ABSTRACT
        Eight modules are presented for instruction of
teachers of intellectually gifted students. Modules include
statements of objectives and subobjectives, as well as assignments of
activities to demonstrate mastery of the basic materials. Modules
address the following topics (sample subtopics in parentheses):
population (rationale for units, characteristics of gifted students);
cognitive behavior (B. Bloom's taxonomy); deductive sequencing (R.
Gague's eight levels of learning); learning activities (suggestions,
based on Bloom's taxonomy); terminal and enabling objectives;
inductive sequencing of learning activities (problem solving);
management systems (learning activity packets, learning centers,
grouping, theme development, independent study, and contracts); and
communication (conflict resolution, problem ownership). Worksheets
are appended. (CL)

gifted education module system

by

Donald Nasca   Hilarie Davis

GEMS is available from:

> Bureau of Educational Field Services
> State University College at Brockport
> Brockport, New York 14420

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Gifted Education Module System

Only the teacher can combine the variables of time, space, student, and subject matter to provide a successful learning environment.

Monroe & Orleans BOCES

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Management

How to use a variety

Population

Who they are — What they
need — Who should teach them

Cognitive Behavior

How they think

Inductive Sequencing

How to add
Beginnings and
Endings

Deductive Sequencing

How to
Organize Content

Objectives

An easier way to use
them to write about goals
and activities

Activities

Techniques to get content
across and promote higher
level thinking

Communication

How to handle "spontaneous inter-
action" in the classroom

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How to use a variety.

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Cognitive Behavior
How they think

Inductive Sequencing
How to add Beginnings and Endings

Deductive Sequencing
How to Organize Content

UNIT PLAN

Objectives
An easier way to use them to write about goals and activities

Activities
Techniques to get content across and promote higher level thinking

Communication
How to handle "spontaneous interaction" in the classroom

Creating Design Excellence

The unique setting which is the classroom is an expression of who you and your students are. Its organization reflects how you bring all your experience and training to bear in an effort to create a learning environment. This setting includes all the gems of your experience in education. The GEMS book is composed of modules on topics which are the "gems" of gifted education. They are the basics for a differentiated education.

Have you ever bought, borrowed, or stolen a program, or even a single unit that you used in its original form? Has it not <u>always</u> been necessary to adapt it to your particular needs? We have found that just as students have individual needs, teachers do also. Recognizing that this is true of most educators, we are presenting you with information on the components of a program for gifted students and suggesting that you adapt it to form the unique setting that is your classroom. Like a master jeweler, you must cut and mount these gems to show off their brilliance in your own unique setting.

The first step in this process of achieving design excellence is mastery of the basic material. Each module presents information to be mastered and an activity to demonstrate that mastery. Only as the pieces are completed can they fall into place. The information is best digested over a period of several weeks. When the components are familiar, the design of the unit plan can follow. This final product is completed, however, only with a large measure of your creativity.

The theme of a unit is the perspective you, the teacher, select to take. Almost any perspective is acceptable as long as it can include the basic information (curriculum), and it is a topic you are interested in. Since the emphasis in gifted education is on the process, a model or tool which
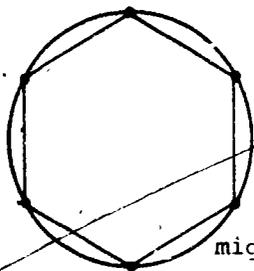
might be generalizable is most appropriate for the theme. "The election of a president" for example, would be more appropriate than "The election of Calvin Coolidge". Other examples follow:

Content	Theme
Electricity	Efficient usage of electricity
Mythology	How man explains the unknown
Evolution	Causes of change
Western Europe	How cultures influence each other
Middle Ages	Recreating history - Historical Fiction

Some classes have the opportunity to use interdisciplinary themes. Almost anything will do - butterflies, green, popcorn. Often the more fanciful the topic, the more interesting its application to the various disciplines. In addition, the interdisciplinary effect allows students the breadth they need to create unique products.

The distinguishing characteristic of gifted education is that information is no longer being gathered for application. Instead, information is being mastered for the purpose of production. The chief characteristic of the gifted - the ability to think at higher cognitive levels - necessitates a program aimed at finding a productive outlet.

As a result of completing this program you will produce one unit and have gained the skills to complete many others. The development of your unit will follow a sequence of your own choosing. The one below is suggested. If you find you are having difficulty with a particular "gem" please move to another one. The list below provides a description of the tasks to be completed to demonstrate mastery of each module. Worksheets are provided on

page 145-148. A completed worksheet appears on pages 149-152. After all your gems are mounted, and polished, please use the form on p. 153 for a final copy.
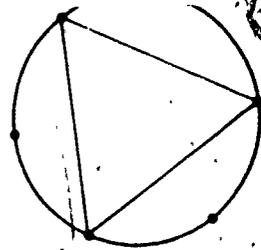
Module	Your Task	Date Completed
Module 1 Population	Select a unit topic. Write a rationale for unit.	
Module 2 Cognitive Behavior	List cognitive behaviors and verbs which indicate those that are suitable for inclusion in your unit of study.	
Module 3 Deductive Sequencing	Identify concepts in your unit of study and then identify prerequisite multiple discriminations. List principles and problems that may be examined within this content area.	
Module 4 Learning Activities	Write eighteen learning activities that will involve students in using and achieving desired cognitive behaviors.	
Module 5 Terminal and enabling objectives	Arrange all activities within a framework of terminal and enabling objectives.	
Module 6 Inductive Process	Write introductory and culminating activities to facilitate an inductive learning approach.	
Module 7 Management Systems	Convert learning activities into a format for actual use with students in one of six alternative management systems in either a deductive or an inductive sequence.	
Module 8 Social Communication	Add communication skills principles to your unit.	

You now have completed the work for a Unit of Work for Gifted Students. Now condense, rewrite, and put it in the final form given on p. 153.
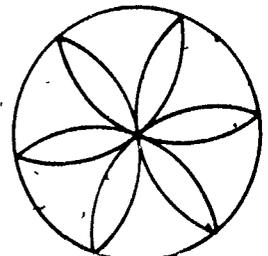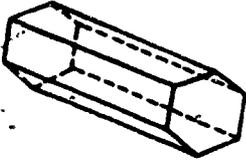
Module 1

Population

T   The teacher will be able to write a rationale for a unit of study to be used with intellectually gifted students in a qualitatively differentiated program as demonstrated by criteria included in this Module. (Synthesis)

E_1 The teacher will describe characteristics of intellectually gifted students as a result of reading descriptions. (Comprehension)

E_2 The teacher will list characteristics of a qualitatively differentiated unit of study for intellectually gifted students as a result of reading a description and studying examples. (Comprehension)

Population
(Unit of Study)

Characteristics   Qualitatively
of Intellectually   Differentiated
Gifted   Unit of Study
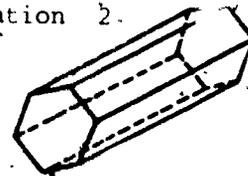
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T   The teacher will be able to write a rationale for a unit of
study to be used with intellectually gifted students in a
qualitatively differentiated program as demonstrated by
criteria included in this Module.   (Synthesis)

Rationale

Intellectually gifted students are defined as individuals with
I.Q.'s two standard deviations above the mean on an individually
administered I.Q. test, that is, 130+ on the Stanford Binet or
132+ on the WISC-R. Because of unique qualities possessed by these
individuals their needs are often not met in traditional classroom
settings. An examination of these students reveals certain common-
alities that can be enhanced through qualitatively differentiated
programing that is distinctly different from traditional classroom
programing.

Our study of the qualitatively differentiated programs begins
with the characteristics of the population we will be dealing with
and implications for topics of study to use with this population.

E_1 The teacher will recognize characteristics of intellectually
gifted students as a result of reading descriptions.   (Knowledge)

Intellectually gifted students, first, gain more input
from their environment and second, store more information for
longer periods of time. These two characteristics have obvious
curricular implications. These abilities permit gifted students
to accumulate greater quantities of information in shorter time
periods and provide for more rapid recall of factual information
than their agemates. Attention to these two characteristics
generally leads to increased content in a reduced time period.
Acceleration, grade skipping and some forms of enrichment are
manifestations of concern with these two gifted characteristics.
More content in less time leads to a quantitatively differentiated
program for gifted students.

The third characteristic of gifted students is by far the
most important and provides the key for building qualitatively
differentiated programs. Gifted students have the ability to
process information, i.e. evaluate, synthesize and analyze
information far more efficiently than their agemates. An appro-
priately differentiated program for the gifted must therefore
include greater quantities of information and a heavy emphasis
on nurturing processing skills. It is estimated that currently,
92% of questions asked in elementary classrooms are low level
cognitive questions and that 90 - 95% of all curricular materials
focus on low level cognitive behaviors. On the other hand, aca-
demically gifted students need anywhere from 20 - 50% of their
time dealing with higher cognitive processes.
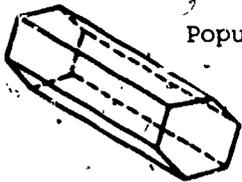
Although intellectually gifted students are defined as students with an I.Q. (individually administered test) of two Standard Deviations above the mean, the expense of this type of testing often negates using it with an entire population. Some means of identifying potentially gifted students is generally applied to the entire population and is followed by further screening until the desired gifted population is identified.

Although there are frequent cautions that group administered achievement and I.Q. tests will miss up to 50% of truly gifted and talented students, this caution applied to the notion of giftedness prior to the designation of the six categories of giftedness now generally in use. It is true that creativity, leadership, and visual and performing artists were not adequately identified by standardized tests. When dealing with the one category of intellectually gifted however, the percentage of students missed by group administered standardized tests will be substantially lower. There does remain however, the possibility that group administered, paper and pencil tests will miss some intellectually gifted students, that is, students who would normally score 130+ on the WISC and 132+ on the Stanford Binet. Miss-identified students may also include another group, the so-called "over-achievers", individuals who are not gifted but score very well on standardized paper and pencil tests.

Truly gifted students may fail to demonstrate their ability on group administered tests for one of three reasons:

1. They may have a greater store of information than the population on which the test was normed and can often justify more than the one correct answer. They may become quite frustrated with multiple choice formats frequently found on group tests.

2. Intellectually gifted students are often more interested in processes and causes than with "fill in the blank" type questions and see little significance in low level cognitive questions so they treat these tests with indifference.

3. Intellectually gifted students may be bored with traditional knowledge-oriented courses of study and may fail to accumulate the standard set of knowledge sampled on popular group administered tests.
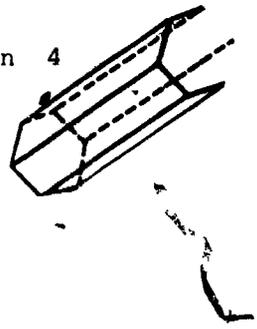
Because of the limitations of group testing, multiple measures, including parent nomination, teacher nomination, school achievement and anecdotal records often contribute to the pool of potentially gifted with final decisions made through committee structures. Parent nomination forms generally look for behaviors like:

> Special interests and/or hobbies
> Reading habits
> Unusual accomplishments
> Relationships with others
> Preferred activities when alone
> Special talents

Teacher nomination forms may focus on:

> Questionning behaviors
> Plans for projects
> Alertness
> Knowledge about specialized subjects
> Boredom with traditional curricula

Additional insights into the nature of giftedness is gained from interviews with parents of intellectually gifted students who have provided the following comments:

-He reads fluently. His special interests are space (especially moon, stars, gravity, etc.) and anatomy. (Preschool child, age four.)

-He feels that school is wasting his time....

-After an excellent elementary school experience, junior high doesn't provide anything special.

-At times he found class work boring. While in the early grades, at times friends complained about his vocabulary.

-The public school system is not equipped to meet individual needs of gifted children. In our school district, present priority is solely on "remedial" and bringing up the level of slow achievers. Any demand to meet the special needs of advanced pupils is equated with racism. There is unhealthy political atmosphere.

-Nothing was done during grade school, except to recommend a private school. Big deal!

-We were told to move out of the district for his best interests.... to protect himself, he has had to internalize some of his feelings because he cannot understand why any person wants to hurt another human being, either verbally or physically.

-Loss of many friends since she was identified as "gifted." Non-gifted children are very nasty to these children.

-Her teacher is comfortable in a standard classroom situation.... It has been shown that she hasn't acquainted herself with students' records from previous years. She is concerned only that they behave in the classroom, and anything that is messy or too much trouble doesn't find its way into the curriculum; thus, there is little room for student participation.
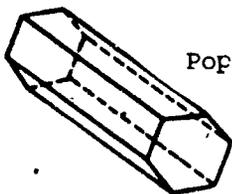
-Creative writing, he has an excellent command of language;
raises animals and birds; gardens--loves growing things;
he follows the stock market; radio-controlled model air-
planes. (Twelve year old boy)

-Teachers, especially male, used ridicule to keep him in his
place when he introduced notions and challenges from his
own reading. Others mismarked papers and forced him to
justify answers at length....He has become cynical about
school as a place to learn about respect for learning
among his agemates. He now tries for approval as an expert
on cars, hi-fi's, cameras, etc. He feels safest among much
older kids and adults.

-Was classified as hyperactive by teacher and principal in first
grade so they wouldn't accept him in gifted program until I
took him for an EEG. The doctor said he was just bored and
not getting challenges and was not hyperactive--but they
still have not, as yet, placed him in any program. (Parent's
additional comment: He works with a microscope two or three
hours a day; reads many books--also chemistry, loves reading
of plants, rocks, evolution, etc.)

-David is our "lawyer!" He analyzes, grasps ideas quickly,
remembers well. Natural science, living things interest him.
Also he collects stamps, participates in sports and children's
theatre (outside of school).

Activity 1.1 Describe two intellectually gifted students you have known.

1.

2.

E₂ The teacher will be able to list characteristics of a qualitatively
differentiated unit of study for intellectually gifted students as
a result of reading a description and studying examples. (Comprehension)

The qualitatively differentiated unit of study for intellectually
gifted students has one distinguishing characteristic - it contains
between 20% and 50% higher cognitive behaviors. The content is
irrelevant and may be drawn from a variety of sources including
standard curriculum guides, teachers favorite hobby, current events,
and/or student interest. Units of study, for example, completed by
teacher's of the gifted have included: Butterflies, Feelings, Nouns,
New England States, Horrors, Maps, Medieval Days and Sensory Awareness.
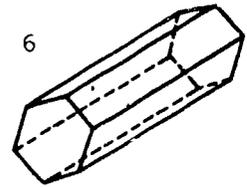
Historical Fiction

Historical Fiction as a literary genre is one of the most valuable literary forms for students to study. By definition, it is fiction based on history, and so, is, reality based. Through reading and discussion of Historical Fiction, students gain insight into the lives and times of famous figures of the past. Understanding one's heritage, and the lives of others tends to contribute to self-knowledge. Moreover, a "sense of history" can contribute to daily problem-solving by increasing the number of alternatives through broadening one's perspective.

The study of historical fiction is particularly appropriate for gifted students because a great deal of it has been written about gifted people. The study of these gifted individuals of the past may serve to help the gifted student recognize and accept his strengths, and his weaknesses. This study may also provide the gifted student with interesting role models.

The process of writing historical fiction requires convergent production, a higher level cognitive behavior. All the "fictionalized" details must be consistent with the actual historical setting. Writing historical fiction requires sophisticated analytical and imaginative skills.

It will be a challenging task, for gifted students to analyze the attributes of historical fiction and to try on their own to follow some historical facts in producing a historical fiction short study.

Activity 1.2   List the distinguishing characteristics of qualitatively differentiated unit of study for intellectually gifted students.

Presented below is another example of a rationale from units of study prepared by teachers of gifted students in the Monroe County Project.

Exploration

A unit of study on exploration, for 6th grade, intellectually gifted students has been selected because it offers extensive opportunities for research, comparing and contrasting, speculation and role-playing. The diversity of explorations from space, to inside the brain, to historical sea voyages provides a broad range of topics for individual investigation. Regardless of the specific topic selected by individual students, there are opportunities for gathering basic information, applying information to different time periods and types of explorations, and opportunities for speculation on future exploration and role-playing around famous explorers of the past, present, and future.
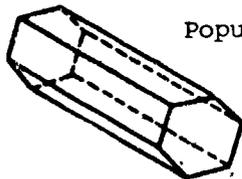
Exploration is the basis for advancing our knowledge. It is a process that involves risk-taking and values focusing on the need to be different - to be unique - to pursue one's own interests. In brief - exploration is putting intellectual talent to work in productive tasks.

Terminal Task

a. Select a topic for your unit of study.
b. Write a rationale for your unit of study.

Does your rationale:

1. Briefly describe opportunities to gain and process information?

2. Describe why the study of this topic is relevant to any individual's life?
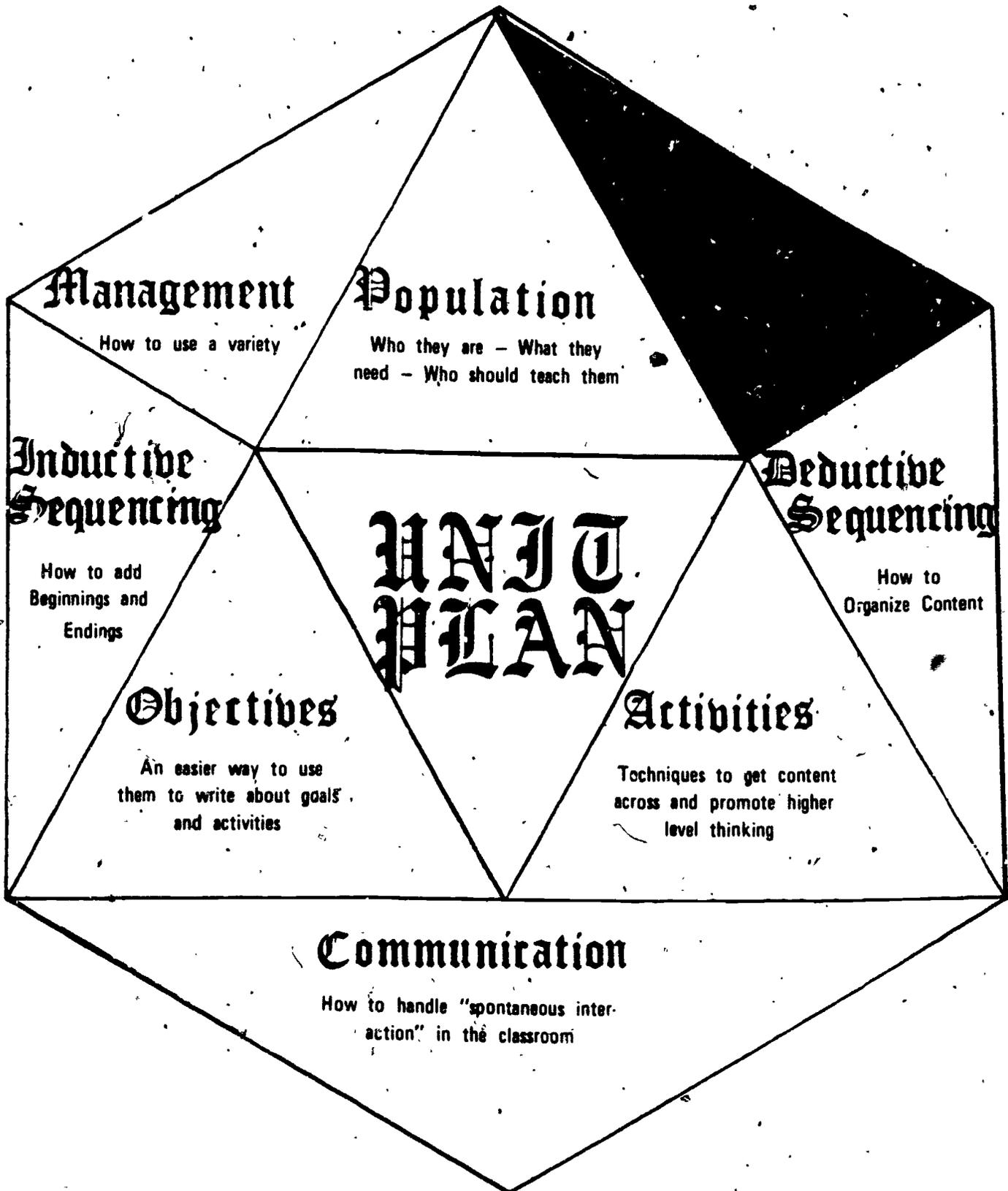
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Management
How to use a variety

Population
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Communication
How to handle "spontaneous inter-
action" in the classroom

T   The teacher will be able to demonstrate comprehension of
     Bloom's taxonomy by correctly identifying the cognitive
     category of learning behaviors. (Comprehension)
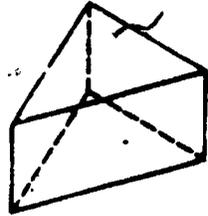
Rationale

     In 1956, Benjamin Bloom and several others developed a
taxonomy of cognitive behaviors. Although the hierarchy was
specifically designed to facilitate construction of questions
designed to measure student achievement, it has been extremely
useful in organizing curricula. The hierarchy is particularly
useful in a program for gifted students for three reasons.
First, the cognitive behaviors specified in the hierarchy form
the basis for learning beginning with basic knowledge and compre-
hension levels and extends to the higher cognitive behaviors of
analysis, synthesis, and evaluation. Gifted students quickly
master knowledge and comprehension level objectives leaving far
more time for higher cognitive behaviors than normally available
with regular classes. Second, the hierarchy clearly delineates
observable behaviors. This clarity of expectations is imperative
if students are to eventually become academically independent and
self-directing.

     Furthermore, the taxonomy provides specific categories of
cognitive behaviors which may be directly taught. Not only are
learning tasks at different levels operationalized within the
taxonomy, but the cognitive behaviors of analysis, synthesis
and evaluation are sufficiently well defined to be taught as
discrete skills. Bloom's taxonomy provides not only a framework
for organizing a curriculum but serves also as a basis for teaching
skills that gifted students may use in ordering their own thinking.

E_1 The teacher will be able to order six categories of cognitive
        behavior after examining verbs and definitions commonly associated
        with each category. (Knowledge)

     Bloom presents six categories of cognitive behaviors. They
     are hierarchical, i.e., each category subsumes the preceding
     ones, with the exception of evaluation which may be utilized
     in conjunction with any of the preceding levels. The following
     is a listing of the categories and a brief description of each.

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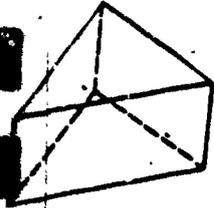
Knowledge

Knowledge level behaviors generally require the recall of information previously accumulated by the student. Factual data, dates, names, places, and processes are frequently encountered at this level. Memorization is the primary issue at this level of cognitive behavior.

Examples of acts requiring Knowledge.

When did Columbus discover America?
Identify the capitol of New York State.
Name three trees common to this area.
State the definition of a "noun."
List the steps used in applying the scientific method.

Verbs generally used in knowledge level objective.

define	identify	recall	recognize	matches
states	select	acquire	lists	distinguish
labels	names			

Comprehension

Comprehension level behavior generally represents an understanding of material. It is manifested in restating, interpreting and/or extending. The ability to restate information in ones own words generally denotes comprehension. Explanation and extension of trends or tendencies are also classified as comprehension level behaviors.

Examples of acts requiring Comprehension.

Converting a math problem into an equation.
Explaining the process of precipitation.
Interprets information presented in graphic form.
Give examples of proper nouns.
Paraphrase the conversation between two characters in a given book.

Verbs generally used in comprehension level objectives.

translate	illustrate	read	represent
change	defend	rephrase	rewrites
restate	extends	interpret	reorder
estimate	paraphrase	converts	gives
examples	summarizes		
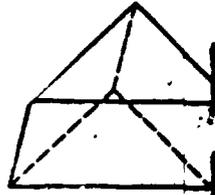
Application

Application level behaviors generally require the use of abstractions, general rules and/or general methods in a specific ituation. Generalities are used to explain and/or demonstrate ability to deal with specific cases.

Examples of acts requiring Application.

> Prepare a demonstration of the rain cycle.
> Diagram a sentence.
> Identify an unknown tree using a taxonomic key.
> Construct a sentence according to some prespecified criteria.

Verbs generally used in application level objectives.

produce	apply	generalize	relate
choose	employ	discover	modifies
organize	operate	solves	use
manipulates	computes	restructure	classify

Analysis

Analysis is cognitive behavior directed at the internal characteristics of some stimuli. The stimuli may include such items as; communications, objects of art; formal arguments, plans, problems, buildings, etc. Internal characteristics may include elements, relationships, organizing principles, structure, etc. Basically, analysis focuses on the isolation of internal characteristics for purposes of intensive investigation and/or identifying interrelations.

Examples of acts requiring Analysis:

> Discriminate between a deductive and an inductive argument.
> Discriminate between a premise and a conclusion.
> Arrange a set of randomly presented pictures into an appropriate
>   sequence.
> Discriminate between a triangle and a trapezoid.
> Isolate pieces of information required for solving a particular
>   prob.
> Identify the probable traffic flow in a house plan.
> Describe the relationship between two dissimilar objects.
>   (e.g. paper clip and nail).
> Solve an analogy.
> Identify the bias of a particular author.

Verbs generally used in Analysis level objectives.

discriminate	categorize	deduce	compare
subdivide	distinguish	analyze	contrast
separate	diagram	breaks down	
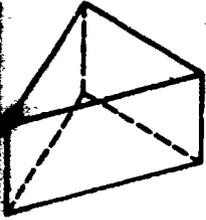
Synthesis

Synthesis is a cognitive behavior in which two previously unassociated elements are brought together. The result is a new, undefined relationship. The unique product is the expression of this relationship.

Examples of acts which may result in synthesis behaviors are:

Write a short story about a pink turtle.
Write a poem on something unpoetic.
Develop a hypothesis to explain something unexplained.
Design a plan for world peace.
Build a model village of a settlement on Mars.
Draw a picture emphasizing the wrong things.
Develop a formal argument for buttering toast from the
center outward.

Note - Synthesis is often thwarted because of a schooling
emphasis on correct answers. Synthesis can be fostered
by encouraging development of alternatives. This of
course leads to creativity i.e.
fluency - a number of alternatives
flexibility - a number of different alternatives
originality - a number of unique alternatives.

