Mathematics Council NEWSLETTER

The Alberta Teachers' Association

Volume 2 Number 8 May 1984

From the Editor . . .

I have previously emphasized the need for creating an environment where students can learn mathematics in a practical situation. The following article by Henry Taschuk and Bob Mitchell does an excellent job of outlining how a math lab can be established and used effectively.

There exists in every school the opportunity to establish a math lab. It can start on a small scale and be developed over time.

Hopefully, this article will present the incentive to get math labs going in some schools.

Math Lab at Satoo Elementary School

A walk through Satoo Elementary School reveals the usual sights of an elementary school: busy classrooms, active, happy children, and children's work displayed on hallway walls. However, one area of this school attracts attention because of its uniqueness. To the students, staff, and parents of Satoo, this area is simply known as the Math Lab.

In the Math Lab, mathematics is taught with concrete "hands on" materials. Hundreds of activities and student materials crowd the wall storage areas. Tables and chairs are arranged to encourage small group work. Learning centres such as the "General Store" beg children to get involved in mathematics. Trays and boxes filled with buttons, beans, blocks, and geoboards are neatly stacked in the storage areas. Some materials are commercially made, but most have been put together by teachers, parents, and students. The Math Lab has the appearance of being a place for children. It is designed to be a place where children "experience" mathematics.

According to Satoo's principal, Bob Holmes, the Math Lab concept has two major objectives. First, it provides children with concrete experiences

to help them develop mathematics concepts and skills. Second, it provides teachers with an environment in which they can develop a more complete understanding of how children learn mathematics.

The Math Lab concept in Satoo began about four years ago. Several Satoo teachers, including Rick Johnson, visited Highwood School Math Lab in Calgary. All teachers were impressed and excited by the effectiveness of the approach in helping children develop mathematics concepts and skills. Through school and District funding, Mr. Johnson and his colleagues began the collection of materials and the development of activities. With Mr. Johnson's leadership, the Math Lab became a vital part of Satoo's mathematics program.

Initially, all grade 1 and 4 children spent a portion of their mathematics instructional time in the Math Lab where Mr. Johnson and the classroom teacher directed student activities. The positive response of teacher and students to the Math Lab convinced Mr. Holmes to expand the program to include additional grades. Over the next two years, the grade 2 and 3 children were included in the program. At present, grade 1, 2, and 3 classes are scheduled in the Math Lab for two hours per week. The activities are directed by each classroom teacher with the assistance of a teacher's aide who helps to prepare and collect materials.

Mr. Johnson sees several benefits for children involved in the Math Lab program. Increased uderstanding of mathematical concepts, the improved ability to discuss mathematics fluently, and the development of a more positive attitude towards mathematics are the three most obvious benefits. Mr. Holmes reports that the program has helped teachers become more effective and knowledgeable mathematics educators. Parents in the community have been very supportive of the program; many of them have volunteered to assist in the collection and preparation of materials for the Math Lab. Several parents have acted as teacher aides by assisting with student activities.

Mr. Holmes is pleased with the impact of the Math Lab on the students and teachers in his school. For future years he sees a continuation of this program and, hopefully, the expansion of the program to include students of all grade levels. The incorporation of the microcomputer is another direction being seriously considered by the Satoo staff.

Another avenue Mr. Holmes would like to explore is the use of the Math Lab as a centre where District teachers can improve their teaching of mathematics. In the meantime, teachers interested in a tour of the Math Lab are invited to contact Bob Holmes at 462-5125.

The Satoo Math Lab program has been internationally recognized by the National Council of Teachers of Mathematics. In this regard, the council will be featuring Satoo students at work in the Math Lab on the covers of the April, May, September, and October 1984 editions of the Arithmetic Teacher. Copies of these editions will be distributed to all elementary schools in the District.

Congratulations on a job well done to Rick Johnson, Bob Holmes, and the rest of the staff at Satoo Elementary.

--*Henry Taschuk and Bob Mitchell* (reprinted from Staff Bulletin, Edmonton Public Schools, March 9, 1984)

Items of Interest

This letter was written to the Associate Director of Curriculum and should be of particular interest to all teachers of Mathematics 31.

Gary Popowich,
Associate Director of Curriculum,
Devonian Building, West Tower,
11160 Jasper Avenue,
Edmonton, Alberta.
T2K 0L2

April 5th, 1984.

Dear Mr. Popowich,

On behalf of the Mathematics Council, the current Issues Committee has examined the issue of Mathematics 31 in regard to Rutherford Scholarship requirements. It is our recommendation that Mathematics 31 should be allowed as one of the courses a student may present.

