic subject matter through the use of these materials. Very often, the so-called slow student is slow because of a lack of interest. This plan of study offers him the opportunity to stimulate his interest and at the same time develop a clearer understanding of the basic principles involved. In all cases, the practical applications of the basic principles of science are apparent. The student is in a better position to understand and appreciate the role of science in his environment.

Table of Contents

CHAPTER ONE

HISTORICAL DEVELOPMENT

General science became a part of the curriculum shortly after the turn of the century. The demand for such a course arose almost simultaneously in several parts of the country. Many students were leaving school before they had obtained even the simplest introduction to the scientific principles as applied to the home and the community. Since science was becoming more important, and the classical chemistry and physics offered few practical applications, general science was added to the curriculum to cope with the situation.

Crecelius[1] listed the following as the principle aims of general science teaching:

(a) to become acquainted with the elementary laws of nature necessary for the health of the individual and community;

(b) to give information about appliances which science has developed and which are useful in making for greater comfort and convenience in the home and community;

(c) to give children opportunity to indulge in the

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[1]Philipine Crecelius, "A Report on the Objectives of General Science Teaching," School Science and Mathematics, XXIII, (April, 1923), 313-319.

playful manipulation of toys, tools, and machines in order that they may explore the world of reality;

(d) to provide opportunity for acquaintance with the simpler applications of science in public utilities in order that the individual may more adequately fulfill the duties of citizenship.

Since general science was taught before chemistry and physics and required of all students, these aims apparently fulfilled the basic reasons for adding the course to the curriculum. The fact that all students were required to take the course gave it a two fold purpose. Preston[2] lists these objectives as orientation for those students who must leave school to go to work and as a foundation for higher science study. Later studies [3] list the following objectives for the course:

(a) be in harmony with the accepted objectives set for the pupils;

(b) lead to the inculcation of appropiate scientific attitudes and the understanding of the methods of science;

(c) encourage the belief in and practice of desirable social ideals involving science;

(d) be of direct use to the pupils in their daily living;

(e) be appropiate for the ability of the pupil;

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[2]Carlton E. Preston, The High School Science Teacher and His Work, McGraw-Hill Book Company, New York, 1936.

[3]National Society for the Study of Education, Science Education in American Schools, Forty-sixth Yearbook, Part I, The University of Chicago Press, Chicago, 1947.

(f) aid pupils in the interpretations of the local and world environment;

(g) be in harmony with the needs and interests of the pupils.

This list of objectives indicates that general science is still in the curriculum to cope with a situation that is quite similar to that at the beginning. Although more students are remaining in school for a longer period of time, a great number of them do not take the more formal high school science courses. Since many people refer to this as the age of science, it is even more important that there be a way for the student to prepare himself for his place in a rapidly changing and demanding environment. The objectives for such a course in general science are best described in the preface of one of the modern textbooks[4]. These are:

(a) give the student an orderly understanding of the materials and forces which make up his environment;

(b) give the student a first hand experience with the scientific method of solving problems;

(c) help the student adjust his life to the rapid progress which science is making in this Atomic Age.

With these objectives in mind, the next logical step is to choose the subject matter for the course. Of necessity, the subject matter must come from the pupil's immediate environment. The environment offers such a wide area that some

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[4] Ira C. Davis, John Burnett, and E. Wayne Goss, Science, Discovery and Progress, Henry Holt and Company, Inc., New York, 1957.

preliminary decisions must be made. However, pupil interest must guide the way to the final decisions as to the actual course content. Most of the modern textbooks give a wide selection of material so that they are easily adaptable to the situation. As a result of studies in child interest and general science curriculum, Pollock[5] suggests that the teacher not tie himself to any particular textbook in mapping out a course in general science. He further suggests that the teacher should choose the textbook that contributes most to the interest of the pupils and the others that have stressed and developed the special environment should be used as a supplement. It is necessary to take the subject matter from both the physical and biological sciences. Most of the current textbooks present these in such a manner that no account is taken of the divisions in the sciences. The sciences are found working together in the environment, so if the student is to understand his environment, the sciences should be demonstrated and taught as they actually exist.