List as many uses for a brick as you can.
List as many reasons for a given occurrence as you can.
Draw as many pictures using a square for the starting point
as you can.

Verbs generally used in Synthesis level objectives.

compile	tell	produce	transmit
write	create	summarize	constitute
modify	document	formulate	originate
reorganize	generate	design	

Evaluation

Evaluation is cognitive behavior requiring a judgement of worth. Stimuli being evaluated may be judged externally or internally. External evaluation requires comparison of the stimuli with some external criteria or standard, that is, some standard that exists entirely separately from the stimuli being evaluated. Internal evaluation requires an examination, of internal consistency or organization within the stimuli.
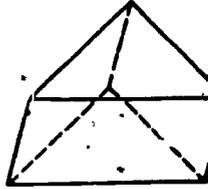
Examples of acts requiring Evaluation.

Determine which of five·shapes on the left is most nearly like the one shape on the right.

Are the stated premises sufficient and necessary for the conclusion?

Determine if the geometric shape given on the left is a composite of individual shapes given on the right.

Determine which paintings incorporate basic principles of design.

Determine which narrative selections include basic principles of science fiction.

Judge, according to principles of logical reasoning, the adequacy of a given argument.

Determine the probability of the correctness of an answer to a given problem.

Verbs generally used in evaluation level objectives.

judge	argue	consider	validate
decide	standardize	compare	contrast
appraise	assess	criticize	support
justify	explain		

Task 2.1: Presented below are behaviors commonly used in describing curriculum activities. Locate and circle the six cognitive behaviors from Bloom's Taxonomy.

Memory	Comparisons	Reasoning	Application
Interpretation	Evaluation	Creativity	Recognition
Knowledge	Conclusions	Synthesis	Conjecture
Divergence	Analysis	Explanation	Translation

Rank the six cognitive behaviors you circled above from the most basic to the most difficult.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

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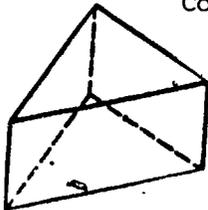
E$_2$ The teacher will be able to write descriptions of six cog-
nitive categories based on recall from previous activities
and/or study of additional references. (Comprehension)

Each of us is a unique individual by virtue of our genetic
inheritance and environmental nurturance. By virtue of our
individual sets, we encounter and process information in
many different ways. Objective 2.2 asks you to translate
the information presented to you in Bloom's Taxonomy into
your own vocabulary.. It is essentially a paraphrasing
task; i.e. the restatement of information for the purposes
of clarification.

If you need further information and clarification on
the categories, you are referred to the original sources
listed below, or one of the other references which offer a
treatment of the information. ·

Bloom, B.S.; et.al. Taxonomy cf Educational Objectives:
     Handbook I, The Cognitive Domain. N.Y.: David McKay Co.,
     1965, pp. 201-207.

Hunkins, F.P. Questioning Strategies and Techniques. Boston:
     Allyn and Bacon, Inc., 1972.

Sanders, N.M. Classroom Questions: What Kinds? New York:
     Harper & Row, 1966.

Examples of Behaviors Representing Each of the
Cognitive Levels of Bloom's Taxonomy.
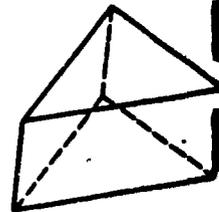
Knowledge

1. Recognize a Shakespearean sonnet in a group of sonnets.
2. Recall biographical information on Abraham Lincoln.
3. Identify hexagons and octagons.

Comprehension

1. Read musical scores.
2. Write two-page book report.
3. Interpret information from a map.

Application

1. Present ideas in written form in accordance with principles
   of grammar.
2. Use math skills to figure cost per year of electricity for
   one's own family.
3. Explain why the weather forecast is for rain.

Analysis

1. Given a list of statements about a story, distinguish between
   a conclusion and the statements which support it.
2. Identify the motives c the main character in . . .
3. Infer the author's viewpoint.

Synthesis

1. Develop a tentative hypothesis based on the data collected.
2. Identify possible ways in which experiences may be organized
   to form a conceptual structure.
3. Express your own ideas in writing with clarity and correctness.

Evaluation

1. Determine the validity of the President's arguments for tax
   reform.
2. Identify your own bias in regard to race.
3. Compare the two major theories of the origin of life.

A flowchart to aid in discriminating among cognitive behaviors is
presented in the fig. for your use in achieving the final task of
identifying cognitive behaviors.
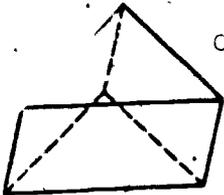
Task 2.2:

Description of the six categories of the cognitive behaviors in the learners own words.

Category	Description

A Flowchart of Bloom's Taxonomy

Stimulus elements are immediately available and student response requires interacting with the stimulus material. → **No** → Student is required to recall stimulus material.

↓ **Yes**

↓ **Yes**

Knowledge

↑ **Yes**

Student is merely required to demonstrate awareness of the stimuli by rewording, re-ordering, or rearranging its component parts or decoding coded information. → **No** → Student is required only to recognize existence of stimulus material, to name it, label it, or identify it.

↓ **Yes**

↓ **No**

Comprehension

A multiplicity of responses and/or limited unique responses are possible outcomes of student interacting with stimulus material. May require reference to a multiplicity of stimulus elements. ← **No** ← Student is required to actively interact with the stimulus material, to manipulate variables, apply rules and/or principles and produce one correct answer.

A limited number of responses are available depending on how the stimulus material is broken down into it's component parts and/or relationships. ← **No**

↓

Analysis

↓ **Yes**

↓ **Yes**

Synthesis

Student is required to produce one answer based on comparing stimulus material with an external standard (criteria) or examining the internal consistency of the material.

Student is required to produce an answer by manipulating and/or identifying variables according to previously defined rule. ← **No**

↓ **Yes**

Application

Evaluation

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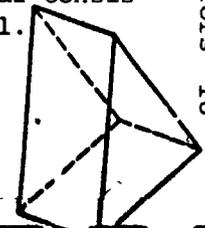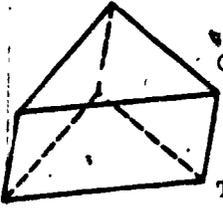
Task 2.3:

Identify the cognitive domain category in each of the behaviors below using the flowchart on page 18.

Knowledge - K	Analysis - N
Comprehension - C	Synthesis - S
Application - A	Evaluation - E

_____1. Construct a presentation using graphic materials.

_____2. Define the technical terms for four common house plants.

_____3. Determine the artistic quality of VanGogh's "Sunflowers".

_____4. Find the rate of acceleration of a vehicle weighing 2000 lbs. on an incline of 63°.

_____5. Interpret sign language.

_____6. Identify three cause and effect relationships in the one-family society of Swiss Family Robinson.

_____7. Act as group facilitator to coordinate suggestions, suggest solutions, and orient these to the goals of the group.

_____8. Recognize the meanings o_ the names of common punctuation marks.

_____9. Read German. (in German)

_____10. Identify reliable sources of information for wise purchasing.

_____11. Compare two other IQ tests with the Stanford-Binet.

_____12. Predict the effect of another oil embargo.

_____13. Identify the method of inquiry Sherlock Holmes uses in the story...

_____14. Verify the accuracy of the proof for the Pythogorean theorem.

_____15. Restate main idea of the poem "Jabberwocky" by Lewis Carroll.

_____16. Given the economic conditions of a country, determine what policy might be most effective.

_____17. Devise an experiment to test the hypothesis that transcendental meditation can enable one to transcend gravity.
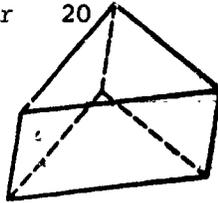
Answer Key (Task 2.3)

Task 2.1 - Review E_1

Task 2.2 - Review E_1

Task 2.3

1. S, New product

2. K, Recall of a definition

3. E, Criteria is artistic quality

4. A, Applying a formula

5. C, Rephrasing

6. N, Examination of internal relationships of the ...icty

7. S, Requires new solutions

8. K, Simple recall

9. C, Translating written symbol into sound

10. E, Criteria is reliable/unreliable

11. N, Examination of elements of each

12. S, Hypothesis generation

13. A, Requires applying K of inquiry techniques to the new situation presented in the story

14. E, Criteria is accuracy

15. C. Rephrasing

16. A, Using K of economic policy

17. S, Requires hypothesis generation
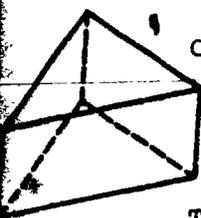
Terminal Task - List verbs which indicate the cognitive behaviors you
plan to include in your unit of study. Check to make sure you have
included approximately 50% higher level cognitive behaviors in your
list. Does your list contain observable behaviors? Can you identify
each behavior according to its cognitive level as defined by Bloom?

Management
How to use a variety

Population
Who they are — What they. need — Who should teach them

Cognitive Behavior
How they think

Inductive Sequencing
How to add Beginnings and Endings

Objectives
An easier way to use them to write about goals and activities

UNIT PLAN

Activities
Techniques to get content across and promote higher level thinking

Communication
How to handle "spontaneous inter- action" in the classroom

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Module 3

Concepts and Deductive Sequencing

T   The teacher will be able to isolate relevant concepts in a topic
and identify related multiple discriminations, rules, and problems.

E_1 The teacher will be able to recognize examples of multiple
discriminations, concepts, principles and problems as a
result of studying definitions and practicing discrimina-
tions.   (Comprehension)

E_2 The teacher will be able to identify concepts as a result
of studying and practicing examples.   (Comprehension)

E_3 The teacher will be able to recognize concepts embedded in
rules as a result of examining rule formation and rule
definitions.   (Knowledge)

E_4 The teacher will be able to deductively organize enabling
objectives by studying examples and practicing simulated
hierarchies.   (Application)

Content Analysis of
Objectives

Multiple |
Discriminations   Concepts   Principles

Gagné

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Module 3

T   The teacher will be able to isolate relevant concepts in a topic
and identify related multiple discriminations, rules, and problems.

Rationale

    Robert Gagné, in his book, <u>Conditions of Learning</u>, (1965)
describes eight levels of learning. The eight levels are hier-
archical, that is, each level is dependent upon mastery of lower
levels. Knowledge of the eight levels as defined by Gagné, is
extremely useful in deductively organizing learning tasks de-
signed to assist students in mastering terminal objectives. Because
the system is hierarchical with problem solving at the eighth
or highest level, it seems particularly appropriate to examine
this model in preparation for dealing with intellectually gifted
students.

    The first two levels in the Gagné hierarchy generally occur
during pre-school years and it is only the six higher levels that
will concern teachers of the gifted.

    Qualitatively differentiated instruction is facilitated by clear
identification of the content to be mastered. Gagne's hierarchy pro-
vides a framework for describing content. By reducing a topic to
concepts, principles, and problems, and combining these with the verbs
describing cognitive behaviors, the objectives of instruction are
formed. Instructional tasks can therefore be designed to move from
simple to complex in terms of both the content and the cognitive
behavior required.
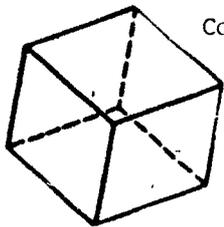
E_1 The teacher will be able to recognize examples of multiple
discriminations, concepts, principles and problems as a
result of studying definitions and practicing discrimina-
tions.   (Comprehension)

> (Note: The following represents only an introduc-
> tion to the eight levels of learning.   You may find
> it desirable to refer to Gagne's book for further
> information.)

Level 1, Signal Learning, and Level 2, Stimulus response
learning; rarely occur in a pure form in humans and are
not relevant for our study of academically gifted students.

Level 3 - Motor chaining (MC) - A connection of motor re-
sponses such that one response triggers the mechanism for
the next response.   Riding a bicycle, typing, and driving
a car represent motor chains.

Level 4 - Verbal chaining (VC)- A chain of verbal responses
such that one response triggers the mechanism for the next
response.   Memorizing the alphabet, counting and memoriz-
ing poetry are examples of verbal chains.

Level 5 - Multiple discrimination (MD) -- The ability to
separate objects based on distinctive features, e.g. to re-
cognize triangles as different from squares, doors as diff-
erent from windows, and letter A's as different from letter
B's.

Level 6 - Concept (C) - Concepts have names or labels and a
set of defining attributes (definition).   Exemplars (examples)
of concepts form classes or groups.   Triangle is a concept.
Triangle is the label or name for a group or class of two
dimensional, closed figures formed by three rays (lines)
intersecting at three points.   Parable is a concept.   Parable
is the name for a literature form in which some basic truth
or moral is presented in a narrative style.   Measurement is
a concept.   It is defined as the comparison of standard
units with unknown quantities to produce a quantitative
index.   Although measurement in itself is a concept, it is
frequently related to other concepts, e.g. area, perimeter,
etc.   Concepts may be concrete (directly observable) or de-
fined, i.e. based on abstract definitions.

Level 7 - Rules, Principles (P)-Concepts may be joined to-
gether to form rules or principles.   "Triangles have area
and a perimeter" is a principle composed of three concepts
(underlined).   "Capitalism cannot occur in a socialist state"
is a principle composed of four concepts (underlined).
Uniting concepts to form new rules or principles is a critical
behavior required for problem solving.
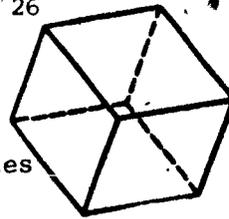
Level 8 - Problem Solving (PS) - An ability to use rules in generating hypotheses. Hypotheses are new, higher order rules that, in and of themselves, form new rules. This level implies a strategy for application of rules in response to a question.

Examples : listed below are several tasks with level of learning identified for each task.

Task	Level of Learning
1. Collect all three sided figures.	MD
2. Recognize a satire.	C
3. Move 3 matchsticks and change 5 squares to 3 squares.	PS
4. Recognize a flower.	C
5. Find a procedure for determining the area of a triangle.	PS
6. Apply the formula for measuring circumference of a circle to the following problems.	P
7. Match the following names of trees with their leaves.	C
8. Group coastal features from a topographical map into different groups.	MD

Task 3.1 - Listed below are several tasks, identify the level of learning associated with each.

1. Recognize the letter C as different from other letters. _____

2. Separate all numeral "8" from a pile of mixed numerals. _____

3. Point to "edge" in a diagram of a cube. _____

4. Find a formula for the cumulative sum of N terms in a series. _____

5. Describe the attributes of government. _____

6. Develop a list of attributes for "Science fiction". _____

7. Determine who in your environment is manipulated and who manipulates? _____

8. If Jack has 5 apples and gives away 2, how many does he have left? _____
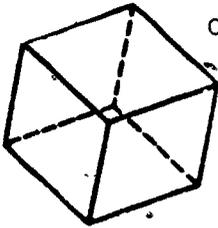
E_2.   The teacher will be able to identify concepts as a result of studying examples and following a set of guidelines.

Concepts form the basic core of learning.   They represent the key for more sophisticated problem solving and serve as a focal point for prior learning.   Learning activities may be efficiently anchored to concepts.   Once concepts to be learned have been thoroughly clarified,   then prerequisite multiple discriminations may be taught and subsequent principles and problems may be examined.   The key is to reduce curriculum content into its basic concepts and then insure that prerequisite multiple discriminations have been mastered and opportunities for relating concepts (forming higher order rules) in problem solving tasks are available.

The curricular area of measurement can be broken apart into several component concepts.

Concepts

1.   Standard unit – the structural basis for each type of measure, e.g. inch, pound, meter, etc.

2.   Weight – pull of earth's gravity on any given mass.

3.   Length – a linear measure of the shortest dimension of any two dimensional shape.

4.   Perimeter – length of the boundary used to enclose a two dimensional space.

5.   Area – a measure of two dimensional space within the boundaries of a closed figure.

Ask yourself for each concept if it is clear what items would be included in the set of exemplars and the set of non-exemplars.

The definitions for concepts may be derived from a variety of sources.   Dictionary definitions represent one starting point, authorities within the particular discipline have often developed more refined definitions, and curriculum guides will usually contain those definitions that are found on standarized tests.

It is important to distinguish between being able to recall the definition of a concept and mastery of the concept.   Memorizing the definition of a concept is nothing more than a verbal chain and is unrelated to mastery of the concept.   Concept acquisition is demonstrated by using the concept as a skill, or finding exemplars of the concept and distinguishing them from non-exemplars. Memorizing the lables for concepts, although required for abstract communication about the concept, is no substitute for using the concept in developing principles or solving problems.

Here is another set of concepts related to simple machines.

1.   Work – effort directed to produce movement.
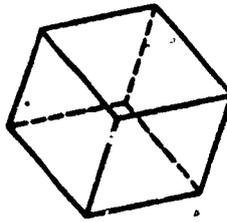
2. Wedge - a solid in which two principle faces are joined in an acute angle.

3. Inclined Plane - a slanting, flat surface.

4. Force - a measure of the amount of effort being directed in a given direction.

5. Resistance - any force to be overcome in the movement of objects.

Labels are underlined and definitions follow. Test them. Can you clearly distinguish between exemplars and non-exemplars?

Task 3.2 - List five concepts. Define the concepts. Determine whether each concept is concrete or abstract. Could anyone divide stimuli into sets of exemplars and non-exemplars based on your definition?

Label	Definition	Examples of Exemplars	Examples of Non-exemplars

1.

2.

3.

4.

5.
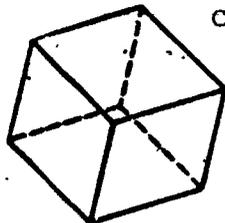
E₃   The teacher will be able to list multiple discriminations
      required prior to forming concepts as a result of studying
      definitions and practicing examples.

Before a learner can effectively deal with a concept, he must be able
to distinguish that exemplars belonging to the class actua   do possess
characteristics that differentiate them from non-exemplar   It is ex-
tremely difficult, for example, for a student to mas'   ncept of
triangle if he is unable to recognize that a trian   ∟∪ ∪ifferent
from a square. Recognizing that a triangle is indeed different from a
square does not require a definition of either a square or a triangle.
All it requires is an opportunity to separate objects based on shape.
If the student can separate triangle into a single class based on an
idosyncratic sorting strategy, then he has demonstrated ability to dis-
criminate triangle. He may then go on to learn that triangles represent
a unique class of figures with a specific set of defining attributes
and that there are a wide variety of triangles that may be considered
exemplars of the concept. (See an article on concept acquisition in
the Arithmetic Teacher, "Cognitive Formation", Nasca, December, 1978)

Multiple discrimination tasks generally provide students with oppor-
unities to deal with exemplars and non-exemplars of a concept before
any concept names, labels, or definitions have been introduced. Sort-
ing or classifying tasks require students to develop strategies of their
own for separating and grouping sets of objects. The outcome of sort-
ing tasks will generally illustrate how capable a student is of distin-
guishing the minor differences which are required for mastery of a con-
cept.

Gagne (1965) stresses the significance of multiple discrimination prior
to concept formation. Piaget also provides considerable evidence for
the importance of this sequence. His concrete operational stage as a
precurser to formal operations is extremely consistent with the Gagne
hierarchy. Direct experience with real materials in making multiple
discriminations is extremely important if we expect children to
"conceptualize or to be able to form their own concepts. To clarify
what concept formation is try this out with a colleague - "What is the
difference between teaching a concept and forming a concept?"

Below are two examples of multiple discriminations that may be used
as prerequisities for the concepts of standard unit and weight.

Example A - Concept - Standard Unit

The student must be able to discriminate between standard units and
non-standard units. This may be accomplished by having students
measure objects with any units of their own choosing and comparing
results. Students who recognize that comparisons between different
objects can be made only if the same unit of measure, e.g. paper clips,
nail, etc. was used to measure both objects, are ready to deal with the
concept of standard unit in its abstract sense, i.e. name, label, de-
finition and defining attributes.

Example B - Concept - Weight

A student must be able to recognize that some objects are "heavier" or
"lighter" than others, i.e. press down harder, are pulled toward the
floor harder or with more force - whatever his language might be, be-
fore he can be expected to deal with weight as a discrete concept.   Ex-
perience with weight as an attribute of objects and the fact that
different objects are heavier or lighter are discriminations that should
be made prior to formal measuring of weight.
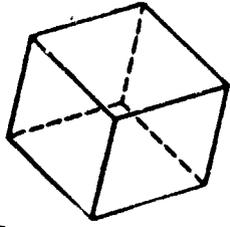
Task 3.3 - List the multiple discriminations a student would be re-
quired to master before the following concepts could be
mastered.

Numeral

Poem

Westard Expansion

Friendship

Analysis

E_3 The teacher will be able to recognize concepts embedded in
rules as a result of examining rule formation and rule
definition.

Concepts serve two primary functions.   First they se ve as organizers
of real objects and ideas in our environment.   These organizing en-
tities (concepts) may be learned, that is, the labels, defining attri-
butes and lists of exemplars and non-exemplars may become known (memorized)
by students.   Or, students as we have already seen, may be encouraged to
form concepts based on their own observations.   This latter task incidently
is far more appropriate for gifted students than the former, i.e. mere
knowing about concepts.

Secondly, concepts may be joined together in meaningful relationships
to form principles (rules).   Two or more concepts joined together in a
hypothetical relationship constitutes a hypothesis.   If the relationship
is validated, then the hypothesis becomes a formal rule or principle.
Using these formal rules and principles in new situations is the cognitive
behavior of application.
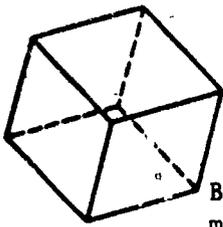
Below are examples of fe ble relationships between concepts from the measurement topic. Stude..ts may be required to validate the. relationships if they exist or prove that they do not exist. Students may also be invited to generate their own set's of relationships. (synthesis cognitive behavior)

Example - Concepts within the measurement topic, e.g. standard unit, weight, length, area, perimeter may be randomly combined to see if meaningful relationships emerge. For example, are there any consistent relationships between the following:

length and area (l x w = a)   perimeter and area (p = a)

- width and length (no relationship)   weight and standard unit. (weight measured by standard units like pound, ounce, etc.)

Or, illustrate how the standard unit for each type of measure may be related to other standard units.

e.g. square inch and inch, (in, in^2)
     yard and square yard, (yd, yd^2)
     ounce and inch, (unrelated)
     pound and inch, (unrelated)

Or, problems may be constructed in which the solution requires joining two or more concepts.

e.g. Find a linear relationship be: , any two measures of
      a circle. (Analysis, radius and diameter, 2 = d)
      Find a non-linear relationship between any two measures
      of a square. (Analysis, length of a . ide and area, l x w = a)

Task 5.4 - Underline the concepts in the following rules.

a.) The area of a triangle equals ½ of the product of the base
     and height.
b.) A cinquain is a five line poem constructed such that:
     1st line - one word - noun
     2nd line - two words - adjectives
     3rd line - three words - feeling
     4th line - four words in a phrase related to line 1
     5 line - one word - synonym for line 1

E   The teacher will be able to deductively organize enabling
    objectives by studying and practicing examples.

The arrangement of learning activities in a hierachical sequence from simple to complex tasks is classified as a deductive approach to unit development. It begins by isolating key concepts followed by insuring that students have the preresquite multiple discriminations and then move toward rule development based on combining concepts, and eventually into problem solving. Problem solving (at least one type) requires the application of specific rules.

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Task 3.5 - Presented below are sets of randomly arranged tasks.   Arrange
these tasks into a deductive hierarchy.

Set 1.   a.   Solving word problems.
b.   Discriminating between four arithmetic operations.
c.   Converting word sentences to number sentences.
d.   Discriminating between open and closed number sentences.
e.   Ability to define arithmetic operation indicated by
symbols for addition, subtraction, multiplication and
division.

Deductive order   ____   ____   ____   ____   ____
1st   last

Set 2.   a.   Discriminating between punctuation marks.
b.   Constructing a paragraph.
c.   Discriminating between a topic sentence and supporting
sentences.
d.   Discriminating between questions and telling sentences.
e.   Defining a sentence.
f.   Discriminating between a complete sentence and a phrase.

Deductive order   ____   ____   ____   ____   ____
1st   last

Terminal Task

1.   Identify the concepts in the topic you have selected and write
a clear definition for each concept.

2.   Identify multiple discriminations, and/or verbal or motor chains
required prior to mastering these concepts.

3.   List possible rules or principles and problems that may be
developed or solved based on these concepts.

*4.   Write at least one higher level thinking task for each concept.

*5.   Write a task which would require the formation of a principle or
problem (synthesis level cognitive behavior).

*optional

Answer Key

Task 3.1

1. MD
2. MD
3. MD
4. PS
5. C
6. C
7. PS
8. PS

Task 3.2

Check with instructor.

Task 3.3 - Listed below are some of the multiple discriminations required.

Numeral
1. Groups are different as a function of the number of objects in the group.
2. Number names have different configurations.
3. One-to-one correspondence.
$$4 = \begin{matrix} \square\ \square \\ \square\ \square \end{matrix} \qquad 2 = o^o$$

Poem
1. Message-carrying communications and nonsense.
2. Prose versus poetry.

Analysis
1. Cognitive behaviors are differe from affective behaviors.
2. Cognitive behaviors range from simple to complex: knowledge, comprehension, application, analysis, synthesis, evaluation
3. Discriminate between part and whole.

Westward Expansion
1. Discriminate between occupied and unoccupied territory.
2. Discriminate between perspectiv (Indian versus white man).
3. Physical movement versus station ary position.

Friendship
1. Discriminate between positive and negative emotions and their manifestations.
2. Discriminate among friendship and other positive relation- ships.

Task 3.4

1. area, triangle, equals, 1/2, product, base, height.
2. cinquain, five, line, poem, constructed, 1st, line, one, word, noun, 2nd, line, two, words, adjectives, 3rd, line, three, words, feeling, 4th, line, four, words, phrase, related, line, 1, 5th, line, one, word, synonym, line, 1.

