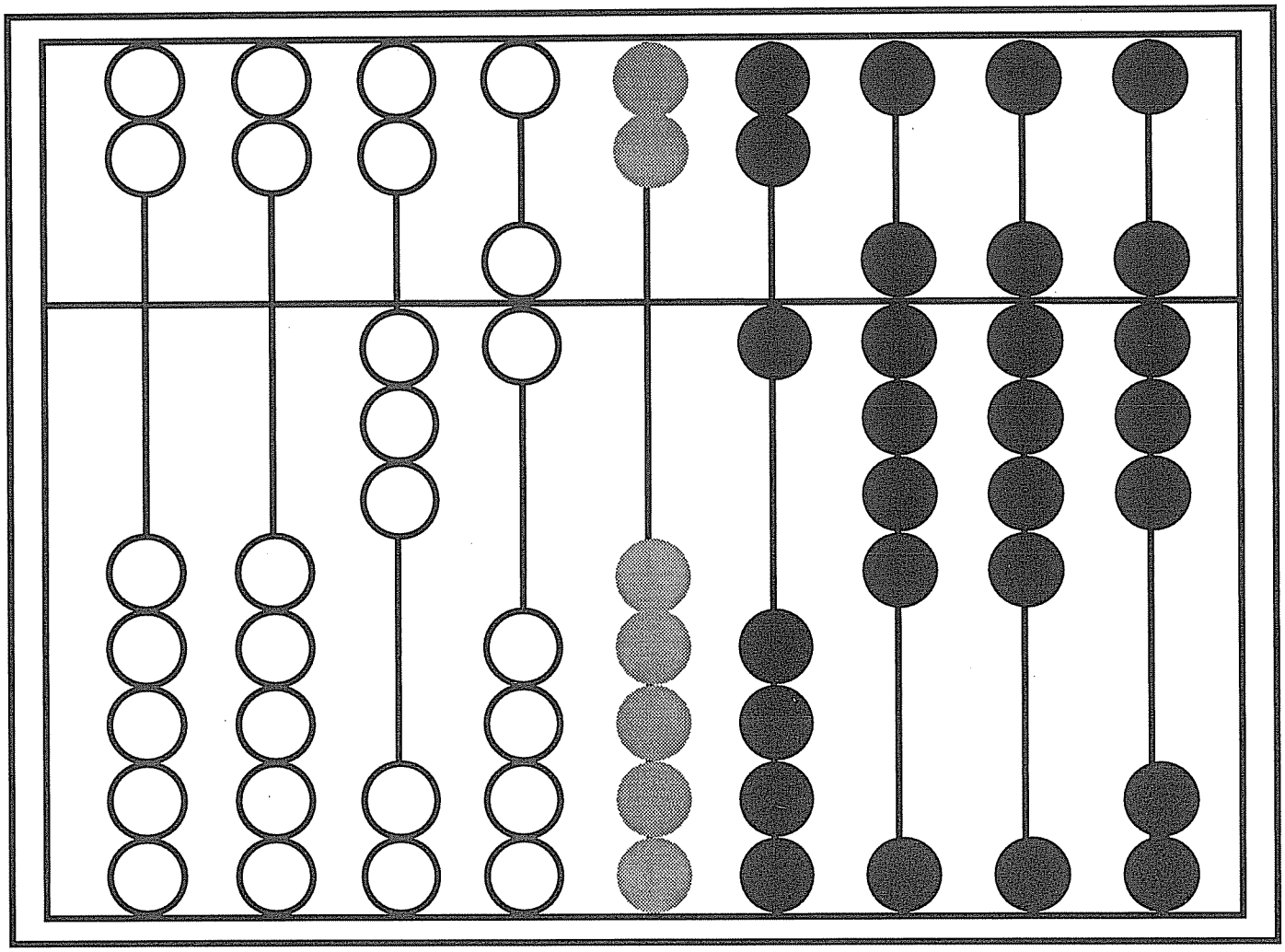
Abacus

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Patterns and Fun for Elementary Mathematics

A key component of the **Ontario Curriculum, Grades 1-8:Mathematics 1997** is the connection of mathematics strands to other subject areas. The primary and junior working groups of OAME are working hard on this project. In the March *Abacus* Susan Stuart and the junior committee presented 'quilt study' activities. In this issue you'll find excellent activities for patterning done by the primary working group and facilitated by **Nancy Moore**, Toronto. Nancy has extensive experience with primary mathematics in her career of independent consultant, author, instructor and coordinator for OAME Junior Assessment document. Thank you Nancy and committee for your efforts.

