

Curriculum Units by Fellows of the Yale-New Haven Teachers Institute 1985 Volume VIII: The Measurement of Adolescents

# **Integration, the Skill that Binds**

Curriculum Unit 85.08.01 by M. Burgess & J. Cummins

The objectives of this curriculum unit are:

A. Students will be able to use mathematical concepts to help clarify their beliefs to effect solutions to issues, and improve verbal skills.

B. Students will be able to use the steps common to the scientific method as an aid in the development of cognitive skills.

C. Students will be presented with opportunities to refine those skills relevant to the promotion of leadership skills and to be a productive member of a team.

D. Students will be aided in the development of a data base that will serve them well regardless of their future educational or career goals.

#### Rationale

We often hear one person or group criticize another for being narrow minded, intellectually limited. The complaint in general stems from observations or interactions that leads one to [assume] that such persons are victims of inadequate cognitive skill development, or that their actions are based upon a very limited data base.

By data base we mean the information available to aid one in the recognition, construction, and implementation of a solution in regard to a problematic situation. Problem solving is predicated upon making the right connections among several factors. Steinberg, in describing the difference between the types of thinking employed by children, and that employed by adolescents, cites the use of the "scientific method" in problem solving situations (reasoning that systematically tests and then accepts or rejects hypotheses) as a key characteristic of the adolescent age group. The data base that one has at ones' disposal and the skills necessary to obtain needed information are directly related to one's ability to actually test an hypothesis. Consequently, ones ability in employing said method will be adversely affected if the data base is limited and those skills which co-vary with this entity (grasping, interpretation, computation, transformation, integration,

etc.) are equally limited.

Under such conditions cognitive skill development does not receive needed stimulation, and as a result can be effectively arrested. No one is born with an adequate data base and the related skills that co-vary to the extent that one can function in this modern communication orientated world of ours. The needed base of information and related skills have to be acquired and then reinforced.

In our system (U.S.A.) of education the \*integrationist mentality is most often visible in the elementary/grade school and in institutions of higher learning especially at the graduate level.

In graduate circles collaboration is a given. Individuals with extensive data bases and particular skills form teams (research, study, activist, etc.) to obtain object-goals. In such situations relationships between distinct variables are investigated, and integrated. Relative stability of the group during the course of the project is a key characteristic of this particular approach. In elementary/grade school the shared structures and object-goals are also stressed, in modified form of course. The classroom unit is a stabilized unit, the group is not in a constant state of change. Relationships between distinct variables are investigated and integrated. Emphasis is placed on group dynamics, one's relationship within the group, and the formation of teams within the group.

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Children come here . . . let us form our circle—Teacher holds up a piece of paper. "What color is this paper?" . . . (class) "Red"—"Watch me cut this shape . . . —Teacher performs operation—"What shape is this . . . (class) . . . "Triangle"—"What color triangle is this?" . . . (class) "Red triangle"—"Let's count the sides" . . . (class) . . . "1, 2, 3..

(Observation of a Day Care class—age range 3 to 4 years of age)

\*By "integration" and "integrationist" we refer to the ability to synthesize the relationship between two or more distinct variables.

In this activity a number of objectives are addressed: (a) group participation, (b) mathematical skill development, (c) recognition (color, shape), (d) integration.

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Four little frogs jumping on a bed One fell off and bumped his little head Momma frog called the doctor and the doctor said, "No more frogs jumping on the bed" Three little frogs jumping on the bed . . . (observations of same class)

The songs promotes *mathematical* skill development and the type of symbolism that serves as the basis for any *English* Lesson. Jumping on a bed can be dangerous. Issues relevant to *Social Studies/History* are also present. For example: a. Rules—No more jumping on the bed, and (b) Civil disobedience—The frogs continue to jump.

Another key objective at this level of educational instruction focuses on students remaining attentive during the delivery of instructions and showing respect for the rights of others (raising hands, etc.). This objective, however, is not projected as the key determiner of success at this level. Lessons and activities are designed with an awareness of the needs of the child (freedom of expression, movement, choice) versus that of society (order, submission to a controlling entity). Thus the children come to expect that others will recognize their viability as a social entity with the related rights and privileges. As they proceed through the ranks they are reluctant to relinquish that which they were helped to realize.

The structure common to middle and high school classes is the separation of academic disciplines. Five or six subject classes constitutes a standard academic load. The base class (homeroom generally) from Period I until the end of the academic day is repeatedly altered. It is not uncommon especially in a large comprehensive high school for students to encounter a high percentage of new students with each successive class. Except for chance meetings in the hall, cafe, or an extra curricula activity, many students will not see each other until the next—academic class—day.

Consequently, the concept of a base group is largely symbolic.\* If we consider the forces which beset a typical student attempting to negotiate middle and high school as it is presently structured we find what we have chosen to label the "multiple force phenomena." The multiple-force phenomena relates to the transition from elementary/grade school to the higher levels (middle, high school) which is characterized by the activation of multiple forces.

Examples of Multiple Force Phenomena:

A. Multiple disciplines: Five or six academic classes. B. Multiple Approaches: Methods and approaches used by instructors will probably vary, with a maximum total of 6.

C. Multiple Personalities: Each teacher is a distinct personality.

D. Multiple base group: Seldom do entire classes move together as a unit from class to class.

E. Multiple time frames: Classes range from 43 to 47 minutes and movement is predicated on the bell—regardless of how involved a lesson may be.

F. Multiple assignments: Assignments, homework, etc., are in general issued without regard for what may be happening in other disciplines.

If we were to compare the elementary/grade school experience to that of the middle/high experience the resulting equations would be characterized by an increase in coefficient of change from Step I to Step II.

\*(1) If the family unit or community is in a state of flux and does not promote relatedness in regard to key variables the likelihood of stability in regard to a base group is further diminished.
(2) The average time period per class falls within the range of 43 to 57 minutes. Non-Instructional class time (attendance, collecting homework, announcements, etc.) can easily consume 5 to 10% of the allotted class time. With the recent push for standardization of instruction (cost effective—purchase of instructional materials, testing—national, state, city wide) many teachers have had to react to the pressures of covering pre-determined parameters of information or to "teach the test."

Key: y = 6, X = Number from 1 to 6, A, B, C, D, E, F (defined above) minus the multiple.

Step I: X, A + B + C + D + EX + FX = Elementary/grade school. Step II: Ay + X, B + Cy + X,D + Ey + XF = Middle/High school

For many students, especially urban students, the elevation from step I to step II is the beginning of the end of success in school. The number of variables exceed their capacity for integration. They quite simply cannot pull it together.