Task 3.5

Set 1   b, e, d, c, a

Set 2   e, f, a, d, c, b

Management
How to use a variety

Population
Who they are — What they
need — Who should teach them

Cognitive Behavior
How they think

Inductive Sequencing
How to add
Beginnings and
Endings

Deductive Sequencing
How to
Organize Content

UNIT PLAN

Objectives
An easier way to use
them to write about goals
and activities

Communication
How to handle "spontaneous inter-
action" in the classroom

Module 4

Activities

T   The teacher will be able to write activities on six cognitive
     levels using one of the three systems outlined in this module
     as demonstrated by writing activities for the concepts of his
     topic.   (Application)

And one of the following:

T_a The teacher will be able to use "Blooming with Bloom" to
         write activities on six cognitive levels as demonstrated
         by writing one (1) activity on each cognitive level for
         a concept.   (Application)

T_b The teacher will be able to use the matrix system to write
         activities on six cognitive levels as demonstrated by
         writing one (1) activity on each cognitive level for a
   concept.   (Application)

T_c The teacher will be able to use the Williams' strategies
         to write activities on six cognitive levels by writing
         six (6) activities for each concept.   (Application)

Activities

Blooming   Matrices   Williams' Strategies
with Bloom

45
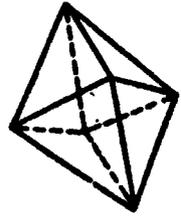
T   The teacher will be able to generate a variety of activities representing the range of cognitive behaviors as demonstrated by doing so on a topic of his choice.

Rationale

Thus far in this instructional system, you have identified a topic for a population of gifted students, examined the cognitive behaviors appropriate for that group, and identified concepts within the topic to be taught.

The three techniques offered in this module are all designed to provide a systematic approach for generating activities for the identified concepts within your topic. You are asked to write activities on all six cognitive levels for several reasons. Although you will be using primarily higher level thinking activities with gifted students, whenever they have difficulty it may be helpful to suggest a less complex activity as preparation for eventual completion of the more difficult task. In addition, in beginning with knowledge level activities you clarify the knowledge base you require. A clearly delineated knowledge base is helpful in evaluation. Finally, writing activities at all levels will help you in recognizing exemplars and non-exemplars of the concepts of the cognitive behavior.

Task

Three systems are offered in this module for generating tivities on a topic. The terminal objective for this module requires that you choose one of the three systems and generate activities on the topic you have selected.

T_a is a system which provides verbs and products for each cognitive behavior. When combined, these can be used to write a variety of activities.

T_b is a matrix system. One matrix uses the two dimensions of concepts and cognitive behaviors. The other focuses on the cognitive behavior of synthesis as one dimension, and alternative modes of expression as the other.

T_c is a system of 18 strategies based on the work of Frank Williams. It uses techniques such as analogies, par oxes, and discrepancies to generate activities.

To determine which of the systems you would prefer to use, read through this module and try generating a synthesis activity from each system on a concept for your topic; then choose one terminal objective to fulfill by writing activities on all cognitive levels for all topics.

Concept: _____

"Blooming" activity:

Matrix activity:

Williams activity:
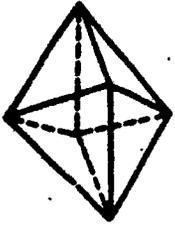
"Blooming with Bloom"

T$_a$ The teacher will be able to use "Blooming with Bloom" to
write activities on six cognitive levels as demonstrated
by writing one (1) activity on each cognitive level for a
concept.   (Application)

E   The teacher will recognize the parts of the flower as
a result of reading a description of them. (Knowledge)

E$_2$ The teacher will complete activities for the six cog-
nitive levels using the flower, as a result of studying
examples.   (Comprehension)

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Blooming with Bloom

recommendation

letter   group discussion

panel   news item   survey   television

court trial   conclusion   people   radio

value   self or other-evaluation   newspapers   books

editorial   critique events   magazines   tapes

speakers   diagrams   models

models   records   films

evaluate   filmstrips

judge   debate   translate   microfiche

story   illustrate read   description

news article   discuss   editorialize

TV, radio show   decide   recommend   represent   rewrite

poem, cartoon   combine   choose   support justify   rephrase   restate   facts/ opinions

new game   compile   write   argue   validate   interpret

recipe   invent   compose   assess   reorder   microfilm

product   predict   hypothesize   convert

play   estimate   infer   summarize

advertise-   create   produce   SYNTHESIS   construct   diary

ment   originate   generate

pantomime   formulate   design   teach   paint   collection

new color   imagine   sketch   relate   puzzle

song, new taste   classify   generalize   use   diagram

puppet show   discriminate   deduce   employ   compute   photographs

compare   contrast   report   simulate   sculpture   diorama

separate   subdivide   solve   modify   map   scrapbook

graph   diagram   dissect   manipulate   stitchery   mobile

survey   categorize   operate   model   illustration

survey   computation   lesson

questionnaire   plans   painting   design

commercial   report   divisions

chart   diagram   parts

structure   machine

invention

observe
match
identify
define
recall

state list
acquire label name
distinguish
locate

EVALUATION   COMPREHENSION   APPLICATION   ANALYSIS   KNOWLEDGE

Rationale

"Blooming with Bloom" is a technique for generating activities on a concept. It provides verbs which are commonly associated with each cognitive level, and possible products in an easy-to-use format.

E₁ Teachers will recognize the parts of the flower.

Knowledge is the stem of the flower. Symbolically, it is the basis of all the other cognitive behaviors. The verbs which can be used to indicate a knowledge level objective are given on the leaves.

The center of the flower is made up of five parts. Each part contains a cognitive behavior .
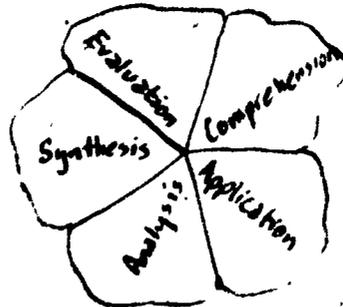
Beginning in the upper right hand corner, comprehension is the lowest cognitive behavior represented in the center of the flower. Higher cognitive behaviors, appropriate for intellectually gifted students, begin with application and continue as one moves clockwise around the flower.

The second layer of each segment of the flower contains the verbs which may be used to generate an activity requiring the cognitive behavior at the center.

combine

compile   write

invent   compose
predict   infer
create   produce

originate
generate

Synthesis
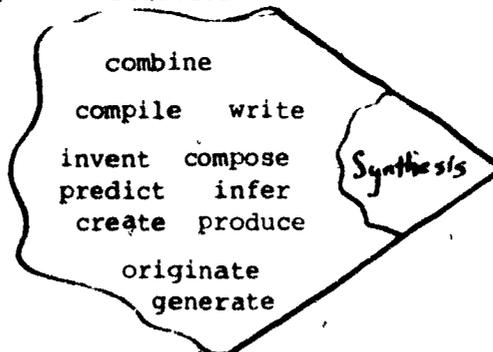
The third layer of each segment of the flower contains possible products for that cognitive behavior. More than any other layer of the flower, however, these products can result from more than one cognitive level behavior.
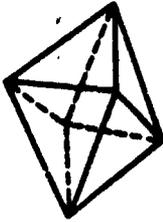
Task 4.2

Label the parts of the flower using the following terms:

Knowledge   Application
Comprehension   Analysis
Synthesis   Verbs
Evaluation   Products
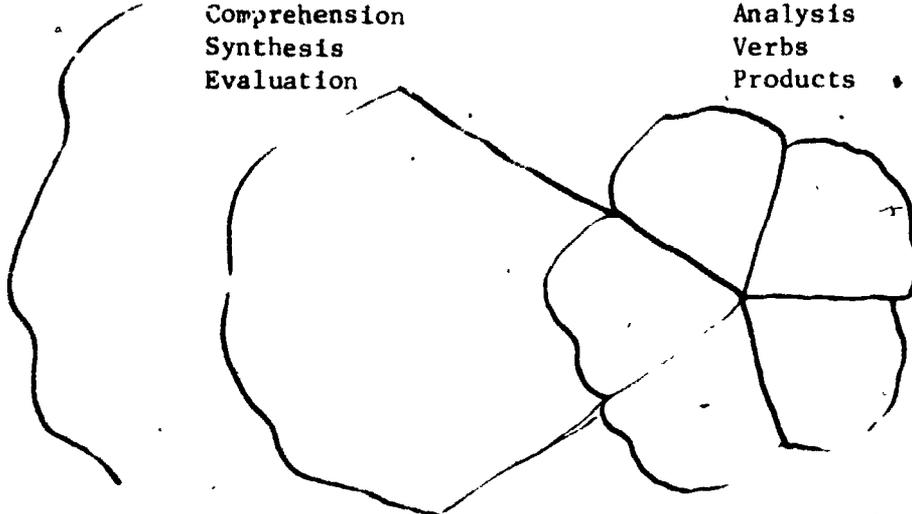
E_2 The teachers will complete activities for the six cognitive
levels using the flower, as a result of studying examples.

To generate activities for each concept using the flower,
begin with knowledge verbs from the leaves. Choose a verb
and write it with a product from the flower. For example,
on the concept of freedom

Recognize a model of freedom for individuals among
several types of government.

Next, go to the comprehension segment of the flower and
choose another verb and product:

Describe the pattern of freedom set by France for
the colonies.

Continue moving around the center of the flower in a
clockwise direction to generate activities at each of the
six levels.

Application: Apply the concept of a democracy to the
New Guinea situation.

Analysis: Compare two or more of the systems of
government of countries which guarantee
personal freedom to their citizens.

Synthesis: Describe an ideal government for insuring the
freedom of children.

Evaluation: Evaluate 18th century England in terms of
the freedom of children.
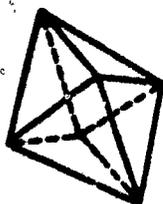
Task 4.3

Using "Blooming with Bloom", complete an activity for each of the cognitive levels on your concept.

Knowledge: Identify...............

Comprehension: Paraphrase..............

Application: Use...............

Analysis: Compare................

Synthesis: Change...............

Evaluation: Judge...............

If you have decided to use this system for generating activities, proceed to the Terminal Task Worksheet at the end of this module.
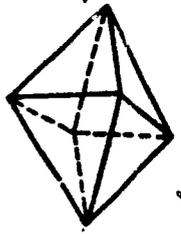
Matrices

T_b The teacher will be able to use the matrix system to write activities on six cognitive levels as demonstrated by writing one (1) activity on each cognitive level for a concept. (Application)

E_1 The teacher will recognize the parts of the concept/cognitive behavior matrix as a result of reading a description of the matrix. (Knowledge)

E_2 The teacher will complete five cells of a partially completed matrix as a result of reviewing examples. (Comprehension)

E_3 The teacher will recognize the parts of the synthesis matrix as a result of reading a description of the matrix. (Knowledge)

E_4 The teacher will complete five cells of a partially completed matrix as a result of reviewing examples. (Comprehension)
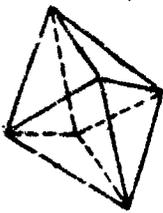
T_b The teacher will be able to use the matrix system to
write activities on six cognitive levels as demonstrated
by writing one (1) activity on each cognitive level for a
concept.   (Application)

Rationale

The concept/cognitive behavior matrix has two dimensions which
form a grid. Within the grid it is possible to generate six activities,
one at each cognitive level for each concept. The matrix system sets up
forced relationships between the concepts and the cognitive behaviors.

The synthesis matrix was developed because synthesis activities are
probably the most valuable for gifted students and generally are most
difficult to generate. The cognitive behavior of synthesis is often
confused with application. The differences between the two as elaborated
on in Module 2, is that synthesis involves some change. One dimension of
the synthesis matrix, therefore, has different ways to change formation.

E_1 The teacher will recognize the parts of the concept/cognitive behavior
matrix as a result of reading a description of the matrix.   (Knowledge)

The vertical axis of this matrix is for the concepts that have been
identified on your topic. The horizontal axis is for the cognitive
behaviors according to Bloom.

Cognitive Behaviors

Know.	Comp.	Appl.	Anal.	Syn.	Eval.
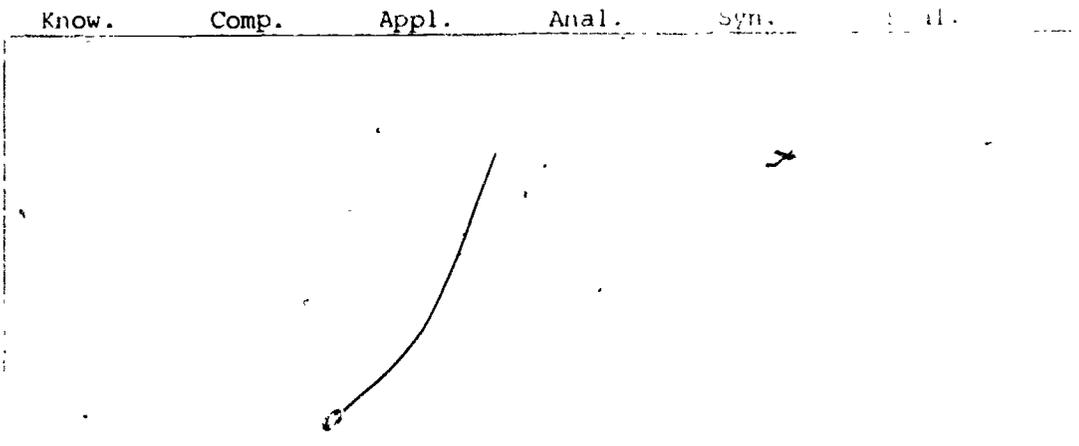
The intersection of any of the components of the two dimensions
should result in an activity at a particular cognitive level for
a particular concept.
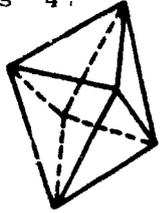
A slight modification of this system is a full page matrix
with only one concept. This allows more room for generating
multiple activities at each cognitive level.

Cognitive Behaviors

Concept	Know.	Comp.	Appl.	Anal.	Syn.	E⋅⋅l.

Task 4.4

        Label the blank matrix with the appropriate information, usin,
the concepts for your topic. (page 45)
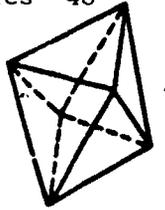
Topic:

Cognitive Behaviors

Concepts

Activity 4.4   Concept/Cognitive Behavior Matrix

55

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E_2 The teacher will complete five cells of a partially completed matrix as a result of reviewing examples. (Comprehension)

The examples in this section will focus on the higher level cognitive behaviors of analysis, synthesis, and evaluation.

Topic: Democracy

Cognitive Behavior

Concepts	Analysis	Synthesis	Evaluation
Freedom	1. Compare the personal freedom of the individual in a democracy and under another form of government.	1. Improve upon the Bill of Rights. Write a new one.	1. Evaluate the importance of personal freedom to the concept of a democracy.
	2. Analyze the constitution to determine the rights of children.	2. Imagine a country in which the individual has no personal freedom. Write a short story to describe how the government would enforce its policies and how people would react.	2. Debate the issue of the rights of the unborn.
	3. Analyze the effect of individual personal freedom on the economy of a country.		
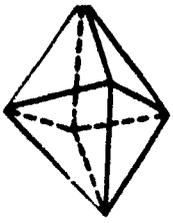
Task 4.5

Add five activities to the partially completed matrix on Democracy. You may add a concept or continue to create activities on the concept of freedom.

1) The teacher will recognize the parts of the synthesis matrix as a result of his/her construction of the matrix. (Knowledge)

The synthesis matrix is a combination of the two dimensions of change strategies and ways of communicating. Given a concept, at least six synthesis activities can be generated using the change strategies.

Concept:_____

Change Strategies

Ways of Communicating	Attribute	Perspective				History
Write						
Draw						
Build						
Dramatize						

A slightly modified version ... on the vertical axis instead of ...

Task 4.6

Label the blank matrix ... information using a concept? ...

Ways of
Communicating

pic:

Change Strategies

cepts

61

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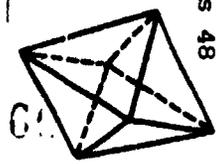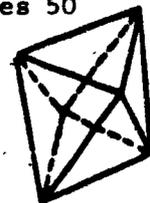
E_4 The teacher will complete five cells of a partially completed matrix as a result of reviewing examples. (Comprehension)

To formulate activities using the snythesis matrix, focus on a concept and one of the change strategies. For example, using the concept of freedom, the attribute of political independence may be changed to yield an activity:

> Elaborate on the idea that an individual is dependent on the government which grants him political independence.

The next step is to choose a way of communicating this idea (from the vertical axis on the matrix).

> Write a short story about this paradox.

Other examples are given below:

> Change Persepctive: Advocate a freedomless society in an expository speech.

> Change Use: Draw up a constitution based on the premiss that the needs of the society, are more important than the freedom of individuals.

> Change View: Dramatize the quality of life of the individual in a society which granted no personal freedom.

> Change Effect: Individual freedon results in free enterprise. If there were no laws governing free enterprise (limiting their freedom), what might result. Represent your conclusion in a schematization.

> Change History: Draft a Declaration of Independence as if there had been no French Revolution.

Task 4.7

Write five more synthesis activities using the matrix on the concept of freedom or another concept under the topic of democracy. Use five different change strategies.
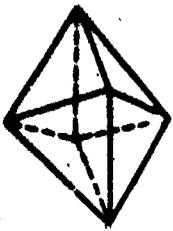
Concept:

Change Strategy:

Activity:

Concept:

Change Strategy:

ctivi :

Concept:

Change Strategy:

Activity:

Concept:

Change Strategy:

Activity:

Concept:

Change Strategy:

Activity:

If you have decided to use the matrix for generating activities, return to the worksheets for activities 4.4 and 4.6. (pages 45 and 48-49) Complete the matrix on page 45 for the concepts for your topic. Then, proceed to the Terminal Task Worksheet at the end of the module. As long as your matrix is complete there is no need for you to transfer the information to this worksheet.

64
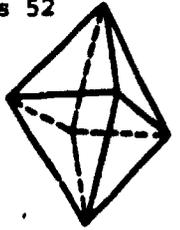
Williams' Strategies

T_c The teacher will be able to use the Williams' Strategies
to write activities on six cognitive levels as demonstrated
by writing six (6) activities for each concept. (Application)

    E₁ The teacher will describe the steps in his own words
for using the Williams' Strategies for generating
activities as a result of reading a description of
the steps. (Comprehension)

    E₂ The teacher will use Williams' Strategies to finish
several activities for a concept as a result of re-
viewing several examples. (Comprehension)
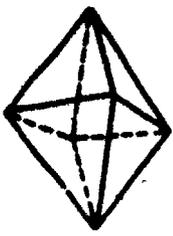
T_c The teacher will be able to use the Williams' Strategies
to write activities on six cognitive levels as demonstrated
by writing six (6) activities for each concept. (Application)

Rationale

Williams has presented 18 teaching strategies in his book
Classroom Ideas for Encouraging Thinking and Feeling (1970, D.O.K.).
The strategies focus on the unusual, puzzling, or exceptional about
a concept.

Thinking in terms of these strategies when developing activities
usually helps to generate higher level thinking activities.

E_1 The teacher will describe in his own words the steps for using the
Williams' Strategies for generating activities as a result of reading
a description of the st s. .(Comprehension)

Williams' 18 strategies are listed and defined on the following
pages. Three activities can be generated for each one based on
Bloom's Taxonomy.

1.   Identify and define the element. (Knowledge, Comprehension)

2.   Recognize and locate examples of the element. (Application,
Evaluation)

3.   Analyze the element for the purpose of invention. (Analysis,
Synthesis)

These three steps represent the developmental sequence to be used
when teaching with each strategy. Activities generated on steps
two and three would help to satisfy the needs of the gifted student
for higher level thinking.

Williams' 18 strategies are given and defined on page 55. An example
of creative activities for a science fiction unit follow the definitions
on page 56. Each strategy takes a unique perspective on the content.
Before the student can respond to that he must be able to identify it
and locate examples. Following this acquisition of information, he may
manipulate it at higher cognitive levels. The examples on science
fiction are all from step 3 above.
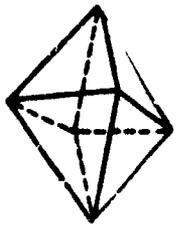
Task 4.8

Describe the three steps for generating activities using Williams. Try not to refer back to the description - this is a comprehension level task.

Step 1:

.Cognitive Behaviors

Step 2:

Cognitive Behaviors

Step 3:

Cognitive Behaviors

E_2 The teacher will use Williams' strategies to finish several activities for a concept as a result of reviewing several examples. (Comprehension)

Using the concept of freedom, we have given examples of activities throughout a chart on pages 58 and 59. Fill in five more activities, making certain you lend variety to the task by writing at least one activity in each column.

Williams' 18 Strategies

1. **Paradox** Something which seems to be contradictory that may nonetheless be true.

2. **Attributes** The inherent properties, characteristics or qualities.

3. **Analogies** The comparison of two things based on some criteria of likeness or difference.

4. **Discrepancies** Unknown, missing, or unreported information.

5. **Provocative Questions** Inquiring about the puzzling, controversial, or mysterious.

6. **Examples of Change** A focus on the dynamics or growth of a situation and the subsequent modifications.

7. **Examples of Habit** A focus on the rigidity of thinking and the effects of it.

8. **Organized Random Search** Using a familiar idea (like alphabetical order) to go at random to create a new idea.

9. **Skills of Search** Searching for information through research in the areas of:
    Historical - search for ways something has been done before.
    Descriptive - search for the current status of something.
    Experimental - search for what happens in an experimental situation.

10. **Tolerance for Ambiguity** Posing situations which are open-ended and do not force closure such as situations which puzzle, intrigue, or challenge thinking.

11. **Intuitive Experience** Sensitive to information from the five senses, emotions and inward hunches.

12. **Adjustment to Development** Learning and developing from mistakes or failures; generating many options for action.

13. **Creative People and Process** Examining the traits and processes of creative people in a field of endeavor.

14. **Evaluate Situations** Check ideas against the facts; make decisions based on consequences or implications.

15. **Creative Reading Skill** Using reading as a springboard, a way to generate ideas.

16. **Creative Listening Skill** Using listening to learn and generate ideas.

17. **Creative Writing Skill** The skill of communicating ideas in writing and generating new ideas through writing.

18. **Visualization** Express ideas in visual form and learning from visuals.
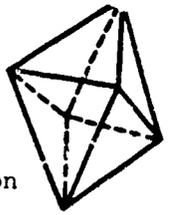
Higher Level Thinking Activities for a Science Fiction
Unit based on Williams' Strategies

1. Paradoxes

Propose a hypothesis to explain why it is that science
fiction writers are able to accurately predict new
inventions but not create them.

2. Attribute :

Analyze at least a dozen works classified as science
fiction to determine its characteristics as a literary
genre.

3. Analogies

Analyze "science" and "science fiction" to determine
their relationship. Analyze "fiction" and "science
fiction" to determine their relationship.

4. Discrepancies

Identify something which is unknown in a science fiction
work: write a science fiction story in which that unknown
is known.

5. Provocative
   Questions

Propose an hypothesis to answer the question: "Why
has science fiction been called a modern mythology?"
Predict the effect of a science fiction "fact' suddenly
becoming real.

6. Examples of
   Change

Create a science fiction story pretending that you, the
author, are living in the 1800's.

7. Examples of
   Habit

Evaluate a science fiction work in terms of all the ways
it contradicts our habitual ways of viewing things.

8. Organized
   Random Search

Create a science fiction story in which you change the
sex of the main character.

9. Skills of
   Search

Summarize the history of science fiction.

10. Tolerance for
    Ambiguity

Propose alternative hypotheses for solving Princess Lea's
problem in "Star Wars".   (Teacher may read any science
fiction story outloud and stop at a crucial point for
several days to allow students to propose solutions to a
dilemma.)

11. Intuitive
    Experience

Re-write a story including yourself as a character.
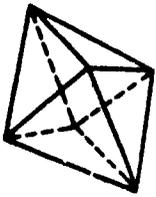
12. Adjustment to   Propose questions to be able to describe a
    Development   mysterious character, object, or situation.
                        Propose hypothesis based on information available
                        (twenty questions).

13. Creative People   Analyze Isaac Asimov's life to describe his dual
    and Process   careers as science fiction writer, and scientist.

14. Evaluate   Investigate the effect of science fiction on the
    Situations   scientific community.

15. Creative Reading   Compare two science fiction works written 100 years
                        apart.

16. Creative   Create sounds for several machines or weapons used
    Listening   in a science fiction work.

17. Creative Writing   Write a story 100 years hence using one of the two
                        themes analyzed in objective #15.

18. Visualization   Create illustrations for one of your original
                        science fiction works.
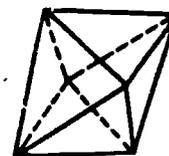
Activity 4.9 - Activities Based on Williams Strategies
Concept: Freedom

Strategy	Identify, Define	Find Examples	Create
Paradox		If freedom is the natural state of humans, why do some tolerate not being free?	
Attributes			
Analogies		A doctor is to medicine as _____ is to freedom.	
Discrepancies	"Free" means unre-stricted. Freedom is restricted by the rights of others. Explain.	Right to lifestyle. How is it restricted? How is it related to per-sonal freedom in a free society?	Describe a society which gives unre-stricted freedom to individuals.
Provocative Questions			
Example of Change	The Bill of Rights has grown. Why? How?		
Example of Habit	People take their freedom for granted. How? Why?	Have we lost some freedoms through neglect?	What freedoms would you want first if you had never been free? Why?
Organized Random Search			
Skills of Search	New democracies are experimenting with our model. What coun-tries have? With what result?		
Tolerance for Ambiguity			
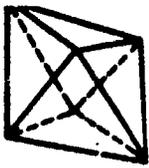
Activity 4.9 - Continued

Strategy	Identify, Define	Find Examples	Create
Intuitive Experience			You have just been ma a slave. Describe ho you feel.
Adjustment to Development		How has big government affected the freedom of the individual?	
Creative People and Process	Thomas Jefferson Who was he? Why is he identified with freedom?		
Evaluate Situations			What will be the stat of personal freedom on earth in the year 2200
Creative Reading Skill	Historical Fiction What is it? Of what value is it? To whom?		
Creative Listening Skill		Freedom has been expressed in song and poetry. When? What are some examples?	
Creative Writing Skill		Thoreaus' treatis Civil Disobedienc a classic expressio of personal freedom. Why? Find another example.	
Visualization Skill	Symbols of freedom What are they? Where did they originate?		
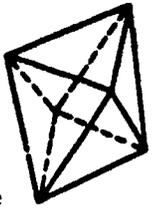
If you have decided to use this system for generating activities, use the additional chart provided on page 61 to write activities. It may not be possible or even useful to generate 54 activities. Instead, choose one technique for each concept and write at least three activities for it.

