Open-ended Explorations for your Math Corner

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Have you tried work cards to guide independent investigations for intermediate and junior high students? If so, have you wished for additional ideas that provide sufficient motivation but do not require extensive background materials or teachers' explanations? The following open-ended examples have been successful with individuals and small groups in the middle grades. Select from and adapt them (or better yet, allow children to do so) according to your classroom needs.

PERIMETER

1. Experiment with a geoboard or pegboard and rubber bands to find all the rectangles with perimeter 20 that fit the following rules:

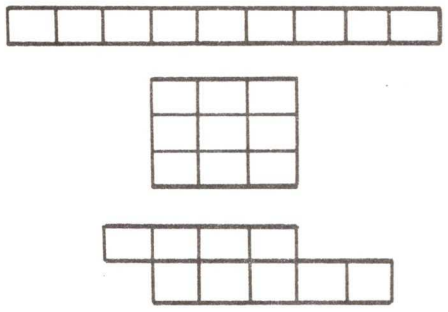
   Rule 1: Each side must measure a whole number of units - 1/2 unit not fair!

   Rule 2: Sides must follow lines - No jay walkers or diagonals allowed!

2. Draw each of the rectangles on dot paper.
3. Cut out the rectangles, order them according to length of longest side, and make a nest by pasting them one on top of the other on graph paper starting with the rectangle with the longest side. What pattern do you see?
4. What is the largest area possible under the rules given?
5. What is the smallest area?
6. If you were not limited to rectangular shapes, which one(s) having 20 unit perimeter(s) would enclose the largest area?

CONSERVATION OF AREA

1. How many different regions can you form using nine squares? (Do not overlap the squares. Organize your trials on dot paper.)
2. What is the largest perimeter you can have under these conditions?
3. What is the smallest perimeter?
4. Keep a record (chart) of your findings. For example:

REGION	PERIMETER
	

Then order the perimeters and plot the range of perimeters for the given unit area on a line graph. Compare graphs and try to predict maximum and minimum perimeters for other areas.

5. Experiment with 16 squares (or use dot paper) and predict the maximum and minimum perimeters.

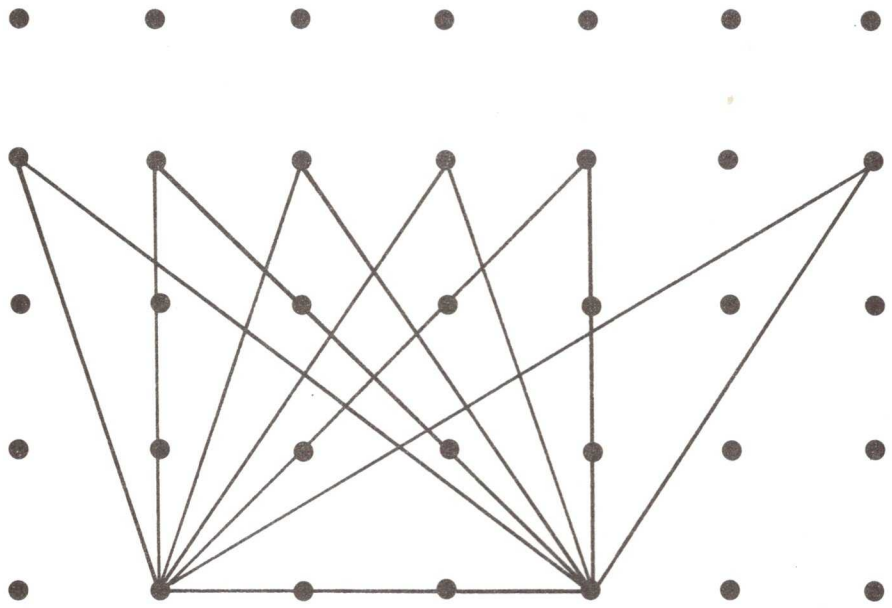
6. Check your guesses and graph the results as in 4.

7. Construct a line graph showing the number of outside edges in contrast with the perimeter.

8. Experiment with eight cubes and consider the maximum and minimum surface areas.

ATTRIBUTES OF TRIANGLES

1. Using a geoboard or pegboard and rubber bands, and a *single* base (for example, 2 units), construct five different triangles having the same height.



2. Find the area of all five triangles.

3. Make a chart to show the base, height, and area of all of the triangles.

4. Express as many ideas as you can as a result of your investigations.

5. Is there a relationship between the base and height of a triangle and its area?

6. Find the perimeters of the five original triangles and chart the perimeter and area of each. Which triangle has the shortest perimeter?

7. Predict the area of five triangles that have the *same base* as those in 1 above but are *twice as high.*

8. Draw the triangles in 7 on dot paper and find the areas to see whether you were correct.

9. Predict the area of five triangles that have the *same height* as those in 1 above, but have a base *twice as wide.*

10. Again draw the triangles and check your prediction.

11. Predict the area of five triangles that are *twice* as high and twice as wide as those in 1 above. Draw the triangles and check your predictions.

12. Find the triangle that encloses the largest area if the perimeter is 12 units.

MISCELLANEA

▷ The November, 1970, issue of *"The NTA Bulletin"* (Newfoundland Teachers' Association) carries a news item of interest to Alberta mathematics teachers: "125 teachers from across the province met in Gander on October 24 and formed a Mathematics Council... Guest speakers for the day were Dr. Joan Kirkpatrick who dealt with primary and elementary Mathematics..."

▷ We have received one copy only of a pamphlet entitled *"Positional Notation in the Gaussian Integers".* MCATA members may borrow this document. Address your request to the Editor.

▷ We remind you that letters to the editor are welcome anytime.