6. Do the following:

a) Point out on a model plane the forces which act on an airplane in flight.

b) Show one other principle basic to flight.

c) Build a wing section and show the principles of lift.

d) Tell six rules of safety to follow around airplanes and airports. Tell safety rules for building and flying model airplanes. Tell safety rules for glue, paint dope, and plastics.

e) Visit an airport or any local air base near his home. After the visit, tell how the facilities were used.

7. Find out what job opportunities there are in aviation. Tell the qualifications and working conditions of one job in which he is interested in. Tell what it offers for reaching his goal in life.

Barbering

1. Visit a barbershop. Talk to the barber and request him to give some pointers about barbering.

2. Show the proper way of using a barber's scissors and razor.

3. With the help of a barber, learn how to cut hair properly, demonstrate the proper technique of cutting hair and demonstrate how to use a whetstone and a stropping belt for sharpening scissors and razor.

4.Cut the hair of three (3) of his friends to their satisfaction.

Basketry

1. Name at least ten (10) different native materials used in basketry and the various places in the Philippines where each of these materials can be found.

2. Name at least four (4) different hand tools used in basketry. Give their uses and explain how they are sharpened.

3. Do the following:

a) Describe the steps in bleaching:

[1] *buri* leaves;

[2] bamboo

b) Name the dyestuff used in coloring *buri* leaves and bamboo.

4. Submit an album or a collection containing:

a) labelled samples of at least ten (10) basketry materials.

b) samples of at least six (6) weave designs and of at least three (3) basket finishing trimmings.

5. Show how to prepare at least two (2) of the following Philippine raw materials used for making baskets: *buri, nito, ticug*, bamboo, rattan, *bamban,* and coconut midribs.

6. Submit one working drawing of a basket made of any of the following: bamboo, bamboo-rattan, bam boo-*bamban,* bamboo-rattan-*nito,* or plywood-bamboo-*buri*.

7. Make at least one (1) basket using materials mentioned in No. 6.

Beekeeping

1. Look for and make a study of a beehive. Remove the combs. Find the queen. Calculate the amount of the brood, number of queen cells. Calculate the amount of honey in the hive.

2. Show the difference between the drones, workers, eggs, larvae, and pupae at different stages. Tell the difference between honey, wax, pollen, and propolis. Tell where wax comes from. Explain the part played in the life of the hive by the queen, the drones, and the workers. Tell how bees make honey.

3. Hive a swarm or divide at least one (1) colony. Explain how a hive is made.

4. Prepare the honey for marketing.

5. Write in not more than 200 words how and why the honeybee is used in pollinating farm crops. Name five (5) crops in your area pollinated by honeybees.

Bird Study

1. Tell how he has acquired his knowledge of birds, whether (a) through books or (b) through actual field study.

2. From actual observations, tell:

a) How many species of birds he had observed in his neighborhood; in a farm nearest to his home;

b) What species disappear during certain seasons of the year; and

c) When they disappear.

3. Do the following:

a) Give the common names in English or in his dialect of ten (10) birds he has personally observed.

b) Tell where he observed them.

c) Tell something about the size, coloring, habits, nesting, and general movements of each bird.

4. Do the following:

a) Give reasons why birds need protection, especially the endangered Philippine Eagle.

b) Tell how birds are protected in the Philippines.

c) Tell how bird protection is enforced in this country.

d) Tell why schools and similar entities should help disseminate information on bird protection.

5. Tell what he has done to persuade others not to destroy bird life. Show evidence of some constructive piece of work done to extend protection to bird life in the Philippines.

Blacksmithing

1. Show how to build fire in a forge using either charcoal, coal, or wood.

2. List the operations in forging and the corresponding tools to be used.

3. Make a tent hook, stock 3/8” in diameter.

4. Make a simple hunting knife or a small bolo.

5. Make a lap welded ring of l/4” stock (5” in diameter).

6. Make a color scale for tempering different tools.

Example:

Tool | Color | Temperature | Bath | Uses

7. Demonstrate how to temper the following tools according to the temperature scale:

- Knife
- Ax
- Hatchet

- Bolo
- Iron Bar
- Cold Chisel

Boating

1. Before doing the other requirements, swim 100 yards using any stroke; then rest by floating as still as he can for one (1) minute.

2. Show that he knows safety rules for boating or sailing.

3. Secure a permit to operate a motorboat, if needed. Explain the laws affecting pleasure boating in his area.

4. Show that before going in a boat he knows the features or hazards of the body of water to be cruised.

5. Explain and show as many as possible, the rules of the sea lanes. Describe aids to navigation used where he cruised.

6. Examine the condition of the following safety gears:

a) lifesaving device for each person on board;

b) fire extinguisher;

c) oars or paddles;

d) light;

e) tool kit;

f) extra shear pin and spark plugs;

g) horn, whistle or other sound signals;

h) compass;

i) anchor and line;

j) safety chain (for outboard motor);

k) first aid kit;

l) bilge pump or similar device that can be used for bailing.

