LESSON 2.10

Perimeter and Surface Area Functions

You will need:

the Lab Gear

PERIMETER

1. Look at this sequence of block figures. Think about how it would continue, following the pattern. Then:

a. Sketch the next figure in the sequence.

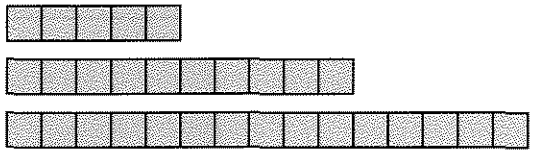
b. Copy and complete the table below.

c. Describe the pattern in words.

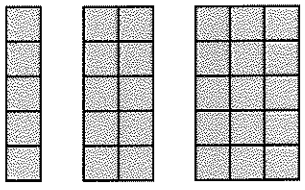
Figure #	Perimeter
1	4
2	6
3	8
4	...
10	...
100	...
n	...

Repeat problem 1 for each of these sequences.

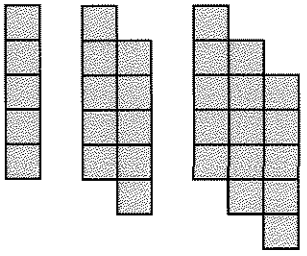
2.



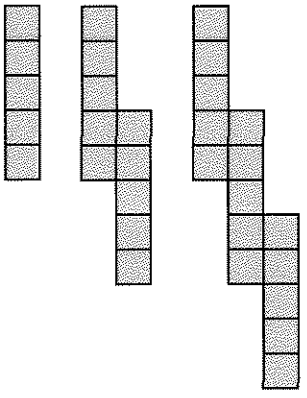
3.



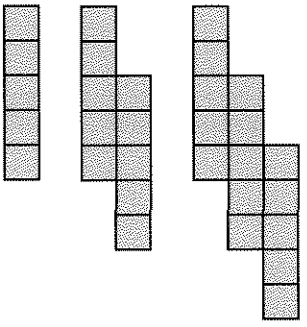
4.



5.



6.



If you have trouble answering questions 7-8 by trial and error, try making graphs from the data in your tables, with the figure number (n) on the horizontal axis and the perimeter on the vertical axis.

7. In problem 1, which figure would have perimeter 50?

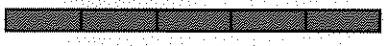
8. Is it possible to have perimeter 50 for any of the patterns in problems 2-6?

9. Look at the x-block.

a. What is the perimeter of its top face?

b. What is its perimeter if $x = 1, 2, 3, 4, 10$? Make a table like the ones above.

c. Compare your table with those in problems 1-6. It should be the same as one of them. Which one? Explain why you think this works.



10. a. This figure represents the tops of five x-blocks. What is its perimeter?

b. What is its perimeter if $x = 1, 2, 3, 4, 10$? Make a table like the ones above.

c. This figure is related to one of problems 2-6. Which one? Explain.

Note that in problems 9 and 10, just one figure represents a whole infinite sequence of figures, because of the use of variables.

11. Find the blue block that is related to problem 3. Explain.

12. For each of problems 4-6, build a related figure made of blue blocks. Check your answer by making a table.

SURFACE AREA

13. Look at the sequence of cube figures. Think about how it would continue, following the pattern. Then:

a. Sketch the next figure in the sequence.

b. Copy and complete the following table.

c. Describe the pattern in words.

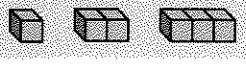
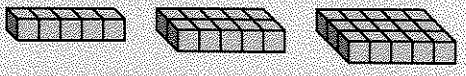
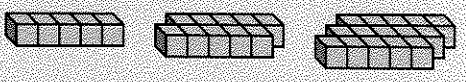


Figure #	Surface Area
1	6
2	10
3	14
4	...
10	...
100	...
n	...

Repeat problem 13 for each of these sequences.

14. 

15. 

16. 

17. For each of problems 13-16, build a related figure made of blue blocks. Chec your answers by making a table.

MORE SURFACE AREA

18. Look at the sequence. Think about how i continues, following the pattern. Then:

a. Sketch the next figure.

b. Make a table like the following one.

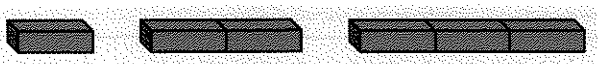
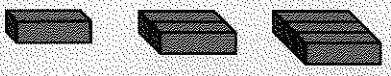


Figure #	Surface Area
1	$4x + 2$
2	$8x + 2$
3	$12x + 2$
4	...
10	...
100	...
n	...

c. Describe the pattern in words.

Repeat problem 18 for each of these sequences.

19.



20.

21.

22. Make a figure out of blue blocks such that by substituting 1, 2, 3, ... for y in its surface area you get the same sequence as you did in problem 19. Check your work by making a table.

GAME *SPROUTS*

This is a game for two players. Start with three dots on a piece of paper. These represent towns. Players take turns. To make a move:

- Join a town to itself or to another town with a *road* (a line).
- Place another town somewhere on the road you just created.

Rules:

- A road cannot cross itself, another road, or an existing town.
- No town can have more than three roads coming out of it.

The winner is the last person able to make a legal move.

23. Play the game with a classmate.

24. What is the maximum number of moves possible in a game?