We base this recommendation on the following points:

1. Core objectives in Mathematics 31 either are different from, or extensions of, core objectives in Mathematics 30.
2. Mathematics 31 is advantageous to students pursuing post-secondary education in Mathematics/Science related fields.
3. Mathematics 31 requires significant levels of rigor and abstract logic indicative of high scholastic ability.

Thank you for your consideration. We trust this recommendation will be taken forward to the appropriate committees.

Yours truly,

Louise Frame

Louise Frame,
Chairperson,
Current Issues Committee,
Mathematics Council.

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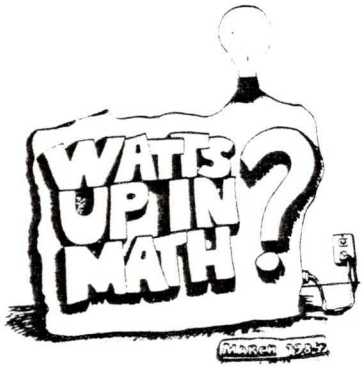
If you can fit another conference into your schedule, this looks as if it could be an excellent one.



Mathematics Update

This article is provided to us by Bruce Stonell, Education Consultant, Red Deer Regional Office.

He outlines what is occurring at the Department level as far as mathematics is concerned.

1.0 Elementary

1.1 New Recommended Calculator Resource

Ginn Publishing's calculator workbooks provide a good source of "instructional" and "computational" activities for students. Activities develop and reinforce concepts, foster exploration and experimentation, and facilitate problem solving. Materials also furnish basic ideas for an elementary school calculator literacy program. Book 1 and Book 2 provide activities for grades 1 to 3 and grades 4 to 6 respectively.

Please refer to the School Book Branch Catalogue for other listings of recommended calculator books.

"Yes, Virginia - Calculators Have an Important Place in a Computer World!"

1.2 TOPS Materials (Techniques of Problem Solving)

Negotiations are taking place between Dale Seymour Publications and two Canadian firms (GLC Publishers and Spectrum) for distribution of these excellent problem-solving materials. No provincial authorization will be considered until the material has been Canadianized and has been made metric. Dale Seymour Publishing is currently making these required changes to the materials and expects to have them completed in approximately one to two months. Whichever of the two Canadian distributors for Dale Seymour presents the best price to Alberta Education will likely receive the contract with the School Book Branch.

1.3 Elementary Mathematics LOGO Packages

1.31 A locally developed LOGO package by Judy Dobson (Lindsay Thurber Comprehensive High School) and Pat Richardson (Edmonton Public) and published by Addison-Wesley, will likely be ready for distribution this September. The package will be a contained unit introducing the teacher to LOGO using problem-solving strategies and will take them through to extended applications, grades 3 to 6. The package will

correlate with the problem-solving monograph and the 1982 elementary mathematics program.

1.32 Alberta Education is preparing an inservice package on LOGO for educational supervisors which will use the Polya problem-solving model, and will integrate with mathematics, language arts, social studies, and other subject areas. This inservice package will include the Dobson/Richardson package. A training package will be piloted in May-June, and by August it is expected that the first 25 consultant's packages and 200 kits of teacher material will be ready.

I believe that an inservice approach similar to the one used to introduce the problem-solving component of the elementary mathematics program will be utilized.

2.0 Junior High

2.1 Needs-assessment questionnaire

It was previously mentioned in the January issue of WATTS UP IN MATH that a questionnaire based on perceived changes to the Junior High Program would be administered to teachers this year to provide information for curriculum revision. It was decided recently to postpone the administration of the questionnaire, likely until after completion of the Secondary School Review. I expect a flurry of curriculum revision in the early part of 1985 with possible piloting in September 1985.

2.2 Jurisdictions Considering the Purchase of New Textual Materials

Those jurisdictions considering the purchase of new textual materials are encouraged to make arrangements with the various publishers that have new or revised junior high texts. New provincial listings are unlikely prior to September 1986. With the normal delisting process, jurisdictions will receive at least three years of use from any new texts they may choose.

3.0 Mathematics 31

Based on pilot results from the first semester, the Math Curriculum Coordinating Committee has recommended that Mathematics 30 be the co-requisite or pre-requisite for Mathematics 31. Pilots indicated that some students had a weak background for both the calculus and vector components of the Math 31 course. As a result additional class time was required to teach the skills students required prior to addressing the Math 31 objectives.