Demonstrate the proper use of these gears.

Bookbinding

1. Name the different parts of a book.

2. Do the following:

a) Name the different materials used in bookbinding.

b) Name some substitute materials used in bookbinding.

c) Describe the proper steps in preparing paste and explain their uses.

3. Name the tools and equipment used in bookbinding and explain their uses.

4. Describe at least four (4) different stitches used in bookbinding.

5. Bind or rebind any of the following:

a) Sheets of papers

b) Volume of loose magazines or newspapers

c) A damaged book

Botany

1. Make five field trips of at least two hours each, to observe wild plant life. Keep record, based on field notes of varieties of flowers found, with date, place, nature of locality (e.g., swamp, roadside, woods, meadow, etc.), and other observations such as seeds, seed pods, leaf arrangements, insect attraction. (Record will be interesting if photographs or sketches are included.)

2. Identify from living specimens at least 50 plant specimens.

3. Identify in three or more specimens all parts of a perfect and complete flower. Explain:

    a) how plants are pollenated;

    b) how ferns differ from flowering plants.

4. Identify specimens of at least ten families of flowering plants (other than trees), or submit properly labeled specimens of such families. (May be included as part of requirement 8b.)

5. Know what plants are rare in his vicinity and what is being done or should be done to protect them.

6. Explain how plants use light, heat, water, oxygen, and carbon dioxide; how they manufacture their own food.

7. Submit or identify in the field one specimen each of fungi, algae, lichens, and mosses.

8. Carry out one of the following projects:

    a) Submit a seed collection, properly labeled, of at least 20 different kinds of seeds gathered by himself; germinate at least five species; find out all he can about different varieties of seeds and how they are scattered;

    b) Submit specimens of at least 30 species of flowering plants. Includeleaf, stem, flower and root (if specimens are not rare). Mount neatly, label with both common and scientific names, date, place where found, nature of locality;

c) Make a study of plant life in an area of not less than two square meters for at least two months. Keep record of species found, type of locality, insect attraction, seeds, etc.;

d) Raise a wild flower or fern garden, including at least five different species of plants. Know:

[1] both common and scientific names of each;

[2] proper methods of transplanting and care.

Business

1. Write a satisfactory business letter and a personal letter.

2. Know simple bookkeeping, shorthand, or typing.

3. Make a budget of his expenses, including those for clothes and incidentals, and keep a complete and actual account of personal receipts and expenditures for three months.

4. Be prepared to answer questions and problems on interests, percentages, and discounts.

5. Obtain and hold a job in a company or business organization for at least one (1) month (after school hours, weekends or vacation periods). Present a certificate from his employer that for the period he was employed, he put into practice the Scout Oath and Law and has shown efficiency in his attendance, due regard for his general appearance; or render one year successful service as a Troop/Outfit Scribe, under the same conditions.

Camping

1. Show his Counselor and Troop Leader/Outfit the following:

a) Preparing for camp: clothing and equipment and how to pack them.

b) Camp shelter and sanitation, including tent pitching.

c) Precautions to be taken on a Patrol/Crew or Troop/Outfit camp.

2. Make a camp lay-out and prepare a plan for a weekend camp including a schedule of activities; submit these to his Counselor. With the members of his Patrol/Crew or Troop/Outfit, discuss the camp plan in the presence of the Troop Leader/Outfit Advisor and the counselor. Carry out the camp plan.

3. While in camp, do the following:

a) Make a comfortable ground bed and sleep on it. Use ground cloth and padding of clothing, grass, leaves, or straw.

b) Make a camp table, a tripod for suspending camp supplies, clothes line or other camp conveniences using proper lashing techniques.

4. Show and explain the proper method of storing and protecting his food and equipment against small animals, insects, and wet weather.

5. Tell how he would protect himself against wet weather and cold while in camp.

6. Camp a total of at least twenty (20) days and twenty (20) nights in the out-of-doors, submitting evidence to his Troop Leader/Outfit Advisor and Counselor that these camps were made within standards. (You may use weekend camps and/or a week of summer camp as part of the 20 days and 20 nights.)

7. Submit reports to his Troop Leader and Counselor of his participation in the twenty (20) days and twenty (20) nights of camping, which should include the following:

a) Sketches of the campsites

b) Schedule and details of activities in camp

c) What he did or learned in camp, and

d) Experience in the camp which developed his character, his health, his self-reliance and his harmonious relationship with other Scouts.

