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ABSTRACT

This listing of behavioral objectives is designed to assist teachers in planning and developing learning activities in elementary industrial arts. It was developed from a project in Bertie County, North Carolina, in which industrial arts was correlated with the basic elementary curriculum. Separate behavioral objectives are presented for special education students and those in kindergarten through eighth grade. These objectives cover the following major areas: Manufacturing, Power, Transportation, Construction, and Communication. (Author/HD)

BEHAVIORAL OBJECTIVES FOR ELEMENTARY INDUSTRIAL ARTS IN BERTIE COUNTY, NORTH CAROLINA

A Title III, E.S.E.A. Project
in cooperation with the U. S.
Office of Education, North
Carolina Department of Public Instruction
and Bertie County Board of Education

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ABSTRACT

Industrial Arts, at the elementary school level, is an essential part of the education of every child. It deals with ways in which man thinks about and applies scientific theory and principles to change his physical environment. To meet his aesthetic and utilitarian needs, it provides opportunities for developing concepts as a result of concrete experiences which include manipulation of materials, tools, and processes, and other methods of discovery. It includes knowledge about technology and its processes, personal development of psychomotor skills, and attitudes and understandings of how technology influences society.

Industrial arts is being correlated with the basic elementary curriculum in Bertie County. This correlation approach utilizes the talents and abilities of classroom teachers to offer our children a more meaningful education through studying industry and technology. This project has involved children in activities dealing with tools, materials, machines, and processes reflective of present day technology. Industrial arts, when properly employed, becomes a vehicle through which the abstract becomes a re providing meaningful experiences for all children of all ls of ability. When correlated with the basic curriculum, industrial arts offers solutions to an existing problem of helping children understand our modern society. This book has been designed to assist teachers in planning and developing learning activities in elementary

industrial arts. It does not include all objectives for every child but it is a beginning from which teachers and students may expand and develop.

INTRODUCTION

A recent term being heard in educational circles today is "accountability". Many educators have a vague idea of what the term means as it relates to education. Everyone connected with education should become more aware of accountability and know how the term relates to each educational position from teacher to superintendent.

In simple terms, accountability refers to responsibility for performing certain duties or tasks as assigned by one's employer. In education, the term relates directly to the educator's responsibility to and for the students. For teachers, it means that all teachers are held accountable for student performance in terms of stated expected outcomes (objectives).

Many teachers never prepare or develop outcomes or objectives for their classes and thus, they never know when the students have achieved specific expectations.

Even worse, the student never knows what he is expected to accomplish and by what means he will be judged as to having reached or not reached an expected level of learning.

The time has arrived in education when teachers are expected to know what they hope students will learn. Teachers should also prepare and know in advance how the students will be evaluated. The student should not be left out of the planning and preparation for it is he who will derive the benefits of a good education.

There are many elements which must go into the planning of a learning activity. The student is the focal point for learning and the teacher, with her many aids and materials, is the media through which learning is facilitated.

This book is intended to assist the teacher and the student in the learning process by providing ideas, suggestions, and guides for preparing learning or performance objectives. Each teacher should utilize the material in this book, combined with her own objectives, in preparing learning activities. Student participation in formulating objectives should be included as an integral part of planning.

A complete listing of objectives to meet the needs of each student would be extremely lengthy, if not impossible. Therefore, each teacher should develop and modify objectives as the need arises.

Accountability can often become a frightening charge, but if you know what you are accountable for, then you are better prepared to meet and fulfill that charge. This book will assist you in meeting educational responsibility. Additional assistance is available upon request from the Title III, E.S.E.A. staff.

Larry T. Ivey
September, 1970

SPECIAL EDUCATION

Objectives

1. Each student will be able to identify the following as sources of power: wind, water, and electricity.

2. After constructing suggested projects, each student will be able to identify the form of power it incorporates.

3. Each student will be able to list the three basic forms of transportation: air, land and water.

4. Each student will be able to identify various vehicles and their related mode of transportation.

5. Each student will be able to identify two means of communications electrical and graphic.

6. Each student will be able to identify the construction materials used in the various homes listed: teepee, sod, adobe, log, frame.

7. Given the necessary materials, each student will be able to construct models of these types of homes.

8. Each student will be able to make a linoleum block and silk-screen print.

9. Each student will gain a measure of skills in using the available tools.

10. Each student will gain a measure of knowledge of the occupations related to the activities done.

KINDERGARTEN

Objectives

1. Each student will be able to identify wood, metal, plastic, clay and cloth as being different materials.

2. Each student will gain a simple understanding of the application of basic tools.

3. Each student will be able to use simple techniques to decorate their projects or cutouts.

4. Each student will learn to work with other students cooperatively.

GRADE ONE

I. Transportation

1. Given a series of pictures, the students will be able to identify the type of transportation expressed in each: air, land, and water.

2. Given a series of pictures of automobiles, the students will be able to identify the old vehicle.

3. Given a series of pictures of automobiles, the students will be able to identify the new vehicle.

4. Students will be able to recognize that trucks are used for freight delivery.

5. Given a series of pictures, the students will be able to identify the automobile as being the most common transportation vehicle.

6. Given a series of pictures, the students will be able to identify the commercial bus as a vehicle of which a person must pay to ride.

7. Given a series of pictures depicting occupations, students will be able to identify those relative to the railroad industry.

8. Given a series of pictures, students will be able to identify the horse drawn cart as being powered by some external means.

9. Given a series of pictures one depicting an airport, the students will be able to identify the airport according to its physical characteristics.

10. Given a series of pictures depicting the launching of a rocket, the students will be able to arrange them in correct sequence.

11. Given a series of pictures depicting the types of power, the students will be able to identify the types of power used in water transportation.

12. Given materials necessary in constructing a sailboat, students will be able to construct simple sailboat.

13. Given a series of pictures depicting traffic control, students will be able to identify the stoplight.

II. Manufacturing

1. Given a series of pictures of different types of tools, students will be able to identify two types of tools.

2. Given a series of pictures depicting finishing processes, students will be able to identify painting as a finishing process.

