GIFTED EDUCATION WITHIN THE

CONTEXT OF THE REGULAR CLASSROOM

A Practicum

Presented to

the Faculty of Graduate Studies and Research

The University of Manitoba

In Partial Fulfillment

of the Requirements for the Degree

Master of Education

by

Joy A. Riglin

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ABSTRACT

This Practicum focused on the development of a program for gifted students within the regular classroom setting in grades three and four. Science was selected as the subject area to be taught with a special emphasis on the science processes. Instruction in the thinking skills as outlined in Bloom's Taxonomy (1958) and problem solving as outlined in Parnes Creative Problem Solving Techniques (1976) was also emphasized.

Renzulli's Triad Model (1977) was used as a guideline in the development of a program model for the instruction of the gifted students in this Practicum.

The gifted students were identified through their skill in applying the science processes within the framework of the science content, using the higher level thinking skills of analysis, synthesis, and evaluation.

The students identified as gifted attended a once-a-week two hour class where they had activities and experiences in the higher level thinking skills and worked on real world problems based on the six levels of Parnes Creative Problem Solving Process. The gifted students also attended a mentor program which enabled them to explore areas of study not available in the regular school program.

The co-operating teachers were given inservices on the various aspects of gifted education including identification and program development for gifted students.

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CHAPTER I

INTRODUCTION

The educational system is committed to giving the best possible instruction to each individual student. It has been a popular assumption that the bright student will be successful in spite of the quality of education or the instructors involved. Gifted children differ as much from each other as they differ from the rest of the population. The needs of each individual child have to be considered as in the case of any other exceptionality. Teachers need to learn to identify gifted children in an accurate manner. The research indicates that in fifty percent of the cases, teachers identify those children who are not gifted as being gifted, and miss many who are so (Tuttle and Becker, 1980). The students in this practicum were identified by the teacher of the program for the gifted and the cooperating regular classroom teachers. This means of identification was used after both teachers became familiar with the characteristics of their students. The students identified as gifted were the students who performed well in the higher level thinking skills and who were proficient in creative problem solving techniques.

This practicum focused on the teaching of a science-based, process thinking program that emphasized the higher level thinking skills. This program was the "tool" through which the students were identified as being gifted. These identified students left the regular classroom once a week and were placed in a program geared to the development of higher level thinking skills and a creative problem-solving process. They also

attended seminars with mentors once every two weeks for a period of one hour. These mentors were experts in a given field of study. The purpose of the mentor system was to expose the students to experiences that they could not obtain in the regular school system - that would increase their interest in a number of subject areas.

OBJECTIVES OF PRACTICUM AND OUTCOMES

There were three main objectives of this Practicum. Firstly, the gifted students participated in a regular science program based on the science processes and the various levels of thinking skills of knowledge, comprehension, application, analysis, synthesis and evaluation. That way the gifted students were not separated from the rest of the students in the regular classroom. They had all the social benefits and peer interaction that any other student experienced. Gifted students were identified within a regular classroom setting through their application of the higher level thinking skills in a science process based program. Secondly, the gifted students were provided with an out-of-class program which gave them experience in the application of the higher level thinking skills of analysis, synthesis and evaluation. The students were also taught the six levels of the Parnes Creative Problem Solving Process (Parnes, 1975). This class consisted of twelve to fifteen students identified as being gifted in the regular science process based program. Here the students were provided with the opportunity to explore real world problems based on their particular area of interest. Consequently, the gifted students were provided with an

enriched science program as well as experience in the creative problem solving processes. In addition, the students were not isolated from the other students of the same age level.

Thirdly, the co-operating classroom teachers were given inservices in gifted education, focusing on the higher level thinking skills and creative problem solving.

The results of this study were an in-class science process program taught within the regular classroom setting by the teacher of the gifted program and assisted by the regular classroom teacher. Instruction was science-process based with a strong emphasis on the higher level thinking skills of analysis, synthesis and evaluation. The gifted students were identified through the application of the science process skills in the regular classroom. There was also an out-of-class pull-out attended by twelve to fifteen gifted students. They received instruction in the higher level thinking skills and in the six levels of Parnes Creative Problem Solving.

The co-operating classroom teachers were given inservices on the various aspects of educating gifted students. This included identification of the gifted, characteristics of the gifted, and program development for the gifted centering around the higher level thinking skills within a science based program.

PRACTICUM DESIGN

Figure 1 indicates there were eight groups; four grade four classes and four grade three classes in two separate schools. They were taught

School Organization of the Gifted Program
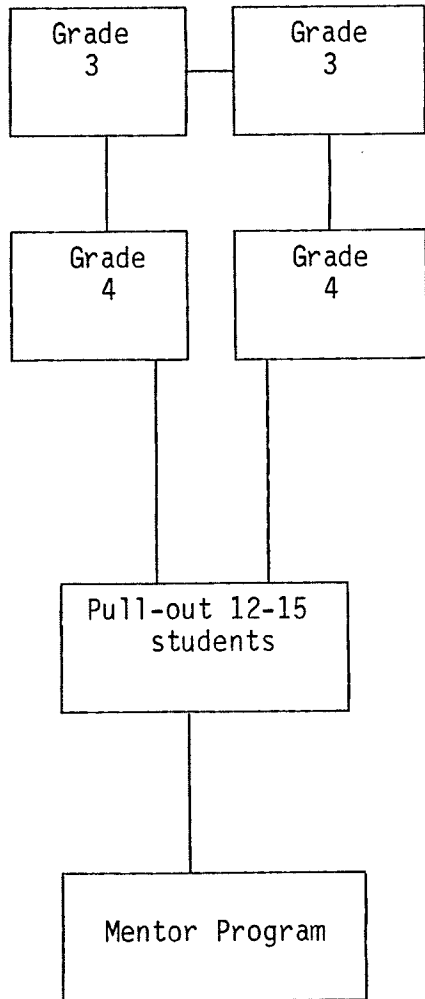
School A   School B
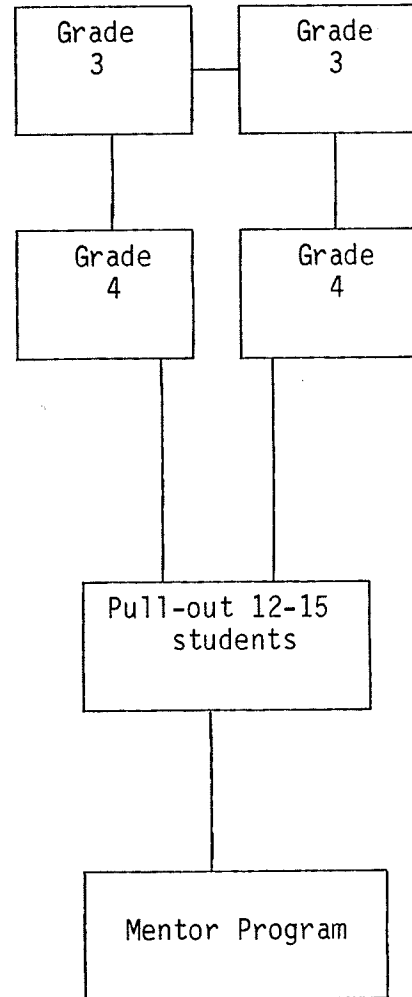
FIGURE 1

a science-based program based on the regular curriculum guidelines in which an emphasis was placed on the higher level thinking skills. The identified gifted were placed in a pull-out program once weekly where they were instructed in creative problem solving skills, using their individual interests.

Figure 2 indicates that the regular science program was made up of approximately thirty students per class. It also demontrates that observing, describing, graphing, classifying, ordering, measuring, inferring, predicting and formulating hypotheses were examples of the processes taught within the science classroom. Figure 2 also indicates that knowledge, comprehension, application, analysis, synthesis and evaluation as the thinking skills that the students were guided through as they learned the science processes. Figure 2 demonstrates that the students learned the first two levels of Parnes Creative Problem Solving Process which were "Senses and Challenges" and "Fact-finding."

Figure 3 indicates that the out-of-class pull-out was made up of twelve to fifteen students identified as gifted and talented in the regular science process class. It also points out that Creative Problem Solving along with the higher level thinking skills of analysis, synthesis and evaluation were taught in the pull-out class. Figure 3 shows the relationship between the mentor system as a component of the gifted program. This element exposed students to highly motivational areas of study and experiences that could not be obtained in the regular school system's programs.

REGULAR IN-CLASS SCIENCE
PROCESS PROGRAM B

SCIENCE PROCESSES   THINKING SKILLS

Regular Science
Program

Observing   Knowledge

Describing   (grades 3 & 4)   Comprehension

Graphing   Application

Classifying   · Analysis

Ordering   approx. 30 students   Synthesis
                     per class

Inferring   Evaluation

Predicting

Formulating
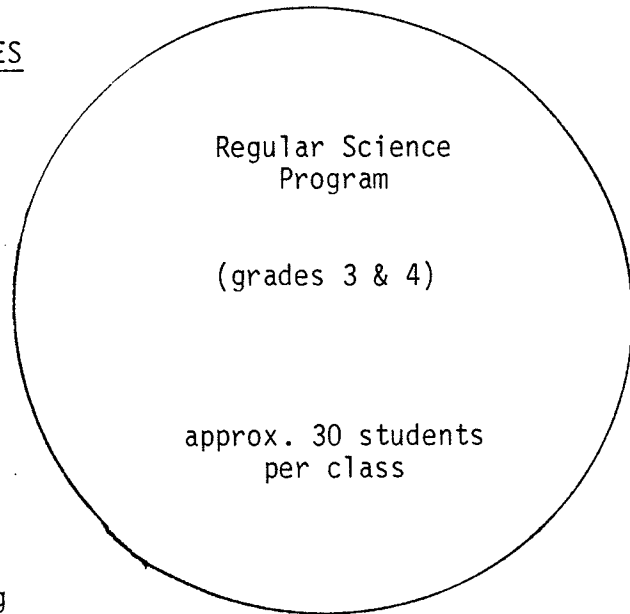
Hypotheses

Level 1   Level 2

Parnes Creative
Problem Solving Process
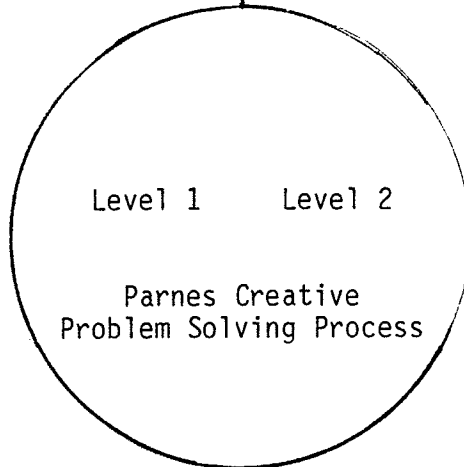
FIGURE 2

OUT-OF-CLASS PULL-OUT FOR GIFTED

Out-of-Class
Program

(identified gifted)

Creative Problem Solving

12-15 students
from Gr. 3 & 4

Mentors

(new experiences)
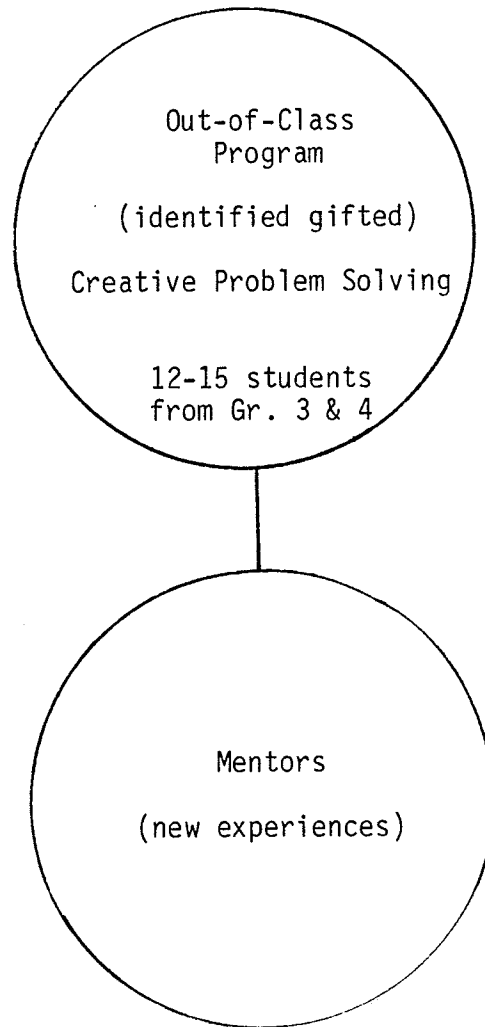
FIGURE 3

LIMITATIONS OF THE PROGRAM

There were limitations to the program. Firstly, the program was limited to two schools with two grade three classes, and two grade four classes. Consequently, generalizations about programming for the gifted cannot be made due to the relatively small group of students involved.

Secondly, no formal testing was permitted prior to the selection of the gifted students. The selection was limited to the apparent proficiency of the students in the regular science process instructional periods.

Thirdly, the program was limited to one subject area only, which was instruction in the science processes. The students who excelled in science might have been identified as gifted whereas a child gifted in an unrelated area was not so likely to be identified by the teachers involved.

SUMMARY

Designing a program for gifted students is a complex task. The program designed for this study was concerned with providing the gifted and talented student with the best possible education. The science curriculum in grades three and four served as a base for a program which emphasized the process thinking skills, and identified the students through a number of criteria. The gifted students remained with their classmates in the regular classroom situation to enable them to interact with their peers. They also participated in out-of-class programs that

centered around the creative problem solving process on a once-a-week basis. In the (pull-out) class, the activities are centered around the students' interests within this class. In addition to the creative problem solving, the students also participated in the higher level thinking skills of analysis, synthesis and evaluation. The mentor program provided the gifted student with exposure to highly motivational areas of study which could not be obtained in the regular school system.

The results of this study are an enriched class science based program geared to a regular classroom situation. The gifted student was allowed to work at his/her own level. The pull-out program emphasized the creative problem-solving and the higher level thinking skills. The gifted student used all the skills obtained within the science class in processes, and in the levels of thinking within the framework of real world problem solving.

Chapter two of this Practicum will deal with a review of the literature on educating the gifted and talented. Chapter three will explain in detail the theoretical framework and methodology in implementing the L.E.A.P. Program B. It will feature the organizational aspects to prepare the co-operating teachers and for teaching the students in the program. Chapter four is comprised of the classroom activities, and program modifications from October 1981 through March 1982. Chapter five will deal with the results of the regular class science program and the out-of-class pull-out with the gifted students. Chapter six will summarize the program, draw conclusions about various aspects of the program and deal with the future implications of the technique.

CHAPTER 2

LITERATURE REVIEW

INTRODUCTION

Numerous theories about which methodology is most effective in stimulating and directing the brightest minds evolved over the past six decades. Interest in programming for the gifted was very cyclical. In the 1920s classrooms were developed that were designed for the very bright student. They were allowed to accelerate in school, and were provided with varied educational opportunities. Interest in gifted education waned in the 1930's. In the 1940's programs were designed for whole classes of gifted students to enable them to study together and progress at their own rates. Interest in gifted education diminished again in the 1950's. Around the mid 1960's, gifted education came to the forefront once again. Theoretical models on thinking skill development, creative problem solving, and program design for the gifted developed. In the 1970's the Enrichment Triad model developed by Renzielli (1977) became widely used as a program design for the gifted.

Parnes (1975) and Feldheusen (1980) developed models for teaching creative problem solving which was an integral part of gifted education. Along with problem-solving techniques comes the "Stimulation of the Imagination Model", known as "SCAMPER", developed by Eberle (1972). This is a method that causes gifted and talented students to use their imagination to create ideas for idea finding purposes.

De Bono (1970) developed the lateral thinking concept which

provided a means to restructure patterns and come up with new and unique ways of approaching a problem situation.

Guilford (1967) and Bloom (1958) developed thinking process models that enabled educators to instruct gifted students in the various levels of thinking. These theorists emphasized the need to teach thinking skills and formulated the method with which to do this.

Torrance (1961) stressed the importance of Creativity in a gifted program. He alerted educators to the individual and unique thinking skills that creative students possess. He also stressed that creative students do not necessarily fit into the more common behavioral norms.

Program models, thinking skill processes, and creative problem solving techniques are all components of gifted programs.

Theorists generally agree on two basic ideas: firstly, the gifted student must be schooled in Creative Problem Solving techniques, and secondly they must spend most of their time in the higher level thinking skills of analysis, synthesis and evaluation (Bloom, 1958).

Program models have been developed that incorporate the processes learned in thinking and problem solving techniques within the regular school program.

PROGRAM DEVELOPMENT MODEL

Joseph S. Renzulli (1977) related theories of creativity to enrichment activities particularly for the "gifted" student. Renzulli's theory based on the "Enrichment Triad Model" moves students through an awareness process and product procedure. Gifted students need quali-

tatively differentiated learning experiences that enable them to learn the basics, gather knowledge, comprehend the knowledge they have gathered, and spend the majority of their time in the analysis, synthesis and evaluation levels of thinking. Over and above this, they must become effective creative problem solvers, using all the tools they have acquired.

Renzulli's objective in developing the "Enrichment Model" was two-fold. He wanted to build a rationale for special programs based on the best available information on the characteristics of gifted and creative persons. He also wanted to integrate the rationale with enough practical guidelines to enable teachers to build a program around the model. Renzulli's model may prove to be a threat to educators who believe in the supremacy of the IQ or the high ability scores as the major criterion for admitting students to specialized programs. The "Enrichment Model" proposes a rationale for not necessarily selecting students on the basis of academic ability measures, but on thinking skills and creative problem solving techniques.

Renzulli outlined several objectives that he believed should be essential to any gifted program. Firstly, he stated students should have an opportunity to pursue their own interests to whatever depth they desired, using their own preferred styles of learning. Renzulli went on to suggest that programs for the gifted should focus on the systematic development of the cognitive and affective processes. He warned against recreational thinking centered on kits, games and gimmicks. Students in gifted programs should be able to demonstrate qualitative differences in the intructional process. The references the students use should

consist of more than just the same encyclopedias or library books to which they would have access in the regular school program. Renzulli emphasized the fact that gifted education should be doing something much different with the children than just providing children with a freer atmosphere which provides them with a break from the regular classroom routine.

Renzulli stated that the primary role of any teacher for gifted students is to provide students with assistance in identifying and structuring realistic solvable problems that are consistent with the students' interests. He also stated any teacher of the gifted should help the student acquire methodological resources and investigate skills which are necessary for solving these particular problems and find appropriate outlets for student products.

Renzulli emphasized that knowledge and comprehension is important as a tool to creative and productive endeavours. Gifted students must be taught strategies of problem-solving and creativity. However, to be creative, they must build on knowledge and comprehension of a subject or area of interest to enable that creativity to make any sense.

Renzulli's Enrichment Model (Figure 4) encompasses three types or levels.