Wanted by Editor:

From time to time teachers ask me to write activities for specific strands and grade levels. As your editor I would be pleased to include submissions on one or more of the following which have been requested. Grade 2-5 is the level range.

1. Data Management, Statistics

Each spring and fall the local food bank has a drive for non-perishable canned and packaged foodstuffs. Does your class/school do a collection? If so, do you lead an activity that looks at amount of food collected, classifies the food,or determines the value of the food? Share your activity and/or results with other teachers via the *ABACUS.*

2. Statistics for Children (Data collection)

Children's natural questions about the world around them can lead to some interesting investigations and explorations. For instance, popcorn is made and someone notices that not all the kernels pop. This could lead to an exercise in determining what fraction of the kernels do pop each time, is the mass of corn before popping same as mass after popping, and how long does a kernel take to pop? Has anyone done this type of class activity? If so, share it with your colleagues via the *ABACUS.*

3. Mathematical Art

What activity do you do in your class? Send a sample to *ABACUS* editor.

Send your ideas to *ABACUS* editor (address and fax on front cover). Other teachers are waiting to see your ideas.

Frances Schatz

Answer Keys

Pattern

A B B C A B B C A B B C A B B C

3. **1 3 5 7 9**

1 4 9 16 25

1 3 6 10 15

1 3 5 7 9

20 16 12 8 4



Specific Expectations from Ontario Curriculum, Mathematics Grades 1 to 8

The following expectations are drawn from Grade 2. Please look at the corresponding expectations for Grade 1 and/or Grade 3.

Number Sense and Numeration:

- count by 1's, 2's 5's, 10's
- discuss the use of number and arrangements in their community?
- use ordinal numbers (first, second...)

Geometry and Spatial Sense:

- create a three-dimensional model from an illustration, using concrete materials
- make a pattern using two-dimensional shapes

Patterning and Algebra:

- recognize that patterning results from repeating an operation
- describe and make models of patterns encountered in any context and read charts that display the patterns
- identify patterns
- combine two attributes in creating a pattern
- relate growing and shrinking patterns to addition and subtraction
- given a rule expressed in informal language, extend a pattern

Data Management and Probability:

- pose questions about meanings derived from the data on graphs
- identify attributes and rules in presorted sets
- organize data using graphic organizers and various recording methods
- interpret displays of numerical information and express understanding in a variety of ways

Levels of Performance:

Level 1:

The student needs assistance to recognize the pattern and to extend it.
Needs assistance in communicating the pattern(s) created.

Level 2:

The student tries the activity but needs assistance in order to get back on track to extend the pattern.
Explains the pattern(s) with assistance.

Level 3:

The student works through the activity and accomplishes the task.
Communicates and shows understanding in the steps/terms of patterns.

Level 4:

The student works through the activity, accomplishes the task, extends the patterns and creates his/her own extensions of the activity.
The student communicates his/her strategy and understanding using mathematically precise language.

Teacher Notes:

In order to provide the students with experiences with extending growth patterns choose some of the activities from below. Consider the experience that the students have. Some students will need to have more free exploration time. Encourage the students to share patterns with each other and to communicate what the pattern is. Perhaps have students record or copy their patterns onto paper or card and have others extend their patterns.

Extension Activities

- Have the students use cubes, blocks and create their own growing and shrinking patterns.
  Record the pattern and share with a friend.

Teacher Interaction:

- What changes from the first step/term to the next one?
- What is different?
- What changes in the next steps?
- What will come next? How do you know?
- What numbers represent each step?

Pre Activities:

1. Free Exploration with Patterns

Suggested Materials:

• pattern blocks • film canisters • blocks • lego • buttons • bread/milk tags • stickers

Using a variety of materials have students build patterns.

- Have students share their patterns and have students discuss what would be next in the pattern.
- If possible take out the middle of a pattern and see if the students can tell what is missing. For example...

A B B C A B _ _ _ _ _ C A B B C

2. Patterns with Books

Read one of the following pattern stories and show it as a growth pattern.