After completing the chart with at least 12 activities, proceed to the Terminal Task Worksheet at the end of this module. It is not necessary to rewrite your activities in this format if they are organized by concept.
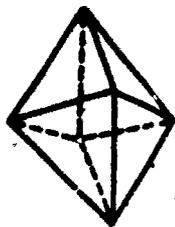
Activity 4.9 - Activities Based on Williams Strategies
Concept:

Strategy	Identify, Define (Concept)	Find Examples	Create
Paradox			
Attributes			
Analogies			
Discrepancies			
Provocative Questions			
Example of Change			
Examples of Habit			
Organized Random Search			
Skills of Search			
Tolerance for Ambiguity			
Intuitive Experience			
Adjustment to Development			
Creative People and Process			

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Activity 4.9 - Continued
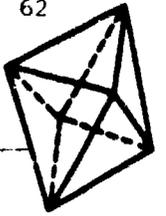
Strategy	Identify, Define	Find Examples	Create
Evaluate Situations			
Creative Reading Skill			
Creative Listening Skill			
Creative Writing Skill			
Visualization Skill			

Activities 63

Terminal Task Module 4

Complete the following information to meet the requirements of the Module:

Topic _____

   Concepts

   A.

      Activities

      1.

      2.

      3.

      4.

      5.

      6.

   B.

      1.

      2.

      3.

      4.

76

5.

6.

C.

1.

2.

3.

4.

5.

6.

D.

1.

2.

3.

4.

5.

77

6.

E.

1.

2.

3.

4.

5.

6.

Management

How to use a variety

Population

Who they are — What they
need — Who should teach them

Cognitive Behavior

How they think

Inductive Sequencing

How to add
Beginnings and
Endings

UNIT PLAN

Deductive Sequencing

How to
Organize Content

Activities

Techniques to get content
across and promote higher
level thinking

Communication

How to handle "spontaneous inter-
action" in the classroom
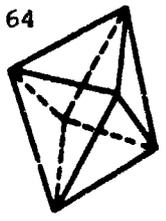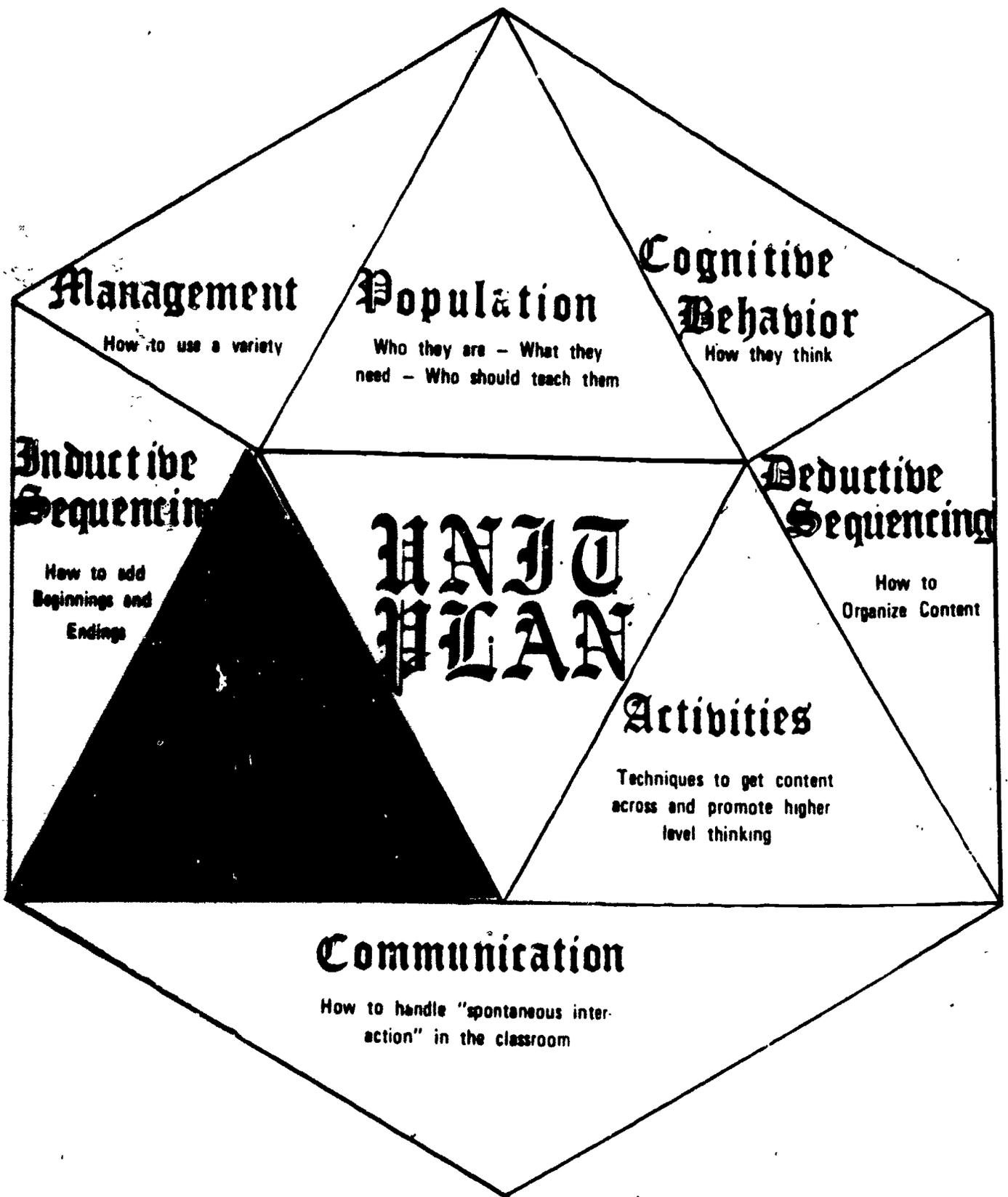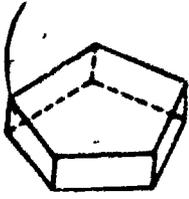
Module 5

Terminal and Enabling Objectives

T₁ The teacher will be able to write terminal objectives that include a defined population, a cognitive behavior, and method of evaluation. (Application)

T The teacher will be able to write enabling objectives that include a defined population, a cognitive behavior, and activities designed to develop those behaviors. (Application)

E The teacher will be able to recognize the four independent behavioral objectives as a result of studying definitions and practicing discriminating among those parts. (Comprehension)

E The teacher will be able to discriminate between terminal and enabling objectives as a result of recognizing which parts of behavioral objectives are included in terminal objectives and which parts are included in enabling objectives. (Evaluation)

Objective

Terminal   Enabling

Evaluation   Cognitive Behavior   Activity
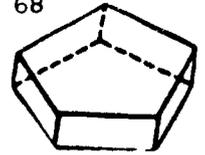
T₁   **The teacher will be able** to write terminal objectives that include a cognitive behavior and method of evaluation.

T₂   **The teacher will be able** to write enabling objectives that include cognitive behaviors and activities designed to develop those behaviors.

Rationale

At this point in the instructional program you have selected a topic, written a rationale, identified cognitive behaviors, arranged cognitive behaviors in a deductive sequence, and identified a minimum of 18 instructional activities. You are now ready to complete your basic unit plan by combining these components into a system of terminal and enabling objectives. Your unit plan will specify terminal behaviors to be achieved by gifted students along with suitable evaluative conditions and, enabling objectives designed to move students along a continuum toward these desired end of unit behaviors. The enabling objectives will be the activities you have already written, organized from simple to complex in terms of cognitive behavior and content. The terminal objective will describe the final student outcome of the entire unit of study. For gifted students it will probably represent a problem and require synthesis level cognitive behavior.

You have no doubt noted that you, the gifted teacher, are expected to complete the higher cognitive level task of writing a unit as a result of this program. Each Gem provides you with opportunities to complete a part of that task. The activities within them "enable" you to complete the terminal objective.

E₁   The teacher will be able to recognize the four independent parts of an objective and have then gone on to make some vague distinctions between goals and objectives. This has resulted in little substantive differences between goals and objectives and the distinction has served no useful purpose. We attempt to avoid the confusion created in this structure by focusing on terminal and enabling objectives. Functional rules for terminal and enabling objectives can be defined and clear distinctions between them can be drawn. First, the four parts required in the formation of objectives include:

1. Population - who will demonstrate the behavior specified in the objective.

2. Behavior - a word or phrase that clearly describes the behavior to be acquired by the population. (See Module 2 on Cognitive Behavior)

3. Activity - a description of the activity(ies) that will produce the desired behavior. (See Module on Deductive Sequencing and Module 4 on Activities)

4. Evaluation - how will the desired behavior be evaluated and what level of mastery will determine successful performances. (See Module 4 on Activities)
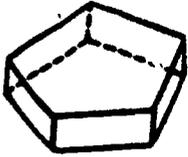
Example

Intellectually gifted 4th grade students - population (p)

Will write a minimum of five hypothesis - behavior (b)

After examining alternative causes for
hypthetical events presented in short
paragraphs   - activity (a)

Each hypothesis will meet the two stan-   - evaluation (e)
dards of:
    a. accounting for data presented
        in the event description
    b. testability

Task 5.1

Identify the following parts of objectives as referring to the
    population (p), behavior (b), activities (a), or evaluation (e).

Objective 1. ___(a) Intellectually gifted 5th grade students.
          ___(b) will construct two dimensional shapes
   ___(c) by following sets of written directions.

Objective 2. ___(a) Creatively gifted 1st grade students
          ___(b) will identify humorous events
          ___(c) observed in their own homes over a two-day period.

Objective 3. ___(a) Intellectually gifted 6th grade students.
          ___(b) will describe Buck's early environment and
          ___development (c) during a class discussion following
            silent reading of Chapter 1 in "Call of the Wild."

Objective 4. ___(a) Intellectually gifted 5th grade students
          ___(b) will demonstrate an ability to compare
          ___geometric forms (c) by constructing a two dimen-
            sional matrix that illustrates the relationships
            between number of angles and number of sides of a
            minimum of five shapes.

Objective 5. ___(a) Intellectually gifted 6th grade students
          ___(b) will be able to state in their own words
          ___the law of the "Club and the Fang" (c) so that the
            statement is recognizable to peers.

Objective 6. ___(a) Creatively gifted 3rd grade students (b) will
          ___demonstrate an ability to generate (c) a minimum
          ___of six alternative hypothesis explaining why each
            of several events has occurred when given verbal
            descriptions of unusual events.
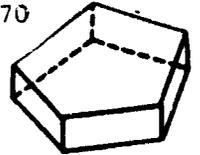
F_2 The teacher will be able to discriminate between terminal and
enabling objectives as a result of recognizing which components
of objectives are included in each.

Enabling objectives contain the following components:

1. Population
2. Behavior
3. Activity

Enabling objectives focus on the activities students will engage
in as they work in the unit of study. Several similar, optional, and/or
alternative activities may be listed under one enabling stem, that is,
one statement of population and cognitive behavior. Enabling objectives
are characterized by the word "will." The student "will" do something to
gain the information or skills he needs in working toward the completion
of the terminal objective.

Intellectually gifted 4th grade students will compare attributes
of trees by:
1. Examining diagrams of trees,
2. Examining trees on school grounds.
3. Participating in a brainstorming session, and
4. Discussing with classmates commonalities and differences
    of trees.

Terminal objectives contain the components:

1. Population
2. Behavior
3. Evaluation

Terminal objectives are distinguished by a "will be able to" or
"will demonstrate" phrase and criteria for judging successful performance
of the cognitive behavior specific within the objective. Conditions
selected for demonstrating final performance may be drawn from the pool
of activities developed in Module 4. Someone looking at a terminal
objective should be able to asnwer the question, "How will I know when
I have successfully demonstrated the cognitive behavior stated in the
objective?" You may ask yourself, "How will I distinguish between
successful and unsuccessful performance?"

Examples

Enabling
1. Creatively gifted 3rd grade students will list alternative
    modifications for a broom by using an attributes checklist.
2. Intellectually gifted 5th grade students will record critical
    incident contributing to changes in their environment
    observed over a two-week period of time.
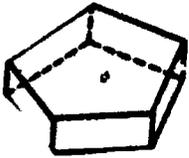
Terminal
1. Creatively gifted 2nd grade students will demonstrate the ability to produce flexible responses to pictorial stimuli with a minimum of five categorically different responses per picture.
2. Intellectually gifted 6th grade students will demonstrate an ability to contrast two literary selections by isolating a minimum of five contrasting elements for each of three pairs of selections.

Task 5.2
Return to task 3.2 and classify the objectives you wrote as either enabling or terminal. Look for the characteristic phrasing of "will do" (enabling) and "will be able to." Do you use other synonyms for these phrases? What are they?

Terminal Task - At this point, you should be able to organize the cognitive behaviors you have selected, activities, and knowledge of terminal and enabling objectives in a complete unit plan. At this point your unit plan will contain a rationale, terminal objectives in which evaluation conditions for demonstrating terminal behaviors are specified and enabling objectives that delineate cognitive behaviors and activities. These terminal and enabling objectives should be hierarchically arranged in a deductive sequence consistent with the taxonomy of cognitive behaviors and levels of learning in content.

Your unit should meet the following criteria:

1. Rationale - as specified in Module 1

2. Terminal Objectives
   a. Population
   b. Observable cognitive behavior
   c. Evaluative criteria

3. Enabling Objectives
   a. Population
   b. Observable cognitive behavior
   c. Activities

4. A sequence of enabling objectives that will lead students through the prerequisite lower level cognitive behaviors and levels of learning to the desired terminal objective.

5. A preponderence of higher level cognitive behaviors.

6. Each objective labeled with the cognitive level behavior.
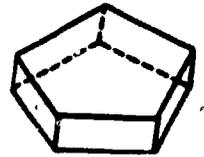
Answer Key

Task 5.1

<u>Obj. 1</u>

a. Population
b. Behavior
c. Activity

<u>Obj. 2</u>

a. Population
b. Behavior
c. Activity

<u>Obj. 3</u>

a. Population
b. Behavior
c. Activity

<u>Obj. 4</u>

a. Population
b. Behavior
c. Evaluation

<u>Obj. 5</u>

a. Population
b. Behavior
c. Evaluation

<u>Obj. 6</u>

a. Population
b. Behavior
c. Evaluation

Task 5.2

Obj. 1   E

Obj. 2   E

Obj. 3   E

Obj. 4   T

Obj. 5   T

Obj. 6   T

Management
How to use a variety

Population
Who they are — What they need — Who should teach them

Cognitive Behavior
How they think

Deductive Sequencing
How to Organize Content

UNIT PLAN

Objectives
An easier way to use them to write about goals and activities

Activities
Techniques to get content across and promote higher level thinking.

Communication
How to handle "spontaneous interaction" in the classroom
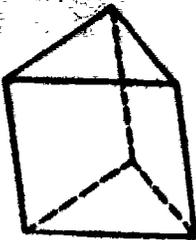
Module 6

Inductive Sequences of Learning Activities

T   The teacher will be able to construct a unit presentation using the inductive approach, as demonstrated by the addition of introductory and culminating activities to his unit plan. (Application)

E_1 The teacher will describe the inductive approach to sequencing learning activities as a result of reading a description of it. (Comprehension)

E_2 The teacher will develop an introductory activity as a result of completing T_a or T_b:

    T_a The teacher will be able to describe a minimum of three learning activities designed to teach problem solving strategies for Type 3 and Type 4 problems as measured by the definition of an introductory activity in the inductive approach.

    T_b The teacher will be able to write ontological, axiological and epistemological questions and activities for use as an introduction to a topic and which meet the criteria of an introductory activity. (Application)

E_3 The teacher will develop culminating activities for a unit as a result of reading a description of problem solving and examples of activities. (Application)

$\int$
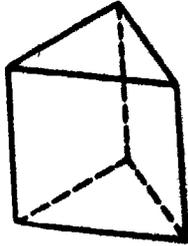
T   The teacher will be able to construct a unit presentation using
    the inductive approach as demonstrated by the addition of intro-
    ductory and culminating activities to his unit plan.   (Application)

Rationale

There are two basic approaches to organizing learning
activities for students. One follows a deductive approach
(Module 3) in which prerequisite behaviors are carefully established
as students are led up through both Bloom's taxonomy in the cognitive
domain and Gagne's levels of learning. This approach utilizes a
sequential organization of enabling objectives that lead to terminal
behaviors. Knowledge and comprehension level behaviors are est-
ablished prior to application type behaviors followed by analysis,
synthesis and evaluation level behaviors. Multiple discriminations
and concept acquisition are established prior to principle and
problem solving level tasks.

The other approach utilizes an inductive approach in which
students are immediately immersed in higher level tasks and then
find (discover) it necessary to backtrack through lower level be-
haviors in order to resolve apparent paradoxes and ambiguities.
Each approach has its strengths and weaknesses depending upon
teacher preference, content area, and student grade l   l and
sophistication.

The purpose of examining the inductive approach is to produce
an introductory and culminating activity for your unit. Although the
body of your unit is complete with its activities and expectations,
we have made no mention of its presentation to students. The in-
ductive approach provides the key to the successful implementation of
a well-prepared unit.

The introductory activity is designed to interest students in
the topic and to provide or initiate direction for information gathering.
The intermediary activities guide this search for information so that the
topic is thoroughly explored. The culminating activity then ties all that
has preceded it together. It represents the best answer to the question
posed by the introductory activity.

Topic	Introductory questions and activities	Culminating activities
Historical Fiction	How accurate is historical fiction? Students listen to tape recording of Hal Holbrook's Truman, and read an historical rendition.	Students "become" an historical figure, there- by creating historical fiction.
Fractions	How many different ways can you tell someone you want a part of something? In groups of five students receive a large candy bar. They are asked to write what part they want of it on a piece of paper using any expression except fractional ones. The student with the most unusual and accurate request (as judged by another group) gets that part. The rest of the candy bar is divided among the others.	
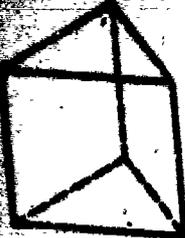
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E_1 The teacher will describe the inductive approach to
          sequencing learning activities as a result of reading
          a description of it.   (Comprehension)

The inductive approach to a unit consists of three stages:

Stage 1.   Introductory activities which present a question or
           problem, and then clarify it.
Stage 2.   Intermediary activities which are built around a terminal
           objective and several enabling objectives.
Stage 3.   Culminating activities which bring all the information of
           the unit to bear on solving the problem or answering the
           question posed at the beginning of the unit. Idea-finding
   and solution finding contribute t. this stage.

How to write introductory activities is the topic of the next enabling
objective (E_2).   Introductory activities may be based on a problem (T_a) or a
philosophical question (T_b).   The problem solving process of problem clari-
fication, idea-finding and solution-finding are presented in the section on
culminating activities (E_3).   You have already written the intermediary
activities for the unit if you completed module 4.

Task 6.1 Describe the three stages of the inductive approach in your own
          words.   Try not to refer to the description given.


Stage 1.

Stage 2.

Stage 3.
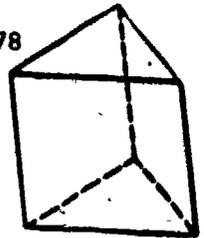
E_2 The teacher will develop an introductory activity as a
result of completing the terminal objective for problem
solving or philosophical perspective.

The basic premise of the inductive approach is that students
are more motivated to learn about a topic if they are presented with
something which puzzles them. Like a rhetorical question, an intro-
duction to a unit which has an unknown answer, can get students in-
volved through presenting them with a challenge. Added to a unit of
study, this is the introductory activity.

The section on problem solving discusses four types of problems,
two of which are appropriate for introductory activities for a unit
for gifted students. The section on philosophy suggests a perspective
which poses three unanswered questions on a topic.

At this point you whould read the rationales for each of the
sections and then choose one to complete. Of course you may examine
the sections as closely as you wish before making your decision.

After formulating an introductory problem or question, it should
be added to your unit plan. In addition, you will want to be sure to
make plans to make it a highly visible part of the students' environ-
ment, something on the order of a large banner at the front of the room.
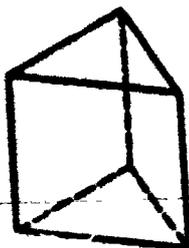
Problem Solving

T_a The teacher will be able to describe a minimum of three learning activities designed to teach problem solving strategies for Type 3 and Type 4 problems as measured by the definition of an introductory activity in the inductive approach. (Application)

E_1 The teacher will classify problems as a result of studying definitions and examining examples of problem types. (Comprehension)

Teaching
Problem Solving

```
                    |-------------------------------------|
               Types                                  Strategies

        |----|----|----|
        | 1    2  |3    4 |                     |--------------|--------------|
                                            Problem          Idea         Solution
                                         Clarification      Finding        Finding
```
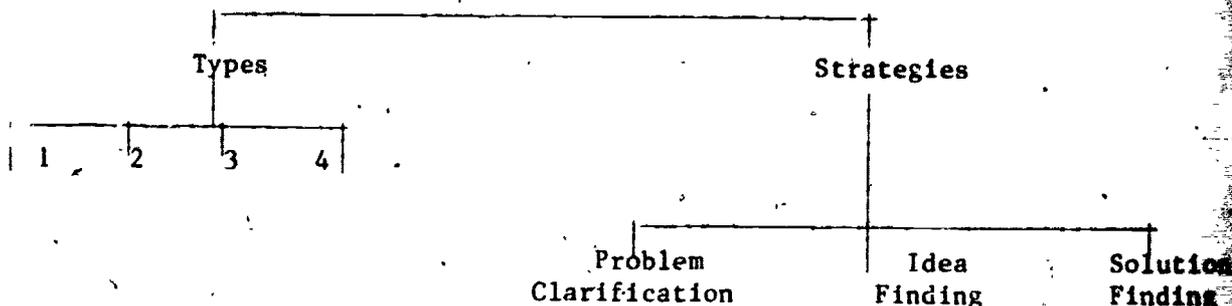
Rationale

The two tasks of problem finding and problem solving provide numerous opportunities for application of higher level cognitive behaviors. Because of their significance in the intellectual gifted classroom, it is desirable to examine them from a first person perspective as well as a process to be taught. It is assumed that teachers well-versed in efficient problem solving strategies will not only be better able to teach problem solving as a process, but will increase their effectiveness by serving as problem solving models.

Although problem solving can be taught to all levels of students, it is the intellectually gifted who, as future producers of information, will benefit most significantly from skills in this area. Problem solving is one of the distinguishing features of the intellectually gifted classroom and emphasis on problem finding and problem solving contribute significantly to the qualitatively differentiated curriculum.

Posing a Type 3 or Type 4 problem is an excellent way to begin a unit. They present the students with "real" problems to be solved.

E₁ The teacher will classify problems as a result of studying
definitions and examining examples of problem types.
(Comprehension)
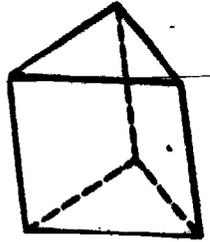
Clarification of higher level cognitive behaviors in
problem solving is grounded in the problem finding - problem
solving context presented by Getzels (1975). Problem classi-
fication, according to Getzels, is based on who has information
about different stages of the problem solving process. The
figure below, adapted from the work of Getzels and extended to
include one new type of problem, presents a problem classi-
fication scheme based on the amount of information possessed by
teachers and students for each of three primary stages in the
problem solving process.

Problem Finding - Problem Solving

Problem Types	Problem Statement		Idea Finding		Solution Finding	
	Tch.	St.	Tch.	St.	Tch.	St.
1	+.	+	+	+	+	-
2	+	+	+	-	+	-
3	+	+	+	+	-	-
4	-	-	-	-	-	-

As pointed out by Getzels, the only mystery in Type 1 problems is the
correct answer to be supplied by students. Actually, Type 1 problems require
only the low level thinking skills of knowledge and comprehension. Type 1
problems are frequently encountered in commercial text and workbook series
and can be identified by a basic fill in the blank format. Type 1 problems
present the problem statement for which some standard method of solution is
already known to students. For example, "Side A of a square is 5 inches,
find its area." The method of solving this problem has already been estab-
lished and students are required only to recall a formula, substitute one
number in the correct place, and to perform one arithmetic operation in
order to arrive at the correct solution.

Type 2 problems require the student to find a method of solving the
problem as well as determining its correct solution. For example, "Side A
of a square is 5 inches. How do you suppose you can find its area?" Type 2
problems are utilized in discovery learning processes in which students are
expected to explore several alternative methods for arriving at a correct
solution. Students then evaluate various alternatives and select the most
efficient method. /What frequently happens in group settings, however, is that
one student discovers a solution which is confirmed by the teacher, and the
rest of the group then has only a Type 1 problem to solve.

A third type of problem offers a defined problem statement to both
teacher and student for which one general methodology is employed.
The solution for Type 3 problems is however, open-ended. Any solution
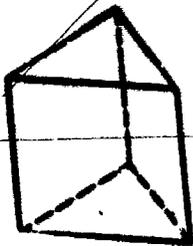
that can be supported either directly or b inference is considered. Type
3 problems are generally encountered in such settings as moral reasoning sessions
(Galbraith & Jones, 1976) where moral dilemmas establish the problem setting;
Great Books program where interpretations   authors' intent are used to establish
lish problem conditions; and in Lipman's (1974) Philosophy Program for
Children. Solutions are judged neither right or wrong, but rather in terms
of probabilities based on the supportive evidence gathered from contextual
clues. The method employed in Type 3 problems is based on analysis of the
problem setting mediated by values and/or feelings held by the problem
solver. The significance of various pieces of information may vary based
on each individuals mediating function and a variety of correct solutions
may emerge.

Type 4 problems are unstructured situations in which neither teacher
or student has defined the problem. Obviously, in this state of ambiguity,
there can be "neither a predetermined method or predetermined solution."
For example, "Here is a square, how many different questions can you ask
about it?" or "How many ways can you divide eighteen in half?" Type 4
problems are often stated as tasks to be accomplished or offered as settings
in which something is likely to change. For example, "Build", "Find",
"Defend your position", "How will life be different 20 years from now?",
or "If snow were green........" introduce opportunities for defining and
solving Type 4 problems.