The next question to be considered is the manner of teaching to be employed in this course. Heiss, Obourn, and Hoffmen[6] maintain that the teacher must formulate a philosophy of teaching to suit his own conditions and needs but must continually guard against the possiblity of his philosophy becoming fixed. The same is true of the teaching methods

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[5]Francis D. Curtis, A Digest of Investigations in the Teaching of Science, P. Blaikston's Son and Company, Philadelphia, 1926.

[6]E.D. Heiss, E.S. Obourn, and C.W. Hoffman, Modern Science Teaching, Macmillan Company, New York, 1940.

that are used. If the philosophy is not rigid, then the instructional techniques used must be flexible. The use of any one method of teaching exclusive of all others is of little value. Common teaching methods are the textbook, the lecture, the demonstration, and the laboratory. Audio-visual instructional materials must be added to this list of methods for they involve the presentation of knowledge to be gained through the eye[7]. It is to be remembered that the audio-visual materials are tools of instruction and should be used as teaching devices and not as entertainment. The same situation arises during the expermentation phase of teaching. The exercises should have purpose, be carefully planned, and as far as is possible be carried out by the students themselves[8]. Young people are eager to learn about the physical and biological principles which govern the world in which they live. Therefore, the teacher should use any ethical teaching method that is available to help carry out the learning process.

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[7]Milton O. Pella, "Audio-visual Aids in Teaching Science," The Science Teacher, February, 1949, 24-25.

[8]Glenn O. Blough and Paul E. Blackwood, Science Teaching in Rural and Small Town Schools, United States Government Printing Office, Washington, D.C., 1955.

CHAPTER TWO

TEACHING GUIDE

Organization

Four major divisions make up the teaching guide. The first of these divisions is an outline of the subject matter to be covered. This outline is not a rigid thing that cannot be altered, however, it is made of questions that are commonly asked by ninth grade students. A list of laboratory work makes up the second division of each unit. Most of these activities can be carried out with simple, inexpensive equipment. They are activities that help illustrate the basic principles that are discussed. The supplementary material makes up the third division of each unit. This material is correlated with each unit so that the students may see the practical applications of the basic principles as they study them. The use of supplementary material provides the opportunity to point up the important place that science occupies in the daily life of the student and his family. A bibliography, composed of as many interest groups as possible, completes the teaching guide. The student can use this as a guide for outside reading selections.

Course Outline

Unit I Matter and Energy

A. Subject matter

1. What are the materials and forces of nature?
2. What properties of matter make it useful to man?
3. How is energy used in the environment?
4. What is the relationship between matter and energy?
5. What is the scientific method of solving problems?

B. Laboratory activities

1. Organic vs inorganic matter.
2. Effect of heat on the form of matter.
3. Air occupies space and has weight.
4. Area and volume in the metric and English systems of measurement.
5. Force, inertia, friction, and gravity.
6. Scientific method of problem solving.

C. Supplementary material

1. The Amazing Story of Measurement, Lufkin Rule Company.
2. 101 Atomic Terms, Esso Research and Engineering Company.
3. The World Within the Atom, Westinghouse Electric Corporation.
4. Inside the Atom, General Electric Company.
5. Mesa Miracle, Union Carbide Nuclear Company.
6. Energy and Its Transformation, Encyclopedia Brittanica Films.
7. Nature of Energy, Cornet Instructional Films.
8. Precisely So, General Motors Corporation.

9. Years of Progress, Modern Talking Picture Service.

10. Energy, Visual Text Sales Company.

11. Energy, Visual Sciences.

12. Atomic Bomb, Armed Forces Photographic Company.

Unit II Air Pressure

A. Subject matter

1. What is air pressure?

2. How is air pressure measured?

3. How is air used in pneumatic appliances?

4. How is air pressure used in transportation?

B. Laboratory activities

1. Air exerts pressure.

2. Unbalanced pressures.

3. The mercury barometer.

4. Compression and vacuum pumps.

5. Lift and force pumps.

6. Siphon.

7. Hydrogen filled balloons.

8. The principle of the atomizer.

9. Propellers develop thrust.

10. Jet propulsion.

C. Supplementary material

1. Adventures in Jet Power, General Electric Company.

2. ABC of Jet Propulsion, General Motors Corporation.

3. Properties of Air , Civil Aeronautics Administration.

4. "Jets, How and Why They Work," Superstition to Supersonics, Manufacturing Chemists' Association.