III. Services

1. Given the different types of mail depositories, students will be able to tell where each is found.

IV. Construction

1. Given a series of pictures of carpenters' aids, students will be able to identify the sawbench.

2. Given a series of pictures depicting construction, students will be able to identify the picture concerned with house construction.

3. Given a series of pictures of different machines, students will be able to identify the machine used in house destruction.

4. Given a series of pictures depicting people using tools, students will be able to identify the picture showing a man repairing a roof.

5. Given a series of pictures of tools, students will be able to identify the tool used by a carpenter.

6. Given a series of pictures of building materials, students will be able to identify the material used in building a tree house.

7. Given a series of pictures of various homes, students will be able to identify the mobile home.

8. Given the term apartment house, students will be able to list (orally) the advantages and disadvantages of apartment housing.

9. Given a series of pictures of machinery, students will be able to identify the machine used in construction of large buildings.

10. Given a picture of a crane, students will be able to discuss the uses of the crane in the building industry.

V. Communication

1. Given four scenes, one depicting communication through the television, students will be able to identify the television as a means of visual communication.

2. Given four scenes, one depicting communication through the telephone, students will be able to identify communicating by the use of the telephone.

3. Given pictures of communications media, students will be able to identify the picture which shows printed communication in the form of the newspaper.

4. Given a series of pictures, students will be able to identify a camera as a device through which communications can be achieved.

VI. Foods

1. Students will be able to list two methods of food preservation.

2. Given materials needed for constructing and operating a store, students will be able to do so.

3. Given two products, students will be able to distinguish between homemade and commercial products by sight.

GRADE TWO

I. Communication

1. Given a telephone, the students will be able to demonstrate the correct procedure for calling and receiving telephone calls.

2. Given a telephone, the students will be able to identify the main parts of the telephone: receiver, transmitter, and dial.

3. Given a list of the various telephone communications occupations, the students will be able to identify those qualifications relative to the telephone operator.

4. Given a list of terms having nothing to do with communications and also the word telephone, the students will be able to distinguish which word is a form of communication.

5. Given a list of duties of personnel in television station, the students will be able to identify those relative to the cameraman.

6. Given a series of pictures of communicative devices, the students will be able to identify the television camera.

7. Given a series of pictures of communicative devices, the students will be able to identify the television station.

8. Given a series of pictures of communicative devices, the students will be able to identify the television tower.

9. Given a series of pictures, one depicting the correct method of transmission of television pictures, the students will be able to identify the correct method of transmission.

10. Given a series of pictures one of which depicts a horn on a transportation vehicle, the students will be able to identify the horn as a communication apparatus.

11. Given pictures of several printing methods, students will be able to identify linoleum block printing.

12. Given pictures of several forms of communications, students will be able to identify the lighthouse as a means of communication from ship to shore.

II. Construction

1. Given six different materials used in local construction, the students will be able to identify each construction material.

2. Given a list of processes involved in house construction, the students will be able to arrange them in the order in which they occur. Include foundation, framing, exterior and interior processes.

3. Given a list of occupations, the students will be able to identify which occupation is relative to house construction.

4. Given a group of tools, the students will be able to identify which tools are used by a carpenter.

5. Given several pictures of heavy equipment, the students will be able to identify that equipment which is used in bridge construction.

6. Given a series of pictures, one of which depicts construction, the students will be able to identify the one that is a form of construction.

III. Power

1. Given a series of pictures of effects of forced air, the students will be able to identify the one which illustrates the force or effect of natural wind.

2. Given a series of pictures, one of which depicts uses of compressed air, the students will be able to identify this one.

3. Given a picture of a locomotive, the students will be able to identify it as being powered by steam.

4. Given a group of five different types of rocks, the students will be able to identify the piece of coal.

5. Given a series of pictures, one depicting coal as a source of power, the students will be able to identify this one.

6. Given a list of five possible locations, the students will be able to identify the correct location for finding coal.

7. Given a picture of a dam, the students will be able to identify it as a source of electrical energy.

8. Given an electrical set-up, the students will be able to connect the set-up correctly to the positive and negative terminals of a battery.

9. Given a series of tools, the students will be able to identify the one which uses for its operation electrical energy.

10. Given a group of materials, the students will be able to identify the material that will conduct electrical energy.

11. Given the materials necessary for constructing a temporary magnet, the students will be able to do so.

12. Given pictures of different types of work, students will be able to identify the type done by light.

13. Given a series of pictures, students will be able to identify the burning fuel.

IV. Service

1. Given a group of pictures, the students will be able to identify the one that shows the process of making ice cream.

2. Given a series of pictures, the students will be able to identify the process of making butter.

3. Given a series of pictures, the students will be able to identify a road scraper.

4. Given a series of pictures, the students will be able to identify the equipment that is used by the fireman.

5. Given a series of pictures, the students will be able to identify the snowplow.

V. Transportation

1. Given a list of power sources, the students will be able to identify the most common type used today for automobiles.

2. Given a series of pictures on the firing of a rocket, the students will be able to arrange them in the correct sequence of events.

3. Given a series of highway signs (in picture form) the students will be able to identify each one correctly.

VI. Foods

1. Given a series of pictures, the students will be able to describe the process of grinding corn.

2. Given a series of pictures, the students will be able to identify the packaging and delivering of foods.

3. Given a model of store and items for sale, students will be able to successfully buy and/or sale products.

VII. Simple Machines

1. Given several pictures, students will be able to identify the simple machine illustrated in each picture.

VIII. Pollution

1. Given a series of pictures, the students will be able to identify the industrial smokestack as a cause of air pollution.

IX. Water Purification

1. Given the proper procedure, students will be able to describe how water is purified.

X. Manufacturing

1. Given a picture of a car, students will be able to identify the tires as a product of rubber.

2. Given several pictures of types of packaging, the students will be able to identify the method used in packaging heavy appliance.

3. Given the necessary materials needed in making a candle, the students will be able to make a candle.

GRADE THREE

I. Manufacturing

1. Given wood, metal and plastics, students will be able to identify the products according to their properties.

2. Given a sequence of the separation of iron from iron ore, students will be able to identify and arrange them in a logical sequence.