The MC^3 also recommended that Mathematics 31 be included as one of the Grade 12 courses used to determine student eligibility for the Rutherford Scholarship. The Math 31 course meets or exceeds the academic nature of the courses currently used to determine eligibility for the scholarship.

The new textual resource for Mathematics 31 will include material for the core (Calculus - 50%, Vector - 30%) and the electives. The new text

is a collection of chapters from a variety of different Holt texts. It is expected to be ready this spring.

4.0 Annual Conference of the Mathematics Council of the ATA will be held at the Red Deer College on Friday evening, October 26, and Saturday, October 27, 1984.

THEME: Mathematics for the 21st Century

Please encourage teachers from your jurisdiction to attend. Further information regarding workshops and sessions will be forthcoming.

1. So you say you're tired of those smart algebra students showing you those neat little tricks with numbers. You say you want 3's? I've got plenty. Here's one to get back at them with:

```
  12345679
X       27   :notice 27 is the THIRD multiple of 9
-----------
333,333,333
```

If you also want 4's, just do the same but with the FOURTH multiple of 9. Make 'em scream with this one. Remember to leave out the 8 in the multiple. Good Luck...

2. Find three positive integers such that the square of the square of the second integer decreased by 1 equals the sum of the three integers. The sum of the three integers is 2 times the quantity, 2 times the square root of 36. The sum of the first and second integers equals the sum of the three integers decreased by 11.

3. Simple Sequences -- What comes next? Can you find the next two numbers in these sequences?

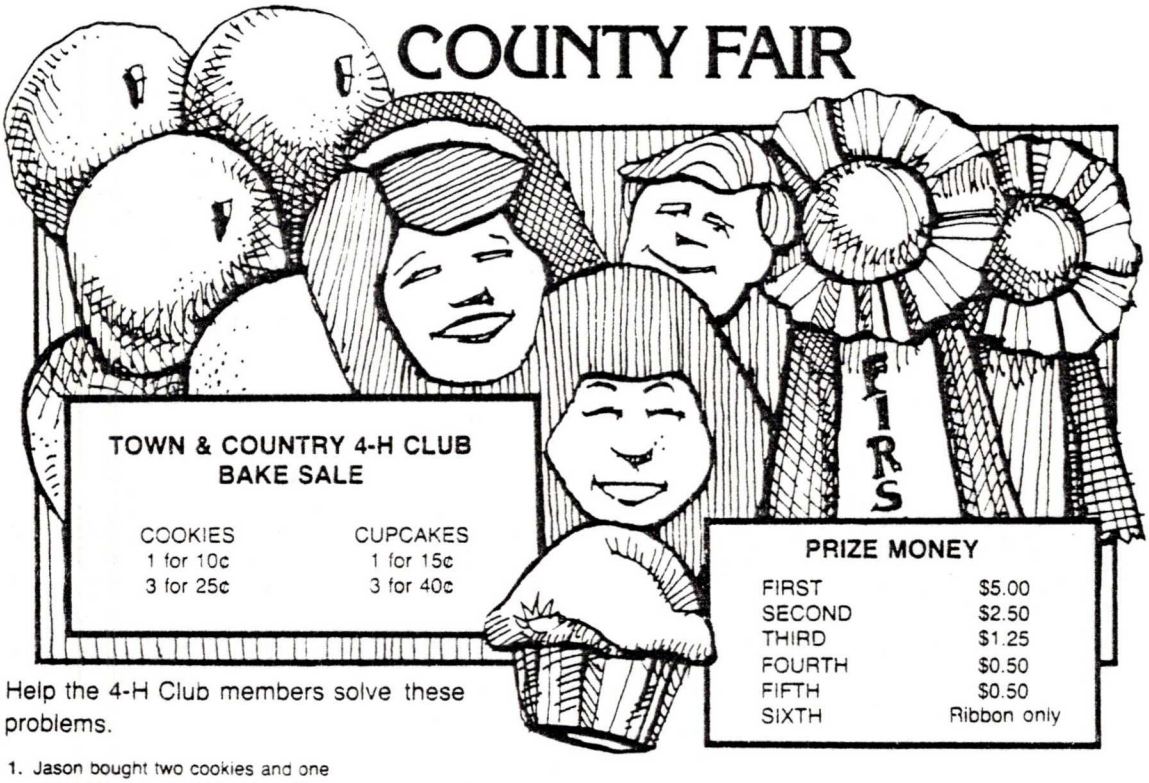
(a) 4, 8, 12, ...
(b) 5, 9, 13, ...
(c) 1 1/4, 2 1/2, 3 3/4, ...
(d) 3, 6, 12, ...
(e) 32, 16, 8, ...
(f) 121, 12321, 1234321, ...
(g) 3, 4, 6, 9, 13, ...

