

Perimeter and Surface Area Functions

You will need:

the Lab Gear



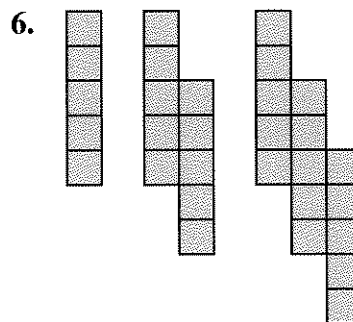
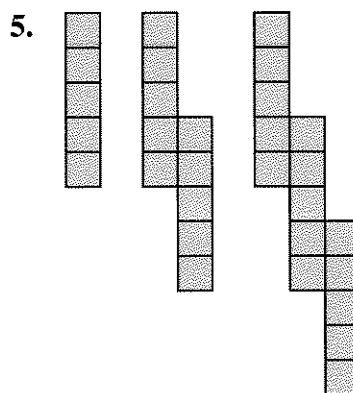
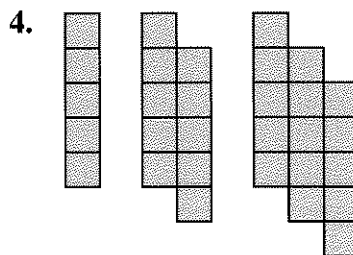
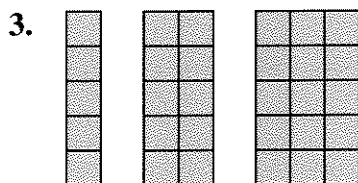
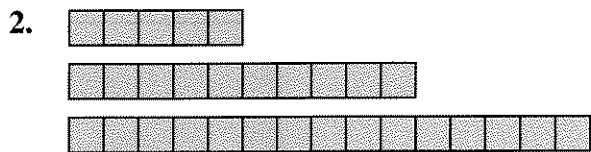
PERIMETER

- Look at this sequence of block figures. Think about how it would continue, following the pattern. Then:
 - Sketch the next figure in the sequence.
 - Copy and complete the table below.
 - 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.



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.

- In problem 1, which figure would have perimeter 50?
- Is it possible to have perimeter 50 for any of the patterns in problems 2-6?

▼ 2.10

9. Look at the x -block.
- What is the perimeter of its top face?
 - What is its perimeter if $x = 1, 2, 3, 4, 10$? Make a table like the ones above.
 - 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?
- What is its perimeter if $x = 1, 2, 3, 4, 10$? Make a table like the ones above.
 - 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.

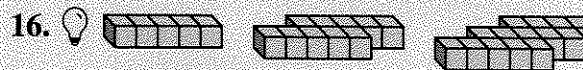
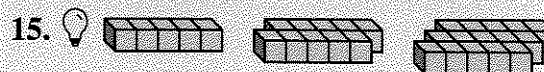
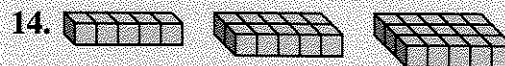
SURFACE AREA

13. Look at the sequence of cube figures. Think about how it would continue, following the pattern. Then:
- Sketch the next figure in the sequence.
 - Copy and complete the following table.
 - 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.



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

MORE SURFACE AREA

18. Look at the sequence. Think about how it continues, following the pattern. Then:
- Sketch the next figure.
 - 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.



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?