Carpentry

1. Show how to sharpen an edge-cutting tool and a toot-cutting too.

2. Demonstrate the use of the ruler, square, level, plumb line, meter, chalk line, and bevel.

3. Demonstrate the proper way to drive, set, and clinch a nail, draw a spike with a claw hammer and to join two (2) pieces of wood with screws.

4. Show the correct use of the cross-cut saw and the rip-saw.

5. Show how to place the edge and the broad surface of a board.

6. Demonstrate how to use a chisel by making a mortise, a lap joint and tenon joint.

7. Without assistance, make a simple article of furniture for practical use in the home or around the yard such as a pergola, bench, small shed, chair, table, cabinet, etc.

Chemistry

1. Explain the meaning of chemistry. Discuss its branches and how it is different from the other fields of natural science.

2. Do the following:

a) Show that a candle flame uses up oxygen from the air and produces carbon dioxide.

b) Demonstrate that heating sawdust or wood chips produces a gas that burns.

c) Sketch the carbon dioxide-oxygen cycle.

3. Explain how the following gases are produced industrially:

a) Oxygen

b) Hydrogen

c) Chlorine

d) Ammonia

4. Differentiate between carbonates, sulfides, chlorides, acids, and gases.

5. Write the formulas of two compounds that make water hard. Write an equation describing how a home water softener works.

6. Explain what oxygen does in the animal body. Tell how oxygen, carbon dioxide, and carbon monoxide are carried in the body. Describe the chemical changes that take place when vegetables cook, meat cooks, bread dough rises, bread bakes, and bread is chewed.

7. Carry out an experiment to show the different ways of protecting iron or steel from rusting. Give examples using Scouting utensils. Tell why aluminum does not rust and why iron does.

8. Do two (2) of the following:

a) Visit a plant that makes chemical products and uses chemical processes. Describe the processes used.

b) Visit a laboratory or place of business that uses chemicals. Find out how and why the chemicals are used.

c) Learn how chemistry is meeting farm problems of soil fertility and crop pests.

d) Explain the differences in university courses for training chemical technicians, chemists, and chemical engineers. Describe two (2) different kinds of work done by chemists, chemical engineers, and chemical technicians.

Citizenship in the Community

1. Prepare a written outline of the history of his community, including such known information as who the first settlers were, when they came, important historical events, and people who figured prominently in the growth of the community.

2. Mark or point out in a map of his community:

a) principal government buildings;

b) fire station (fire brigade), police station (outpost), hospital or puericulture center, schools, and churches;

c) main highways and or feeder roads to neighboring towns or cities;

d) nearest port or airport, bus, jeepney or railroad station, if any;

e) chief industries (principal source of income or livelihood);

f) historical and other points of interest.

3. From radio, television, newspapers, or other sources of public information, gather opinions on both sides of a public issue and give his own ideas on it.

4. Draw a diagram of the organizational structure of his municipal and provincial or city government, showing its executive, legislative and judicial branches, and tell briefly what each branch perform.

5. Do two of the following:

a) Draw a diagram of the organization structure of his *barangay*, municipal or city government showing the top officials, courts, and administrative departments. Indicate who among these officials are elected and who are appointed. Give the name of these officials.

b) Know and tell how to do at least seven of the following:

[1] report a fire

[2] report a vehicular accident

[3] call a physician or ambulance

[4] report damage to electric power, gas, or water supply system

[5] report damage to or need of repairs on streets, roads, bridges, or sewer system

[6] report a mad dog scare

[7] report a contagious disease

[8] call a veterinarian

[9] obtain a building permit

[10] obtain help from a representative of the Department of Environment and Natural Resources

[11] report to authorities the commission of a crime such as a robbery, theft, rape, burglary, illegal cockfighting, gambling, etc.

[12] report a traffic violation

[13] report an election violation

c) Visit one department of his local government and report on what services it offers for the community; OR, attend a court session or a public meeting of a government body and report what takes place.

d) Know how much it costs to run his local government for one year, how this money is obtained, and for what it is chiefly spent. Tell what kind of taxes his family pays in meeting this cost.

6. Discuss with his family or counselor in what way Scouting helps to train him for citizenship, and give examples of democracy at work in his troop.

7. Take an active part and vote regularly in elections of officers and matters of business in his troop, school, and other groups to which he belongs.

8. List and briefly describe the work of several civic organizations other than the Boy Scouts of the Philippines, through which people of his community work together for the general welfare by way of serving youth, safeguarding public health or safety, disaster relief, care of orphans, aid to the poor, providing recreational facilities, promoting good business or better farming, improving labor conditions, or general civic improvement.

9. Do one of the following:

a) Identify the principal political parties or factions of parties in his community or province and explain briefly their points of view on one public issue of which they disagree.

b) Describe at least one vocational opportunity offered by his community in some form of public service. Tell what personal qualification are needed for the job.