ANSWERS on page 12. . . .

IDEAS

NAME_____

WELCOME TO THE SHELBY COUNTY FAIR



Help the 4-H Club members solve these problems.

1. Jason bought two cookies and one cupcake. How much did he spend?

_____

2. Ting-Yi bought three cupcakes and three cookies for her grandparents. How much did she spend?

_____

3. Andrew bought nine cookies. How much change did he get back from one dollar?

_____

4. Waldo, Wanda, and Willie each bought one cupcake at the single price. How much could they have saved if they had bought the cupcakes at the "3 for" price?

_____

5. If you had 50¢ to spend at the bake sale, what would you buy?

_____

How much change would you get back?

_____

The chart tells the value of each prize at the fair. Answer the questions to the right about each club member's prize money.

6. Jeanine placed second in ceramics and sixth in oil painting. How much money did she receive?

_____

8. Maria placed second in gardening, fourth in woodworking, and third in photography. How much money did she receive?

_____

7. Craig placed fifth in photography, first in woodworking, and third in ceramics. How much money did he receive?

_____

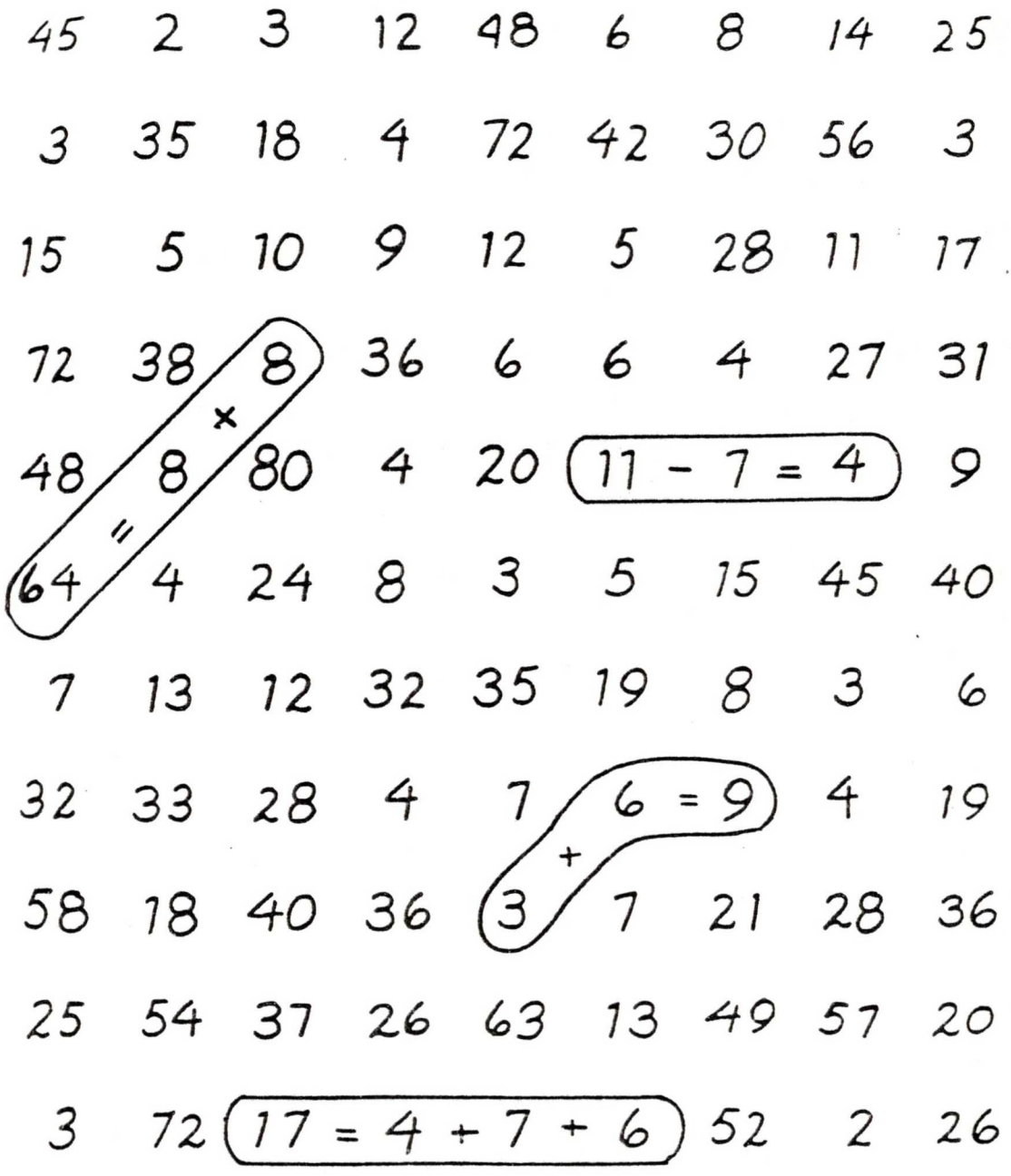
9. Jim had the measles and could not go to the fair. He received a check for $3.75 for the two projects that he had entered. What places did he win?

