6. Take the authorized Pilot's physical examination. Or demonstrate the use of certain physical requirements tests similar to those outlined in the book "Are You Fit To Be a Pilot" by Erwin L. Ray and Stanley Washburn; and explain the physical effects of altitude and speed on the pilot. (XXXIV)

Ace Life Explorations For Rank Only

1. Select and carry on a new hobby or advance an old one, and show evidence of fair mastery of one added craft skill.

2. Compare the three vocations which seem most attractive to him, and outline in conference with his Squadron Leader or Aviation Counselor a practical plan he could follow to enter any of them. (XXXIV)

3. Give evidence of having read a book or pamphlet on social usages; present directions for five social games appropriate for informal Air Scout occasions; assist social committee in arranging and conducting a formal social event.

Ace Community Participation For Rank Only

1. In addition to his own help or leadership in some approved community project, report to his Squadron on what services, protective and developmental, are carried on by his local government primarily for the benefit of youth. (XXXV)

2. Survey and report the main plants and animals discovered at any one season in an approved area, indicating their relation to human life; or explore and report on some one form of plant or animal life, as its prevalence, how it lives, what part it plays in its natural setting, and its possible values.

3. Assist in training others as needed, as part of his continuing help to the community through church, school, Scouting, or other community projects.

Ace Group Participation For Rank Only

Render at least six months satisfactory service as an Air Scout Craftsman.* (XXXIV)

*Satisfactory service will be determined by his Squadron Council, of his participation in the service, social, outdoor and indoor meeting program of his group; of his educational progress and his religious interests, as well as his practice in daily life of the Scout Oath and Law and ideals of good citizenship.

Put paste on this strip and fasten inside the front cover of your *Air Scout Manual.*

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AIR SCOUT ADVANCEMENT REQUIREMENTS

Boy Scouts of America
2 Park Avenue, New York 16, N. Y.
Cat. No. 3022 HERB STEET 250001047

ADVANCEMENT BEYOND APPRENTICE RANK

By meeting 5 of 6 requirements in a group (and taking part in service, outdoor, and social activities) you earn one of these SPECIALIST BADGES

By meeting 14 Requirements, including one from each of the 9 groups in a column, you earn one of these BADGES of RANK

SPECIALIST BADGES	Observer ↓	Craftsman ↓	Ace ↓
Airman ↑	Observer Airman	Craftsman Airman	Ace Airman
Builder ↑	Observer Builder	Craftsman Builder	Ace Builder
Communicator ↑	Observer Communicator	Craftsman Communicator	Ace Communicator
Mechanic ↑	Observer Mechanic	Craftsman Mechanic	Ace Mechanic
Navigator ↑	Observer Navigator	Craftsman Navigator	Ace Navigator
Outdoorsman ↑	Observer Outdoorsman	Craftsman Outdoorsman	Ace Outdoorsman
	Life Explorations		
	Community Participation		
	Group Participation		

AIR SCOUT ADVANCEMENT REQUIREMENTS

General Air Scouting accomplishments are now recognized by advancement in RANK, and *specialized* aviation knowledge by advancement in RATINGS.

The badges for Apprentice, Observer, Craftsman, and Ace RANKS and their positions on the uniform remain unchanged. The new badges for Specialized RATINGS, illustrated in this pamphlet, are red strips 2½ inches by ½ inch, containing the various insignia. They are worn on the outside of the right sleeve, the first one 4 inches above the cuff, and additional ones directly above that, edge to edge.

The requirements for all RANKS were revised, effective January 1, 1947. Apprentice requirements are the same for all candidates; but each higher RANK is earned by qualifying for any 14 of its requirements including at least one from each of its 9 groups of requirements. RANKS may be attained only in this order: Apprentice, Observer, Craftsman, Ace.

A Specialist RATING is earned by qualifying for any 5 of its 6 requirements and also taking part in at least one service, one outdoor, and one social activity. Within any Specialist field, such as Mechanic, RATINGS may be attained only in the order listed below, for example, Observer Mechanic, Craftsman Mechanic, Ace Mechanic.