10. List and explain at least five privileges and forms of protection he enjoys as a citizen in his community, and describe his obligations to the community.

11. With the advice of his Troop Leader/Outfit Advisor and counselor, plan his own program of community service and give at least 10 hours of his time in carrying it out; OR, give 10 hours of community service in a project carried out by his troop.

Citizenship in the Home

1. Discuss with his parents (or teacher) and counselor:

    a) the meaning of citizenship

    b) the importance of the home in the training of a Scout for citizenship.

2. Submit a statement from his parents or other people who are familiar with his conduct at home, evidence that he practices good citizenship at home by being courteous, fair, and helpful to members of his family and that he puts into practice the Scout Oath and Law, Scout Motto, and Slogan.

3. Prepare a list (at least five) of his regular home duties for at least one month and keep a record of how often he does them.

4. Discuss with his family or counselor his rights and obligations in his family.

5. Do the following:

    a) Make a health and safety check-up of his home, and help his family correct as many hazards as possible.

    b) Prepare with his family a plan of escape in case of fire in his home.

    c) Tell how to get help in case of accident, illness, fire, and other emergencies in his home.

6. Do at least one major Good Turn for his home outside of regular duties.

7. Make a budget and keep a record of his own income and or allowances and expenses for two month. Explain why it is wise to live within one's means.

8. Submit a report on a family group activity which he helped to plan, prepare for, and carry out.

Citizenship in the Nation

1. Read the Constitution of the Philippines and:

    a) Explain its purpose as set forth in the Preamble.

    b) Draw a diagram to show the organization of the Philippine Government into three branches as provided.

    c) Describe and explain the purpose of the system of checks and balances.

    d) Tell how the Constitution may be amended.

2. Present newspaper or magazine clippings showing instances of how at least three of the privileges in the Bill of Rights have been protected in our C0unlry, or how they have been set aside in countries under totalitarian rule.

3. Take part in a group discussion in his Troop, school, family or any other Troop, of an important national problem.

4. Do ONE of the following:

    a) Visit the National or Provincial Capitol; or a National project which serves his community, province or region; or a place associated with a person who had figured in the history of our country. Prepare and submit a brief report of his visit.

    b) Correspond with someone preferably a Scout who lives in another region of the Philippines. Exchange ideas, descriptive materials, hobby items, e.g. stamps, Scout insignias, etc.

5. Give the names of the President, the Vice-President, the President of the Senate, the Speaker of the

House of Representatives, the Chief Justice of the Supreme Court, any Senator (preferably one from his Region), and the Representative of his District in Congress. Tell how to address a letter to each of them at their respective of office.

6. Indicate to which branches of the national government any ten of the following list fall:

- national parks
- appropriations for government expenses
- national forests and wildlife protection
- foreign policy
- fish protection
- soil conservation
- flood control
- child welfare
- investigation of violations of national laws
- settlement of sparsely populated areas
- judgment of such violation
- fundamental education
- issuance of currency

7. Describe five ways by which the National Government serves him, his family, and his community.

8. Present his birth certificate or other legal evidence of his citizenship; OR, if foreign-born, learn what a person must do in order to become a Filipino citizen.

Coconut Growing

1. Tell the value of coconut as food.

2. Give some examples of the uses of various parts of a coconut tree.

3. Discuss briefly the soil and climate requirements of the coconut tree. Tell how coconut seedlings are prepared.

4. Describe briefly:

a) How to establish a one-hectare coconut plantation.

b) How to care for a newly-planted coconut plantation.

c) How to care for an old coconut plantation.

d) How coconut is harvested in his locality and how often it is done

5. Name the most destructive pests and diseases of coconut. Describe how each pest or disease can be controlled.

6. Explain the importance of coconut or its many products in the world market.

Computers

1. Tell what computers are and briefly describe their history. Tell what data processing is and how it is used.

2. Name the four major components of a computer system and describe the function of one component in detail.

3. Build a simple model of one the following that will help you to illustrate its function in detail:

a) core storage

b) drum storage, or

c) disk storage

4. Do the following:

a) Describe the differences and uses of analog and digital computers.

b) Explain the Hollerith and Powers codes and their role in computers.

5. Obtain your local post office Zip code and convert to binary.

6. Using the flowchart diagram method, show the steps necessary in setting up a campsite.

7. Name four different uses of computers in business.

8. Convert your full name to each of the following codes:

a) Hollerith,

b) Binary-coded decimal, and

c) Eight channel standard code

9. Be able to tell your Merit Badge counselor in your own words the meaning of the following words or terms:

- functional units,
- storage,
- input/output devices,
- random access,
- on-line system,
- central processing unit,
- magnetic ink character,
- information retrieval,
- solid-state components,
- nanosecond,
- stored program,
- console,
- optical reader, and
- register.

