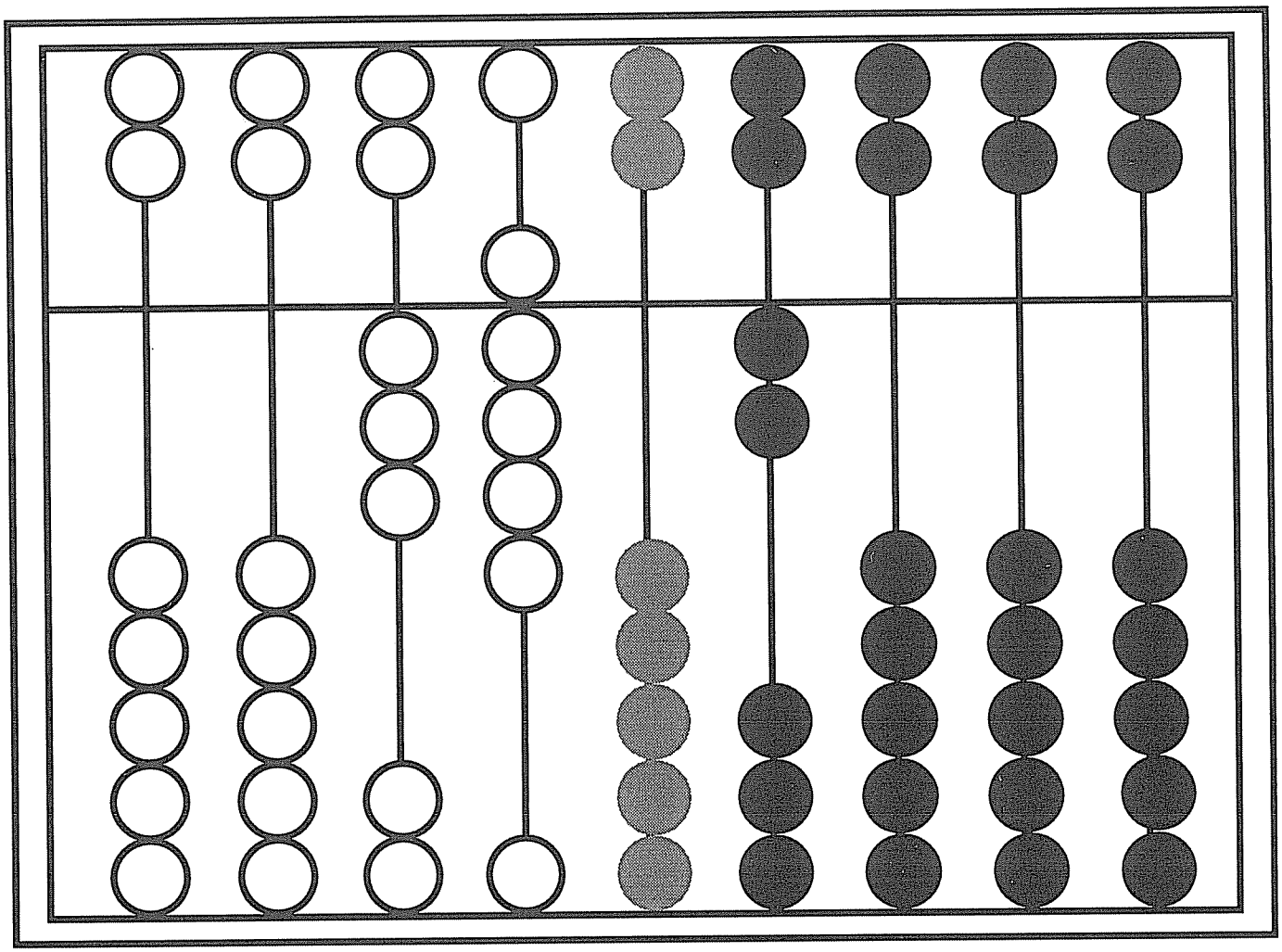
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Edited by Frances Schatz 56 Oxford Street, Kitchener, Ontario N2H 4R7
Tel: (519) 578-5948 • Fax (519) 578-5144 Email: frances.schatz@sympatico.ca