RENZULLI'S ENRICHMENT TRIAD MODEL


```
            /\
           /  \
          /TYPE III\
         /INDIVIDUAL AND\
        /SMALL GROUP IN-\
       /VESTIGATIONS OF  \
      /REAL PROBLEMS       \
     /----------------------\
    /                        \
   /        TYPE II           \
  /                            \
 /    GENERAL TRAINING          \
/        ACTIVITIES              \
----------------------------------
         TYPE I

    GENERAL EXPLORA-
    TORY ACTIVITIES
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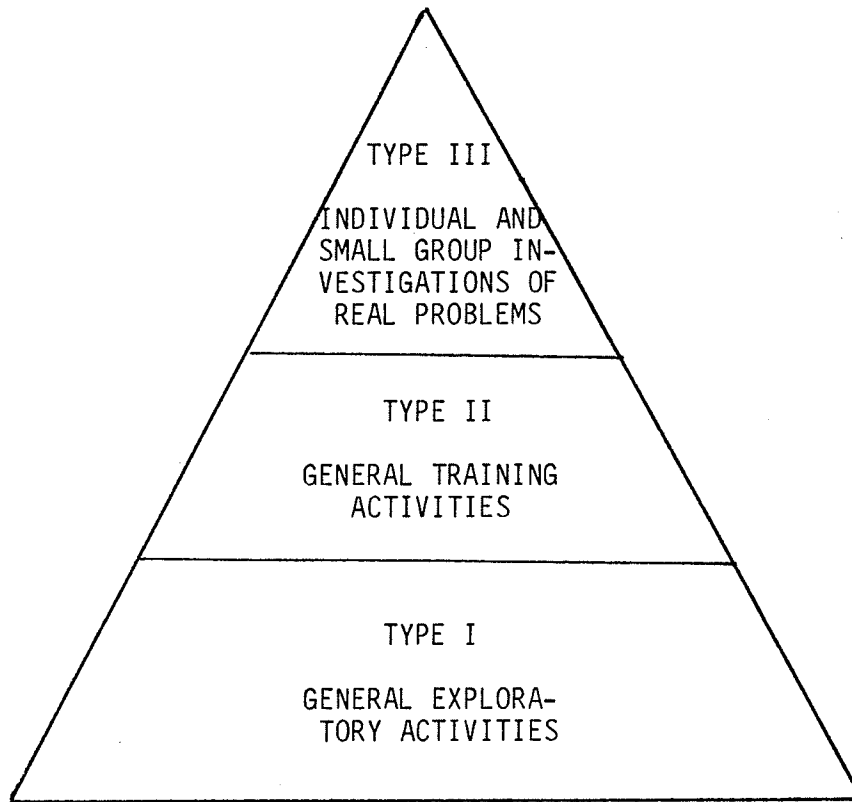
FIGURE 4

The first two levels are the General Exploratory Activities and Group Training Activities which are appropriate for all learners. Renzulli considered these levels to be very important for gifted and talented students because these activities deal with strategies for expanding student interests and developing the thinking and feeling processes. General Exploratory Activities stimulates the student's interest, and exposes him/her to motivational activities. Exploratory and group training activities represent logical input and support systems for the investigations of real problems later on in the student's school experience. Though the general exploratory activities

and the group training activities provide a solid base for the students to begin, Renzulli stated that gifted and talented students should spend one-half of their time in the individual and small group investigations of real problems.

The Type I Enrichment is the General Exploratory Activities. In the General Exploratory Activities, Renzulli states that the students should be given a lot of freedom to explore a variety of interests. Then after a period of time the student takes responsibility for analyzing his or her own experiences, and coming up with alternate suggestions for further study. When a student becomes very keen or interested in a given area of study, it sets the base for the General Exploratory Activities in Type II, and the Group Training Activities in Type III. These interests may grow out of regular curriculum or the environment in general. Renzulli states that it is wise to direct a student to a proposed area of study with which the student is unfamiliar. This enables the student to broaden his or her scope of experience. This systematic exposure to other fields of potential interest will broaden the students potential for a variety of interests. Each student is an individual and will generate a variety of interests before settling on one particular area. There are some students who simply lack motivation to follow through on a particular area of interest for any particular length of time.

Renzulli stated it is important for the teacher not to pressure the student to settle quickly on a given topic. This could create a superficial interest in a topic and deflect the purpose of the exercise. It is important that the student be exposed to descriptive information

about particular fields of knowledge, rather than collections of accumulated information. The construction of a successful interest development centre can be a very creative endeavor on the part of the teachers.

Renzulli stressed that it is important for the student to have opportunities to interact with artists, curators, engineers, and various other peoples in a variety of fields of study. Being involved with a particular subject, rather than superficially exploring it is very beneficial to the student in the general exploratory activities. Renzulli also stressed that it is unrealistic to expect a student to sustain an avid interest in a given area for a very long period of time. Consequently, the type I General Exploratory Activities is an on-going exercise that will continue as the students are pursuing their intellectual and creative development in the Group Training Activities and the Investigations of Real Problems.

The Type II Enrichment are the Group Training Activities. The Type II Enrichment is concerned about the methods, materials and instructional techniques that are concerned with the development of the thinking and feeling processes. These activities consist almost entirely of training exercises. Here the learner develops the processes or operations that enable him or her to deal more effectively with content, brainstorming, observation, classification, analysis, evaluation interpretation, comparison, categorization, synthesis, fluency, flexibility, originality, elaboration, hypothesizing, awareness, and appreciation. Value clarification and commitment are all a part of these processes. Renzulli states that it is important to direct our emphasis away from the content, and toward the thinking and feeling

processes. These processes are more widely transferable to new learning situations. They develop generalized strategies for attacking problems in a variety of content areas. This enables the student to develop skills and abilities to help them deal with new problems in a variety of situations. Facility in thinking and feeling processes will better prepare the student for adaptive behaviour in problem solving situations.

The Type III Enrichment, the Individual and Small Group Investigations of Real Problems is where the student becomes the actual investigator of the real problem. He or she should be able to take unorganized bits of information, the conclusions of other theorists or investigators and apply appropriate methods of inquiry to solve the problem. In the Type III Enrichment, the student takes an active part in formulating both the problem and the methods by which the problem will be analyzed and eventually solved. There is no routine method of solution. The investigation must be of particular interest to the student. The student must have a producer's attitude and not a consumer's attitude, and produce a product in the end. For a student to become an investigator, he or she must focus his or her attention on real-problem-oriented productivity. They must focus in the identification and elimination of problems similar in nature to those produced by professional researchers in a given area of study. The student actually bcomes a professional investigator himself. The teacher's role is to assist the students in translating and focusing a general area of concern into a solvable problem, and to provide the students with methodological techniques that are necessary to solve the problem. Another important role for the teacher is to assist the students in

communicating their results to authentic audiences.

Renzulli outlined the three basic characteristics gifted and talented students possess. They are intelligent, they have a high level of task commitment, and they are very creative. This type of student makes out very well in the Type III, the Investigations of Real Problems. Renzulli emphasized the fact that these students must produce a real product and must be able to tell others about it. It is not enough to research a problem and draw conclusions or solutions, but the student must be able to implement those solutions as well. The realness of these efforts are very important to the learner. It helps the learner become aware of how the real professional feels about the end product he or she has created. Renzulli states that the success of the Type III Enrichment is largely dependent upon the student's motivation and interest. Renzulli has developed an Interest-a-lyzer that brings out what areas the student is interested in. It identifies general patterns and areas of student interests that help the student focus on a real and solvable problem.

The Enrichment Model has added a new scope to gifted education. It has provided the teacher and the parent of the gifted student to take a strong position for program models for the gifted. It sets out in a very practical way, the stages a student must pass through to be an effective creative problem solver. It negates the need to do away with the regular classroom curriculum to make the gifted program look unique. Instead it provides a solid basis from which the student can build toward becoming an effective thinker. Renzulli's Enrichment Triad model outlined the importance of the learning of creative problem

solving techniques. Parnes (1975), Eberle (1972) and Feldheusen (1980) developed models that outlined specific creative problem solving skill development.

CREATIVE PROBLEM SOLVING

Sidney J. Parnes (1975) developed Creative Problem Solving that has become widely used in the education of the gifted. Parnes initially investigated the effects of brainstorming on group productivity. Eventually in 1969 Parnes became involved in a Creative Studies Project that led to the ultimate six-step creative problem solving process. The project's goals were to research the nature and nurture of creative behaviour, to translate and incorporate the findings into educational programs, and to field test programs and disseminate detailed informa- tion on a national and subsequently an international basis. The results produced new evidence that the cognitive, divergent and convergent skills of productive thinking could be successfully taught in an educa- tional setting. These findings were of great importance for curricula and training programs for creative problem solving methodology and techniques.

Parnes modified the creative problem solving process so it could be adapted more readily for use in the classroom setting. This technique integrates readily with the Type III of Renzulli's Enrichment Triad. Vincent (1969) stated that there are salient factors and particular instructional strategies that have direct application to the technique of teaching creative problem solving. Students are encouraged to become

sensitive to situations. Emotions such as curiosity and conflict are a part of that sensitivity. The students are guided in their awareness of problems and situations that need to be dealt with. The interaction within the student body itself is a key factor in producing supportative comments, sharing views, and decision-making. Divergent thinking is encouraged, and the students are encouraged to engage in imaginative thought. Creative use and manipulation of materials both in and out of the classroom is necessary. Individual expression and risk-taking is encouraged. Failure isn't viewed as something negative, but it is viewed as a learning experience.

Brainstorming is an extremely important aspect of creative problem solving because it involves the process of thinking up ideas (Osborn 1963). Parnes (1976) outlined some very specific guidelines before the students proceed in a brainstorming session. He emphasized that the students must realize that all their ideas are acceptable and they must not worry about making mistakes. Creative ideas are encouraged. They open up whole new avenues of thought, and are likely to produce some very rewarding results. The more ideas that are produced, the better. The students are encouraged to come up with a lot of varied ideas. They are also encouraged to build on ideas that were already given. The brainstorming session should have an opening and a closing within an announced time span of three to five minutes. The main purpose of the brainstorming activity is to think up ideas that will be applied to the solution of problems and challenges. Sidney Parnes stated "Creative Problem-Solving is fun, but is not for fun." The skills that the students learn have far reaching implications in

that they will have the tools that will enable them to improve things.

The Creative Problem Solving Process as outlined by Parnes involves six levels. Level I is "Sensing Problems and Challenges". This involves an awareness the students have that a problem exists and it needs to be solved.

The purpose of participating in Level I activities as outlined by Parnes, is to enable children to name and describe situations in need of improvement. They do such activities as sitting in a room, looking around them and finding something that needs to be improved. When they spot something, they list it on the left side of a page and answer why it needs to be improved on the right side of the page. Then they talk about it. This increases their awareness of problems and what they should do to solve these problems.

Level II is Fact-Finding. It is a process of guided scientific inquiry. It is basic to understanding why a problem exists, and what should be done about it. The students are encouraged to gather all the factual information available. Key questions are asked, and the students answer them. These questions are: Who?, What?, Where?, When?, Why?, and How? The students are asking: Who does this involve?, What is involved?, Where does this occur?, When is this happening?, Why am I concerned about this?, How am I, and others affected? Parnes outlined various activities where the students frame fact-finding questions about perplexing situations. This enables the student to find out as much as possible about the specific problem.

Level III is Problem-Finding. Here the facts are reviewed and a problem search is conducted which could produce many mini-problems.

When a host of problems is created, the students are encouraged to select the problem that appears to be more pressing and the one that can be solved. Problem-Finding involves instruction in flexible thinking. The students are encouraged to view situations from a variety of prospectives and to re-define the problem. The higher level thinking processes of analysis, synthesis and evaluation are exercised a great deal in the Level III, Problem-Finding. The students go back and review the facts, and look at the problem from many different angles. They identify many mini-problems and priorize them. They produce many ideas, and review a manageable problem that they have selected as top priority.

Level IV is Idea-Finding. Idea-Finding involves a great deal of divergent thinking. Parnes recommends that the students do a great deal of "Brainstorming" and a great deal of "Scampering for Ideas." The Scamper (Eberle, 1971) checklist is adapted from Osborn's work (1963). Idea-Finding must incorporate most, if not all, of the thinking processes associated with productive, imaginative thought (Torrance, 1962). Thus idea-finding incorporates a lot of creative thought. Creative thought is fluent thinking which encompasses producing numbers of ideas. Flexible thinking is also a part of creative thought. It enables the student to progress to all sorts of contrasting ideas and categories. Elaborate thinking encourages the student to add a great deal to his or her ideas. Idea-Finding also lends itself to original thinking which encompasses various avenues of unique responses. In Idea-Finding the students produce a number of ideas that can have a unique slant to them, or can spin-off from someone else's ideas. The student is encouraged to suspend ideas while allowing numerous ideas

to surface. Ideas are combined and reworked. Students are encouraged
to be original and creative.

Level V is Solution-Finding. It encompasses the process of in-
volving students in the application of higher level thinking skills.
The students are encouraged to do a great deal of evaluating - making
judgments based on evidence, established standards or given criteria.
They apply evaluative criteria to various ideas to compare their useful-
ness. Divergent and Convergent thinking skills are applied a great deal
in the solution-finding process as well. Students are encouraged to
remain emotionally apart from their ideas and to look at their ideas
realistically. They must not be afraid to make decisions. They must
produce data to support their choice of ideas, and produce measures to
evaluate ideas. They must also select an idea that has the best chance
of succeeding.

Level VI is Acceptance-Finding. Here the student uses a great deal
of prediction and organizational skills. The Who?, What?, When?,
Where?, Why?, and How? line of questioning may be applied here. Accep-
tance-finding is very crucial to the creative problem solving process.
Here the student goes beyond solving the problem to finding ways of
implementing the solution to the problem. The students need to know for
themselves what they want to accomplish, and to know the resources that
will be required for the implementation of the solution. This requires
a step-by-step implementation plan that involves a time-table and a
schedule of events. They also need people to support what they hope to
implement. Thus Parnes has created a Problem Solving process that
implements a common sense approach to the creative problem solving

technique.

Parnes' dedication to the implementation of such a technique in the programs for gifted and talented students has proven to be invaluable to the teachers of such children. It has provided curriculum specialists and teachers with a tool used to integrate life application skills with academic programs. More concisely, it trains teachers and students to become more effective thinkers, analysers, and evaluators. Idea-finding and brainstorming was an integral part of Parnes' Creative Problem Solving process. Imagination also played an important part in the development of these skills.

Eberle (1972) developed a checklist to stimulate the imagination. Eberle's "Scamper Method" is useful when "brainstorming" for ideas. Imagination is critical in the development of new and creative thoughts and ideas. Creative problem solving involves students in a great deal of "Scampering for ideas" (Eberle, 1971). Scamper means you begin each statement with "what ways".

S	Substitute	What could you substitute What might you do instead? What would do as well?
C	Combine	What could you combine? What might work well together? What could be brought together?
A	Adapt	What could be adjusted to suit a purpose or condition? How could you make it fit?
M	Modify	What could happen if you changed form or quality?
	Magnify	Could you make it larger, greater, or stronger?
	Minify	Could you make it smaller, lighter, or slower?

P Put to other Uses	How could you use it for different purposes? What are some new ways to apply it? What does it suggest?
E Eliminate	What could you subtract or take away? What could you do without?
R Reverse	What would you have if you reversed it or turned it around? Could you change the parts, layout or sequence?

Eberle stated that educators should be aware of the fact that conditions can hamper creative, imagination expression. He said educators must possess a working knowledge of the attitudes and behaviors that encourage intellectual stimulation, and must learn to revise the known and create the unknown (Eberle, 1972).

Problem solving and creativity use the imagination to stimulate ideas that produce solutions and ideas. Eberle's scamper method is used in brainstorming for ideas within the creative problem solving process. It is a method that can be used for gifted students in their problem solving methods. Imagination uses the thinking processes in fluent, flexible and original thinking procedures. One problem is examined and a reasonable solution is compiled.

John F. Feldhusen (1980) developed a model of creative problem solving. The student progresses through six stages. In stage one, students work in small groups and identify this one problem within a circular framework outlined by the instructor (Feldhusen and Treffinger 1980). The table developed in figure 4 outlines the thinking processes and the activities centered around Feldhusen's creative problem solving techniques. In figure 4, a specific problem is used as the framework

FELDHEUSEN'S CREATIVE PROBLEM SOLVING MODEL

Processes

Fluency
Flexibility
Originality
Deferred Judgment
Evaluation

I. PROBLEM GENERATION
    A. What are some problems our country faces as a result of the energy crisis?

    Brainstorm problem identification.

    B. What are the most critical and general problems? Pick 3, then 1

II. PROBLEM CLARIFICATION
    A. What are illustrations of the problem?

Analysis
Evaluation

    B. What are things that cause the problem?
    C. What are further problems caused by the problem?
    D. What are attributes, characteristics or dimensions of the problem?

III. PROBLEM IDENTIFICATION

Synthesis

    A. State the problem in light of stage II discussions as precisely as possible.

IV. IDEA FINDING
    A. Brainstorm for solutions

Fluency
Flexibility
Analysis
Originality
Deferred
Judgment

        1. What could we do?
        2. What could be changed?
    B. Forced association
    C. Attribute analysis
    D. Synectics
    E. Solving parts of the problem

V. SYNTHESIZING A SOLUTION

Synthesis
Elaboration
Evaluation

    A. Pick out the best elements from Stage IV.
    B. Develop a Gestalt-closure
    C. Does it fit to the problem statement?

VI. IMPLEMENTATION
    A. Who will do what?

Synthesis
Evaluation
Originality

    B. How will it be done?
    C. What temporal sequence will be followed?
    D. What precautions and obstacles must be watched for?

Flexibility

    E. Locations?
    F. How to overcome obstacles?

FIGURE 4

from which to develop the creative problem solving process. Brainstorming identifies the problem, and the evaluation process selects out three problems, and then selects the one most crucial problem to be solved. Stage two clarifies the problem by producing illustrations of it, and discussing it. Stage three is a problem specifying process where the problem is written out very clearly. Stage four generates ideas by analyzing the problem. Stage five is where the students put all the ideas outlined in stage four in one composite solution. Stage six is the implementation stage where the students plan how to implement their solution.

The creative problem solving models engage students in thinking skills that include fluency, flexibility, originality, deferred judgment, analysis, evaluation and elaborating. The various methods of creative problem solving can be incorporated in the regular classroom environment as well as in the gifted programs. The objectives of instruction in problem solving is not primarily one to solve problems as such but to help students to develop abilities to analyze various kinds of problems as they emerge.

Deferred judgment is an integral part of Feldheusen's Creative Problem Solving Model. Judgment is deferred to enable the learner to generate new ideas. The concepts in lateral and vertical thinking stress the art of deferred judgment to enable the learner to produce new ideas.

LATERAL AND VERTICAL THINKING SKILLS AND THE GIFTED

Edward de Bono (1970) developed the concept of lateral thinking. He stated that lateral thinking is a process which provides a means to restructure patterns. This process can be illogical and can move in many directions. Creativity is closely related to the lateral thinking process.

The lateral thinking process is based on the premise that the mind creates patterns out of perceptions of the environment. In the lateral thinking process information is not used for the knowledge it imposes upon the learner, but for its effect. It is possible to be wrong at some point in the lateral thinking process, in order to arrive at a solution. At times it is also possible to seek out irrelevant information to arrive at relevant information. Lateral thinking is simply a different and more creative way of using the mind.

Lateral thinking delays judgment in order to generate new ideas. It utilizes many alternatives to the same problem. Lateral thinking is not only concerned with problem solving; it has to do with new ways of looking at things and new ideas of every sort (de Bono, 1978). Lateral thinking becomes an attitude that brings about an awareness of the processes involved in lateral thinking. De Bono stressed that it must be practised over and over to be an effective tool in problem solving (de Bono, 1970). Lateral thinking is a major component in the problem solving process. This is the area in which gifted students work most of the time. Lateral thinking generates new ideas and allows the gifted learner to become more creative in his/her approach to problem solving.

Lateral and vertical thinking are both necessary components in the thinking process that enable gifted students to become more creative problem solvers.

Vertical thinking is fundamentally logical thinking. It is very selective and requires the learner to reach a conclusion by means of a valid series of steps. Vertical thinking selects the best way of approaching a problem. It moves in a very precise direction by way of experimental design. Vertical thinking develops concept patterns which lateral thinking restructures such patterns and produces new ones. Vertical thinking develops ideas originated by lateral thinking.

Gifted learners need the thinking skills developed within the lateral and vertical thinking processes. They enable the gifted learner to be more creative, yet more precise when in the creative problem solving area. These thinking skills are developed within the framework of thinking processes as outlined in Guilford's model of the human intellect and Bloom's taxonomy.

THINKING PROCESSES AND THE GIFTED

Guilford (1967) in his model of the human intellect enabled the educator to understand the importance of teaching thinking skills as opposed to memorizing facts.

Many authorities on gifted education have emphasized the need to teach thinking skills as opposed to teaching facts. Joy-Paul Guilford (1967) developed a complicated psychological model of the human intellect. It is a taxonomy in which the various components of mental

functioning are isolated and their interrelationship are suggested. The model is represented visually as three-dimensional and cube-shaped. The various components of the model are comprised of operations, content and products which are cross-classified with their intersecting point or cell describing an unique combination of all three elements. That is, each cell represents one type of operation, one type of content, and one kind of product. The model has the potential of describing 120 of these cells but to this point only 80 have been described by Guilford.

The first group of intellectual abilities considered by Guilford are the operations. They involve the skills needed when the mind is presented with raw material or information. They are the processes involved in thinking. Firstly, the three process operations are: cognition or ways we understand, involve as a group the ability to discover, become aware, recognize and comprehend information. Memory is the operation involving the retaining or "fixing in storage" as Guilford described the act, and the further ability to reproduce the information as needed. This information which has been recognized and remembered forms the basis of the more productive thinking skills, that is, convergent and divergent thinking and the evaluation aspects of these operations. Convergent thinking involves the formulation of given information as facts or associations into one predictable outcome. The conclusion leads step-by-step from the given information and as described by Guilford as "logic tight." In other words, it is the type of thinking employed in mathematics as formal logic. Divergent thinking is also termed creative thinking. It involves the ability to utilize information or knowledge, to produce one or many novel solutions or

"logical alternatives" on the basis of the given knowledge. The emphasis is upon the quantity of ideas generated, and the variety and their relevance to the initial source. The final element in the operational grouping is evaluation or critical thinking. This is concerned with abilities to decide or judge the adequacy, correctness, suitability or desirability of alternative conclusions reached in terms of criteria involving the accepted value system or systems.

The second group of elements in Guilford's system are those involved in content and are concerned with the kind or nature of the material or information. Information at the figural level is the concrete source presented to the senses and involves, for example, visual or auditory stimulations. This information is perceived and recalled in the form of images. These images gain additional meaning at the symbolic level where the information is presented at an abstract level in the form of symbols such as words or numbers which have no inherent meaning in themselves. The semantic level is the content level where symbols become ideas or constructs, for example, in the form of words that involve the mind in verbal thinking and communication or as pictures. The behavioural stage includes the information about the actions of ourselves and others. Here is the level where thought, emotion, desire, intentions, and moods are involved as part of the content aspect.

The third group of elements are the products or the forms information takes within the mind of the person processing it as well as the relationships established within groupings as the thought processes occur. The system involves a hierarchy of concept utilization becoming

increasingly complex, involving a more sophisticated, higher degree of mental functioning as the information is related in patterns. The levels of intellectual activity at the simplest involve units -- items or "bits"; next are classes or grouping, these "bits" according to common properties. Following classes are relations or meaningful connections, systems or organizing patterns, transformations or changes and finally, the most developed level is implications or information suggested by other information.

Guilford's model for classifying human intellect, although highly abstract is of great use for teachers of the gifted. It offers very specific identities to intellectual functions yet does not lose sight of the entire structure. It specifically permits tests, programs, and curricula to be developed to satisfy the need to train exact areas of thought. For instance, a program can be created and evaluated in terms of the exact cell or cells which it desires to train. It also permits educators to examine a course or program as to its being a unique intellectual exercise involving new skills or variations of them or actually a redundant program involving skills already mastered.

Guilford has developed and validated special tests for assessing abilities and specified tasks to be performed to increase skill development. For example, he suggested that the cell created by the intersection of cognition, figural and information can be further trained by developing a special maze that is designed as a tracing task.

Guilford's Model has educational implications for the gifted. By increasing our understanding of the multiplicity of components involved in human intellect, it is possible to extend our understanding and

ability to measure accurately the capacities of the gifted population. It is possible to exactly isolate the few or many areas in which the person excels and develop them further with specific, more differenti- ated programs, or, in turn, consider and "work" on those areas which are not as strongly developed. This model is structured in a more divergent manner than is the thinking process taxonomy developed by Benjamin Bloom (1958). Bloom moved the thinking process skills through six different levels that enabled the learner to progress within the thinking process boundaries.

BLOOM'S TAXONOMY AS APPLIED TO THE GIFTED

Bloom developed a taxonomy to indicate the various levels of thinking. These levels are: knowledge, comprehension, analysis, synthesis and evaluation. Bloom stated that gifted students pass through the lower levels of thinking quickly and spend most of their time in the higher level thinking skills of analysis, synthesis and evaluation.

Bloom's Taxonomy (1958) describes the activities and thought processes that occur at each level:

A.	KNOWLEDGE	define, repeat, list, memorize, name, label, record, recall, relate
B.	COMPREHENSION	restate, describe, explain, identify, report, discuss, recognize, express, locate, review
C.	APPLICATION	translate, apply, employ, practice, demonstrate, interpret, operate, schedule, illustrate, dramatize
D.	ANALYSIS	distinguish, debate, question, solve, differ- entiate, compare, diagram, inventory, contract,

experiment, test, analyse, criticize, relate, calculate

E. SYNTHESIS   compose, propose, formulate, assemble, construct, design, arrange, collect, organize, prepare

·F. EVALUATION   judge, compare, choose, estimate, evaluate, score, predict, rate, value, assess, select, measure

There are question cues which can be utilized at each level. They enable the instructor to direct the learner in a precise way through the various levels of thinking. These question cues are instructions which describe the type of activities that should be exercised at a particular level of thinking.

A. Knowledge (memory questions) Question cues are:

tell - list - describe - who - when - where - which - what do you remember - state - does - define - identify - did you know that - relate what you know about

B. Comprehension (translate or interpret) Question cues are:

change to different symbol or medium - tell in your own words - describe how you feel about - relate - interpret - compare - contrast - what in an analogy to - what can you extrapolate from that - discover and explain - what does it mean - what are the relationships

C. Application Question cues are:

demonstrate - use it to solve - where does it lead you - how can you use it - how does one thing possibly lead to another

D. <u>Analysis</u> (not retrieved but reached or derived) <u>Question cues are:</u>
how - reason - why - what are causes - what are consequences - what
are the steps of the process - how would you start - arrange -
specify the conditions - which are necessary for - which one comes
first, last - what are some specific examples of - list all the
problems, solutions

E. <u>Synthesis</u> (self-initiated activities leading to originality and
imagination) <u>Question cues are:</u>
create - devise - design - how many hypotheses can you suggest -
think of all the different ways - how else - what would happen if -
think of as many as you can - what would it be like if - how many
ways are possible - compose - develop - in what ways can you
improve - suppose - form a new - think of something no one else has
thought of before

F. <u>Evaluation</u> (judge to a standard, set criteria and weigh) <u>Question
cues are:</u>
set standards for evaluating the following - which are good, bad -
which one(s) do you like - what do you think are the most likely -
rate from good to poor - select and choose - is that good or bad -
weigh according to evaluate the results - judge the evidence -
judge by how you feel - what is the problem - are these solutions
adequate - will it work - decide which

Bloom's most recent research on the gifted was published in November, 1981. It dealt with the development of talent. More than 120 persons who excelled in a given area before the age of thirty-five were interviewed to determine what factors were significant in the development of their particular talents. Famous pianists, athletes and mathematicians were interviewed to determine what caused them to become successful people (Bloom, 1982).

The findings indicated that a positive family background had a direct effect on the success of the individuals involved. Family members took an interest in the particular field of talent, and gave strong support and encouragement.

Bloom's research also indicated that there was not only support, but individualized and personalized instruction from the parents in the home.

Bloom stated that, "Schools in general do not promote talent, nor does it permit the child to become fully involved in any one part of the curriculum" (1981, p. 86). He stated that parents provided a model for the children to follow. The parent often valued the talent area and expected the child to have that interest also. In many cases the child was not asked if he/she would participate in the particular talent area, it was assumed that the child would wish to learn the talent emphasized by the parents.

Bloom stated that in talent development, each child was seen as unique. Bloom contrasted this to the school setting where the child becomes part of a group. His/her uniqueness becomes less apparent amongst the rest of the class. School learning emphasizes group

learning and subjects or skills, as opposed to the home style of learning where the child gets very individualized instruction.

Bloom's research contrasted talent development and elementary-secondary schooling. The implications of this research could be very significant in regard to the gifted education program development in the future. His study indicated that students excel in individualized instruction and need to be praised for what they do. It demonstrates the importance of valuing talent and providing a very supportative atmosphere for the child. Bloom's research placed a great deal of emphasis on the parental role model and the parental expectations when dealing with the child. The parental role model and parentl expectations were most important in the success of educating the gifted learner. Creativity utilizes the importance of the effective domain of the gifted learner.