5. How an Airplane Flies, Shell Oil Company.

Unit III Nature of Air and Fire

A. Subject matter

1. What gases are present in the air?
2. What are the conditions necessary for combustion?
3. What is oxidation and how is it related to burning?
4. What are the products of burning?
5. What are the sources of the common fuels?
6. How can losses from destructive fires be reduced?

B. Laboratory activities

1. Gases in air.
2. Elements combine to form compounds.
3. Compounds and mixtures.
4. Conditions for burning.
5. Kindling temperature of certain substances.
6. Oxidation, slow and rapid.
7. Products of combustion.
8. Chemical and physical changes.
9. Destructive distillation of coal.
10. Fire extinguishers.

C. Supplementary material

1. "Oxygen, Nitrogen, and You," Superstitions to

Supersonics, Manufacturing Chemists' Association.

2. Petroleum in Our Age of Science, American Petroleum Institute.
3. Teachers Handbook, American Petroleum Institute.
4. Coal, Field Enterprises, Inc.
5. The Beginnings of Coal, Bituminous Coal Institute.
6. The Bituminous Coal Story, National Coal Association.
7. Come Inside a Coal Mine, National Coal Association.
8. Chemistry of Combustion, Edited Pictures System.
9. Fight that Fire, Employers Mutual Accident Insurance Company.
10. Air, Visual Sciences.
11. Fire Extinguishers, Association of Casualty and Surety Companies.

Unit IV Heat

A. Subject matter

1. What are man's sources of heat?
2. How are temperature and quantity of heat determined?
3. How is combustion in a stove or furnace regulated?
4. How is heat transferred from one place to another?
5. How can heat loss be reduced?
6. How is the modern house air-conditioned?

B. Laboratory activities

1. Friction produces heat.

2. Thermometer construction.

3. Compare centigrade and Fahrenheit thermometers.

4. Heat units.

5. Fire creates a draft.

6. Operation of a gas burner.

7. Heat transfer.

8. Insulators and their use.

9. Reflectors reduce heat loss.

10. Thermos bottle.

11. Circulation of air.

12. Heat absorption during evaporation.

C. Supplementary material

1. A to Zero of Refrigeration, General Motors Corporation.

2. How Temperatures Are Measured, Tempil Corporation.

3. Distributing Heat Energy, Encyclopedia Brittanica Films, Inc.

4. Energy from the Sun, Encyclopedia Brittanica Films, Inc.

5. Heat, Visual Sciences.

Unit V Weather and Climate

A. Subject matter

1. How does temperature affect weather?

2. How does temperature affect humidity?

3. What causes winds?

4. Why do atmospheric storms occur?

5. How are weather reports helpful to man?

B. Laboratory activities

1. Effect of seasons on the length and temperature of the days.
2. Different rates of heat absorption of substances.
3. Factors that determine the rate of evaporation.
4. Determine the dew point.
5. Use the hygrometer to determine relative humidity.
6. Convection currents.
7. Study a weather map.

C. Supplementary material

1. What Is This Thing Called Humidity?, Taylor Instrument Companies.
2. Instruction for Home Weather Forecasting, Taylor Instrument Companies.
3. Daily Weather Maps, local newspaper or the nearest Weather Bureau station.
4. Pictures of cloud formations, nearest Weather Bureau station.
5. "Humidity Study, The Scientific Way," Superstition to Supersonics, Manufacturing Chemists' Association.
6. Atmosphere and Its Circulation, Encyclopedia Brittanica Films, Inc.
7. Energy from the Sun, Encyclopedia Brittanica Films, Inc.
8. Air Masses, Jam Handy Organization.
9. Weather, Jam Handy Organization.

Unit VI Water

A. Subject matter

1. How does nature keep a constant supply of water?

2. How is water distributed from its source to the places where it is used?
3. How is drinking water kept pure?
4. How is dissolved material removed from water?
5. What causes water to flow?
6. How is the flow of water controlled in the home?
7. How is the force of flowing water used?
8. What causes objects to float or sink?
9. How are boats propelled through water?
10. What is the relationship between water and hydraulic machines?

B. Laboratory activities

1. What gives water its taste?
2. Diagram the local water distribution system.
3. Show that pressure varies with the depth of the water.
4. Show that pressure is independent of the shape of the container.
5. Test water for organic matter.
6. Distillation.
7. Softening hard water.
8. Operation of a water wheel.
9. Loss of weight in water.
10. Why do objects float in water?
11. How a submarine rises and sinks.