▲ From the Editor's Desk

In the September 2000 issue, **Joanne Harris**, Centennial Middle School, Georgetown, provided *Abacus* readers with a very interesting Data Management and Probability Performance activity using OHL statistics. In this issue you will see some results produced by her students, **Evan M**, **Jonathan S**, and a group of girls **Candon J**, **Jessica Y**, and **Jessica M**. Joanne told me that one student is a talented hockey player while the others took the task seriously and relied on what they had learned in class to help them address the project. Excerpts from their projects can be found on pages 3 and 4.

In July, I attended the NCTM Regional conference in Halifax. The theme of the conference was *Making Mathematics Meaningful in the Millennium.* It was held at the World Trade Centre in downtown Halifax not far from harbourfront where the Tall Ships had gathered. This conference gave me an introduction to curriculum and assessment across the country. I have chosen several items to share with readers.

Martha Stewart, a mathematics consultant with the Annapolis Valley Regional School Board in Nova Scotia, presented *Developing Measurement Concepts in Early Elementary Classes.* I really found her general framework for helping students develop an understanding of a measurement concept interesting. Her first steps (before formal measurement units and formulas are used) include:

A. Seriation: put items in order by looking and feeling. Increase the challenge as you move up the grades.

B. Comparison: put items side by side and make direct and indirect comparisons

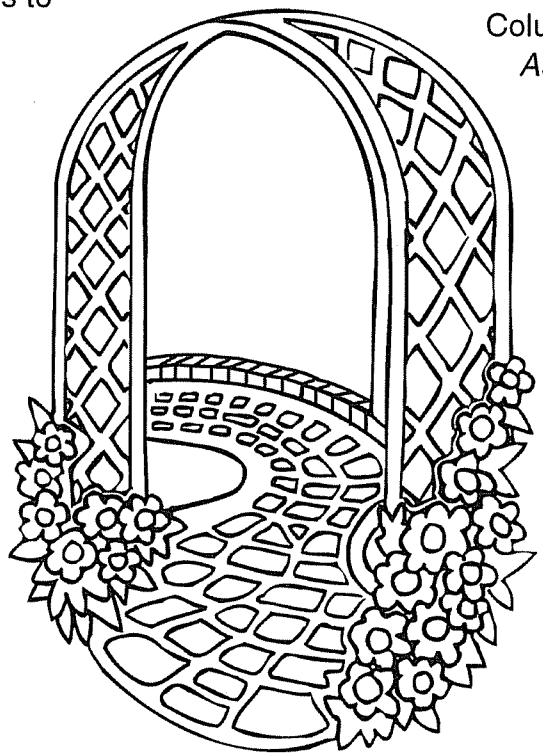
C. Make and use countable non-standard units.

D. Make and use countable standard units.

A String Puzzle, **Personal Tape Measure**, **and Millimetre Measure** give excellent ideas for K-3 measurement learning centres.

Jocelyn Heighton, a teacher at River John Consolidated School in Nova Scotia, provided hands-on *Nifty Number Sense: Fun Explorations in the Early Grades.* **Number Line Quickies** (K-4) describe activities to help students develop a sense of the relative magnitude of numbers.

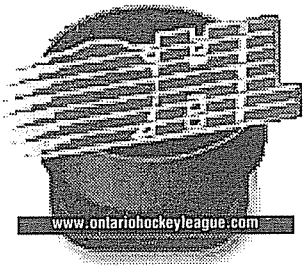
Catherine Sheard, Coquitlam, British Columbia, has done in-depth research in *Assessing Mathematics Meaningfully - Rubrics in Action* for middle school. **Leading You Down the Garden Path** is a middle school activity that lends itself very well to group work and an opportunity for the teacher to observe social skills for group work and to see what math processes are being used to solve the problem.



There was lots of mathematics on and around the Tall Ships too. That will be saved for another time.

