We need to maintain the positive aspects of industry-communications, medicine, standard of living, etc., while at the same time controlling our growth so we don't destroy the environment that supports them. We must decide our priorities and start to cut back on waste and ecological destruction NOW. The industrial designer is part of the manufacturing process and therefore shares direct responsibility for bringing our technology under control. Our exhibition suggests that the student /designer must first be fully conversant with the problem in order to solve it. He must understand the language of material science, economics and production systems and must also have an overall perspective of his actions in order to determine priorities. This requires an understanding of ecological, human and socio/political factors and an ability to effectively communicate ideas to initiate interaction amongst those affected. Therefore the Design Research curriculum is orientated towards the concept of local production of essential industrial products, but within a scale that our environment and society can support.

Curriculum Outline

The first two years of the program allows for basic skill training with access to facilities for small incontext projects. The remainder of the program establishes individual directions and specializations for each student.

A list of the courses offered within Design Research are:

Library Research: How to research using the Vancouver Public and U.B.C. Libraries

Wood Science: Lectures and labs on the wood complex.

Metal Science: Lectures and labs on the structure of metals.

Plastic Science: Lectures and visits related to the polymers.

Drafting and Perspective: Basic introduction for designers.

Creative Thinking: Understanding our thinking processes.

Colour slides for Documentation: How to produce a slide/tape program.

Super 8/Tele-Cine: How to shoot super 8 for transfer to video.

Creative Writing: How to express yourself on paper.

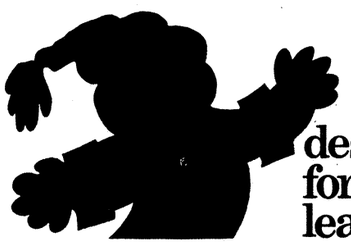
Graphic Design: The basics as it applies to industrial designers.

Wood and Metal Manufacturing Technology: Mini courses held with the cooperation of local industry.

Electronics: Basic digital electronics and computors.

Environmental Psychology: A scientific approach to colour, touch, sound, space, etc.

Additional programs are established as required by individual students through a program of visiting lecturers and visits.



design for learning

Today's market is flooded with learning aids designed to teach and reinforce particular concepts. Many of these aids are of excellent quality, effectively achieving what they purport to do. What is lacking are two types of materials that the large scale toy/educational aid industries cannot afford to produce:

- those based on local environment
- those which give the teacher full choice as to what is to be taught.

On display are design solutions developed in both areas plus several solutions to specific educational design problems.

Vancouver Alphabet Game

This board game was designed for the Vancouver Environmental Education Project (V.E.E.P.) as a multifaceted learning experience for first and second graders. It is useful in Kindergartens and Preschools as a simple one—to—one classification exercise. Grades 3 and 4 enjoy the game as a stimulus to interaction and socialization. The game is particularly interesting and beneficial for all ages of children learning English as a second language and those with learning disabilities in the area of reading.

The Vancouver Alphabet Game promotes:

- auditory and visual perceptual skill development
- identification and conservation of alphabetic symbols
- recognition and identification of urban environment (in turn promoting verbalization,social interaction, urban orientation and environmental interaction)
- regular left to right tracking necessary for reading
- sight reading of numerical configurations (on di)
- transferral of numerical concepts on di to movement across squares on board
- fine motor coordination
- understanding of symbols,meaning and use of arrows

Children choose an animal marker, placing it in the upper left—hand "aquarium" square. The players are required to draw cards from the deck as the game progresses. They achieve the objective of traveling through the city to reach the "zoo" by rolling the dice and moving the number of squares indicated. When a player lands on a square, any child holding the matching card from the deck may discard it. The game is complete when all players have reached the zoo. At this point, the players holding the **least** cards is declared the winner.

The gameboard displayed in the centre of the panel is the prototype which has been tested in a number of Vancouver schools by children in grades 1 through 4. Testing results brought to light the need for a way for younger children to organize their collected cards. This was efficiently solved by asking the classroom teacher to provide half a sheet of construction paper for each player to serve as a "card mat".

An alternative gameboard is the one made of vinyl pockets capable of holding a matched set of cards. The advantages of this design are:

- game variations could easily be made by the children or teacher through production of their own cards (the manufacturer might provide blanks for this purpose).
- game variations could easily be made by the manufacturer through production of differing sets of cards.
- the matched cards remain neatly placed.
- the game can be played horizontally or vertically.
- the game can be folded away or displayed on the wall when not in use.
- the pockets could serve many other uses.