10. Do two of the following:

a) arrange with your counselor to visit a local data-processing installation.

b) Obtain and read two pieces of information about data processing other than the manufacturer's literature. Summarize what you read for the counselor.

c) Write a 500-word report on the various types of specialist occupations available in the data-processing field. Include educational requirements and average wage brackets when possible.

d) Show your counselor five examples of data-processing output or the tape, cards, or report form used.

11. Do the following:

a) Construct an analog adder and explain its operation.

b) Construct a card reader, demonstrate it to your counselor and explain to him the difference between the Hollerith code and the internal machine code.

Cooking

1. Make a food list, showing cost and amount needed to feed his entire Patrol, using a prepared balanced menu covering three whole days of camping.

2. Make a list of the utensils needed to cook and serve meals for his patrol.

3. While in camp, show the proper way of handling and storing food under sanitary conditions, and the correct way of washing dishes and utensils for both kitchen and table. Practice the correct and environment-friendly way to dispose of garbage, cans, paper, and other rubbish by burning them or by the use of a trash bag.

4. Serve satisfactorily as cook of his Patrol/Crew or Troop/Adviser for at least three meals using a prepared menu.

5. Do the following:

a) Build a fireplace out of stone, brick, clay, logs, other locally gathered materials; or dig a fireplace in the ground, and show the proper way of storing firewood.

b) Build fire in the fireplace he has built and after its use, remove the traces that it has been used

as one.

c) With an economical budget and considering proper nutrition and taste, prepare meals for at least four persons including rice, soup, meat or fish, vegetables, a salad, and a native desert which requires cooking; time his cooking so that courses will be ready to be served at the proper time.

d) Set the table, properly sheltered, for a meal for at least four persons.

e) Serve the meal in accordance with good table manners, and clean up after eating.

Crop Production

1. Show on a map of the Philippines where the following crops are grown in volume: corn, rice, sorghum and soybeans.

2. Grow any of the above crops in an area of not less than 200 square meters (if planted to a standard variety) or in a smaller plot if planted to an experimental variety. (Consult Merit Badge Counselor before planting.)

3. Keep an accurate and complete record of costs, hours of work, seed and other materials, and yield.

4. Submit his record, with samples of yield, to his counselor and describe the relative value of at least three varieties of the crop planted.

5 Describe modem ways of crop farming.

Cycling

1. Have a bicycle of his own, borrow, or hire one.

2. Ride fifteen (15) consecutive kilometers each month for a period of three (3) months. He shall submit to the Merit badge counselor a report of the rides taken, including dates, routes traveled, and interesting things observed.

3. After the three-month conditioning period in Requirement No 2, ride a bicycle 30 kilometers in ten (10) hours.

4. Know the rules and regulations in cycling races.

5. Learn the proper techniques of taking care of a bicycle. Repair a puncture and inflate a tire. Take apart and clean a bicycle and put it together again properly.

6. Know and demonstrate safety precautions on the road.

7. Go on cycling expedition over a route selected by the Merit badge counselor, and make a report; report correctly verbal messages in connection with this expeditions. Read and follow a course laid out on a map.

Dairying

1. Know and understand the relative nutritional values of milk from cows, carabaos, and goats.

2. Milk a cow, carabao, or goat.

3. Understand and demonstrate the pasteurization of milk and the care of dairy utensils and appliances.

4. Understand the care and management of dairy animals.

5. Visit a milk or a dairy plant. Make a report of his visit.

Drafting

1. Make a rough sketch of his Troop meeting room or a room in his church, school or home. From it, submit a finished scale floor plan, such drawing to be properly titled and to indicate by accepted conventional symbols, all openings, equipment, and safety devices. Name the drawing instruments used.

2. Submit a scale drawing of some piece of craftwork for use in home, school, Troop meeting place, or camp, which is sufficiently clear and detailed to be used by somebody else as a working basis for making the article. The drawing should include a bill of materials with an estimate of costs.

3. Submit drawing made by himself of each of the following:

a) Orthographic and isometric projections of an object other than those specified in Requirement Nos. 1 and 2.

b) Reduce or enlarge a simple scale drawing approved by his Counselor, indicating the scale of enlargement or reduction he has used.

4. Make an ink tracing of the craftwork in Requirement No. 2 and submit the cost of reproducing drawing by blue-printing, photo stating, or other methods of reproduction.

5. Submit a hand-lettered poster or bulletin approximately 60 x 70 centimeters, for use by a school,

church, Troop, or Council; or submit a hand-lettered personal greeting card for someone's birthday, a holiday, or other similar occasions.