Frances Schatz

▲ OHL Playoff Predictions



(excerpts from work done by Joanne Harris students Spring 2000)

(Editor's note: Please see September 2000 Abacus *for details about this project.)*

Report I

To decide the outcome of the 1999-2000 OHL playoff series, there are several factors that lead to my decision. I looked at current leaders, regular season records, and current playoff scores. The main component in making my decision is each team's record to its opponent. To decide the qualifiers into the second round, I looked at the first round match-ups. In each series I took the past history of the teams' confrontations and if there was a tie in the number of wins, then the highest regular season placed team would break the tie and win. If the regular season standings are too close to break up a tie in the first round, then any current lead is used.

(Editor's note: This student compiled charts for the four rounds, then summarized his predictions in the following table.)

My bets are as follows:

(Team name with percent chance of being 1st)

1. Barrie	95%	9. Sarnia	1%
2. Plymouth	75%	10. Kingston	1%
3. Ottawa	60%	11. Peterborough	1%
4. Erie	40%	12. Kitchener	1%
5. Sudbury	1%	13. Brampton	1%
6. Sault Ste. Marie	1%	14. Oshawa	1%
7. Belleville	1%	15. Guelph	1%
8. Windsor	1%	16. North Bay	1%

Report II

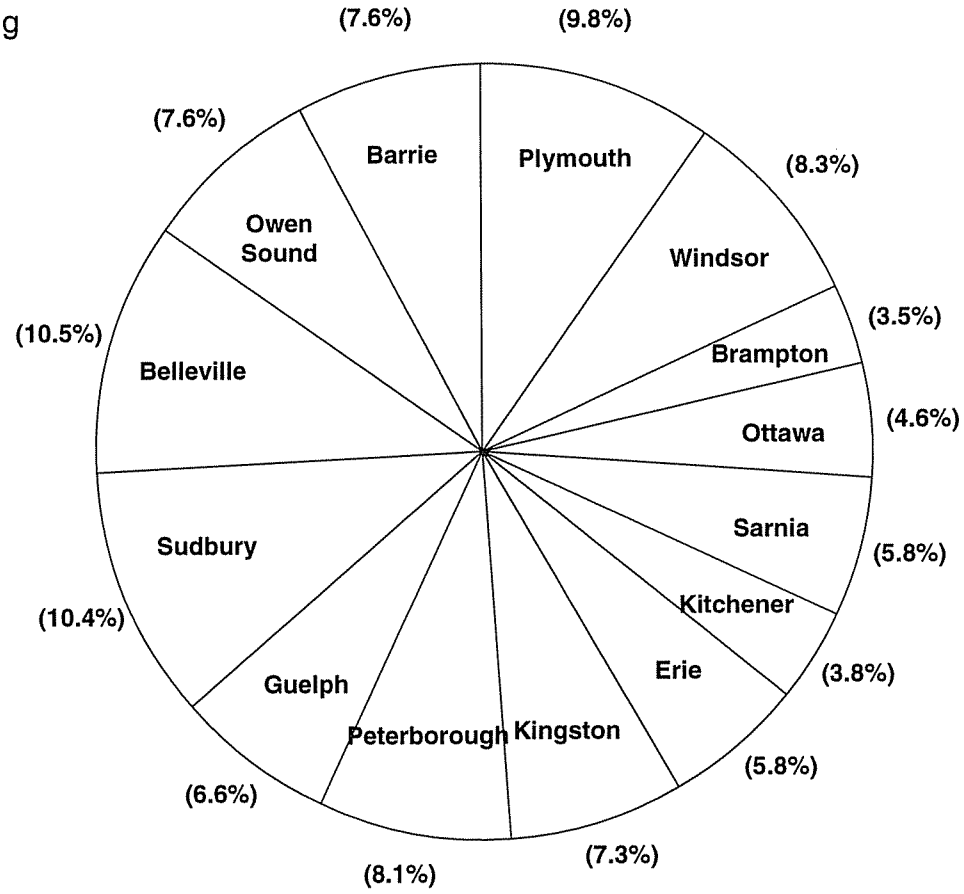
I give the Ottawa 67's 91.5% chance of winning with Plymouth a 70% chance, Barrie Colts a 35% chance, Erie a 5% chance, Belleville a 2% chance, and all others 0% chance. Here is why I picked the Ottawa 67's.