_____

From the *Arithmetic Teacher*, April 1984

Number Sentence Search

Make and "loop" correct number sequences. You may make an overhead and ask for oral answers or duplicate this sheet. (From *Problem Solving* by Oscar Schaaf, 1982.)



How To Teach Children to Hate Mathematics

Children generally do not hate mathematics when they start school. This is a trait they acquire as a part of their elementary school training.

The feat of loathing mathematics can generally be accomplished if the teacher will use one or more of the following procedures:

(1) Assign the same work to everyone in the class. This technique is effective, with about two-thirds of the class becoming frustrated from trying to do the impossible, and with the top third hating the boredom. Warning: this may not be effective with about the middle third of the class.

(2) Go through the book, problem by problem, page by page. In time, the drudgery and monotony are bound to get to them.

(3) Assign written work every day. Before long, just the word "mathematics" will remove every smile in the room.

(4) Be sure that each student has plenty of homework. This is especially important over weekends and vacation periods.

(5) Never correlate mathematics with life situations. A student might find it useful and get to enjoy math.

(6) Insist there is ONLY one correct way to solve each problem. This is very important as some creative student might look for different ways to solve a problem. He could even grow to like math.

(7) Assign mathematics as a punishment for misbehavior. The association works wonders. Soon math and punishment will take on the same meaning.

(8) Be sure that ALL students complete ALL the review work in front of the textbook. This ought to last until Thanksgiving or Christmas, and is certain to kill off the interest of most students.

(9) Use long, drill-type assignments with many examples of the SAME type of problem. (For example, 30 long column addition problems.) This type of assignment requires little teacher time and keeps the student occupied for a long time. The majority of the pupils are sure to dislike it.

(10) Always insist that papers be prepared in a certain way. Name, date, page number, etc., must each be placed in a specific spot. If a student fails to follow this procedure, tear up his paper and let him start over again. Instant humiliation and despair are almost guaranteed.

(11) Lastly, insist that EVERY problem worked incorrectly be reworked until it is correct. This procedure is most effective in promoting distaste for math, and if followed very carefully, the student may even learn to detest his teacher as well.

(Reprinted from Minnesota Council of Teachers of Mathematics Newsletter, March, 1983.)

Tongue-in-Cheek Corner

A Student's Guide to Problem Solving

Rule 1: If at all possible, avoid reading the problem. Reading the problem only consumes time and causes confusion.

Rule 2: Extract the numbers from the problem in the order in which they appear. Be on the watch for numbers written in words.

Rule 3: If rule 2 yields three or more numbers, the best bet for getting the answer is adding them together.

Rule 4: If there are only two numbers which are approximately the same size, then subtraction should give the best results.

Rule 5: If there are only two numbers in the problem and one is much smaller than the other, then divide if it goes evenly--otherwise, multiply.

Rule 6: If the problem seems like it calls for a formula, pick a formula that has enough letters to use all the numbers given in the problem.

Rule 7: If the rules 1 - 6 don't seem to work, make one last desperate attempt. Take the set of numbers found by rule 2 and perform about two pages of random operations using these numbers. You should circle about five or six answers on each page just in case one of them happens to be the answer. You might get some partial credit for trying hard.

Rule 8: Never, never spend too much time solving problems. This set of rules will get you through even the longest assignments in no more than ten minutes with very little thinking.