Dramatics

1. Show that he is familiar with the outstanding period in the history of drama, beginning with Greek drama and including Philippine drama.

2. Submit evidence that he has taken part in a play presented to an audience of at least fifty persons, such part to be of sufficient importance to give him opportunity to display his dramatic ability.

3. Submit a one-act play written by himself, of at least twenty (20) minutes duration preferably on a subject connected with Scouting, with a Philippine setting, with a sketch of the set for such play, indicating left and right of stage, back drop, proscenium, etc.

4. Through an oral quiz, using his own play in Requirement No. 3 to illustrate, show a knowledge of the fundamental elements of a play, like plot, characterization and dialogue. Point out some of the elements of the plot such as conflict, surprise, rising action, climax, etc. Show why the dialogue should be natural and brief and accompanied by action.

5. “Make-up” as an old man.

6. Present to the Counselor a list of five entertainment features which he can arrange to give at a moment's notice, either alone or with others, suitable for campfires, Troop meetings or general gatherings and present any two selected by the Counselor from such list.

Duck Raising

1. Raise and take care of five (5) ducks. Properly house them and give the proper food.

2. Keep a record of food consumption, mortality, medication, and vaccination.

3. Keep a complete record of eggs laid, squabs hatched, sickness, deaths, etc. for this same period.

4. Describe breeds of ducks used for squabbing.

5. Visit a duck-raising farm near his place.

6. List the basic requirements for successful duck-raising.

Ecology

1. Explain the meaning of the following: ecology, biosphere, ecosystem, plant succession, limiting factor. Give an example of the last two.

2. With the help of his counselor, pick an area of three (3) hectares for study. City Scouts may pick an area in a large park, if a better place is not available.

3. Visit the area four times for two (2) hours each time. Do this at different times on one day a week for a month, or if at camp, on four different days of the week at different times of the day.

a) Record the temperature, rain, and wind.

b) List the animals you saw. Tell what they were doing.

c) List the plants you saw.

d) Name the kinds of rocks and soil.

4. Write about his study in 500 words or more showing:

a) How the climate, topography, and geology have influenced the number and kinds of plants and animals.

b) How the living and non-living elements are interrelated.

c) Why is it important that people understand this.

5. With his counselor, plan and carry out a project on one (1) of the following:

a) The effect of water-holding capacity of soil on plant life. The relation of plant cover to run-off. How both are related to the water and oxygen cycles.

b) The influence of land plant life on temperature, light intensity, wind velocity, and humidity. The influence of water plant life on water environment. How both land and water plants affect animal life.

6. Make a report, in the form of a short talk to a Scout group, on what he did in requirement number five (5).

7. Show he understands the following:

a) The causes of water pollution. Tell what it does to rivers and lakes.

b) The causes of land pollution. Tell what it does to the environment.

c) The causes of air pollution. Tell what it does to the environment.

d) How some chemicals get into the tissues of animals miles from where they were used.

8. Describe what he and others can do to help solve a local problem of air pollution, water pollution, or litter.

9. Describe the duties of three positions in environment science.

Electricity

1. Know the sources and ways of producing electricity.

2. Make a simple electromagnet. Show and state the relationship between electricity and magnetism.

3. Understand the difference between a direct current and an alternating current and show uses to which each is adapted. Give a method of determining what current flows in a given circuit.

4. Have an elementary knowledge of the construction of cells, batteries, switches, electric bells, and transformers.

5. Demonstrate how to replace fuses and properly splice, solder, and tape rubber-covered wires.

6. Make and submit a diagram or sketch showing the lights, switches and outlets controlled by each fuse in his house.

7. Read correctly an electric meter and compute the bill.

Electronics

1. Explain the theory of the transistor. Tell how transistors may be used with resistors, capacitors, and coils, in making simple circuits.

2. Do the following:

a) Draw a simple circuit showing the resistors or tubes. Label all parts. Wire the circuit.

b) Demonstrate the right way to solder and unsolder.

c) Explain how to avoid heat damage to the parts.

3. Explain the following:

a) *Remote-control* – Build a device to show how an electronic circuit is used for remote control.

b) *Electronic brain* – Explain the binary system of numbers. Change binary numbers to decimal numbers. Build a simple flip-flop circuit with either transistors or tubes.

4. Discuss job opportunities in the field of electronics.

Emergency Preparedness

1. Earn the First Aid Merit Badge.

2. Tell what he would do to prevent injury and possible loss of life to himself and others in each of the following situations:

• Fire or explosion at home or in a public building,

• car stalled in a secluded place,

• motor vehicle accident,

• mountain accident,

• food poisoning,

• boating accident,

- search for lost persons,
- gas leak,
- earthquake,
- flood,
- typhoon,
- lightning,
- nuclear fallout,
- avalanche (rock) and landslide.