NOTE:
V.E.E.P. is part of the Western Education Development Group directed by Dr. C.J. Anastasiou. at the University of British Columbia. This non-profit group provides support for teachers who wish to develop their ideas into shareable teaching units, games and films.

Self-Correcting "Match—Box"

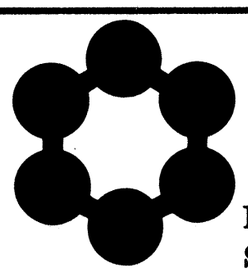
The Match—Box was originally designed as a classroom aid for children with severe learning disabilities, particularly those with problems in the area of visual perception. The objective was to provide a self—motivating, mistake—proof means of teaching and reinforcing specific information. The user could be sure of a correct answer by the sound signal emitted by the box when a pair of cards was properly matched.

For example, the plastic cards on display require matching a card with a picture which begins with a certain sound to a card with the letter that expresses that sound. If the child is unfamiliar with the phonics required, he may discover the sound of each letter by reversing the above procedure; attempting to match a letter to the chosen picture.

The original analog version completes a circuit by means of coded brass contacts embedded on the backs of the cards.

The digital prototype functions by a pairing of inputs from 2 light sensitive transistors, one from the left side of the box and one from the right. The circuit is completed when a similar electronic "message" from both transistors is conveyed through a series of gates to an oscillator which produces the sound through a small transistor radio speaker. If the message from one transistor does not equal the message from the other, the gate receiving both messages remains closed and no sound is produced. Eleven light sensitive transistors used in combination with ten gates yield 32 possible code combinations. The gates are enclosed within three CMOS integrated circuit "chips". CMOS technology was chosen because it uses very little current, allowing the Match—Box to operate for several months on one small 9 volt battery.

You are welcome to experiment with the two prototype models.



material science

The selection of materials for a particular design application is all too often based on history rather than science. Although the knowledge gained by generations of craftsmen should not be ignored, it must be used with caution. The molecular understanding of a material is essential to be able to ascertain its performance during processing, and its working life span. The designer must be able to deal effectively with a scale of matter beyond the limited range of the naked eye. This involves the use of instruments that can probe the physical, chemical and visual micro structure of materials. Few materials have a pure arrangement of atoms, various substructures form into such patterns as crystals, grains, fibres, polymers, etc. It is these substructures that often determine the working properties of a material by producing directional and other characteristics. Numerous standard tests have been developed within materials but not across. Also they only approximate working conditions therefore the data should always be confirmed by tests on the finished product.

Ultimate Tensile Strength
The amount of tensile stress a material will stand is the most significant indication of its strength.
Hardness
The ability for a material to retain its shape during such stresses as denting and penetration.
Impact Resistance
The toughness of a material that takes into account its susceptibility to fracture at notches, sharp corners, etc.
Strength To Weight Ratio
The tensile strength of a material divided by a standard weight unit.
Cost
Cost of a standard weight unit of each material.

alder resource

The exploration of Red Alder, as portrayed in this exhibition, is based on it's ecological role in the environment as well as it's potential as a developable resource.

The map of B.C. shown on the panel represents the substantial future of this tree as a resource base. 460 million cubic feet of mature coastal Alder stands represents a large enough concern to warrant further consideration. A major question raised by this display involves economics verses ecology. Historically, when resource consumption is paired with economics, the latter triumphs leaving a residue of chronic pollution and/or ineffectual design. If a fraction of the research channelled towards conifers had been allocated to exploring the potentials of fuller hardwood utilization in B.C., we may have seen benefits reflected in more secondary and tertiary industries. Realizing that economics must be united with purposeful ecological and design considerations, we must ask two basic questions:

- Should we further develop the industries within the province to produce goods and services for local use and for export?
- Should we continue to rely on imports?

Our initial research naturally favors #I. To continue to rely heavily on imported items creates a depletion of local skills needed for a balanced manufacturing economy. e.g. Our present practise of importing wood products from eastern Canada and Europe will eventually be curtailed by rising transportation costs, but will we still have the skills to design and manufacture on a local level when this happens?

Therefore a continued investigation of Red Alder both as real and as symbolic examples of attitudes towards compatible resource priorities is strongly urged.

