Academic math program at Simon Fraser

W. G. Sorge

This year we are attempting a "B" option in each grade level. We have two classes in Grade VII and one each in Grades VIII and IX.

GRADE VII

Mrs. Acton and I are attempting to develop a structured course for our students. We started with a unit on number systems other than base 10. We are now progressing in two different directions so that we can better analyze our programs at year end.

The Grade VII program I have developed has been based on Irving Adler's *Magic House of Numbers*, plus any interesting material I am able to find in my reading. The program to date includes the following areas of study:

(a) quick check method for base 10 calculations (casting out 9's)
(b) number curiosities (patterns, etc.)
(c) triangular numbers
(d) square numbers
(e) cube numbers
(f) perfect numbers
(g) puzzle problems with and without numbers
(h) magic squares
(i) topology (moebius strips)
(j) games
(k) items of interest from research.

GRADES VIII AND IX

Since I am involved only in teaching the Grade VIII and IX programs, I have allowed considerable overlapping in the two and will consider them together. More freedom and less teacher direction is allowed with these levels. Approximately one period in three will involve teacher-directed activities while the other two periods involve pupil interest.

PROGRAM OF BASIC UNITS OF INSTRUCTION

(a) puzzles, commercial games, and library projects
(b) teacher-directed activities:
    pure math (areas not covered in text - for example, vectors)
    general interest (from personal reading, any activity I feel informative and interesting will be attempted), for example, hexahexaflexagons and flexatubes from Scientific American publications or math materials purchased from J. Weston Walch, Portland, Maine.
(c) games (I will have students make their own games after introducing several from the Walch publications).

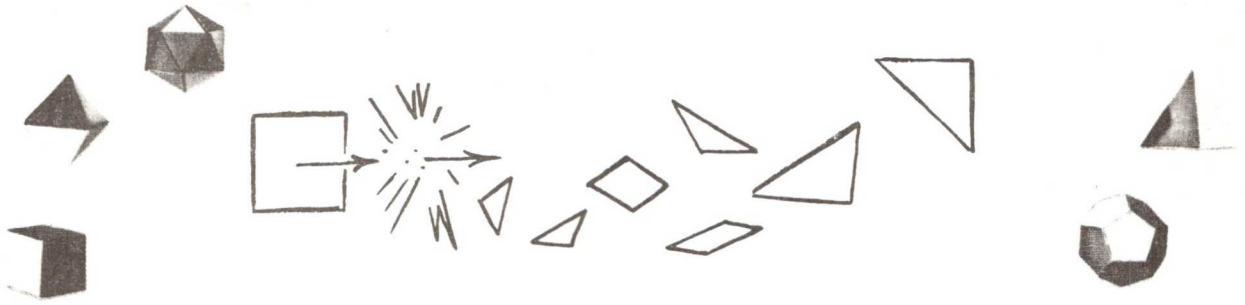
Mr. Sorge is vice-principal at Simon Fraser Junior High School.

EQUIPMENT REQUIRED FOR A SUCCESSFUL MATH PROGRAM

(a) good library, scissors, paper, rulers, glue, pipe cleaners and straws, etc.
(b) money for the purchase of math oriented games, puzzles, and for texts.
(c) adequate space.

EQUIPMENT FOUND USEFUL IN OUR PROGRAMS

(a) *Magic House of Numbers* I. Adler
(b) *Scientific American Book of Mathematical Puzzles*
(c) some cubes (excellent)
(d) Hi Q and Brainbuster
(e) Instant Insanity and number cubes
(f) wooden puzzles: cubes, octagons, boats, pyramids, tower of Hanoi, barrels, spheres
(g) games: Tuf, Wff'n Proof series - Wff'n Proof, On Sets - (games of logic), Equations
(h) Publications from J. Weston Walch: bingo, graphing pictures, Yes - Math Can be Fun (excellent), For the Math Wizard (excellent), Games for Learning Mathematics, Poster Sets on Math (wide variety to choose from).



DIFFICULTIES

(a) lack of time for adequate research
(b) maturity of child involved
(c) evaluation
(d) teacher's math background

The following chart is an attempt to show mathematical concepts which some of our projects have introduced.

PROJECT	MATHEMATICAL CONCEPT
1. bases other than ten	(a) relationship of different numeration systems to our system (b) students learn how our numeration system was formed (c) place value (d) reading numerals (e) addition, subtraction, multiplication and division in different bases

2. check method of casting out nines	(a) drill in mathematical computations with excellent way of checking solutions quickly and accurately (b) we demonstrate how system applies to bases other than ten
3. triangular, square, cubic, rectangular and perfect numbers	(a) our numeration system is made up of a series of different numbers forming different geometrical shapes (b) introduces idea of research in mathematics because no one knows if there is a seventh perfect number
4. word puzzles with and without numbers	(a) demonstrates importance of reading, interpretation, collection of relevant facts, and solution finding
5. wooden puzzles, Soma, Brainbuster, etc.	(a) students become familiar with prisms (b) assembly of puzzles takes considerable thought and patience (c) teaches organization and symmetry
6. flexagons	(a) construction of angles (b) types of triangles (c) formation of different geometrical figures from a strip of connected equilateral triangles, e.g., trapezoid, parallelogram, centennial design, etc. (d) introduction to regular solids, e.g., tetrahedron, octahedron
7. magic squares	(a) pattern of formation (several) (b) sequence of numbers
8. tower of Hanoi	(a) relationship to base 2 (b) formation of formula to determine number of moves for x number of blocks
9. poster problems (Walch Publications)	(a) mathematical calculations relating to everyday business world
10. games	(a) mathematical calculations (b) proper use of parentheses (c) set theory (d) logic

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