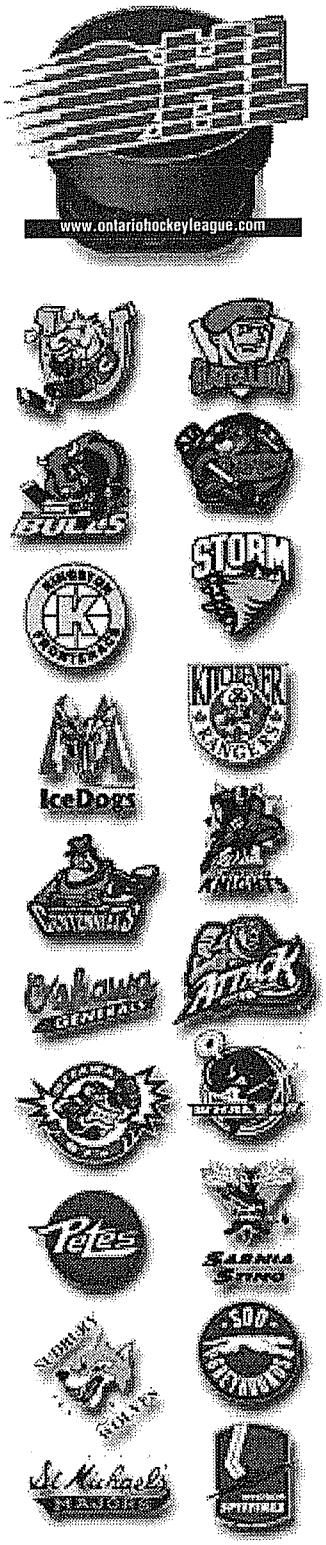
The Ottawa 67's are usually a fairly good hockey club in the regular season. This year they finished 2nd in the East, only two points back of the Barrie Colts. With great experience behind the bench, they are a disciplined squad of boys. The Ottawa 67's also carry a strong team, which dominates in the defensive end of the ice. This is why they have the third best plus minus in the league. The defensive play of Ottawa has been a key factor, as their first string goalie has been sidelined for 28 games this year with heart trouble (murmur). Ottawa also picked up a few new faces just before the deadline, to help a playoff run.

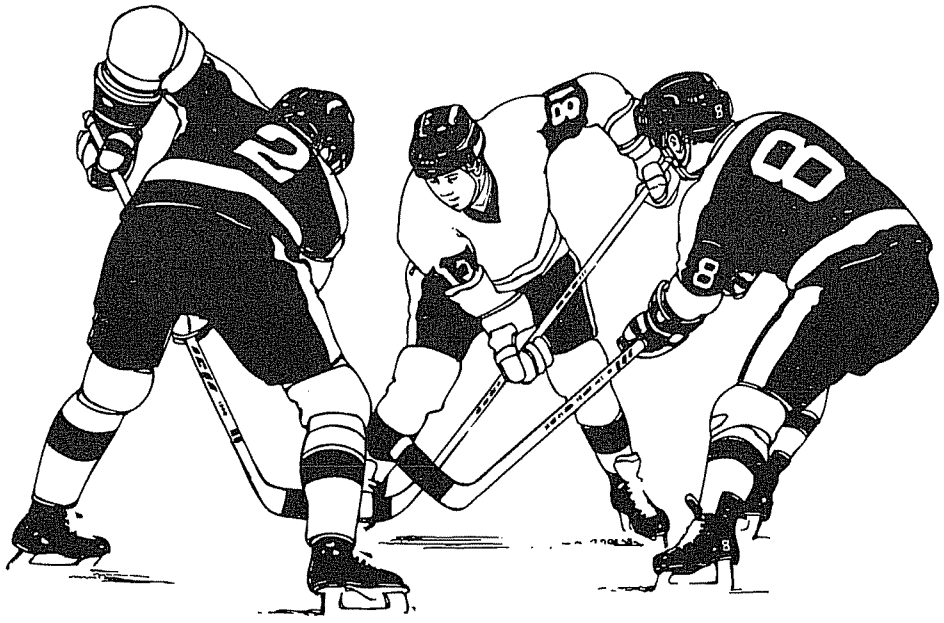
In the past the 67's have had tremendous playoff runs. They are known to come alive in the playoffs. The 67's coach has won the cup with a couple of teams, including his own. As the defending champs, the Ottawa 67's are under a fair bit of pressure this year. But, like always in the playoffs, they will rise to the occasion.