B.C. Hardwoods:

The representative hardwoods of B.C. are Red Alder, Big Leaf Maple, White Birch, Trembling Aspen, Black Cottonwood, and Balsam Poplar; the latter 3 usually grouped as species Populus. Hardwoods represent 2.7% of the mature timber volumes in B.C. For purposes of this exhibition, coastal volumes will be highlighted(Trembling Aspen and Balsam Poplar are primarily interior species; consequently their volumes are greater in the interior volume counts).

The following is a list of coastal timber volumes for B.C. hardwoods.

Aspen	18 million cubic feet
Cottonwood	239 million cubic feet
Birch	18 million cubic feet
Alder	460 million cubic feet
Maple	35 million cubic feet

Source: B.C.F.S.

The Forest Community:

According to the diagram, the alteration of any of these interrelated factors results in relative degrees of change both in the immediate community and downstream from it. Some changes are:

- soil erosion from wind, water and sun
- nutrient loss
- water and soil temperature changes
- alterations in water, carbon, oxygen and nitrogen cycles
- changes or elimination of surface, and subsoil animals
- changes in other biogeochemical aspects of soil

Notably, Red Alder has an overabundant capacity for nitrogen production and plays an essential role in contributing to the nutrient budget of the soil.

In a natural forest progression the ongoing process is known as plant succession. A man made destructive element such as clearcutting of trees obviously alters this progression. In addition, skid roads and heavy logging equipment causes soil compaction; thereby restricting the benefits of aeration needed for soil fertility.

The photograph, showing a clearcut area, portrays a common sight when this method of harvesting is practised. Alternate forms of logging such as selective cutting (shelterwood and seed tree) do not eliminate all these problems but they do reduce the destruction of the forest community substantially. However economics is the ruling factor that makes clearcutting the dominant logging method for securing the valuable conifer crop.

Government and industry must review forest management procedures and include more hardwoods research in the spectrum of the forestry industry of B.C. We as consumers should be obliged to re-evaluate our "needs" which dictate that only one type of wood will suit our "wants"; and prepare to accept locally produced and manufactured products.

Why Red Alder:

Alder has numerous potential uses, properties and benefits.

- an economic 40 year growing cycle
- easy to machine and finish
- supplies a large volume of nitrogen to the soil
- as a fuel for power generation
- can be pulped or made into hardboard.

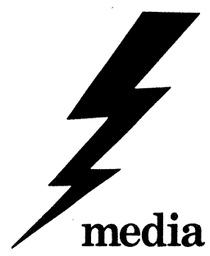
Timber and Plywood:

To substantiate the research, we conducted a number of practical experiments to verify Alder's theoretical potential. We studied the operation of a hardwood sawmill that was converting both Alder and Maple logs. We documented the process from log storage, cutting, through to kilning procedures. In addition, with the cooperation of the Department of the Environment, Forest Products Laboratory at U.B.C., we acquired Alder logs for peeling veneer. This was to be made into plywood and veneer for lamination.

Student Projects:

Prototype designs were constructed by a number of students who utilized Alder in three forms.

- The desk is producted from solid Alder timber with a laminated top.
- The molded chair is custom laminated using Alder veneers imported from Oregon.
- The table was constructed from Alder veneer glued up by a local company.



media

The development of Film and Video systems for the mass market has brought about a range of recording and playback equipment, offering good quality and relatively low cost, while requiring only basic media skills from the user. This now enables the designer to document and communicate his concerns to an audience using a wide range of media formats. Traditional forms of media (drawing and print) prove inadequate for initiating the dialogue on the Social/Political problems that increasingly dominate the design process.

We have assembled a combination of Film and video components to create a system that caters to our particular needs. All visual material is originated on 35 mm. slide film and super 8 movie film(silent and single system sound), all non-synchronous audio material is recorded using portable taperecorders. This material can then be arranged and edited into a number of different formats for presentation. The super 8, slides and sound material can be presented as films and slide tape shows or it can be arranged together and be transferred onto ¾" video tape cassettes via a telecine chain.

Telecine Chain

The function of this machine is to transfer optically projected film images via a series of mirrors and lenses into a video camera. By having two cameras on the telecine chain and through the use of an effects generator the images on the two cameras can be manipulated electronically to achieve a variety of effects (cuts, fades, dissolves, added titles, etc.)