3. Given native clay and commercial clay, students will be able to differentiate between them.

4. Given the physical differences between steel and iron, students will be able to identify steel as the harder and more durable of the two.

5. Given the term uranium, students will be able to identify the uses of uranium.

6. Given the term petroleum, students will be able to list five products of petroleum.

7. Given the term coal, students will be able to list its most common use.

8. Given a list of different foods, students will be able to identify and describe the process each type of food goes through in manufacturing.

9. Given a list of different foods, students will be able to describe the technological advancements made in preparation.

10. Given an opportunity to review a film concerning new developments in eggs, students will be able to list new developments in processing of eggs.

11. Given a list of finishes including stain, lacquer, varnish, and paint, students will be able to identify where and why each is used.

II. Power

1. Given examples of simple machines , students will be able to name each and give an application of each telling how it helps man.

2. Given a list of devices, one of which is electrical, students will be able to identify the one which incorporates electrical power.

3. Given the term computer, the students will be able to define computer.

4. Given the term robot, students will be able to explain its uses and functions.

5. Given a series of pictures, students will be able to choose the one in which man has harnessed the wind to do work for him.

6. Given the term air power, the students will be able to list ten uses of it.

7. Given the necessary materials, students will be able to construct a working model of some item using solar power.

8. Given the term solar power, students will be able to list five ways in which it is used.

9. Given the terms undershot wheel and overshot wheel, students will be able to identify these as two methods of harnessing water.

10. Given the terms solid and liquid fuel propellants, students will be able to identify their place in space travel.

III. Transportation

1. Given the term truck transportation, students will be able to explain and define in terms relative to shipping, scheduling, dispatching, etc.

2. Given a list of equipment used in firefighting, students will be able to identify each and discuss its uses.

3. Given the term train depot, students will be able to construct a model explaining its function and identifying jobs relative to train transportation.

4. Given the term taxi, relative to the transportation industry, students will be able to explain its function.

5. Given a series of pictures, students will be able to identify the use of sled in history.

6. Given the term bus, students will be able to identify uses and its relationship to the transportation industry.

7. Given the term automobile sales, students will be able to identify the procedure necessary in purchasing an automobile.

8. Given the terms quantity and quality in automobile production, students will be able to identify how both can be achieved simultaneously.

9. Given the term airplane, students will be able to list five functions relative to air transportation.

10. Given the term helicopter, students will be able to list three functions relative to air transportation.

11. Given the term rocket launch, students will be able to identify the procedure required in launching a rocket.

12. Given the term water transportation, students will be able to identify and contrast with land and air.

13. Given a list of water transportation vehicles, students will be able to identify each.

14. Given a list of water transportation vehicles, students will be able to list the advantages and disadvantages of each type.

15. Given the term harbor, students will be able to identify the function of the harbor.

IV. Communication

1. Given two types of printing, students will be able to identify silkscreen printing process and linoleum block printing process according to use and process.

2. Given a script, students will be able to dramatize a television show.

3. Given a list of occupations of the television, students will be able to identify each in his connection with T.V.

4. Given the term satellite, students will be able to identify its relationship to television communication.

5. Given pictures of different structures, students will be able to identify the lighthouse as means of communications.

6. Given the term camera, students will be able to identify its role in communication.

7. Given pictures of diffe..ent sound making devices, students will be able to identify each device.

8. Given the term stoplight, students will be able to identify the stoplight in relation to traffic communication.

V. Construction

1. Given pictures of different homes, students will be able to identify the materials used in construction.

2. Given a list of building materials, students will be able to distinguish the ones used in constructing a delicatessen store and a fruit stand.

3. Given a picture of a house and of an apartment house, students will be able to describe each relative to design and construction.

4. After discussion of the candy shop, students will be able to sketch their version of such a shop.

VI. Services

1. Given the term blacksmith, students will be able to identify this person and explain why he has become extinct.

GRADE FOUR

I. Power

1. Given the term animal power, each student will be able to identify animal power and compare it to other forms of power.

2. Given the necessary materials, each student will be able to construct a windmill.

3. Given the term compressed air, each student will be able to identify items that use compressed air.

4. Given the necessary materials, each student will be able to construct an overshot and undershot waterwheel.

5. Given a waterwheel and necessary materials, each student will be able to use these to identify and construct a model showing conversions of water power to mechanical power.

6. Given the term hydroelectric dam, each student will be able to identify hydroelectric dam as a source of electrical power.

7. Given the materials necessary for a model showing how steam power is converted to mechanical power, each student will be able to identify the process.

8. Given the term steam power, each student will be able to list four uses of steam power.

9. Given the terms static and current electricity, each student will be able to differentiate between the two.

10. Given a motor, each student will be able to disassemble it and identify the field and armature coils.

11. Given the necessary materials, each student will be able to construct a simple electric motor and label the parts.

12. Given the term safety, each student will be able to list ten safety rules to follow when working with electricity.

13. Given the term petroleum, each student will be able to identify oil as the major product of petroleum.

14. Given the necessary materials, each student will be able to identify and construct a model of the first oil well.

15. Given the term coal, each student will be able to list four uses of coal.

16. Given the terms anthrocite and bituminous, each student will be able to differentiate between the two types of coal.

17. Given a small gasoline engine, each student will be able to identify it as a source of power.

18. Given a model rocket engine, each student will be able to identify the engine as a source of rocket power and as being a solid fuel propellant.

19. Given a model rocket kit, each student will be able to construct the rocket.

20. Given the term atomic power, each student will be able to list five uses.

II. Transportation

1. Given the term wheel, each student will be able to identify its importance in improving modes of transportation, reducing friction, etc.

2. Given the necessary materials, each student will be able to identify the helicopter and construct a model of the helicopter.

3. Given the necessary materials, each student will be able to construct a simple model of a stagecoach, covered wagon, sled, train, and automobile.

4. Given the term transportation, each student will be able to identify the four major means of land transportation as automobile, truck, train, bus.

5. Given the term mass production, each student will be able to identify mass production with the production of an automobile.