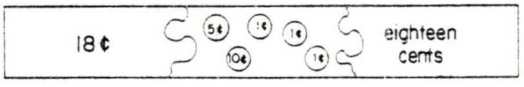
Joe Dodson

(This was taken from the North Carolina State Math Newsletter. The author, Joe Dodson, is Mathematics Supervisor for the Winston-Salem/ Forsyth County Schools.)

Money

MONEY VALUE RECOGNITION

Make a set of puzzle cards. The cards should be about 10 cm by 24 cm and made of cardboard or some type of tagboard for durability. Cut each card in two places, puzzle fashion, to make three pieces of about the same size. On the first piece, write the coin value in numerals (e.g., 18¢). On the second piece, represent the coins by a coin stamp, pictures of coins, or the like. On the third piece, write the value of the coins in words (e.g., eighteen cents) so the children associate the number value, the coin value, and the number word when they fit each puzzle together.



The cards can be color coded. Easy cards can be prepared for primary children, harder combinations for older children.

Try a game. Give out puzzle parts to all the children in the classroom. Allow them to locate their puzzle partners.

From the file of
Patricia Hershberger, Gardiner, NY 12525

AT-4-84

JOHN B. PERCEVAULT (University of Lethbridge) has taken one of the problems that had been submitted in an earlier Newsletter and expanded upon it to involve a number of concepts as outlined below:

The following series was presented

```
          1
        1 2 1
      1 2 3 2 1
    1 2 3 4 3 2 1
```

The readers were asked to continue the pattern by completing 2 or more examples.

By using the pattern and changing to an addition problem, a hypothesis may be formed.

			Multiplication Fact
Row 1	1	= 1	1 x 1
Row 2	1+2+1	= 4	2 x 2
Row 3	1+2+3+2+1	= 9	____
Row 4	1+2+3+4+3+2+1	= 16	____
		= ?	____
		= ?	____
		= ?	____
m	1,2,3,...m...,3,2,1	= ____	m^2

If this were continued find the sum of the numerals in the:

12 row ____
15 row ____
25 row ____

The diagram may be patterned to show the square number:

(a) X

(b)
```
x x
  1
x x
  2
1
```

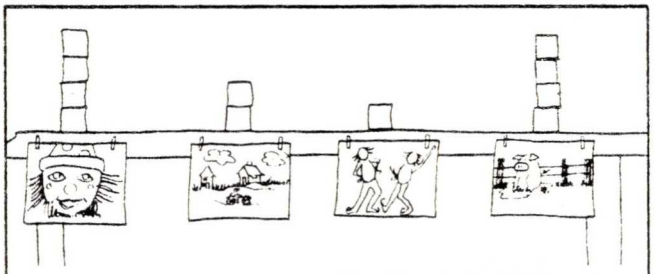
(c)
```
x x x
  1
x x x
  2
x x x
  3
1 2
```
etc.

Finally, junior high school students (senior high?) may enjoy discovering the relationship between the number in the row and the number of the row.

Row 1	1	1
Row 2	1 2 1	3
Row 3	1 2 3 2 1	5
Row m	1, 2, 3, . . . m . . . 3, 2, 1	2m - 1

There are still other relationships discernible in the table given above.

What's New?



How to Choose and Create Good Problems for Primary Children, *by Doyal Nelson and Joan Worth.* Written to help teachers design and select appropriate mathematical problems for the early childhood years. The material for this book was gathered in the early seventies and first appeared in NCTM's 37th Yearbook, *Mathematics Learning in Early Childhood.* Provides problems derived from real-world situations and events that will make sense to young children. 40 pp., #324, $3.00.

NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS
1906 ASSOCIATION DRIVE, RESTON, VIRGINIA 22091

It's of particular note that both Joan Worth and Doyal Nelson are Albertans who teach in the Department of Education at the University of Alberta.

Answers to Questions from Page 6 . . .

(1) ---

(2) 5, 8, 11.

(3) (a) 16, 20. Multiples of 4. An A.P. with a = d = 4.
(b) 17, 21. An A.P. with a = 5, d = 4.
(c) 5, 6 1/4. An A.P. with a = d = 1 1/4.
(d) 24, 48. A G.P. with a = 3, r = 2.
(e) 4, 2. A G.P. with a = 32, r = 1/2
(f) 123454321, 12345654321. (Palindromic numbers)
(g) 18, 24. The differences between consecutive numbers form the sequence 1, 2, 3, 4, 5, 6.

Editor's Note . . . Since this is the last issue of the Newsletter for this school term, I wish each and every one of you a pleasant summer holiday. Hopefully, an issue of the Newsletter will be in your hands before September 30, 1984.

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