

Very Busy Animals

OBJECTIVE

Children will use estimation skills to determine sums, and discover a predictable growth pattern.

WHAT YOU WILL NEED

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Color Tiles, 55 per pair



.....

Crayons



OVERVIEW

In this activity, children use Color Tiles to figure out the total number of animals in a nonsense rhyme in which addends keep increasing by one.

THE BIG IDEA

In this activity, children work with a predictable growth pattern. With each new group of animals, the group size increases by one. A growth pattern of this sort, which increases or decreases by adding or subtracting a constant number at each step in a sum, is called an arithmetic series.

The pattern $1 + 2 + 3 + \dots$ appears in mathematical situations such as counting, staircase patterns, and triangular numbers. This pattern also occurs in many children's stories and poems. When young children work with this simple growth pattern, they reinforce their familiarity with counting. Using concrete objects to build the pattern helps children go beyond rote counting to develop their sense of quantity.

When asked to find the total number of animals, many children begin by counting out the number of Color Tiles that corresponds to each line of the rhyme. Children may then place the tiles in rows or columns, keeping each group of animals separate. After this, some children simply move in order from 1 to 10, adding the numbers on one at a time and finding an ever-growing sum.



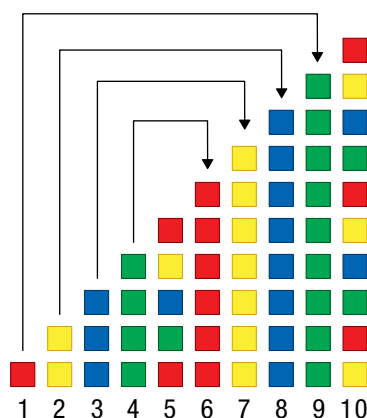
Some children may need to write down each set of addends and its sum like this:

$$\begin{array}{r} 1 \\ + 2 \\ \hline 3 \end{array} \quad \begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \quad \begin{array}{r} 6 \\ + 4 \\ \hline 10 \end{array} \quad \begin{array}{r} 10 \\ + 5 \\ \hline 15 \end{array}$$

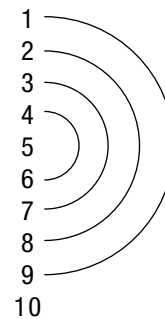
Other children may just write the sum from each addition problem and use the tiles as they count on. A few children may be able to find the sums and count on mentally all the way through the problem.

Children who are visual learners may count out the Color Tiles to represent each line of the rhyme and then move the tiles around on their desk, grouping them by 2s, 5s, or 10s, using whichever grouping makes the most sense to them and is easiest for them to count with mentally.

If children have worked with forming groups of 10, they may notice how neatly this series lends itself to making such groups: The 1 can be placed on top of the 9, the 2 on top of the 8, the 3 on top of the 7, and the 4 on top of the 6, forming five columns of 10 plus 5 tiles left in the 5 column, for a grand total of 55.



Children may also notice this same pattern if they write the numbers in the rhyme as a column of numbers to be added.



Grouping numbers together to facilitate addition is formally called the associative property of addition. Looking at how grouping the numbers in sets of ten makes the addition easier underscores for children the meaning of our base-ten number system.

Sharing different solution strategies for this problem can help children broaden their view of mathematics and make them more flexible in their approach to problem solving.

1 INTRODUCTION

- ▶ Prepare a chart with the words to the rhyme *Very Busy Animals*, which are presented in *On Their Own*.
- ▶ Post the chart and invite the class to read along as you read the words aloud.
- ▶ Give children a chance to react to the rhyme.
- ▶ Ask children how many lions were flying and how many dogs sat on logs. Then ask how many animals altogether were busy flying or sitting on logs. Have children explain how they know this.

2 ON THEIR OWN

Students will complete *On Their Own*. During this time, the teacher's role is to:

- ▶ ask probing questions to guide and extend
- ▶ record student thinking
- ▶ record student conversation that promotes collaboration

Use the information gathered to inform the Math Talk.

3 MATH TALK

Invite pairs to talk about how they went about solving the problem.

Use prompts such as these to promote discussion:

- ▶ How did you make your estimate before you began to work with the tiles?
- ▶ Was the number of animals in your estimate greater or fewer than the real number?
- ▶ How did you use the tiles to solve the problem?
- ▶ How did you go about counting the tiles? Do you think counting them in groups is easier than counting them one at a time? Why?
- ▶ Did you notice how the number of animals increased as the rhyme went on? If so, tell how.

4 EXTENSION

- ▶ Have children repeat the activity, but this time change the rhyme using only even numbers. (2 dogs sitting on logs, 4 foxes hiding, and so on.)
- ▶ Look for children's literature to provide other rich problem-solving scenarios that involve growing patterns. Some examples are *One Gorilla*, *Ten Black Dots*, and *Twelve Circus Rings*.

Very Busy Animals

ON THEIR OWN

How many animals altogether are very busy doing different things?

- 1 Work with a partner. Read this rhyme softly together.
1 lion flying
2 dogs sitting on logs
3 cats wearing hats
4 foxes hiding in boxes
5 parrots nibbling on carrots
6 kangaroos tying their shoes
7 pigs eating figs
8 ants doing a dance
9 seals walking on their heels
10 poodles serving noodles
- 2 Make an estimate, or guess, about how many animals there are in all. Record this number.
- 3 Use Color Tiles to help you to figure out the answer.
- 4 Show how you solved the problem. Use words, numbers, and drawings.



- ② Make an estimate, or guess, about how many animals there are in all. Record this number.
- ③ Use Color Tiles to help you to figure out the answer.
- ④ Show how you solved the problem.
- Use words, numbers, and drawings.

B

VERY BUSY ANIMALS

FOLD / FOLD

VERY BUSY ANIMALS

A

How many animals altogether are very busy doing different things?

- ① Work with a partner. Read this rhyme softly together.

1 lion flying	2 dogs sitting on logs
3 cats wearing hats	4 foxes hiding in boxes
5 parrots nibbling on carrots	6 kangaroos tying their shoes
7 pigs eating figs	8 ants doing a dance
9 seals walking on their heels	10 poodles serving noodles