Torrance (1961) stressed the importance of appreciating the nonconformist and his/her abilities.

CREATIVITY AND THE GIFTED LEARNER

E. Paul Torrance stated that "creativity involves independence of mind, non-conformity to group pressures, or breaking out of a mold" (Torrance, 1961). He stated that highly-creative students will inevitably experience some difficulties and may have problems making adjustments within the classroom setting.

Creativity is an integral part of gifted education. When identi-

fying gifted students, highly creative individuals may be overlooked because they do not react in the same way in given situations as some other students react. Reading problems may occur, yet the student may have remarkable abilities to use information imaginatively and to produce very creative solutions to problems. Creative individuals are very inventive, flexible and are original in their ability to develop ideas.

Torrance suggested that educators should capitalize on the creative student's unique strengths, and not be so concerned with trying to fit the student into the normal mode of behaviour or thought pattern. Creative students like to work on their own at times. Generally, it is assumed that children do not learn on their own. This attitude places the creatively gifted child at a disadvantage as he/she may not be able to conform to the kind of learning style suggested by the instructor. Creative students often like to attempt difficult tasks and should be encouraged to do so. Torrance stressed repeatedly that educators must be aware that highly creative students may not conform to what the instructor thinks is best. Rather the student may have a tendency to follow his/her own areas of interest.

Characteristically, highly creative students seem to gain a reputation for having wild and silly ideas. Instructors may have difficulty evaluating the students' ideas because they often do not conform to behavioral norms.

Creatively gifted students also can be characterized by their sense of humor and playfulness. Torrance also stressed that highly creative students need some purpose which is worthy of the enthusiastic devotion they seem capable of giving.

Torrance stated that giftedness and creativity should be valued. He stated that the nation as a whole should be responsible for stimulating the fullest potential of gifted and talented children. He stated there should be more provision made for developing talents in students and rewarding them for their achievements (Torrance, 1980).

IDENTIFICATION OF THE GIFTED

There have been six areas identified in research for gifted education. Gifted and talented children are capable of high performance in at least one of these eight areas or may be gifted in combinations of the eight;

1. General Intellectual Ability

2. Specific Academic Ability

3. Creative or Productive Thinking

4. Leadership Ability

5. Visual and Performing Arts

6. Psychomotor Ability

These categories are in accordance with the U.S. Senate definition of giftedness in 1972. There are two other areas that should be explored when considering giftedness:

The Disadvantaged Child (Gifted)

The Underachiever Gifted

Gifted children are children who consistently excel or show the potential to consistently excel above the average in one or more of the following areas of human endeavor to the extent they need and can profit

from specially planned educational services:

1. <u>General Intellectual Ability</u>. The child possessing general intellectual ability is consistently superior to that of other children in the school. The child needs and can profit from specially planned educational services beyond those normally provided by the standard school program.

2. <u>Specific Academic Aptitude</u>. The child possessing as specific academic aptitude is that child who has an aptitude in a specific subject area that is consistently superior to the aptitude of other children in the school. This child can profit from specially planned educational services beyond those normally provided by the standard school program.

3. <u>Creative Thinking</u>. The creative thinking child is that child who consistently engages in divergent thinking that results in unconventional responses to conventional tasks to the extent that he needs and can profit from specially planned educational services, beyond those normally provided by the standard school program.

4. <u>Leadership Ability</u>. The child possessing leadership ability is that child who not only assumes leadership roles, but also is accepted by others as a leader, to the extent that he needs and can profit from specially planned educational services beyond those normally provided by the standard school program.

5. <u>Visual and Performing Arts Ability</u>. The child possessing visual and performing arts ability is that child who, by his consistently outstanding aesthetic production in graphic arts, sculpture, music or dance, needs and can profit from specially planned educational

services beyond those normally provided by the standard school program.

6. <u>Psychomotor Ability</u>. The child possessing psychomotor ability is that child who consistently displays mechanical skills or athletic ability so superior to that of other children in the school that he needs and can profit from specially planned educational services beyond those normally provided by the standard school program.

There are specific characteristics that serve as indicators to identify giftedness as also identified by the U.S. definition of giftedness 1972.

Early language acquisition: uses a large vocabulary; speaks in long, complex sentences; talks early and often.

Fine and gross motor skills: walks, climbs, runs early and well, controls small objects such as scissors, pencils, crayons; handles tools well.

<u>Intellectual areas</u>: reads signs or even books; does mathematical problems; draws associations among diverse ideas; remembers facts and events; is interested in social and moral issues; has a long attention span; asks why.

<u>Social areas</u>: has empathy for others; is self-confident and independent; organizes and leads group activities; very active both mentally and physically.

<u>Creative areas</u>: has a vivid imagination; enjoys playing with words and ideas; shows a highly developed; often verbal sense of humor; uses objects, toys, colours in imaginative ways.

<u>Specific areas</u>: plays musical instruments; plays sports well; sings; in general, shows remarkable ability in specific area.

Researchers have established lists of general characteristics and have been fairly consistent in their findings.

The gifted as a group tend to be stronger and healthier than the average child. They learned to walk and talk at an earlier age and have fewer physical and sensory impairments than the average population (Bradley and Earp, 1970; Feldhusen, 1966; Miles, 1954; Terman, 1925; Thomas and Crescimbeni, 1966; Witty, 1951).

The gifted tend to be a more curious group, and have longer memories and a keen sense of time (Barbe, 1965; Feldhusen, 1966; Kirk, 1962; Isaacs, 1971; Jacobs, 1972).

They have many interests, although they may have a stronger interest in one area, and are involved in many kinds of hobbies (Feldhusen, 1966; Isaacs, 1971; Lucito, 1963; Telford and Sawrey, 1967; Terman, 1925; Thomas and Crscimbeni, 1966).

The gifted have many talents and abilities. They can have a superior ability in one or more areas such as social leadership, art, creative writing, mathematics or mechanics (Feldhusen, 1966; Goldberg, 1965; Isaacs, 1971; Torance, 1965; Witty, 1970).

They produce work that is unique. They are creative and show vitality (Barbe, 1965; Bradley and Earpe, 1970; Isaacs, 1966; Torrance, 1966).

The gifted child has unusual abilities in using higher levels of thinking. He can organize, integrate and evaluate (Guilford, 1965; Isaacs, 1971; Torrance, 1970; Witty, 1967).

The gifted exhibit leadership ability (Getzels and Jackson, 1962; Isaacs, 1971; Terman, 1954; Terman and Oden, 1944, 1959; Witty, 1951,

1967).

These children possess favourable social characteristics and have desirable personalities (Barbe, 1965; Bradley and Earpe, 1970; Garrison and Force, 1965; Telford and Sawrey, 1967).

The Intellectual and Academically Gifted

These children can usually be recognized by high test scores, high achievements, and high I.Q. scores. They seem to get by with relative ease and find no task a burden. The following can be seen as characteristics of this group:

1. They are observant and alert.

2. They have exceptional retention powers.

3. They are very curious and ask many questions.

4. They learn easily.

5. They can become absorbed in their work.

6. They express themselves well.

7. They apply knowledge they have learned.

8. They understand abstract relatonships.

9. They are problem solvers.

10. They know many things beyond their age level.

The Creatively Gifted

There are many definitions of creativity. Guilford (1959) defines creativity as being more than a general trait. It includes, "originality, flexibility, fluency, motivational and temperamental traits as well." Creative individuals tend to be more spontaneous and non-conforming, more sensitive and emotionial.

Torrance (1967) sees the characteristics of the creatively gifted as follows:

1. They never seem to be bored.

2. They are very curious and attracted by the mysterious.

3. They make up their own mind.

4. They do not strive for power but stand firm on his own feet.

5. They are self-confident.

6. They are intuitive.

7. They are energetic and motivated to do things on their own.

8. They have deep convictions.

9. They are willing to take risks.

10. They are accepting of disorder and often have more than one thing started.

11. They don't worry about being thought of as different.

12. They can become preoccupied.

13. They are persistent.

14. They are independent thinkers.

15. They are adventurous.

16. They set goals.

Creative Potential can be determined, according to Mary Meeker, by asking the following questions:

1. Does he/she show unusual sensitivity to peole's feelings, for problem solving, to the harmony of sounds or vision?

2. Does he/she have rapid verbal or motor responses?

3. Does he/she show originality in ideas, in expressions, in motor skills or in his/her sense of humor?

4. Has he/she the ability to organize much information on people, or things?

5. Has he/she the ability to abstract meaningful information?

6. Has he/she a high level of energy?

7. Does he/she perserve in his/her work?

8. Is he/she impatient with rote work?

Leadership Ability

Leadership is an ability which involves the taking of responsibility of directing and coordinating in group situations. It's an ability that is highly useful in our society. Characteristics of the gifted in leadership are summarized below:

1. They can be counted on to carry through with responsibilities.

2. They are confident with both children and adults.

3. They seem to be well linked and may be quite popular.

4. They are cooperative.

5. They express themselves well.

6. They adapt readily and seem undisturbed by changes in routine.

7. They are sociable and tend to dominate or direct activities.

8. They participate in most school functions.

9. They are popular partners in work and in play.

The Talented

Talented children have the ability to create new ideas or work. They do not reproduce what others have done but either extend those or recreate their own works. The talented art student may have the following characteristics:

1. They show a strong interst in anything visual and remember detail.

2. They spend a great deal of time drawing, painting, modeling or construction.

3. They work seriously and demonstrate skill.

4. They experiment with media and do the unconventional.

5. They plan.

6. They produce work superior in balance, unity design or color and have distinctive styles.

The characteristics of the talented in music are as follows:

1. They have unusual interest in music.

2. They are responsive to mood.

3. They can repeat rhythmic pattern with ease.

4. They can sing in tune.

5. They can identify similarities or differences in short rhythmic patterns.

6. They can identify tones as higher or lower, familiar songs by rhythm alone, and short melodies.

Ability in Psychomotor Activities

These are children who express an unusual ability in dance or sports. They tend to have superior fine and gross motor skills. The psychomotor gifted display characteristics such as:

1. They show strong interest in motor activities.

2. They demonstrate advanced eye-hand coordination.

3. They enjoy movement and demonstrate a wide range of it.

4. They show exceptional balance, agility, and strength for their age.

5. They show outstanding ability to combine and adapt previously learned motor skills.

The Disadvantaged Child

These children are disadvantaged in terms of economics, socialization, environment, or language. Identifying these students is somewhat more difficult as our testing materials do not properly account for these variables. Their strengths, however, tend to be in figural concepts, social intelligence, divergent problem solving, and transformations. E. Fitzgerald (1975) proposes the following as charcteristic of this group:

1. They have verbal proficiency in small groups.

2. They have good vocabulary compared to age level and have information on various subjects.

3. They are keen and alert and are concerned with the how and why of things.

4. They can generalize.

5. They read independently.

6. They look for individual differences.

7. They can separate complicated materials into respective parts, reason things out and see logical and common sense answers.

8. They learn easily and use and the adapt new information.

9. They learn English rapidly if English is a second language.

The Gifted Underachiever

Some gifted children do not perform well in school. They may have become bored due to lack of challenge, they may have conformed to traditional teaching and material, or they may have been non-conformists and have been aliented by the teacher. As a result, deficits in basic skills can show up and/or they can become real behavior problems. May Seagoe has suggested characteristics of the gifted underachiever:

1. They may resist direction.

2. They may have difficulty in accepting the illogical.

3. They may invent their own systems.

4. They dislike dull and routine.

5. They need mastery of foundation skills.

6. They have a critical attitude towards others and need to be discouraged from self-criticism.

7. They resent interruptions.

8. They are stubborn.

9. They are very sensitive to criticism.

10. They become frustrated with inactivity and absence of progress.

11. They have a tendency to rebel.

When identifying these children, one needs to look specifically at each of the eight categories and decide where the child seems to fit. There are a number of devices or methods that can be used to check each area.

In exploring the area of intellectual or specific academic giftedness, one could use teacher recommendation, both past teachers and present teacher can supply valuable information. Intelligence scores, both group and individually administered scores, can be used. Achievement test and diagnostic scores can be checked and specific achievement tests given in the area thought to be gifted. Cumulative and resource records might contain information such as outside interests, scores, test results and old report cards. The parent and student inventory instrument might also be used.

The area of leadership abilities can be identified using sociometric tests, teacher recommendations, peer identification and anecdotal reports.

Identification of the creative or productive thinker can be made using teacher recommendations, records, inventories, peer identification devices, situational tasks, and creativity tests.

Giftedness in the area of visual and performing arts can be made on speciality teacher's recommendation, inventories, peer identifications and on student interest and value inventories.

Psychomotor ability can be measured by specialty teacher's reports, peer identification and parent inventories.

Giftedness is not always easily seen by the classroom teacher. If teachers are aware, however, of the different components of giftedness and the characteristics of them, then, perhaps this awareness will help to point out students who are possibly gifted and need some special consideration in our school programming.

SUMMARY

Educators of the gifted and talented needed program models that provided them with program designs that meet the needs of the gifted and talented student within the regular school system; and which allowed these students to reach their potential.

Renzulli provided a program model design known as the "Enrichment Triad Model." It gave the educator a program design that encompassed the regular classroom curriculum and provided gifted students with opportunities to reach their potential in the higher level thinking skills and in creative problem solving.

Parnes, Feldheusen and Eberle developed models for teaching creative problem solving. These models are very precise and direct ways

of guiding gifted and talented students through the problem solving processes.

De Bono developed a lateral thinking concept which provides unique ways of viewing a problem situation. Torrance stressed the importance of creative thinking within the problem solving processes. He also provided guidelines to be followed by instructors of the gifted that enabled them to accept and guide creative students. He alerted instructors to the fact that creative individuals do not necessarily fit into the normal behavioral patterns followed by other students.

Guilford and Bloom developed thinking process models to assist educators in the instruction of thinking processes. These models enable educators to define the different levels of thinking a student moves through, and thus provide better programming for the individual student.

These theories and models have been very helpful to the educator of the gifted and talented student. They enabled the instructor to define the thinking and problem solving processes so necessary for all students. They enabled the instructor to identify and develop programs suited to the gifted and talented student. These models are the theoretical basis for the program development for the gifted students in this Practicum.

Identification of gifted students is a complex task. Gifted children consistently excel or show potential to excel in general intellectual ability, academics, creativity, leadership, visual and performing arts, and in psychomotor ability. It is important for an educator of the gifted to become familiar with the general character-

istics of the gifted student. This will enable the educator to identify the gifted more accurately.

CHAPTER 3

PROGRAM DEVELOPMENT

HISTORY OF THE GIFTED AND TALENTED PROGRAM

In the school division in which the researcher was teaching, several teachers and administrators expressed a concern over the lack of suitable programs for bright students. This concern led to the formation of a committee that spent a year researching and visiting gifted programs.

The school divison is located in a suburban area of Winnipeg, Manitoba, Canada. The population within the Division was comprised primarily of middle class families with a wide range of ethnic backgrounds.

A committee of seventeen persons, teachers and administrators, was organized to discuss gifted education in general in May of 1980. It was decided that the committee should research all aspects of gifted education as soon as possible, and visit gifted programs that were already in progress.

Research began in several different areas:

      1. Identification of gifted/talented students

      2. Curriculum development for gifted/talented students.

Many programs were visited by each member of the committee. These included gifted programs in Winnipeg School Division and surrounding urban school divisions, Vancouver, Toronto and in England. After visiting these programs the individual members of the committee reported

back to the committee as a whole.

From the findings in the research work, and the visitations, the School Division decided to pilot two separate kinds of programs which were called Program A and Program B for a period of one year. At the end of the one year period it would be decided if the programs A and B would continue, or if they would be terminated.

Teachers were asked to apply for positions as teachers of the gifted for Program A and B. The writer of this practicum was hired to be the teacher of Program B.

THE DEVELOPMENT OF THE LEARNING ENRICHMENT ASSISTANCE PROGRAM

The "Learning Enrichment Assistance Program" or "L.E.A.P." began through two separate programs in the pilot year: Program A and Program B.

Program A was a pull-out program where students who were identified as gifted were taken out of the regular classroom and instructed in the higher level thinking skills and in Edward de Bono's Thinking Skills Process. The instruction took place over a two hour period of time within the week.

In Program A, the co-operating teachers were not a direct part of the instructional time. Lesson plans were given to the classroom teachers so they could follow the program the students were studying when out of the regular classroom.

In Program B, the children were taught a regular science program centered around the science processes and the various thinking skill

levels. This included the whole class population. Gifted students were identified and taken out of regular class for a two hour period of time and were instructed in Creative Problem Solving and the higher level thinking skills.

THEORETICAL FRAMEWORK FOR L.E.A.P. PROGRAM B

Renzulli's Enrichment Triad Model, Bloom's taxonomy and the Parnes Creative Problem Solving Process were used as a theoretical framework from which to build the L.E.A.P. Program B. Renzulli stated that gifted students should have time within the regular classroom with their peers, and time out of the regular classroom where they can receive individual instruction in the creative problem solving processes (Renzulli, 1977). He stated that gifted students need to acquire the basic thinking skills and some content to become effective problem solvers.

L.E.A.P. Program B developed its theoretical framework from this model. Science was to be taught within the regular classroom setting to all students of varied abilities. The gifted students were to remain in the regular science class with their peers, and participate in Type I and Type II of the Enrichment Triad Model. Type I consists of "general exploratory activities", which enables the students to experience a variety of activities and subjects designed to motivate the student to want to learn about them.

Then the students were taken through the Type II, "general training activities" where the student is involved in instruction in the thinking skills according to Blooms' taxonomy. Renzulli refers frequently to the

different thinking levels.

Bloom stated that the student develops his/her thinking skills beginning with knowledge, then comprehension, application, analysis, synthesis and evaluation.

Renzulli stated that gifted children should spend 50% of their time in analysis, synthesis and evaluation, and in creative problem solving.

L.E.A.P. Program B was designed so the regular science program would reflect what Renzulli had instructed in his Enrichment Triad. It was designed to instruct the students in the "general exploratory activities", and the "general training activities." The students were also instructed in the first two levels of Parnes Creative Problem Solving Process, which corresponded with Renzulli's "individual and small group investigations of real problems." The gifted students were identified by direct observation by the teachers involved.

In the out-of-class pull-out, the students were instructed in small groups. An emphasis was placed on creative problem solving. This was patterned after Renzulli's Type III "Individual and Small Group Investigations of Real Problems." The teacher in L.E.A.P. Program B was to use Parnes Creative Problem Solving Process.

Parnes developed a technique for guiding students through a logical thinking process that began with level I, "Senses and Challenges", and progressed through the six levels of problem solving which included:

Level II   - Fact finding

Level III   - Problem finding

Level IV   - Idea finding

Level V   - Solution finding

Level VI   - Acceptance finding

These exercises were to be based on real world problems. The out-of-class pull-out of L.E.A.P. Program B was designed to spend the majority of the instructional time in the creative problem solving process.

Program B consisted of three separate parts:

1. Regular Science Process Class. The regular grade three and four classes were to receive instruction in a science process program using the Manitoba Elementary Science Curriculum as a guideline. They were to be instructed in the levels of thinking skills of knowledge, comprehension, application, analysis, synthesis and evaluation as well as Parnes Creative Problem Solving Process.

    This instruction was scheduled in three thirty-five minute lessons per week.

2. Out-of-Class Pull-Out. The identified gifted students left the regular classroom once a week and were to attend a class where they were instructed and guided in the higher level thinking skills of analysis, synthesis and evaluation. They were also to be instructed in the Parnes Creative Problem Solving Process.

3. Mentor Program. The students were to participate in a Mentor Program where they were to attend workshops in special areas of study.

The Mentor Program was developed to be used as a motivational base to increase the student level of interest. It was also developed to open up new areas of study and expose the students to experiences they could not have in the regular school system.

IDENTIFICATION OF THE GIFTED

Prior to the beginning of the program for gifted students it was decided by the committee potential students for the gifted program should be identified. In May and June of 1981, the grade one to grade four classrooms were visited with the purpose of requesting the classroom teachers to list the students in their classes whom they believe to be gifted. These lists were not revealed to the teachers of the L.E.A.P. Program. The purpose of this exercise was to see how accurately classroom teachers could identify gifted students without formal testing procedures.

When the L.E.A.P. Programs A and B began in the fall of 1981, students in Program A were identified in a formal way. They were identified by administering specific tests to all students in grades two to five. These tests were:

1. The Otis Lennon IO test:

2. CTBS testing:

3. Teacher nomination.

The students in Program B were identified within the regular science process class by the teacher of L.E.A.P. Program B and the co-operating classroom teachers. These students were chosen for the

program based on their performance and skill in the higher level thinking skills of analysis, synthesis and evaluation within the science process program. This identification process took place after four weeks of direct classroom instruction and observation.

These students attended an out-of-class pull-out program designed to instruct the students in creative problem solving and the higher levels of thinking skills.

TEACHER PREPARATION PRIOR TO THE BEGINNING OF L.E.A.P. PROGRAM B

Prior to the beginning of Program B a manual (Appendix A) was compiled by the L.E.A.P. Program B teacher to enable the co-operating teachers to better understand the theoretical base and nature of the program within the regular science classroom. Bi-weekly meetings were to be held with the L.E.A.P. Program B and the co-operating teachers in September 1981 prior to the beginning of the program which started in the first week of October. The purpose of these meetings was to discuss with the co-operating teachers how the students would be identified, the objectives of the program and how these objectives would be carried out within the regular classroom setting. Specific areas such as how the science processes would be taught along with the thinking processes of knowledge, comprehension, application, analysis, synthesis and evaluation were discussed in detail. Theories behind gifted education and how they applied to the program were studied as well. There was an emphasis placed on Renzulli's Enrichment Triad Model and Bloom's Taxonomy.

There was also a half day inservice held in September 1981 for the

co-operating teachers to help them understand the six levels of Parnes
Creative Problem Solving Process which was to be used in the out-of-
class pull-out program with the gifted students.   The importance of the
L.E.A.P. teacher's visitations to the class in September to get to know
the students was stressed as being of primary importance to the success
of identifying students as quickly as possible.

TEACHER PREPARATION AFTER THE COMMENCEMENT OF THE PROGRAM

Bi-weekly meetings continued following the commencement of the
program in October 1981.   These meetings were held to keep the co-
operating teachers up-to-date on events and information about the
program.   Student's progress and attitudes were also discussed in terms
of their abilities within the higher level thinking skills.   Teachers
were given additional hand outs and current writings on gifted
education.   Any questions the co-operating teachers had regarding the
program were analyzed and discussed at these meetings.   The co-operating
teachers were granted six one half day inservice times to be used to
visit the Mentors with the students, and to observe the pull-out when it
started in January 1982.   These days were also left open for half day
inservice times where the teachers could meet from both schools and
discuss any common concerns or questions they have about the program.

PARENT INVOLVEMENT

It was decided that parents should be informed about Program B and

instructed in the type of instruction their children were receiving and the rationale behind it. The parents were to be informed in two ways:

1. All the parents whose children participated in the L.E.A.P. in-class science process program were to be informed about the regular class program. They were to be informed also that twelve to fifteen students would be taken out of the regular class once a week and taught in a smaller group in the creative problem solving processes after they were selected for the pull-out program. The parents were to be informed about the criteria used in selecting the students for the pull-out program. This was that the students would be identified according to their performance in the higher level thinking abilities and their understanding and application of the science processes.

2. Parents of Pull-out class. There would be a meeting called after the students are identified to be participants in the out-of-class pull-out. The parents were to be informed as to what their children would be studying in the out-of-class pull-out. Any questions or concerns were to be answered at that meeting. The parents were also asked to take turns transporting the students to the Mentor Program.

EVALUATION

The students in the regular class science process program were to be evaluated by how they understood and applied the science processes

using the science content as a framework. They were to be evaluated also on their performance in the various levels of thinking of knowledge, comprehension, analysis, synthesis and evaluation. They were to be tested by the L.E.A.P. Program B teacher by tests made up by the teacher covering the skills and processes taught within the classroom.

The students in the pull-out were evaluated by their performance in Levels I - VI of Parnes Creative Problem Solving Technique. This would be done by giving them real world situations and assessing their ability to apply the Parnes Creative Problem Solving technique.

QUESTIONNAIRE

The co-operating teachers were given a questionnaire which enabled them to state their opinions about the program. The questionnaire was designed by the author and was consistent with the objectives of the program. It was modified and validated by a panel of experts. This panel was asked to evaluate whether or not the questions on the questionnaire pertained to the objectives of the program. The teachers were asked to express their opinions in relation to the cognitive and affective aspects of the regular science process program and the once-a-week pull- out for the gifted and talented students. They were also asked to express their opinions as to whether or not they learned about gifted education through their participation in the program.

CHAPTER IV

PROGRAM PROGRESS

ADJUSTMENTS TO PROGRAM B

The purpose of this practicum was to develop a program for gifted and talented students that provided these students with intervention with peers of their own age. These Gifted Students also had the opportunity to interact with students of varied levels of ability along with being instructed amongst other gifted students. This practicum was also designed to provide a gifted program that used one of the regular curriculum subjects, science, to teach gifted and talented students according to Type I and Type II of Renzulli's Enrichment Triad Model (Renzulli 1977). Creative Problem Solving was taught in a limited way through the first two levels of Parnes Creative Problem Solving. This was Type III of the Enrichment Triad Model. This practicum was also designed to develop a program that would identify and teach the group of gifted/ talented students in the Parnes Creative Problem Solving Process within an individualized instructional time period, of two hours per week.

After implementing Program B, there were changes that had to be made to accommodate the co-operating administrators, teachers and the students. The changes were:

1. Timetabling became a concern part way through the year. Initially the time table was set up so that each of the grades three and four had three thirty-five minute periods per week of

instruction within the regular science process oriented classroom setting. School A requested that the timetable be adjusted so the two grade four classes would have a thirty-five minute class on Monday, and one grade four would have a seventy minute class on Tuesday. The other grade four class would have a seventy minute class on Wednesday. The grade three classes remained the same as before. The reason the co-operating teachers in the grade four classes requested a change was due to the fact that this time change would accommodate them in the timetabling of other subject areas. They felt it was better that the students had a longer period of instruction at one time. This change worked out well and consequently, the students had more time to finish their projects and their notes.

School B had a timetable that also allowed each of the classes to have three thirty-five minute periods of instruction per week. The grade three teachers requested that the students continue to have a thirty-five minute period of instruction on Monday and Tuesday, but one class have a seventy minute on the one Thursday, while the other grade three have the seventy minute period on the following Thursday. They felt the students needed one long period of instruction in which they could have more time to finish projects and write in their notebooks. The disadvantage to this timetable was that the teacher for the gifted program saw one grade three classroom three times a week, and the other two times the same week. There seemed to be quite a lapse of time before the one grade

three class got to see her the following week. The grade four teachers in School B would have liked longer periods of instruction for the students in their program as well. This was not possible due to the timetabling of the other subject areas.

2. <u>Lesson plans</u> were drawn up in some detail by the teacher of the gifted program prior to the teaching of each lesson. These were recorded in a day book. These lesson plan outlines were discussed with the teachers from both School A and School B from October to the end of the school year. There was an adjustment to this procedure after January/82 for School B. The teacher of the gifted program drew up all the lesson plans for each unit in detail, had them typed and submitted them to teachers in Schools A and B before teaching the unit. This enabled the co-operating teachers to have an overview of the concepts and processes being taught. These lessons were explained thoroughly to the teachers in School B at the bi-weekly meetings to enable them to understand what was occurring within their classroom. Questions and concerns were answered as they were brought to the attention of the teacher for the gifted program. School A were given the lesson plans and any questions they had were answered during the regular class time. It did not seem necessary to meet with these School A teachers to discuss the lesson plans as they felt they understood what was being instructed, and felt any additional meetings were unnecessary.