Report III

We calculated the chances of winning for each team and produced the following pie chart.







▲ Making Mathematics Meaningful in the Millennium: A Collection of Activities

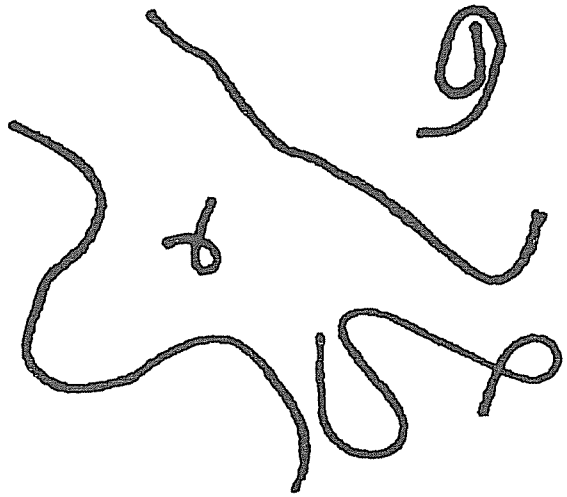
A String Puzzle

Materials: pieces of string or wool, paper, scissors, glue

Activity:

1. Cut a piece of string as long as your pencil.
2. Cut a piece of string that is longer than your pencil.
3. Cut a piece of string that is shorter than your pencil.
4. Cut two pieces of string that are the same length.
5. Paste the pieces of string on a piece of paper in different shapes.

Example:



Ask a friend:

- Which piece of string is the longest? Shortest?
- Which two pieces are the same length?
- Make up some other questions for a friend to answer.

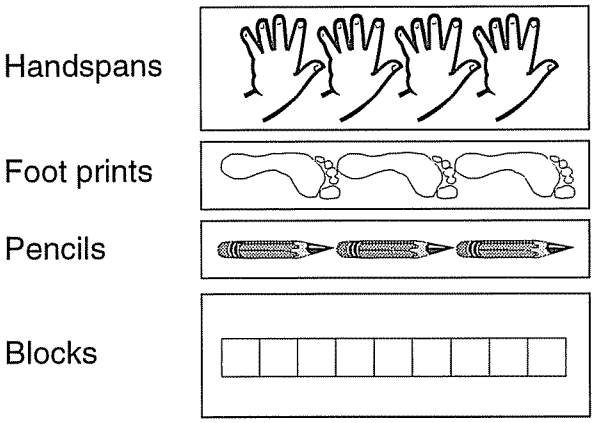
Personal Tape Measure

Materials: strips of paper, pencil, scissors,

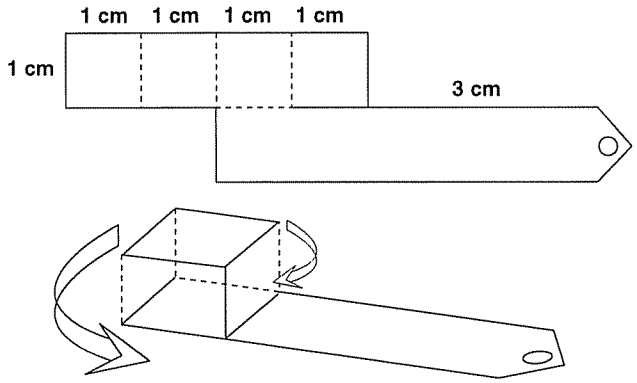
Activity:

1. To make your tape measure you may want to use handspans, footprints, blocks, pencils.
2. Trace around these on the strip of paper.
3. Measure things around your classroom or at home.