The individual for whom this structure has been devised is at a stage in the life cycle characterized by extensive physical, emotional and cognitive changes. It is also a time when the adolescence is being redefined as a social entity. Students who possess adequate to superior verbal skills and are products of base groups (family, community) that define relatedness of variables are in a better position to counter-act the demands of school than those whose strengths lie in the non-verbal skill field, and who are not products of base groups that define relatedness of variables. Given the design of the middle/high school units in regard to the dissemination of instructions selected students non-verbal, are programmed for teacher/students, student/student, and school/student mis-communication.

A commonly referred characteristic of many urban students is that they are "street wise." Street wise connotates that one has refined problem solving skills in relation to a data base that has been nurtured by a particular environment. The particular environment\* in addition provides the key reinforcers for language, attitude and behavior. These reinforcers are gradually strengthened if alternative keys are not available or competitive. Thus what may appear to be a lack of desire or capability to improve language, behavior, attitude, may well be an inability to utilize the available vehicle(s) for skill development. The church social organizations, family, and school are examples of vehicles for skill development.

Even when the deciphering and/or utilization of the vehicle for skill development is effected, without adequate

\*Particular environment denotes an environment that is limited in regard to society as a whole. One's neighborhood, the inner city, rural communities and suburban communities are examples of particular environments. Key reinforcers development appears to reach a point of diminishing return, and is then effectively arrested. Another point to consider is that quite possibly many urban students reject improved

verbal skill development because such improvement will not necessarily aid them in negotiating the particular environment which has ascended to the position of primary impact. With out reinforcements from a competitive environment there is no impetus to resist the shaping pressures within the particular environment. Thus behaviors related to skill development can heighten said pressures and court strong negative reactions from peers.

"you talk funny man—you sound like a . . . boy..You ain't down—you ain't one of the home boys . . . Hey, he . . . the man . . . check them out" Such a reaction can activate behaviors which translate into harassment, isolation, or violence. These reactions can be endured; however, this is unlikely unless strong key reinforcers of the deviant behavior(s) (new) are in place and functioning.

It is with these concerns in mind that we began to re-think approaches in regard to education in general, and the urban situation in particular. The relocation of the target population, the urban verbally deficient student, to a new physical environment is not to be considered. Resources cannot sustain such a proposition. The cultivation of a competitive environment has merit, and is the underlying theme of this curriculum unit.

Movement in the direction of competitive environment which can rival the "particular environment" of the student and lessen the effects of the multiple force phenomena is based upon an approach to education that is geared toward integration. It may not be possible to decrease the number of variables, however, they can be aligned in a manner whereby they not only began to co-vary, but the co-variation is pronounced, and easily identified as such.

#### Example:

A. Disciplines should actively seek to reinforce a Mathematical base in all classes. To integrate other disciplines (Science in History).

B. The method or instructional process which defines the approach in each class should move in the direction of utilization of the Scientific Method.

C. There should be a common base of information incorporated by all classes (Life skills, common word list, and knowledge of mathematical symbols.

D. That each class should incorporate skill development as it relates to leadership and functioning as a member of a team.

E. Immediate connection of instructions and how instructions can be used in the environment.

The key reinforcers for students which will enable him/her to withstand the pressures of the particular environment have got to come from within.

Step I: The genesis of their inward motivation lies with the belief that school is an entity that can be successful negotiated.

Step II: That there are rewards associated with school that are not materialistic or related to high

visibility. Step III: That one is not alone. That there is strength in numbers.

These steps provide the foundation for the needed ideological relocation given that a physical relocation is not a feasible alternative. An ideological relocation that promotes skill development, with appropriate reinforcers that define the parameters of an ideological base group. The succeeding pages of this unit will present strategies and lesson plans which support such an approach to education.

### Strategies/Lessons

I. Unit Objectives: Students will be able to use mathematical concepts to help clarify their beliefs, effect solutions, and improve verbal skills.

There is no escaping the numbers; or the related concepts. They are a part of every aspect of life, and should be integrated within the curriculum of every discipline. One need not be a math major to effect implementation. Key Areas are recognition, computation, application and related vocabulary. Introduction can start with a related lesson.

#### Example:

The Language of Standard Measures/English. A Short History of Standard Measures/History. Subtle incorporation, however, is the long range objective. In discussions or explanations at the board one can use symbols (=,\$gt, \$lt). (Example, The Army of the North was\$gt the Army of the South) One can give students a list of symbols and encourage them to use them in situations where they are being asked to take notes.

Another tactic is to have students read tables, graphs and then convert this information into a percentage, computation. One can then encourage them to use this information to make a statement or develop a position with an essay or position paper. Simple interpretation of symbols or formulas can aid students in the development of improved writing skills (ex. a + b = c, A plus B is equal to C) The use of Math related terms (ascending, descending, ratio, etc.) should be emphasized whenever possible or relevant. It is important not to over extend in regard to the ability level of the students. A moderate but consistent pace of incorporation works best.

## Social Studies

I. Objectives:

Primary Student will be able to transform information from one form to another. Secondary (a) Student will be able to write simple and compound sentences

- (b) Student will exhibit knowledge of basic mathematical concepts and formulas
- (c) Student will be able to follow directions, written, and oral.

Motivation Based on some pre-determined criteria arrange *class* in a bar graph. Explain the function of a bar graph. Point out to student the particular information that they are comparing. Activity Teacher should *define* and give *examples* of the following terms:. Minority, Pre-registration, Absentee Ballot, Candidate, Majority, Plurality, Coalition

Students should be required to record this information and have it available as they proceed with the assignment.

# **Results of Sophomore Class Election Participation**

(figure available in print form)

Background Information:

- 1. The total Sophomore class population is 290 = (160 girls + 130 boys)
- 2. Late registration was held the day before election day during homeroom period

3. Absentee ballots were filed the day before election day and were not open until the polls (voting) ended

- 4. There were 3 candidates in this election
- 5. A candidate needs only a plurality of the vote to win.

Assignment Sheets (Pass out to each student) Based on the ability level of the class the following options should be considered:.

- A. Student should be given the assignment sheets and allowed to work individually.
- B. The class can be divided into groups and allowed to attack the assignment as groups.
- C. The teacher explains each step and the class works together on the assignment.

#### Assignment Sheet I

*Directions* Refer to the graph, key(s) and background information to answer the following question or perform the desire operation. I. Place correct answer on the blank:. *(figure available in print form)* 

II. Perform the following operation, and write a sentence that reflects the operation performed:.

(figure available in print form)

A. + = Sentence:

(figure available in print form)

B + -Sentence: C. + = Sentence (write your own): III. If the information to construct

III. If the information to construct this bar graph was obtained from the registration form, list two questions that had to be on that form.

Α.

Β.

#### Assignment Sheet I

IV. A. If a candidate needs only a *plurality* of the vote to win, what is the least amount of votes

that a candidate could receive and win?

B. If a candidate needs a majority of votes—then what is the number of votes that will ensure a victory?

V. A. Which group(s) can elect a candidate to office if only a plurality of the vote is required?B. Which group(s) can elect a candidate if a majority of the vote is required?