3. Meetings were held bi-weekly with the co-operating teachers from School A and School B. These were necessary in September/ 81 to explain the program and its objectives. These meetings continued in both School A and School B until November 18th. The co-operating teachers in both schools requested that these meetings be held only when necessary. It was decided that it was not necessary to meet on a regular bi-weekly basis due to the fact they felt they understood the program, its objectives, and the identification process involved in selecting students for the program.

In January 1981 this procedure was changed for School B. The bi-weekly meetings were reinstated for School B due to the need for the co-operating teachers to go over the lesson plans and discuss any concerns about the program. In addition, the two grade levels were split so the teachers for the gifted program met with the grade three and the grade four teachers separately alternate weeks. Then once a month she met with the grade three and the grade four co-operating teachers together to discuss any common concerns about the program. This was not necessary for School A. The teachers were very pleased with the program and voiced no particular concerns about the lesson plans or the program in general. Consequently, meetings were held as needed, but not on a regular bi-weekly basis in School A.

4. Attendance of Administrators. At the beginning of the program, when the meetings between the teacher of the gifted program and

the co-operating teachers from School A and School B occurred, the administrators were not requested to be there, although they were invited and very welcome to attend at any time. This changed for School B in January 1982. As the program progressed it was decided it would be beneficial if the Principal or Vice-principal from School B attend these meetings to give advice and to enable them to acquire first hand knowledge of what was going on with the program. In School A this procedure was not followed due to the fact that the Vice-principal had attended numerous classes as they were being taught and many teacher meetings.

5. Alterations to Programs. Originally it had been decided that Program B would consist of instructing the students in the science processes, the levels of thinking, and in Creative Problem Solving. After January 1982 it was decided that the regular science process classroom would be instructed in the first two levels of Parnes Creative Problem Solving Process only, due to a time factor. The out-of-class gifted program remained the same. The regular class had to be changed due to the time element. There was not enough class time to cover all the Science Processes and the Creative Problem Solving as well.

6. The Mentor Program Readjustment. Originally the Mentor Program met twice monthly in the pull-out part of the gifted program. This changed following January 1982. It was felt that the teacher of the gifted program needed more time to work with the students and follow up the studies begun with the mentors. It

was concluded that the Mentor Program should be more intense in the first semester because it proved to provide a high interest level for the students involved. As the year progressed, the students needed more time to research the various topics presented to them; they needed more in-class time. Consequently, the students visited the mentor workshops one time in total from January 1982 - March 1982. Other changes in the program were made as the year progressed. These changes reflected the concerns of the teacher of the gifted program and the co-operating teachers involved. Not all changes occurred in both schools. It should be noted that School A and School B had marked differences in the types of concerns and in the particular professional development needs of the co-operating teachers.

DAILY LOG

There was a daily log kept by the teacher of the gifted program. It outlined in detail the activities and events of the program as the year progressed. It recorded the procedures as the teacher of the gifted program taught the students in the regular in-class science process program and the pull-out.

SUMMARY

After implementing Program B it was found that timetabling had to

be adjusted, and the lesson plans had to be given to each cooperating teacher prior to the lesson being taught to enable the cooperating teachers to understand better what was taking place in the classroom. It was necessary to have regular meeting times and discuss any questions or concerns, preferably with administrators present. Because of the time element, the science processes and the creative problem solving techniques were adjusted so that the Science Process was taught along with the first two levels of Parnes Creative Problem Solving Techniques rather than the six levels.

The Mentor Program was attended much less frequently the second semester to enable the teacher of the gifted program to have more time for follow-up work with the students.

It was found that each individual school had concerns and adjustments unique to its own learning situation. Flexibility became a very important part of the success of the program both on the part of the teacher of the gifted program and the cooperating teachers.

CHAPTER V

RESULTS

INTRODUCTION

The gifted students participated in a regular in-class science program. The students were instructed in the science processes. They learned how to observe and describe properties. They were taught how to describe objects, graph, classify, order, measure, estimate, infer, predict and define operationally. They were also taught how to formulate hypotheses and interpret data. They also learned how to experiment.

The students were also instructed in the thinking processes: knowledge, comprehension, analysis, synthesis, and evaluation. The gifted students participated in an out-of-class pull-out once weekly for a two hour period of time.

The students were instructed in the six levels of Parnes Creative Problem Solving Process and in the higher levels of thinking of knowledge, comprehension, analysis, synthesis and evaluation.

COGNITIVE RESULTS OF THE REGULAR IN-CLASS SCIENCE PROGRAM

The students were tested using an instrument developed by the Program B teacher. This test was based on the processes taught, science content, thinking levels, and the first two levels of Parnes Creative Problem Solving Process (Appendix C). The results of this test

indicated that 90% of the student population received a mark of 75% or higher out of 100.

It was observed that the students learned vocabulary centered around the processes through direct observation. The majority of the students understood what the words meant, and how they applied to the science processes. Most of the students became aware of the levels of thinking and how they applied to the science program.

The regular science class had a wide range of abilities.

The gifted students spent most of their time in the integrated processes of defining operationally, controlling variables, experimenting, formulating hypotheses and interpreting data.

The students who had more difficulty developing the science process skills progressed more slowly. They learned from each other and from the gifted students as they studied together.

The gifted students spent most of their time within the higher level thinking skills of analysis, synthesis and evaluation. They acquired the knowledge, comprehension, and application skills very readily. Other students had difficulty in the higher level thinking skills and remained in the knowledge, comprehension, and application levels of thinking.

COGNITIVE RESULTS OF THE OUT-OF-CLASS PULL-OUT

The students were not formally tested in the out-of-class pull-out. They were evaluated by their responses during the class time and their abilities displayed in the problem-solving process. The

students were given real world problems centered around the student's particular area of interest. They worked through these problems in a logical, sequential way as outlined in the Parnes Creative Problem Solving technique.

RESULTS OF THE MENTOR PROGRAM

The Mentor system was a program attended by the gifted students. They attended workshops twice a month from October to December. The students attended one workshop from January to March. The Mentor program proved to be a highly motivational factor in terms of student interest. It created in the gifted student a motivation to learn new things and to enable them to have educational experiences that were unobtainable in the regular class time.

The Mentor program worked well as a "tool" to motivate the students and develop within the gifted learner a high interest level about a variety of subjects.

The Mentor program did not provide the teacher of the gifted students enough time to explore and study a given area of interest that the students had acquired from the Mentor Program. Consequently, the students were not able to study these areas of interest in depth, or to the extent they would have liked to study.

In January the Mentor Program workshops were attended one time only to enable the students to have time to study areas they had already begun to explore.

AFFECTIVE RESULTS OF REGULAR IN-CLASS SCIENCE PROGRAM

It was observed that the students in the regular science class enjoyed being together. No student felt as if he/she was not as "smart" as the student in the pull-out class. There was a lot of sharing of ideas and interaction amongst all the students.

The advantage of the regular in class program was that the children learned from each other as well as from the teacher.

The gifted students had a chance to interact with their peers, and did not feel as if they were left out of the mainstream of the school's social structure.

The non-gifted student had the gifted students to observe as an academic model. Some non-gifted students improved a great deal as they progressed through the science processes and the thinking skills in a sequential way.

AFFECTIVE RESULTS OF OUT-OF-CLASS PULL-OUT AND MENTOR PROGRAM

The gifted and talented students displayed much enthusiasm during their instruction in the pull-out and in the Mentor Program.

They enjoyed the challenge of problem solving and became very creative in their approach to it.

The gifted and talented students felt it a privilege to be in the pull-out and took a lot of initiative when working on individual projects. They were very interested in displaying their end products, explaining how they worked, what conclusions they arrived at, and how to

go about implementing the solution.

The parents of the students in the pull-out were very supportive of the program and very enthusiastic about their children's reaction to participating in it.

RESULTS OF IDENTIFICATION

The students selected for the gifted program seemed to be accurately identified. They performed well in the pull-out in their projects and in the creative problem solving tasks given to them.

RESULTS OF TEACHER INSERVICE

The cooperating classroom teachers were given inservice on various aspects of gifted education such as the theorists, mentor programs, identification and characteristics of the gifted and talented, and program design within the science process based program. The teachers were also given inservices on the six levels of Parnes Creative Problem Solving Process.

The teachers were given a general overview of gifted education. They would have liked more inservice time and more workshops to become more knowledgeable about gifted education and how to utilize the thinking skills and creative problem solving techniques within the regular classroom setting.

RESULTS OF QUESTIONNAIRE

The questionnaire was answered by eight co-operating teachers involved in L.E.A.P. Program B. They were asked to put a check mark in the place that indicated their opinions concerning each statement as to whether they strongly disagreed, disagreed, were neutral, agreed or strongly agreed.

1. Five teachers agreed the students in the pull-out were correctly identified as gifted. Two strongly agreed and one was neutral.

2. Six teachers strongly disagreed that the identified gifted did not apply the higher level thinking skills in the regular science process based program. Two were neutral.

3. Four teachers disagreed that the majority of the students felt they were "smarter" than the students in the regular science process based program. One strongly disagreed. One was neutral and two agreed.

4. Five teachers disagreed the majority of the students in the regular science process based classroom considered the work too hard for them to master. One strongly disagreed, one was neutral, and one agreed.

5. Seven teachers agreed the majority of the students in the regular science process based program did well in the knowledge, comprehension, and application levels of thinking. One was neutral.

6. Six teachers disagreed that the majority of the students identified as gifted in the pull-out had a great deal of difficulty in the higher level thinking skills of analysis, synthesis and evaluation. Two were neutral.

7. Six teachers agreed the students worked well with their peers in the regular science process based program. Two strongly agreed.

8. Six teachers disagreed that the majority of the students identified as gifted in the regular science process based program did not want to be separated from their peers and placed in a once-a-week pull-out program. One strongly disagreed. One agreed.

9. Five teachers agreed the majority of the students identified as gifted within the regular science process based program showed

evidence of using the higher level thinking skills on a constant basis within the regular science class. Three were <u>neutral</u>.

10. Six teachers <u>agreed</u> the majority of the students in the regular science process based program showed evidence of proficiency in the science process skills that were taught. One was <u>neutral</u>. One <u>disagreed</u>.

·11. Seven teachers <u>agreed</u> the majority of the students in the regular science process based programs learned from each other as well as from the teachers. One <u>strongly agreed</u>.

12. Five teachers <u>disagreed</u> the majority of the students in the regular science process based program did not enjoy being in the science class. Two <u>strongly disagreed</u>. One was <u>neutral</u>.

13. Five teachers <u>agreed</u> the majority of the students in the regular science process program became very effective observers. Two were <u>neutral</u>. One <u>disagreed</u>.

14. Five teachers <u>disagreed</u> the majority of the students in the regular science process program did not learn how to record their data. One <u>strongly disagreed</u>, one <u>agreed</u> and one remained <u>neutral</u>.

15. Six teachers <u>agreed</u> the majority of the students applied their learned thinking skills and processes in subject areas other than science. Two remained <u>neutral</u>.

16. Six teachers <u>disagreed</u> that the majority of the students in the regular science process based program did not learn the first two levels of Parnes Creative Problem Solving techniques. Two remained <u>neutral</u>.

17. Four teachers remained <u>neutral</u> on the statement that the majority of the students in the pull-out program learned how to apply the Creative Problem Solving Techniques to real world situations. Three <u>agreed</u> and one <u>strongly disagreed</u>.

18. Four teachers <u>agreed</u> and four teachers <u>strongly agreed</u> the co-operating classroom teachers gained more knowledge and new insight into gifted education after participation in in-services on gifted education and participation in the science process classroom.

19. Four teachers <u>disagreed</u> the co-operating classroom teachers did not feel they learned much about the identification and the characteristics of gifted students. Two teachers <u>strongly disagreed</u> and two <u>agreed</u>.

20. Six teachers <u>agreed</u> the majority of the students displayed much enthusiasm when attending the mentor program. Two remained <u>neutral</u>.

21. Six teachers <u>agreed</u> the majority of the parents whose children attended the <u>pull-out</u> program considered the program to be beneificial to the education of their children. One <u>strongly agreed</u> and one remained <u>neutral</u>.

22. Five teachers <u>disagreed</u> the majority of the parents whose children attended the <u>pull-out</u> program did not feel good about having their children separated from the regular classroom activities. Two teachers remained <u>neutral</u> and one <u>strongly disagreed</u>.

SUMMARY OF RESULTS OF QUESTIONNAIRE

The majority of the co-operating teachers involved in L.E.A.P. Program B felt the students involved in the pull-out were correctly identified as gifted, and applied the higher level thinking skills within the regular science process based program. They also indicated the students identified as gifted displayed positive attitudes about being separated from their peers and participating in the once-a-week pull-out, but felt they were "smarter" than the other students.

The majority of the co-operating teachers agreed the students identified as gifted showed evidence of using the higher level thinking skills on a constant basis within the regular classroom. Half of the teachers were neutral on the statement that the students in the pull-out learned to apply creative problem solving techniques to real world situations. Three agreed the students had learned to do this, and one strongly disagreed. The majority of the teachers indicated the parents felt the program was beneficial to the education of their children. They also specified the students enjoyed the Mentor Program. The co-operating teachers agreed the students in the regular science process classroom did not feel the work was too hard for them to master and enjoyed being in the class. The teachers indicated the students did

well in the knowledge, comprehension and application levels of thinking, and worked co-operatively with their peers in the science process class. The co-operating teachers also indicated that the majority of the students in the science process program became proficient observers, and learned from each other as well as the teachers involved. They also indicated the students learned to record their data and applied their learned thinking and process skills in subject areas other than science.

The co-operating teachers also indicated the students in the regular science process class learned the first two levels of Parnes Creative Problem Solving Process.

The majority of the co-operating teachers indicated they had gained more knowledge and insight into gifted education after participation in the program.

SUMMARY

The gifted students participated in the regular science process program. They were taught the science processes of describing objects, graphing, classifying, ordering, measuring, estimating, inferring, predicting, defining operationally, formulating hypotheses, experimenting and interpreting data. These science processes were instructed by way of the thinking processes of knowledge, comprehension, analysis, synthesis and evaluation.

The gifted students were identified through their performance in the science process class. The identified gifted students then attended a once-a-week pull-out class.

The students in the regular science process class were taught the first two levels of Parnes Creative Problem Solving Process. The pull-out group of identified gifted students were taught the six levels of Parnes Creative Problem Solving Process. The students in the regular science process Class were tested using an instrument an instrument developed by the Program B teacher.

The test results indicated the majority of the students performed well in the learned science processes and in the levels of thinking of knowledge, comprehension and application.

The gifted students learned the six levels of Parnes Creative Problem Solving Process and the higher levels of thinking of analysis, synthesis and evaluation.

The co-operating teachers learned more about identifying and programming for gifted students.

CHAPTER 6

SUMMARY AND CONCLUSIONS

SUMMARY

The L.E.A.P. Program B proved to be a very challenging year. It was a unique program which was designed specifically to teach process skills to all students and through these processes to identify and pull-out the gifted students.

The in-class science program provided all students with instruction in science processes, thinking skills and two levels of Parnes Creative Problem Solving technique. This enabled the gifted student to interact with the peers of his/her same age group.

The science program also provided the gifted student with instruction with a curriculum subject. Consequently, he/she did not miss a subject he/she needed in the regular school program.

The non-gifted student had the experience of having the same type of instruction that the gifted students had in the science processes and the thinking skills. The program was modified to meet the needs of the student at the various levels of ability.

The timetabling of some of the science classes had to be adjusted to provide a large instructional time period for the students.

The out-of-class pull-out provided the gifted student with activities geared to challenge the student and provide scope for stretching the potential of the gifted child.

The Mentor Program provided workshops that enabled the student to

experience areas of study that were not available in the regular school system. It had to be modified part way through the year due to the lack of time to study given areas of interest in depth.

The co-operating teachers observed and participated in the instruction within the regular science class. The success of this exercise varied, depending on the dedication of the particular cooperating teacher toward the gifted program.

Some of the co-operating teachers worked very well in the science classroom, and utilized many of the techniques and processes in their own classrooms within the framework of a variety of subject areas.

Other co-operating teachers were not as successful in the science classroom. They had some difficulty in understanding how the science processes applied to science content, and were reluctant to participate within the classroom itself. They were also reluctant to utilize the process techniques within their own classrooms.

It was helpful to have administrators attend and participate in the meetings and in the classroom activities. This provided them with first hand knowledge of what was being taught within the program itself.

CONCLUSIONS

The regular in-class science program was good for all students in that it provided teaching practices that gave the students science process and thinking skills instruction.

The pull-out provided gifted students with a program designed uniquely for them. It provided the gifted students with the opportunity

to expand their problem solving potential and help them to become more effective thinkers.

The Mentor Program was a very positive exercise for gifted students in that it provided them with new and unique areas of study that they could not acquire in the regular classroom. It had to be modified to provide the students with more follow-up time to pursue their various areas of study.

Inservice time was provided for the co-operating teachers to give them instruction in various aspects of educating the gifted student, and in identification procedures. The co-operating teachers were inserviced on various aspects of gifted education. They developed an understanding of the general objectives of the program. These included the identification and characteristics of gifted students and their program development. They also obtained a general understanding of the levels of thinking of knowledge, comprehension, application, analysis, synthesis and evaluation and how they applied to activities within the regular science process classroom and the concepts outlined in the six levels of Parnes Creative Problem Solving process.

The co-operating teachers were a positive asset to the program providing they were dedicated to the concept of gifted education. The co-operating teachers who were not dedicated to the concept of gifted education provided the teacher of the gifted students with a great deal more inservice time and paper work to try and explain in detail the theoretical base behind the program and why certain teaching techniques were necessary within the gifted program.

If teachers need a lot of background and are uncertain as to

whether they are convinced gifted education is an integral part and a
much needed facet of the educational system, they should remain outside
of the program until they have this background. If they enter the
program without a positive attitude toward the program there is a
tendency to spend too much time inserving the teachers instead of
placing the instructional time on the students.

The program was developed by a committee of seventeen LEAP PROGRAM
B administrators and teachers who were interested in gifted education.

The procedures were outlined in Chapter 3. However, the reserchers
believe it would be more beneficial to have a wider range of teachers at
each grade level. Details on suggestions for beginning of a program are
outlined in Appendix D.

RECOMMENDATIONS

1. That the grade four classes be scheduled for 45 minute periods of
    study in the science program instead of the present 35 minute
    period.

2. That the teacher of the gifted program meet with the gifted
    students in the out-of-class pull-out twice weekly for a shorter
    period of time.

3. That science continue to be used as the subject through which the
    thinking skills and creative problem solving techniques be taught.

4. That the "Mentor Program" occur once monthly.

5. That a more formalized method of testing the students in the higher
    level thinking skills be used, rather than only teacher
    observation, to identify gifted students.

6. There should be modifications as to how the program should be initially started.   There are a variety of ways to initiate a program for gifted students.   It is largely dependent upon the level of interest in gifted education and in the participants of the actual program developed (Appendix D).

7. Ideally, it is useful to have a wide variety of grade levels represented on the initial program planning committee.   This broader range of committee members will serve to better meet the needs of the program gifted students at the various grade levels (see Appendix D).

8. That teachers who are not committed to the concepts of gifted education be excluded from the program.

9. That it be emphasized that teachers involved in the program need to be positive and flexible people in order to make the program work well.

10. That teachers have more school time for inservice purposes to deal with any questions or concerns that arise during the year.

11. That the co-operating teachers involved with the gifted program take an active part in lesson planning along with the teacher of the gifted program.

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APPENDIX   A

Teacher's Handbook on

Gifted and Talented Education

TEACHERS HANDBOOK

A handbook was given to the co-operating classroom teachers by the teacher of L.E.A.P. Program B. This handbook was developed to provide the teachers with an overview of the various aspects of gifted education.

It provided information on the identification and the characteristics of the gifted and talented student, Checklists, Parent Inventories, case study forms, teacher nomination forms, parent forms, the Williams Scale for rating thinking and feeling behaviors, the Renzulli Scale for rating behavioral characteristics of the gifted, testing information, curriculum planning, lesson plan guidelines, Bloom's taxonomy and application of Bloom's taxonomy to a unit of study objectives for children learning science, mentors and mentor programs, Parnes Creative Problem Solving techniques, and a bibliography of books and materials on gifted education.

There are no vegetables in my garden.
Cucumbers, with their crawling vines, will
  never grow here.
Those rotting, sticking, over-ripe tomatoes
  cannot find their way to my special place.
Orange carrots that burrow into the
  dark earth won't be allowed in my garden.
Leaves will not blow about here for there is
  no wind.
The soil is never wet because there is no soil
  and there is no rain.
No one ever sees my garden
Not even me
For in my garden are many thoughts and
  ideas that grow and ripen
And when they are ready I will pick them
  and eat them.
They feed my mind.

LeAnne Mackey

IDENTIFYING THE GIFTED AND TALENTED CHILD

In our search for the gifted child we are concerned with
identifying a set of behaviorial skills which in some way differentiates
the gifted child from the remainder of the population. In a very
general fashion, then, we should begin by establishing a definition
of giftedness as a beginning. Wood in his short pamphlet on the
teaching of gifted children in England offers a somewhat cynical
definition of giftedness evident in the classroom. He says the gifted
child either has his hand up first and knows the right answer, finishes
his work first and proceeds to create havoc or is clever enough to be
at the bottom of the class if he chooses. [1] The far more formal
definition of giftedness emerged from the U.S. Office of Education
in 1972. They state that the categories of giftedness is six-fold:

general intellectual ability, specific academic aptitude, creative
or productive thinking, leadership ability, visual or performing
arts and psychomotor ability. [2] The gifted, then excel in one or
more of these specific areas.

We are, therefore, seeking the child who shows a quantitative
difference in the speed of their physical, intellectual, social or
emotional development. The gifted child learns to walk at an earlier
age, is more physically fit and agile, reaches puberty earlier and
demonstrates fewer disabilities in, for example, vision or hearing. [3]
He talks at an early age and uses a wider, more enriched vocabulary.
Often they read sooner than school age and are sometimes self-taught.
Their maturity of thinking skills are likwise superior, in both
complexity and depth. [4] Not only is speed of development more
advanced but there is a real qualitative difference between the
gifted and the more normal ranges. These children appear to have a
more profound perception of their environment and tremendous
sophistication within their own range of capacities. They appear to
think and act in a way no normal child at any age can manage.

Before we consider the more specific characteristics involved
in the identifying of a gifted child some very basic considerations
must be taken into account. There is only space to isolate a few of
these considerations. The first idea to be emphasized is that gifted
children differ as much from each other as they, as a group, differ
from the remainder of the population. We must, therefore, consider
the individual child and his needs as we should in the case of any
other exceptionality.

The factor of cultural relativity with regard to giftedness is obvious and important. Because of the needs and values of a society, it chooses certain traits that describe its ideas of giftedness or superior ability. They are often substantially different when we compare the concept of giftedness in differing cultures. For example, the mainstream of North American society would most likely identify the following items as indicators of giftedness:

> Early language acquisition: uses a large vocabulary; speaks in long, complex sentences; talks early and often.

> Fine and gross motor skills: walks, climbs, runs early and well; controls small objects such as scissors, pencils, crayons; handles tools well.

> Intellectual areas: reads signs or even books; does mathematical problems; draws associations among diverse ideas; remembers facts and events; is interested in social and moral issues; has a long attention span; asks why.

> Social areas: has empathy for others; is self-confident and independent; organizes and leads group activities; very active both mentally and physically.

> Creative areas: has a vivid imagination; enjoys playing with words and ideas; shows a highly developed, often verbal sense of humor; uses objects, toys colours in imaginative ways.

> Specific areas: plays musical instruments; plays sports well; sings; in general, shows remarkable ability in specific area. [5]

In somewhat of a contrast the traits identified within the cultural milieu of the Chippewa Tribe of Minnesota are certainly an indication of differences in emphasis:

> Emotional responsiveness: this type of person listens intensely and has a strong empathy for others--is highly aware of the feelings, distress, and needs

of others.

Richness of imagery: the Chippewa language is rich
in imagery; the child shows strong imagery in dance,
movement, in relating to experience, in role-playing,
drawing or other art work.

Responsiveness to the concrete: a tendency here to
also take pride in strength and distrust of schooling.

Enjoyment of and ability in creative movement and
dance: the child shows enjoyment and absorption in
these areas.

Enjoyment and ability in visual arts: joy and ability
in drawing, painting, sculpture or photography. The
beauty of Indian crafts leads one to believe there
are many gifted artists.

Ability to improvise with commonplace materials and
objects: children exhibit this behavior by making
toys and games from commonplace things, using common
materials for unintended purposes at home and school,
and using common material inventions. One boy used
raw potatoes as his toy cars and trucks. [6]

The North American list tends to more intellectual, physical

and social values whereas the Chippewa tribe centers its values

around the more creative areas of dance, art and using materials

in different, novel ways with emphasis also on the affective area.

Often value systems are totally opposed. The loud, brash street

behavior of the Negro is totally inappropriate in the eyes of middle

management. Differences, then, in cultural upbringing of a child

will influence the determination by others as to whether he or she

is gifted.

Consideration must also be made of the role of stereotyping in

the indication of giftedness. Our preconceptions as to what type

of person is gifted have lead us to include those who are not gifted

and exclude those who are. Most persons, when asked to identify

the traits of a gifted person would most likely think of the

bespeckled, anemic, anti-social bookworm who spends his time vor-
aciously reading Paradise Lost at the age of seven or the person
composing sonatas at the age of three. The fact of the matter is
that the gifted on the "average" tend to be healthier, taller and
more socially precocious then their peers. Sociograms indicate that
the gifted are very popular with their age group. [7]

Teachers, even more so it appears, then the general population
are guilty of often inaccurately stereotyping the gifted. They tend
to think of the smart (because he knows the correct answers often),
kind, helpful, courteous and clean child as the one who is gifted.
Whereas the gifted student may well be the child who is mischievious,
untidy and noisy. The fact remains, as established by research,[8]
that in 50% of cases teacher identify those children who are not
gifted as being such and miss many who are so.

To expand our own concept of giftedness and go beyond, at least
a few steps, the common stereotypes of giftedness, it is perhaps
useful to use the model discussed by Dr. Edward Frierson at a
conference on giftedness held in May, 1981 at the University of
Manitoba. He did not indicate the actual source of the model, it
may well be his own, and he draws heavily upon Elizabeth Drews'
book Learning Together.[9] The model represents four different areas
of giftedness--the studious high achievers, the social leaders, the
rebels and the creative intellectuals. Persons representing these
various types differ not only in their major interests but also in
basic personality types, the degree of social integration and responses
to others, in general learning styles and in sources of motivation.
The model can be represented in this form:

