THE DUKE OF EDINBURGH'S INTERNATIONAL AWARD
AOTEAROA NEW ZEALAND | HILLARY AWARD

Skill Section

Participants, instructors and assessors should take note of the conditions as laid down in the Award Handbook. This programme is for guidance and is not to be taken as a rigid syllabus. To indicate the content appropriate to young people with varying degrees of knowledge and experience, it is arranged under three headings: **'For beginners', 'For those with some knowledge' and 'For the more advanced'**, and participants are free to select as broad or as restricted an aspect of this skill as they wish, but appropriate social and cultural aspects are to be covered.

TRANSPORTATION AERONAUTICS

Introduction

Insurance - Liability in connection with the racing and general use of mechanically propelled vehicles and vessels is specifically excluded under the Award Office insurance policy. Those responsible for young people pursuing such activities should ensure that adequate insurance cover is provided whilst carrying out Award Scheme activities.

Assessment - For assessment, each individual is to produce evidence of regular application to the skill over the required period. This may take the form of a certificate of attendance at instruction classes, a notebook, diary or log, or other similar means.

General

Participants should give thought to the social and environmental implication of motorised transport and of transport as a leisure pursuit. The evolution of transport as an economic necessity from its earliest to its present form is included as an aspect of the programme.

For beginners:

Young people should have an elementary knowledge of:

1 **Theory of Flight**

a) Physics - the ICAN standard atmosphere: Dynamic Pressure: Indicated and True Air speed.

b) How an aircraft flies - Lift: Drag: Angle of attack and stalling: Straight and level flight.

c) How an aircraft is built - Fuselage: Aerofoils: Materials - parts of an aircraft.

2 **Airmanship**

Young people should have knowledge of:

Rules of the air in flight; Definition of control zones and control areas; Flight Information Regions; Responsibilities of an Air Traffic Control Centre; Airfield traffic rules - ground signals, light and Very signals.

3 **Navigation**
Those taking part should understand:
Use of ¼ in map - scale map reading; Bearings; Airspeed and ground speed; Track; Variation; Effects of wind - following and head wind only; Duration and fuel consumption.

4 Have some knowledge of the early history of flight and the pioneers of aviation. If possible, visit a museum of aviation.

For those with some knowledge

Young people should have a sound knowledge of:

1 **Theory of Flight**
- a) How an aircraft is controlled - Principle of 'flap type' control - control surfaces, planes of movement - actual control in cockpit.
- b) Lift Augmentation - Flaps and slats.
- c) Gliding

2 **Airmanship**
Young people should understand the meaning of:

- a) Instrument Meteorological conditions and Visual Meteorological conditions: Instruments Flight Rules and Visual Flight Rules; the Quadrantal Height separation system; Altimeter setting regions - regional QNH (R.P.S.)

- b) They should have a sound knowledge of the following instruments; Air speed indicator; Altimeter and rate of climb and descent instrument.

3 **Navigation**
Those taking part should have a sound knowledge of: Triangle of velocity; Use of Mk. 4A Computer; Difference between True airspeed' Indicated air speed and Rectified airspeed; Preparing a flight plan including T.A.S. Track (T); Hdg (T); Hdg (M), G/S Distance; the use of Mercator chart.

4 **Engines (Piston)**
Young people should understand: The petrol system; the carburation system; Ignition; Lubrication and cooling systems of the piston engine; four stroke Otto cycle; use of the throttle regulating power; the basic principles of a propeller and the similarity between the propeller and aerofoil.

5 **Meteorology**
Participants should understand: The types of pressure system - depression, anticyclone and Col; classification of clouds and clouds which make up a warm front, cold front and occluded fronts; the estimation of visibility; how to judge heights of cloud into low, medium and high categories and judge the cloud amounts in eights; surface winds - land and sea breezes; the sign depicting wind direction and velocity on a weather map and its meaning; the difference between an Actual and a Forecast observation.

6 Have some understanding of the effect of aviation on economic and human life up to the present day, e.g. foreign travel for all; and of the effects of two world wars in development.

7 Appreciate environmental implications, e.g. pollution control, sound levels, airport planning and size.

For the more advanced:

Those taking part should have a sound knowledge of:

1 **Theory of Flight**

a) Wing plan forms - aspect ratio
b) Climbing
c) Turning - accelerations, load factor, stalling speeds.
d) Spinning - Auto-rotation, characteristics - recovery.
e) Stability in pitching, rolling and yawing planes.

2 **Airmanship**

a) The Air Pilot - section and types of information available.
b) Air Traffic Control Flight Plans.
c) Air Mess Reporting Procedure.
d) Customs facilities.
e) Search and Rescue - definition, organisation - visual distress and urgency signals.
f) Instruments - basic principles of Rate of Turn indicator, Directional Indicator and Artificial Horizons.

3 **Meteorology**

Young people should understand: Methods of flight forecasts' geostrophic wind; formation of fog; decoding simple plotted meteorological observations; cloud types associated with warm fronts, cold fronts and warm sector conditions.

4 **Engines (Jet)**

Participants should understand: the basic principles of jet propulsion; difference between centrifugal and axial compressions; principles of turbo-prop engines.

5 **Navigation**

Young people should understand: the use of 1/5,000,000 topographic map - relief - conventional signs - variation; direct indicating compasses - errors and disadvantages; remote indicating compass - reduction of errors of D.I. compass and basic principles; safety altitudes; plotting simple track plot' air plot' calculation of D.R.; positions, wind velocities; radio/radar basic principles; mental dead reckoning - track error; closing angle 1:60 Rule.

6 Have some understanding of:

a) Aesthetics of aircraft design.
b) The arms race; sale to underdeveloped countries.
c) International aviation projects.