6. Given pictures depicting early aircraft, each student will be able to identify the first aircraft flown by the Wright Brothers at Kitty Hawk.

7. Given a model of Wright Brothers plane and modern plane, each student will be able to compare them with respect to materials and construction.

8. Given the term water transportation, each student will be able to list ten of the twelve types of water transportation.

9. Given a list of terms concerning water transportation, each student will be able to identify canal locks and harbors and explain their function.

III. Construction

1. Given the term house construction relative to pioneer life each student will be able to identify materials, methods of construction, and types of homes.

2. Given the necessary materials, each student will be able to construct log cabins and sod houses.

3. Given hammers, saws, and measuring devices, each student will be able to use these correctly in making pioneer related projects.

4. Given a slide series on road construction, each student will be able to identify the activity depicted in each slide.

IV. Water Pollution

1. Given the term water pollution, each student will be able to identify the causes, effects, and methods of control of water pollution.

V. Air Pollution

1. Given the term air pollution, each student will be able to identify the causes, effects, and methods of control of air pollution.

VI. Waste Control

1. Given the term waste control, each student will be able to identify the methods used in the community to control waste.

2. Given the term waste control, each student will be able to identify the technological advancements in waste control.

VII. Weed Control

1. Given the term weed control, each student will be able to identify the technological advancements in weed control.

VIII. Manufacturing

1. Given a list of the phases in production, each student will be able to identify the conglomerate as manufacturing.

2. Given a simple project, each student will be able to design a flow chart and mass produce the project.

3. Given the term food production, each student will be able to list five different foods of the Indians and how they prepared them.

4. Given Indian corn, each student will be able to grind the corn using stones.

5. Given several samples of trees, each student will be able to identify five different trees.

6. Given the term lumber production, each student will be able to identify the technological advancements.

7. Given the necessary materials, each student will be able to make paper.

8. Given the term sulfur, each student will be able to identify its role in manufacturing.

9. Given a map, each student will be able to locate the copper mining areas of United States.

10. Given the term copper mining, each student will be able to identify the technological advancements in the field.

11. Given five fabrics, each student will be able to identify the fabrics and state one use of each.

12. Given yarn, each student will be able to set up a loom and weave.

13. Given the necessary materials, each student will be able to make natural dye and use this to dye materials they have woven.

14. Given the term clothing store, each student will be able to identify its relationship to the textile industry.

15. Given the term clothing production, each student will be able to compare present and past methods and be able to state differences.

16. Given the term iron ore, each student will be able to identify iron ore as iron with impurities.

17. Given the term steel, each student will be able to identify steel as a product of iron.

18. Given the term adobe brick, each student will be able to identify the materials and processes used in making adobe bricks.

19. Given the term sandstone, each student will be able to define sandstone and tell how it is used.

20. After a field trip to Perry-Wynn's Fishery, each student will be able to write a short explanation explaining the preparation and packaging of fish.

21. Given a section of a rubber tire, each student will be able to identify the parts of the tire.

22. Given the process of making candles, each student will be able to re-create the colonial process.

IX. Communications

. Given the necessary materials, each student will be able to construct a model of a telegraph set.

2. Given a picture of an early telephone, each student will be able to identify three basic parts of early telephone parts.

3. Given the term telephone, each student will be able to identify the effects of telephone on society.

4. Given the term mail, each student will be able to identify the evolution of the mail service.

5. Given the term letterpress, each student will be able to identify the letterpress as a major process of printing in present and in past.

6. Given the term sound, each student will be able to identify its role in communications.

7. Given the term light, each student will be able to identify its role in communications.

X. Services

1. Given necessary information and demonstrations concerning medical technology, each student will be capable of reflecting upon recent developments in medical technology in written and/or oral reports.

2. Given the term surgical transplant, each student will be able to identify the role of technology in medical transplants.

GRADE FIVE

I. Construction

1. Students will be able to list two uses for each of the following construction materials: wood, steel, cement, copper.

2. to list two qualities or properties for each of a list of construction materials: wood, steel, cement, copper.

3. to correctly list the steps involved in the construction of a highway.

4. to identify the different types of bridges used today.

5. to identify the tools and equipment used in highway construction.

6. to list the materials used in highway construction.

7. to list several jobs associated with highway construction and tell which one he would rather perform and why.

8. to explain the purpose of the fort in our early history.

9. to list the tools and materials used in the construction of an old fort.

10. to list several reasons the construction of canal locks, harbors, dams, and bridges are important to the shipping industry.

11. to list two construction materials used in the construction of a canal lock, a dam, or a bridge.

12. to identify the steps in the construction of model rockets.

13. to list the procedure used in constructing a launch system.

14. to list the tools and equipment used in the construction of model rockets.

15. to list the construction materials used in constructing model rockets.

II. Manufacturing

1. Students will be able to list three of the older procedures in the processing of food products.

2. to list three of the newer procedures in the processing of food products.

3. to list one purpose of the U. S. government in food inspection.

4. to list three activities of the Food and Drug Administration.

5. to list the materials used in packaging foods for commercial sale.

6. to list the by-products of grains.

7. to identify the purpose of salt water conversion.

8. to list the steps in the procedure of logging.

9. to list two purposes of logging in our society.

10. to list the steps in the procedure of cutting logs for lumber.

11. to list the sequence of steps required to transform wood pulp into paper.

12. to list the uses of five different trees: pine, oak, walnut, basswood, cedar.

13. to perform the steps in making paper.

14. to list the basic equipment used in making paper in the school laboratory.

15. to recognize the differences in various papers.

16. to list the physical characteristics of cellulose fibers.

17. to list several by-products of cellulose fibers and their uses.

18. to list the types of woods most commonly used for furniture.

19 to [illegible]e steps in the operation of the spinning wheel.

20. to list two reasons the spinning wheel is important to our history.

21. to list two reasons the cotton gin was important to our history.

22. to list the steps in the ginning of cotton.

23. to demonstrate the process of ginning cotton.

24. to list and demonstrate the steps in the process of weaving cloth.