Air Scout Advancement is reviewed and approved by the Squadron Council, made up of the young men officers, the Squadron Leader, and members of the Squadron Committee. This group is instructed and supervised by the Local Council or District Advancement Committee to assure maintenance of standards.

After awards have been reported to and approved by the Local Council, they may be presented by the Squadron at a social affair or any meeting. Thus Air Scout Advancement is conducted by as well as for young men with the aid of their advisors and the supervision of the Local Council.

Roman numerals or capital letters after many of the requirements refer to Chapters or Appendix sections in the *Air Scout Manual*.

Air Scout Apprentice

To become an Air Scout, any Scout or young man 15 years of age or over shall:

1. Present his Air Scout application and evidence of physical check-up, together with a list of the hobbies, skills and sports which interest him, and an outline record of his aviation and camping experience, if any.

2. Know the Scout Oath and the Scout Law, and interpret to his Squadron Leader their practical meaning in his daily life and in his life plans.

3. In a Squadron Ceremonial formally declare his adherence to the Scout Oath and Law, and his allegiance to the United States of America, and to its flag. (VI, X)

Air Scout Observer

Observer Airman

1. Explain why these six basic atmospheric conditions concern a pilot—atmospheric pressure, temperature, humidity, clouds, winds, precipitation. (XV)

2. Identify in the sky, from photographs (or from sketches, if necessary) the ten forms of clouds in the international classification grouped in the four classifications—high, middle, low, and vertical. (XV)

3. Draw and present a rough outline map, marking the dense fog areas and maximum thunderstorm areas of the United States. (XV)

4. In a meeting with a group show the location and explain the function of all engine and flight controls in the cockpit of an airline transport aircraft. (XXIII)

5. Know the names of the principal airlines of the U. S. and foreign countries, the insignia which identify their planes, the names used for common civilian and military planes (Clipper, Mainliner, Flagship, etc.), and types of planes (Boeing 314, DC-3, B-17, etc.), and draw the routes they fly on a globe or polar projection map. (XI)

6. Identify and explain by means of blackboard diagrams the major regions of the earth's atmosphere and heights of their boundaries. (XV)

Observer Builder

1. (A) Point out the following with accuracy on a plane, a model plane, a photograph, or diagram, and explain their use—fuselage, cabin, cockpit; landing gear, struts, wheels, wheel pants brakes, skiis; engine, cowling, spinner, propeller, cylinders, wings; camber, leading and trailing edges, ailerons, flaps, slots; empennage, fin, rudder, elevator, tabs, stabilizer, (B) Make rough diagrams distinguishing between landplane, seaplane, flying boat, amphibian, autogiro, helicopter. (XI, XIII, XIV)

2. Build a flying model plane (kit may be used) and cover with transparent material so that structure may be observed. Discuss arrangement of structure with Ace Builder or leader. (XIII)

3. Carve, for a flying model, two propellers having the same diameter (about 2/5 of the wing span) and approximately the same pitch, but with different blade areas, one 1/10 and the other 1/6 of the wing area. Test in flight and report. (XIV)

4. Build and compare for takeoff, speed and stability, two simple stick flying models, the same in every respect except one to be Rise off ground and the other Rise off water. (XI)

5. Explain to a Crew or Squadron, with a rough diagram or model the chief structural differences between rigid, semi-rigid airships, non-rigid blimps, free and captive balloons, pointing out the advantages and uses of each. Make a balloon from gores or patterns cut from tissue paper and fly, using hot air generated with a wick fastened at the mouth of the balloon. (XII)

6. Demonstrate before a Crew or Squadron his ability to start and operate a model gas engine successfully. Show with a rough diagram the difference in the working of a two-cycle and four-cycle engines. (XI)

Observer Communicator

1. Name five methods of U. S. Civil Airway communications, and explain the fundamentals of their operation. Make own equipment either for sending and receiving auditory signals by International Morse Code, or for sending and receiving visual signals by International Morse Code. (XVII)

2. Send and receive a message by International Morse Code auditory signals at not less than 25 characters per minute. (XVII)

3. Send and receive a message by International Morse Code visual signals at not less than 20 characters per minute. (XVII)