C. Supplementary material

1. "Putting the Sun to Work," Superstition to Supersonics, Manufacturing Chemists' Associa-

tion.

2. The Story of the Turbine, General Electric Company.

3. Properties of Water, Cornet Instructional Films.

4. Water Cycle, Encyclopedia Brittanica Films, Inc.

5. Clean Waters, General Electric Company.

6. Chemistry of Water Softening, United States Public Health Service.

7. Water, Visual Sciences.

8. Field trip to the local water purification plant.

Unit VII The Universe

A. Subject matter

1. What makes up the solar system?

2. What are the star constellations?

3. What causes day and night and the seasons?

4. How does a traveler find his direction by day or by night?

5. How are different locations determined?

6. What causes the tides?

B. Laboratory activities

1. Phases of the moon.

2. What causes night and day?

3. What causes the seasons?

4. Identify some of the major constellations.

5. Use of a pendulum to tell time.

6. Centrifugal force.

C. Supplementary material

1. The Solar Family, Encyclopedia Brittanica Films, Inc.

2. The Earth in Motion, Encyclopedia Brittanica Films, Inc.

3. Time, The Servant of Man, Modern Talking Picture Service.

Unit VIII The Nature and Uses of Light

A. Subject matter

1. How does the sun's energy reach the earth?

2. How are shadows and eclipses formed?

3. What kinds of flat surfaces are used to form images?

4. What happens to light rays when they pass through glass or water?

5. How are images formed by lenses?

6. What are the different colors in sunlight?

7. How is light used in making pictures?

8. How does the eye see things?

9. How is the modern home lighted?

B. Laboratory activities

1. Light travels in straight lines.

2. How shadows are formed.

3. Images formed by a plane mirror.

4. Bending of light rays in transparent materials.

5. Focal point of a convex lens.

6. Let a beam of light pass through a prism.

7. Light in picture making.

8. Examine a model of the eye.

C. Supplementary material

1. "Making Your Own Pictures with Sunlight," Superstitions to Supersonics, Manufacturing Chemists' Association.
2. Light Waves and Their Uses, Encyclopedia Brittanica Films, Inc.
3. Light, Visual Sciences.
4. Proper home lighting, local light company.
5. Use of lenses to correct certain eye defects, local optometrist.

Unit IX The Nature of Sound and Music

A. Subject matter

1. How are sounds produced?
2. How are sound waves carried from place to place?
3. How do ears hear sounds?
4. What are the characteristics of musical sounds?

B. Laboratory activities

1. Vibrations produce sound.
2. Substances that carry sound.
3. Is sound transmitted through a vacuum?
4. Examine a model of the ear.
5. What determines the pitch of a stringed instrument?
6. What determines the pitch of a wind instrument?

C. Supplementary material

1. Sound Waves and Their Sources, Encyclopedia Brittanica Films, Inc.
2. Sound, Visual Sciences.
3. Sound in public building construction. local architect.

4. Construction and function of various musical instruments, school music department.

Unit X Electricity and Magnetism

A. Subject matter

1. How is electricity produced by friction and chemical action?
2. What causes electricity to flow through a circuit?
3. What is magnetism?
4. What effects does an electric current produce?
5. What are series and parallel circuits?
6. How is electricity distributed and used in the home?
7. How are electromagnets used in doorbells and electric motors?

B. Laboratory activities

1. Friction produces static electricity.
2. Construct a wet cell.
3. How do dry cells differ from wet cells?
4. Wires and cells in series.
5. Measure electrical quantity and pressure.
6. Voltage of cells in series and parallel.
7. Use of fuses in electrical circuits.
8. Resistance in parallel.
9. Magnetic and non-magnetic substances.
10. Magnetic lines of force.
11. How a wire carrying electricity affects a compass.

12. Construct an electromagnet.

13. Electrolysis of water.

14. Electroplating with copper.

15. Chemical action in the storage battery.

16. How an electric bell works.

17. Basic parts of an electric motor.

C. Supplementary material

1. "Trapping Smoke with Electricity," Superstitions to Supersonics, Manufacturing Chemists' Association.