25. to list two natural fibers used in the manufacture of clothing.

26. to list two man-made fibers used in the manufacture of clothing.

27. to distinguish the differences between natural and man-made fibers.

28. to give one reason the firearm industry was important to our history.

29. to list the steps involved in the processing of tobacco.

30. to list the different stages of fuel processing relative to petroleum.

31. to list the materials necessary in constructing an oil drilling rig.

32. to list the steps involved in making glass, past and present.

III. Power

1. Students will be able to list two purposes of the hydro-electric plant.

2. to identify the divisions of a hydroelectric plant -- in this case the generation facility, not the generator.

3. to list the steps in the operation of a hydroelectric plant.

4. to identify the electromagnet as the main force in the operation of an electric motor, telegraph, or buzzer.

5. to list two important purposes of atomic energy in our technological society.

6. to list three uses of pneumatic tools and/or equipment.

7. to list the steps in the operation of the internal combustion engine.

8. to give two reasons the internal combustion engine is important to our society.

9. to list one limitation of water as a source of power.

10. to list the steps in the operation of a steam engine and steam turbine.

11. to list two examples of the steam powered machinery of our history.

12. to list the two types of jet engines.

13. to list two uses of heat energy.

14. to list two uses of light energy.

15. to list four uses for coal.

IV. Communications

1. Students will be able to list two purposes of the telegraph.

2. to list the steps of the procedure in constructing a telegraph system.

3. to send and receive telephone calls properly.

4. to give two reasons of importance of the telephone in our industrialized society.

5. to list one reason for the computer's importance in communications.

6. to list one reason the lighthouse is important to coastal communications.

7. to list smoke as one of the earliest long-distance communications systems.

8. to list telestar and other communications satellites as the latest means of long-distance communications.

9. to list one important reason the Television is important to communications.

10. to list writing as one prevalent method of communication.

11. to list one reason for the importance of printing as a means of communication.

12. to list the steps in the letterpress method of printing.

13. to list the steps in the silkscreen method of printing.

14. to list lithographic printing as one means of communications.

15. to list the steps in the block printing process.

16. to list correct speech as one effective means of communications.

V. Transportation

1. Students will be able to trace the history of air travel from the Wright Brothers through the Apollo moon landing.

2. to list air travel as the fastest method of transportation.

3. to list one purpose of the airport.

4. to list one job performed by the airport employees.

5. to list the auto industry as the largest industry in the United States.

6. to trace the development of the auto from the beginning to the present.

7. to list one industry connected with the automobile to keep it running smoothly.

8. to list the auto industry as the first to use the assembly line production method.

9. to list two reasons the railway system is still important to our society.

10. to list two different boats and their uses.

11. to give two reasons for the importance of water transportation in our industrial society.

VI. Industries in Other Countries

1. Students will be able to compare industrialization in other countries with that of the United States.

GRADE SIX

I. Communications

1. Given the necessary materials, each student will be able to make parchment and papyrus.

2. Given the necessary materials, each student will be able to design and make a two color block print.

3. Given the term television, each student will be able to identify how corner waves are transmitted and received.

4. Given the term television camera, each student will be able to identify the significance of the television camera.

5. Given access to a video recorder, students will be able to enact a television program with the recorder.

6. Given the term computer, each student will be able to identify the role of the computer in communications.

7. Given the term radio, each student will be able to identify the signals and how they are transmitted and received.

8. Each student will be able to list the two variants of the radio.

9. Given the necessary materials, each student will be able to construct a crystal radio.

10. Given the term telephone, each student will be able to list five technological advances in the telephone.

11. Given the term satellite, each student will be able to identify its role in communications.

12. Given the necessary materials, each student will be able to construct a telegraph system and send messages using the international code.

II. Construction

1. Given the term house construction, each student will be able to identify materials used in construction of a house.

2. Each student will be able to compare materials used in house construction of colonial period with materials used in house construction of today.

3. Given the necessary materials, each student will be able to make adobe bricks and concrete bricks.

4. Given the term house construction, each student will be able to discuss the factors which dictate the type of house construction used.

5. Given the necessary materials, students will be able to construct a model highway and bridge.

6. Each student will be able to differentiate between highway construction of other countries and highway construction of the United States.

III. Manufacturing

1. Given samples of different types of metals, each student will be able to recognize each by sight.

2. Each student will be able to list the properties of the various metals.

3. Given certain selective metals, each student will be able to tell where they are found and what they are used for.

4. Given tooling foil, each student will be able to select designs and make projects using the foil.

5. Given the term glass, each student will be able to identify the raw materials used in glass making.

6. Given the necessary materials, each student will be able to do some glass forming.

7. Given the necessary procedure, each student will be able to list the steps involved in staining glass.

8. Each student will be able to distinguish the difference between commercial clays and native clays relative to their characteristics.

9. Given the term coal mining, each student will be able to identify the tools used in coal mining.

10. Given the term coal, each student will be able to identify its role in the production of iron ore.

11. Given the term crude oil, each student will be able to identify five products extracted from crude oil.

12. Each student will be able to list five countries other than the U.S.A. where petroleum can be found.

13. Given samples of four natural fibers, each student will be able to identify each by sight.

14. Each student will be able to construct a model of a spinning wheel.

15. Given the necessary materials, each student will be able to construct a loom.

16. Each student will be able to list the steps in processing silk.

17. Each student will be able to list the steps in processing wool.

18. Each student will be able to list the steps in making linen.

19. Given the necessary materials, each student will be able to construct a flax breaker and carting blocks.

20. Each student will be able to list two methods of logging.

21. Each student will be able to list two methods of drying lumber.

22. Each student will be able to list the smallest size trees used for lumber.

23. Given the term lacquer, each student will be able to identify its origin.

24. Given the terms lacquer and varnish, each student will be able to differentiate between the two in relationship of physical properties.

25. Each student will be able to list the steps involved in drying paper.

26. Given the necessary materials, each student will be able to dye paper.

27. Each student will be able to list the three processes of preparing foods both modern and historical.

28. Each student will be able to display their knowledge of food preparation by comparing the food processing of the United States and three other countries.