4. Demonstrate in the field five ways of signalling to an airplane from the ground in case of emergency.

5. Explain the international code for identifying aircraft as to type and country including the identification letter for at least three nations. Explain the special problems in international air transportation when an airplane passes from country to country in a few hours, e.g., arrangements with other countries to fly to their territory, immigrations, customs, public health requirements, language difference, differences in social customs and commercial practices. (XI)

6. Establish a Squadron or Crew emergency mobilization system with and without the use of a telephone.

Observer Mechanic

1. Build a flat working model of an internal combustion engine. Demonstrate and explain its functions to a group of Air Scouts. (XI)

2. Show on a plane, or with sketches, or on model, the following—blade, hub, tip, diameter, leading edge, trailing edge, blade area, blade element, pitch, slip, thrust and torque. Explain the general principles and advantages of adjustable, controllable, and constant speed propellers. (XIV)

3. Prepare rough diagrams or working models for contrasting two and four-cycle internal combustion engines. (XXII)

4. Contrast airplane and automobile engines as to (A) general lubrication; (B) fuel supply system, including injectors and super-chargers; (C) electrical systems. (XXII)

5. Make a "daily inspection" (line inspection) report of some aircraft and have it approved by a licensed pilot or mechanic.

6. Explain a lubricating diagram of any multimotor plane to a Squadron or Crew.

Observer Navigator

1. Draw and explain a wind triangle diagram to show how to obtain heading and ground speed when given course, airspeed, wind direction and wind speed. (XXXI)

2. Show the relative locations of the North and South Magnetic Poles and the location of the "Agonic" line in the United States. Explain the differences and relationships among True North, variation, and deviation. (XXIII, XXXI)

3. Design and build a simple floating compass from a sewing needle, cork, and waterglass and demonstrate the difference between true and magnetic north and the effect of nearby magnetic bodies on the compass reading. (XXIII)

4. In a group meeting, explain and demonstrate three methods for locating and identifying the North Star. (XXVI)

5. Prepare a talk for presentation to a group meeting explaining the conversion of standard time to local time.

6. Read the signs and symbols on an airway map as designated by his counselor. (XVI)

Observer Outdoorsman

1. Explain to a group of Scouts the physical requirements for receiving a student's, private and commercial pilot's certificate, and explain the requirements for a parachute rigger's certificate. (XXXII, XXXIII, C)

2. Take a cross country hike of at least five miles through *territory as near to wilderness as possible, making note of every* thing an aviator who has been forced down would use to get back to civilization. Write a report of the trip, explaining how the aviator would find his way, what food was available, etc. (VIII, XVIII, XXVI, XXXIV)

3. Take an overnight trip or camp preparing his own food and shelter, using good Scouting technique. Submit a report including weather; cloud and astronomical observations. (VIII, XVIII, XXVI, XXXIV)

4. On a hike or camp, demonstrate First Aid for five injuries specified by his counselor, and three methods of signalling aircraft from the ground. (XXXIV)

5. In a meeting with a group, discuss proper care of the hands and feet, tell how to care for the feet on a hike, how to guard against infection of the feet, explain the value of properly constructed shoes, and the use of wool stockings.

6. Demonstrate personal First Aid, including bandage, tourniquet, splint, use of antiseptic, and treatment of burns, cuts and sprains.

Observer Life Explorations For Rank Only

1. Demonstrate a reasonable degree of proficiency in a physical skill or sport, such as gymnastics, weight lifting, football, basketball, swimming, track, archery, skiing, etc.

2. Hold a job for 30 days or more and present evidence of success.

3. Visit and make a written report on the vocational opportunities in some industry preferably related to aviation. (XXXIV)

4. Demonstrate accepted social usage in introducing two people; handling formal and informal invitations; the role of an escort; respect due ladies and older people; calling at a home; entertaining at restaurants and theatres.

Observer Community Participation For Rank Only

1. Carry out, alone or jointly, at least one community service project developed in consultation with his Squadron Leader. Report on what provision is made by his municipal or county government to protect health.

2. Do his share as a volunteer leader in the community through church, school, Scouting or some other community project. (XVIII, XXXV)

3. Make a study of the aviation program of his community, and suggest what immediate projects are needed for the growth of the community in aviation.