Both Type 1 and Type 2 problems have predetermined methodologies
and one correct, predetermined solution. Students need apply only the
cognitive behaviors of recall and comprehension in finding the correct
solution to Type 1 problems. In Type 2 problems, students must "discover"
a method and then find the solution. Although analysis, comprehension, and
application behaviors may all occur in Type 2 problems, it is questionable
whether a large number of students actually engage in all of these cognitive
behaviors in a group setting. Type 3 problems require analysis of some
problem condition, generation of plausible solutions based on evidence
available in the problem setting, and then organization of evidence to
support selection of one solution. Not only are synthesis behaviors re-
quired in generating plausible solutions but evaluation behaviors are re-
quired in assessing the degree to which selected evidence actually supports
the conclusion. Type 3 problems generally structure the method of solution
around formal reasoning processes.

Type 4 problems require students to first clarify the problem and
then find both a method and a solution for solving the problem. This
process may lead to a whole set of questions to be explored individually
or by small groups of students. Type 4 problems offer substantial opport-
unity for developing problem finding and problem clarification skills re-
quiring the use of analysis level behaviors. Type 4 problems also require
synthesizing behaviors, i.e., the construction of a method or alternative
methods leading toward a solution; and finally evaluation, i.e. determining
which alternative method is most efficient and whether or not the solution
satisfies conditions defined in the problem. The qualitatively different
program for gifted students will contain a preponderence of Type 3 and
Type 4 problems.
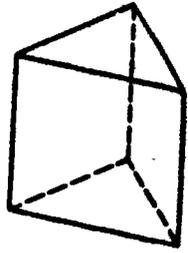
Examples of Type 3 problems that might be built into existing curricula are:

1. Which character in this story do you think is strongest? Why? How do you define strength?
2. What would you have done in John's position? Why?
3. Why do you think Harry Stottlemier behaved like that?

Although Type 3 problems are now generally found in some very excellently structured programs, their use should increase and generalize to the standard curriculum as experience with these programs continues.

Examples of Type 4 problems that might be included in any curricular programs are established in such directions as:

1. Reproduce a natural environment in your classroom.
2. Develop a system for measuring small objects.
3. Develop a plan for organizing a student government.
4. Find out how people are manipulated in our environment.
5. Find at least two ways to measure a tin can.
6. Develop a non-verbal process for comminicating directions in the classroom.

Each activity is basically open-ended and requires that the student extablish his own starting point, that is, state the problem or define the question. Once a basic question is defined, the student may go on to invent a methodology (idea finding) and eventually arrive at a solution. The solution is not judged in terms of its correctness from any normative standard but rather, is judged on how well it responds to the original question. Type 3 and Type 4 problems provide inductive opportunities for learning. That is, they provide overall structures within which investigation of topics and gaining of both knowledge and skills may occur.

Examples - presented below are examples of several problems classified by type.

Problem	Type
1. Go outside and count something you know more about after you have counted it than you did before you counted it.	4
2. How is a parable different from other literary forms?	3
3. Given two alternatives, which do you think John should choose?	3
4. If John has 30 apples and he gives 12 to Mary, how many apples does John have left?	1
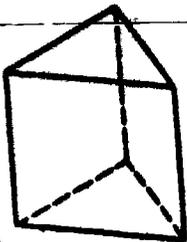
5. If a bullet weighs 6 gms. and has a muzzle   1
   velocity of 1,250 ft./second, how high can
   the bullet travel if directed in a line con-
   gruent with our earth radii?

6. How could you locate points in two-dimensional   2
   space?

7. Collect information from your classmates about   4
   their favorite color.

8. Which character in this story is the most   3
   frivolous?

Task 6.2 - Classify each of the following problems as a Type 1, 2,
   3 or 4 problem.

1. How do you suppose we can use a barometer to find
   the height of a skyscraper?

2. Map something that cannot be seen.

3. Find the area of a triangle with h=5" and b=4".

4. List at least four problems that the farmers of
   Latin America face.

5. Find out what people do that they say they don"t do.

6. If you were to change just the ending of this story
   to make it more interesting, how would you do it?

7. Identify the theme of the story beginning on page 26
   of your basal reader.

8. How many different types of closed geometric figures
   can you construct with 5 or less straight lines?

Terminal Task

        Suppose you were using a problem-solving approach in a
heterogeneous-oriented classroom and wanted to explore the topic
of energy conservation. You might begin by brainstorming the
topic and encouraging individual students to identify specific
problems related to the topic. (an introductory activity) They
might then be encouraged to find alternative solutions. (intermediary
activities) These problem clarifying and problem solution stages
would then be followed by a verification stage in which students
would be required to find and/or generate data related to their hypo-
thesis. Finally, these solutions would be evaluated and compiled in
a product. (culminating activity)

        The process may be used with whole class groups, small
groups and/or individuals. The distinguishing feature of the

approach is beginning with a Type 3 or Type 4 problem, clarifying
the question, generating alternative hypotheses and then collect-
ing data to verify or reject hypotheses. During the hypothesis
verification stage, students will be applying a range of specific
information-gathering and processing skills and may be introduced
to new research tasks as needed.
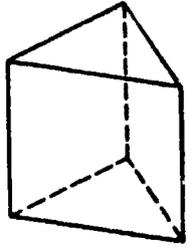
Task

1. What questions, for your grade level might you expect to
   come out of the energy topic?

2. What are some of the alternatives answers to these questions?

3. What activities would students engage in as they verified
   these hypotheses?

4. Write a Type 3 or Type 4 problem on your topic and describe how
   it could be used as an introductory activity.
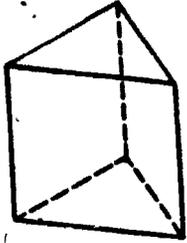
Philosophical Perspective

T   The teacher will be able to write ontological, axiological, and epistemological questions and activities for use as an introduction to a topic and which meet the criteria of an intorductory activity. (Application)

E_1 The teacher will write ontological, axiological, and epistemological questions as a result of reading examples, and recognizing question stems for each type. (Application)

E_2 The teacher will describe how philosophical questions can be used in a unit of work as a result of reading a description of several alternatives. (Comprehension)

Philosophical Questions

Ontological	Epistemological	Axiological

T   The teacher will be able to write ontological, axiological, and epistemological questions which meet the criteria of definitions those terms from Koofner. (1969).

I.   Rationale

There are at least three perspectives in confronting the information received through the senses: acquisitive perspective, critical perspective, philosophical perspective. The acquisitive perspective is the process of acquiring information, i.e. the sensory input is recognized, and understood. It may be stored in short or long-term memory. This acquisition of information does not require manipulating it. The other two perspectives, critical and philosophical, require processing of information. Critical thinking involves analysis and is thoroughly discussed in the module on Bloom.

The philosophical perspective questions the criteria upon which the critical perspective is based. It involves questioning how we know, what exists, and what is valued. These areas are formally called epistemology, ontology, and axiology, respectively. Gifted students have the ability and the inclination to think philosophically. An inductively sequenced unit for them can begin with philosophical questions.
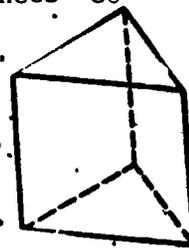
E₁   The teacher will be able to write ontological, axiological, and epistemological questions as a result of reading examples, and recognizing question stems for each type. (Evaluation)

Axiology is the study of what is valued. Ethics, moral dilemmas, and values clarification all fall under axiology. In this area the formal goals are to describe the valuing experience of people, propose hypotheses about why certain value systems are held, and to compare valuing systems. Take gifted education, as a sample topic for axiological questions:

> Is gifted education valued?
> Who values gifted education?
> Who doesn't value gifted education?
> Why is it important to some people?
> Why is it not important to others?
> Is there a relationship between support for education
>   in general and support for gifted education?

Axiological questions about parables follow the same pattern:

> Is the parable valued by some group of people?
>   By whom?   Why?
> Do some people reject the parable as an important
>   literary form?   Why?
> Are there some people who recognize the existence
>   of the parable and yet deny its importance?
>   Who?   Why?
> Is there a relationship between literary taste and
> the valuing of parables?

Questions of an axiological nature about measurement are:

> Who is perimeter important to?   Why?
> What else do you suppose is valued by these individuals?
>   Why?
> Is there a group of individuals who value perimeter
>   and no other concepts in measurement.   Why?

With experience, students can delve more and more deeply into questions of value. In order to answer a question of value it is necessary to use analysis, synthesis and evaluation. Students are directed to propose reasonable hypotheses to answer open-ended questions.

Axiological questions generally ask:

> What is important?
> To whom is it important?
> How is it important?
> Why is it important?
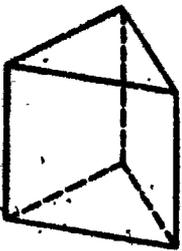
Task 6.3 - Identify the axiological questions by checking them:

_____ 1. Describe the geographic features of the area.
_____ 2. Why did the travelers choose to stop by the river?
_____ 3. What was valued most by the Mohawk Indians?
_____ 4. Who is land important to today?
_____ 5. Why did Cinderella take the abuse of her sisters' and stepmother?
_____ 6. What did the prince in "The Prince and the Pauper" hope to achieve when he switched places with the Pauper?

Task 6.4 - Write four axiological questions.

1.
2.
3.
4.

Epistemology is the study of how we know. As an outgrowth of axiological questions, students may be asked how we know about a topic. In the formal study of epistemology several sources of knowledge have been proposed. Some of the most familiar sources of knowledge are sensory input, reason, authority, and intuition. Other sources which have been proposed are instinct, racial memory, extra-sensory perception, supernatural revelation, spiritualism, occult, and anamnesis (deja vu). Epistemological questioning attempts to establish the reliability or accuracy of our information. Epistemological questions about gifted education might include the following:

How do we know what gifted education is?
What is the definition of gifted? How do we know?
    How can we test our definitions?

What does a program for gifted students include?
    How do we know?

About parables, some epistemological questions are:

How do we know about parables?
When did we first know about them?
What do we know about parables?
Has a definition of parable been agreed upon?
    Is it logical? Consistent? Accepted by
    everyone?

On the topic of measurement:

How do we know about measurement theory?
How was it developed? By whom?
Can we personally verify the concepts of triangle,
square, and rectangle as defined by measurement
theory? How?
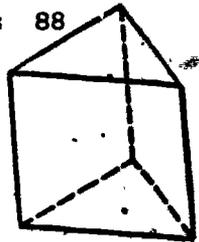
Epistemological questions ask:

>What do we know?
>How do we know about it?
>How do we know we know about it?
>Is our knowledge complete?
>Is it accurate?

Task 6.5 - Identify the epistemogical questions:

_____ 1. Should policemen be able to break the law to
inforce it?

_____ 2. What do we know about gravity?

_____ 3. What is the definition of love?

_____ 4. Has science fiction been defined?

_____ 5. How do we know about the magnetic north?

_____ 6. Where is San Diego in relation to Los Angeles?

_____ 7. Can hate be defined?

_____ 8. Is freedom a realit?

Task 6.6 - Write four epistemological questions.

>1.
>2.
>3.
>4.

Ontology is the study of the essence of existence of a concept.
Ontology seeks to verify or deny the existence of a concept and to
describe how it exists. It is closely linked to epistemology, so
closely in fact, some people have questioned its existence as a
meaningful area of inquiry. But ontology asks how something exists,
not how we know it exists. It deals with the state of the condition
of something's existence. Ontology also asks if the existence of
something can be verified, or if, indeed, it has reality. The most
familiar ontological question is, "Does God exist?" In the area of
gifted education some ontological questions are:

>Does gifted education as a unique type of education
>   exist?
>Can it be defined?
>Does it exist in the learner, the curriculum, the teacher,
>   or all three?
>Does it exist by definition or naturally?
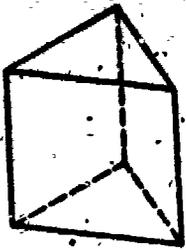
In the area of literature:

If parable is defined as presenting a "basic truth,"
what is the definition of a "basic truth"?
Are "basic truths" discovered or created?
Are parables unilaterally linked with some individuals
or some time periods?
Are there more parables in some time periods than others?
-Are parables a reflection of the state of society or
vice versa?

In the area of measurement:.

Did people discover triangles in nature or create them?
Are two-dimensional measurement concepts real?
Is "area" a meaningful concept in four dimensions?
Is "length" a meaningful concept without "width"?

Ontological questions ask:

Does it exist?
How does it exist?
What are the conditions of its existence?
When did it come into existence?
How did it come into existence?

Task 6.7 - Identify the ontological questions in the following list:

_____1. Are governments natural or created by man?
_____2. Does education really occur?
_____3. What is the definition of existence?
_____4. Does an increase in leisure time reflect a
decadent society?
_____5. Are concepts meaningful only in terms of their
opposites?
_____6. Can success be absolutely defined?

Task 6.8 - Write four ontological questions:

1.
2.
3.
4.

Questions in the three areas tend to lead into each other rather
naturally. For some students, acquisitive learning can take place within
the philosophical perspective. Others, however, who skim the surface of
the philosophical questions will need guidance into acquisitive learning
in order to have a body of knowledge to operate from.

Task 6.9 - Identify the following questions as axiological (A),
epistemological (E), or ontological (O):

Topic: Nude Bathing

_____1. Why is nude bathing important to some poeple?
_____2. What is the definition of nude bathing?
_____3. Is nude bathing acceptable in some places?
_____4. Has nude bathing always occurred?
_____5. What do we know about nude bathing?

Topic: Skiing

_____1. Do all Nordic skiers also enjoy Alpine skiing?
_____2. Where did skiing originate?
_____3. Is skiing a natural activity for humans?

Topic: Democracy

_____1. Can democracy be operationally defined?
_____2. Are people naturally democratic?
_____3. How do we know about democracy?
_____4. Why is democracy important to some people and
socialism important to others?

Write questions in each philosophical area for your topic.

Topic:_____

Axiological questions:

1.
2.
3.

Epistemological questions:

1.
2.
3.

Ontological questions:

1.
2.
3.
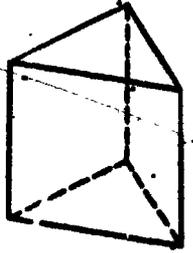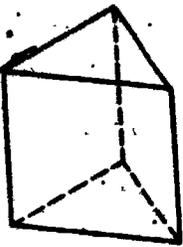
E₃   The teacher will describe how philosophical questions can be
     used in a unit of study as a result of reading a description
   of several alternatives. (Comprehension)

        The order of the philosophical areas presented here is only
one possibility. Using topics relevant to students' lives, you
may find starting with the values issue works best. Rules in
school, for example, may be questioned; why are they important?
Have they always been important? These questions can lead into
epistemological areas. How do we know the rules? Are there
societies that don't have these rules? Further discussion may
lead to ontological issues: Are these rules in accord with nature?
Are they made up for the convenience of a few people? Other topics
may be best approached initially from an epistemological viewpoint.
In science, for example, students may be asked how they know a plant
gets water. The answer can be obtained from several sources:
authority, experimentation, or reasoning. The epistemological
question poses the problem. Almost every topic can be subjected
to philosophical questioning.

        As mentioned briefly in the last section, some students will
acquire the standard body of knowledge through questioning from a
philosophical perspective. These students will be seeking informa-
tion to further their own basic knowledge of an area, and to support
their own speculations. They may only need to be confronted with a
concept and asked whether or not it exists. Obscure or nonexistent
concepts often provide further challenge for this type of student.
Not all students, however, will display this independence of thought
and action. Use of the philosophical perspective with less en-
thusiastic students can still take place within the structured
environment of the deductively organized unit plan.

Task 6.10 - Describe how you would use the philosophical question
   generated in activity 5.9 to begin a unit.

E₃ The teacher will develop culminating activities for a unit
as a result of reading a description of problem solving and
examples of activities. (Application)

 The culminating activity of a unit uses the problem
solving process to focus all the information accumulated
in the unit on the problem or question posed in the intro-
ductory activity. The first part of this section focuses
on the problem solving process. The second part gives
some examples of culminating activities.

 Although there are a variety of definitions and names
for problem solving, the most concise definition offers
three basic stages. First, there is a problem clarification
stage followed by some sort of idea-finding related to
methodology, and finally, a solution-finding process. The
problem is generally stated as a question. The most impor-
tant consideration at the problem clarification stage is
formulating the correct question. Examining the problem
situation and asking "why" for each potential question will
generally broaden the problem to its most fundamental or
accurate condition. For example, a teacher wants to de-
crease the amount of noise in her classroom so she poses
the question - "How can I reduce the talking in my class-
room? - Why? - Answer - "So students can get their work
done." - Isn't then the question really, "How can I encourage
my students to get their work done?" the broader problem that
opens up more alternatives for achieving a solution then is
the clarified question. Another example might be, a teacher
is concerned that a very poor relationship with a building
administrator will adversely influence a forthcoming tenure
decision. The initial problem appears to be, "How can I
improve my relationship with the administrator?" Asking
"why?" again broadens the scope to "How can I insure objective
treatment in a tenure decision?" Again asking why?, in-
troduces the question of, "How can I be assured of continu-
ing employment in my chosen profession?" This latter ques-
tion opens the way for far more alternative approaches to a
solution than either of the narrower questions.

 Idea-finding related to the problem generally begins
with gathering information followed by generating feasible
solutions stated as alternative hypotheses. Obviously,
Type 1 problems will not require an idea-finding phase.
Hopefully, problem Types 2 through 4 will encourage sub-
stantial idea finding based on fluent and flexible respond-
ing. The list of alternative hypotheses is narrowed to the
most reasonable hypothesis as part of the solution finding
stage. Stage 2 in the problem solving process may require
considerable fluency and flexibility if one expects an
original solution or if non-standard processes are required
to solve the problem. The more hypotheses that can be
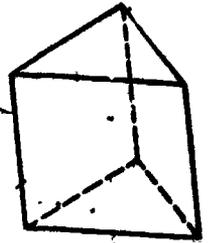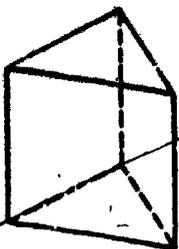
generated, the greater is the likelihood that a solution will be
both novel and useful. Hypothesis generation is frequently
classified as a divergent, "ideational fluency" task subject
to the human frailities of "set" and/or "function fixedness."
i.e. a condition that tends to limit thinking to only a few
alternatives. Specialized techniques including such things
as attribute listing, morphological analysis and checklists
as described in Davis (1973, pgs. 103-119) and the Creative
Problem Solving (CPS) process (Noller, 1977) are extremely
helpful in generating hypotheses.

A solution is reached when one or more of the feasible
hypotheses is tested or evaluated against all available
data and a match is found. The solution is almost anti-
climatic if the correct question has been asked and creative,
usable hypotheses have been generated. The solution may
come either as an "Ah ha!" solution or may require tedious
checking and verification with available data.

Examples of the three stage process applied to four problem types
include:

Stage 1.   Question finding.
Stage 2.   Solution finding.
Stage 3.   Solution acceptance.

Type 1 - Find the area of a triangle with a h=5" and b=4'

Stage 1 - Question clearly stated.   (Comprehension)
(Question)
Stage 2 - Recall formulas for finding area of a triangle.
(Knowledge)
(Solution)

          Substitute numbers in formula. (Comprehension)
          Complete computation. (Knowledge)
Stage 3 - Submit answer to teacher for evaluation. (Verification)
   (No student behavior)

Type 2 - How do you suppose we can use a barometer to find the
          height of a skyscraper?
Stage 1 - Question clearly stated.   (Comprehension)
Stage 2 - Generate alternative hypothesis. (Synthesis)
Stage 3 - Submit answer to teacher for evaluation.   (No
          student behavior) or,
          Identify and support the alternative hypothesis
          that best solves the problem. (Evaluation)
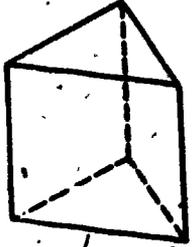
Type 3 - If you were to change just the ending of this
story to make it more interesting, how would
you do it?
Stage 1 - Question clearly stated.   (Comprehension)
Stage 2 - Generate alternative hypotheses. (Synthesis)
Stage 3 - Submit answer to teacher for evaluation.
(No student behavior)
Determine adequacy of the answer. (Evaluation)

Type 4 - Map something that cannot be seen.
Stage 1 - Clarify question.   (Analysis)
Stage 2 - Generate alternative hypothesis. (Synthesis)
Stage 3 - Determine adequacy of response. (Evaluation)

Task 6.11 - Solve each of the following problems and describe what
happens in each stage of the problem solving process.

Problem 1 - How are the following numbers ordered?

0, 2, 3, 6, 7, 1, 9, 4, 5, 8

Stage 1 -

Stage 2 -

Stage 3 -

Problem 2 - List as many different ways as you can to divide
eighteen in half.

Stage 1 -

Stage 2 -

Stage 3 -

Problem 3 - Find the area of a rectangle with side a = 8cm.
and side B = 4cm.

Stage 1 -

Stage 2 -

Stage 3 -

Problem 4 - Four baseball players, Jeff, Bart, Cliff and Matt
and (not necessarily respectively), a first base-
man, second baseman, third baseman and short stop
are riding to the game on two double seats, one
directly behind the other on the right hand side
of the team bus.
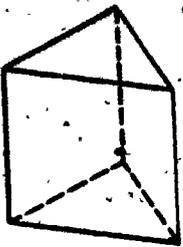
The second baseman is sitting to the right of Matt,
(who, by the way, is not the first baseman) and
Jeff is sitting directly in front of Bart. Matt
is sitting behind the short stop. Where is each
player's position?

Stage 1 -

Stage 2 -

Stage 3 -

Culminating Activities

The problem solving process need not be confined to the culminat-
ing activity period of the unit. If possible, it may be effectively
interspersed throughout the unit period. The problem clarification
may occur during the introductory activities, during the implementation
of the unit plan, and again at the end. Likewise, the idea-finding and
solution-finding would seem to a natural outgrowth of gaining more infor-
mation on the topic.

Culminating activities begin with a brainstorming session on what has
been learned that contributes   to solving the problem or answering
the question (solution finding). After brainstorming, individuals or
small groups of students then take the responsibility for organizing
pieces of this information for presentation to the larger group.
Depending on how much organization is needed, the group may want to
discuss presentation format then, or wait a few days. After the pre-
sentations are ready, a practice run is held, then the final presenta-
tion made.

An example of this process is a science fiction unit in which the
initial problem posed was , "What will life on earth be like in the
year 2099?"

The terminal objective of the unit plan was:

The student will be able to identify the trends in the present
which science fiction writers have developed into the realities
of the future as demonstrated by an analysis of a specific work
using that criteria.
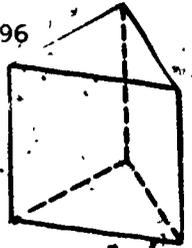
    The culminating activity was a science fiction fair for the entire
grade level in which small groups of students were responsible for centers
on various components of life on earth in the year 2099. Each center made
a prediction about its component, justified it in terms of current trends,
ane engaged the audience in some sort of activity to help them to experience
what life will be like in that year. One center, for example, was on
animals. They predicted that the ozone layer will be destroyed based on
the continuing use of florocarbons. They described the effect of no ozone
layer on animals and then asked the audience to consider how their individual
pets would have to adapt.

Task 6.12

    Describe some possible culminating activities for use in your unit.
Be sure to include activities for the problem solving stages and formulation
of a culminating event.

Task 6.3

1.
2.
3.
4.
5.
6.

Key
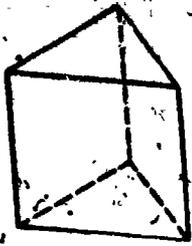
6.2   1. 2
        2. 4
        3. 1
        4. 1
        5. 4
        6. 3
        7. 1
        8. 2

Questions 2, 5, and 6 may involve value issues. If, for example, the travelers chose to stop by the river because they valued the view, or the water for its uses, then this would be considered an axiological question. Many decisions in literature are based on values if they are examined in depth.

Task 6.5

1.
2.
3.
4.
5.
6.
7.
8.

Task 6.7

1.
2.
3.
4.
5.
6.

Task 6.9 - Nude Bathing

1. A
2. E
3.
4.
5. E

Skiing

1. A
2. Q
3. O

Democracy

1. E
2.
3. E
4. A

Task 6.11

Problem 1 - Type 2
    Stage 1 - Question clearly stated. (Comprehension)
    Stage 2 - Recall possible orderings (owledge) arithmetical, geometric, alphabetical.
    Stage 3 - Check various orderings on number sequence. (Application) Reverse alphabetical order of word representation of numerals.

Problem 2 - Type 2
    Stage 1 - Question clearly stated. (Comprehension)
    Stage 2 - Generate alternatives. (Synthesis) 18 - 2 = 9, 1 - 8, :
    Stage 3 - Submit answer to teacher for evaluation. (No student behavior) or Determine adequacy of response (Evaluation)

Problem 3 - Type 1
    Stage 1 - Question clearly stated. (Comprehension)
    Stage 2 - Recall formulas for finding area of a triangle. (Knowledge) Substitute numbers in formula. (Comprehension) Complete computation. (Knowledge)
    Stage 3 - Submit answer to teacher. (No student behavior).