Example:



Millimetre Measure



Use the above diagram. Cut on the solid lines, then fold on the dotted lines.

With tape, you have made yourself a little square-sided spoon as shown.

NUMBER LINE QUICKIES

Here are a few number line activities to help students develop a sense of the relative magnitude of numbers.

(Editor's note: Jocelyn Heighton adapted some of these ideas from Elementary and Middle School Mathematics *by John A. Van de Walle, 1998, pages 177-178)*

1. My Number Position

0 _____ 50

Draw this line on a blackboard or a sheet of paper on the floor. Each student has a card with a number from 0 to 50 on it. Ask students to place numeral cards along the number line and justify their placement. Encourage discussion.

2. Who Am I?

0 _____ 100

Draw this line on a blackboard or a sheet of paper on the floor. Mark the position of a secret number, called Who Am I. As students try to guess the secret number, mark and label their guesses on the line. Continue until the secret number is identified.

3. Squeeze Me

0———10———20———30———40———50———60———70———80

Subdivide a line into ten equal parts and label with multiples of ten (above is an example). Place arrow cards at each end. Leader has a secret number. As the students try to guess the leader's secret number, the leader announces whether the guess is too high or too low. The arrow cards are moved to the spot corresponding to the guess - as they are moved they will squeeze in on the leader's secret number.

4. Close, Far, and In Between

Pick any three digit numbers, example: 523, 318, 839.

1. Which two numbers are closest? Why?
2. Which number is closest to 400? To 750?
3. Name a number between the middle and high number.
4. Name a multiple of 25 between the low and the middle number.
5. Name a number that is more than all of these.
6. About how far apart are the low and the high number?
7. Estimate the total of all three numbers.

Have students create other questions related to three chosen numbers.

5. Friend - What is Your Number?

Choose boundaries for a set of numbers. Print a number on a sticky note for each person so that each number is different. The leader goes around the room and puts a different number on the back of each person. The goal is for the friend (who knows the number) to answer yes or no to the questions asked by the person who must guess the number on his/her back. The questions must require yes or no answers. Once the number is guessed, the friend hands the sticky note to the person, and each person gets into a line that puts the numbers in the room in order.

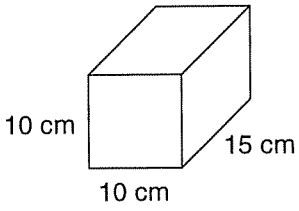
(This activity can be extended to decimals and fractions within boundaries.)

▲ Leading You Down the Garden Path A Landscape Problem

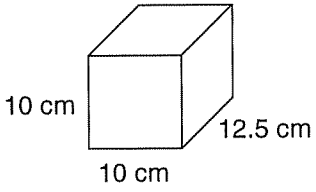
You are part of a landscape design team and have been contracted by Ms. Greenstreet to design an ornamental brick border for both sides of a nine metre garden path. The border must be composed of a repeating pattern of bricks and the pattern must repeat at least 16 times. The pattern must be the same on both sides of the path and the border must not extend past the end of the path or finish before the end of the path. Nor must the pattern be incomplete at either end of the path.

The bricks you have available have these dimensions:

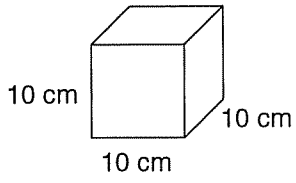
Brick A



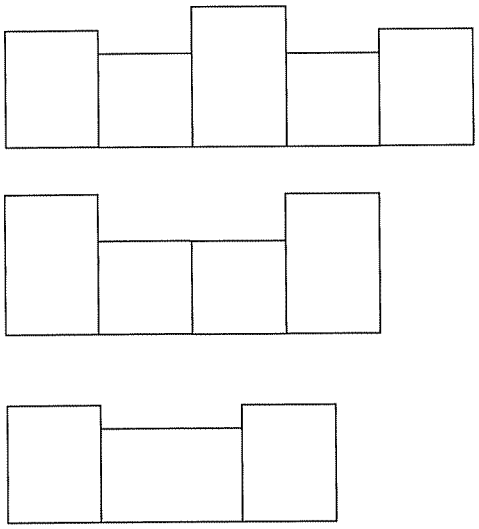
Brick B



Brick C



Examples of patterns the company has used in the past include the following (as seen from above):



However, a pattern will only be acceptable if it meets all of Ms. Greenstreet's requirements.