Designlink

Designlink is a project to try and establish a communication network with other Design Schools around the world using the video cassette format. A major reason for choosing the ¾" cassette format over other comparable video systems is that it is compatible internationally with three different video standards (NTSC, PAL and SECAM).

The Designer in the field equipped with only a small light-weight super 8 movie and/or a 35 mm. camera, and a tape recorder can record audio and visual information with ease. The video cassette system allows the sophisticated arrangement of these materials while also providing easy storage, access and distribution.

design politics

From the person who made the first tool people have always been designers. Prior to the industrial revolution the responsibility for the design of a product lay largely with its producer/craftsperson. Only since the industrial revolution when machines largely replaced skilled labourers and the responsibility for design was removed from them, has design become a profession called "Industrial Design" and the responsibility of design given to someone removed from the actual labour of producing the product.

> *"In an age of mass production when everything must be planned and designed, design has become the most powerful tool with which man shapes his tools and environments [and by extension, society and himself]. This demands high social and moral responsibility from the designer."* (V.Papanek, Design for the Real World).

To say the least, designers have not lived up to this responsibility and industrial design has become one of the most harmful professions existing.

Designers have been loathe to consider the aims for which they design or the people for whom they design. In a world where the richest 31% of the population consume 87% of the fuel resources; in a world where the economic gulf dividing rich from poor is widening, and where the preoccupation of most of mankind is obtaining enough food, designers have aligned themselves with those who need design services least.

> *"We seem to be designing for the old, the fat, the rich, the white, the powerful; the ones who have managed to get us into every single mess and frightfulness mankind has so far experienced. To create lipstick for honest whores is one thing, but to create deodorant for her pimp is another."*(Papanek)

And if humankind is to get itself out of the messes and frightfulness it has created, designers must begin to assess the aims and consequences of the tools and products they create. Designers must start listening to and working with those who bear the brunt of the consequences of their tools and products—the poor, the workers, women, the third world as well as environmentalists, sociologists, doctors and other people with specialized skills. Designers must consider the unintended consequences of their designs—pollution, alienation over-consumption, energy-depletion—and work at solutions to these.

> *"...decentralization of urban populations and industrial concentrations; minimal patterns of consumption; recycling of waste products; government geared to serve the functional needs of decentralized population units rather than the destructive whims of General Motors, U.S. Steel and Standard Oil."*(Farnham and Miller, The Ecology and Politics Manual)

But because these changes are political and social, designers must develop a political and social awareness in their work. And because the problems of pollution, over-consumption and under-employment exist here, in Canada, as well as in the third world, designers must begin to deal with these problems here as well as offering whatever support they can to the developing countries.

Design Research is working to develop a socially and politically aware philosophy of design, one which arranges the priorities of designers in a rational and compassionate way to solve real problems for all people, rather than artificial problems for a few.

Perception and Creativity

If design is bringing order from chaos, then a new way of creating order means a new way of perceiving the chaos.

Perception has meanings as diverse as our senses (that can be aided by microscopes, microphones, telescopes and photographs) or as the "seeing" of how two previously unrelated ideas can be brought together. This bringing together is how Arthur Koestler (who wrote the *Act of Creation*) defines creative acts. It is also, he explains, an essential element of humour.

Edward de Bono prefers the term **lateral thinking** to describe moving between concepts as opposed to logical or vertical thinking which moves sequentially along and within a single concept.

There are, however, numerous blocks to creative thinking. James Adams in *Conceptual Blockbusting* lists some of these; they are perceptual blocks emotional blocks, cultural and environmental blocks, and intellectual and expressive blocks.

> *"Perceptual blocks are obstacles which prevent the problem-solver from clearly perceiving the problem itself or the information that is necessary to solve the problem."* (Adams).

For example, the inability to see a problem from various viewpoints or the failure to utilize all sensory inputs are perceptual blocks.

The ideas that playfulness is only for children or that humour is out of place in problem solving are two common cultural blocks. Lack of support from colleagues or friends to help bring ideas into action is an environmental block. This latter example is closely related to, and would be particularly effective in blocking a person who was afraid to make a mistake or to fail. Because this is an internally rather than externally operative block, it can be considered emotional.

Intellectual and expressive blocks may be the most easily overcome since they result from a lack of skills. For instance an insufficient knowledge of mathematical or visual tools to carry an idea through or to communicate the finished idea to colleagues are examples.

In order to overcome these blocks Design Research includes in its program of studies, exercises and puzzles to facilitate problem solving skills.