Problem 4 - Type 2
    Stage 1 - Question clearly stated. (Comprehension)
    Stage 2 - Record matrix method of organizing information. (Knowledge) Use mat system to find solutions. (Applic tion) Jeff = 1st, Bart = 2nd, Ma 3rd, Cliff = short stop.
    Stage 3 - Submit answer to teacher. (No stu behavior) or Determine accuracy o answer from problem. (Evaluation)
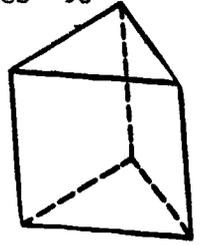
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Population
Who they are — What they
need — Who should teach them

Cognitive Behavior
How they think

Inductive Sequencing
How to add
Beginnings and
Endings

UNIT PLAN

Deductive Sequencing
How to
Organize Content

Objectives
An easier way to use
them to write about goals
and activities

Activities
Techniques to get content
across and promote higher
level thinking

Communication
How to handle "spontaneous inter-
action" in the classroom

Module 7

Management Systems

T   The teacher will be able to construct a unit of study using
     one of six management systems for intellectually gifted students
     as measured by checklists of criteria included in the module.
     (Synthesis)

E   The teacher will be able to identify management systems
     after reading descriptions and demonstrating comprehension
     level behaviors associated with each system. (Knowledge)
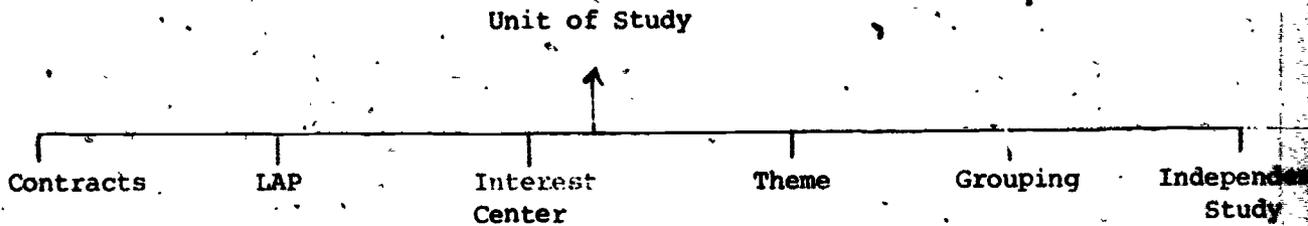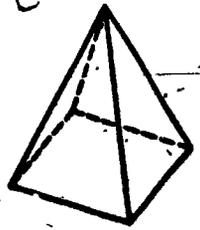
Unit of Study

Contracts	LAP	Interest Center	Theme	Grouping	Independent Study

101

T   The teacher will be able to construct a unit of study using one
    of six management systems for intellectually gifted students as
    measured by checklists of criteria included in the module.
    (Synthesis)

Rationale

        Learning activities developed for the purpose of insuring that
    students will perform behaviors stated in terminal objectives may
    be organized in a variety of ways. As we have already noted, in-
    structional sequences may be organized in either an inductive or
    deductive approach. Now we will examine alternative means for
    transmitting instructional activities developed by teachers into
    learning experiences for students. Instructional activities are
    activities designed by teachers. These activities must be trans-
    mitted to students in order to become learning experiences. Trans-
    mission is accomplished through a management process.   Management
    is defined as a technique for organizing instructional activities
    designed by teachers for transmission to students as potential
    learning experiences. All of the management systems included in
    this module facilitate differentiated instruction for students of
    different ability levels and areas of interest.   That is, these
    systems are recommended for heterogeneously organized classrooms.

        In this module, you will take the unit plan you have developed
    and convert instructional activities into student learning experiences.

        Students may acquire terminal behaviors in isolation, in small
    groups, or in large groups. Students may receive verbal or written
    directions about which behaviors are to be acquired and/or how they
    are to be acquired, or students may be expected to determine their
    own direction. A management system for gifted students will:

        1. Provide opportunities for participation in higher level
            cognitive behaviors, and
        2. Provide opportunities for students to work toward increased
            independence by:
            a.   providing for flexible use of time, and
            b   providing for flexible use of academic content.

        Meeting these conditions for gifted students may be accomplished
    in any one of six different arrangements or combination of arrangements.
    Briefly management arrangements include:

    1. Learning Activity Packets (LAPs) - self contained
        learning experiences.

    2. Learning Centers - physical locations for storage and
   presentation of learning activities.
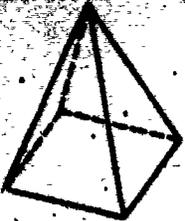
3. __Grouping__ - student groups·formed to facilitate student interaction and interaction with content and/or processes.

4. __Theme Development__ - a broad focal point within which several specific directions may be taken.

5. __Independent Study__ - product oriented study stressing·free choice of topic and product.

6. __Contracts__ - individual student contracts provide flexibility in both rate of progression and level of difficulty for each student

You may examine each of the six basic management techniques included within this module and then select one system that seems appropriate for you to transmit your instructional activities into learning experiences for students. The terminal objective for this module requires only that you organize your instructional activities into one of the management systems. Examine each management system, complete the enabling objective for each system, then choose one to use for your unit.

LAP

Learning Activity Packet
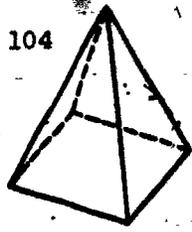
T_1 The teacher will be able to organize instructional activities into a LAP as demonstrated by the criteria listed in this module.

E_1 The teacher will be able to identify each component of a LAP as a result of reading descriptions and studying an example.

Rationale:

A LAP is a self-contained unit of work designed to provide students with alternative objectives, and/or activities. The LAP generally delineates a purpose or rationale for acquiring the objectives defined and is organized for independent use by students. LAP's may be introduced to whole groups and some activities within the LAP may be group oriented. References, observations, and experiments outside the LAP may be cited and students may be expected to gather information from a variety of sources as well as developing a variety of activities outside the LAP. Provisions for evaluating progress within the LAP are usually included within the LAP and students can determine, based on self-testing built into the LAP, when they have satisfactorily completed it. LAP's can be used in heterogeneous settings if the alternatives cited are sufficiently varied to accommodate a range of student talent and intellectual capacities. See also: Dunn, Rita and Kenneth Dunn. Seeing, Hearing, Moving, Touching Learning Packages. Teacher, May/June, p. 48-51; and Jackson, Pat. The Writers LAP; 1969 Educational Associates, Inc.

E_1 The teacher will be able to identify each component of a LAP as a result of reading descriptions and studying examples.

A LAP is a sheet of paper or booklet that contains:

1. Rationale - A rationale describes the significance of studying information presented in the LAP and/or acquiring the behaviors stated in the terminal objective.

2. Behaviorally Stated Objective - Identifies for the student the terminal behaviors he is expected to acquire as a result of completing the LAP.

3. Learning Activities - Identifies for a student the specific activities he may complete in order to acquire the terminal behaviors. Activities may be optional or required, or some of each. All activities may be included within the LAP or students may be directed to resources outside the LAP, e.g. a filmstrip, the library, interview with a community resource person, etc.
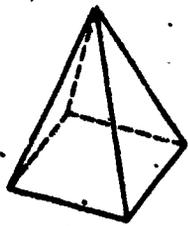
4.   Evaluation - Provides criteria for the student to use in
determining whether or not the terminal behavior has been
acquired and what to do if it has not.

Activity 7.1

Presented below are excerpts from a LAP.   Identify to which of
the four components each excerpt represents.

A.   _____   Mastering the skill of producing numerous ideas
in response to sounds will help develop creative writing
skills.

B.   _____ Listen to the four sounds on tape and write one
word that describes an image of the sound.

C.   _____ At the conclusion of this unit, you will be able to
produce many ideas in response to recorded sounds.

D.   _____ Count the number of images you have listed.   Count
the number of different images you have produced, i.e.
images that are different eg. musical instruments are all
considered one type of image, and nature scenes would be
another type.
   If you have listed less than five images and/or
three different types of images for each sound, please
repeat activities #_____, _____ & _____.

E.   _____ Study the definition of onomatopoeia and write a
new definition in your own words.

F.   _____ At the conclusion of this unit you will be able
to define vocabulary associated with sounds and
images.

G.   _____ Define the following list of words and have
a partner check your definitions.   If you miss more
than eight, please reexamine the missed definitions
and repeat the test.
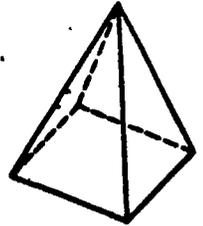
Terminal Task - Do not complete this task unless you have
selected this management system as a way of organizing
your instructional activities.

Prepare a LAP on a topic of your choosing and have a
colleague determine if the following elements are con-
tained within the LAP.

Rationale
Appropriate reading level.   _____
States significance of studying
'the LAP   _____
Gives convincing reasons for
• 'completing the LAP   _____

Objectives
Uses behaviorally stated terms   _____
Contains a preponderence of
higher cognitive behaviors   _____
Stated in terms students can
understand   _____

Activities
Clearly states what is to be done   _____
States which activities are
optional and which are required   _____
Specifies a sequence if one is to
be followed   _____
Tells where resources are located
if not included within the LAP   _____

Evaluation
Student can tell when he has com-
pleted the LAP   _____
Student knows what to do if he fails
to complete the LAP   _____

If your LAP does not meet all of these criteria please
revise and have it rechecked.

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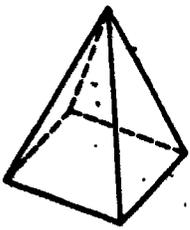
Learning Center

T_2 The teacher will be able to organize instructional activities
in a learning center as demonstrated by the criteria listed in
this module.

E_2 The teacher will identify components of a learning center as
a result of reading a definition and studying examples.

Rationale

A learning center is a physical location within the classroom
or school environment designed to provide a variety of starting
points for student activity within one general area of investigation.
Learning centers are generally attractive, appealing and invite the
students' interest. Learning centers may contain a variety of objec-
tives to be accomplished, directed activities, and/or open ended
activities. Things to do in the learning center may be color coded
by level of difficulty or area of interest. A record keeping system
of who has accomplished what may be included in the center. Raw
materials and references required for completion of activities may
be a part of the center or may be located at other points in the room.
Work may be done at the center or in other parts of the room based on
physical constraints. Time at the center can be scheduled by indivi-
dual, small groups' or remain completely open-ended. Activities within
the center may be changed periodically or the entire center may be
changed.

The basic idea of a center is the gathering of ideas and materials
designed to stimulate student interest in pursuing some avenue of in-
vestigation, creative production; or simply the acquisition of new skills
and/or information. The center may have a designated sequence of activi-
ties that are organized either deductively or inductively, or the arrange
ment of activities may be open ended and left entirely to a students
prero ative. See also: Gurske, Barbara and Bernardt, T. Cote. Learning
Center Guide, California, 1972; Voight, Claude R. Invitation to
Learning Creating a Learning Environment, Washington, D.C.: Acropolis
Books Ltd., 1971; Morlan, John. Classroom Learning Centers. Belmont,
California: Fearon Publishers, 1974.
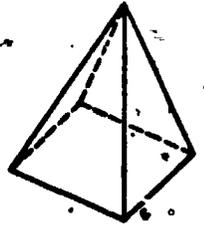
E₂ The teacher will be able to identify components of a learning center as a result of reading a definition and studying examples.

A Learning Center **contains** the following components.

1. Rationale
2. Pre-test
3. Rules for using
4. Objectives
5. Student activities
6. Record keeping system
7. Self evaluation device

1. Rationale ⁼ Often, with younger students, the interest center is introduced to the entire group by the teacher. During this introduction, the rationale, as well as purpose (terminal objective) may be stated. Again with younger students, rules and written directions may be reviewed. Some or all of these steps may be an integral part of the center for older students. First time users of interest centers will benefit from a review of all seven components listed above.

2. Pre-test - A pre-test may be administered to the entire class to determine who should be assigned to the center or a pre-test may be included in the center and students given the opportunity to assess their own needs.

3. Rules for using the center - Generally describes when it may be used, who may use it, how many students may use it, and how the resources are to be handled. Location of additional resources may be noted, any special sequencing instructions and/or record keeping instructions may also be visually obvious.

4. Objectives - Both terminal and enabling objectives may be given in the teacher introduction and/or clearly presented in the center. Objectives may also form the basis for a record keeping system with students held responsible for checking off completed behaviors.

5. Student activities - Because the center is generally used by different students at different times, it is necessary to keep the activities format flexible. Activities presented on task cards seems to be most efficient. Sets of task cards may be color coded to designate various enabling objectives, level of difficulty, or levels of cognitive behavior. Color coding and number or letter designations will provide the opportunity for coding two variables, e.g. yellow cards for enabling objective #1 with cognitive level (K, C etc.) also recorded on the card.

6. Record keeping system - The center should have a system that provides students with the opportunity of recording completed activities and/or acquired behaviors. Student names down one side of a matrix with activities or behaviors across the top is sufficient. Color coding, if used, may be added to the record keeping chart.
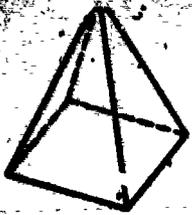
7. Self evaluation devise - Self correcting formats for each
activity and/or enabling objectives should be available
so the student can determine or measure his own progress.

General - A center should be attractive and easily accessable
to students. It should be a fun place to work.

Activity 7.2

List components you would include in a center for 1st graders
and components appropriate for 6th graders. What teacher
directions would you give to each of these groups.

Terminal Task - Do not complete this task unless you have selected
this management system as a way of organizing your instructional
activities.

Prepare a plan for a learning center on a topic of your choosing
and have a colleague determine if the following elements are con-
tained within the plan.

1. Physical Arrangement
   a. Does a diagram illustrate an attractive
      arrangement?
   b. Does a diagram illustrate ease of
      student use?
   c. Does a diagram include all component
      parts?

2. Pre-test questions adequately cover topic.

3. Student Directions
   a. Are student directions clear?
   b. Are student directions all inclusive?

4. Objectives
   a. Uses behaviorally stated terms.
   b. Predominately higher cognitive levels.

5. Activities
   a. Will students be able to find activities
      easily?
   b. Are resources for completing activities
      available?
   c. Sample task cards clear and attractive?

6. Record keeping
   a. Matches activities and/or enabling
      objectives.
   b. Students will be able to record their
      own progress.

7. Evaluation
   Self checking devices are available.

Grouping
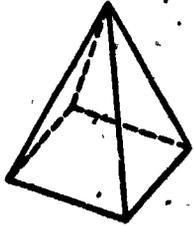
T₃   The teacher will be able to organize instructional activities
      in a grouping system as demonstrated by the criteria listed in
      this module.

E₃   The teacher will identify components of a grouping organization
   as a result of reading a definition and studying an example.

Rationale

        The organization of a class into small groups is designed
to meet the criteria for management of gifted students in a
variety of ways. Groups may be arranged heterogeneously or
homogeneously depending upon the task to be accomplished.
Groups may be given a variety of different tasks depending upon
ability levels and ranges. Groups may be required to achieve
consensus in completing tasks or individuals may be invited to
work independently on tasks within a structure defined by the
group. Grouping within the classroom may be a function of pre-
determined assignments or may result from student choices. Or,
almost any combination of the above may be utilized to meet
criteria of a management system for gifted students, as long as
there is provision for meeting the needs of individuals.

E₃   The teacher will identify components of a grouping organization
      as a result of reading a definition and studying an example.

        A grouping organization is based on one of two basic assump-
tions. Either students require interaction on a small group basis
or members of a group have needs in common with other members of
the group. Specific activity organization may vary depending on
the grouping basis. Interaction groups are generally formed for
the purpose of modeling - that is, students with superior skills
are included in groups with students who need to acquire those
skills. Common needs types of groups are generally working on
the same type of task because of achievement and/or interest levels.

        Interaction groups will generally be given the same set of
directions and all groups will be working toward the same or
similar sets of goals. Group oriented projects such as plays,
skits, T.V. programs and simulation games may serve as activities
for these groups. Generally there will be some group consensus
required and often there will be a division of labor within the
group.
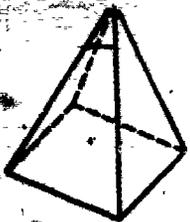
Common needs types of groups are generally a collection of individuals, each working on their own task with limited interaction. These individuals constitute a group only because it is easier to give several individuals the same task rather than a separate task for each individual. A classroom, for example could be subdivided into four ability level groups of:

1. Basic knowledge and comprehension level tasks
2. Application tasks
3. Analysis level tasks
4. Synthesis tasks

and any unit of work broken up so that each group completes all activities at its designated level.

Grouping commonly allows the teacher an opportunity to spend time with one group while other groups are working independently. The teacher may then rotate her time across groups for periodic evaluation, task orientation and/or diagnostic purposes. In order for this to occur effectively, each group must have sufficient direction to carry out its responsibilities for at least short periods of time.

Grouping may be flexible during any one unit and changed from one basis to another depending upon goals.

The basic need for a grouping arrangement is therefore; 1) multiple levels within one basic theme or topic or, 2) directions for interactive activities to be carried out within the group.

Activity 7.3 In which grouping organization would each of the following be likely to occur?

A. _____ Select a common animal and develop a skit to illustrate how that animal relates to other animals in its environment.

B. _____ Write a poem that describes your feeling when you first awake in the morning.

C. _____ Describe the geography of an island by interpreting the symbols presented on the attached map.

D. _____ Create a plan for a model pyramid.

E. _____ Develop pro and con arguments for nuclear energy.

F. _____ Develop a plan for building a model city and list the tasks that will be required in order to build the model.
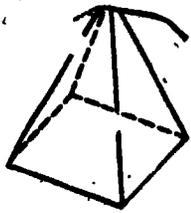
Terminal Task - Do not complete this task unless you have selected
this management system as a way of organizing your instructional
activities.

Develop a plan for assigning individuals to groups - interactive
and/or common needs - and have a colleague apply the checklist
provided below to determine if your plan is adequate.

1. Basis for identifying and assigning members
   to groups is consistent with grouping basis. _____
   (Interactive - Common Needs)

2. Instructions for tasks are adequate.   _____

3. (Interactive groups) There are opportunities
   for different roles.   _____

4. (Common needs) Higher level cognitive be-
   haviors predominate for intellectually
   superior students.   _____

5. Teacher's role for interacting with groups
   is defined.   _____

If you have failed to meet all criteria please revise and have
your plan rechecked.
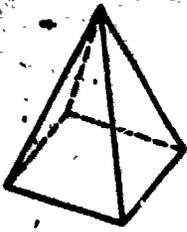
Theme Development

T_4 The teacher will be able to organize instructional activities in a theme as demonstrated by the criteria listed in this module.

E_4 The teacher will identify components of a theme as a result of reading a definition and studying examples.

Rationale

A fourth approach to management is generally classified as theme development and more specifically defined in, "The Davis Model" (1978). The Davis Model (presented in its entirety below) is most effectively used with an inductive sequence. In fact, freedom required to focus on personally relevant topics can be partially destroyed by attempting to structure the process in a deductive arrangement. A unique feature of theme development is the brainstorming used in Stage 1 and mapping structure for collecting ideas.

E_4 The teacher will identify components of a theme as a result of reading a definition and studying an example.

The Davis Model for Unit Development has four stages. (see pg. 119). It proceeds from the introduction of the topic by the teacher and a series of teacher-directed activities which immerse the students in the topic to a second stage in which the students commit themselves to doing an individual project on the topic. The third stage is comprised of a teacher-directed review of the knowledge base of the topic and student progress reports on individual projects. The final stage in the model involves the presentation of the product of student research and an evaluation of knowledge on the topic.

The purpose of Stage 1 is to totally immerse the students in the topic, not through instruction in facts, but through questioning and thinking. Stage 1 has no content goal, i.e. students will not emerge from it knowing "x, y, z." On the contrary, it is intended that the student will leave Stage 1 knowing only that he does not know something that he wishes to know. The process throughout Stage 1 is divergent production.

The teacher may initiate discussion of the topic by conducting a brainstorming session. On the topic of science fiction, for example, the students might be asked to list all the things that they consider science fiction. Their responses might include some of the following:

Spiderman   Frankenstein
Star Wars   Peter Ran
20,000 Leagues Under the Sea   Close Encounters
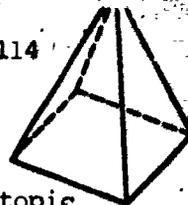
Student ideas are recorded on the blackboard with the central topic in a box in the center. Lines drawn out from the box lead to extensions of the main topic and these new headings in turn lead to new associations. e.g.

A completed map presents a wide range of routes for investigation. For example, starting with the topic Seagull leads to habitat, oceans, migrating routes, "Jonathan Livingston _____", bird sounds, flight etc. Teachers may get a feel for the possible routes to be taken by constructing maps prior to their actual introduction in the classroom. However, the classroom map should be primarily a student product. After listing all of the students' responses, the teacher asks them to categorize the things they listed and then extend the lists for each category. This sequence of brainstorming, categorizing, and elaborating may extend over a period of three or four days. In the meantime, other activities are taking place.

In a science fiction theme, for example, the students may view a science fiction film and write their own questions for discussion. Or, they may be challenged to role-play a character from the film or speculate as to "what I would have done..." They read (and/or are read to) science fiction short stories and discuss what the stories have in common and how they are different. They hear poetry which is science fiction. They view art which was produced for science fiction. They discuss analogies like; science is to science fiction as..... They react personally to science fiction by adding themselves as a character in a story, critiqueing a work, or hypothesizing about how they would relate to a science fiction writer or character as a person. They imagine sequels to plots they have encountered and outline original works in response to science fiction music. They expand or condense characters through dialogue or monologue. They illustrate science fiction works. All these activities are a part of Stage 1 of the model and take place in large group settings under the direction of the teacher. The most accurate estimation of length for this stage is obtained from the students. When they begin to indicate they would like to find out more about "this" or "that", it is time for Stage 2.

Stage 2 begins the convergent process for students. Each student must make an individual and written commitment (project proposal) to do a project on the topic. The students have sampled a wide range of products as well as areas of investigation. At this point the student is evaluating the vast amount of information at hand and his or her own personal interests, and making a decision to pursue something in particular. During Stage 2, students receive clarification of resources and product possibilities, and guidance in research techniques from the teacher, but they are directing their own project and organizing their own learning experiences. Optional small group sessions focus on such issues as "If I were investigating the life of an author, I would..." and "How to find out about science fiction that has become a reality."
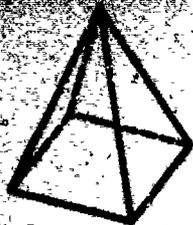
These teacher-directed small groups are scheduled in response to students' needs. The management system during this stage must allow for the flexible scheduling of all activities so students can work independently and in small groups.

There are two parts to Stage 3. First, progress reports by individuals are given to small groups for feedback and suggestions. Each student then finalizes his own plan for the completion of his product by the announced deadline. This final plan is reviewed by the teacher and student in an individual conference. At that time the teacher can also identify any student needs which may have arisen and assist with any problems. The second part of Stage 3 concerns the minimum knowledge base required by the teacher or curriculum on the topic. The teacher establishes the criterion (amount/areas of knowledge) that all students must meet to pass the unit. In many cases this will be review for the students, but it is essential to formally establish the grounds for evaluation so there is no misunderstanding as to the expectations for the unit. During Stage 3 the teacher continues to meet with students individually and in small groups to meet their needs, focusing mainly on the basic knowledge requirements. In science fiction, for example, the minimum requirements for knowledge are the following:

The student will be able to briefly describe the history
of science fiction as a literary genre.
The student will be able to identify a work as science
fiction or not science fiction and support his or her
conclusion with evidence from the story.
The student will be able to describe the five most famous
fiction writers and at least one of each of their works.

In Stage 4, the students share their products with the class. Each student receives a copy of the presenter's project proposal and evaluates his product in terms of it. In addition, the students are tested on the objectives outlined in Stage 3. The questions, however, require more than simple recall. Instead, they assume the basic knowledge and require the student to go beyond it. The science fiction test follows:

Choose one of each two to answer:

1. Briefly outline the history of science fiction as it
   will be written for the next fifty years.
   Rewrite science fiction history as it would have developed
   if motion pictures had not been invented.
2. Define "artistic fiction" and briefly describe how a
   particular science fiction work might be modified to fit
   this category.
   Modify your favorite fairytale to fit the definition of
   science fiction as you understand it.
3. Choose one of the five major writers and describe what
   the effect would have been on a particular work if he
   had been blind.
   Describe the characteristics of a "great science fiction
   writer."
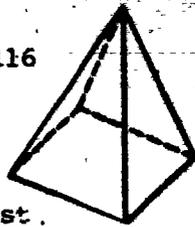
Such synthesizing forms the core of the entire model. All these test questions require the student to take a new perspective in the information he or she has acquired. Evaluation of responses to questions is made on the basis of the degree to which the student heeded the problem conditions, the extent and coherence of the support offered, and the consistency of the conclusion. It is especially important that the evaluation be in terms of the students' own proposals and in terms of the problem condition stated in the test item. Otherwise, the entire process of student responsibility in thought and action is negated through the imposition of an external standard.

In review, the four stages and their components are:

Stage 1 - IMMERSION, Activities include the following:

Brainstorming	Poetry appreciation
Categorizing	Art appreciation
Elaborating	Personally reacting
Role-playing	Critiqueing
Attribute listing	Examining implications
Comparing and contrasting	Illustrating
Questioning	Music appreciation

Stage 2 - COMMITMENT, Individual students decide what, when, where, and how about a particular area of the topic. They write project proposals and line up resources. They begin research.

Stage 3 - REVIEW
   a. Project proposal review and revision, final product commitment.
   b. Review of minimum knowledge requirements as criterion for evaluation.

Stage 4 - EVALUATION
   a. Project presentation
   b. Synthesis question test

The process begins with divergent thinking so that as many ideas as possible are explored. To leave it at this, however, may result in the students learning many   unconnected details. The process shifts, therefore, at Stage 2 to convergent thinking in an area of personal interest to the student. Finally, the "basics" of the topic are received and some closure is achieved through the completion of projects. The door is thrown open again, however, for further thought investigation and research through the use of synthesis questions on the final examination.

Activity 7.4

Construct a map around the topic Pluto.   The map is started below.
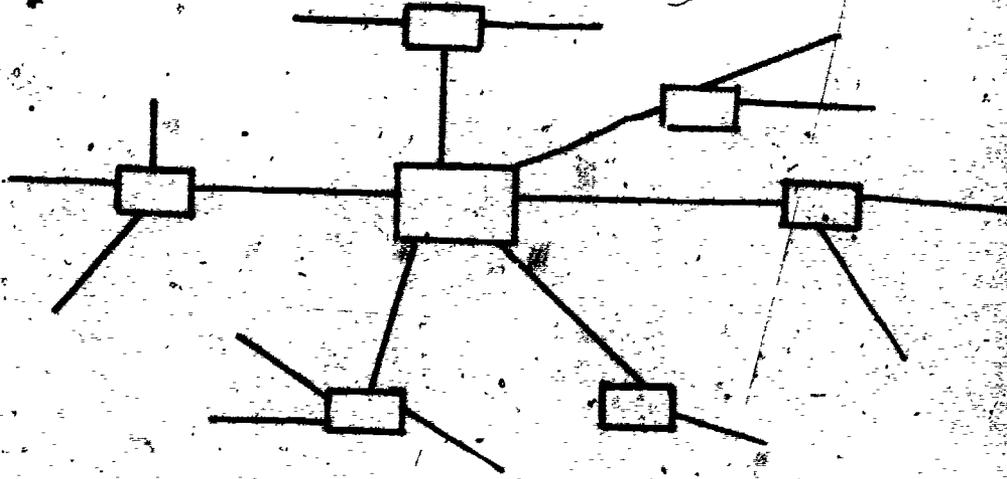
Activity 7.5

Briefly describe, in your own words, each of the four stages in the Davis Model.