VI. Which situation a simple majority, or a plurality is more likely to encourage the development of a coalition? Explain.

# **Lesson II**

#### Mathematics/Social Sciences

Primary—Students will construct a bar graph on the Presidents' Political Party affiliation. Secondary—Students will see a relationship between social studies and mathematics via research into and construction of this bar graph.

Motivation—We will present a film on political parties past to present and/or have a guest speaker from one of the current major political parties who will talk about the philosophies of their parties.

#### Activity

Step I research the political parties of our Presidents. Step II Tally how many Presidents from each of the aforementioned political parties. Step III Construct a bar graph/histogram to reflect the tally from Step II.

## **Lesson III**

#### Statistics/Interdisciplinary

Primary—Students will be able to use their test/quiz scores in any given subject area and their knowledge of measures of central tendency to find their marking period average, the class average, the class median, midrange and mode.

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Secondary—The strengthening of computational skills in the finding of the measures of central tendency and also the reinforcement of vocabulary used in math and other classes (i.e. ascending, descending order).

Motivation—Everyone wants to know how they did in any class in which they are a participant and this lesson will enable students to calculate their own averages.

Activity —tudents will be provided by their teachers their test/quiz scores for a given marking period. These will be given in the order they appear in the grade book.

Step I Students will arrange their scores in descending order.
Step II Students will calculate their mean (average).
Step III Once all students have calculated their averages they will submit them to the teacher and then the teacher will list *all* student averages on the board.
Step IV Students will calculate the mean, mode, median, and mid-range for the entire set of individual averages in their class.

II. Unit Objective: Students will be able to utilize the steps common to the Scientific Method as an aid in the further development of cognitive skills.

Regardless of the academic subject area incorporation of the Scientific Method should not present a problem. This is especially true if one accepts the method as a cognitive approach to problematic situations. The five basic steps should be displayed in the classroom. Students should be made aware of the fact that in large part they have always used this particular method and will continue to do so as they move thru the life-cycle. That a key objective of the class is to heighten proficiency in regard to usage, and to impact positively in regard to cognitive skill development. It is important to remind students that there is nothing new to learn, only to refine that which is already in operation. In presenting lessons (written/oral) the teacher should be consistent in referring to particular steps in the method as situations arise. Whenever possible students should be allowed and encouraged to collect the needed data themselves. To form hypotheses, and to test said hypotheses. In the beginning, first marking period, needed data should be readily available in the classroom (wall charts, classroom demonstrations, textbook, films, etc.) with a gradual and subtle movement in the direction of utilization of outside references (library, on site interviews, etc.). Student usage of the method as a matter of course, without being prompted is the, bottom-line, object goal.

#### Social Studies : Lesson II

#### **Objectives:**

Primary—Student will be able to utilize the steps common to Scientific Method.

Secondary—

(a) Students will be able to write simple and/or compound sentences.

(b) Students will be able to utilize mathematical concepts and/or formulas.

Motivation—Pass out copies of a news article about a recent "Lotto" winner. Define Random Sample. Define Population as used by statisticians. Briefly discuss how these two concepts relate to one who plays or wins "Lotto."

## Activity

Inform the class that will serve as a Congressional Committee charged with presenting a proposal for choosing the order in which potential candidates will be inducted into the military. Briefly outline the problem with the class and have them write it down in their notebook.
 Present students with some examples of how Random Samples might be obtained. (Supermarket give-aways, survey participants, radio-call ins, etc.)

(3) At this step the teacher can divide the class in groups and allow them to come up with their own methods, for presentation to the class. The teacher can proceed with the following activity. Have all the students get out of their seats and stand to one side of the class. The teacher or another student can arrange 12 chairs in a row. The teacher or a student will allow the first 12 students to choose a number from one to twelve from a bag. According to the numbers chosen by the students they will occupy the chairs. After the 12 have been seated they will choose a sealed envelope from another bag. After all the students have received an envelope they will proceed to open them in order. The envelopes will contain the months of the year. The student in seat No. I's month will be the first month utilized to gain candidates for induction. As each month is revealed it is posted on the board.

(4) Each student will then be asked to write a letter to the members of his/her district. In the letter the student should include a description of the method under consideration for the order of inducting potential candidates into the military (this method, or the one chosen if the class was divided into groups to choose their own). The letter should also request an opinion of the method, and ask how the voter would want their representative to vote in regard to the proposal.
(5) After the teacher has collected letters, and made the necessary comments they should be passed back for the final re-write. Arrangements should be made by the teacher with the teachers of an English and a Math class to receive the letters and to respond. This response can serve as the foundation for a lesson on an item coming back to the committee for refinement, change or approval.

#### Mathematics/Science

Primary—Students will construct a circle graph to show the types of contraceptive measures we know of based on their percentage of success in preventing conception.

Secondary—Be able to convert fractions to decimals to percentiles in order to construct a circle graph.

Motivation—Students will see what measures of birth control are the most to the least successful and also see the relationship between this major issue in health science and mathematics via the circle graph (speakers, films and articles on birth control will be used as a motivational device).

Activity—Given the following measures of birth control and their rate of success and rate of usage, construct a graph:

- A. Birth Control Pill, 64%
- B. I.U.D., 10%
- C. Rhythm Method, 6%
- D. Creams/Foams, 2%
- E. Condoms, 18%

Step I Convert the percentiles to fractional values then to decimal values.

Step II To know what part of the circle each category will take-up, multiply the given decimal value by 360 to find the number of degrees each category will use in the

Step III Using a protractor measure of the number of degrees in each category plot the points on the arc of the circle and construct each slice of the circle graph in this fashion.

## **Lesson Plan IV**

#### Logical Thinking/Interdisciplinary

Primary—From a given set of facts students will be able to make sound logical judgements on statements which follow the given facts as to these statements being true—false—or opinions.

Secondary—Students will reinforce reading and vocabulary skills.

Motivation—Film on logical/illogical thinking—newspaper articles that students will read and then comment upon.

Activity—Given facts in individualized examples students will have to determine from these given facts if statements which follow are true statements, false statements or opinions.

Note: This lesson is very extensive and many mini lessons on conversions of fractions to decimals to percentiles—geometry (the circle) and the use of a protractor to construct angles.

Step I Facts:

Tom is a good swimmer. Lisa does not know how to swim. Tom's best friend is in the pool. Everyone in the pool can swim.

#### Conclusions:

- 1. Tom's best friend knows how to swim.
- 2. Lisa is in the pool.
- 3. Tom is in the pool.
- 4. Lisa is Tom's best friend.

Step II Facts:

Jim is taller than Alex. Joe is taller than Debbie. Alex is shorter than Lisa. Lisa is shorter than Debbie.