29. Given the necessary materials, each student will attempt to pa[illegible]ize milk.

[illegible] the necessary materials, each student will be able to construct model dairy.

31. Each student will be able to list steps involved in processing of pork, beef, and mutton.

32. Given the term pork processing, each student will be able to differentiate between home process and industrial process.

33. Each student will be able to list steps involved in processing of tomatoes.

34. Given the necessary materials, each student will be able to dramatic play marketing of some product.

35. Given the term tea, each student will be able to give its origin.

36. Given the necessary materials, each student will be able to brew tea.

37. Each student will be able to list the steps involved in processing of sugar cane and sugar beets.

38. Given the term rubber, each student will be able to identify steps involved in its production.

39. Each student will be able to list ten by-products of rubber.

40. Given the term plastics, each student will be able to classify them as either thermoplastic or thermosetting.

41. Each student will be able to list three types of plastic molding.

42. Given the term coffee, each student will be able to give its origin and list the steps involved in the processing of coffee.

43. Given the necessary materials, each student will be able to grind coffee.

44. Each student will be able to identify the basic difference between the fishing industry of the U. S. and other countries such as China, Iceland, Italy, Japan, and Norway.

45. Each student will be able to list the economic importance of the fishing industry.

IV. Power

1. Each student will be able to list and identify five sources of electricity.

2. Given the necessary materials, each student will be able to construct an electric bell.

3. Given the term circuit, each student will be able to list three types of circuits.

4. Given the necessary materials, each student will be able to do some copper plating.

5. Each student will be able to list the steps in producing electricity.

6. Given the necessary materials, each student will be able to make a simple electric generator.

7. Given a multimeter and test leads, each student will be able to test the voltage in a circuit.

8. Each student will be able to list the methods of transmitting energy in the following sources of power: steam, gasoline, rocket, jet, atomic, water, light and heat.

9. Given the term laser, each student will be able to list five uses.

V. Services

1. Each student will be able to identify the type of water system common to their community.

VI. Transportation

1. Each student will be able to differentiate between a nuclear and fuel powered submarine.

2. Given the necessary materials, each student will be able to construct an authentic model of a farm wagon.

3. Given the necessary materials, each student will be able to construct models of canal locks.

4. Each student will be able to differentiate between the construction of a race car and a passenger car.

5. Each student will be able to list five qualifications of a truck driver.

6. Each student will be able to list the steps involved in licensing a truck driver.

7. Each student will be able to identify the significance of the truck and train lines in delivering materials to and from industries.

8. Each student will be able to list the types of vehicles used in space travel.

9. Given the necessary kits, each student will be able to construct models of space vehicles.

VII. Water Pollution

1. Given the term water pollution, each student will be able to identify natural and man made processes of purifying water.

2. Each student will be able to list the federal requirements in waste control to which industry must conform.

VIII. Air Pollution

1. Given the term smog, each student will be able to identify the term and its effects on society.

2. Each student will be able to list the North Carolina regulations on air pollution.

IX. Sewage Disposal

1. Students will be able to recognize the different types of sewage disposal relative to their communities.

GRADE SEVEN

I. Communication

1. Given the term raised printing method, each student will be able to identify this method as the printer's method used in the letterpress method of producing newspapers.

2. Given a linoleum block, each student will cut a design and print a card.

3. Given the term communication, each student will be able to define it orally or written.

4. Each student will be able to explain that printed fabric designs are made with the raised printing method similar to the linoleum block method.

5. Each student will be able to explain the events which take place during the exposure, developing, and printing stages of photography.

6. Given the procedures necessary to process negatives, each student will be able to arrange them in their proper sequence.

7. Each student will be able to identify the basic parts of a camera.

8. Given a set of pictures or photographs, each student will be able to select the central theme of these photographs.

9. Given a series of pictures, each student will arrange them in a logical sequence to tell a story.

10. Each student will be able to identify the steps involved in producing a visual essay.

11. Given pictures of various sections of a television station, each student will be able to identify the occupations shown.

12. Each student will be able to demonstrate proficiency at using the telephone including proper techniques, manner, and voice.

13. Each student will be able to identify the proper manner of researching a number and placing a call.

14. Each student will be able to identify the duties of a telephone operator: information assistance, emergency assistance, direct dial and long distance assistance.

15. Each student will be able to identify the process of transmitting electromagnetic energy (radio waves) which involves converting the voice to electric energy, transmitting it through the atmosphere, receiving it by antenna, detecting the voice and reproducing it.

16. Each student will be able to identify the advantages of solid state electronics.

II. Construction

1. Each student will be able to identify the scale used in a set of house plans.

2. Given an extract of house plans, each student will be able to identify the outside dimensions of the house.

3. Given a picture of a house, each student will be able to identify the picture window, ease, foundation, roof cap, and chimney.

4. Given a cutaway view of the wall of a house, each student will be able to identify the floor joists, ceiling joists, studs, sub-flooring, plaster/sheetrock, brick/block/wood siding, base board, shingles and molding.

5. Each student will be able to identify the primary materials used in house construction including: brick, wood frame, stucco, cement, stone, cinderblock.

6. Each student will be able to identify advantages of prefabricated and pre-cut houses: low cost, quick assembly, mass produced and ease of construction.

7. Each student will be able to identify from pictures or the actual item, the tools used in house construction: claw hammer, hand saw, framing square, rule, plumb line, combination square, jack plane, and level.

8. Given a list of jobs required in house construction, each student will be able to identify the related occupation: plumber, electrician, carpenter, painter, brick mason, surveyor and heating technician.

9. Given a drawing of a room and its size, each student will measure it and determine the scale to which it is drawn.

10. Each student will be able to identify house construction of colonial times.

11. Each student will be able to identify the primary advantages of wood, concrete, and steel bridges.

12. Each student will be able to identify the strongest bridge for transportation of heavy loads.

13. Each student will be able to select the best bridge to use to cross long spans from three illustrations.

14. Given a cross section of a roadbed, each student will be able to identify the materials used in the construction including: sand, cement, asphalt, and rock.