```
        ←───────────────→
   ↑  ┌──────────┬──────────┐  ↑
   │  │ Social   │ Studious │  │
   │  │ Leaders  │ High     │  │
   │  │          │ Achiever │  │
   │  ├──────────┼──────────┤  │
   │  │ Rebels   │ Creative │  │
   │  │          │ Intellectual │
   ↓  └──────────┴──────────┘  ↓
        ←───────────────→
```
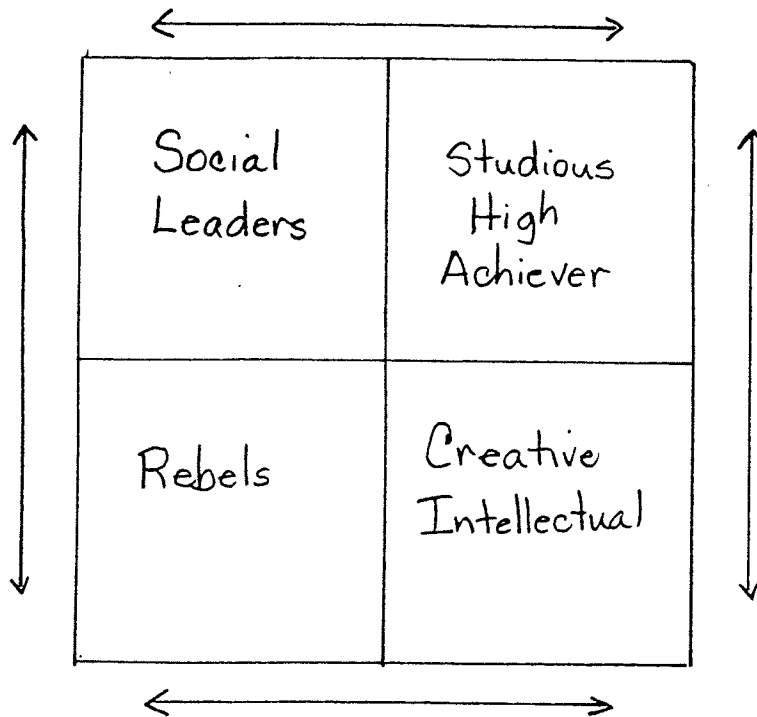
The arrows on the model are an indication of
possibilities of motion or change. There can
be horizontal and vertical motion but no
diagonal motion. In other words, with proper
stimulation a social leader can become a
studious high achiever or a rebel but never a
creative intellectual. A rebel could become
a social leader or a creative intellectual
but never a studious high achiever.

The studious high achievers are those most commonly thought of

as gifted and comprise a large proportion (60%) of the gifted

population. They are the "A" students. They are very much influenced

by what they think society expects of them. As a result, they tend

to be motivated by approval of adults either parents or teachers.

They tend to spend a good deal of time with their books partly

because of a real desire to learn but considering that they are

motivated by adults there is some pressure and resulting anxiety

with the thought that they just might receive a "B$^+$" on the next test.

The social leaders (about 20%) contrast to the studious high achievers not so much in potential ability--they are as intelligent but in the source of their motivation and in interests. They are far more concerned with peer approval and tend to be energetic organizers. They are the class presidents in schools. They involve themselves with many activities with their peers and find little time for studying and coast along with slightly above average marks. Their teachers quite often realize their ability but social leaders despite expressed and quite genuine intentions to study never quite manage to do so because the next dance is on Friday and nobody has made decorations.

The creative intellectuals (about 20%) are the poets, writers, artists and musicians who are dedicated to self-expression and are perhaps less involved socially because of a tendency to singleness of artistic or intellectual purpose. They are often introspective, contemplative and highly sensitive although it is obvious that gregarious artists do exist. In Drews book, she offers the example of Jane Goodall as a creative intellectual. Goodall from her early childhood showed a determination and single-mindedness in her study of animal behavior which Drews believes is characteristic of this group of people. Her intense, self-directed actions as a child involving her own natural history museum and magazine about animals developed as an adult into a capacity for lonely, patient observation of chimpanzee behavior in the wild. Goodall's desire to learn and express her findings are one example of the creative intellectual at work. [10]

The final category concerns the rebels. Intellectually brilliant,

few in number, they have a totally alien relationship to the rest of the world. They have not absorbed many social values. In the example Friedson gave, one boy at the college level failed every course but one--chemistry. He had an "A" in that. He was using his knowledge and stealing supplies from the labratory in order to build bombs.

Drews discusses at length one boy named Don who like so many rebels was a failure at school and a drop out at seventeen. The product of a chaotic home life in which several of his family were either declared insane or living at extremes with tendencies to both social and political excesses. He was extremely intelligent and with a grade ten education far outshone university graduates in his reading level. He expressed his ideas in poetic terms like a young Shelley. At school, he absorbed and wrote an inspired critique of one of Max Weber's works to which his overworked football coach teacher thought of as the work of a Communist. This particular episode caused him to drop out of school. He also either contemplated suicide for himself or entertained the idea of killing many persons with a hand grenade. In the next few moments he wanted to become president of the United States and save the wretched of the world from themselves. The despair, intensity of emotion and the feeling of being an alien is part of the rebels mind set. Many are not recognized for what they are and do with great anguish destroy themselves. [11]

IDENTIFICATION--NOTES

1 D. Wood, <u>Teaching Gifted Children</u> (Hyde, Cheshire: Francis Gerrard (Publishers), 1973), p. 6.

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3 C. Burt, <u>The Gifted Child</u> (London: Hodden and Sloughton, 1975), p. 135.

4 S. Bridges, <u>Problems of the Gifted Children</u> (New York: Crane, Russak and Co. Inc., 1973), pp. 7-14.

5 F. Tuttle, Jr. and L. Becker, <u>Characteristics and Identification of Gifted and Talented Students</u> (Washington, D.C.: National Education Association of the United States, 1980), p. 14.

6 Tuttle and Becker, pp. 16-17.

7 Wood, p. 6.

8 Tuttle and Becker, p. 54.

9 E. Drews, <u>Learning Together: How to Foster Creativity, Self-Fulfillment and Social Awareness in Today's Students and Teachers</u> (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1972)

10 Drews, pp. 62-63.

11 Drews, pp. 5-28.

CHARACTERISTICS OF THE GIFTED AND TALENTED

It is important to remember that gifted children are individual and even though they have similarities as a group, they also possess a wide range of personal differences. There have been many lists compiled which show characteristics common to the gifted. One cannot, however, use these as checklists to determine giftedness as gifted children will not necessarily display all the qualities and they may even conceal these qualities. [12]

The following three profiles, compiled by Gertrude Hildreth, help to show that similarities can be drawn but also that individual differences do exist.

Profile A

"Teachers quickly discovered that "A" was a bright child, full of vitality, enthusiastic, humorous and playful, always doing things with vim and gusto. The other children respected his intelligence and admired his vast abilities. He proved to be a leader in dramatic play, with a head full of fertile ideas and language expression equal to any occasion. With adults he was thoroughly at ease.

"A" proved to have an aimable disposition, to be friendly toward other children, but he was not able to plan or work with them well because he was always so far ahead of the others in his grasp of a situation.

"A" enjoyed "clowning" and amusing people. He tended to lampoon other children who were slow and clumsy. ... Although the children enjoyed his sense of humor, they resented the tricks he was forever

playing on them and the way he used his cleverness to wriggle out of
difficult situations when he was caught.

Very early he tended to dominate any situation, shoving others
aside in dictatorial fashion. ... insistent on having his own way,
inclined to fight when controversy arose. He was not always inclined
to take the blame when he should. ..."

Profile B

"At an early age showed ability to make adjustments easily, to
accept suggestions from teachers, so be reséonsible in following
routines, and dependable in carrying out instructions. He was
exceedingly agile and nimble in his movements, able to work with high
concentration of attention, tending to complete jobs. He worked with
purpose and planning, showed evidence of leadership, and found a place
for himself in a group of like-age children. He proved to be at ease
with adults, companionable in the family circle. He appeared to have
more ability than he actually put to use. He tended to be a gay,
happy youngster, inclined to laugh easily. As he developed his leader-
ship traits stood out more and more. He was decisive with a serious
purpose, but his face easily lighted up over a joke. ... He was
tolerant of others, had definite standards of right and wrong and
was well liked and respected by all. ..."

Profile C

"... "C" was described as having an alert, happy, sensitive
face with eyes that glowed with friendliness and humor. He proved
to be one of the most naturally friendly children ... and his joy
in life was unabounding. At times he was inclined to go to greater

lengths in hilarity and fun than was helpful but he responded well to quieting down. ... His great friendliness and many interests tended to make him more popular than was sometimes good for him, for he was inclined to fool around, to be distracted and to waste time. The boy was creative and original. ... He was generous and sincere in praising others for accomplishing a good job." [13]

All three boys were admired, "A" for his cleverness, "B" for his leadership qualities and "C" for his love of life and fun. "A" fully used his potential but isolated himself from his peers. He was not socially well adjusted. "B" did not utilize his full capacity and tended more to conform to standards. He, however, was well liked and a natural leader. "C" was extremely popular to the detriment of his academic work. He was very highly involved in social functions and pursued many interests. The profile of "A", "B" and "C" are different and so will each profile of every gifted student be different. This makes the problem of identifying these students even more difficult.

Researchers have established, however, lists of general characteristics and they have been fairly consistent in their findings.

The gifted as a group tend to be stronger and healthier than the average child. They learned to walk and talk at an earlier age and have fewer physical and sensory impairments than the average population. (Bradley and Earp, 1970; Feldhusen, 1966; Miles, 1954; Terman, 1925; Thomas and Crescimbeni, 1966; Witty, 1951.)

The gifted tend to be a more curious group, and have longer

memories and a keen sense of time. (Barbe, 1965; Feldhusen, 1966; Kirk, 1962; Isaacs, 1971; Jacobs, 1972.)

They have many interests, although they may have a stronger interest in one area, and are involved in many kinds of hobbies. (Feldhusen, 1966; Isaacs, 1971; Lucito, 1963; Telford and Sawrey, 1967; Terman, 1925; Thomas and Crescimbeni, 1966.)

The gifted have many talents and abilities. They can have a superior ability in one or more areas such as social leadership, art, creative writing, mathematics or mechanics. (Feldhusen, 1966; Goldberg, 1965; Isaacs, 1971; Torance, 1965; Witty, 1970.)

They produce work that is unique. They are creative and show vitality. (Barbe, 1965; Bradley and Earpe, 1970; Issacs, 1966; Torrance, 1966.)

The gifted child has unusual abilities in using higher levels of thinking. He can organize, integrate and evaluate. (Guilford, 1965; Isaacs, 1971; Torrance, 1970; Witty, 1967.)

The gifted exhibit leadership ability. (Getzels and Jackson, 1962; Isaacs, 1971; Terman, 1954; Terman and Oden, 1944,1959; Witty, 1951,1967.)

These children possess favourable social characteristics and have desirable personalities. (Barbe, 1965; Bradly and Earpe, 1970; Garrison and Force, 1965; Telford and Sawrey, 1967.)

There have been eight areas identified in research for gifted education. Gifted and talented children are capable of high

performance in at least one of these eight areas or may be gifted in combinations of the eight:

1. General Intellectual Ability

2. Specific Academic Ability

3. Creative or Productive Thinking

4. Leadership Ability

5. Visual and Performing Arts

6. Psychomotor Ability

These categories are in accordance with the U.S. Senate definition of giftedness in 1972. There are two other areas that should be explored when considering giftedness:

7. The Disadvantaged Child (Gifted)

8. The Underachiever Gifted

The Intellectual and Academically Gifted

These children can usually be recognized by high test scores, high achievements, and high I.Q. scores. They seem to get by with relative ease and find no task a burden. The following can be seen as characteristics of this group:

1. They are observant and alert.

2. They have exceptional retention powers.

3. They are very curious and ask many questions.

4. They learn easily.

5. They can become absorbed in their work.

6. They express themselves well.

7. They apply knowledge they have learned.

8. They understand abstract relationships.

9. They are problem solvers.

10. They know many things beyond their age level.

The Creatively Gifted

There are many definitions of creativity. Gilford (1959) defines creativity as being more than a general trait. It includes, "originality, flexibility, fluency, motivational and tempermental traits as well." [14] Creative individuals tend to be more spontaneous and non-conforming, more sensitive and emotional.

Torrance sees the characteristics of the creatively gifted as follows:

1. They never seem to be bored.

2. They are very curious and attracted by the mysterious.

3. They make up their own mind.

4. They do not strive for power but stand firm on his own feet.

5. They are self-confident.

6. They are intuitive.

7. They are energetic and motivated to do things on their own.

8. They have deep convictions.

9. They are willing to take risks.

10. They are accepting of disorder and often have more than one thing started.

11. They don't worry about being thought of as different.

12. They can become preoccupied.

13. They are persistent.

14. They are independent thinkers.

15. They are adventurous.

16. They set goals.

Creative Potential can be determined, according to Mary Meeker, by asking the following questions:

1. Does he/she show unusual sensitivity to people's feelings, for problem solving, to the harmony of sounds or vision?

2. Does he/she have rapid verbal or motor responses?

3. Does he/she show originality in ideas, in expressions, in motor skills or in his/her sense of humor?

4. Has he/she the ability to organize much information people, or things?

5. Has he/she the ability to abstract meaningful information?

6. Has he/she a high level of energy?

7. Does he/she perserve in his/her work?

8. Is he/she impatient with rote work?

Leadership Ability

Leadership is an ability which involves the taking of responsibility of directing and coordinating in group situations. It's an ability that is highly useful in our society. Characteristics of the gifted in leadership are summarized below:

1. They can be counted on to carry through with responsibilities.

2. They are confident with both children and adults.

3. They seem to be well liked and may be quite popular.

4. They are cooperative.

5. They express themselves well.

6. They adapt readily and seem undisturbed by changes in routine.

7. They are sociable and tend to dominate or direct activities.

8. They participate in most school functions.

9. They are popular partners in work and in play.

The Talented

Talented children have the ability to create new ideas or work. They do not reproduce what others have done but either extend those or recreate their own works. The talented art student may have the following characteristics:

1. They show a strong interest in anything visual and remember detail.

2. They spend a great deal of time drawing, painting, modeling or constructing.

3. They work seriously and demonstrate skill.

4. They experiment with media and do the unconventional.

5. They plan.

6. They produce work superior in balance, unity design or color and have distinctive styles.

The characteristics of the talented in music are as follows:

    1. They show unusual interest in music.

    2. They are responsive to mood.

    3. They can repeat rhythmic pattern with
       ease.

    4. They can sing in tune.

    5. They can identify similarities or
       differences in short rhythmic patterns.

    6. They can identify tones as higher or
       lower, familiar songs by rhythm alone,
       and short melodies.

Ability in Psychomotor Activities

These are children who express an unusual ability in dance or sports. They tend to have superior fine and gross motor skills. The psychomotor gifted display characteristics such as:

    1. They show strong interest in motor activities.

    2. They demonstrate advanced eye-hand coordination.

    3. They enjoy movement and demonstrate a wide range of
       it.

    4. They show exceptional balance, agility, and stength
       for their age.

    5. They show outstanding ability to combine and
       adapt previously learned motor skills.

The Disadvantaged Child

These children are disadvantaged in terms of economics, social-

ization, environment, or language. Identifying these students is somewhat more difficult as our testing materials do not properly account for these variables. Their strengths, however, tend to be in figural concepts, social intelligence, divergent problem solving, and transformations. E. Fitzgerald (1975) proposes the following as characteristic of this group:

1. They have verbal proficiency in small groups.

2. They have good vocabulary compared to age level and have information on various subjects.

3. They are keen and alert and are concerned with the how and why of things.

4. They can generalize.

5. They read independently.

6. They look for individual differences.

7. They can separate complicated materials into respective parts, reason things out and see logical and common sense answers.

8. They learn easily and use and adapt new information.

9. They learn English rapidly if English is a second language.

The Gifted Underachiever

Some gifted children do not perform well in school. They may have become bored due to lack of challenge, they may have conformed to traditional teaching and materials, or they may have been non-

conformists and have been alienated by the teacher. As a result, deficits in basic skills can show up and/or they can become real behavior problems. May Seagoe has suggested characteristics of the gifted underachiever:

1. They may resist direction.
2. They may have difficulty in accepting the illogical.
3. They may invent their own systems.
4. They dislike dull and routine.
5. They need mastery of foundation skills.
6. They have a critical attitude towards others and need to be discouraged from self-criticism.
7. They resent interruptions.
8. They are stubborn.
9. They are very sensitive to criticism.
10. They become frustrated with inactivity and absence of progress.
11. They have a tendency to rebel.

When identifying these children, one needs to look specifically at each of the eight categories and decide where the child seems to fit. There are a number of devices or methods that can be used to check each area.

In exploring the area of intellectual or specific academic giftedness, one could use teacher recommendation, both past teachers and present teacher can supply valuable information. Intelligence scores, both group and individually administered scores, can be used. Achievement test and diagnostic scores can be checked and specific

achievement tests given in the area thought to be gifted. Cumulative and resource records might contain information such as outside interests, scores, test results and old report cards. The parent and student inventory instrument might also be used.

The area of leadership abilities can be identified using sociometric test, teacher recommendations, peer identification and anecdotal reports.

Identification of the creative or productive thinker can be made using teacher recommendations, records, inventories, peer identification devices, situational tasks, and creativity tests.

Giftedness in the area of visual and performing arts can be made on speciality teacher's recommendation, inventories, peer identifications and on student interest and value inventories.

Psychomotor ability can be measured by specialty teacher's reports, peer identifications and parent inventories.

Giftedness is not always easily seen by the classroom teacher. If teachers are aware, however, of the different components of giftedness and the characteristics of them, then, perhaps this awareness will help to point out students who are possibly gifted and need some special consideration in our school programming.

CHARACTERISTICS--NOTES

12 F. Tuttle, Jr. and L. Becker, <u>Characteristics and Identification of Gifted and Talented Students</u> (Washington, D.C.: National Education Association of the United States, 1980), p. 12.

13 F. Laycock, <u>The Gifted Children</u> (Illinois: Scott, Foresman and Co., 1979), pp. 11-13.

14 Telford and Sawrey, <u>The Exceptional Individual</u> (New Jersey: Prentice-Hall Inc., 1972), p. 156.

TESTING FOR GIFTED AND TALENTED STUDENTS

We have outlined eight general areas of giftedness. These are general intellectual ability, specific academic aptitudes, creative productive and cognitive thinking, leadership ability, visual and performing arts and psychomotor abilities. Because of this broad based concept of giftedness, there is need to employ a multiple criteria in the identification and testing process. [15] Group screening should be thought of as a preliminary step toward identification in which group intelligence and achievement tests, teacher judgment, teacher checklists, student interests, peer nomination are used.

The drawback to using group tests to identify the gifted is that their content is designed for the majority of pupils within certain age and grade ranges; content for the gifted is limited to a few items. The problem that results from using group tests is that an artifical "ceiling" or limit is imposed on a child's I.Q. score. However used in combination with other methods group tests are effective screening devices. [16]

Individualized tests have a number of advantages over group tests. A broader sampling of abilities is possible, better testing condtions can be arranged and a greater range of aptitude in any area can be tested. It is important to use individual tests that provide an adequate ceiling and measurement in a number of abilities. Individualized tests would include areas such as intelligence, achievement and aptitude. Also other checklists and inventories would include such sources as parents, other teachers, administrators, and social and leadership inventories. [17] There has also been

considerable development in the area of testing children in creative
or productive thinking. Measurements of fluency, flexibility, orig-
inality, elaboration, quantity and quality of creative achievements
are used. The measurements require different kinds of thinking
processes.

The different types of information needed for identification
would basically consist of the following three categories using
group or/and individual tests were applicable:

1. Measurements of intelligence, creativity,
   and achievement.
2. Nomination forms, checklists, and inventories.
3. Diagnostic information. [18]

The end product of the identification process is the case study
where all information concerning a student and his/her unique abilities,
talents, interests, specific educational accomplishments are made
apparent to educators. In the study, consideration should be given
to the child's health, language status, intellectual stimulation at
home, nutrtion, attitudes, test results, and checklist and inven-
tory results. [19] The more complete the information, the greater
the base for understanding and effective planning. The study should
be cumulative. It should have on going data on pupil progress.
Yearly reevaluation of student progress and recommendations for
continuation are necessary. [20]

The criteria for inclusion in the program must include some of
the following:

1. 130 or higher score on an individual

   I.Q. Test.

2. Outstanding achievement in academic areas.

3. Creative or productive potential. [21]

Following are some of the tests and examples of inventories and checklists. There are many others.

Group Achievement Tests

1. California Test of Basic Skills (grades 1-8)

2. Iowa Tests of Basic Skills

3. Metropolitan Achievement Test (grades 1-12)

4. Stanford Achievement Tests (grades 1-9)

5. Cognitive Abilities Tests (grades K-8)

Group Intelligence Tests

1. Otis-Lennon

2. Slosson

Group Diagnostic

1. Stanford Diagnostic in Reading and Math.

Individual Achievement

1. Any of the group achievement tests which
   ensure that the child can reach his/ her
   ceiling ability.

Individual Intelligence Tests

1. Stanford-Benet Intelligence (grades K-12)

2. Wechsler Intelligence Scale for Children (WISC)
   (Ages 5-15)

3. Wechsler Adult Intelligence Scale

4. Peabody Picture Vocabulary Test (grades K-12)

5. California Tests of Mental Maturity (grades 4-12)

Individual Diagnostic

1. Stanford Diagnostic in Reading and Math.

Creativity Tests

1. Torrance Tests of Creative Thinking, Verbal (grades 4-12)

2. Torrance Tests of Creative Thinking, Figural (grades 1-12)

3. Guilford's Test of Creativity, Verbal and Figural
(grades 7-12)

Character and Personality

1. Early School Personality Questionaire (grades 1-3)

2. Children's Personality Questionaire (grades 3-6)

3. Junior-Senior High Personality Questionaire (grades 6-12)

4. California Test of Personality (grades K-12)

5. Piers-Harris Self Observation Scale.

Self-Concept

1. "How Do You Feel About Yourself" Inventory (grades 4-12)

2. Tennessee Self-Concept Scales (grades 5-12)

3. Self-Concept as a Learner

   Elementary Scales (grades 3-12)
   Secondary Scales (grades 7-12) [22]

Parent Inventory--see attached form

Student Interest Inventory--see attached form

Teacher Nomination--see attached form

<u>Renzulli-Smith Early Childhood Checklist</u>--see attached form

<u>Gifted and Talented Screening Scale</u>--see attached form

<u>Socially Gifted Checklist</u>--see attached form

<u>Scale for Rating Behavioural Characteristics of Superior Students</u>--see attached form [23]

<u>Checklists for Creative Abilities</u>--see attached form

<u>Case Study Guide</u>--see attached form

The acceptance and implementation of new concepts of giftedness creates many new problems in our school systems. Hopefully, our understanding and knowledge will offer hope for a more humane and liberating approach to their problems and their education. Recent psychologists have predicted new kinds of giftedness that will be needed for the future. It may be that many abilities not now measured by current methods will be important in the future. Torrance has recently given considerable attention to measuring the ability of gifted students to project images of the future. These and others have been the more recent interests in and questions about educating and identifying gifted children. [24]

GIFTED AND TALENTED SCREENING SCALE (GTSS)

1. Uses a large vocabulary in comparison to peers in such a way that it is clear that he/she comprehends the variety of meanings implicit in the words.

2. Appreciates beauty when encountered in tasks and activities with which he/she comes in contact.

3. Produces many solutions to tasks and/or has many ideas on problems presented.

4. Works well with teachers and classmates.

5. Responds emotionally (within reasonable bounds) to situations encountered regardless of sexual stereotypes of "expected" roles.

6. Likes to reorder, organize, or adapt concepts to new or different situations.

7. Is sufficiently self-assured to treat his/her creative products in an open and less-than-serious manner.

8. Works to attain perfection on projects, group tasks, etc.

9. Is responsible in that he/she can be depended upon to complete a task effectively.

10. Would rather work on projects with a group than work alone.

11. Sorts complex materials into component parts for comprehension and study.

12. Other students like to have him/her as a member of their team or activity.

13. Likes to participate in those activities which are team oriented.

14. Shows strong concern in regard to justice and ethics.

15. Is a self-starter. Initiates project-task action with little outside encouragement.

16. Likes to fantasize or be humorous about subjects of interest.

17. Displays a large amount of information on several topics and areas of interest.

18. Is quickly able to see cause and effect relationships.

19. Maintains his/her position on issues.

20. Other students follow his/her initiative on tasks undertaken.

GTSS (cont.)

21. Is willing to take chances in areas of interest.

22. Likes to work independently on projects.

23. Is willing to defend his/her position even in the face of object-
ions or disagreements with peers or teachers.

24. Appreciates the aesthetic values in the environment.

25. Is liked by peers.

CHECKLIST FOR THE SOCIALLY GIFTED

1. They are generally physically attractive and neat in appearance.

2. They are clearly accepted by an overwhelming majority of people whom they know, peers and adults alike.

3. They are generally involved in some sort of social enterprise to which they make positive, constructive contributions.

4. They are generally looked to as arbiters or as "policy makers" in their own group.

5. They relate to peers and adults on an egalitarian basis, resisting insincere, artifical or patronizing relationships.

6. They maintain no facades. Their behaviour is non-defensive in character.

7. They appear free of emotional tension; that is, they are unafraid to express themselves emotionally, but their demonstrations of emotion is always relevant.

8. They maintain enduring relationships with peers and adults. Socially gifted children do not experience rapid turnovers in friendship.

9. They stimulate positive behaviour in others.

10. They are gay young people who, in general, seem to personify an unusual capacity for coping with any social situation. They manage to do so with a delightful mixture of intelligence, humour, and insight.

CHECKLIST FOR CREATIVE ABILITY--DRAMATICS

1. Expresses ideas powerfully and accurately through gestures and body language.

2. Combines speech with gestures and body language to communicate nuances that cannot be expressed by words alone.

3. Skilled in mimicry, imitations, impressions, etc.

4. Uses gestures and body language to "tell a story."

5. Skilled in charades that rely upon the use of gestures and body language.

6. Reads orally "as though the thing were happening."

7. Skilled in role playing.

CHECKLIST FOR CREATIVE ABILITY--IN MOVEMENT AND DANCE

1. Experiences deep enjoyment in creative movement and dance.

2. Becomes completely absorbed in creative movement and dance.

3. Can interpret songs, poems, stories, etc. through creative movement, dance etc.

4. Movement facilitates child's learning and understanding.

5. Spends unusual amounts of time in perfecting movement and dance.

CHECKLIST FOR CREATIVE ABILITY--KINESTHETIC

1. Skillfully communicates ideas through movement.

2. Skillfully interprets meaning of movement.

3. Displays skillful manipulative movement in crayon work, typing, piano playing, etc.

4. Makes quick, precise movements in mime, creative dramatics, etc.

5. Shows skilled movements in drawing and other visual art products.

6. Makes fine discriminations of kinesthetic phenomena.

7. Has excellent memory for kinesthetic information.

8. Displays total bodily involvement in interpreting a poem, story, etc.

CHECKLIST FOR CREATIVE ABILITY--MECHANICAL MANIPULATIVENESS AND INVENTION

1. Makes toys from common materials.

2. Uses common materials to modify or repair toys.

3. Makes games from common materials.

4. Uses common materials for unintended uses in the home, the school, etc.

5. Uses common materials in inventions.

CASE STUDY #_____

PARENT INVENTORY
Pleae fill in and return to school office.

STUDENT_____ SCHOOL_____

SEX_____AGE_____BIRTHDATE_____ GRADE_____

SCHOOL_____ TEACHER_____

LANGUAGES SPOKEN BY STUDENT_____

1. SCHOOLS ATTENDED_____ DATES _____

2. FAMILY INTERESTS, SIBLINGS_____

_____

_____

_____

3. BRIEF DESCRIPTION OF STUDENT_____

_____

_____

_____

4. SPECIAL TALENTS, SKILLS OR ACADEMIC ACHIEVEMENTS EXHIBITED BY STUDENT_____

_____

_____

5. WHAT RECREATIONAL ACTIVITIES AND HOBBIES DOES YOUR CHILD ENJOY MOST?
_____

6. SIGNIFICANT CONDITIONS OR STRESS WHICH MIGHT INFLUENCE PERFORMANCE_____
_____

7. PARENTAL BACKGROUND:	FATHER	MOTHER
ADVANCED EDUCATION		
OCCUPATION		
SPECIAL INTERESTS		
PRIMARY LANGUAGE		

CASE STUDY #_____

STUDENT INTEREST INVENTORY (MAY BE FILLED IN BY PROJECT POTENTIAL TEACHER)

STUDENT_____ DATE _____

1. WHAT DO YOU LIKE TO DO BEST OF ALL?_____

   _____

   _____

2. WHAT DO YOU USUALLY DO AFTER SCHOOL?_____

   _____

   _____

3. WHAT DO YOU LIKE TO DO AT SCHOOL?_____

   _____

   _____

4. WHICH TV PROGRAMS DO YOU LIKE?_____

   _____

   _____

5. WHAT KIND OF BOOKS DO YOU READ?_____

   _____

   _____

6. DRAW A PICTURE OF YOURSELF AND ANYONE ELSE YOU LIKE DOING SOMETHING YOU
    REALLY LIKE TO DO.

CASE STUDY #_____

DATE_____

TEACHER NOMINATION FOR PROJECT POTENTIAL

STUDENT_____ PARENTS_____

ADDRESS_____ SCHOOL_____GRADE_____

AGE_____BIRTHDATE_____ HOMEROOM TEACHER_____

RECOMMENDING TEACHERS (S)_____

PRINCIPALS_____

LASTEST GROUP ACHIEVEMENT TEST SCORES (USE NATIONAL NORMS EITHER PERCENTILE OR STANINE)

DATE	TYPE	READING	SCIENCE	MATH	LANGUAGE	OTHER

LATEST MENTAL ABILITY TESTS (IQ)

DATE	TYPE	VERBAL	PERF	TOTAL
	Individual			
	Group			

	5 (HIGH)	4	3	2	1
ACADEMIC CLASSROOM PERFORMANCE					
SOCIAL PERFORMANCE					
LEADERSHIP PERFORMANCE					
CREATIVE/PRODUCTIVE					

STUDENT BEHAVIORS CHECK LIST   Directions: Please check all items that apply.

_____Exhibits curiosity
_____Manipulates environment
_____Extensive Vocabulary
_____Works ahead independently
_____Memorizes easily
_____Reasons out solutions
_____Innovative, offers unusual solutions
  to common problems
_____Assertive

_____Keenly observant - asks questions
_____Exhibits mature sense of humor

_____Displays common sense
_____Enjoys difficult challenges
_____Achievement Appropriate to ability
_____Self-motivated
_____Has positive self-concept
_____Expresses ideas clearly
_____Shows organizational ability

_____Loses track of time due to
  involvement
_____Needs little direction
_____Has special talent in_____

THE WILLIAMS SCALE

A SCALE FOR RATING THINKING AND FEELING BEHAVIORS CHARACTERISTIC OF GIFTED, TALENTED, OR CREATIVE CHILDREN

Child's Name _____ Date _____ Grade _____

School _____ Age _____ Birthdate _____
                                        yrs.   mos.   yr. mo. day

Person completing scale _____ Relationship to child _____

How long have you know the child? _____ _____

DIRECTIONS FOR USING THE SCALE

Check the appropriate box beside each item which best describes the child's behavior.

FLUENCY

Often	Sometimes	Seldom	
☐	☐	☐	The child thinks of several answers when a question is asked.
☐	☐	☐	The child draws several pictures when asked to draw one.
☐	☐	☐	The child has several ideas about something instead of just one.
☐	☐	☐	The child asks many questions.
☐	☐	☐	The child uses a large number of words when expressing ideas.
☐	☐	☐	The child works rapidly and produces a great deal.

FLEXIBILITY

Often	Sometimes	Seldom	
☐	☐	☐	The child thinks of many ways to use an object other than its common use.
☐	☐	☐	The child expresses more than one meaning for a picture, story, poem, or problem.
☐	☐	☐	The child can transfer meaning in one subject to another subject.