#### **Conclusions:**

- 1. Alex is shorter than Debbie.
- 2. Lisa is taller than Joe.
- 3. Alex is taller than Joe.
- 4. Jim is taller than Joe.

Step III Facts:

Jim is a computer programmer. Lori is a mathematician. All computer programmers are mathematicians. Most colleges train computer programmers.

#### **Conclusions:**

- 1. Jim is not a mathematician.
- 2. Lori is a computer programmer.
- 3. Some mathematicians are computer programmers.
- 4. Most mathematicians train at colleges.

Step IV Facts:

Everyone on the farm is related to Jill. Jill's only child is a boy. Kim lives on the farm. Jack is Sues husband.

#### Conclusions:.

- 1. Kim is Jill's relative.
- 2. Kim is Jill's Daughter.
- 3. Jill lives on the farm.
- 4. Jill has a son.
- 5. Jack lives on the farm.

Step V Facts:

Adam is a drummer. All of Bill's friends play in the band. Andy is Bill's friend. All of the band members are wealthy. Some band members are from Hamden.

#### **Conclusions:**

- 1. Adam is wealthy.
- 2. All band members are from Hamden.

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- 3. Adam and Bill are friends.
- 4. Bill has many poor friends.
- 5. Andy is wealthy.

III. Unit Objectives: Student will be presented with opportunities to refine those skills relevant to the promotion of leadership or being a productive member of a team.

Leadership and/or team working skill development can be realized through activities that center around the division of the class into groups. This division does not only have to occur in regard to the activation of a specific academic lesson. Early in the academic year according to some pre-determined scheme the class can be divided into groups. Such groups would be on going for the duration of the academic year, however, this should not effect the formation of new groups for specific academic activities. These base groups can be given such task as class decorations, announcements, classroom set-up and other responsibilities as they relate to classroom operation. If base groups are used a list of members should be posted along with a time schedule for agreed upon duties. They should be encouraged to elect a group leader, teacher contact person, and an alternate. Early in the year the teacher should incorporate a lesson into the curriculum that focuses on group dynamics. Particular care should be taken to point that out that:

A. That leadership and/or membership is in large part based on the goals of the group.

B. That those groups which attain success in general have leadership/membership that

understand and commits self to the groups goals.

C. That it is important to understand your position in the group as well as the position (function) of the other members.

If base groups are utilized in a class then new members should be allowed to visit with each group before final placement is effected. If in planning group activities there is no time (or one wants the group to select the leader) to pre-select and prep group leaders then step by step, easy to read instructions should be given to the group leader. Careful attention should be paid to the rotation of the leadership role. Incorporated within the instruction should be, directives, that exhibit the relationship of power to position(s) within the group (ex. group leader will only vote in case of a tie). When possible there such be an election for the position of group leader. Group leaders instructions should allow for the appointment of as many members as is feasible to titled positions within the group (ex. secretary, timekeeper, ballot collector/counter, etc.).

This approach has merit in regard to acclimating students to the idea of occupying a position of responsibility (power) within the group. Assigned tasks should be predicated on the ability level of the students; nothing

succeeds like success. As the group gains assurance, functioning as a unit, basic parliamentary procedure should be introduced. These can be achieved via the group leader instructions (one/two concepts at a time) or a lesson designed for this purpose. Parliamentary procedures lend order and control to group operations. It also provides a context to further re-affirm the basic steps of the Scientific Method. Framing a motion is predicated upon properly identifying the problem. Discussions, and individual(s) report constitutes collecting known data. The call for questions (prior to a vote) and the vote can be related to the testing of the Hypothesis. Thus new information can be reinforced by that which is already known. Group activities can noticeably raise the noise level of class, and so this concern must be given consideration as it relates to respect for the rights of others (other groups in the class—the class next door). One (the teacher) has to be able to make the distinction between constructive noise, and noise for noise sake (confusion, argumentative, etc.). To respond to each situation as a separate entity, for in a class of 3 groups each may exhibit distinctly different characteristics.

# **Lesson III**

#### Social Studies

Primary—Student will be able to make a contribution functioning as a member of a (team) group, and to perceive the opportunity (value) of power within a group.

Secondary—

(a) Student will be able to make oral presentations.

(b) Student will be able to write simple or compound sentences.

Motivation—Class should be shown pictures, and slides of various groups that the class is familiar with. The class can be then asked if they can identify the leader or function of the group by positioning of members or dress. At least two of the groups should be listed on the board. The following information should be listed for each group (a) the function of the group, (b) possible criteria for leadership of the group, (c) the skills needed and possible duties of the membership.

Activity—Divide class into odd numbered groups. Use either pre-selected group leaders or have groups elect a leader. Group leaders will proceed to open sealed envelope and read instructions (ex. (1) group leaders can only vote in case of a tie, (2) group leader can appoint group members to the following positions—timekeeper, ballot collector/counter, recording secretary. Group leader will then open manila envelope and pass out to each group member needed materials—assignment sheet, ballot slips, and reply sheet.

Assignment sheet—Groups must decide the criteria that will apply to anyone who runs for a school office or (seeks) attempts to try out for a varsity team.

- A. Class: at least a Freshman, Sophomore, Junior
- B. Grade Average: at least A, B, C, D
- C. Recommendations by Teacher: at least 1, 2, 3, 4

D. Student Signature: at least 25, 50, 75, 100

E. Attendance: previous year no more than 5, 10, 15, 20 days absent

1. *Group Leaders* will inform the groups that they must (by law) respond to at least 3 of the possible criteria [A,B,E]

2. Group leader will entertain motion from group members as to which topic will they pursue first.

The Ballot collector/counter will collect ballot—announce results.

3. The Group leader will entertain motion for time limit for discussion. Ballot collector/counter will follow same procedure.

4. The Group leader will present potential criteria A, and entertain discussion. Timekeeper will ensure that agreed upon time frame is kept.

5. This procedure will continue unless a motion is carried to delete C or D.

6. When a complete packet has been reached (a) A,B,E, (b) A,B,C,E, (c) A,B,C,D,E—group leader will call for a vote on the entire packet.

7. Students who vote against entire package will write a minority opinion (why they think it should not be used). Students who vote for the packet will write a majority opinion (why they believe it should be used).

8. Group members will select a member to present the groups recommendation to the class. The group leader will appoint someone—to present the minority opinion if one exists.

IV. Unit Objective: Student will be aided in the development of a data base that will serve them well regardless of future educational or career goals.

Information relevant to the construction of a data base model should reflect two basic categories, reinforcement and Phase in—Phase out. Reinforcement relates to materials and skill development that remains constant during the life of the model. Phase in—Phase out relates to information that is emphasized then phased out in order that new information can be emphasized in its place. This does not mean that phased out material is disregarded. It is simply not emphasized to the same degree as the new. It is most important that this base model be used in more than one of a students classes. It is not crucial that specific

lessons be derived from the base model as it is for the information and/or skill development to be incorporated within the structure of a particular discipline. The following examples suggest information and skill development that could be utilized in a base model.