3. Demonstrate and explain how he could safely save a person from the following situations:

a) Touching a live electric wire.

b) In a room filled with carbon monoxide or other fumes or smoke.

c) Clothes on fire.

d) Drowning using non-swimming rescues (including river, sea, or beach accidents).

4. Tell the things a group of Scouts should be prepared to do, the training needed and the safety precautions to be taken for the following emergency service:

a) Crowd and traffic control

b) Messenger service and communication

c) Collection and distribution services

d) Group feeding, shelter and sanitation.

5. Demonstrate the following:

a) Three ways of attracting and communicating with rescue planes or helicopters.

b) The proper use of ropes and lines for rescue work by doing the following:

[1] Tie knots for joining lines, shortening or adjusting lines, and lashings.

[2] Lower a person from a height sufficient to show how.

[3] Coil and accurately throw light and heavy 50-foot heaving lines

6. Prepare a written plan for mobilizing your troop for emergency service. Prepare an “emergency kit” for use by your Patrol or your family.

7. Participate in one emergency service.

Engineering

1. Know what high school preparation is required for admission to an accredited engineering college.

2. Briefly describe the type of work done by an engineer and explain how the following branches of engineering benefit our society:

- aeronautical engineer,
- chemical engineer,
- civil engineer,
- computer engineer,
- electrical engineer,
- mechanical engineer,
- mining engineer, and
- metallurgical engineer.

3. With the assistance of your merit badge counselor, make an inspection trip to a manufacturing or processing plant or an engineering project in your locality. Discuss the activities with an engineer on the project or plant. Prepare a report describing the inspection trip emphasizing those features that involve engineering knowledge and skills.

4. Do THREE of the following:

a) Design a cam, linkage, gear train, or other mechanical device for transforming motion; prepare a working drawing and build a working model from wood, plastic or metal.

b) Design and build a simple electrical or electronic device such as an amplifier, radio receiver, or an electric motor.

c) Show by diagram how forces are distributed in a lock bridge carrying a 100-kilo load at the center, if the two members are inclined 30° above the horizontal.

d) Explain with the aid of a diagram and calculate how much it would cost to pump l00,000 gallons of water from sea level into a reservoir whose surface is at 550 feet elevation if electric power costs P2.50 per kwhr, and motor efficiency is 80 percent and 5 percent of the water is

lost in leaks along the way.

e) Write a report explaining how energy in a fuel is converted into useful work in a typical machine such as an automobile, diesel tractor, drilling machine, airplane, rocket, or turbine engine. Use sketches and diagrams to illustrate the process.

f) Select, with the advice of the merit badge Counselor a busy street or other traffic artery in the community. Go to the location and make a study of the traffic flow both in periods of light and heavy traffic. Obtain from an appropriate local official the predicted increase and population over the next 5 years. Report on the investigation, including your plan on how the traffic situation 5 years hence might be alleviated at the particular location.

g) Set up a distilling apparatus with and without a fractionating column. Draw a graph of product purity versus percent distilled. Explain why better results are obtained with a fractionating column.

h) Demonstrate how to use one device for obtaining engineering measurements such as transit, builder's level, micrometer calipers, Wheatstone bridge, potentiometer, thermocouple for measuring temperatures, pilot tube for measuring gas or liquid velocities, stroboscopic tachometer, oscilloscope, frequency counter.

i) Set up a device for measuring heat transfer. Draw a graph plotting heat transfer versus rate of flow. Explain why better heat transfer is obtained with a high rate of flow than with a low rate of flow.

j) In place of one activity under this requirement, the merit badge counselor may choose subjects that will make use of engineering activities in the local are

Environment

1. Explain the meaning of the following: ecology, biosphere, ecosystem, plant succession, limiting factor. Give an example of each.

2. With the help of your Counselor, pick an area of four (4) hectares for study. City-based Scouts may pick an area in a large park, if a better place is not available.

3. Visit the area four times for two (2) hours each time. Do this at different times on one day a week for

a month, or if at camp, on four different days of the week at different times of the day.

a) Record the temperature, rain, and wind.

b) List the animals you saw. Tell what they were doing.

c) List the plants you saw.

d) Name the kinds of rocks and soil.

4. Write about your study in 300 words or more showing:

a) How the climate, topography, and geology have influenced the number and kinds of plants and animals.

b) How the living and nonliving elements are interrelated.

c) Why it is important that people understand this.

5. With your Counselor, plan and carry out a project in ONE of the following:

a) The effect of water-holding capacity of soil on plant life. The relation of plant cover to run-off. How both are related to the water and oxygen cycles.

b) The influence of land plant life on temperature, light, intensity, wind velocity, and humidity. The influence of water plant life on the water environment. How both land and water plants affect animal life.