15. Each student will be able to identify the procedures in road construction: surveying, grading, preparing the roadbed, applying the surface and landscaping.

16. Given a number of photographs, each student will be able to identify the machinery used in road construction: the bulldozer, grader, pan, dump truck, crane, backhoe/power shovel, packers/rollers.

17. Given slides of train cars, each student will be able to identify eight types: flat car, caboose, refrigerator, box, tank, coal, piggyback, and passenger.

18. Given the necessary materials, students will be able to construct a model railroad.

III. Manufacturing

1. Given the characteristics of metals, each student will be able to identify characteristics of iron.

2. Each student will be able to identify the blast furnace in refining process of iron.

3. Each student will be able to define slag, bricks and pigs as related to iron refinement.

4. Each student will be able to identify the role of copper, silver, zinc, aluminum in industry.

5. Given samples, each student will be able to identify pine, oak and basswood.

6. Each student will be able to identify hard woods and soft woods from samples of pine, oak, and basswood.

7. Each student will be able to identify the easiest wood to shape from samples of pine, oak, bass, and balsa wood.

8. Each student will be able to identify from samples of pine, oak and basswood the one which is the strongest.

9. Each student will be able to identify activities which occur in the lumber producing process: selecting, cutting, ansporting, shaping, and surfacing.

10. Each student will be able to identify these lumber occupations: timber cruiser, timber cutter, transporter, sawer, and surfacer.

11. Each student will be able to identify two sources of paper, rags and wood.

12. Each student will be able to explain that pulp is made from wood by chipping, cooking, pressing, mixing, and drying.

13. Each student will be aole to explain how paper is made in industry.

14. Each student will be able to identify sandpaper, stain, sealer (shellac), and varnish.

15. Given pictures of furniture fastening techniques, each student will be able to identify the mortise and tenon, rabbet and butt, rabbet and dado and dowel joints.

16. Given the term colonial furniture, students will be able to identify how it was constructed.

17. Each student will be able to demonstrate safety practices used ir industrial arts activities which also apply at home: use of sharp tools, explosive liquid use and storage, and electrical hazards.

18. Each student will be able to identify wool, cotton, silk, and flax from samples of cloth.

19. Each student will be able to differentiate between man-made and natural fibers.

20. Each student will be able to explain the purpose of the cotton gin.

21. Each student will be able to list several uses of cotton seed oil.

22. Each student will be able to describe the steps involved in the processing of fur.

23. Each student will be able to list the people who grow food for their community.

24. Each student will be able to identify the methods used by Indians in processing food.

25. Each student will be able to identify the methods used by Pioneers in producing foods.

26. Each student will be able to list three uses of soybean products.

27. Given the necessary materials, each student will be able to construct an incubator.

28. Each student will be able to identify new mechanical developments in egg processing.

29. Each student will be able to list steps involved in processing of eggs.

30. Each student will be able to identify whaling as an industry in Alaska.

31. Given four items of identical content, of different weight, of different brands, and different prices, each student will be able to identify the most economical in terms of price per ounze per value delivered.

32. Each student will be able to list four minerals found in North Carolina.

33. Each student will be able to state the fact that North Carolina has the largest open granite quarry in the world.

34. Given the necessary materials, each student will be able to construct model of service station.

35. Given the term coal, each student will be able to list where coal is found in North Carolina.

36. Given the necessary materials, each student will be able to make common bricks.

37. Given the term tanning, each student will be able to list the steps involved in tanning a hide.

38. Given the term Kaolin, each student will be able to give two uses of it.

39. Given the term Kaolin, each student will be able to give the significance of it in the production of China.

IV. Transportation

1. Each student will be able to differentiate between a jet and a reciprocating engine.

2. Each student will be able to identify the advantages of aircraft for transportation including: time savings, long distance coverage, comparable costs.

3. Each student will be able to explain why an airplane takes off and lands into the wind.

4. Each student will be able to identify the rocket as the basic source or power for space transportation.

5. Each student will be able to explain that thrust propels spacecraft.

6. Given the necessary kit, each student will be able to construct a lunar module.

7. Each student will be able to differentiate between a fixed wing airplane and a rotary wing airplane (helicopter).

8. Each student will be able to explain that airplanes fly through a combination of lift and thrust.

9. Each student will be able to explain the purpose of a harbor.

10. Given a set of pictures, each student will be able to identify various kinds of ships: luxury liner, freighter, tug, and aircraft carrier.

11. Each student will be able to explain the function of an automobile transmission, motor, and differential.

12. Each student will be able to identify basic automotive problems and select the proper facility to correct the problem: flat tire, dead battery, bends in the body, ignition trouble.

13. Each student will be able to identify the method by which automobiles are assembled.

14. Each student will be able to match historical and modern transportation methods to their era: canoe, automobile, train, airplane, rocket.

V. Power

1. Each student will be able to identify water as a source of power for electric generators.

2. Each student will be able to identify the functions of a dam: flood control, stored energy, conserve water, and recreation.

3. Each student will be able to explain the purpose of using turbines to generate large quantities of electricity.

4. Each student will be able to identify the basic components required to produce electricity and transmit it to private homes: generator, transmission lines and transformers.

5. Each student will be able to identify the source of alternating current and direct current.

6. Each student will be able to explain the characteristics of alternating and direct current.

7. Given two schematics, each student will be able to identify a series light circuit.

8. Given two schematics, each student will be able to identify a parallel light circuit.

9. Each student will be able to identify the circuit used in house wiring.

10. Given samples of conductors and insulators, each student will be able to identify the conductors and insulators.

11. Students will be able to identify the function of the Tennessee Valley Authority.

12. Each student will be able to identify the intake, compression, ignition and combustion (power) cycles of an internal combustion engine.

13. Each student will be able to explain the four cycles of an internal combustion engine.

14. Each student will be able to identify and explain the purpose of the pistons, valves, spark plugs, camshaft, connecting rods, distributor, and crankshaft of an internal combustion engine.