Examples:

ReinforcementPhase In—Phase OutLibrary Usage skillsWord ListPunctuationMathematical SymbolsLife Skills (careers)Life Skills (careers)

## Lesson I

## Mathematics/Career Awareness

Primary—Students will (be able to) use measures of central tendencies depending on data given.

Secondary—Students will be reinforcing computational skills (addition/division) when finding measures of central tendencies for given data.

Motivation—Career awareness resulting from the understanding of measures of control tendencies, interpreting which is the best descriptive of a given set of data, when job seeking (newspaper articles, want ads will be used to gain student interest.)

Activity—Given the following want-ad in the local newspaper:

WANTED: CUSTODIAN Apex Tool company, 100 Main St., New Haven, CT. Good Benefits. Average Company Salary \$50,000. Apply in Person.

Step I Find the (1) mean (average), (2) mode, (3) median, (4) midrange of the given data: DATA: \$220,000 owner

30,000 production supervisor 25,000 machinist

- 22,000 machine operator
- 20,000 drill press operator 18,000 secretary

## 15,000 custodian

Step II Which measure of central tendency is the best descriptive of the given set of data? Step III Why is the information given in the want ad regarding salary grossly misleading?

## **APPENDIX A**

Student Interview

Subject: Female, 18, attended area high school—just completed first year of college

Q. When did you graduate from high school?

A. June 1984

Q. What did you like most about high school?

A. When there wasn't really much of anything that I liked—other than my social life.

Q. What did you like the least about high school?

A. Most the rules and regulations—Everyone (teacher, administrators) felt they had to baby you along.

Q. What did you like most about your classes?

A.... What did I like ... Well nothing really.

Q. How would you rate your classes?

A. On a scale from 1 to 10 . . . about a 6.

Q. If you finish (completed) an assignment in class were you allowed to get out of your seat—talk to other students?

A. No, you had to just sit there until everyone finished.

Q. Were there any diversions in class—anything to occupy your time if you finished early (magazines, puzzles, etc.)?

A. No.

Q. Were you involved in any group projects at any time during your high school career?

A. Well, no—only in Chemistry we had lab—where 2 or 3 students might work together on a report.

Q. How would you rate yourself as a math student? Poor? Fair? Good?

A. I say fair.

Q. Did you see any relationship between what you did in your math class and any of your other classes? Did you see any relationship between what you did in class and the real world.

A. No, at the time I felt it was mostly a . . . (waste of time).

Q. Could you conduct a survey and convert your findings into a graph or chart and then make a presentation?

A. Yes.

Q. Where did you learn this skill and/or skills? In school? On your own?

A. Not really in high school—mostly on my own and last year (in college).

Q. Were you required to make oral presentations in high school?

A. I made one my senior year.

Q. Were you taught how to make an oral presentation in high school? How to stand? (etc.)

A. No.

Q. Did you pursue any positions of power in high school (editor school paper, captain cheerleader, etc.)?

A. No.

Q. Any particular reason why you didn't?

A. No, I just was not interested.

Q. If you (group of students) wanted to get a message across to an administrator how would you go about it?

A. A few of us would talk to him/her—if he could do something he would—if it had to go over his head . . . to the Board of Education, we wouldn't hear anything.

Q. Do you feel high school made a connection between what you were doing in school and the real world? A. Yes, it did.

Q. Do you feel you could have learned the same things from a job?

A. Not as in depth.

Q. Could you give me an example?

A. In high school you get your message to the top (principal), in the real world it wouldn't be as easy to reach the President.

- Q. How do you think most of your friends would rate high school?
- A. I think most of my friends would rate it as being worthwhile.

Q. Any particular reason why? Do you mean worthwhile in the academic sense or the social sense?

A. Worthwhile in the social sense because of the experiences we had (relating to each other).

Q. Did you find high school challenging?

A. Academically, . . . No. It did not take must effort to get good grades.

Q. Were many of your classes concerned with problem solving or was more information relay (expected to memorize)?

A. Expected to memorize—except for math class.

Q. Did you feel your teachers were competent?

A. Yes.

Q. You made a mention of classes being boring. What do you mean?

A. Yeah, they were boring—but my teacher knew their materials, but they tried to make it interesting-I guess.

Q. Would you consider—it to be a situation of poor presentation—that it did not involve you as much as you would have liked?

A. No, it did not involve me as much as I would have liked to have been involved-I think more actual situation could have been used—and sort of show me where I fitted in—you know we should have work it out like that—you show me how it was going to help me out later on in life. Q. If you were a teacher, how would you have done things?

A. I felt most my teachers went strictly by the book—everything was sort of in a monotone sense (one dimensional). If I was the teacher I try to make the experience more fun-more

challenging—I feel if the way I was teaching was not working I would try something else.

As an ending comment I would like to say I feel students should get more involved in high school. I was not that active. I always felt that working and my outside social life were more important, but I feel that more students should get involved in school. It could really help you later on in life—

# **APPENDIX B LEARNING TO LEARN**

This curriculum unit focuses attention on the cultivation of (particular) attitudes, skills, and the creation of a classroom environment that is conducive to learning to learn. The major contention of the unit is that there is a certain environment which is conducive to the development or refinement of certain attitudes and skills. We do not argue the fact that there is an enormous amount of information and skills that can be gained from an equally vast number of environments. We feel, however, that the key question is "what particular information, attitudes and skills, it is desirous that one attain. And will they be perpetual in nature. For if students do not take key attitudes and skills with them, can we say that they have learned. Performance at some later date in effect becomes the bottom line. Robert J. Sternberg, Associate Professor of Psychology at Yale University, in his article, Criteria for Intellectual Training indicates that the most successful training programs for intellectual skills development seem to have incorporated skills that relate to executive and non executive information processing. If students master the skills associated with executive and non executive processing of information then learning becomes a self perpetuating entity. The transmission of such skills to students according to Sternberg must take into consideration the students cultural base, individual needs, and individual differences. It is also his contention that there must be a link between training and real world behavior. Sternberg makes it guite clear that motivational stimulation is a must. Since the training has to take place somewhere (site) logic dictates that it be considered as a motivation force, either positively or negatively.