Napping House, by Audrey Wood (ISBN 0-15-256708-9)

The story starts out with a napping house and in the napping house there is a bed, a cozy bed in the napping house and the snoring granny is on the cozy bed, in the napping house ...

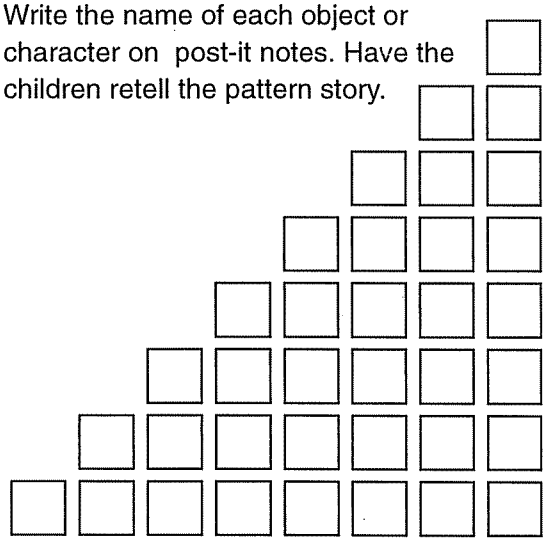
In a growth pattern the book looks like this...

						mouse	flea
					cat	cat	mouse
				dog	dog	dog	cat
			child	child	child	child	dog
		granny	granny	granny	granny	granny	child
	bed	bed	bed	bed	bed	bed	granny
house	house	house	house	house	house	house	bed
							house

On each page a new character is added to the pattern.

Suggested activities:

- Write the name of each object or character on post-it notes. Have the children retell the pattern story.

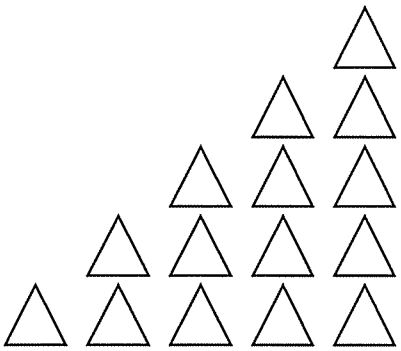


- Children can create their own napping house stories by starting with their house and what is inside.

					mouse
				cheese	cheese
			bread	bread	bread
		plate	plate	plate	plate
	table	table	table	table	table
House	House	House	House	House	House

Rooster's Off to See the World, by Eric Carle (ISBN 0-88708-042-1)

In this story, the rooster decides he wants to travel. So he sets off to see the world but he gets lonely. On each two page spread, the rooster meets other animals, two cats, three frogs, four turtles and five fish. After time the pattern decreases as the animals leave rooster as they are hungry. In the upper right hand corner of the page it has the pictures of the animals in a growing pattern.



Teacher Interaction:

- How many animals are there on the first page?
- How many are on the second? Third? .....
- What is the pattern?
- If I made this pattern with cubes what would it look like?

Suggested Activities:

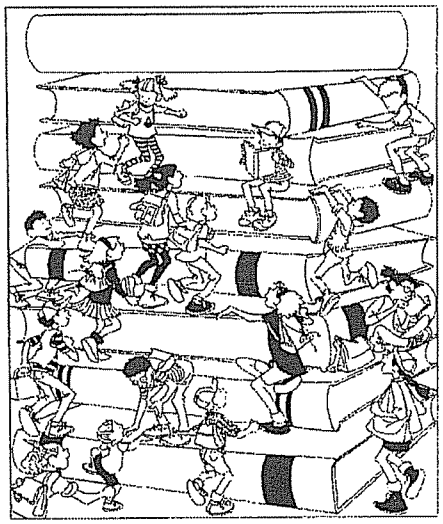
- Have students act out the pattern story as a class. Have pictures of the characters that the students can hold.
- Have students write their own pattern stories.

I went for a walk in the city and I bought 2 apples, 3 candy bars, 4 flowers and 5 dinosaur stickers. This could be illustrated as the book illustrates the pattern.

On my walk home, I visited my best friend and I gave her the 5 dinosaur stickers. I next ran into my grandmother and gave her 4 flowers. I met friends in the park and we ate the 3 candy bars.....