6. Make a report, in the form of a short talk to a Scout group, on what you did in requirement 5.

7. Show you understand the following:

a) The causes of water pollution. Tell what it does to rivers and lakes.

b) The causes of land pollution. Tell what it does to the environment.

c) The causes of air pollution. Tell what it does to the environment.

d) How some chemicals get into the tissues of animals miles from where they were used.

8. Describe what you and others can do to help solve a local problem of air pollution, water pollution, or litter.

Farm Management

1. Make a plan of an ideal farm; with correct layout of farm structures, show sewage disposal plan; include background garden layout.

2. Visit and observe farm operations near his home and then draw up some requirements and recommendations for the improvement of said farm. Furnish the Counselor with a copy of the recommendation.

a) Submit proposals to management of the said farm.

b) Discuss with Counselor further development on submitted proposals whether the recommendations were noted or not.

3. Make a report on the equipment, tools, and facilities being used in the farms e.g. corn plants, seeder, tractor, etc. Tell their uses.

4. Discuss with Counselor some methods of keeping farm records.

5. Mention some recent developments in the field of farming innovation that would further improve the farming system.

Filipino Heritage

1. Write a biography of at least five Filipino heroes or great men. Explain to his Troop what outstanding

work they did for our country that made them great. Describe any of their personal virtues or qualities that are worth emulating by the youth.

2. Cite at least five (5) literary works written by Filipino heroes or great men. Explain to his Troop the significance of each of these literary works. Select at least three (3) points from each which he thinks are still relevant today.

3. Compile and relate to his Troop ten (10) Filipino traditions that are worth emulating. Give reasons why they should be emulated and preserved.

4. Compile and recite to his Troop twenty (20) Filipino proverbs; explain at least half of them.

5. Recite a poem written by his favorite Filipino hero or great man in a Troop meeting and explain the meaning of the lines or phrase of the poem.

6. Take part in a Patrol of Troop activity or any project honoring the memory of Filipino heroes or great men.

7. Visit any historical place or shrine connected with Filipino heroes or great men. Make a written report of the visit to his Troop Leader.

Firemanship

1. Explain three common causes of fire in the home (other than careless use of gasoline and kerosene) and tell how to guard against them.

2. Do the following:

a) Inspect his own home, fill out an inspection form and present it to the Counselor.

b) Explain how he would plan, in case of fire at night for everyone in his house (including himself) to escape to safety.

c) List the equipment and materials in his home, if there are any available, for fire protection

and explain under what conditions each is used.

d) Tell what fire fighting forces would respond to a fire alarm.

e) Tell where flammable liquids such as gasoline, kerosene, alcohols and turpentine should be stored for absolute safety and under what conditions they should be used.

f) Explain at least two causes of spontaneous combustion and how to guard against them.

3. Do the following:

a) Make a fire pail out of an empty gasoline can or make a fire breaker or a fire rake.

b) Show what to do if caught in a room filled with dense smoke or fumes.

c) Give three ways of turning on a local fire alarm, tell the exact location of a fire alarm nearest his home, school, and Troop meeting room.

d) Show how to save a person whose clothes are on fire.

4. Using proper methods:

a) Build a fire in the open where there are flammable materials both around and over the place where fire is to be laid; extinguish the fire.

b) Burn leaves and rubbish where it is allowed.

5. Do the following:

a) Tell how to select, prepare, and maintain a campsite so it is safe from fire.

b) Conduct a fire drill wherein his Patrol/Crew or Troop/Outfit can help the local fire fighting organization in the community conduct a fire prevention campaign.

First Aid

1. Show the correct way to:

a) Transport a person with compound fracture of the forearm; head injury; spinal column injury.

b) Make and apply splints for a broken thigh bone.

c) Explain the dangers involved in the transportation of an injured person before the extent of the injury is known.

2. Show how to:

a) Stop bleeding from a ruptured varicose vein in the leg.

b) Control arterial and/or venous bleeding on the wrist and calf of leg and other parts of the body.

3. Tell and show what to do in the following cases:

a) A person in contact with an electric wire.

b) A person in a state of shock due to starvation, injuries, and certain diseases.

c) A person who choked from drowning from water or food lodged in his windpipe while eating.

d) A person who dove into shallow water, struck his head against a submerged object and fell unconscious.

4. Tell what disease germ is likely to be carried into a wound from a gunshot, stab wound, rusty nail, pitchfork or garden rake, or from a powder burn; explain why the patient in such cases must be taken to a physician for further treatment.

5. Show how to:

a) Sterilize a small piece of cloth or part of his shirt if he has to use it as an improvised bandage or dressing.

b) Treat extreme shock, using cover, correct position, and heating devices.

c) Give a patient cardio-pulmunary resuscitation.