15. Each student will be able to explain the purpose of octane ratings in gasoline.

16. Each student will be able to differentiate between a diesel and gasoline engine.

17. Each student will be able to explain the need for viscosity (weight) ratings in engine lubricating oils; to compensate for temperature changes.

18. Each student will be able to differentiate between nuclear power, internal and external combustion engines, and combustion engines.

VI. Services

1. Each student will be able to identify automotive services provided by service stations including: minor auto repairs, tire repair, auto servicing, and directions.

2. Each student will be able to explain orally or written the role of the postmaster.

3. Each student, given the necessary materials, will be able to construct a mailbox.

4. Each student will be able to identify methods of water conservation such as: damming, anti-pollution, stream cleaning, pesticide control.

VII. Desalting Plant

1. Each student will be able to describe one process of removing salt from salt water.

GRADE EIGHT

I. Manufacturing

1. Given the term assembly line, students will be able to identify its origin.

2. Given the term automation, students will be able to identify its role in our changing technological society.

3. Given the term assembly line, students will be able to identify who made the first practical application of it in mass producing a product.

4. Given the term mass production, students will be able to identify it and its effects on our technological society.

5. Students will be able to identify the role of natural resources and the part they play in the development of any industry.

6. Students will be able to identify labor unions and their functions.

7. Given a project idea, students will be able to set up and manufacture this project using mass production techniques, incorporating management, production sales, etc.

8. Students will be able to identify the use/uses of pulpwood.

9. Students will be able to identify the process of manufacturing plywood.

10. Students will be able to identify the properties of plywood relative to stress or structural durability and uses.

11. Students will be able to differentiate between the properties and uses of plywood and solid woods.

12. Students will be able to identify five industries that utilize wood as its chief manufacturing component.

13. Students will be able to identify that the fern trees were the first plants to grow on the earth and that they were the basis for the coal we have today.

14. Given the necessary materials, students will be able to make paper.

15. Students will be able to identify the different processes from which different grades and textures of paper are derived.

16. Students will be able to differentiate between 19th and 20th century furniture according to appearance and structure.

17. Students will be able to identify the products procured from the naval stores.

18. Students will be able to identify the two different methods of tanning leather.

19. Students will be able to identify five different types of leather.

20. Students will be able to identify ten different uses of leather.

21. Students will be able to identify the process of procuring leather.

22. Students will be able to identify the history of vulcanization of rubber.

23. Students will be able to list five uses each for thermo-setting and thermoplastic plastics.

24. Given the necessary materials and equipment, students will be able to make functional projects from plastics.

25. Students will be able to identify two different processes of manufacturing glass.

26. Students will be able to identify that glass blowers are highly skilled craftsmen.

27. Students will be able to identify the steps in the processing of seafoods, meats, vegetables, grains, coffee, peanuts, and sugar.

28. Students will be able to identify the three most valuable fruit crops grown in North Carolina.

29. Given the necessary materials, students will be able to prepare foods for freezing.

30. Given the necessary materials, students will be able to construct a hand loom.

31. Students will be able to weave three different patterns.

32. Students will be able to identify and list three industries related to cotton.

33. Students will be able to identify the use of the cotton gin by ginning cotton.

34. Given the necessary materials, students will be able to construct a carding machine.

35. Students will be able to identify the importance of the spinning jenny.

36. Students will be able to identify the difference between the spinning wheel and the spinning jenny.

37. Students will be able to identify the importance of the power loom to the clothing industry.

38. Students will be able to identify the process of making linen.

39. Given flax breaker, students will be able to break flax.

40. Students will be able to identify the use of synthetic fibers in the clothing industry.

41. Students will be able to identify the role of the designer in the clothing industry.

42. Students will be able to identify the steps in the open-hearth process of making steel.

43. Students will be able to identify the process of converting iron to steel.

44. Students will be able to describe the steps in the production or iron through the use of the blast furnace.

45. Students will be able to identify the processing of aluminum.

46. Students will be able to identify the new technological advances in processing tobacco.

47. Students will be able to list the steps necessary in making barbed wire.

II. Power

1. Given a list of sources of power, students will be able to perform the necessary operations in harnessing these to simple machine applications.

III. Transportation

1. Given a model train layout with a minimum of two circuits, students will be able to identify the role of technology in the complex railroad system.

2. Given the three systems of an automobile, students will be able to identify each in terms of function.

3. Given the necessary materials, students will be able to construct authentic transportation model forms.

4. Given the necessary materials, students will be able to construct a wind tunnel.

5. Given the necessary materials, students will be able to construct, test, and fly models of air transportation.

IV. Communication

1. Students will be able to compose a booklet of activities done during the year using every available means of printing.

2. After constructing a telegraph system, students will be able to evaluate it and evaluate the use of the telegraph today.

3. Given the necessary materials, students will be able to construct a simple transistor radio.

4. Students will be able to identify the role of telstar and other satellites.

5. Students will be able to define the use of radar in communications.

6. Students will be able to describe the colonial printing of a newspaper and the modern method of printing a newspaper.

7. Students will be able to identify the new mechanical developments in the printing industry.

V. Construction

1. Students will be able to identify each of the following construction materials and identify what they are most commonly used for. (clay, bricks, concrete, fibreglass, mortar, asphalt, cement)

2. Given the necessary materials, students will be able to construct house sections using actual size materials.

3. Students will be able to make a bill of materials for a certain house.

4. Students will be able to describe the function of the F.H.A.

5. Students will be able to identify the different types of materials used in road construction.

6. Students will be able to identify the following roads (colonial, Forbes', turnpike) with reference materials and methods of construction.

7. Students will be able to identify the purposes of constructing a canal.

8. Given the necessary materials, students will be able to draw a layout of a railroad station.

9. Given the necessary materials, students will be able to construct a model suspension bridge.

10. From a series of pictures, students will be able to identify each type of bridge shown.

11. Students will be able to differentiate between the construction of a public building and a home with reference to materials and methods of construction.

12. Students will be able to identify three different types of fire extinguishers.

13. After proper demonstrations from a fireman, students will be able to operate the school fire extinguishers.

14. Students will be able to identify the growth of the postal service from its beginning to present day.