Sternberg in his article, *How Can We Teach Intelligence*, endorses (Fuerstein's) the Instrumental Enrichment Program and (Lipman's) the Philosophy of Children as vehicles for intellectual skill development. His endorsements, however, are not given without reservations. The Instrumental Enrichment Program is Characterized by the absence of a discipline base, the need for extensive teacher training, and its concentration on abilities required by I.Q. tests. The Philosophy For Children is program is characterized by the difficulty of the reading materials, the value orientation of the characters portrayed, and its dependence on a gifted teacher to effect the program. We interpret these reservations to mean that successful use of either program is in large dependent upon the skill level of the participants prior to their involvement in the program(s). It is possible that selected student might derive benefit from these programs, however, we believe that extensive usage in an urban educational situation is a questionable proposition. The requirements which dictate success would tax the resources of most urban school districts. We, also believe such programs would test the patience level of many urban students, and quite possibly place their concept of self worth in jeopardy.

Attitudes are reflective of the experiences that we have had. The experiences that we have are in large measure a result of the skills we employ to decipher and to implement in relation to particular environments. If particular attitudes are desired then one has to consider programming one or more of the key particular environments of an individual to cultivate that which is desired. A particular environment designed with the promotion of intellectual skill development as a key objective must speak to the interest of the individuals concerned. It must be designed to arouse curiosity and provide opportunities for experimentation. It must reflect the skills stated in the objectives as they move through the phases of an information processing

system (i.e. scientific method). Active involvement, and staying power on the part of the student are best realized when the aforementioned are covariants within the environment designated for intellectual skill development. Our experience as classroom teacher lead us to conclude that environments which do not effect this co-variation will influence student to detach (passive disruptive), do just enough to get by (survive) or to fight back (active disruptive). Environments which do not affect the aforementioned co-variation are in a very real sense predicated upon survival of the fittest. Whether the environment is confining or loosely structured does not alter this basic condition of survival of the fittest. Success in such an environment is dependent upon ones ability to self-actuate, or the possession of certain skills prior to involvement in the program. If success is possible without regard for these conditions then we could conclude that one need not be very fit in order to survive. We perceive the key difference in the programs for intellectual skill development proposed by the Instrumental Enrichment Program and the Philosophy For Children and that which we advocate is the degree of nurturing that is effected. Nurturing in the sense that provisions are made for the cultivation of a particular attitude, and the component skills\* that under score intellectual skill development.

#### Adolescent Readiness/Classroom Environment

Who is it that we want to learn? Who is the school-age child in general, the middle and high school in particular? It is the adolescent. Who are these adolescents? What do they want? What are they ready for? Basically we are talking about a person between the age of 13 and 17. We are talking about a person who is undergoing extensive physical, cognitive, emotional, and role changes. Such persons have presented an enormous problem to educators in recent years. One wonders if we, educators, really consider this stage in the life-cycle called adolescence. Yes, we are aware of teen pregnancies and have put into operation programs to deal with this issue. Yes, we are aware of drug abuse, teen violence, the need for remediation, poor test scores, physical fitness, mental health and the list goes on and on. This list, however reflects the reality consequence of the age-group, and not to the guestion of adolescence. Much of what we do as educators is predicated on the capability of the adolescent. What test scores say that he or she should be able to do. Perhaps the greater question just might be what is the adolescent ready to do? If we say that the adolescent is ready to challenge and be challenged, do we consider and provide for that reality? If we say that the young person is changing from one who is no longer thinks primarily in terms of "What is" but thinks in terms of "What is possible" do we provide for and/or encourage such thinking? If we say that the adolescent should be ready for a higher level of responsibility and trust, do we provide the related opportunities? If we say that they must learn to decipher, adjust and survive the reality that is the world in which we live. Can we decipher, adjust, and survive the reality that is the adolescent? Do we

\*We define component skill to mean those skills which relate to: (a) Transformation of information from one to another, (b) recognition of key words, symbols, and formulas, (c) presentation skills (written and oral). consider that they are sophisticated enough to perceive the duplicity if we say yes we do, when in actual practice we do not? If the question of adolescent readiness is not given more than just a passive acknowledgement as a particular stage in the life-cycle then it is our belief that no matter how noble our intention, or the industry of our effort the best designed efforts will fail. We believe that many students do not find school a challenging, exciting, or informative place to be. If one did not include the opportunity for social interaction we believe a large number of students would simply categorize the situation as non-productive. This is not a recent development in regard to what is often portrayed as the adolescents' view of school. If you ask a small child if he or she likes school and he or she says that they hate it. It is not unusual for some people who pass off such a response as being cute, or typical and say something to the effect that this is just a stage and it will pass. What is the consequence if the stage does not pass. A popular TV program of the 1950's and 60's *Leave it to Beaver* had as a major theme that was repeated over and over again: School was an

intimidating, and at the same time boring place to be. Although one might find a nice teacher on occasion, teachers in general were people only a parent could love. School attendance was synonymous with punishment. A more recent program featured a group called the sweat-hogs and although its intentions was comedy, the underlying theme was not only that school was a joke, but it also was rather dangerous. The roles given to key figures of authority were very similar to those rules given to blacks in the early days of film, buffoons. Room 222 and The White Shadow were more realistic, yet neither program projected school in the light of being a challenging and exciting place to be. A place that requires hard work and provided a sense of fulfillment from a job well done. The most recent program Fame does underscore hard work for art's sake. However, it is enjoyable, creative, and participation is based on student choice and administrative selection. It also reflects only a minute segment of the adolescent population. Many people if asked might say well these programs were meant to be entertaining, and if that is truly the case, then who am I to say that they did not entertain. They were all very popular and enjoyed reasonable runs so far as the life of a TV program is concerned. Re-runs of *Leave it to Beaver* are still immensely popular. It is our contention that those programs were reflective of more than just an effort to entertain. Just as today's current popularity of adult programming is reflective of more than just an effort to entertain. We have it because there are adults who identify with it, want it, and are willing to pay for it especially since they can have it within the privacy of their own home (cable, VHS). On the one hand we question such adults in regard to moral standards and with the other hand applaud them for accepting the reality that constitutes their lives by exercising their rights as citizens. It seems only right that we accord the same prerogative to adolescents. They have been saying for years that school could be, should be, so much more than it is actually. Oddly enough we, educators, supply much of the evidence that supports this contention. We say that students (especially in urban schools) consistently realize less than 50% of their potential. Students simply do not commit themselves to the effort. Why? Could it be that what we present, in the manner that it is presented and that the reasons given for presentation does not correlate with what adolescents are ready for? This should not be confused with what is felt that they should are capable of at a particular stage in the life cycle. In observing small children at play, dress-up (adult behavior) is unquestionably a favorite. Their seriousness and attention to detail is to be commended. It seems that as students proceed through the ranks of our educational system they are denied this one time favorite. At a time when the urge to emulate adult behavior is just as strong, and they are in a far better position to activate the game they are in many ways forced to repress this urge. This repression is reflected in student attitude and behavior in regard to school.