2. Network of Power, General Electric Company.

3. Electricity Around Us, General Electric Company.

4. Edison and Electricity, General Electric Company.

5. Steinmetz, Latter Day Vulcan, General Electric Company.

6. Principles of Electricity, General Electric Company.

7. What Is Electricity?, Westinghouse Electric Corporation.

8. Introduction to Electricity, Cornet Instructional Films.

9. Primary Cell, Encyclopedia Brittanica Films, Inc.

10. Magnetism, Cornet Instructional Films.

11. Current Electricity, Visual Sciences.

12. Magnets, Young America Films, Inc.

13. Magnetism, General Electric Company.

Unit XI Electricity and Communication

A. Subject matter

1. How does the telegraph send signals over wires?

2. How does induction produce electric currents?
3. How does the telephone carry spoken messages over wires?
4. How are messages sent through space by radio?
5. How does television bring events into the home?

B. Laboratory activities

1. How a telegraph works.
2. Alternating current.
3. Basic parts of a generator.
4. Transformer.
5. How a telephone works.

C. Supplementary material

1. Man Made Magic, General Electric Company.
2. Telegraph, John Muir Company.
3. Telephone, John Muir Company.
4. Visit the local telephone exchange.
5. Visit the local electrical power plant.
6. Visit a radio station.
7. Visit a television station.

Unit XII Simple Machines

A. Subject matter

1. What is work and how is it measured?
2. What are machines and how are they used?
3. How are levers used to do work?
4. How is the pulley and the wheel and axle used to do work?
5. How is the inclined plane used to do work?

6. How are forces transferred from one machine to another?

7. What compound machines are used in the home?

B. Laboratory activities

1. What is work?

2. Efficiency of a machine.

3. Levers.

4. Pulleys.

5. Inclined plane.

C. Supplementary material

1. Machine Tools, America's Muscles, National Machine Tool Builders Association.

2. Lever Age, Shell Oil Company.

3. Simple Machines, Encyclopedia Brittanica Films, Inc.

4. Levers, Visual Sciences.

5. Pulleys, Visual Sciences.

6. Simple Machines, Popular Science.

Unit XIII Important Raw Materials and Machines

A. Subject matter

1. How are metals separated from their ores?

2. Why are coal, petroleum, and wood such important raw materials?

3. How does the steam engine change the energy in fuels into energy of motion?

4. How does the gasoline engine convert the energy of gasoline into the energy of motion?

B. Laboratory activities

1. Separate a metal from its ore.
2. The reciprocating engine.
3. Bunsen type burner.
4. Gasoline engine.

C. Supplementary material

1. A Chemical Giant, Coal, Manufacturing Chemists' Association.
2. Petroleum from the Ground to You, American Petroleum Institute.
3. Petroleum in Our Age of Science, American Petroleum Institute.
4. The Conservation of Petroleum, American Petroleum Institute.
5. Making Paper from Trees, United States Department of Agriculture.
6. "From Trees to Cloth, A Science Miracle," Superstitions to Supersonics, Manufacturing Chemists' Association.
7. Diesel, The Modern Power, General Motors Corporation.
8. Metallurgy and Wheels, General Motors Corporation.
9. A Power Primer, General Motors Corporation.
10. Optics and Wheels, General Motors Corporation.
11. 10,000 Feet Deep, Shell Oil Company.
12. Oil from the Earth to You, American Petroleum Institute.
13. Chemistry of Iron, American Iron and Steel Institute.
14. ABC of Internal Combustion, General Motors Corporation.
15. ABC of Automobile Engines, General Motors Corporation.
16. A Miracle of Modern Chemistry, National Coal Institute.

Unit XIV The Nature and Uses of Chemicals

A. Subject matter

1. What kinds of substances are used by the chemist?
2. What kinds of particles make up matter?
3. What are the properties of acids, bases, and salts?
4. What are some of the important chemical compounds?
5. How are plastics made?

B. Laboratory activities

1. Metals and non-metals.
2. Properties of elements.
3. What is a compound?
4. Properties of acids and bases.
5. Formation of a salt from an acid and a base.
6. Purification of an impure salt.
7. Preparation of other compounds from salts.
8. Make a simple plastic.