Other Pattern Books:

(This is just a partial list...ask the resource teacher-librarian for others.)



The Cake that Make Ate
Rose Robart 0-919964-96-6

A Rose in My Garden
Arnold Lobel 0-590-41530-1

Five Little Monkeys Jumping on the Bed
Eileen Christelow 0-89919-769-8

I Know An Old Lady That Swallowed a Pie
Alison Jackson 0-525-45645-7

The Bag I'm Taking To Grandma's
Shirley Neitzel 0-688-12960-9

The 12 Circus Rings
Seymour Chwast 0-15-201-361-X

Mouse Count
Ellen Stoll Walsh 0-15-201050-5

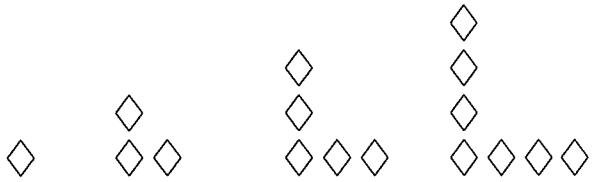
I Went to the Zoo
Rita Golden 0-590-24533-3

Big Fat Hen
Keith Baker. 0-15-200294-4

3. With materials have students extending and creating patterns.

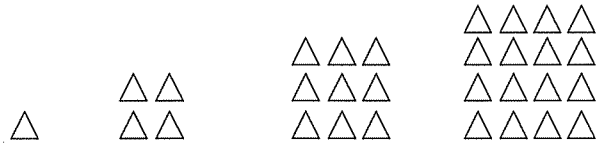
The following patterns can be placed on activity cards and children can build the patterns with the manipulatives. Students could be asked to record their work on paper or in their journals. The work can be shared at the end of the activity.

Extend the pattern...



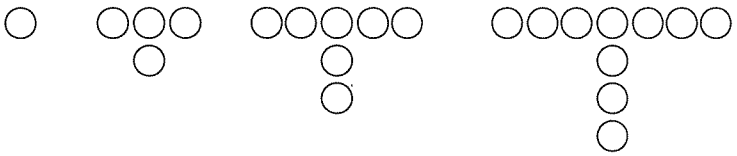
What is the number pattern for this design? 1 3 5 __ __

Extend the pattern...



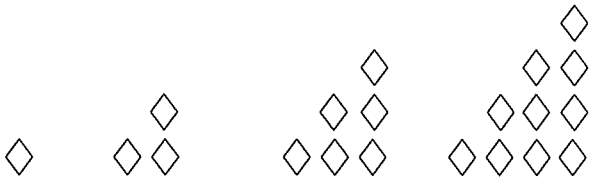
What is the number pattern for this design? 1 4 9 __ __

Extend the pattern...



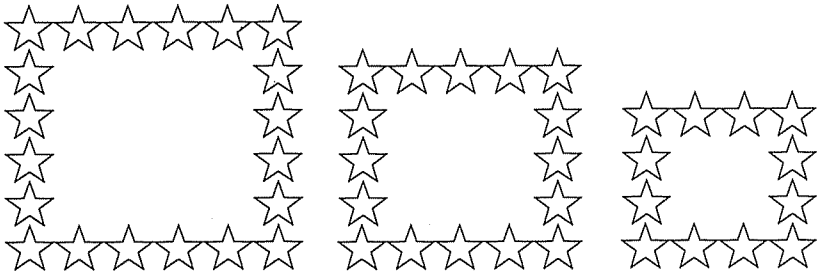
What is the number pattern for this design? 1 3 6 __ __

Extend the pattern...



What is the number pattern for this design? 1 3 5 __ __

What comes next...



_____ _____

What is the number pattern for this design? 20 16 12 ___ ___

4. Graph and Chart a Growing or Shrinking Pattern.

Model with the students creating a chart and graph to represent a growth pattern by using one of the above models or taking one of the student's examples.

In the first step, how many cubes were used?

In the second step, how many cubes were used?