1. Discuss the problem with your landscaping group. Brainstorm ways of solving the problem.
2. Work individually to find solutions to the problem that are aesthetically pleasing and meet Ms. Greenstreet's requirements.
3. Prepare a presentation for Ms. Greenstreet. It must:
   - Show the pattern of bricks you are proposing.
   - Prove that x number of complete patterns will fit the length of the border.
   - Provide a breakdown of how many bricks of each size will be required to complete the contract.
4. As a group, write a rule or formula that the group could use to figure out how many bricks would be in a border of any length you are given. Assume a repeating pattern is used.

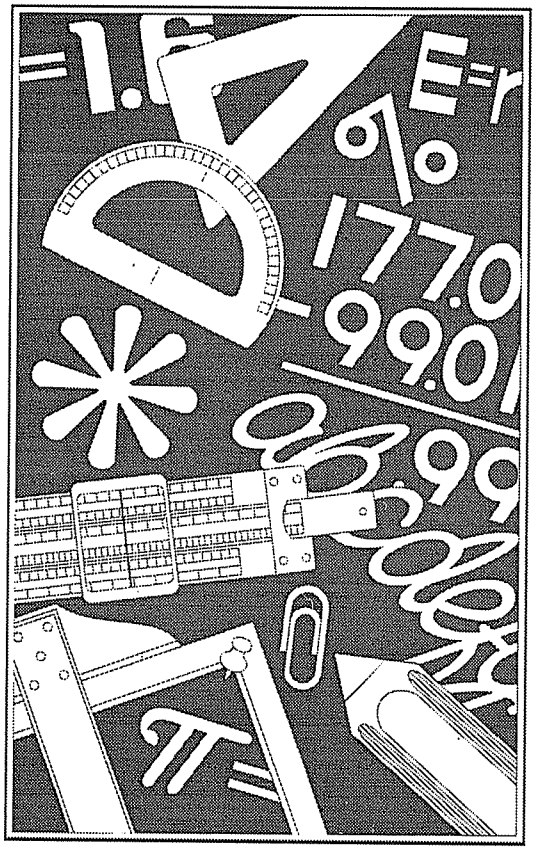
TEACHER NOTES FOR GARDEN PATH PROJECT

Observations Checklist

A. Social Skills for Group Work

The teacher completes this checklist while observing the students working on the group task. Observations can include:

- contributes appropriate ideas
- engages quickly in the task
- show respect for one another
- all members are involved
- all are focussed on the project



B. Student Reflection and Self-Assessment

Students need to reflect on their own work for the purpose of understanding themselves as learners. They need opportunities to reflect on their prior knowledge, the processes they are engaged in, and the quality of the products they produce. From these reflections, they are able to set personal learning goals. Some prompts to elicit thoughtful reflection include:

- In what ways did you contribute to your group task?
- What part of the problem did you find the most difficult? Most simple?
- Did you share your ideas with others?
- Were you a good listener?

C. Math Processes

The teacher can observe the following while the students work.

- makes logical predictions
- makes reasonable estimations
- develops own manipulatives
- draws a diagram
- revises the thought process
- summarizes the findings

D. Task Criteria

Criteria checklists define the expectations for successful completion of assignments. Each criteria can be rated on a 4 or 5 point scale.

• include an organized, accurate diagram	4 3 2 1
• include logical estimations	4 3 2 1
• does pattern fit entire length	4 3 2 1
• shows how many of each brick needed	4 3 2 1
• include and explain calculations	4 3 2 1
• summary is done	4 3 2 1

Students can be encouraged to develop their own task criteria. Suggest the use of action words such as use, describe, develop, explain, ...