Stage 1

Immersion
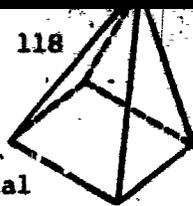
Stage 2

Commitment

Stage 3

Review

Stage 4

Evaluation   128

Terminal Task - Do not complete this task unless you have selected
this management system as a way of organizing your instructional
activities.

Construct a map illustrating the major topics and subtopics
included in your unit of study. List the resources to be used
in the immersion part of the plan, list the types of products
that might emerge from investigation of the topic and identify
the resources you would have to provide in order to make the
unit successful.

Have a colleague apply the checklist provided below to
determine if you have met this objective.

1. Map is comprehensive and includes routes
    for investigations in math, literature,
    science and social science.   _____

2. Immersion resources are motivating and
    informative.   _____

3. Product suggestions are reasonable goals
    for intellectually gifted students.   _____

4. Adequate resources are available for com-
    pleting the products.   _____

Revise if criteria are not satisfied.

| STAGE 1: IMMERSION		STAGE 2: COMMITMENT	STAGE 3: REVIEW	STAGE 4: EVALUATION

TOPIC   MAPPING   DIVERGENT
PROCESS   CONVERGENT.
PROCESS

DAVIS MODEL OF UNIT DEVELOPMENT FOR GIFTED STUDENTS
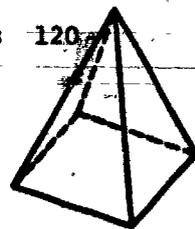
Independent Study

The teacher will be able to describe how to use "independent study" as an individualizing technique (as measured by a checklist of criteria for evaluating an independent study program). (Comprehension)

E_1 - The teacher will be able to define "independent study" as a result of reading a description of it. (Comprehension)

E_2 - The teacher will be able to identify students for independent study programs as a result of reading about the type of student who qualifies. (Comprehension)

E_3 - The teacher will be able to describe the process of directing a student's independent study as a result of studying a description and several examples. (Comprehension)

Rationale

"Independent Study" is an instructional technique which can be used to achieve individualization. It is often thought of as a traditional exercise reserved for older and/or advanced students. The thesis, term paper, and dissertation are all the result of independent study but to define it in terms of these exercises is to limit the concept severely. Although the product is essential in independent study, it is not its only defining characteristic. Nor is age or expertise essential.

Instead of the traditional notions, an independent study project can be more accurately associated with pursuing a tangent, elaborating on a digression or chasing an "elusive butterfly" far afield. It is the pursuit of some knowledge or integration that can best be achieved alone.

When teachers do use the technique of independent study, they create more powerful learners. They are teaching the kind of learning that takes place for the 75% of the total life span not spent in "institutions of learning".

This approach is more concerned with student decision-making than with content and should be used to extend a student's thinking beyond the basic requirements of most units of study. Do not expect to "cover" a predetermined body of content with this approach.

E₁   The teacher will be able to define "independent study" as a
       result of reading a description of it.

           Independent study is the process in which an individual
       gathers and/or manipulates information in a structure of his
       own design on a topic of his own choosing. It results in a pro-
       duct which can be shared.

           The key to independent study as a discrete concept is the
       phrase "in a structure of his own design." It is an opportunity
       for the student to construct his own plan to achieve a goal. He
       can seek help in constructing that plan. He may need help in
       drawing up a realistic time frame, or locating helpful sources of
       information. The teacher will probably be the main source of much
       of this information. In a sense, the responsibility for structuring
       study has been shifted from the teacher to the student - "the shoe
       is on the other foot" so to speak. The ultimate decisions about
       when to work, what to do, how to organize it is up to the student
       who is doing independent study.

           The product to be shared is essential because it focuses the
       entire process on a goal. Independent study is goal directed
       activity. The sharing brings the independent thinker back to group,
       forcing him to get feedback and polish his ideas. Even in primary
       grades, this sharing often looks like a colloquium in which
   the emphasis is on constructive criticism.

           The student's right to choose the topic is crucial. Independent
       study is difficult, and the sustained motivation necessary can best
       be achieved as a result of a personal commitment on the part of the
       student. Choosing the goal gives the student a kind of ownership
       over the project which helps in difficult moments.

       Activity 7.6   Write a definition of independent study.

E₂   The teacher will be able to identify students for independent study
       programs as a result of reading a discussion of the type of student
       who qualifies.

           Any student who is motivated, can make decisions and can commun-
       cate his ideas is a candidate for an independent stud project.

           The "motivation" is specifically a curiosity about something - a
       need to know. A student has to recognize he doesn't know something
       and then want to know it. In some people this is a natural tendency.
       They are always discovering something they do not know anything about
       but would like to. They want to know badly enough to find out.
       Teachers can create "want to know" situations by presenting tidbits
       of information at the "tips of icebergs." In primary grades, this
       might be just the fact that there are dozens of shades of blue that
       all have names. Students of geometry may be intrigued by "the most
       beautiful rectangle."
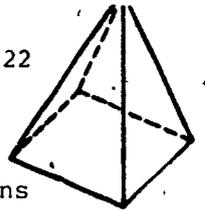
Decision-making on the part of the student in an independent
study program is constantly required. A student who asks questions
about paper size, writing utensil type, composition length, etc. is
not usually a candidate for independent study. The student must not
only make those decisions, but also decisions about the organization
of time, materials, and information. He may seek input from the
teacher to make his decisions but not the decisions themselves.

Since the product must be shared the student must be able to
communicate her ideas in some medium. The process of independent
study also requires communication. Because the teacher is not
establishing and directing the steps of the learning process, an on-
going dialogue between teacher and student is maintained. The student
shares with the teacher the things he is thinking and doing on his
project.

Activity 7.7   Describe the independent study student.

E_3 The teache   ll be able to describe the process of directing a student's
independent udy as a result of studying a description and several ex-
amples.

The process of directing a student's independent study can be re-
viewed in terms of four components: the environment, the task, the
teacher's role, and the student's role.

The learning environment which supports independent study is
characterized by a wide variet of shared information. Things of
interest to th students and teacher are displayed everywhere. There
is a profusion of resources - paper, markers, file folders, books,
magazines, reports. The atmosphere is one of shared inquiry. Everyone
is interested in something and the classroom is their forum.

A teacher can create such a learning environment by always showing
an interest in what the students are interested in.   A good way to
begin is with an interest inventory.   The teacher can
model sharing by talking about some personal interests and sharing
books and other resources she has used to expand her interest. New
topics from the curriculum can be personalized by asking for student
input from personal experience.

Even though these activities are not academic, they are pre-
liminary to independent study in an academic area because they set
the tone for sharing. The idea is to rake sharing easy and valued so
students will be comfortable pursuing their own ideas and sharing them.
These activities will help students to feel that the teacher and others
in the class appreciate and want to hear their ideas.

The Task

In independent study, the teacher and student establish the task
together. The requirements are that there be a product to be shared,
and that throughout the process the student communicate with the teacher
on a regular basis.

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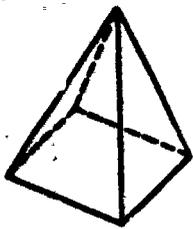
The initial meeting to establish the task for an independent study should focus on the selection of a topic, a review of the requirements, and setting a date for the next conference.

The focal point of each successive conference is dependent on the pace the student sets, but content of these conferences should be something like the following:

1- Selection of a topic, review of requirements, setting date for next conference.
2- Clarification of chosen topic (narrowing if necessary), discussion of possible resources, listing of questions to be answered, setting date for next conference.
3- Progress report on information gathered, discussion of possibilities for organizing information, setting date for next conference.
4- Review of information gathered, check on questions asked at beginning, redefinition of topic, setting date for next conference.
5- Discussion of ways to share information, and how to set and accomplish goals for a presentation, setting date for practice run.
6- Practice run of sharing session.

At each stage of the independent study process, both the teacher and student have responsibilities to fulfill.

The Teacher

At each stage of the independent study process, the teacher is serving as a resource for the student, providing him with help in gathering, organizing and sharing information. The conferences are directed by the teacher to discern the student's progress and current needs. Mini-lessons on the topics mentioned in "Task" also occur. Sometimes several students may be moving through this process at about the same rate. If so, the mini-lessons may be conducted with that small group. Each student should also have an individual conference to set specific goals for the period of time before the next meeting.

The teacher's responsibilities during the independent study process are:

1- Establish requirements.
2- Monitor the student's progress.
3- Provide constructive feedback.
4- Instruct the student in research techniques.
5- Evaluate student's work.

Evaluation of independent study projects is based on how well the student met the original goals, how well he participated in the process, and how effectively he shared his product, The evaluation of accomplishment of goals and effectiveness of the sharing are done with the student The evaluation of how well the student participated in the process is
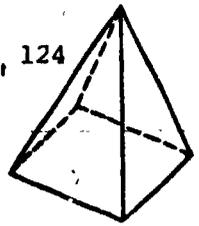
done by tne teacher. It includes the depth of the research, degree of preparation for conferences, and the degree of responsibility assumed by the student.

The teacher should keep a folder on each child doing an independent study that includes his proposed topic, notes conferences, and any other pertinent information.

The Student

After a few students have done an independent study, others will be asking about it. To help the student decide if he should undertake an independent study project, he should receive a copy of the following questions:

      1- Are you interested in knowing more about something?
      2- Do you enjoy figuring things out on your own?
      3- Do you like to organize information?
      4- Do you like talking about the ideas you're working
          on and the things you are doing?
      5- Can you teach people about things you know about?

If you answered yes to all of the questions above, you would probably like doing an independent study . It gives you a chance to do some thinking and investigating on your own and get credit for it besides.

When a student decides to do an independent study he signs the following contract:

In fulfillment of the requirements of an independent study, I agree to:

      1- Investigate a topic of my own choosing.
      2- Prepare a product to be shared.
      3- Participate in the evaluation of my performance
          in the independent study process.
      4- Communicate with the teacher on a regular basis
          during the process.

Name_____ Date_____

Proposed topic of investigation_____

Activity 7.8 Describe the process of directing an independent study in terms of the four components of environment, task, teacher, and student.
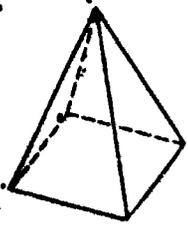
Terminal Task - Do not complete this task unless you have
selected the independent study option as a means for
transmitting your activities to students.

Describe how you would structure the environment to
facilitate independent study and describe the process of
setting up independent study programs within your unit of
study.

Have a colleague apply the following criteria to
determine if you have met this objective.

1. Is the environmer* conducive to student
    selection of a topic?   _____

2. Has the student been given an opportunity
    to acquire sufficient background of
    knowledge
    and skills for independent study?   _____
                                                        _____

3. Are there ample opportunities for
    choosing a topic as an extension of
    this unit?   _____

4. Does the plan for independent study
    specify student and teacher respon-
    sibilities?   _____

Revise if needed.

3. Small group is ¿ kin⌐ so loudly,
   ne ghboring stu   cs complain
   that they can't ncentrate on
   their work.

4. John (returned from isolation)
   sits sullenly at his desk doing
   nothing.

5. Betsy, with whom teacher is having
   conference has failed to complete
   her contract.

E_4 The teacher will be able to describe the use of "Magic Circles" as a
result of reading about the use and application of "Magic Circles".
(Comprehension)

   The magic circle is a systematic procedure designed for several
specific uses. Bessell and Palomares (1973) recommend the circle
arrangement as the basis for a human development program while authors
like Glasser and Gordon use a circle type arrangement for establishing
group participation in group decision-making and group problem-solving.
Bessell and Palomares recommend that the magic circle at grades K-4
be developed over time.   They recommend starting with three groups
and building up to the full class circle over a time period of from
three to 24 weeks.   Variations in deve   ent depend on class composition.

   The magic circle arrangement provides for:

   1. Focusing attention on a speaker.

   2. Establishing eye contact between speakers and listeners.

   3. Focusing attention on listening.

   4. Securing contributions from everyone who wishes to
       contribute.

   5. Establishing and practicing rul.. for speaking and
       listening.

   6. Conducting a variety of class discussions including
       decision-making, problem-solving, exploring feelings,
       and introducing units

   Procedures for operating within the circle are generally established
with topics that provide opportunities for non-threatening and positive
type responses. e.g. "I really feel good about _____", where each
child in turn has an opportunity to respond or pass.   Confidence in re-
sponding and discussion is developed to the point where real problems
can be solved, feelings can be shared, e.g. "How I felt when I did   to
get attention." and opinions expressed, e.g. "I did not like it when the
teacher _____.".

   Numerous specific activities for establishing and maintaining the
magic circle are provided in the Bessell and Palomares material.

Task 8.8   Write in your own words, a brief description of
           magic circle.

Terminal Task - Briefly describe how you would plan to apply the concept
               of social independence in your unit of study.   Give at
               least one specific example of how the concept can be
               associated with a specific activity within the unit.

Student Contracts

T_6 The teacher will be able to organize instructional activities
into a system of student contracts as demonstrated by criteria
listed in this module.

E_6 The teacher will be able to identify components of a
contract after reading a description and studying examples.

Rationale

Student contracts provide a flexible system for teachers
to control differentiation of instruction. Individual students
may be assigned (or may decide in consultation with the teacher
or may decide on their own) objectives to be mastered, resources
to be used, activities to complete, and/or time line to follow.
The formal contract between teacher and student states what is
to be accomplished by a given deadline and the teachers primary
responsibility is in assuming clear direction, access to appro-
priate resources and monitoring progress. Excellent opportunities
for student decision-making exist in this management system.

E_6 The teacher will be able to identify components of a contract
after reading a description and studying examples.

Initial use of contracts by students will require more detailed
instructions and fewer choices than will contracts with more ex-
perienced students. Presented below are samples of contract decisions
that illustrate progression from initial use to use with experienced
students.

Contract 1
    List resources on the contract - student checks which
        resources he will use to complete an activity.

Contract 2
    List activities - student checks which ones he will
        complete, and deadlines by which they will be completed.

Contract 3
    List objectives and specify activities to be completed for
        each objective - students check objectives to be
        mastered, activities to be completed, and deadline
        for each.

Contract 4
    Repeat 1-3 but this time add an opportunity for the student
        to add alternatives of his own choosing.

Contract 5
    Repeat #4 but require that the student add at least one
        alternative of his own.

A sequence of limited choices to more choices to constructing alternatives is illustrated in this progression of contracts. More sophisticated and individualized contracts can be made by teachers working with experienced students in which all of the alternatives are developed during conference time. Contracts may be used in conjunction with independent study and/or theme development. All contracts are signed by both the teacher and the student and each retains a copy.

Contracts may be distributed at the beginning of a unit or class period, they may be developed by students during a planning time or they may be developed jointly during conference time. Deadlines may vary from one day to one week or even longer, depending on student need for direction.

Resources for completion of contracts are generally available within the classroom. Occasionally however, resources may be located in the library, resource room, art room, or even the community.

Activity 7.9 Develop a contract that allows for either selection or construction of both objectives and activities to be completed by the student. Include on the contract all necessary directions for the student.

Terminal Task - Do not complete this task unless you have selected the option for organizing your instructional activities.

Make up contract forms to be used by students in completing activities and/or projects in your unit of study and list the resources that will be available for students to use. Describe what both the slowest and sharpest student in this class might be expected to complete.

Have a colleague check your contract and plan using the following criteria.

1. Is it clear what decisions the student is to make?

2. Are the requirements stated?

3. Are there options?

4. Are resources

5. Is the range between slow and sharp student adequate?

The teacher will be able to identify management systems after
reading descriptions and demonstrating comprehension level
behaviors associated with each system.

Examples of Management Systems for different units of work.

A. A second grade teacher has the goal of helping students
increase their ability to generate ideas for writing
creative stories about their personal experiences.

   1. LAP - A learning activity packet could be structured
       around recalling specific personal experiences and
       then using specific creativity tools (morphological
       analysis, attribute listing) to generate multiple
       ideas related to that experience. A final task
       would be to put these ideas together in a story.

   2. Learning Center - Task cards sequenced in a learning
       center would require students to recall personal
       experiences and to apply creativity tools to each
       experience. A number of task cards could be in-
       cluded to assist some students focus on personal
       experiences. Putting together creative ideas into
       a story would be the same terminal task as in a LAP.

   3. Grouping - Groups could be formed based on
       vocabulary level or common experiences. Groups
       could write a play with each member assuming specific
       roles after initial writing has been completed. Each
       student could write about personal experiences
       following a brainstorming session within the small
       group (good leadership opportunity).

   4. Theme Development - A large group session would focus
       on creative writing and fluency vocabulary associated
       with personal experiences. A collection of experiences
       and words would be collected and recorded on the black-
       board and possibly recorded for more permanent use.
       Each student would then begin to focus in on their own
       experience and finally to write their own story.

   5. Independent Study - Individual students can be given the
       task of designing a plan for developing a creative story
       about a personal experience. Options for format and
       creativity exercises could be presented to the student
       (or recalled from earlier activities) and the student
       encouraged to choose the one best suited to his purposes.

   6. Student Contracts - A list of fluency activities could be
       offered on student contract forms and students invited
       to check the activities they would like to complete.
       Location of each activity could be given to the entire
       group verbally or on a classroom map.
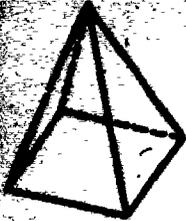
Activity 7.10   Determine in which management system each of the following
events is most likely to occur.

1. _____Each student is given a booklet containing
objectives, activities, and self-correcting forms for
completing a unit of study on ecology.

2. _____Five groups are formed and each group is
given the task of analyzing one type of literature for
a presentation to the entire class.

3. _____Three students have demonstrated a high level
of interest in the topic of deserts and you have de-
cided to provide them with time to pursue their interest.

4. _____Each student is given a list of optional
objectives and activities for a unit of study on animals.
Each study must select 5 objectives from column 1 and
3 objectives from column 2 and complete at least 2
activities for each objective selected.

5. _____The entire class brainstorms on the
topic 'Iceland' with the teacher recording infor-
mation on the board in a mapping structure.

6. _____A series of task cards and resource
materials for the study of creative writing have
been arranged in an attractive display near one
end of the room. Students are requested to complete
a designated set of tasks and record their progress
on a checklist.

Now - Select one management system and organize your instructional
materials for presentation to students within that system.
Guidelines for developing the system are provided and criteria
for evaluating your product has been provided.
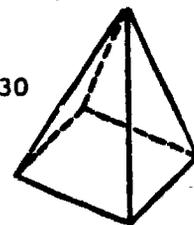
Answer Key

Activity 7.1

A. Rationale
B. Learning Activity
C. Behavioral Objective
D. Evaluation
E. Learning Activity
F. Behavioral Objective
G. Evaluation

Activity 7.2

1. Rationale
2. Pre-test
3. Rules for using
4. Objectives
5. Student activities
6. Record keeping system
7. Self evaluation device

The same components would be appropriate for both 1st and 6th graders.
Teacher directions for both groups would include an explanation of the
use and purpose of a learning center, and of the specific activities
and requirements of this one.

Activity 7.3

A. Interactive
B. Common needs
C. Common needs
D. Interactive
E. Interactive
F. Interactive

Activity 7.10

1. LAP
2. Interactive Grouping
3. Independent Study
4. Contract
5. Theme
6. Interest Center
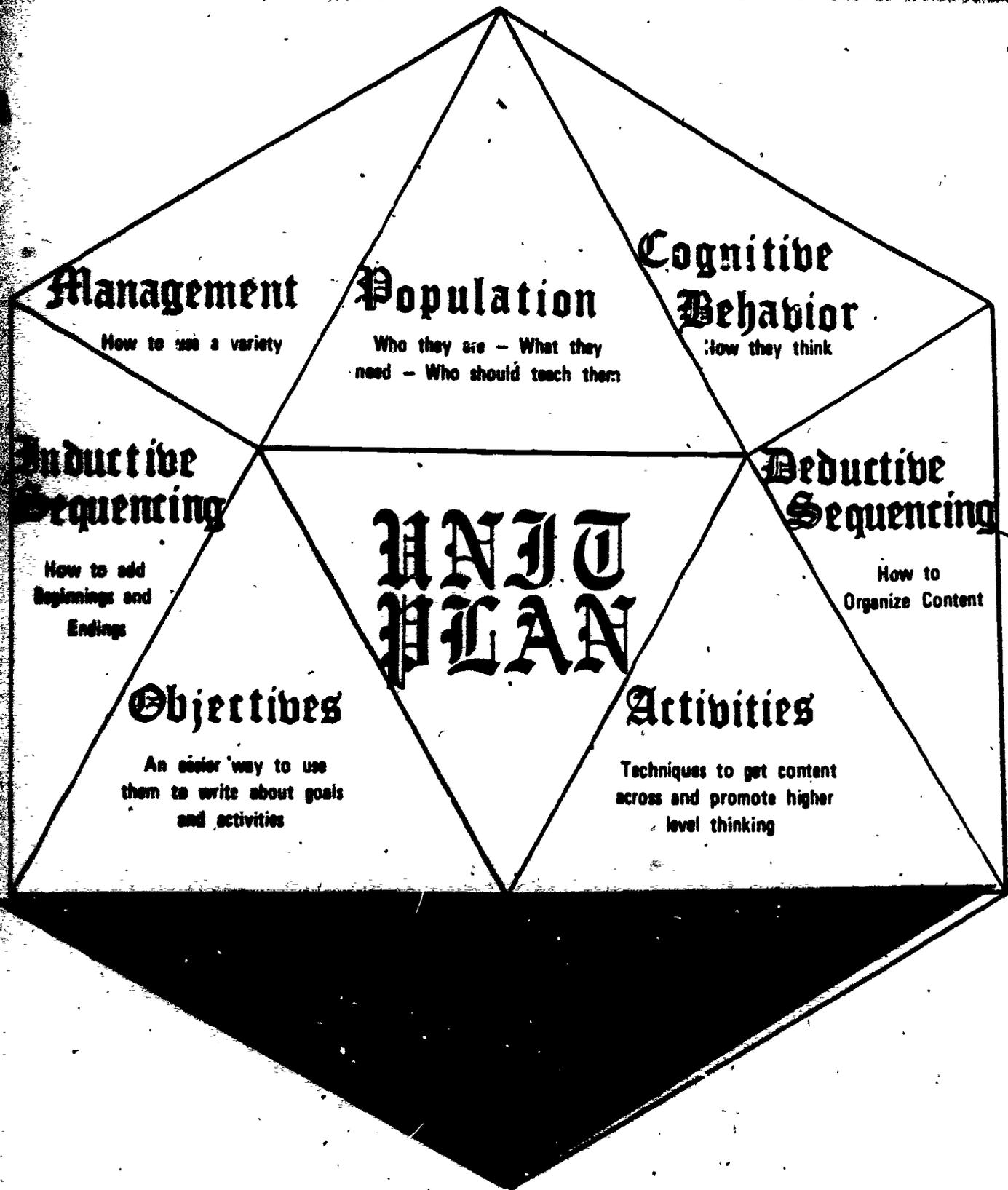
Management

How to use a variety

Population

Who they are — What they
need — Who should teach them

Cognitive Behavior

How they think

Inductive Sequencing

How to add
Beginnings and
Endings

Deductive Sequencing

How to
Organize Content

UNIT PLAN

Objectives

An easier way to use
them to write about goals
and activities

Activities

Techniques to get content
across and promote higher
level thinking

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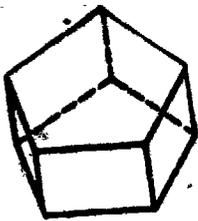
Module 8

Communication

T   The teacher will be able to select the strategy that will lead
    to facilitating teacher-student communication as measured by a
   test of, "Teacher Responses to Simulated Classroom Conditions."
    (Comprehension)

    E_1 The teacher will be able to identify problem ownership
            as a result of studying definitions and examples of
            problem ownership.   (Evaluation)

    E_2 The teacher will be able to construct dialogues using
            "No Win - No Lose Conflict Resolutions," "Active Listening,"
            and "I Message" statements as a result of studying definitions,
            explanations, and examples of teacher-student interchanges.
            (Application)

    E_3 The teacher will be able to construct material and logical
            consequences for classes of student behavior as a result of
            examining explanations and examples of natural and logical
            consequences.   (Application)

    E_4 The teacher will be able to describe the use of "Magic
            Circles" as a result of reading about the use and application
            of "Magic Circles".   (Comprehension)

Select a Strategy
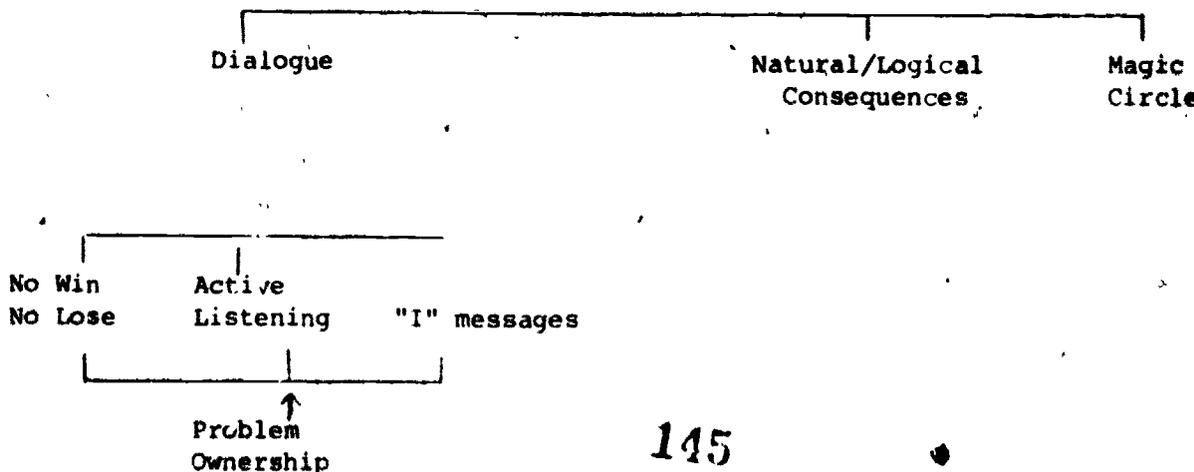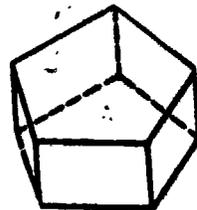
Dialogue   Natural/Logical   Magic
                                  Consequences   Circle

No Win   Active
No Lose   Listening   "I" messages

                    Problem
   Ownership   145

T   The teacher will be able to select the strategy that will lead
to facilitating teacher-student communication as measured by a
test of, "Teacher Responses to Simulated Classroom Conditions."
(Comprehension) .