Attitude can be defined as one's perception or feelings in regard to a particular entity. How one perceives a situation to a large extent determines how one will behave. If one is serious about changing behavior and obtaining a maximum effort from students then one has to consider the question of attitude. If the student's attitude is one or a combination of:

- a. Adults say one thing, but do something else
- b. School is a bore (school work not relevant)
- c. That there are all powerful structures that oppress (school, government, police, etc.)
- d. That certain groups are the object of scorn, and there is little that can be done about it.

When such attitudes are not addressed then the amount of actual learning that takes place is debatable. Debatable because under such conditions many students tend to rebel, withdraw, and/or endure. Information which is not directly related to these concerns for the most part is considered irrelevant. If the situation is intense and of long duration students are for the most part rendered useless to the system created for their supposed enhancement.

The work of Kahneman and Tversky suggest that presentation of a problem is vital. That how something is presented can affect one's perception of its validity. What good is it for a teacher to spend untold hours developing materials for classroom use if it does not penetrate the student consciousness in a way that cultivates a reaction that can be built upon. Many teachers complain of time spent developing lessons that just do not seem to go over well with students. Some adopt the attitude that students are lazy, uncaring, incapable, and the list goes on and on. And perhaps they may have a point in regard to some students. However, we do not believe this to be the case for the vast majority of students. Curiosity, the desire to understand the process within, and those that surrounds is a characteristic of the Adolescent age group. One does not have to reach the age of maturity to perceive insincere and evasive tactics. We tend to believe that materials although presented well will raise concerns if they do meet student needs.

How does one do it for one's self? Regardless of subject matter if this question is avoided in large measure so is adolescence. Adolescents are ready to challenge. Suicide, drug abuse, teen pregnancies, apathy, delusions of grandeur, teen violence, and extreme fad identification, are realities of the Adolescent age group of today. They are ready to challenge, and they do—challenge. If this is the price that we must pay for socialization, especially in regard to school, for this particular age group then we say that the price is quite high. Socialization is a valid concern, however, valid does not make it any easier for adolescents to endure. Especially if they cannot really understand the reason why.

In dealing with the reason why, we feel that skills related to the executive, and non-executive process are an excellent vehicle, regardless of subject matter.

"There is an all powerful structure that oppresses"

How does one attack such an attitude? The real question here is power. Those who desire to possess it, students, do not have it. How can one share power with them, and still maintain a measure of control in the classroom?

#### Examples:

- a. prep a student(s) to teach a mini-lesson
- b. create opportunities for students to be the center of attention.
- c. give students opportunities to make decisions that are implemented (small group projects)

d. allow or create opportunities for students to be out of their seats and/or talk to other students without having to ask permission

- e. prep students for a simple exercise in which they have to deal with an actual figure of authority
- f. role-play figures of authority (dress-up)
- g. when possible use cassette/or video equipment to allow student to hear and see themselves
- h. involve students in the decoration of the walls—and or class stations (library, etc.)
- i. class rules should be posted\*

A simple definition of power means that one has some say in that which will be. Once students have been drawn into a circle of power, classroom involvement, other concerns can be addressed. The usage of power is a skill and should be given due consideration within the curriculum .

Activities which grant the student a measure of power and involve him or her in the lesson constitutes important preparatory training for the teaching of executive and non-executive skills. Such activities help to develop feeling of trust and mutual respect between teacher and student, and between the various students in the class. It is advantageous for an atmosphere to be developed whereby students begin to actually feel for each other. To look out for each other and to encourage each other. To begin to compare experiences. "Yeah, I was nervous but once I began to talk—I was OK."

\*Class should be involved in the development of classroom rules. Teacher should make it clear that no rule can take precedence over school board policy or rules listed in the student handbook.

### Team Work-Group Dynamics

Certain concerns are important in regards to preparing students to work as members of a team. Team work related projects are an excellent vehicle for the integration of executive and non-executive skill development into the curriculum. Team work related projects also give students additional opportunities to emulate adult behavior. For many students this will be a completely new approach to learning and therefore it is of utmost importance that the teacher exercise a degree of patience. Topics used to introduce the team work skills to the class should be on something that students can easily identify with (ex. 1. What is the cost of graffiti removal? 2. Is there a dress code associated with positions of power?). Students should be slowly introduced to a system for the processing of information.

#### Example:

- a. identification of the problem
- b. identification of potential sources of information
- c. what mechanism and/or strategies will be used to collect data
- d. what method will be used to interpret, and to present collected data
- e. who will be assigned to a particular task
- f. what time frame will be placed on individual sections and on the overall project
- g. potential usages of the completed project

It is most important that the teacher understand the ability level of the student involved and not to be *overly* concerned with certain aspects in the beginning (quality of written report in regard to spelling, etc.). Such concerns can be addressed in time. The important concern is to involve students in the process and to help them see it through The more involved students are the more likely they will want it to be just right. They will

re-write a report that has grammatical errors. They will redo an oral taped presentation. They will ask question or get a dictionary to help them better understand written material relevant to an aspect of the project.

It is important that students be cautioned that the plans often require adjustment in the midst of implementation. The reasons for such adjustments are numerous however a few examples to the class will be sufficient. (ex. a group member will get sick, a group member will fail to perform an assigned task—which may lead to removal from the group). The teacher has to be prepared to pull group members who fail to exert the desired effort and organize them into an alternate group. It will be very important that remaining group members close ranks and keep moving forward. The message to all has to be that one or two or a number of people will not stop a project. Those who want the information, client who is paying, want just that, and not excuses. It has to be impressed upon students that communication within the group is very important. If a deadline cannot be met then adjustments have to be made. If a change in methods (ex. collection of data) is necessary, then it *must* be effected. If roles within the group have to be changed, than group members must deal with this issue. These are extremely important skills for student to master. It will not happen if they are not given the opportunity. During the course of this project daily lessons should be designed to reinforce and explain the steps in the system for the processing of information.

Every situation, contingency, and problem has to be viewed as an opportunity to teach. Is there a certain dress appropriate for one who is conducting an interview? What ground rules should be set before the interviews takes place? Can I use a tape recorder? What is the agreed upon usage of the material obtained? What does the person want for granting the interview? How should he or she be thanked?

If attention is paid to the concept of adolescence readiness educators can realistically plan in regard to the formation of particular attitudes and refinement of certain skills in the most stable environment of the student-teacher relationship, the classroom.

#### **Classroom Environment**

Classrooms should:.

- a. State that (society) is based upon certain rules (laws)
- b. Provide an opportunity for student to examine, explore and to question.
- c. Provide an opportunity for students to obtain skills which help to alleviate fear (presentation skills, logical thinking, problem solving, improved feeling of self worth, etc.)

d. Should transmit messages that promote hard work, good citizenship, the life-cycle key social, economic, and political questions.

e. That life is for the living and in as much as circumstances permit should be enjoyed.

f. Allow for controlled, semi-controlled and uncontrolled interaction between students/students and teacher.