Observer Group Participation For Rank Only

Render at least three months satisfactory service as an apprentice Air Scout. (See footnote, page 16) (XVIII)

Air Scout Craftsman

Craftsman Airman

1. Explain the color code used to indicate the different types of fronts and the various types and kinds of precipitation on a weather map. (XV)

2. Name and explain the types of precipitation and obstructions to vision given in hourly airways weather reports. (XV, XVII)

3. Describe the following aerobatic maneuvers: loop, chandelle, wingover, snap roll, falling leaf, slow roll, Immelman, whip stall. Or have completed two hours of flight in accordance with the Senior Scout regulations. (XXXII)

4. Explain the construction and principle of operation of the altimeter and the relationship of indicated altitude to actual altitude under extreme conditions of temperature and pressure. (XXIII)

5. Tell the conditions of flight which make it difficult to hold a course, and the minimum navigation instruments required for instrument flight. (XXXI)

6. Read and interpret signs and symbols on an aeronautical chart or map. (XVI)

Craftsman Builder

1. Build three drag demonstration airfoils of same cross-section width-cube, cylinder, "streamline"; improvise small easy-rolling 4-wheel support to demonstrate air resistance of these airfoils in an air current. Also list the type of plane or airship involved. (XX)

2. Build a six-inch airfoil wing section of 5-inch chord and high light cambers, mount and demonstrate with it the principle of lift; submit with explanations, a rough diagram used in explaining to another Scout the Aeronautics Merit Badge outlines of the positive forces of Thrust and Lift, and the negative forces of Gravity and Drag. (XX)

3. Investigate the various materials used in model plane building. Write complete report on your findings or build at least one flying model from material other than balsa wood.

4. Build some piece of furniture, equipment, or decoration for the Squadron airport, or assist in painting or decorating the airport. (III)

5. Demonstrate the use of a small wind tunnel to provide controlled air current, and show relative Lift and Drag on two different wing section airfoils designed. Show design difference in camber of wings for high lift and for high speed. Use actual airplane models or rough sketches, and explain reasons. Also show why dihedrals, sweepbacks, high wings, and slots tend to give a plane stability in flight. (XX, E)

6. Build *one* of the following: (A) an airfoil pressure manometer testing set; (B) a demonstration wind tunnel, and design (C) a model of any historical plane. (XX)

Craftsman Communicator

1. Explain the difference between direct and alternating current; give at least three advantages for each, and demonstrate

a method of determining which kind flows in a given circuit. Make a simple electric magnet, and explain its use in a radio, buzzer, and telephone. (XXV)

2. Demonstrate how to rescue a person in contact with a live electric wire, and a knowledge of the method of resuscitation of a person unconscious from shock. (XXV)

3. Alternately send and receive by radio or buzzer messages for a consecutive period of at least ten minutes, averaging 40 characters per minute. (XVII, XXV)

4. Draw a wiring diagram of a simple receiving set for use on short wave with vacuum tube detector and one stage amplifier. Use correct symbols and show all essential apparatus, including antenna and telephones. Describe each detail of apparatus and explain briefly the use of each. Using the above diagram, explain how this receiving set could be made to operate also as a transmitter. (XXV)

5. Construct a working receiving set and demonstrate its operation by receiving signals from at least three different stations. (XXV)

6. Alternately send and receive messages by either Morse Code or Semaphore Code with flags for a consecutive period of at least 10 minutes averaging 35 characters per minute. (XVII, XXV)

Craftsman Mechanic

1. Explain on a radial type engine or rough sketches of a radial type engine, the various cylinder arrangements and order of cylinder firing, showing crankshaft and connecting rod assembly. Using diagram, mock-up, or actual equipment, explain the principle and function of the turbinal supercharge. (XXII)

2. Assist in making, or make, some major repair on some type of internal combustion engine, or assist in taking down and re-assembling an internal combustion engine, reporting on main steps. (XXII)

3. Explain power loading, and work out the horse power ratio on some gas model airplane.

4. Develop fixed cost and operating cost for some horse power class airplane, including depreciation, maintenance cost, repair, hangar, etc.

5. Show with rough diagrams or sketches the difference between an internal combustion, gas turbine and jet propulsion engine. Point out the advantages of each.