☐	☐	☐	The child shifts his point of view to another point of view.
☐	☐	☐	The child exhibits a variety of ideas and expresses many of them.
☐	☐	☐	The child thinks of numerous possibilities for solving a problem.

Often	Sometimes	Seldom	

ORIGINALITY

☐ ☐ ☐ The child likes objects in a room placed off-center or perfers drawings and designs which are asymetrical.

☐ ☐ ☐ The child becomes dissatisfied with one right answer and seeks other options.

☐ ☐ ☐ The child thinks in uncommon ways.

☐ ☐ ☐ The child enjoys the unusual and dislikes ordinary ways of doing things.

☐ ☐ ☐ The child, after having read or heard about a problem, begins inventing solutions.

☐ ☐ ☐ The child questions established methods and devises new methods of problem solution.

ELABORATION

☐ ☐ ☐ The child adds lines, color, and details to his/her drawing.

☐ ☐ ☐ The child senses a deeper meaning in an answer or solution and produces more depth of meaning.

☐ ☐ ☐ The child takes off with another's idea and alters it in some way.

☐ ☐ ☐ The child wants to "jazz-up" or embellish the work or ideas of others.

☐ ☐ ☐ The child has little interest in ordinary objects and adds details to make them better.

☐ ☐ ☐ The child changes the rules of games.

CURIOSITY-INQUISITIVENESS

☐ ☐ ☐ The child questions everything and everybody.

☐ ☐ ☐ The child loves to explore mechanical things.

☐ ☐ ☐ The child is constantly searching for new avenue for thinking.

☐ ☐ ☐ The child normally explores things and ideas which are new to him.

☐ ☐ ☐ The child is alert to possibilities for color as.

☐ ☐ ☐ The child explores books, games, maps, pictures, etc., that carry meaning.

	Often	Sometimes	Seldom

IMAGINATION

			The child makes up stories about places never seen.
			The child imagines how others would deal with a problem.
			The child daydreams about things or places.
			The child likes to imagine things he has never experienced.
			The child sees things in pictures or drawings other than the obvious.
			The child can wonder freely about things and ideas.

COMPLEXITY

			The child is interested in intricate things and ideas.
			The child likes to involve himself in complicated tasks.
			The child wants to figure things out without assistance.
			The child enjoys tasks that are difficult.
			The child thrives on trying again and again in order to succeed.
			The child produces more complex solutions to problems than seem necessary.

COURAGE

			The child will defend ideas regardless of the reactions of others.
			The child sets high goals of accomplishment and is not afraid to try to achieve them.
			The child admits to mistakes or failures.
			The child likes trying new things or ideas and is not easily influenced by friends.
			The child is not overly concerned with disapproval by classmates, teachers, or parents.
			The child prefers taking chances or "dares" just to learn of the outcomes.

Following are some open-ended questions which will allow you an opportunity to express your reactions about the child and the program for the Gifted and Talented. Make your statements brief but specific.

1. Do you think this child is or may be gifted? ____Yes ____No (check one)

    If yes, why? _____

    _____

    _____

    If no, why not? _____

    _____

    _____

2. Do you think this child is or may be creative? ____Yes ____No (check one)

    If yes, report briefly what he or she does in a creative way

    _____

    _____

    If no, why not? _____

    _____

    _____

3. What do you expect of a <u>school</u> <u>program</u> for gifted and talented children?

    _____

    _____

    _____

    _____

    _____

4. What would you like to see the child accomplish as a result of participation in a program for the gifted and talented children?

    _____

    _____

    _____

    _____

THE WILLIAMS SCALE

SCORING AND INTERPRETING

Scoring and interpreting the Scale:

1. Count the number of items checked in column 1 (often) and multiply this sum by two (2). These are double weighted items which should receive two (2) points each.

2. Count the number of items checked in column 2 (sometimes). These items receive one (1) point each.

3. Count the number of items checked in column 3 (seldom). These items receive no (0) points.

4. The four open-ended questions at the end of the scale receive one (1) point each if answered "yes" with reasons or comments. This is a quantitative score just for being answered. The quality of the remarks can help those designing programs for the gifted and talented.

Number of column 1 items checked (often)	x 2 =	_____
Number of column 2 items checked (sometimes)	x 1 =	_____
Number of column 3 items checked (seldom)	x 0 =	_____
Number of open-ended items answered	x 1 =	_____
Total Score		_____

Children can be ranked on a scale of 100 since there are 100 points possible for a total score.

This scale has been researched and designed based upon the eight factors of the Williams Cognitive-Affective Interaction Model of student behaviors taken from his TOTAL CREATIVITY PROGRAM kit, Educational Technology Publications, Inc., 140 Sylvan Avenue, Englewood Cliffs, New Jersey, 07632.

RENZULLI-SMITH EARLY CHILDHOOD CHECKLIST — Research Edition

Name _____ Date _____

School _____ Grade _____ Age _____

Teacher or person completing this form _____

How long have you known this child? _____ months Sex _____

Directions: Please fill in the information requested above. Next, read each of the follow items and consider the degree to which you have actually observed the presence or absence of characteristic or behavior. Place an "X" in the appropriate place according to the following scale of values:

1 = seldom or never	2 = rarely	3 = sometimes	4 = almost always

Scoring: Add the total number of x's in each column to obtain the "Column Total." Multiply column total to obtain the "Weighted Column Total." Sum the Weighted Column Total across to obtain the "score."

		1	2	3
1.	Has displayed unusual talent in music, drawing, rhythm, or other art form	—	—	—
2.	Expresses a wide range of interests and is curious about almost everything that goes on around him/her.	—	—	—
3.	Asks many "intelligent questions" about topics in which young children do not ordinarily have an interest.	—	—	—
4.	Keen observation and retention of information about things he/she has observed.	—	—	—
5.	The ability to attend or concentrate for a longer period of time than other children his/her age.	—	—	—
6.	An early interest in clocks and calendars, and an ability to understand their functions.	—	—	—
7.	Understands the meaning of and use for maps, diagrams, or graphs better than other children his/her age.	—	—	—
8.	Knows the relationship among and between the various coin denominations (ie.: 4 quarters = 1 dollar)	—	—	—
9.	Understands the meanings of number concepts beyond the numbers from 1 to 10.	—	—	—
10.	The early accurate use of a large vocabulary.	—	—	—
11.	Spoke in entire sentences at an unusually early age.	—	—	—
12.	The ability to tell or reproduce stories and events with great detail at an early age.	—	—	—
13.	Carries on "intelligent conversations" with older children and adults.	—	—	—
14.	Learned to read early, with little or no formal teaching.	—	—	—
15.	Can write short stories, poems, or letters.	—	—	—
	Column Total			
	Weight			
	Weighted Column Total			
	Total			

Please add any comments that you feel will give additional insights into this child's abilities and talents:

_____

SCALE FOR RATING BEHAVIORAL CHARACTERISTICS OF SUPERIOR STUDENTS

Joseph S. Renzulli / Robert K. Hartman

Name _____ Date _____

School _____ Grade _____ Age _____
years   months

Teacher or person completing this form _____

How long have you known this child? _____ months.

Directions. These scales are designed to obtain teacher estimates of a student's characteristics in the areas of learning, motivation, creativity, and leadership. The items are derived from the research literature dealing with characteristics of gifted and creative persons. It should be pointed out that a considerable amount of individual differences can be found within this population; and therefore, the profiles are likely to vary a great deal. Each item in the scales should be considered separately and should reflect the degree to which you have observed the presence or absence of each characteristic. Since the four dimensions of the instrument represent relatively different sets of behaviors, the scores obtained from the separate scales should not be summed to yield a total score. Please read the statements carefully and circle the appropriate number according to the following scale of values:

1. If you have seldom or never observed this characteristic.

2. If you have observed this characteristic occasionally.

3. If you have observed this characteristic to a considerable degree.

4. If you have observed this characteristic almost all of the time.

PART I: LEARNING CHARACTERISTICS

1. Has unusually advanced vocabulary for age or grade level; uses terms in a meaningful way; has verbal behavior characterized by "richness" of expression, elaboration, and fluency. 1 2 3 4

2. Possesses a large storehouse of information about a variety of topics (beyond the usual interests of youngsters his age). 1 2 3 4

3. Has quick mastery and recall of factual information.   1   2   3   4

4. Has rapid insight into cause-effect relationships; tries
    to discover the how and why of things; asks many provoca-
    tive questions (as distinct from informational or factual
    questions); wants to know what makes things (or people)
    "tick".   1   2   3   4

5. Has a ready grasp of underlying principles and can
    quickly make valid generalizations about events, people,
    or things; looks for similarities and differences in
    events, people, and things.   1   2   3   4

6. Is a keen and alert observer; usually "sees more" or
    "gets more" out of a story, film, etc. than others.   1   2   3   4

7. Reads a great deal on his own; usually prefers adult
    level books; does not avoid difficult material; may show
    a preference for biography, autobiography, encyclopedias,
    and atlases.   1   2   3   4

8. Tries to understand complicated material by separating it
    into its respective parts; reasons things out for himself;
    sees logical and common sense answers.   1   2   3   4

                          Column Total   ___ ___ ___ ___

                                Weight   ___ ___ ___ ___

                 Weighted Column Total   ___ ___ ___ ___

                                 Total   _____

PART II: MOTIVATIONAL CHARACTERISTICS

1. Becomes absorbed and truly involved in certain topics or
    problems; is persistent in seeking task completion. (It
    is sometimes difficult to get him to move on to another
    topic.)   1   2   3   4

2. Is easily bored with routine tasks.   1   2   3   4

3. Needs little external motivation to follow through in
    work that initially excites him.   1   2   3   4

4. Strives toward perfection; is self-critical; is not
    easily satisfied with his own speed or products.   1   2   3   4

5. Prefers to work independently; requires little direc-
    tion from teachers.   1   2   3   4

6. Is interested in many "adult" problems such as religion, politics, sex, race--more than usual for age level.   1   2   3   4

7. Often is self-assertive (sometimes even aggressive); stubborn in his beliefs.   1   2   3   4

8. Likes to organize and bring structure to things, people, and situations.   1   2   3   4

9. Is quite concerned with right and wrong, good and bad; often evaluates and passes judgment on events, people, and things.   1   2   3   4

Column Total   ___ ___ ___ ___

Weight   ___ ___ ___ ___

Weighted Column Total   ___ ___ ___ ___

Total   _____

PART III: CREATIVITY CHARACTERISTICS

1. Displays a great deal of curiosity about many things; is constantly asking questions about anything and everything.   1   2   3   4

2. Generates a large number of ideas or solutions to problems and questions; often offers unusual ("way out"), unique, clever responses.   1   2   3   4

3. Is uninhibited in expressions of opinion; is sometimes radical and spirited in disagreement; is tenacious.   1   2   3   4

4. Is a high risk taker; is adventurous and speculative.   1   2   3   4

5. Displays a good deal of intellectual playfulness; fantasizes; imagines ("I wonder what would happen if...)"   1   2   3   4

6. Displays a keen sense of humor and sees humor in situations that may not appear to be humorous to others.   1   2   3   4

7. Is unusually aware of his impulses and more open to the irrational in himself (freer expression of feminine interest for boys, greater than usual amount of independence for girls); shows emotional sensitivity.   1   2   3   4

8. Is sensitive to beauty; attends to aesthetic characteristics of things.   1   2   3   4

9. Is nonconforming; accepts disorder; is not interested in details; is individualistic; does not fear being different.   1   2   3   4

10. Criticizes constructively; is unwilling to accept
authoritarian pronouncements without critical examina-
tion.   1   2   3   4

                                        Column Total   ___ ___ ___ ___

                                              Weight   ___ ___ ___ ___

                              Weighted Column Total   ___ ___ ___ ___

                                                 Total   _____


PART IV: LEADERSHIP CHARACTERISTICS

1. Carries responsibility well; can be counted on to do what
   he has promised and usually does it well.   1   2   3   4

2. Is self-confident with children his own age as well as
   adults; seems comfortable when asked to show his work to
   the class.   1   2   3   4

3. Seems to be well liked by his classmates.   1   2   3   4

4. Is cooperative with teacher and classmates; tends to
   avoid bickering and is generally easy to get along with.   1   2   3   4

5. Can express himself well; has good verbal facility and
   is usually well understood.   1   2   3   4

6. Adapts readily to new situations; is flexible in thought
   and action and does not seem disturbed when the normal
   routine is changed.   1   2   3   4

7. Seems to enjoy being around other people; is sociable
   and prefers not to be alone.   1   2   3   4

8. Tends to dominate others when they are around; generally
   directs the activity in which he is involved.   1   2   3   4

9. Participates in most social activities connected with the
   school; can be counted on to be there if anyone is.   1   2   3   4

10. Excels in athletic activities; is well coordinated and
    enjoys all sorts of athletic games.   1   2   3   4

                                        Column Total   ___ ___ ___ ___

                                              Weight   ___ ___ ___ ___

                              Weighted Column Total   ___ ___ ___ ___

                                                 Total   ___ ___

63

Scoring. Separate scores for each of the three dimensions may be obtained as follows:

* Add the numbers circled in each column to obtain the "Column Total."

* Multiply the Column Total by the "Weight" for each column to obtain the "Weighted Column Total."

* Sum the Weighted Column Totals across to obtain the "Score" for each dimension of the scale.

* Enter the Scores below.

Learning Characteristics .... _____

Motivational Characteristics .... _____

Creativity Characteristics .... _____

Leadership Characteristics .... _____
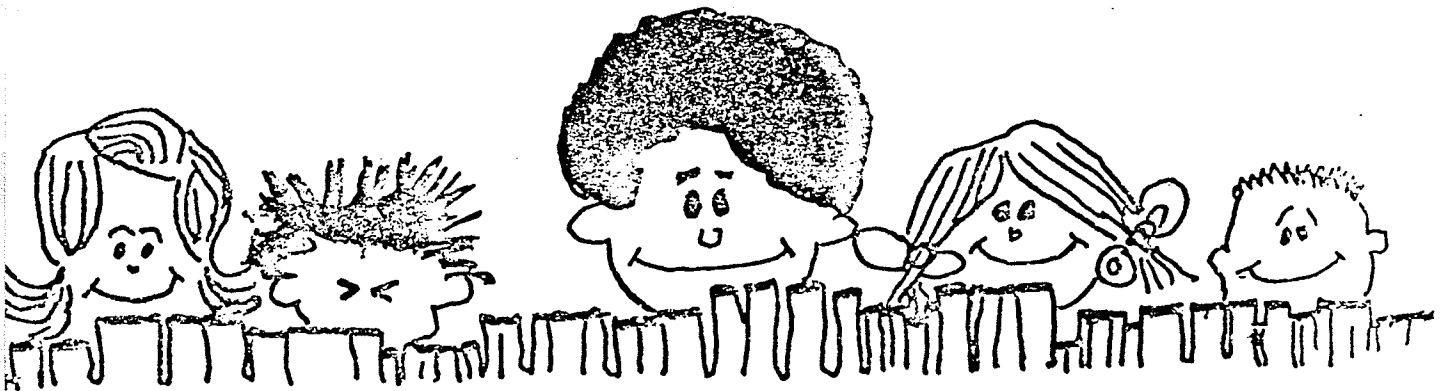
CREATIVE THINKING SKILLS

Ability to be fluent in producing ideas.

Ability to generate original, statistically frequent ideas.

Ability to elaborate on ideas.

Ability to make unusual associations between remote ideas.

Ability to be flexible in thinking patterns.

Ability to rearrange elements of thought.

Ability to sense when problems exist.

Ability to act spontaneously.

Ability to visualize mentally.

Ability to tolerate ambiguity and uncertainty.

Ability to sense discontinuities and inconsistencies.

Ability to make guesses and hypothesis.

Ability to take psychological risks.

Ability to redefine elements of a task.

Ability to work with concentration.

Ability to maintain autonomy of ideas.

CASE STUDY #_____

STUDENT AUTOBIOGRAPHY CAN BE DICTATED TO TEACHER IF NECESSARY.

PLEASE WRITE AN AUTOBIOGRAPHY. START OUT WITH YOUR EARLIEST

MEMORIES. YOU MIGHT WANT TO INCLUDE HOW YOU FEEL ABOUT THINGS;

SOME OF THE IMPORTANT MOMENTS IN YOUR LIFE, WHAT YOU LIKE TO DO

BEST, OR EVEN THINGS YOU DO NOT LIKE AT ALL. WRITE IT YOUR OWN WAY.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

TESTING--NOTES

15 W. Barbe and J. Renzulli, <u>Psychology and Education of the Gifted</u> (New York: Irvington Publishers, Inc., 1975), p. 239.

16 Barbe and Renzulli, p. 238.

17 W. Cruckshank, <u>Psychology of Exceptional Children</u> (New Jersey: Prentice Hall Inc., 1980), pp. 477-479.

18 South Suburban Areas Service Center of Educators of Gifted Children, Governors State University, Park Forest, South Illinois, 60466.

19 B. Barthwick, I. Dow, D. Levesque, and R. Banks, <u>The Gifted and Talented Students in Canada: Results of A CEA Survey</u> (Toronto: Canadian Education Association, 1980).

20 South Suburban Area Service Center.

21 South Suburban Area Service Center.

22 South Suburban Area Service Center.

23 Barbe and Renzulli, pp. 266-270.

24 Cruckshank, pp. 489-491.

CURRICULUM PLANNING

There is no single prescription for a school program that will help talented children and youth develop their potential ability, but there is widespread agreement on the general characteristics of such a program.

Talented children profit from an enriched program that carries them more deeply or more broadly into the subjects they study. Enrichment does not consist of additional exercises or assignments of the same type already completed but of the introduction of materials and learning activities requiring a more mature level of study and performance. A curriculum must be devised that will allow gifted and talented students to develop their potential and explore new domains of knowledge.

Curriculum is the medium through which learning occurs. It includes both the content to be learned and the processes which faciliates learning.

Although it is normally the role of the teacher to design and implement a curriculum for the students, gifted students should share in this reponsibility. Curriculum for these students should not be a predetermined route which all must follow. It should instead be a framework for individual learning alternatives and it should be flexible enough to meet the needs of both pupils and teachers. Instructional units for both gifted and talented curriculum and regular curriculum can be similar but the breadth, depth and intensity of learning activities within the gifted curriculum will mark it as distinctive.

One of the most important considerations in designing a
curriculum for these pupils is to ensure that it fits the learning
modes of the students. It should allow students the opportunity
to both create and consume learning as well as offer alternative
activities for achieving learning objectives.

They must be given opportunities which encourage:

1. the development of abstract thinking
2. the sharpening of reasoning abilities
3. practice in creative problem solving/setting
4. higher cognitive processing such as analysis,
   synthesis, and evaluation.

Curricula for the gifted should include activities which
focus on:

1. interpretation of material being investigated
2. summative skills
3. creativity
4. divergent thinking
5. decision making
6. independent inquiry [28]

Since the major goal of a curriculum for the gifted is to
provide more opportunity for independent learning, the teacher's
role becomes that of a facilitator rather than a dispenser of
knowledge. This does not lessen the importance of his/her role.
The features of the teaching process change with regard to the gifted
in that the processes of learning and thinking are often a higher

priority than the content of a subject. It is vital that the teacher know and use various teaching/learning models such as:

1. Renzulli's Triad
2. Bloom's Taxonomy of Educational Objectives in both the cognitive and affective domains
3. Guilford's Structure of the Intellect [29]

which best exemplify a means to reach the end result of working with the gifted.

The curriculum which is most effective is one which translate the basic principles of learning into practical activities for learning. Each principle represents a component to be included in the curriculum:

1. Learning activities must be related to something that will lead to thought and action.
2. Learning activities must promote thinking skills and processes rather than the storing of facts.
3. Learning activities must include tasks which produce active involvement from the learner.
4. Learning activities should have room for several responses.
5. Learning activities should provide options for individual differences.

6. Learning activities that induce creative
   problem solving. [30]

The curriculum is a product of integrating content with process. This generates a learning activity. The identification of the need and purpose for learning will determine the base on which the curriculum is built. What is incorporated into the curriculum is tied to a curricular pattern wherein content and process form the learning activities.

The curricular pattern could be a domain of knowledge or a skill to be learned or researched.

It could have a generalized theme or topic with broad or diverse application to several subject areas. This would lead to the development and integration of learning experiences.

The curricular pattern could be a self-selected topic or student and/or teacher selected topics, themes subjects where skills of thinking are applied.

The learning experience could be based on an outline of basic questions.

The format could also be experiential where the development of attitudes, understanding, and appreciations from first hand experience forms the activities for learning.

Another curricular pattern could be environmental, where the relevant issues and features of the environment are used as the springboard for learning concepts and skills. [31]

The curriculum must be set up in such a way that it is usable as a classroom tool. It must be classroom ready so that it will motivate both teacher and student to use it. It must include types of resources and material which augment learning activities.

A guide can be an invaluable tool. This consists of a collection or an outline of learning experiences which is meant to direct the teacher or student toward achieving a desired set of objectives. The use of the unit also leads to a broader scope of learning activities. It includes a comprehensive outline of activities related to a specific subject topic or theme, indicating the breadth of learning opportunities and the sequential development of learning.

Task cards consisting of a group of learning activities which are either related to a predetermined subject or are open ended in their application to any student selected topic can be used. These are individually constructed and can become self-contained learning activities, to be used separately or as a complete set.

The learning center can be used to reinforce learning through a variety of experiences. It consists of a collection of both tasks and materials which are placed within the classroom environment to act as an instructional aid to introduce, teach and reinforce learning.

Learning kits can be very useful to promote specific learnings. They consist of a package of learning suggestions, directions and correlated materials.

CURRICULUM WITHIN THE REGULAR CLASSROOM

Curriculum for the gifted can only be called that if it includes

elements which distinguish it from being suitable for the education
of all children. It must be congruent with the characteristics that
identify them as a distinct population. Differentiation of curricular
activities relies on certain variables:

1. Proceedures for presenting learning
   opportunities
2. Nature of input
3. Expectancies for learning outcomes.

Within the regular curriculum gifted students must be exposed
to experiences, materials and information which is not in the reg-
ular curriculum, does not match age/grade expectancies, and intro-
duces something new and unusual.

Students must be given the opportunity to elaborate on the
regular curriculum through additional allocation of working time,
materials and experiences as well as self-initiated or related study.

Gifted students may go into a more thorough or a new explanation
of a concept or skill which is part of a general learning activity
within the regular curriculum. [32]

SEPARATE CURRICULUM FOR GIFTED STUDENTS

If the program calls for withdrawal of students from the reg-
ular classroom, the curriculum would include accelerated or advanced
content. Much of the curriculum would be student selected according
to interest. [33]

READING PROGRAMS FOR THE GIFTED

Reading programs for gifted children will deviate in methods,

materials and content utilized but certain features will be recog-
nized as necessary components of a program for the gifted.

First the reading program should be highly individualized.
With early and accurate assessment of children's abilities, the
teacher can individualize the reading program for the child. Each
child should be permitted to move ahead as rapidly as he is able to
proceed. Mastery of skills must be included in the curriculum as
needed. The reading program should emphasize development of higher
mental processes. They are ready earlier for instruction in infer-
ential, interpretive and critical reading. Beginning in the prim-
ary grades the gifted will profit from instruction in the following
skills:

1. Discovering clues from which to infer hidden
   meanings and probable outcomes
2. Analyzing selections to detect author bias
   and subtle propaganda
3. Locating materials on a given topic
4. Organizing and synthesizing materials for
   purposes of reporting
5. Evaluating materials in terms of worth and relevancy
   to purpose
6. Understanding the use of connotation, figures
   of speech, plot, setting and characterization in
   reading selections
7. Appreciating the motives, intents and feelings
   of the author and/or the characters in the selection

8. Selecting a reading technique and speed
   appropriate to the difficulty of the material
   and the purpose for reading it.

The reading program should extend interest in reading.

The teacher must guide the child to choose books that will broaden and enrich his interests as well as to satisfy them.

Reading must be combined with social experience through the use of group projects, play writing and production, creative dramatics, discussion of favourite books, debate of a social issue and sharing of creative writings. [34]

MATHEMATICS CURRICULUM FOR THE GIFTED

A mathematics program for the gifted at the primary level should be influenced by four factors:

1. There are differences among children with
   regard to their interest in, and ability to
   grasp quantitative ideas
2. Children at this age need the tangible, the
   concrete, the real, the relevant
3. Mathematics requires understanding of sequence
   and continuity
4. The instructional program should relate to
   concurrent learning experiences in other subjects.
   These experiences must be integrated so that the
   child's potential will be realized.

Children must be exposed to:

1. numbers and operations
2. geometry
3. measurement
4. application
5. statistics and probability
6. sets
7. functions and graphs
8. logical thinking
9. problem solving

The program as a whole must achieve depth, provide selective emphasis and promote in children a desire for complexities beyond the requirements of the standard curriculum.

The gifted learner's program should add greater emphasis to geometry, graphing, patterns, relations, logic and problem solving.

The highly talented learner should be allowed to work independently and to cope with problems of increasing complexity. This can be arranged by guided study with access to advanced texts, or by the use of a mentor, someone who loves and understands mathematics.

Pupils must be led:

1. From the concrete to the abstract
2. From the lower levels of understanding to the subtleties and logic of a higher degree of understanding
3. From specific learnings to generalizations.

To do this the following operations must be respected and nurtured:

1. Cognition and comprehension
2. Knowledge or memory
3. Divergent and convergent applications
4. Analysis
5. Evaluation and systhesis

A mathematics program for the gifted must provide learning experiences that nurture his interest, engage his abilities in meaningful ways and supplies his young imagination with new possibilities and challenges. [35]

SCIENCE CURRICULUM FOR THE GIFTED

The emphasis in the science curriculum in the primary grades is on inquiry, experimentation, evaluation of evidence and construction of models and theories. This will help the child develop an inquiring mind and a scientific approach to problems.

The child must be given a lot of time and freedom to conduct, test, probe, experiment. This free and often unguided exploration will help develop interests, attitudes and aesthetic awareness.

Later some guidance must be given, written or pictorial, to guide the student to come to some conclusion, come to a greater understanding of the phenomena he has observed. This will help develop basic concepts and produce logical thinking.

Questions may arise and experiments may be devised to answer them. This elaboration helps the child acquire knowledge and learn

skills. Finally through class discussions or a formal lesson, students learn to understand the larger theoretical positions and generalizations that follow from the specific phenomenon they have observed. They will learn to appreciate patterns and relationships as well as interpret findings critically.

The basic processes that are gradually developed from Kinder-garten to Grade 6 are:

1. Observation
2. Classification
3. Communication
4. Measuring
5. Using space/time relationships
6. Inferring
7. Predicting
8. Defining operationally
9. Controlling variables
10. Formulating hypothesis
11. Interpreting data
12. Experimenting

The gifted students in the primary grades are most likely to be working in the Formal Operational Thinking stage. They can see the relationship of problems and are able to generalize. They can think abstractly, in terms of the hypothetical as well as the actual. They are able to control relevant variables. By being given the opportun-ity to investigate and follow this line of process-oriented thinking, they will become a creative problem solver. This will bring out

their true giftedness. They will be able to take the raw data and develop new concepts for themselves.

Gifted students must be helped to understand that the true nature of science is that it is a means or strategy for searching for truth. The essence of science is the careful proceedures by which the truth is sought.

CURRICULUM PLANNING--NOTES

28 Clendening and Davies, Creating Programs for the Gifted (New York, 1980).

29 Clendening and Davies, pp. 95-109.

30 S. Kaplan, Providing Programs for the Gifted and Talented (1975).

31 Kaplan, pp. 141-151.

32 Kaplan.

33 Kaplan.

34 Witty, Reading for the Gifted and the Creative Student (1971).

35 California State, Dept. of Education, Education of Mentally Gifted Minors (1971).

LESSON PLANS

GUIDELINES FOR DEVELOPING UNITS FOR THE GIFTED

Curricular units for gifted students should be designed to develop

thinking skills. Emphasis should be placed on the following teaching

strategies:

1. Help the learners to probe a subject in depth.

2. Provide an opportunity to utilize higher-level thought processes on a regular basis, especially divergent-evaluative thinking.

3. Assist learners in demonstrating self-motivation in some discipline.

4. Provide, on a regular basis, multiple opportunities to be creative.

5. Provide an educational framework within which "Gifted" students can challenge and stimulate each other and share learning experiences designed to help them use their talents productively.

6. Provide multiple opportunities for self-expression.

7. Provide opportunities for learners to demonstrate perseverance in the face of obstacles.

8. Assist learners to master research skills for independency and discovery.

9. Assist learners in assuming responsibility for their own learning.

10. Reduce the amount of teacher talk-lectures; increase student inquiry-talking (interaction).

11. Insist on multi-resources in the study of the unit, using books and numerous other references.

12. Include evaluative techniques as part of the original unit.

13. Encourage "hidden talent" to reveal itself during regular class time.

14. Provide sequential activities progressing from lower level.
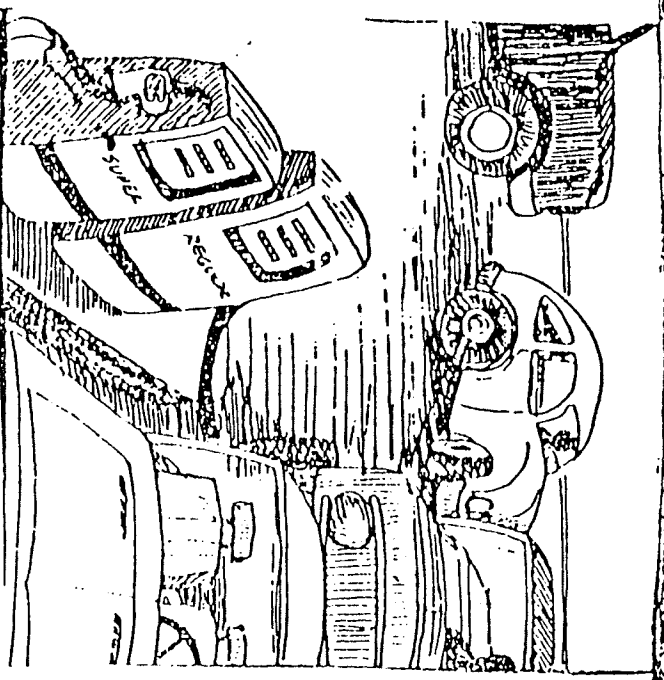
Applying Bloom's Taxonomy to a Unit of Study
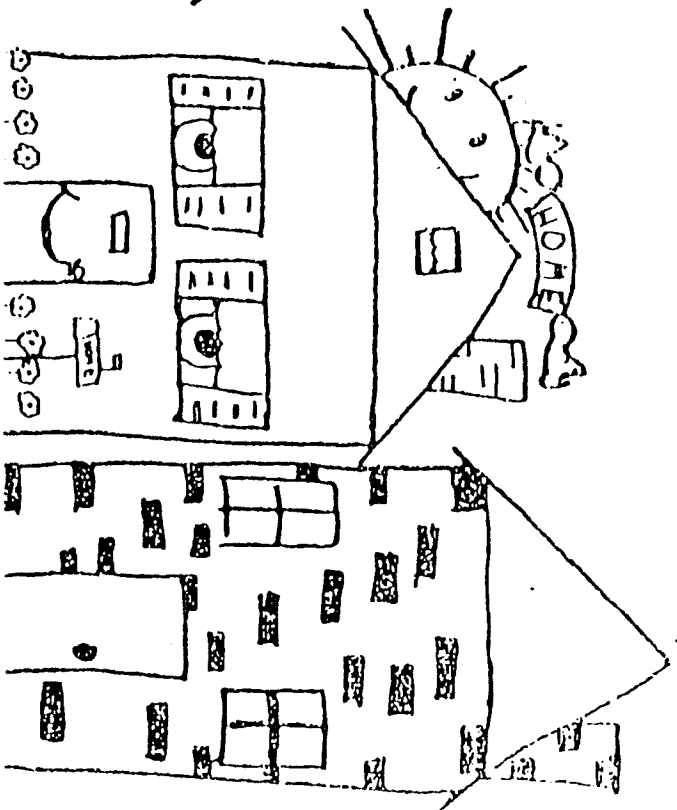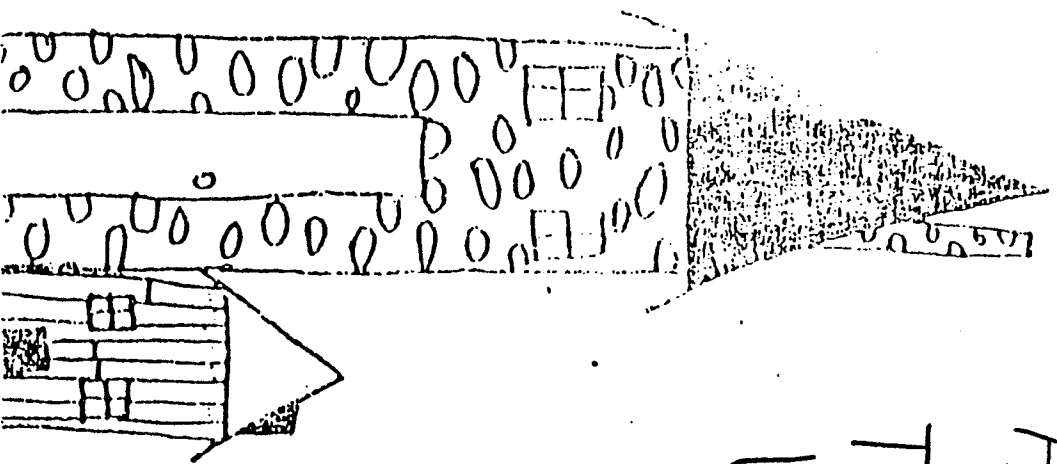
THE CITY IS...

THE CITY IS ....

1. KNOWLEDGE and COMPREHENSION:
   a) Brainstorming
   b) Webbing - relating all the different ideas that were generated
   c) Locating Winnipeg on a map of Manitoba

2. APPLICATION:
   a) Collecting city pictures and producing a collage in the shape of a tall city building
   b) Drawing a map of our neighbourhood
   c) Illustrating city scenes on newsprint
   d) Collecting and reporting on news articles concerning our city

3. ANALYSIS:
   a) Comparing different sections of the city
   b) Comparing Winnipeg to a samll town or another city
   c) Located various buildings, rivers, etc. on a map of the city
   d) Discussed the many different industries, businesses etc. in the city
   e) Study of the Mayor and what his job function is

4. SYNTHESIS:
   a) Creating a Tourist Book for Winnipeg. The children wrote letters to such places as the Planetarium, the Zoo, Winnipeg Arena, etc. They then compiled a book using the information they received and added their own illustrations.

5. EVALUATION:
   a) Deciding whether or not it was a wise decision to build the new bridges on Portage Avenue over Sturgeon Creek. The pros and cons were discussed and listed; then a class vote took place.
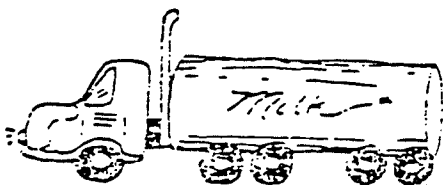
C I T Y   L I V I N G

1.   Name as many communities in the province of
      Manitoba as you can. (large or small communities)

2.   LOCATE some of these communities on a map of
      Manitoba that you have drawn yourself.

3.   People come from many types of communities.
      DIFFERENTIATE between living in a large urban
      community as opposed to a small rural community.

4.   QUESTION your friends to find out what communities
      they were originally from.

5.   COLLECT pictures showing as many aspects of city
      living as you can think of.

6.   Pretend that you could live in any area of your
      choice. COMPARE some areas and make your decision
      as to where you would live.

Valoree Lovatt
Bedson School
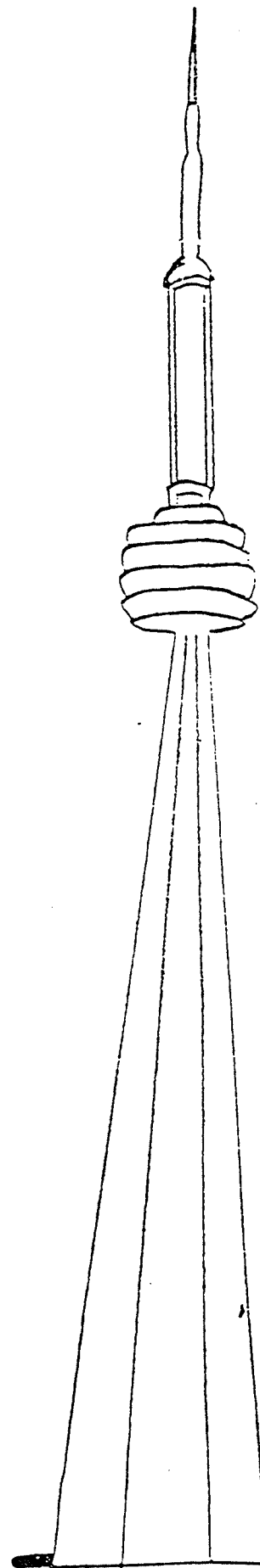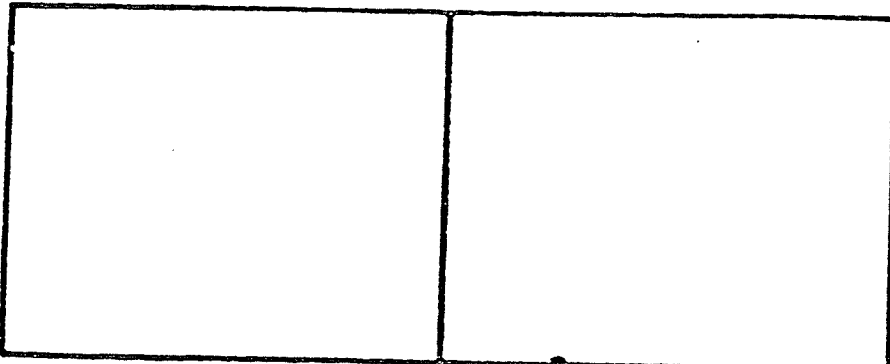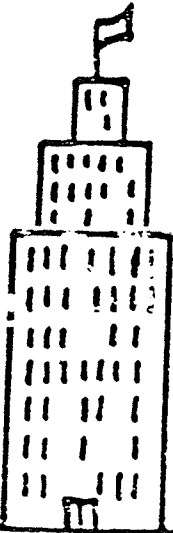
FROM CAVE
TO