In the course of the student teacher relationship the classroom becomes the most stable condition of the relationship. At one time for many the kitchen of one's home served the same function for families. Good day or bad, rain or shine this is where we meet. The potential for impact inherent in such rooms is enormous. The more vital the room the more likely that vitality will be transmitted to those who are within. Directed vitality provides the foundation for accomplishment. Bare classrooms pre-suppose that vitality is being provided elsewhere. What happens when it is not being provided elsewhere? Disruptive behavior, apathy, disinterest—a search for the easy way out? There are a number of programs *in* various stages of implementation in school districts throughout the nation. The verdict is still out in regard to how effective many of these programs can or will be. In the meantime we believe the classroom, its physical presence, offers an excellent point of attack. The physical presence of an entity can have an effect on one's emotional well being. Drab, or barren, or haphazardly constructed (decorated) classrooms do not motivate. We think this is especially true for middle and high school students who were initially educated in elementary classrooms that contained so very much to excite, to arouse ones curiosity, to entertain, to liven the spirit, to remind, to teach . . . so much to challenge students to learn how to learn. Many of our interest and concerns are rooted in our particular age-group. What is of interest and valid to an adult of 28 to 40 may have little significance to a student of 13 to 17.

An exchange of places reflection of students interest for that of the adults will not necessarily effect a solution. It will not reflect balance respect for the rights of others. The room should reflect a process and not solitary segments.

We recommend the following as standard classroom equipment:

A. *Time Line* : A band of information that covers one to three walls of a room:.

*First Wall* : could be a simple time line of events, that compares items, conditions, or people of the past with those of the present.

Second Wall : It could project educational materials felt relevant for different periods of time.

*Third Wall* : It could chronicle a single entity such as means of transportation from man (walking) to spaceships.

B. *Cassette Station* : A cassette player is bolted to a station. Tapes which are made by the students, teacher and other sources would be available for listening or production. A schedule of random or assigned usage could be effected.

C. *Message/Graffiti Board* : Large square pad or bulletin board on which students are allowed to write messages, rules should be posted for usage. A short selection on Graffiti in History will help set the tone for this usage of space.

D. Posters: To transmit messages—to entertain—to use as an aid in presentation. An outlet for creative students-opportunity to encourage something new for the not so creative.

E. *Library Corner* : Relevant materials that reflect the subject area from a variety of positions—from the very serious to the very humorous.

F. *Problem Solving Corner* : A box of brain teasers that cause for students to use a wide range of skills to solve.

G. *Speaker's Stand* : Regardless of the subject a stand for oral presentations is most important. Presentations should not be forced on student, rather they should be encouraged to try and give a presentation. As the year progresses presentations should be worked in as a class requirement. Another consideration in regard to classroom environment centers around seating arrangements. Certain lessons are enhanced by the simple re-arrangement of the desk. (ex. discussion-circle, Teamwork groups of 2, 3, 4's).

The Teacher's desk when possible should also be moved (once a marking period is not unreasonable). People are often fearful of change, however, change can also awaken interest.

There is nothing wrong with students wondering where they might be sitting on a given day. It can also awaken an interest in probability within the student. It may start students to begin considering and suggesting possible arrangements that could be utilized, which provides an excellent opportunity to implement a student's decision.

### Integration MATHEMATICS/SKILL DEVELOPMENT

It is readily apparent to one who teaches in a school system such as ours (urban) that the teaching of various subject areas in a relative vacuum does not hold any values. Our students must not be taught facts such as those in a history or mathematics course in "recipe or cookbook" form because this will do little to serve them in the "real" economic world that they will eventually be part of. We must, challenge students "to learn how to learn." This is what the employees of the world are really seeking. Having been involved in the Private Industry Council "Summer Jobs for Youth," we received first-hand knowledge of what New Haven area employers are looking for from our students. We firmly believe that through mathematics, one can teach our students to think logically. and to be able to take a problem, look at the given data, and solve the problem.

One of the first tasks would be emphasizing that, as in all other areas of life, mathematics has its own unique language, vocabulary, that must be understood in order to go any further. After this area is covered we need to show the students how to use the mathematical and computational skills that they have mastered to solve every-day life problems and then to learn and/or better understand the material being presented in other disciplines such as history or science. We must, somehow, get our students to "think", to see the "big picture"; for if this is accomplished, they will them see the value of high school education.

In our unit we will teach the students to gather data where applicable, process the data, interpret the data, and to implement findings from the given data.

We will teach students how to take data in graph form; bar, circle, histograms, and interpret and truly understand the meaning of the information directed at them. We will also teach the students how to construct their own graphs from various data (collected) or presented to them. Also, we will teach the students how to find various measures of central tendencies such as arithmetic mean, the mode, the median and the midrange and then once they are comfortable in finding these measures for central tendencies will get them to be able to choose among the aforementioned and use the correct and appropriate measure. And to use this information as a part of a project or presentation.

Another area we will cover will be a mini unit on deductive thinking which can be taught through the medium of mathematics.

Through the use of conditional (if-then statements) we hope to emphasize to our students that they can and must develop the ability to see a casual relationship for example in events that might be taught in a *history class*. If this—if then concepts can be put across our students will be on the way to developing the ability to be able to learn how to learn.

Example:

Given that the constitutional requirements for:

President are: a. at least 35 years of age b. natural born citizen c. 14 years a resident (prior to election

Given that it is equally true that certain unwritten requirements are attached to the office of President.

Such as: a. membership in the Democratic or Republican Party

- b. Male/White
- c. enormous amount of financial support

If x = constitutional requirements

- y = potential candidate (one who has realistic chance of winning
- z = unwritten requirements for Presidents

then 
$$y = x$$
  
 $y = z$   
 $y = x + z$ 

## **BIBLIOGRAPHY**

Cohen, Morris R., and Nagel Ernest, An Introduction to Logic and Scientific Method . New York: Harcourt, Brace, and Jovanovitch, 1934.

Cole, Michael, et al., "People's Conceptions of Intelligence," Journal of Personality and Social Psychology, vol. 41, 1981, pp. 37-55.

Huff, Darrell, How to Lie with Statistics , New York: W. W. Norton and Company, 1954.

Piaget, Jean, The Psychology of Intelligence, Totowa, New Jersey, Littlefield, Adams, 1972.

Shulte, Albert P. and Smart, James R., *Teaching Statistics and Probability*, 1981 Yearbook.

Sternberg, Robert J., "Criteria for Intellectual Skills Training."

Robert J., "How Can We Teach Intelligence."

Robert J., "Intelligence and Nonentrenchment," Journal of Educational Psychology, vol. 73, 1981, pp. 1-16.

Robert J., "Nothing fails like success: The search for an intelligent paradigm for studying intelligence," *Journal of Educational Psychology*, 1981, 73, 142-155.

Robert J., "Testing Intelligence Without I.Q. Tests."

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