C. Supplementary material

1. A Is for Atom, General Electric Company.
2. Molecular Theory of Matter, Encyclopedia Britanica Films, Inc.
3. American Success Story, Goodyear Tire and Rubber Company.
4. Sand and Flame, General Motors Corporation.
5. Kingdom of Plastics, General Electric Company.
6. Salt Mining Operations, Carey Salt Company.

Unit XV Rocks and Soils

A. Subject matter

1. How are rocks formed?
2. How are rocks changed into soil?
3. What practices are used to prevent soil erosion?
4. What is a fertile soil, and how may it be kept fertile?

B. Laboratory activities

1. Test for limestone.
2. Test for acidic and basic soil.
3. Capillary action.
4. Minerals in the soil.
5. Some soils hold water better than others.

C. Supplementary material

1. Geological Work of Ice, Encyclopedia Brittanica Films, Inc.
2. Mountain Building, Encyclopedia Brittanica Films, Inc.
3. Volcanoes in Action, Encyclopedia Brittanica Films, Inc.
4. Wearing Away of the Land, Encyclopedia Brittanica Films, Inc.
5. The Birth of Soil, McGraw-Hill Book Company.
6. The Fossil Story, Shell Oil Company.
7. The Vital Earth, local office of the Soil Conservation Service.
8. It's Your Top Soil, U.S. Steel Corporation.
9. Let's Practice Soil Conservation, International Harvester Company.
10. Man and the Soil, International Harvester Company.

Unit XVI Plants and Insects

A. Subject matter

1. What life activities are carried on by plants?
2. How do plants make food?
3. How do plants get water and dissolved minerals from the soil?
4. How do flowers produce seed?
5. What is germination?
6. What food substances are found in seeds?
7. How are plants protected from insects and diseases?
8. How are new varieties of plants produced?

B. Laboratory activities

1. Onion skin under the microscope.
2. The effect of light on plants.
3. Examine a cross-section of a green leaf.
4. Test for starch in green leaves.
5. The use of light energy in forming starch.
6. Need for chlorophyll in photosynthesis.
7. Plants give off oxygen.
8. Osmosis.
9. Absorption of water by plants.
10. Transpiration in plants.
11. Examine the exterior and interior of bean and pea seeds.
12. Seed germination.
13. Stages in the development of a bean seedling.

C. Supplementary material

1. Why the Leaves Change Their Color, United States Department of Agriculture.
2. 4-H Club Insect Manual, United States Department of Agriculture.
3. 4-H Club Insect Manual, Extension Service, Oklahoma A and M College.
4. Plant Growth, Encyclopedia Brittanica Films, Inc.
5. Roots of Plants, Encyclopedia Brittanica Films, Inc.
6. Flowers at Work, Encyclopedia Brittanica Films, Inc.
7. Leaves, Encyclopedia Brittanica Films, Inc.

Unit XVII The Human Body

A. Subject matter

1. Why is a well balanced diet essential?
2. Why must foods be cooked?
3. How is food digested and distributed to the body?
4. How are body activities controlled?
5. How do narcotics and stimulants injure health?
6. How is man affected by the laws of heredity?

B. Laboratory activities

1. Test for nutrients in food.
2. Effect of saliva on starch.
3. Breathing process.
4. Breathing and pulse rates.
5. Effect of color on temperature.

C. Supplementary material

1. About Your Blood, John Hancock Mutual Life In-

surance Company.

2. A First Aid Guide, Association of Casualty and Surety Companies.

3. Your Food and Chemical Research, Manufacturing Chemists' Association.

4. Digestion of Food, Encyclopedia Brittanica Films, Inc.

5. The Circulation System, Society for Visual Education, Inc.

6. The Digestive System, Society for Visual Education, Inc.

7. Your Blood System, American Heart Association.

8. Alcohol and the Human Body, Encyclopedia Brittanica Films, Inc.

Unit XVIII Disease and Decay

A. Subject matter

1. Why do foods spoil?

2. What are the conditions for the growth of bacteria, yeast, and mold?

3. What methods are used to prevent food decay?

4. Which of the bacteria, yeast, and molds, are useful?

5. What causes diseases in man?

6. How are disease germs spread?

7. How is the body protected from harmful germs?

B. Laboratory activities

1. Effects of yeasts on fruit juices.

2. Growth of bacteria.

3. Growth of molds.

4. Distribution of germs.

5. Pasteurization.

6. Effects of sunlight and chemicals on germs.

C. Supplementary material

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