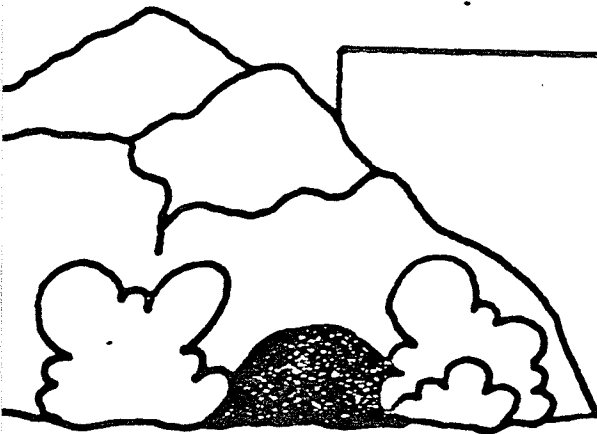# SKYSCRAPER

Show what changes
took place.
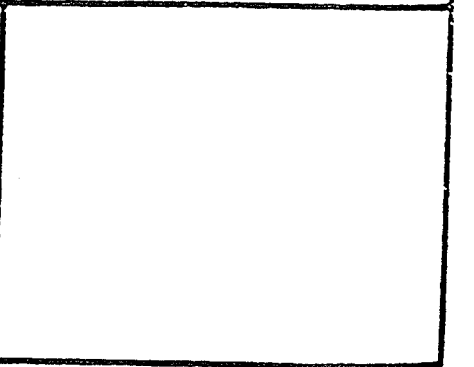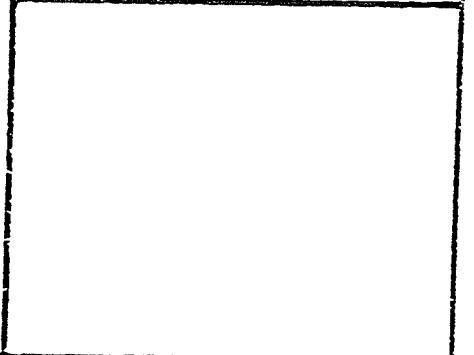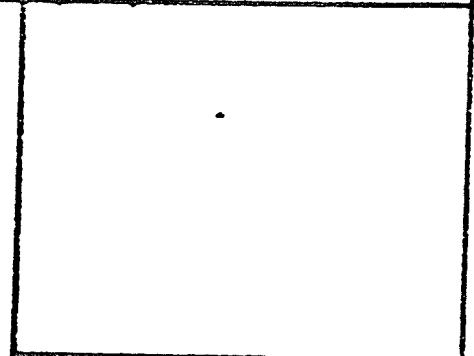
Draw a Street Scene
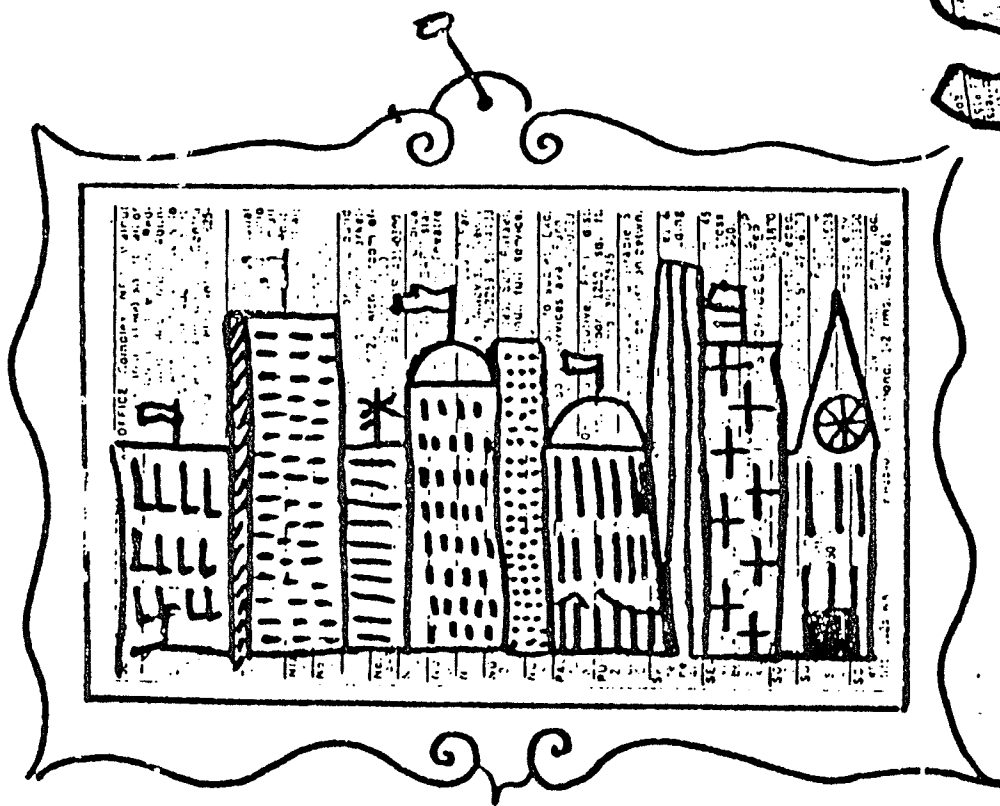
You will need:

1. A page of the newspaper (the classified ads are best)
2. A black felt pen

APPLYING BLOOM'S TAXONOMY

Goldilocks and the Three Bears

Knowledge: LIST 3 things Goldie did in the three
                          bears' house.

Comprehension: EXPLAIN why Goldie liked the little
                          bear's chair best.

Application: PREDICT some of the things Goldie might
                          have used if she had entered your house.

Analysis: SELECT the part of the story where you
                          think Goldie felt most comfortable.

Synthesis: TELL how the story would have been dif-
                          ferent if it had been three fishes.

Evaluation: Goldie was a bad girl. JUSTIFY this
                          statement.

"AN APPLE A DAY KEEPS THE BOREDOM AWAY !!!!

The following activities are the first exposure to Bloom that my students receive. On a huge make-believe tree I hang each activity. If there are thirty activities I make sure that each student selects only seven to complete. The purpose in this limited number is I want each child to SUCCEED, and I also will gain insight into which taxonomy level the child favors. The other advantage of starting the year with an apple unit is that every child has had an experience with an apple, and if that is not the case it would not be difficult to provide that experience. I always introduce a new concept from a "known" .

DEFINE:

cider

dehydrate

variety

seedling

graft
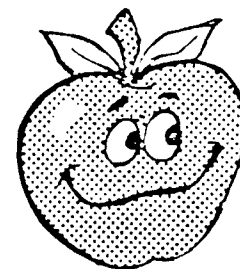
LIST the number of ways apples are used in your home.

RECALL the experience of biting down on a juicy apple.

IDENTIFY four major types of apples sold in your local market.

LOCATE on a map of your State where apples grow.

EXPLAIN how to cut an apple so it is symmetrical.

DRAMATIZE the life of Johnny Appleseed.

CREATE an applehead doll

COMPARE how apples are packaged for the consumer. Are they sold by the pound or piece? Why are different varieties different prices?

90

APPLES.......continued

INTERVIEW an apple. Prepare at least ten
question, and at least ten answers.

ILLUSTRATE the life cycle of the apple.

EXPERIMENT with making apple
prints. Slice it in different
ways, dip it into tempra, and
and apple prints.

DIFFERENTIATE between apple leather
made by your class, and the kind you
purchase in the store.

ANALYZE the climatic conditions
necessary for a good apple crop.

JUDGE the quality of three kinds of apples.

DEBATE the value of organically
grown apple to those that are grown
otherwise.

PREPARE a new type
of apple crisp!

EXPLAIN:
"As American
as apple pie".

TRACE the roots of the
apple as it came across
the Atlantic aboard ship
in 1628.

COLLECT apple seeds
determine the best
ways to make them sprout!

91

DESIGN a game for the
purpose of locating
the Golden Apple.
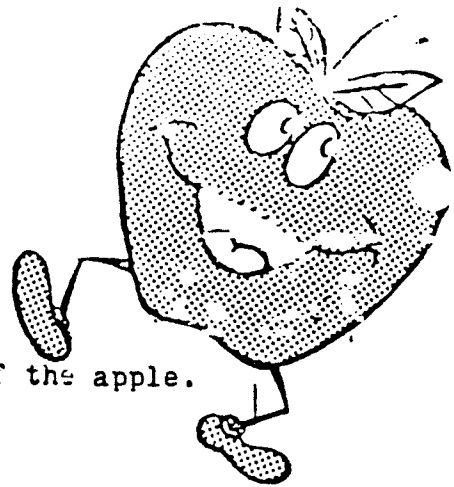
APPLES........continued

RECORD the ingredients found
in apple products. Why are
ingredients added?

Apple production is
measured in BUSHELS,
CONSTRUCT a container
that holds a bushel.

DESIGN a new type of apple.

DEMONSTRATE how an apple
tree is grafted.

ORGANIZE an school campaign
to encourage everyone to eat
an apple a day.

PREDICT how we will grow
apples in the year 2080!

INVENTORY an apple grower
and record the process of
apple production.
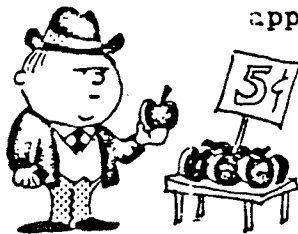
ARRANGE a contest for
the most creative receipes,
then assemble a receipe book.

SOLVE the problem of apples
spoiling.

CREATE your own apple question.....

92

(Taken from Susan Kovalik's *Teaching The Gifted
4 Talented.*)

OBJECTIVES FOR CHILDREN LEARNING SCIENCE
(PROGRAM B.)

Developing an enquiring mind and a scientific approach to problems

1. Developing interests, attitudes and aesthetic awareness.

2. Observing, exploring and ordering observations.

3. Developing basic concepts and logical thinking.

4. Posing questions and devising experiments or investigations to answer
    them.

5. Acquiring knowledge and learning skills.

6. Communicating.

7. Appreciating patterns and relationships.

8. Interpreting findings critically.

General Goals and Objectives

Process Development

Processes are intellectual skills which are developed and used both in science
and other areas of study. When children experiment with materials and examine
ideas, both processes and concepts are being used. Observation and classification
skills are important to the development of more complex processes, such as
interpreting data, and are therefore classified as basic processes. Children
should begin to develop basic processes from their early experiences. Experimenting
and controlling variables are termed integrated processes and can usually be more
effectively learned by children at the late concrete and formal operational
stages. Each process, in turn, consists of a series of levels of difficulty or
sub-processes. For example, the process of observation varies from the skills of
describing an object in terms of a single physical property to identifying the
object in terms of its many properties. A summary of the process development
outlined in the thirty-two units of the basic core is given. The basic processes
are gradually developed from Kindergarten through Grade 6. The integrated
processes are stressed at the higher grade levels as the children begin to develop
formal reasoning. It should be noted that many of the main processes often
include other activities that reflect various aspects of that process. For example:

observing includes identifying;
classifying includes comparing and ordering;
communicating includes describing and graphing;
controlling variables includes the preliminary stage of identifying variables;
experimenting begins in the primary grades with teacher-directed investigations.

The Basic Processes

Observation
Classification
Communication
Measuring
Using space/time relationship
Inferring
Predicting
Defining operationally
Controlling variables
Formulating hypotheses
Interpreting data
Experimenting

[BLOOM'S TAX, AS APPLIED TO SCIENCE]

1. Knowledge - remember facts
                 recite
                 list
                 enumerate
                 write

2. Comprehension - translate information
                     interpret
                     rewrite
                     edit
                     extrapalate

3. Application - use rules, etc. in situation
                   apply known solutions to new events
                   use guides
                   apply new skills to produce solutions to problems
                   make models for solving problems

4. Analysis - show relationship among pt. of whole
                take apart elements of an object or event
                interchange equiv. parts
                separate events for more careful studies
                reorder parts for clearer understanding

5. Synthesis - find new approach
                 form hypothesis
                 new plan of operation
                 new ways of viewing old solutions
                 develop research problems

6. Evaluation - give opinion based on relevant data, or a point of view
                  judge worth of an object on internal and external criteria
                  support position following careful analysis of a situation

BRAINSTORMING

...the basic strategy of Divergent Thinking

WHY DO IT

- to generate a large number of ideas which leads to more creative solutions
- to open students up to sharing ideas without fear of criticism
- to enable students to build on each others' ideas

HOW TO DO IT

1. Teacher states a specific problem or asks a question that is open-ended such as:

    - Name everything you can think of that is soft and white.
    - What other uses can you think of for egg cartons?
    - In what ways can you improve a school pencil to make it easier to use?

2. State the rules for brainstorming.

    - No criticism - all ideas are accepted
    - Make your ideas as 'far out' as you can
    - Build on the ideas of others

3. Restate the problem or question and as students give their ideas, write them on the board with NO comment.

4. After 15-20 minutes, stop the brainstorming and comment on the amount of variety of responses.
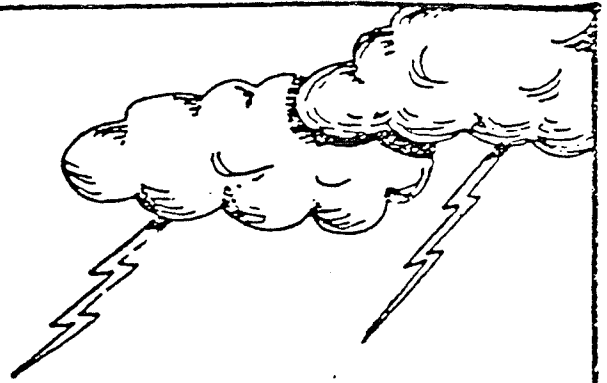
WHAT TO DO AFTER

1. Leave the ideas on the board.

2. Set up with students some standards for evaluating the ideas, such as:
   - Does it help society? - Does it actually solve the problem or does it create new ones?
   - Is it practical? - Can we use it now or in the near future?
   - Is it compatible with human beings? - Are we able to handle it?

3. Ask students to discuss which ideas fit the criteria.

4. Ask students to share any feelings they might have about how they came up with their ideas.

WAYS FOR STUDENTS TO DEVELOP IDEAS

1. Build a model of the idea.

2. Draw a label diagram or design the idea or object.

3. Write an explanation of how to actually use the idea.

4. Create an invention by using the ideas on the board.

5. Write a poem expressing your favorite ideas and how they might work.
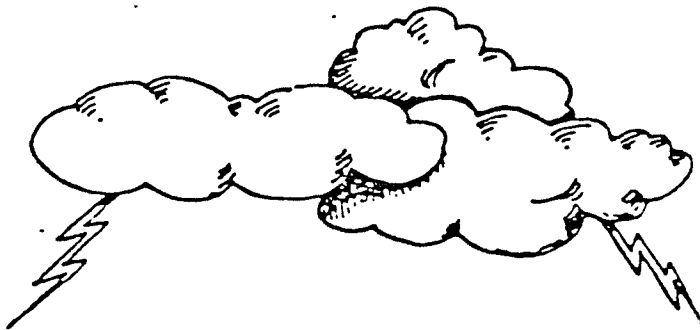
LESSON PLANS--NOTES

36 Barthwick et al., <u>The Gifted and Talented Students in Canada</u> (Toronto: CEA, 1980).

37 S. Kovalik, <u>Teaching the Gifted and Talented</u> (Colorado: ECA Inc., n.d.).

OBJECTIVES FOR CHILDREN LEARNING SCIENCE
(PROGRAM B.)

Developing an enquiring mind and a scientific approach to problems

1. Developing interests, attitudes and aesthetic awareness.
2. Observing, exploring and ordering observations.
3. Developing basic concepts and logical thinking.
4. Posing questions and devising experiments or investigations to answer them.
5. Acquiring knowledge and learning skills.
6. Communicating.
7. Appreciating patterns and relationships.
8. Interpreting findings critically.

General Goals and Objectives

Process Development

Processes are intellectual skills which are developed and used both in science and other areas of study. When children experiment with materials and examine ideas, both processes and concepts are being used. Observation and classification skills are important to the development of more complex processes, such as interpreting data, and are therefore classified as basic processes. Children should begin to develop basic processes from their early experiences. Experimenting and controlling variables are termed integrated processes and can usually be more effectively learned by children at the late concrete and formal operational stages. Each process, in turn, consists of a series of levels of difficulty or sub-processes. For example, the process of observation varies from the skills of describing an object in terms of a single physical property to identifying the object in terms of its many properties. A summary of the process development outlined in the thirty-two units of the basic core is given. The basic processes are gradually developed from Kindergarten through Grade 6. The integrated processes are stressed at the higher grade levels as the children begin to develop formal reasoning. It should be noted that many of the main processes often include other activities that reflect various aspects of that process. For example:

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MENTORS

INTRODUCTION

The concept of the mentor is at least as old as recorded history. However, it has only recently come to be used in the education of the gifted and talented.

A mentor has been defined by Webster as a wise or faithful advisor or monitor. This is probably as simple and as apt a description of a mentor as you will be able to find.

The term "mentor program," which now seems to be in vogue with educators of the gifted and talented, seems to have the ring of new program. However, the word mentor has its' origins far back into history.

The Greek poet Homer wrote about Mentor in the Odyssey. "Mentor" was a faithful friend of Odysseus who was entrusted to care for and educate his son Telemachus. [38]

Mentorship began with Homer and its concept has been carried on throughout history. We find that a mentor relationship existed between Socrates and Plato; Aristotle and Alexander the Great. In the 16th century, many artists enhanced their skills in mentor relationships. Tentoretto studied under his master, Titan. El Greco studied under Tentoretto. In the 17th century, artists such as Van Dyck studied under Master painters such as Rubens. More recently Castaneda wrotes of his relationship with his mentor Don Jaur, a Yaque Indian Sorcerer.

Today, when dealing with the Gifted and the Talented, we define a mentor as a person who guides his students through his craft or profession.

The Mentor is neither a tutor nor a teacher. She is not a tutor as tutoring seems to imply that there is a learning difficulty to be resolved. With mentoring, it is an action oriented program in which the student demonstrates competence and commitment to the task at hand.

Teaching seems to imply that information is passed downward. It is a subordinate, superordinate relationship. In mentoring both the mentor and the student are equal partners in the learning situation. The mentor acts as a catalyst for his student. He does not evaluate, report or record his efforts. He should rather keep his role as scientist, lawyer, photographer etc. for that is what he has to share with his student. Mentoring in its fullest dimension becomes the mentor and his student sharing ideas, sharing interests, sharing resources and sharing knowledge.

THE RESEARCH

A. A study by Jaqueline Shacter: [39]

Shacter felt that many gifted children would be motivated to enjoy more literature and compositions by listening to video tapes of authors of children's books.

It was very difficult to get authors to come in person as they usually limit their personal appearances. The video tapes were either 20 minute cassettes entitled "Meet the Authors" produced in 1960 by Imperial International Learning Corporation in Kankabee,

Illinois or 30 minute cassettes entitled "Profiles in Literature" distributed by Temple University in Philadephia.

Shacter reported two findings:

1. The amount of books read by the gifted students increased substantially after viewing the tapes.
2. The books written by the authors seen on video tapes were rated higher than the books where the author had not been seen.

Shacter concluded that tthis contact, even through mixed media, does stimulate the gifted student to read. For some students, the experience of seeing an author may plant an early seed of desire to become a professional writer.

B. A study by George Szekely: [40]

George Sazekey enlisted art college students to help the artistically gifted child. The art students were to expand the child's awareness of the nature of art and art making and to provide interest in the child's artistic progress. Szekely has been involved with the development of several projects for the artistically gifted. He states, "Hildreth (1967) [41] and other experts agree that the most important outside factor in the artist's development is the teacher or mentor."

The college students were to work with small groups and to provide them with support and companionship. Conversations between students and mentors dealt with their frustrations and triumphs.

Through example and the discussions of other artist work, the art students introduced the students to the ways that the artist might think, work and live by. Although he offers no substantial evidence, he suggests that elementry preformed better and were more interested in art after their experience. He suggests the children gained more confidence in their abilities. They were better at setting goals for themselves and making choices. This experience enhanced their ability as artist.

MENTOR PROGRAMS AT WORK

A. The Minneapolis Project: [41]

The Junior League of Minneapolis for the past three years has developed and founded a mentor program for elementry students in the St. Paul-Minneapolis metropolitan area.

The goals of the program are to:

1. provide in-depth content in subjects not
   regularly encountered in the classroom;

2. encourage and develop logical thinking,
   problem-solving skills, and creative
   production;

3. allow interaction for students of similar
   interests and abilities

The mentors are matched with the students on the basis of interest and expertise. They meet two hours a week for a five to six week black of time. Each mentor is required to undergo twelve hourse of intensive training in the field of gifted and creative educational theory before working with the students. Many local

organizations including the Museums, The State Bar Association, the local art center and the Children's Theatre make contributions and have provided extensive experiences for the program.

Evaluations of the program have shown it to be a highly flexible, low-cost program. The school administrators, teachers, parents and students have all enjoyed the program. The success of the program can be seen by the fact that the program is now expanding throughout the state. The key to its success seems to be a high level of commitment by the mentors, a well informed and involved community and a well organized program.

B. The Burlington Project:

Lord Elgin High School in Burlington, Ontario offers a mentor program for twenty of its high achievement Grade 10-12 students. The program operates somewhat like other mentor programs with one little twist. Each of the twenty students who have been assigned a mentor are in turn asked to act as a mentor for an elementary student. Thereby they are not just being consummers but are being asked to provide a service to younger students.

The mentorship consists of three interactive phases: A) The Basics Workshops; B) The Synergestic Seminars; C) The Mentor Exchange.

The Basics Workshops are a series of workshops designed to teach basic thinking skills, creative problem-solving, self-directed learning, research skills, leadership skills and entrepreneur skills. In this stage, he begins to mentor an elementry student who is interested in the same field of study as himself.

The second phase, The Synergestic Seminar is a practicum lasting three months. The student explores his topic in-depth and applies the skills he has learned from the Basic Workshops.

In the final phase, The Mentor Exchange the student meets with his mentor to share what he has learned and to expand his knowledge of the area under the guidance of his mentor. The mentors range from professors at the local university to senior citizens.

SETTING UP A MENTOR PROGRAM

A successful program must be well organized and it must be operated by deeply committed people. Even the most well intentioned programs fall by the wayside without organization and support.

The people needed to run a successful mentor program are: (1) a well informed, supportive administrator; (2) an enthusiastic librarian and resource teacher; (3) understanding and supportive parents; (4) a faithful and wise mentor.

Before implementing a mentor program meetings with the people involved should take place explaining the reasons why you want to offer a mentor program and the reasons why you need their support. A suggestion to inform parents may be to write them a letter explaining the program.

A. SURVEYING THE NEEDS OF THE STUDENTS

If your goal is to provide a program which is tailored to their needs you must find out what exactly their needs are. So it follows that the next step would be to survey their interests and abilities. This can be done by a questionnaire. Following is one composed by Judy Grize.

B. PUPILS' READINESS

Pupils' readiness to enter a mentor program is often marked by:

1. he/she has courage even if he/she lacks full competence;

2. he/she exhibits a creditable performance at lower instructional levels;

3. he/she knows both how to follow and how to deviate creatively from instructions;

4. he/she is able to focus on the unknown rather than the known;

5. he/she must be able to demonstrate the ability to get along with others and be dependable.

C. MENTOR SELECTION

A mentor should have _some_ of the following qualities:

1. The mentor is usually, but not always an adult.

2. The mentor should be able to guide the learner toward a personally rewarding experience.

3. A mentor should be flexible.

4. A mentor should be capable of imparting to the student an understanding of a life-style and attitudes that are different from those the student might ordinarily meet.

5. The mentor should be interested in the
   student as a learner and an individual.

D. FINDING A MENTOR

The interests of the students should guide you as where you
should look. If the student is interested in dinosaurs, you may
want to contact the university or the museum. On the other hand,
if their interest is engines, you may want to try a vocational
school or a trade center. Here are a few suggested places:

1. The University of Manitoba

2. Hobbiests

3. Trade groups and unions

4. High school students and teachers

*5. Parents (a parent questionnaire soliciting their
    support can be found following)

6. Any type of club or organization

7. The Winnipeg Chamber of Commerce

8. Government departments e.g. The Department of
   Agriculture will provide help on insect
   projects)

9. The Winnipeg Art Gallery

E. GETTING STARTED

In getting started one of the first things you will need is a
contact person. A contact person is a person whom you will be able
to focus upon. They are the person in the field who knows the sub-
ject the students are interested in. This contact person will work
with a small group of students who are interested in a particular
area. After working with all the students for a period of time,

the contact person then may select one or two students who have shown a desire and ability to learn beyond what he has offered them. The contact person then tries to establish a mentor for these few students.

On the following page is a diagram that may help to clarify the process. If you were studying dinosaurs the steps might go like this. These steps represent ideal steps.

A suggested time line is to try to meet once a week for a five or six week black of time. After this time block you will be able to assess the program. Upon completion of the association a letter of appreciation should be sent to the contact person and the mentors involved. It is very helpful to have a parent volunteer drive the students to and from their sessions.

By following these suggestions you should have, hopefully, established a successful mentor program.

CONCLUSION

While special provisions for educating the gifted and talented are a comparatively recent development, these provisions have given us the impetus for a reexamination of what is perhaps one of the oldest teaching relationships, that of the mentor and his student.

Although not a statistically or scientifically proven method, the mentor/pupil relationship has a great deal of intuitive to our logic. Kirk Polking (1978), [42] former editor of Writer's Digest, states that "the best way to develop an ability to write is to work with a successful writer. It is the learning method other successful writers have used for centuries."

Steps involved in establishing a mentor.

Mentor "A" (A Paleontologist)

Mentor "B" (An Anthropolog..

Student "A" is very interested in fossils.

Student "B" is interested in finding out more about the origin of man

Contact Person (A professor of Science)

All students who are interested in dinosaurs go to contact person

Gifted and Talented Class
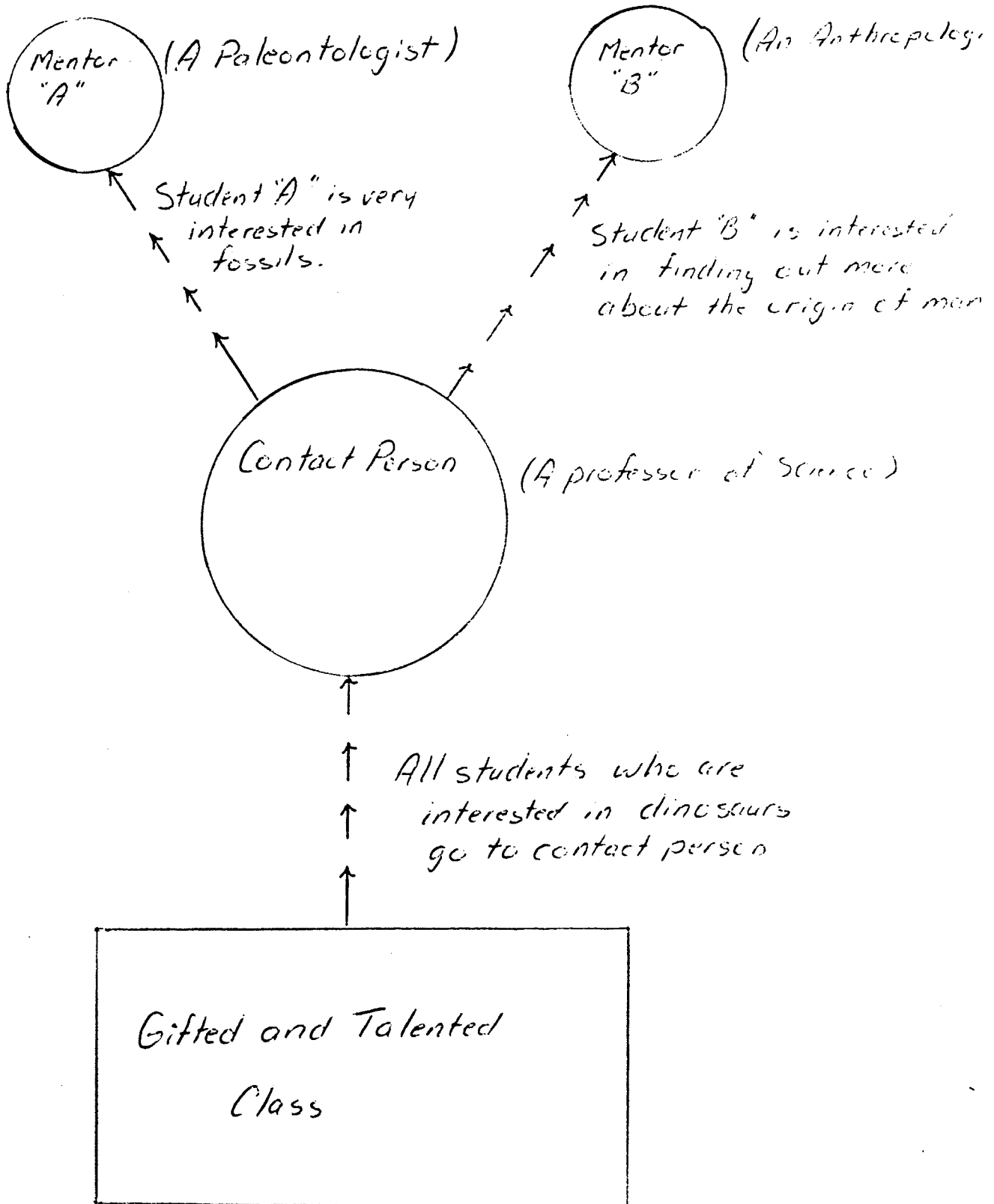
In educational programs, the teacher is the key to effective learning. This fact has been shown repeatedly in studies of the value of various teaching methods (Barbe, 1975). [43] It is this personal contact that makes the difference. A mentor, in his close relationship with his student, does not offer a program, but a personalized fellowship which can only enrich the gifted student's life. Both the mentor and his pupil share a commitment to the truth. Much of the education and educational planning of the future will be done by socially approved mentors for individuals and small groups. They will introduce the learner to procedures for information retrieval, to processes for creative and intellectual skill development, and to self-assessment and goal setting procedures. Mentors will also guide learners into relating with and helping other human beings while at the same time preserving and developing their individuality. (Plowman, 1978). [44]

MENTORS--NOTES

38 B. Boston, <u>The Sorcerer's Apprentice</u> (Reston, Va.: The Council for Exceptional Children, 1976).

39 J. Shachter, "Learning From Authors in Person and in Mixed Media," <u>Gifted Child Quarterly</u>, 24 (1980), 69-71.

40 G. Szekely, "The Artist and the Child--A Model Program for the Artistically Gifted," <u>Gifted Child Quarterly</u>, 25 (1981), 67-72.

41 K. Rogers, "Utilizing Community Resources For Gifted Elementry Students" Minneapolis: National Association for Gifted Children, 1980.

42 K. Rolking, <u>Writer's Digest School Brochure</u> (1978).

43 W. Barbe and J. Renzulli, <u>Psychology and Education of the Gifted</u> (New York: Appleton-Century-Crofts, 1975), pp. 439-447.

44 P. Plowman, "Futuristic Views of Education: Images of What Might Be," <u>Journal of Creative Behavior</u>, 12 (1977).

CREATIVE PROBLEM SOLVING

by

Dr. Sydney Parnes (1967)

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CREATIVE PROBLEM SOLVING

The Creative Problem Solving process, developed by Dr. Alex Osborn and Dr. Sidney Parnes, enables an individual to develop and utilize his/her creative skill to solve problems. The CPS process encourages the development of an open mind, the ability to produce quality and original ideas, and the greater expression of curiosity. Creative Problem Solving is a skill and must be practiced like other skills.

To insure a clear understanding of the steps of the CPS process at an elementary school age, it is advisable to work on the concept of each step independently and then put the steps together for the total process experience.

An important pre-requisite to consider is the necessity to use situations and activities which do not emotionally involve the student. The purpose is an understanding of the process, not proof of it. The basic rules for brainstorming or production of ideas underlies every activity at every step:

1. produce many ideas

2. hitchike on other people's ideas

3. generate far-out ideas

4. defer judgment (no opinions good or bad can be given about an idea until it is time for evaluation)

5. no conversation when ideas are being generated

The process begins with a mess which is a few sentences stating the general problem situation. Step one is fact-finding. In this step, it is important to gather as many facts as possible. Who...What...When...Where...How...are good guideline questions.

Step two is problem-finding.   This step concerns specific problem statements. The problem is stated in as clear a statement as possible beginning with the words, "In What Ways Might I....?" The problem should be stated at least three times, each time trying to be more specific. It is helpful to ask "why" of each statement to gain further clarification and possible clues to the real problem. After several problem statements have been written down, choose the statement that best states the problem.

Step three is idea-finding. This step involves brainstorming ideas for the problem statement (refer to the brainstorming guidelines). After several ideas or alternatives have been generated, choose a given number to weigh in the solution-finding step.

Step four is solution-finding.   Begin by setting up the criteria. Use the rules of brainstorming to think of as many criteria as possible. Criteria are the guidelines one needs to consider when making the decision - size, cost, usefulness, etc. After many criteria have been listed, choose several of the most significant. The criteria alternatives are put on a grid. ex.:

criteria

alternatives

Each alternative is weighed against each criteria and given a number value. The following system is very workable:

4 = excellent   3 = good   2 = fair   1 = poor

The Creative Problem Solving (CPS) process is based on the research and findings of Dr. Sidney Parnes and Dr. Alex Osborn.

Creative Problem Solving is a skill that can be learned and must be practiced like other skills. To insure a clear understanding of the steps of the CPS process at an elementary school age, it is advisable to work on the concept of each step independently and then put the steps together for the total process experience.

The steps of Creative Problem Solving are:

MESS - This is a few sentences describing the "problem situation.

Examples of mess process questions and comments:

Describe a situation you would like to change or that needs to be changed.

Think of one thing you would like to accomplish. Briefly describe it.

Is there a situation that really bugs you? Describe it.

Describe the situation as you see it.

FACT FINDING - Gather as many facts as possible about the situation.

Examples of guideline questions for fact-finding.

Who....
 Which people are involved?
 Who does this situation effect?

What...
 List things that are involved.
 What feelings or circumstances are related to this situation?

When...
 When did this happen? (year, month, day, hour, etc.)
 Are there any timelines or dates involved?

Fact Finding (continued)

    Where...

        Where is the physical location of this situation?
        Are there any other places involved?

    How....

        How did the situation come about?
        How come you or others are involved?
        How has this situation affected other areas of
            your life?

PROBLEM FINDING - During this step specific problem statements
    are developed. The problem should be stated in as many
    ways as possible. Each statement should begin with the
    words, "In What Ways Might ...?" (IWWM...) State the
    problem from many points of view.

Examples of problem-finding questions:

    State the situation - "IWWM...?"

    What is an end goal?

    Why do you want the situation solved?

    What is a result of the situation?
        Is there another way to deal with the situation
        or result?

    Is it the result or situation that is most disturbing
    to you?

After several problem statements have been written down, choose
the statement that you think states the problem situation best.

IDEA FINDING - Brainstorm many possible solutions for the
    problem statement. The emphasis is on producing a
    large number of varied ideas within a short period of
    time.

Examples of idea finding questions:

    List as many possible solutions to the problem as you
    can think of.

    What else might you do?

    What fun things might you do?
        (Relate the problem to a common sound or object.)

    In what ways might a book relate to the problem?

<u>SOLUTION FINDING</u> - Set up criteria. Criteria are the guidelines, st___ __ds, or measuring stick one needs to consider when ma__r_g the decision.

Examples of criteria generating questions:

What things do you need to think about in making this decision?

What standards must this decision meet?

What questions will others aks about your decision?

After many criteria have been listed, choose several you feel are the most significant. The criteria and alternatives can be put on a grid for weighing. Each alternative is weighed against each criteria and given a number value.

The grid can also be used as a guide. Maybe the idea you like the best, scores the lowest. The grid will show in which areas of criteria an idea is weak.

From all the possible solutions, one is chosen for implementation.

Example: Learning about our National Parks.

Rate: 5 - excellent 4 - 3 - 2 - 1 - poor	time involved	cost	does it solve problem	practicality			total
Alternatives							
camping	4	5	5	4			18
check out books	2	5	3	3			13
write to bureau of Nat'l parks	1						

<u>ACCEPTANCE FINDING</u> - This step involves writing a plan of action
for putting the solution into effect.

This plan should include in step form what needs to be
done first, second, etc. Dates and times should be
included for each step indicating when that step needs
to be completed.

Examples of acceptance finding questions:

Who is involved?

What things are needed to sell and/or implement this idea?

What places are involved?

Which methods will be effective?

When are good times for selling and/or implementing this idea?

Why is this a good idea?

What problems might arise while trying to sell and/or implement this idea?

When all the steps are completed, it is not unusual to discover
a whole new problem, especially if the original problem was
complicated. The new problem is then taken through the process.

Creative Problem Solving
~Fact Finding~

Who?

What?

When?

Where?

How?

Problem Finding

Sketch out your problem ~

IWWCJ _____

IDEA FINDING

Problem statement: In what mays might _____

_____

List many solutions to this problem.

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

Mark the ideas you think are the best.

Creative Problem Solving
Problem Finding

IWWCJ _____

Why? _____

_____

IWWCJ _____

Why? _____

_____

IWWCJ _____

Why? _____

_____

IWWCJ _____

Why? _____

_____

IWWCJ _____

Why? _____

_____

IWWCJ _____

Why? _____

_____

SOLUTION FINDING

1. Set up criteria:
   What things do you need to think about in making this decision?

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   Check the most important criteria.

   ===

2. Weigh alternatives against your chosen criteria.

   4 excellent
   3 good
   2 fair
   1 poor

   criteria / Totals / use now / use later / reject

   Alternatives

SEE FULL SCALE GRID......

SOLUTION FINDING

CRITERIA

RATE: 5 = excellent
        4
        3
        2
        1 = poor

IDEAS
(Alternatives)

Hold   Reject   Modify   TOTAL

ACCEPTANCE FINDING - 1

(check) _____ selling an idea   _____ implementing a solution

People involved: Things/materials needed:

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

Places involved: Effective methods:

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

Times/dates to consider: Problems that might arise:

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

ACCEPTANCE FINDING - 2

Why is this a good idea? _____

_____

_____

Solution to be implemented _____

_____

Steps needed to carry out this plan:	date/time	com-pleted
1. _____		
2. _____		
3. _____		
4. _____		
5. _____		
6. _____		
7. _____		
8. _____		
9. _____		
10. _____		
11. _____		
12. _____		
13. _____		
14. _____		

Creative Problem Solving ~ Acceptance Finding
Plan of Action

Summarize the action that will be taken _____

_____

_____

Steps for carrying out plan

what	where	who	when
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

- 107 -

Problems I may encounter in carrying out plan ~

problems	possible solutions

Creative Problem Solving