6. Read a blueprint of a plane or engine, or a reasonably large part of either, as designated by his Counselor.

Craftsman Navigator

1. Explain the general differences between locating position by pilotage, dead reckoning, radio aids, and by celestial observations. Demonstrate how to file a flight plan including an alternate airport problem. (XXXI)

2. Using a sectional aeronautical chart, plot a triangular course with one leg at least 60 miles long and figure magnetic headings, estimated times over well-chosen check points, flying at a given airspeed with a given wind direction and speed. Explain the problem and the solution to a Squadron, bringing out the major reasons for choosing the flight altitude of each leg and the choice of particular check points.

3. Prepare a compass correction card and determine the amount of compass err for at least 8 points of a compass mounted in an automobile or airplane. (XXIII)

4. Make a spot map of ten neighboring airports, using auto road map as a base. Show true course and magnetic course between these airports. (XVI)

5. Prepare a table of sunrise and sunset times for a particular season and place to be designated by the Counselor.

6. With diagrams or drawings, explain to a Squadron or Crew the Conic projection, Mercator projection, and Polar projection, and show value and error of each. (XVI)

Craftsman Outdoorsman

1. Alone or with a buddy, at night, hike from a wilderness spot where an aviator might make a forced landing, travel a distance of not less than five miles cross country, finding direction by stars or compass, in order to arrive at predetermined point. (VIII, XXVI, XXXIV)

2. Take part in three or more additional overnight camping, hunting or fishing trips, demonstrating good Scouting technique.

3. On an overnight camp, demonstrate blackout First Aid including three splints, five bandages, and artificial respiration.

4. Participate in some local project concerned with fish, game, soil, or forestry conservation.

5. On an overnight hike, improvise and use emergency shelter. Demonstrate the use of at least three emergency shelters

made of a shelter half, poncho, blankets, leanto, and others. (VIII)

6. Demonstrate ability to swim or ford a swift stream and the best methods of rescue from water using throw, row, or go procedures.

Craftsman Life Explorations For Rank Only

1. Select and develop a new hobby or skill from list described in the Air Scout Manual, and report or demonstrate in Squadron Meeting.

2. Explore and report in Squadron Meeting on qualities and preparation needed as well as the future outlook for a young man in any vocation related to aviation. (XXXIV)

3. Give evidence of knowledge of proper table etiquette including table arrangement, seating of guests, grace at meals, and the serving and passing of food.

Craftsman Group Participation For Rank Only

1. Continue in effort, alone or jointly, to do his part in helping with community affairs. Report what non-governmental agencies there are in his community which seek to benefit youth.

2. Develop and carry out an original conservation or development project in consultation with his squadron and government or other community leaders.

3. Help find others to help as needed community leaders in church, school, Scouting, etc., in addition to his own continuing service.

Craftsman Group Participation For Rank Only

Render at least three months' satisfactory service as an Air Scout Observer. (See footnote, page 16) (XXXIV)

Air Scout Ace

Ace Airman

1. Explain a weather map in terms of pressure, temperature, and humidity and point out areas of overcast skies and precipitation. Explain the major elements of a severe cold front from the standpoint of flying conditions. (XV)

2. Present a list of the principal air traffic rules and give reasons for them. Explain international aircraft numbering code. (XXXIII)

3. Name and explain the use of the minimum flight instruments necessary for safe instrument flight. Explain the function of the gyroscope in the bank and turn indicator. (XXIII, XXXI)

4. Explain the ground equipment and general procedures for an instrument landing using radar "ground controlled approach."

5. Explain the function of ATC (Air Traffic Control), how and when it controls air traffic, and the pilot's responsibility when flying under its control.

6. Identify from an aeronautical photograph the position represented in one photograph by comparing the recognized ground features with an aeronautical chart, or have completed eight hours of flight in accordance with the Senior Scout regulations.