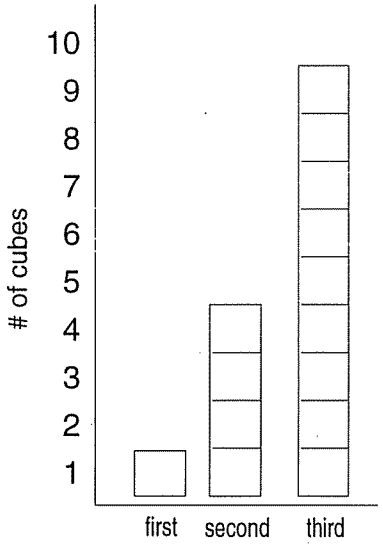
Continue recording in a T chart.

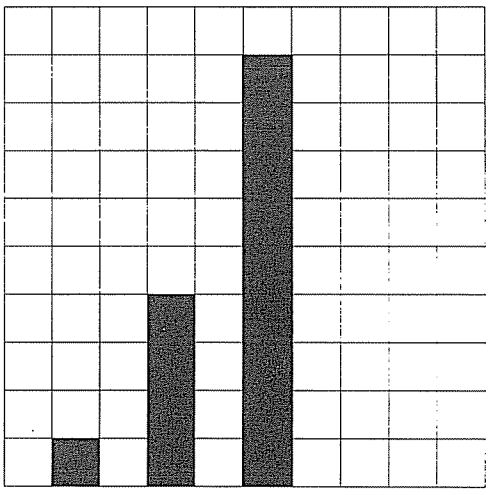
Step/Term	# of cubes
1	1
2	4
3	9

OR

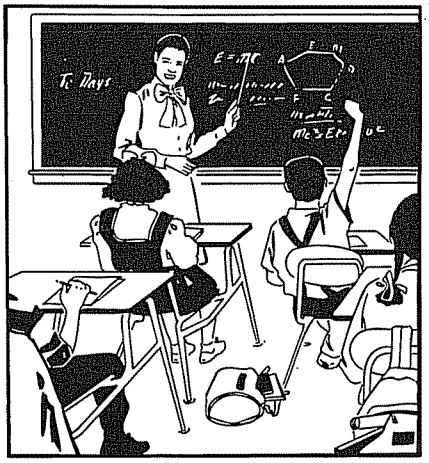
Make a concrete representation using cubes.

Then have students transfer onto the graph paper.





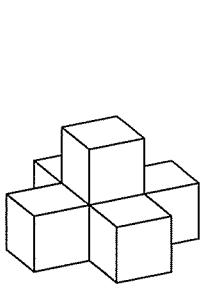
All in a Row

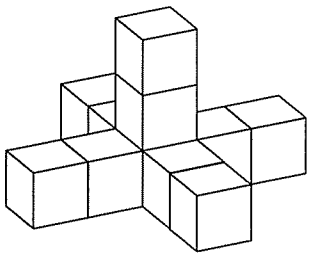


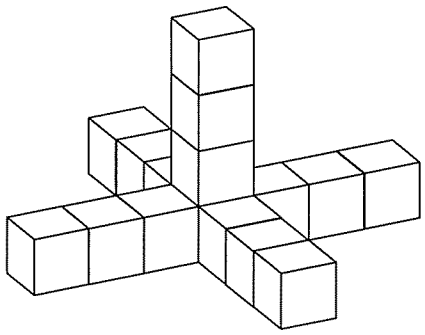
Materials:

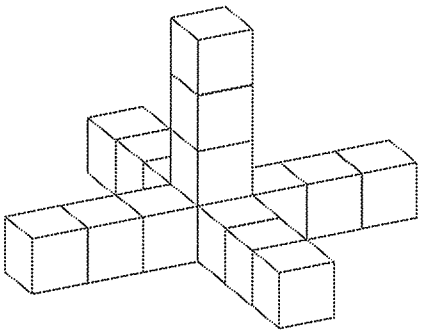
- linking cubes
- 2 cm grid paper
- paper
- pencil
- markers

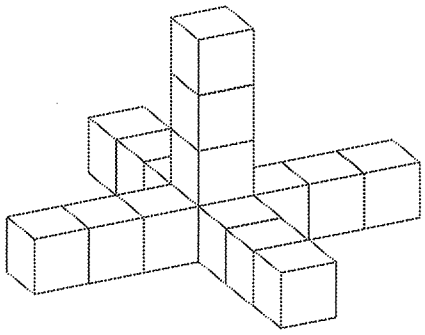
Using the cubes continue the growth pattern.











Extending the Learning:

- Create a chart and graph to represent your growth pattern.