<u>SAMPLE LESSON</u>

I. TALENT AREA

Creative Problem Solving

II. CURRICULUM AREA AND SUGGESTED GRADE LEVEL - Intermediate
Science - Wildlife Conservation

III.. MATERIALS NEEDED

Paper, pencil, and "Ung of Canada", a story from <u>Time to Wonder</u>,
Holt, Rinehart and Winston, Inc., Level 13, 1973.

IV. TEACHER TALK

"We know that in the past years several animals have almost become
extinct. Instead of adding to the problem of destruction of wildlife,
let's find a way of helping to conserve it. Through the Problem
Solving Process let's solve the following problem situation: How
might we help conserve wildlife?"

A. Fact Finding

"What questions can you ask about wildlife conservation? Use the
key words WHO, WHEN, WHAT, WHERE, AND WHY?" Record the questions
as the students respond. "To what resources could we go to find
the answers to each of these questions?" Encourage students to
be fluent and flexible in possible resources. Record responses.

B. .Problem Finding

You need to get to the root of the problem. Restate the problem
three times in different ways using the words 'In What Ways Might
We....' (the IWWMW form.) Your first statement might be 'In
what ways might we conserve wildlife?' Why do you want to conserve
wildlife? Can you make a restatement knowing that? After you
have restated the problem at least three times, decide which
statement most accurately defines the problem."

C. Idea Finding

"Using the problem statement that you have found, list as many
possible solutions as you can think of. Defer judgment. Don't
evaluate, censor or judge. Anything goes! After you have made
your list, circle the best one."

D. Solution Finding

"What standards do you want the solution to meet when you have
finished? List four or five criteria. Make a grid listing your
best ideas down the side and your alternatives across the top
(see page that follows). Rate the ideas from one to five for
each criteria. Work down, not across. Add the total. The
highest number will have the best chance for success, according
to your criteria.

Creative Problem Solving

E. Acceptance Finding

"List three ideas for putting your plan into action. What step would you take for each plan? What problems might you have? How could you prevent these problems? Who might help you ? Choose the plan of action you think is best and put it into practice."

The following are some hints about the Creative Problem Solving process:

- Work with the process many times as a group before proceeding individually.

- By limiting each step, it is possible to take a class through the entire process in an hour.

- Many teachers find it very valuable to do the steps as separate activities (taking approximately 20 minutes) several times before running through the entire process.

- Fact-finding is an excellent comprehension tool for use upon completion of the story. It is also a great way to begin a unit. Each person is responsible for finding answers to a certain number of fact-finding questions during the course of the unit.

- Problem-finding is fun to use during Current Events or when studying world problems. (Student tries to restate the problem and determine if it is the real problem.)

- Idea-finding can be practiced in 1 minute or 10 minutes. The teacher or students suggest a topic for brainstorm.

- Solution-finding can be used when making a decision. It can also be fun to use in Social Studies or Language Arts. Students weigh the alternatives someone else had in a given situation.

- Acceptance-finding provides students with the opportunity to practice organizing and developing workable plans of action.

- It is easier for the student to know where they are in the process if the worksheep for each step is run on a different color.

ROCK GARDEN DILEMMA

I. PROJECT AREA :   Creative Problem Solving

II. CURRICULUM AREA AND SUGGESTED GRADE LEVEL - Science
                                            Primary

   A. Content - Geology, Rocks
   B. Concept - The ground is a mixture of many different materials.
   C. Process - Communicating

III. MATERIALS: Paper, pencil

IV. PRESENTATION:

   A. Motivation

      1. Warm-up: Review steps of creative problem solving.

      2. Discuss what a garden is, how you take care of it and why
         rocks would be a problem.

   B. Teacher Talk

      "Today we are going to do Creative Problem Solving. Our
      problem is that our garden has too many rocks in it.

      Fact-Finding
             List facts about the problem -
                 Who (people involved)
                 What (things or objects involved)
                 When (times involved)
                 Where (locations involved)

      Problem Finding
             State and restate the problem several times. Begin each
             statement with IWWMW (In What Ways Might We...)
                 (Example: IWWMW get rid of the rocks in our garden...
                            IWWMW use the rocks as part of our garden...)

      Idea Finding
             Choose one problem statement and brainstorm many possible
             solutions. Remember to defer judgment.

      Solution Finding
             Set up criteria for weighing the solutions. Put the
             criteria on a grid. Choose several ideas from the previous
             step to put on the grid Starting with the first criteria.
             weigh all the solutions against each criteria. Use a
             number scale for rating the solutions. Total the numbers
             and choose a solution that scores high and solves the
             problem.

      Acceptance Finding
             Make a plan of action to implement the solution. Include
             materials necessary, steps in carrying out idea, problems
             one might encounter, and dates or times when various steps
             will be completed."

C. Student Response

Children go through the steps of Creative Problem Solving
to find a solution and carry out a plan of action to remove
their rocks from the garden.

D. Follow-up

Take some of the rocks and make something out of them.
Add some details with paints.

46.   IWWMW get the storeroom ready quickly?
47.   IWWMW hire a part-time teacher?
48.   IWWMW rush P.R. for more books?
49.   IWWMW remember lunch ticket money?
50.   IWWMW help child gain skills in group process work?
51.   IWWMW change attitude of low-math students?
52.   IWWMW keep our desks neater?
53.   IWWMW make the lunchroom helpers feel happier?
54.   IWWMW use numbers?
55.   IWWMW find out more about our community (New Brighton)?

- CLASSROOM APPLICATION IDEAS -

Re: Problem Statements you may want to work on.
From: Afternoon Flight of September 17, 1974 on Problem
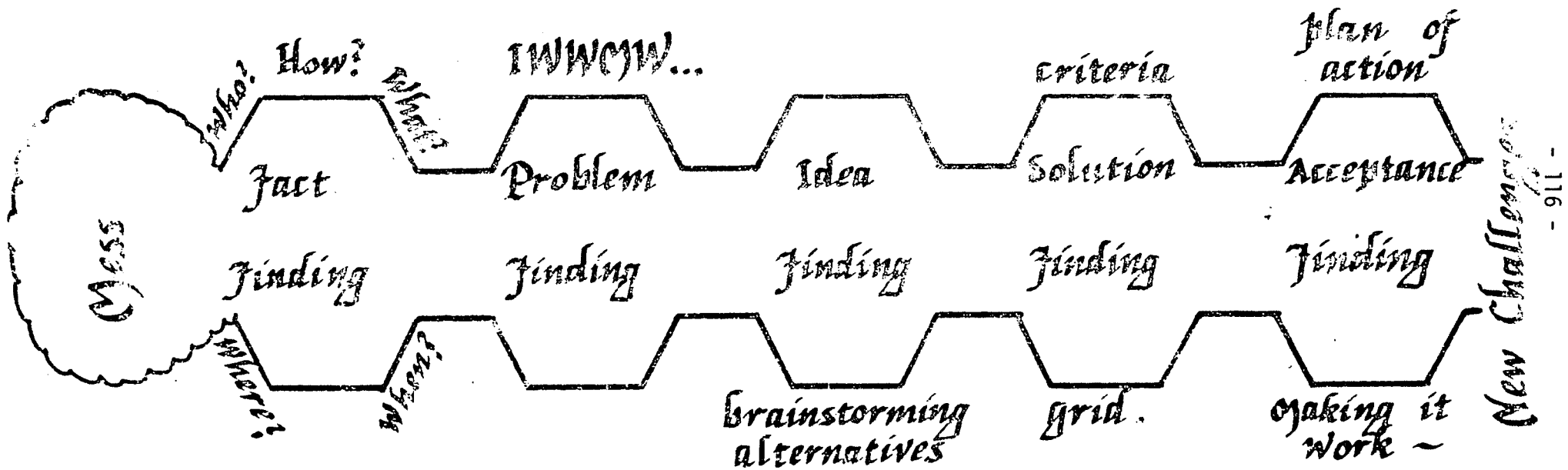   Definition and Idea Finding

1.   IWWMW make our work neat?
2.   IWWMW learn to accept "changes" in our day?
3.   IWWMW welcome a new student?
4.   IWWMW help custodians?
5.   IWWMW keep plants in our room?
6.   IWWMW help all become involved?
7.   IWWMW plan a city (model)?
8.   IWWMW learn about space?
9.   IWWMW learn about stars?
10. IWWMW share responsibilities?
11. IWWMW discover vibrations?
12. IWWMW keep our room neater and cleaner?
13. IWWMW better follow rules?
14. IWWMW better listen and then follow directions?
15. IWWMW keep order in lunch room?
16. IWWMW organize our property (paper, etc.)
17. IWWMW make reading more fun?
18. IWWMW make better use of our free time?
19. IWWMW be better friends?
20. IWWMW make new friends?
21. IWWMW stick to the subject?
22. IWWMW move more quietly?
23. IWWMW keep from running in halls?
24. IWWMW be more aware of classmates feelings?
25. IWWMW better handle disagreements?
26. IWWMW improve our handwriting?
27. IWWMW learn our math facts?
28. IWWMW solve this math problem ?
29. IWWMW increase our vocabulary?
30. IWWMW learn these spelling words?
31. IWWMW improve our worksheet work?
32. IWWMW share a good book (in report)?
33. IWWMW change our classroom arrangement?
34. IWWMW become a better student?
35. IWWMW keep the temperature down in the rooms in afternoon?
36. IWWMW get the children to be better listeners?
37. IWWMW work under heated temperature?
38. IWWMW get students to get their assignments done?
39. IWWMW get to lunch on time if you have gym just before?
40. IWWMW keep desks in order?
41. IWWMW teach children to be considerate of audio visual
          equipment?
42. IWWMW get kids to read more?
43. IWWMW get kids to enjoy reading?
44. IWWMW help children to participate more?
45. IWWMW bring real world into the classroom?

Further information on Creative Problem Solving can be found in the following books:

Applied Imagination-   - Alex Osborn
                           Charles Scribner's Sons (1963)

Guide to Creative Action - Ruth Noller, Sidney Parnes, Angelo Biondi
                           Charles Scribner's Sons (1976)

Creative Action Book   -- Ruth Noller, Sidney Parnes, Angelo Biondi
                           Charles Scribner's Sons (1976)

                           Charles Scribner's Sons
                           597 Fifth Avenue
                           New York, New York 10017

The Creative Process   - Angelo Biondi
                           DOK Publishers, Inc. (1972)

Bird's Eye View of CPS   - Ruth B. Noller
                           DOK Publishers, Inc. (1977)

CPS in Mathematics   - Ruth Noller, Ruth E. Heintz, David A. Blaeuer
                           DOK Publishers, Inc. (1978)

                           D.O.K.
                           Disseminators of Knowledge
                           71 Radcliffe Road
                           Buffalo, New York 14214

It's A Gas To Be Gifted   - Ruth B. Noller
                           Donald J. Treffinger
                           Elwood D. Houseman (1979)
                           DOK Publishers

Creative Problem Solving

...Dr. Sidney Parnes

(Mess)

who? How? What?
IWWCYW...
criteria
Plan of action

Fact Finding
where? when?

Problem Finding
brainstorming alternatives

Idea Finding

Solution Finding
grid.

Acceptance Finding
making it work ~

New Challenges

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APPENDIX B

Questionnaire

QUESTIONNAIRE

Objectives:

1. To identify the students who were gifted within the regular science
    process classroom setting. They were identified by their
    proficiency in the science processes and the thinking skills which
    were taught within the regular science process classroom setting.
    They were also taught the thinking skills through the first two
    levels of Parnes Creative Problem-Solving Process.

2. The gifted students were provided with activities and experiences
    in the higher level thinking skills in a once-a-week pull-out
    program. They also learned Parnes Creative Problem-Solving
    techniques. The pull-out also included a mentor program which
    provided experiences not obtainable in the regular school system.

3. The co-operating classroom teachers were given inservices on the
    various aspects of gifted education that pertained to the
    instruction of gifted students. They were expected to gain a
    clearer understanding of the program development for gifted
    students, and to learn about the identification and the
    characteristics of gifted students.

In addition to the objectives outlined above, this questionnaire
attempted to find out about the affective domain, and other
considerations as listed:

1. The regular science process classroom should provide an atmosphere
    where the students enjoyed what they were studying;

2. The regular science processes taught should enable the co-operating
    teachers to apply these processes to other subject areas;

3. The majority of the students should work well with their peers and
    enjoy studying science;

4. The students who were not identified as gifted should achieve
    success in the science process classroom. They should become
    proficient in the science processes and in the first two levels of
    Parnes Creative Problem Solving Process;

5. The parents of the students selected for the pull-out program
    should feel their children are obtaining a program which is very
    beneficial to them.

PLEASE EXAMINE THE ACCOMPANYING QUESTIONNAIRE AS TO WHICH ITEMS
CORRESPOND TO WHICH OBJECTIVES. ALSO PLEASE COMMENT ON THE QUALITY OF
EACH ITEM.

This questionnaire was designed to find out what the co-operating classroom teachers felt were the strong and weak points of the science process program and the pull-out.

Please check the answer you feel best describes what the participation in the L.E.A.P. PROGRAM B meant to you and to the students involved.

Please do not put your name on the questionnaire as this is to remain confidential.

The results of the questionnaire will be made public.

SD = strongly disagree   A = agree

D = disagree   SA = strongly agree

N = neutral

1.   The majority of the students in the pull-out were correctly identified as gifted.

     SD _____ D _____ N _____ A _____ SA _____

2.   The majority of the students identified as gifted did not apply the higher level thinking skills in the regular science process based program.

     SD _____ D _____ N _____ A _____ SA _____

3.   The majority of the students in the pull-out felt they were "smarter" than the students in the regular science process based program.

     SD _____ D _____ N _____ A _____ SA _____

4.   The majority of the students in the regular science process based classroom considered the work to be too hard for them to master.

     SD _____ D _____ N _____ A _____ SA _____

5.   The majority of the students in the regular science process based program did well in the knowledge, comprehension and application levels of thinking.

     SD _____ D _____ N _____ A _____ SA _____

6.   The majority of the students in the pull-out identified as being gifted had a great deal of difficulty in the higher level thinking skills of anlaysis, synthesis and evaluation.

     SD _____ D _____ N _____ A _____ SA _____

7.   The majority of the students in the pull-out worked well with their peers in the regular science process based program.

     SD _____ D _____ N _____ A _____ SA _____

8.   The majority of the students identified as gifted in the regular science process based program did not want to be separated from their peers and placed in a once-a-week pull-out program.

     SD _____ D _____ N _____ A _____ SA _____

9. The majority of the students identified as gifted within the regular science process based program showed evidence of using the higher level thinking skills on a consistent basis within the regular science class.

    SD _____   D _____   N _____   A _____   SA _____

10. The majority of the students in the regular science process based program showed evidence of proficiency in the science process skills that were taught.

    SD _____   D _____   N _____   A _____   SA _____

11. The majority of the students in the regular science process based program learned from each other as well as from the teacher.

    SD _____   D _____   N _____   A _____   SA _____

12. The majority of the students in the regular science process based program did not enjoy being in the science class.

    SD _____   D _____   N _____   A _____   SA _____

13. The majority of the students in the regular science process program became very effective observers.

    SD _____   D _____   N _____   A _____   SA _____

14. The majority of the students in the regular science process program did not learn how to record their data.

    SD _____   D _____   N _____   A _____   SA _____

15. The majority of the students applied their learned thinking skills and processes in subject areas other than science.

    SD _____   D _____   N _____   A _____   SA _____

16. The majority of the students in the regular science process based program did not learn the first two levels of Parnes Creative Problem Solving techniques.

    SD _____   D _____   N _____   A _____   SA _____

17. The majority of the students in the pull-out program learned how to apply the Creative Problem-Solving Techniques to real world situations.

    SD _____   D _____   N _____   A _____   SA _____

18. The co-operating classroom teachers gained more knowledge and new insight into gifted education after participation in in-services on gifted education and participation in the science process class-room.

    SD _____ D _____ N _____ A _____ SA _____

19. The co-operating classroom teachers did not feel they learned much about the identification and the characteristics of gifted students.

    SD _____ D _____ N _____ A _____ SA _____

20. The majority of the students displayed much enthusiasm when attending the mentor program.

    SD _____ D _____ N _____ A _____ SA _____

21. The majority of the parents whose children attended the pull-out program considered the program to be beneficial to the education of their children.

    SD _____ D _____ N _____ A _____ SA _____

22. The majority of the parents whose children attended the pull-out program did not feel good about having their children separated from the regular classroom activities.

    SD _____ D _____ N _____ A _____ SA _____

APPENDIX   C

Tests

Progress Reports

Science Test   Gr. 3.
  L.E.A.P. Program B
      Name_____

Draw a line from the word to the correct explanation.

1. Mammal   - is a cold-blooded animal.

2. Knowledge   - is when you gather information,
                                  or memorize something.

3. Reptile   - breathes through gills.

4. Fish   - is when you understand something.

5. Comprehension   - is warm-blooded animal.

6. Application   - is information you have gathered.

7. classify   - is when you make something new
                                  from all the information you have.
8. Data

                                - is when you place something in
                                  different catagories according to
                                  a specific characteristic.

9. Name three characteristics of a mammal.

    _____

    _____

    _____

10. Name three characteristics of a reptile.

    _____

    _____

    _____

11. Name three characteristics of a fish.

_____

_____

_____

12. Please classify this data according to eye color, using
    a graph to indicate how many of each color eyes there are.
    Here is the data: In our classroom there are 8 students with
    blue eyes, 2 students with hazel eyes, and 4 students with
    brown eyes, and 7 students with black eyes.

13. Here is a problem for you to analyze. There was an arguement
    on the playground yesterday between two boys. They both
    said it was their turn on the climbers. How would you analyze
    this problem ?

14. How would you set up a nice home in the classroom for a
    Hamster, using the information you have gathered about
    warm-blooded animals. Please draw a picture of the home,
    labelling all the parts. You may also write about it if you
    wish.

Science Test   Gr. 4
            L.E.A.P. Program B
            Name.-_____
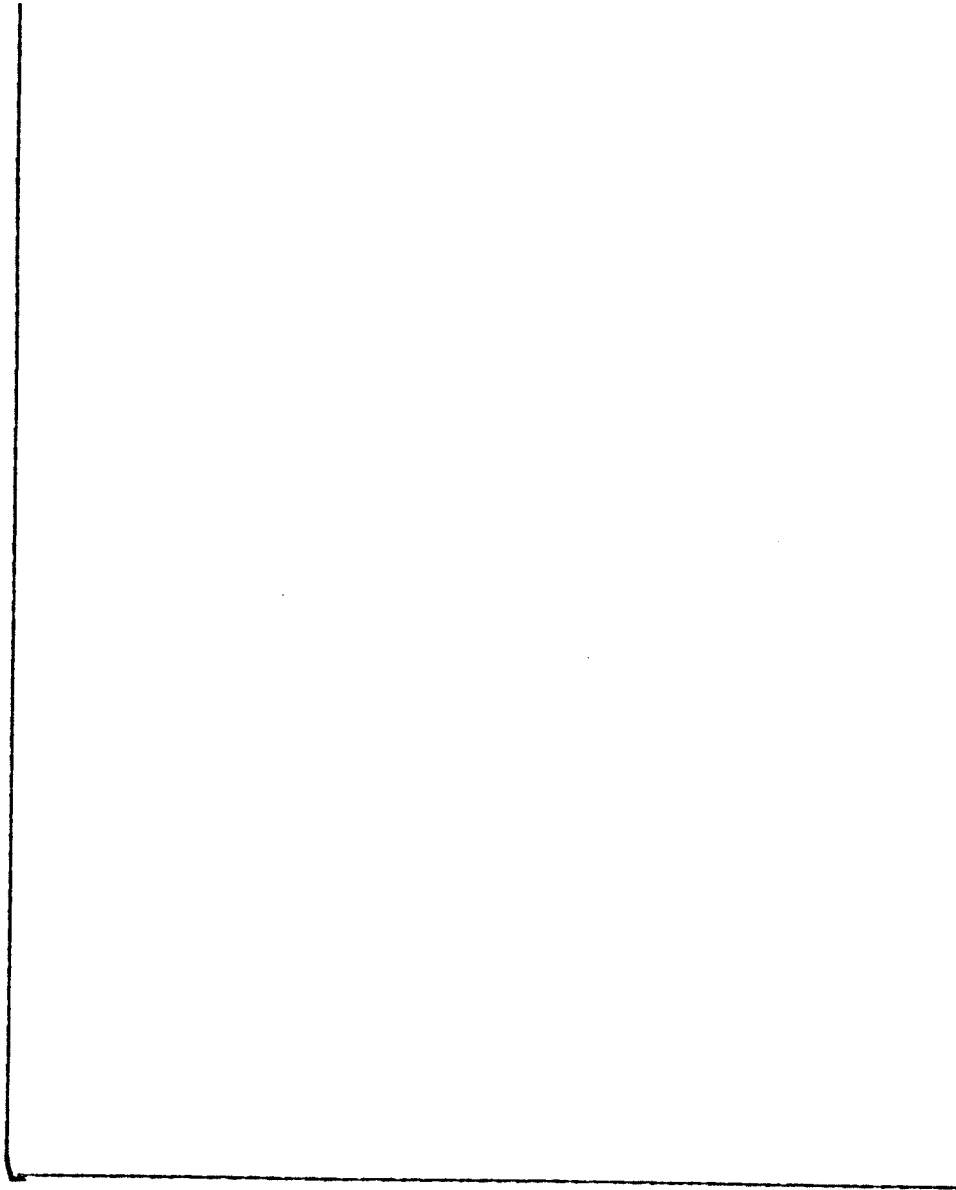
        Draw a line from the word to the correct explanation.

1. Herbivore   - is an animal that eats flesh.

2. Knowledge   -is when you understand something.

3, Carnivore   - is an animal that eats flesh and plant

4. Application   -is when you gather information, or
                                        memorize something.

5. Omnivore   - is when you make something new from
                                        your data.

6. Comprehension   - is an animal that eats plants.

7. Manganese dioxide and
   carbon dioxide   - produces O_2 when you put them
                                        together.

8. Evaluation

9. Take a clean sheet of paper, and draw a food chain. It can be a
   food chain from our forests, or a food chain from the Arctic.
   Be sure to label all parts of the food chain.

10. Explain your food chain in writing. Remember to explain exactly
    how it works.

11. Here is a problem. Tim lost the keys to his house on January 3rd.
    He lost them walking from the school to his home. How would you
    analyze this problem in a logical way ? PLease do this on a separate
    piece of paper.

12. Use your imagination. If you could catch energy in your hand, and
    put it under a microscope, what do you think it would look like ?
    Draw what you think it would look like.

HOOL A

Progress Report 19___ - 19___

L.E.A.P. Teacher: Ms. Riglin

E: _____

DE: _____

Co-operating
Classroom Teacher: _____

L.E.A.P. Program B is designed to teach a SCIENCE PROCESS PROGRAM with emphasis on thinking skills of knowledge, comprehension, application, analysis, synthesis and luation. It is also designed to teach the first two levels of Parnes Creative Problem ving Process. Listed below are the science processes and thinking skills to be taught s year and an evaluation of this child's development in these areas. To date,

N.A. - Not Applicable   Ex. - Exposure

P.M. - Partial Mastery   M - Mastery

	N.A.	Ex.	P.M.	M.
SCIENCE PROCESSES				
1. Observation	___	___	___	___
2. Classification	___	___	___	___
3. Graphing	___	___	___	___
4. Measuring	___	___	___	___
5. Communicating	___	___	___	___
6. Inferring	___	___	___	___
7. Predicting	___	___	___	___
8. Defining Operationally	___	___	___	___
9. Controlling Variables	___	___	___	___
10. Formulating Hypothesis	___	___	___	___
11. Interpreting Data	___	___	___	___
12. Experimenting	___	___	___	___
THINKING SKILLS				
1. Knowledge	___	___	___	___
2. Comprehension	___	___	___	___
3. Application	___	___	___	___
4. Analysis	___	___	___	___
5. Synthesis	___	___	___	___
6. Evaluation	___	___	___	___
CREATIVE PROBLEM SOLVING				
1. Senses and Challenges	___	___	___	___
2. Fact-finding	___	___	___	___

WORK HABITS AND ATTITUDES

1. Follows Directions   _____

2. Works Neatly   _____

3. Completes Work Promptly   _____

4. Co-operates With Others   _____

5. Shows Positive Attitude   _____

6. Participation   _____

L.E.A.P. PROGRAM B

Progress Report 19___ - 19___

L.E.A.P. Teacher: Ms. Riglin

NAME: _____

Co-operating

GRADE: _____   Classroom Teacher: _____

The L.E.A.P. Program B is designed to teach a SCIENCE PROCESS PROGRAM with emphasis on the thinking skills of knowledge, comprehension, application, analysis, synthesis and evaluation. It is also designed to teach the first two levels of Parnes Creative Problem Solving Process. Listed below are the science processes and thinking skills to be taught this year and an evaluation of your child's performance in these areas.

VG - very good   I - improving

S - satisfactory   NI - needs improving   NA - not applicable

	VG	S	I	NI	NA
A. SCIENCE PROCESSES					
1. Observation	___	___	___	___	___
2. Classification	___	___	___	___	___
3. Graphing	___	___	___	___	___
4. Measuring	___	___	___	___	___
5. Communicating	___	___	___	___	___
6. Inferring	___	___	___	___	___
7. Predicting	___	___	___	___	___
8. Defining Operationally	___	___	___	___	___
9. Controlling Variables	___	___	___	___	___
10. Formulating Hypothesis	___	___	___	___	___
11. Interpreting Data	___	___	___	___	___
12. Experimenting	___	___	___	___	___
B. THINKING SKILLS					
1. Knowledge	___	___	___	___	___
2. Comprehension	___	___	___	___	___
3. Application	___	___	___	___	___
4. Analysis	___	___	___	___	___
5. Synthesis	___	___	___	___	___
6. Evaluation	___	___	___	___	___
C. CREATIVE PROBLEM SOLVING					
1. Senses and Challenges	___	___	___	___	___
2. Fact-finding	___	___	___	___	___
D. WORK HABITS AND ATTITUDES					
1. Follows Directions	___	___	___	___	___
2. Works Neatly	___	___	___	___	___
3. Completes Work Promptly	___	___	___	___	___
4. Co-operates With Others	___	___	___	___	___
5. Shows Positive Attitude	___	___	___	___	___
6. Participation	___	___	___	___	___

APPENDIX   D

How to Get Started

HOW TO START A PROGRAM FOR GIFTED AND

TALENTED STUDENTS IN A SCHOOL DIVISION

INTRODUCTION - "GETTING STARTED"

There are two levels of program development. The first one is an administrative one, where enthusiasm and a desire to have the program in a certain School Division is nurtured. The second level is actually developing the curriculum for the program itself.

It only takes one enthusiastic person, committed to the education of the gifted/talented, to actually get things going. Often a teacher or an administrator who has taught a gifted child, or who has a gifted child themselves will be the one to initiate the program. It is a good idea to spread the enthusiasm and compile a committee to begin to study the various programs for the gifted. That one, there is more than one person doing the research, and more than one person going on visitations to other programs.

Ideally the committee of no more than 16 should consist of:

1. major person, from each grade level--primary, intermediate, secondary

2. principal - important, has got to be someone who gets along with all principals

3. Central Office person with power

4. someone with power who can make decisions

5. a good guidance counselor

6. a good guidance psychologist

7. a good school board member who has a gifted child

8. a gifted child's parent

9. Dept. chairperson

10. a vocational rep. person

11. a gifted kid at secondary level if they're <u>extremely</u> gifted

12. a librarian.

It is a good idea to meet at a retreat some weekend where everyone can get together, and brainstorm. However, this is not always possible because of the lack of time, or the inconvenience of it.

Brainstorm - whole group of 16 (put them in groups of 3):

1. Administration support

2. Teacher's attitude

3. Parents of gifted students

4. Other parents

5. School board

6. Guidance counselors

7. Staff development inservice

8. Budget

9. Evaluation

10. Identification criteria

11. Qualified gifted students

12. Support of guidance personnel

13. Methods and materials

14. Existing curriculum design

15. Public relations

16. Community resources

17. Presenters, Mentors

18. Local and provincial

19. Time/schedules

20. Declining enrollment/growth

21. Facilities

22. Philosophy and rationale

23. Transportation

24. State/provincial program approval

25. Co-ordinating neighbouring programs

26. Quality of specialists

27. K-adulthood follow-up

28. Pertinent chart time lines

A meeting held at a specific location every two weeks is also very profitable. These meetings should be chaired by an administrator who gets along well with the other administrators. That way, he/she is able to incorporate the program in the Division with less conflict. The different theories of gifted education should be examined, so the committee can get a firm foundation in their own minds about the different possibilities of program development. Various programs already in progress should be examined. Ideally those in Canada, and those in other countries as well. Mentor systems should be examined and curriculum development itself should be set up. These are the types of things that need to be explored. Each Division is different, and each situation is unique. It is necessary to examine the specific situation to arrive at decisions about it.

There are basically two kinds of programs that can be for the gifted/talented.

The first one is a pull-out program where a teacher "pulls out" a number of students identified as gifted. Some programs prefer using the top 5% as their guideline. In a "pull-out" program the class of children are given an intelligence test, a standard achievement test, the Torrance Test of Creativity and a peer nomination form. There is also teacher nomination. The top 5% are then selected to participate in the school program. These students are taken out of class two or three mornings or afternoons a week and work on development of the creative-problem solving processes. Usually the student's interest is centered upon, and mentors are found for the students who need it.

The second kind of program for the gifted is where the teacher of the gifted remains in the classroom of the particular grade in question and works co-operatively in a team-teaching situation. He/she teaches a science based, process-thinking program, developed around Bloom's taxonomy. After a month or so, the students who are identified as gifted, are pulled out twice a week for a shorter period of time, and worked with. That way, more of the school population benefits from the teaching, the gifted are included in their homeroom class, and the homeroom class benefits from the gifted.

GENERAL OVERVIEW OF SETTING UP A GIFTED/TALENTED PROGRAM--"SKIN AND BONES"

GOALS:

1. To heighten awareness of professionals and parents of the general benefits of excellence as a goal for all children in their school work.

2. To help professionals and parents define excellence in terms of

observable competences--intellectual, physical, creative, artistic, academic

3. to encourage professionals to evaluate their present classroom practice as to how it nurtures excellence

4. to encourage professionals to modify their classroom practice through voluntary activity backed by direct, observable Division support, to better nurture excellence

5. to provide an optional course dealing with thinking process in self-selected schools open to any child in grades K to 6

6. to provide a mentor program for children whose interests or needs exceed the resources of the normal classroom.

CLIENTS:

All children, K to 6, in schools which make an all-staff commitment--

1. to make excellence a school goal

2. to work through the process of defining excellence in terms of observable competencies relative to one or more areas of school work--intellectual, physical, creative, artistic, academic

3. to evaluate present practice and to introduce, where needed, new practice to nurture excellence in the classroom

FACILITATOR'S ROLE:

1. to help a principal and staff evaluate their staff and plant resources relative to introducing a program of excellence with

a view to discerning what arenas the school is best equipped to move into--intellectual, physical, creative, artistic, academic

2. to help a principal and staff set up strategies to develop their adjustment--ie. articulating competencies, organizing staff in-service, identifying available resources, searching out additional resources, drawing up goals, time-out lines, etc.

3. to give in-service training or arrange for it to be given

4. to provide a continuing resource--searching out/suggesting materials, obtaining materials, helping teachers develop their own materials, helping teachers develop lesson plans and strategies for units of work, teaching demonstration lessons, maintaining the faith

5. to create or cause to be created a program designed for children of grades K to 6 to teach thinking as a process and to make this program available, along with the necessary materials, to any school requesting it

6. to provide the necessary in-service training for teachers who intend to offer a thinking process course in their classrooms.

DEALING WITH THE SUPERIOR:

In schools where excellence is an expectation and therefore something to be valued and rewarded there will surface children whose aptitudes/skills are clearly greater than the majority of their fellow students and whose needs for challenge exceed the ready resources of the school/classroom. There will also surface, children whose deeply felt interests are divergent from the classrooms program/resources. It is

difficult if not impossible to predict when, where, and what needs or interests will surface. It is therefore unfair, in this writer's mind, to ask the classroom to prepare for these needs and interests to the extent and depth necessary. It is foolish, in this writer's mind, and also, perhaps, arrogant of a school to think that it can establish programs in anticipation of children's needs to operate on a pull-out basis with a clientele selected through questionable criteria.

Nevertheless, real children who are either superior in some dimension or who are acceptably divergent will surface and have the right to an educational experience suited to them.

THE MENTOR:
1. a person whose skill/knowledge in a given area equals or exceeds the student's
2. a person who has the skill to encourage and nurture excellence in someone else
3. a person who has the time or whose time can be made available to deal with a single or a small group of students
4. a teacher; a person without teacher training but with an area of expertise; a student.

THE PROGRAM
SCHOOL DIVISION RESPONSIBILITIES
1. to identify for use when needed people who are capable of being and who are willing to be mentors--in a variety of fields (physical education, the arts, the humanities, the sciences,

business/industry, services)

2. to make known to self-selected schools the names and expertise of these people

3. to create or to cause to be created groups of students from various schools where a mentor-group seems called for

SCHOOL RESPONSIBILITIES

1. to duplicate at the school level the above mentiond Division responsibilities drawing on the school's staff, student body, parents, local community, and on outsiders known to that school particularily

ALSO

2. the mentor and student(s) to meet at the convenience of both parties--during school hours (pull-out), outside school hours, on weekends or holidays ... parents to be responsible for transportation where the meeting is away from the school.

THE CLIENT:

Students whose interests or skills are either superior to or divergent from their fellow-students and whose needs at that level or in that direction cannot be met by the normal classroom's resources.

IDENTIFICATION

By any one of the following means:

1. teacher motivation

2. self-nomination

3. parent nomination

The classroom teacher would decide the suitability of the nomination or could consult with other teachers, the principal or the Facilitator.

SPECIFIC CONSIDERATIONS WHEN SETTING UP A GIFTED/TALENTED PROGRAM

PURPOSE:

Our purpose is to provide equality of oportunity for education of special needs children. Both ends of the spectrum should have their educational needs met.

DEFINITION:

Initially the program would be for the academically gifted students. The program would be reviewed annually and the criteria would be expanded to identify other types of giftedness and then appropriate programs would be started. No child will be excluded from entering the program because of behaviour problems or learning disabilities. However, if a child is detrimental to the functioning of the group, then some other programming should be planned for that child.

SELECTION:

The top 5% of each grade in each school would be chosen based on these criteria:

        Otis-Lennon I.Q. test

        Reading test

Mathematics test

Teacher nomination

Creativity test

PROGRAM MODEL

Twice weekly pullout program with classroom integration. Mentors would also be used.

COORDINATOR:

A full-time coordinator is necessary particularly for the first two years.

BUDGET:

1. Coordinator's salary

2. Materials and books

3. Committee needs

4. Inservicing needs

Teacher motivation will be enhanced by board policy and board support.

SUMMARY

The section on "How to Get Started" outlines ways in which a program for the gifted can be established in a school division. This is not necessarily the way it happens. Each school division has its own