FOR THE TEACHER **ADDENDUM**

THE KITE AS AN EDUCATIONAL TOOL

Teachers who have ventured into kite-making with their classes will have realized what a joyous activity this can be, for adults as well as for children. Although seen often only as toys, kites have a universal fascination which has led to many wonderful, artistic and scientific achievements, from the times of the earliest kite-fishermen to the most sophisticated of 20th century scientists.

Imaginative teachers may find the following ideas helpful in using research and active kite-making in class as a lead into specific educational areas, instead of treating kite projects as something special in which everyone has fun for a few days and then resumes more formal activities.

It is important when introducing kites to a class for the first time to choose a type which is simple to make and sure to fly. Sleds, made either from plastic or in certain cases paper, are particularly suitable for use in a first project, more difficult designs being selected on the basis of the skills required for success.

Sadly, instant satisfaction has become part of today's world. Persistence, in order to do something well for its own sake, is almost a thing of the past but, as the first aim in building a kite is to make it fly, inherent in the task is the need for accuracy, craftsmanship and commitment.

Why build a kite which will not fly? — Investigate, and find out why!

There is potential here to develop characteristics of enquiry, experimentation and perseverance which can lead to the sustained self-motivation necessary for a full and satisfying life.

Educationally, at the most basic level, observation can be encouraged and kites used to assist in the development of:

Concept formation Matching, symmetry, halving, doubling.

Fine motor control Cutting, sticking, folding, decorating within a limited area, and tying, as required in making some of the simplest of kites.

Gross motor control Making a kite fly by running without dragging it on the ground, or learning to fly it in the wind.

At higher educational levels there are many other directions for study arising from kite-making, some of which are suggested below and which could be developed by teachers with special subject knowledge:

Mathematics Decimals, diagrams, fractions, graphs, percentages, proportion, ratio, working to scale from units of measurement.

Algebra Equations, graphs, increasing and decreasing of scale.

Geometry Angles, construction of geometric shapes in 2D and 3D, triangulation to calculate the height of a kite above the ground.

Geography Spread of knowledge by early explorers from countries with kiting traditions to other parts of the world. Role of kites in different cultures.

History Purposes for which kites have been developed in different periods and countries, e.g. military, scientific, religious.

Science ***Kites have been used for:*** Aerodynamic investigation and aircraft design (Bell, Hargrave). Crossing barriers (Niagara). Electrical demonstration (Franklin). Fighting as a sport (Asia). Fighting, observation of enemy (Cody). Fishing (Asia and Pacific Islands). Hang-glider development and parawing to land space capsules (Rogallo). Lifting (Cody and others). Photography (Archibald). Traction, to pull vehicles over land or water (Pocock).

Kites could be used: To compare their *aerodynamics* with hot air balloons. To study the *balance of forces* in the kite's structure and in relation to wind speed (Why is the Asian fighter kite controllable on a single flying line?). To discover how to send a *camera* up a kite line, control the exposure, release the shutter, retrieve the camera. To consider and compare the properties of *man-made materials*, e.g. fibre-glass, carbon fibre, high-impact plastics, light-weight high-density fabrics: ripstop nylon, acetates, mylar, with *natural materials* (Is there a material which can totally replace bamboo? What is the difference in the dyes required for use on man-made and natural fibres?). To study *weather patterns*, wind currents and speeds at different altitudes (compare with water currents), humidity, thermals: related to terrain and cloud formations. To calculate the *weight* of the kite line, its resistance to the wind, its strength, the area of kite-face in relation to line weight (What is the kite's *lifting power*? What strength of line is required for a particular size and type of kite?).

Art Refinement of fine motor skills. Study of form, colour, design in 2D and 3D. Study of form and function. Observation, exploration, experimentation, invention (common to both Art and Science). Decoration through the ages (To decorate or not?). Oriental Art as seen in kite design and Japanese prints etc. The influences of a society on kite design, and on art generally, in developed countries and primitive societies in East and West. Exploration of suitable materials, concern with unity of form and sculptural qualities of different types of kites, the form in space etc. (Does the wind perfect the sculpture, or is the sculpture formed before flight?).

Botany Plant properties suitable for kite construction, e.g. bamboo or spruce for framing, pandanus or other leaves for covers, twines from natural fibres. Weight, flexibility, strength. Geographic distribution and effect of climate on growth. Plants suitable for making papers for kite covers.

Textiles Fabric characteristics: natural fibres, silk, cotton, linen. Man-made fibres, acetates, rayon, nylon. Density, porosity, weight. Dyeing: batik, tie-dyeing, screen-printing. Types of dye required for different fibres.

Biology Birds: wing types and structure related to type of flight in land birds and sea birds, fluttering birds and soaring birds. Butterflies and insects: wing shapes, sizes and type of flight. Bats and glider possums: type of wing or membrane structure related to flight characteristics. Food intake related to energy output to maintain flight: humming-bird, eagle, migratory birds. Relationship between weight and wing span, volume and mass. Comparison of animals which swim efficiently with animals which fly efficiently: anatomy related to use of air or water and dynamics of each.

Music Vibration of kite lines, notes heard from hummers on Asian kites, experiments in wind-generated sounds. Gamelin orchestras (used in Bali to accompany kite teams to annual contests). Comparison of stringed instruments with wind instruments. Music of the Spheres, The Lark Ascending, etc.

P.T. & Socialization Gross and fine motor control required to fly different types of kites, e.g. Oriental fighter kites: fine control, dual-control stunters: gross control, other types of kites require differing combinations of fine and gross motor control, depending on the particular flight characteristics. Awareness of the body in space, plus the kite in space, with co-ordination of both. Socially, the development of awareness of the space needs of others on the flying field to prevent collisions between people or kites, or both! (N.B. Very good fine motor control can be needed when flying lines become tangled, either individually or collectively, as are also patience and self-control at times!)

Libraries carry a limited number of books on kite-making, although there are many more not available in Australia. Increasing interest and request for more resource material on the subject should help to extend the amount of literature available.