I. Rationale

A general classroom environment conducive to student exploration
in higher level cognitive behaviors is necessarily based on mutual
trust, respect, and openness. Students must be allowed to make
mistakes in order to feel the freedom necessary for open exploration.
They must recognize that their decisions are important and that they,
alone, are accountable for the consequences of their decisions. They
must recognize that there are seldom single answers to any one problem
but rather there are a range of solutions based on available infor-
mation and prevailing conditions.

An environment that allows these conditions to develop requires
that teachers serve in the role of a facilitator rather than the role
of a director. The teacher must be responsive to the information,
skill base and feelings of students.   The teacher must establish
conditions that contribute to student decision-making in all classroom
related areas. These conditions must be established with respect to
both the social and academic behaviors of students.   Independent
learning can only occur in an environment that f ters social
independence.

An effective social environment appears to be a function of
communication patterns currently being advocated by such authors as
Thomas Gordon and Hiam Ginott.. Familiarity with the tools these authors
have developed will assist you as a teacher in reaching the goal of
creating an environment conducive to the development of student social
independence. The basic reference for objectives 10.1 through 10.4 is
Gordon, Thomas; T.E.T., Teacher Effectiveness Training, 1974, Peter H.
Wyden, New York. The reference for Objective 10.5 is drawn primarily
from the literature on behavior modification and personal experience.
No additional material is suggested at this time. Objective 10.6 is
based on the Human Development Program (5 volumes) developed by Harold
Bessell and Uva'do Palmares; Human Development Training Institute;
4455 Twain Avenue, Suite H; San Diego, California 92120.
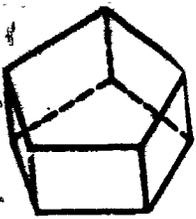
E_1 The teacher will be able to identify problem ownership as a
result of studying definitions and examples of problem owner-
ship.   (Evaluation)

The "Teacher Effectiveness Training" (T.E.T.) approach
endorsed by Gordon is based on mastery of three specific
teacher behaviors.   Behaviors are classified as; "active
listening", "I messages" and "No-win, No-lose conflict reso-
lution."   Specific responses are however, based on problem
ownership.   Problems may be owned by students, teachers or
jointly by the student and teacher.,   Problems owned by
students are generally caused by feelings that prevent them
from successfully engaging in the learning process.   Teacher
owned problems are caused by those situations interfering
with the teacher's responsibility for teaching and maintaining
an orderly classroom.   Jointly owned problems are created when
students personal needs conflict with teacher needs.

Examples - Presented below are several problem conditions and an
identification of ownership.

Problem	Owner
1. Child talks during quiet reading time.	Teacher or class - violation of class rules. This is a problem for whoever estab-lished those rules.
2. Student makes the remark, "This is too difficult, I can't do it."	Student - student is expressing a feeling of frustration.
3. Student hits a classmate.	Student - student is generally expressing a feeling of anger. Hitting might also be used for attention or revenge.
4. Student repeatedly enters classroom late after the daily lesson has been introduced. Student is coming from a series of special music lessons.	Joint - student has a need to attend music lesson and teacher has a need to begin with the entire class.

Task 8.1 - Identify problem ownership.   Who owns the problem.

Situation

1. Student fails to turn in homework
   on time.

2. Student refuses to work with small
   group to which he is assigned
   because, "They won't let me do
   any of the work."
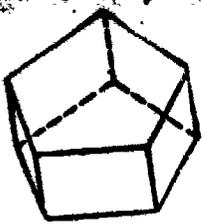
Task 8.2 - Presented below are examples of student problems
and choices of teacher initial responses. Select the correct
response.

Student's Remark	Possible Teacher Responses
1. I'm never going to work with her.	a. Why don't you forget it; he probably didn't mean it. or b. You seem to be really angry with him.
2. I can't do it!	a. Now, don't talk like that! Just get started! or b. It seems very difficult to you.
3. Billy ruined my project.	a. We had better speak to Billy about his behavior. or b. You're disappointed at losing your project and angry at Billy for destroying it.

Task 8.3 - Presented below are several student problems. Construct
appropriate "active-listening responses."

Construct Responses

1. "Wow, my parents are really
   going to bawl me out for
   flunking that test."

2. "How come we have to do all
   this work when the rest of
   the class sits and makes up?"

3. "I ... ...
   doctor."

4. "This class is really like
   my regular class, it starts
   with a lot more interesting work."

5. "Why always has to be the
   leader, I can't ever be in
   the same group with my anymore."

6. "John broke my project." (crying)

7. "Why do we always have to do this
   boring work, why can't we do some-
   thing different like going out
   of the room."
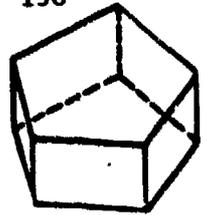
3. Student fails to clean up after a
   messy art lesson.

4. Student comes in from playground
   and is overheard saying, "Boy,
   I'm going to get even with John
   for hitting me like that."

5. Student continually interrupts
   during class discussion.

6. Small group is disturbing surrounding
   students while practicing their skit.

7. Student says he can't work because his
   classmates are too noisy.

8. Student says, "I can't get started on
   this project."

E_2 The teacher will be able to construct dialogues using "No Win -
   No Lose Conflict Resolutions," "Active Listening," and "I Message"
   statements as a result of studying definitions, explanations, and
   examples of teacher-student interchanges. (Application)

   Active listening is the appropriate response to student owned
problems. ·Gordon lists four levels of communication including:

   1. Passive Listening
   2. Acknowledgement Responses
   3. Door Openers, Invitations to Talk
   4. Active Listening (Feedback)

   Active listening is the only level of communication that conveys
to the student a sense of understanding. Active listening is designed
to reflect feelings of teacher empathy and respect.

   Active listening involves interaction with the student in a
manner that provides the student with proof of teacher understanding.
Teacher responses are designed to reflect the student's feelings and
generally require that the teacher "make a guess" or "draw an infer-
ence" about the feeling of a student. Teacher feedback is initially
used to validate understanding of student feelings -- teacher is
guessing and initial responses are designed to determine if teacher
has accurately defined the student's feelings. Responsibility for
solving the problem is left up to the student. Teacher role is
solely to help the student clarify his problem and to look at it
·realistically.

"I messages" are delivered when a problem interfering
with learning belongs to the teacher.
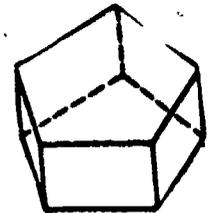
An "I Message" consists of three specific parts including:

1) What is creating the problem?
2) Identifies the tangible or concrete effect on
   the teacher, and
3) Identifies feelings generated within the teacher.

Example – "When you have your feet in the aisle (description of
behavior), I'm apt to trip over them (tangible effect) and I'm afraid
I'll fall and get hurt (feeling)."

"When you come in late (1), I nave to stop
whatever I'm doing (2). It's distracting to
me and I'm frustrated (3)."

"I messages" are presumably effective because they:

1) Indicate an acceptance of responsibility for an
   inner feeling by the teacher.
2) The teacher assumes responsibility for being open
   enough to share this inner feeling.
3) Responsibility for the student's behavior remains
   with the student, and
4) Negative impact is avoided.

"I messages" meet three important criteria for effective confrontation.

1) They have a high probability of promoting a willingness
   to change;
2) They contain minimal negative evaluation of the student;
   and
3) They do not injure the relationship.

Task 8.4   – Presented below are examples of teacher owned problems
with alternative types of responses. Select the appropriate
response.

Student Action	Possible Responses
1. Student fails to replace books on bookshelf.	a. When you don't keep agreements, I feel it's unfair because I have to do all the work. or b. John, will you please replace the books you have used?
2. Student interrupts during a small group lesson.	a. Mary you are being very rude. Now please wait until I am free. or b. Mary, the group cannot hear me when you are interrupting and I am afraid they will miss the directions.
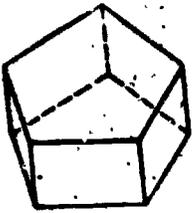
3. A small group of students is making considerable noise while working on a project.

a. Boys, if you can't work quietly together, then you will have to work alone.

or

b. Boys, your noise is disturbing the class and I'm concerned that other people cannot get their work done.

Task 8.5   - Presented below are teacher owned problems. Construct appropriate responses.

Responses

1. Student fails to complete an assignment on time.

2. John is doodling at his seat when he still has considerable work to finish.

3. Student speaks out during class discussion without being recognized.

4. Student runs to head of line when preparing to go to music.

5. A student is tearing up your newly designed learning center.

6. Student is having difficulty solving a problem.

7. Students appear to be bored during a lesson that the teacher has spent considerable time preparing.

"No Win - No Lose Conflict Resolution" procedures are used when problem ownership is shared by both the student and the teacher.

Application of effective conflict resolution procedures requires a teacher skilled in active listening and a teacher who is open enough to deliver honest "I messages." Honesty, understanding and willingness to negotiate must be obvious and shared by both parties in order for the process to function. The process may be applied with both individual and groups.

Briefly, the process requires that both (all) individuals involved in the resolution process participate in:

1. Defining the Problem - requires a critical assessment of both student and teacher needs and identifies precisely what the problem is.
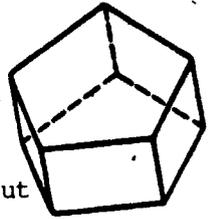
2. **Generating Possible Solutions** - both teacher and student should
   list a set of possible solutions.

3. **Evaluating Solutions** - both teacher and student should strike out
   unsatisfactory solutions.

4. **Making the Decision** - a joint selection of one solution by con-
   sensus decision.

5. **Determine How to Implement the Decision** - write down conditions
   implementing the solution and defining all terms in the solution.

6. **Assessing the Success of the Solution** - May not require a formal
   evaluation but some analysis of solution effectiveness should
   be completed following a trial period. Perhaps the solution
   is worse than the problem - can't be afraid to change.

Task 8.6 Recall a conflict from your teaching experience,
          define the problem and list several "No Win - No
          Lose" type alternative solutions.

E_3 The teacher will be able to construct natural and logical consequences
for classes of student behavior as a result of examining explanations
and examples of natural and logical consequences. (Application)

Occasionally, there are times when students repeatedly exhibit disruptive
and/or irresponsible behavior. Such repetitions cannot effectively be
handled with the preceding suggestions and more drastic steps need to be
taken. This next step temporarily restricts student freedom but is
nevertheless part of a process designed to build social independence.

    Student responsibility for behavior is developed through a process
in which the student recognizes that he is accountable for his own
personal behavior. Students are free to make decisions about how they
behave but they must recognize that disruptive behavior carries with it,
certain consequences. Standards for social and academic behavior should
be developed early in class discussion with student solicited descriptions
of desirable and undesirable behavior. Assurances should be given th
everyone is free to behave in his own best interests but that because
this is a group - a social setting - considerable attention must be given
to needs of the total group. Behaviors that interfere with learning by
other members of the group are not acceptable and will be accompanied by
separation from the group. Separation is generally preceded by a warning
and repeated offense sends the offender into isolation. Return from
isolation can be at the students' or classes' discretion or can require
that the student develop a plan for modifying his behavior. Continued
disruption while in isolation may result in a conference with either a
parent or a counselor.

    The key to this process is a full and complete understanding of a
freedom to do as "I want to," as long as the needs of the group are
accommodated. Failure to respect group needs results in pre-arranged
consequences that are administered quietly, calmly and consistently.
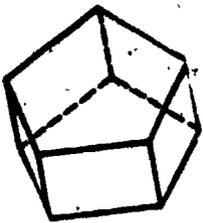
Academic irresponsibility is treated slightly differently.
Failure to complete work within expected or reasonable time periods
are simply met with new deadlines that may require missing optional
activities, staying after school, or completion at home.   Again,
the key is a clearly defined expectation, reasonable time allowance
and student freedom to make the choice.

Example

A 4th grade class has discussed academic and social responsibilities
within the classroom and has arrived at two basic rules. First, any be-
havior that interferes with the rights of others to learn is disallowed
and second, all assignments will be completed by previously agreed upon
due dates.   Social responsibility violators will be given two warnings
per day and then sent into isolation. Removal from isolation may be made
voluntarily when the student is ready - once. A second violation during
the day requires a written plan of action on how repeated disruptive be-
havior is going to be modified. Continued disturbance while in isolation
requires permission of the principal to return to the classroom.

Academic violators simply miss recess time until work is completed.
If the student has made the choice to not work in school then repeated
lateness will require a note from home describing why work cannot be
completed during out of school hours.

Examples - Presented below are examples of situations in the fourth grade
classroom just described with teacher responses.

| Student Action	Consequence
During conference time with individual students the following events occur.	
1. Mary sits day dreaming.	Nothing - Mary is free to choose when she completes her work.
2. John walks past a table and pushes Billy's book on the floor.	Warning - This is interfering with Billy's work.
3. Billy interrupts conferencing by requesting help.	I message - "Billy, I would like to help you but right now I'm working with Susan and your request is breaking my chain of thought."

Task 8.7   Again based on the described fourth grade classroom, provide
appropriate teacher responses.

1. John (same one) throws a paper
   wad at Nancy.

2. Michael hits Craig as he works
   by his table.

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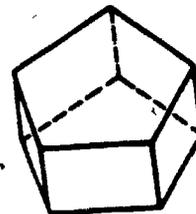
3. Small group is talking so loudly,
   neighboring students complain
   that they can't concentrate on
   their work.

4. John (returned from isolation)
   sits sullenly at his desk doing
   nothing.

5. Betsy, with whom teacher is having
   conference has failed to complete
   her contract.

E_4 The teacher will be able to describe the use of "Magic Circles" as a
result of reading about the use and application of "Magic Circles".
(Comprehension)

   The magic circle is a systematic procedure designed for several
specific uses. Bessell and Palomares (1973) recommend the circle
arrangement as the basis for a human development program while authors
like Glasser and Gordon use a circle type arrangement for establishing
group participation in group decision-making and group problem-solving.
Bessell and Palomares recommend that the magic circle at grades K-4
be developed over time. They recommend starting with three groups
and building up to the full class circle over a time period of from
three to 24 weeks. Variations in development depend on class composition.

   The magic circle arrangement provides for:

   1. Focusing attention on a speaker.

   2. Establishing eye contact between speakers and listeners.

   3. Focusing attention on listening

   4. Securing contributions from everyone who wishes to
       contribute.

   5. Establishing and practicing rules for speaking and
       listening.

   6. Conducting a variety of class discussions including
       decision-making, problem-solving, exploring feelings,
   and introducing units.

   Procedures for operating within the circle are generally established
with topics that provide opportunities for non-threatening and positive
type responses. e.g. "I really feel good about _____", where each
child in turn has an opportunity to respond or pass. Confidence in re-
sponding and discussion is developed to the point where real problems
can be solved, feelings can be shared, e.g. "How I felt when I did not
get attention." and opinions expressed, e.g. "I did not like it when the
teacher _____."

   Numerous specific activities for establishing and maintaining the
magic circle are provided in the Bessell and Palomares material.
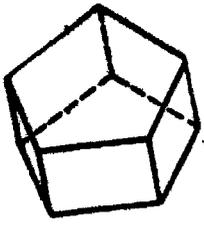
Task 8.8   Write in your own words, a brief description of
           magic circle.

Terminal Task - Briefly describe how you would plan to apply the concept
           of Social independence in your unit of study.   Give at
           least one specific example of how the concept can be
           associated with a specific activity within the unit.
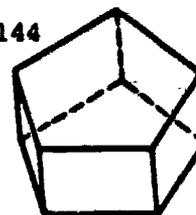
Answer Key

Task 8.1

1. Teacher, teacher gave the assignment.
2. Student, student is expressing a feeling of "being left out".
3. Teacher, teacher made the assignment.
4. Student, student is expressing angry feelings.
5. Joint, student wants to express himself, teacher wants to conduct a discussion.
6. Joint, teacher wants it quiet so all groups can work, skit group needs to make noise.
7. Student, student needs quiet to work, joint problem with classmates who need to make noise.
8. Student, student expressing feeling of frustration.

Task 8.2

1. b
2. b
3. b

Task 8.4

1. a
2. b
3. b

Task 8.3

1. You are really afraid your parents will be angry with you.
2. You don't feel it's fair for different groups to do different types of work.
3. You feel uncomfortable with writing tasks.
4. You are feeling unhappy because you haven't made new friends yet.
5. You are upset because Mary is always chosen as the group leader.
6. You are really upset because of all the work you put into your project.
7. You are unhappy about the time it takes you to finish your work.

Task 8.5

1. I'm concerned that your not doing the homework on time will make it very difficult for me to judge your progress.
2. John, I'm worried about the amount of time I'll have to work with you later if you don't work now.
3. Mary, my train of thought gets broken when you try to talk to me and I'm talking with other students.
4. Billy, I'm always afraid someone will get hurt when you run in the classroom.
5. Max, that really makes me angry to see you tearing up something I have put so much work into.
6. Billy, I feel uncomfortable about the time I'm spending with you because you do not appear to be paying attention.
7. Boys, I'm upset because I have spent a lot of time on this lesson and you are not paying attention.

Task 8.6

Review steps in the No-Wi , No-Lose conflict resolution procedure.

Task 8.7

1. Quietly - John, second warning
2. Quietly - Michael, first warning
3. Boys, I'm upset because your noise is disturbing other children.
4. Nothing - John is free to choose or "I message" (see Task 8.5 response 2)
5. See Task 8.5 response 1.

APPENDICES

Appendix A: Worksheets

Work Plan

Module 1   Unit Topic:

Rationale:

Module 2

Cognitive Behavior Level   Verbs Which Indicate Them

1.

2.

3.

4.

5.

6.

Module 3

Concepts, Definitions and Multiple Discriminations

1.

2.

3.

4.

5.

6.

Module 4   Technique:

Concepts,   Activities and Cognitive Behavior Level

1.

2.

3.

4.

5.

6.

Principles:

Problems:

Module 5

Terminal   Objective(s)

Enabling Objecitves

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

Module 6

Introductory Activity

Culminating Activity

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Module 7

Management System:

Description of tasks completed in conversion process:

Module 8   Social Independence Activities

Module 9   Academic Independence Activities

Sample of Completed Workplan

This is an abbreviated example intended only to illustrate each step.

Module 1: Unit Topic - Science Fiction

Rationale - A unit of study on science fiction for intermediate level, intellectually gifted students takes advantage of a high interest topic that combines fact and fantasy. Although predominately a literature unit, the study of science fiction can be broadened into almost any topic of interest including mathematics, social relationships, science, ecology, etc. Opportunities for research into the development of Science Fiction, its uniqueness, its proponents, and its definition provide substantial practice in comprehe ion, application and analytical behaviors. Projecting beyond what has already been written and role-playing present synthesis level challenges. Creativity in drawing, writing, building, playing and hypothesizing abound within the topic.

Science Fiction is a basic literature form that students and adults may enjoy as a leisure time reading activity. Exposure at this stage of development will provide a solid foundation for understanding the role of science fiction in our world and hope-fully, increasing the frequency of choosing this form of literature.

Module 2: Cognitive Behavior Level	Verbs Which Indicate Them
1. Knowledge	define, recognize, recall, label, distinguish
2. Comprehension	describe, rephrase, paraphrase, illustrate, restate
3. Application	apply, use, relate, employ, generalize
4. Analysis	compare, contrast, analyze, deduce, categorize
5. Synthesis	create, produce, design, originate, formulate
6. Evaluation	judge, criticize, validate, justify, argue

Module 3:   Concepts

1. Science - The observation, identification, description,
      experimental investigation, and theoretical explanation
      of natural phenomena.
      Multiple discriminations: distinguish science from aesthetics,
      art, philosophy, ethics, magic, history.

2 Fiction - Something invented or imagined.
      Multiple discriminations: distinguish fiction from non-fiction.

3. Literary Genre - A distinctive class or category of literary
      composition.
      Multiple discriminations: distinguish class from randomly
      associated items in a group.

4. Future - The indefinite period of time yet to be.
      Multiple discriminations: distinguish future from past and
      present.

Principle

      Science fiction is the literary genre distinguished by imaginary
         happenings set in the future but based on present scientific
         knowledge and using scientific explanations of hypothesized
         phenomena.

Problems

1. How can science fiction extend present scientific knowledge without
   contradicting it?
2. Where do science fiction writers get their ideas?
3. Rewrite a fairy tale as science fiction.
4. Compare science fiction and other types of fiction.
5. Rewrite a science fiction story as historical fiction.

Module 4:   Activities using Williams' strategies - please see Module 4.

Module 5:

      Terminal Objective: Sixth grade intellectually gifted students will be
         able to identify the trends in the present which science fiction
         writers have developed into the realities of the future as demon-
         strated by an analysis of a specific work using that criteria. (N)

      Enabling Objectives
         1. Students will define science fiction as a result of: (K)
            a. defining science, fiction, literary genre, and future.
            b. reading, listening to and viewing several science fiction
               articles.
         2. Students will propose a hypothesis to explain why it is that
            science fiction writers are able to accurately predict new
            inventions but not create them as a result of recognizing and
            identifying specific examples in the literature. (S)

3. Students will analyze at least a dozen works classified as science fiction to determine their commonalities as a result of generating criteria for comparing/contrasting and reading the works. (N)

4. Students will write a science fiction story in which something unknown in another science fiction work is now known as a result of:
   a) defining unknown,
   b) identifying an unknown element in a story,
   c) generating hypotheses about when and how it could be known,
   d) applying writing skills. (S)

5. Students will predict the effect of a science fiction "fact" suddenly becoming real as a result of:
   a) identifying a science fiction "fact",
   b) restating the "fact" to the present. (S)

6. Students will evaluate a science fiction work in terms of how it contradicts our habitual ways of viewing things as a result of:
   a) identifying science fiction concepts in a work,
   b) identifying present-day use of those concepts,
   c) relating a and b. (E)

7. Students will rewrite a science fiction story, changing the sex of the main character as a result of:
   a) identifying the main character in a story,
   b) identifying the implications for the story of substituting an opposite-sexed main character,
   c) applying knowledge of story writing. (S)

8. Students will rewrite a science fiction story including themselves as a character as a result of:
   a) identifying a story,
   b) creating a character,
   c) analyzing the implications for the story of this new character. (S)

9. Students will propose a hypothesis about the relationship of a science fiction writer and a sort of background as a result of:
   a) examining the biographies of several writers,
   b) drawing conclusions about individual authors,
   c) making a generalization. ( )

10. Students will compare two science fiction works written 100 years apart as a result of:
    a) identifying two works written 100 years apart,
    b) reading the works,
    c) identifying criteria for comparison. (N)

11. Students will create sound effects or illustrations for a science fiction work as a result of:
    a) identifying concepts for illustration,
    b) applying aesthetic skill. (S)

12. Students will investigate the effect of science fiction on the scientific community as a result of:
    a) identifying leading areas of research in science,
    b) identifying links between science fiction and science,
    c) researching the life and work of scientists who "invented" science fiction "facts." ( )

Module 6

Introductory Activity: Where do ideas for science fiction come from?

1. Students will brainstorm answers to the question.
2. Students will analyze the question for clarity as a statement of the problem.
3. Students will generate a list of topics to investigate and research to use in answering the question.

Culminating Activity (See Module 6)

1. Students will propose hypotheses to answer the introductory question.
2. Students wi.l support hypotheses with evidence.
3. Students will choose an audience to present their products to.
4. Students will analyze the audience they have chosen for the purpose of planning activities for them.
5. Students will formulate and practice a presentation based on their hypotheses.

Module 7

Management System: Theming, Contract, Independent Study
Description: Topics of investigation by students will be generated in the introductory activity. The theme map will be posted in the learning area. Each student will have a contract. They will be required to complete enabling objective 1, four other enabling objectives, and an independent study on the topic of their choice.

Module 8

1. Students will identify problem ownership and suggest solutions in the conflict between Harrison Bergeron & Diana Moonclamper in the story by Kurt Vonnegut as a result of defining problem ownership and conflict and reading the story. (A)
2. Students will identify the logical consequences of Harrison's behavior and identify the same for their own behavior as a result of a class discussion. (N)
3. Students will participate in a Magic Circle using the stem; "If I were Harrison I would have..." as a result of understanding the rules of Magic Circle and thinking about their own reactions to the situation. (K)

<u>Unit Plan</u> (final form)
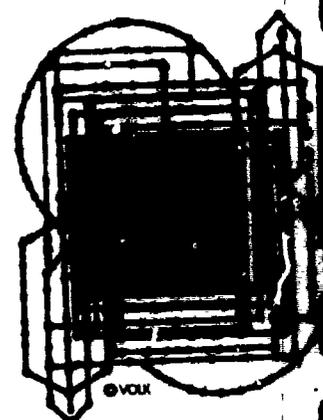
Topic:

Author:

Population:

Management System: (from Module 1)

Rationale:

I. Introductory Activity (fome Module 6)

II. Terminal Objective(s) (from Module 5)

III. Enabling Objectives (from Module 5)

IV. Culminating Activity (from Module 6)

V. Communication Acti [unclear] [from Module 8]

VI. Bibliography: (List any particularly helpful sources, and the
textbook you used if any. Avoid copying biblio-
graphic information from the card catalog.)

Appendix C: Bibliography Format

1. **Periodicals**

Harlow, H.F.   Fundamental principles for preparing psychology
journal articles. Journal of Comparative and Physiological
Psychology, 1962, 55, 893-896.

2. **Books**

Strunk, W., Jr., & White, E.B.   The elements of style (2nd. ed.).
New York: Macmillan, 1972.

3. **Film**

Wolff, L.   (Producer).   Rock-a-bye baby.   New York: Time-Life
Films, 1971.   (Film)