Ace Builder

1. Design and make a report on a wind tunnel test on some type aircraft. Report should cover wing loading and speed with motor of a designated horse power. (E)

2. Make an airplane design wall chart identifying main modern design types, and submit a design analysis as outlined in the Air Scout Manual of not fewer than five modern planes. (XIII, XXVII)

3. Report on the top ceiling speed, and non-stop endurance records of at least three types of aircraft, telling any interesting incidents or stories related to the records. (XXVII)

4. Construct a flying model of original design using any type of power and fly it in competition. Write report on design features that are outstanding. (XXIX)

5. Construct a gas model airplane, meeting academy of Model Aeronautics design requirements, and fly in a sponsored contest. Or build a stick model and a hand launched glider to A.M.A. (Academy of Model Aeronautics) rules and fly both in a sponsored contest. (XXX)

6. Make working drawings, to accurate scale, for a model airplane and present on a correct form.

Ace Communicator

1. Qualify as amateur radio operator, or restricted radio telephone operator.

2. Demonstrate basic signals from pilot instructor to student pilot, and basic hand signals for handling aircraft on the ground.

3. Know and demonstrate the basic signals for directing an aircraft to an aircraft carrier deck. Demonstrate with proper colored beam the basic light signals from aircraft control tower to aircraft.

4. Demonstrate the ability to send and receive by Morse Code at an average speed of not less than fifty letters a minute over a period of not less than ten minutes. Or demonstrate the ability to send and receive by Semaphore Code at an average speed of not less than forty letters a minute over a period of not less than ten minutes.

5. Demonstrate ability to read and write a weather report using C.A.A. (Civil Aeronautics Administration) weather report codes and teach the code to at least two other people. (XV)

6. Know the names of the international code flags and describe or demonstrate their use to a Crew or Squadron.

Ace Mechanic

1. Serve as an apprentice or helper to a licensed aircraft or engine mechanic for at least thirty days full time or ninety days part time.

2. Describe, using diagrams or rough sketches, the functions of at least five engine control instruments; and list and explain some instrument errors which may occur in the use of altimeter, air speed indicator and magnetic compass. (XXIII)

3. Draw, repair, or take down and reassemble a carburetor. (XXII)

4. Using cutaway diagrams or actual propellers, show contrasting functioning of a controllable pitch and a constant speed propeller, including mechanical principles involved, or assist in repair or reassembling of either. (XIV)

5. Prepare for a debate the argument for both the affirmative and the negative side of the question, "Resolved, the liquid-cooled airplane engine is superior in performance and efficiency to the air-cooled engine."

6. Make an actual or a sample of a skin patch on fabric and metal.

Ace Navigator

1. Make a simple sextant, using a plumb-bob as a reference, and use it to determine the latitude by Polaris of his home and one additional location designated by his Counselor. (XXXI)

2. Learn and teach to at least two other people the name and method of locating one star of the first magnitude in each of at least five different constellations.

3. Demonstrate the use of at least two types of computers for figuring compass course, wind correction angle, and Estimated Time of Arrival on any three given problems. (XXXI)

4. Explain and demonstrate by the use of a computer, the effect of differing pressures and temperatures on the true airspeed as compared to indicated airspeed and altitude. Explain with the aid of rough diagrams (of the construction of the airspeed instrument and its connections) why such relationships exist. (XXIII, XXXI)

5. Demonstrate the use of the drift indicator, using an actual drift indicator, mock-up, or diagram. Tell at least five different signs that a pilot may look for on the ground to determine the ground wing direction. (XXXI)

6. Describe the use of radio navigation, including the use of the directional loop for plotting a running fix; and describe how a navigator or pilot intercepting a radio range leg can determine which direction to fly if he was not certain of the wind direction of the radio range. (XI, XVII)

Ace Outdoorsman

1. Alone or with a buddy take and report on a two-day trip through a reasonably wild and sparsely settled territory, carrying only emergency rations and light shelter, living off the country as far as possible. (VIII, XXXIV)

2. Spend at least ten days and nights in camp on expeditions or trips.

3. Qualify for the emergency service corps requirement other than Boy Scout Rank.

4. Collect from the field a minimum of fifteen edible foods; and demonstrate the use of a minimum of three different types of snares or traps for catching fish or wild animals for food in case of emergency. (Use only within local game and fish laws.)

5. Read and report on at least one book related to survival, or a description of the necessary preparation for a successful expedition.