

# Lesson 1 Something to Talk About

## A Develop Understanding Task

Cell phones often indicate the strength of the phone's signal with a series of bars. The logo below shows how this might look for various levels of service.



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<https://flic.kr/p/KVRsof>



Figure 1

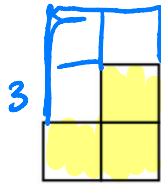


Figure 2

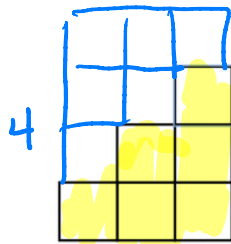


Figure 3

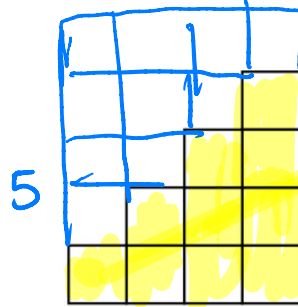


Figure 4

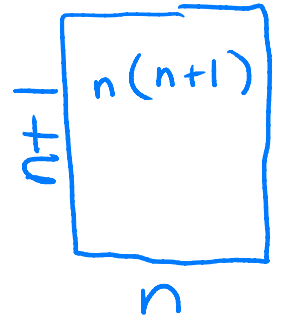
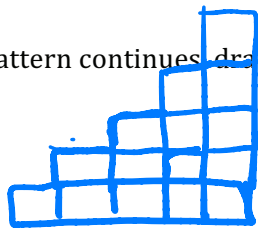


Figure n

1. Assuming the pattern continues, draw the next figure in the sequence.



2. How many blocks will be in the figure 10?

55 blocks

Figure #	Blocks
1	1
2	3
3	6
4	10
5	15

Handwritten notes:  $f(n-1)$ ,  $f(n)$ ,  $n$ ,  $n+1$ ,  $+2$ ,  $+3$ ,  $+4$

3. Examine the sequence of figures and find a rule or formula for the number of tiles in any figure number.

Recursive: Previous term

start  $\rightarrow f(1) = 1$

$$f(n) = f(n-1) + n$$

↑ previous term      ↑ Figure number

Explicit: Input to Output

$$f(x) = \frac{1}{2}(x)(x) + \frac{1}{2}x = \frac{1}{2}x^2 + \frac{1}{2}x$$

or

$$f(n) = \frac{n(n+1)}{2} = \frac{n^2+n}{2}$$

or

$$f(n) = \frac{1}{2}n^2 + \frac{1}{2}n$$