



# THE MATH LINK

for *The Science of Air Teacher's Guide* and *Mr. Slaptail's Secret*

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BioEd Teacher Resources from the Center for Educational Outreach

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This Math Link contains ready-to-use mathematics activities that are aligned with The Science of Air integrated unit. It is not intended to represent a comprehensive mathematics program. The activities are related to mathematics objectives common to many curricula and cover a range of grade and ability levels. Teachers may wish to select from these activities those that are most appropriate for their own students.

# BioEd<sup>SM</sup>

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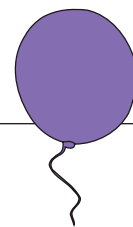
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# Addition



1. Mr. Slaptail has lots of stuff in his house. Find the numbers in Mr. Slaptail's living room. Draw a circle around each number.



2. Solve each problem by choosing a number from the cellar. Choose a number that will make the problem correct. The numbers found in the cellar can be used more than once.

a.

9	10	7	2	8	5	3
+ 6	+	+	+	+	+	+
<u>15</u>	<u>12</u>	<u>11</u>	<u>5</u>	<u>8</u>	<u>10</u>	<u>11</u>

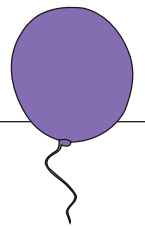
b.

10	11	9	10	11	12	14
+ 12	+ 5	+ 9	+ 6	+ 13	+ 7	+ 3
<u>22</u>	<u>16</u>	<u>18</u>	<u>16</u>	<u>24</u>	<u>19</u>	<u>17</u>

c.

10	11	13	14	17	21	25
+ 10	+ 9	+ 17	+ 8	+ 9	+ 9	+ 15
<u>20</u>	<u>20</u>	<u>30</u>	<u>22</u>	<u>26</u>	<u>30</u>	<u>40</u>

# Subtraction



- Find the numbers hidden in the trees and around Mr. Slaptail's house. Draw a circle around each number.



- Solve each problem by choosing a number from the trees. Choose a number that will make the problem correct. The numbers found in the trees can be used more than once.

a.

$9$	$4$	$7$	$10$	$11$	$4$	$8$
$- 4$	$-$	$-$	$-$	$-$	$-$	$-$
$\hline 5$	$\hline 2$	$\hline 4$	$\hline 5$	$\hline 10$	$\hline 1$	$\hline 2$

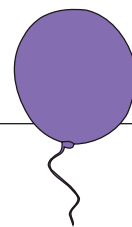
b.

$12$	$13$	$17$	$14$	$19$	$28$	$29$
$- 1$	$- 7$	$- 5$	$- 3$	$- 12$	$- 12$	$- 21$
$\hline$	$\hline$	$\hline$	$\hline$	$\hline$	$\hline$	$\hline$

c.

$21$	$20$	$12$	$13$	$23$	$30$	$25$
$- 14$	$- 11$	$- 7$	$- 9$	$- 19$	$- 29$	$- 10$
$\hline$	$\hline$	$\hline$	$\hline$	$\hline$	$\hline$	$\hline$

# Addition and Subtraction



Read the sentences below. Write your answer to each question in the form of a **number sentence**.

1. When Mr. Slaptail is out at night, he collects things and puts them into big bags. Then he carries the bags home. Mr. Slaptail took 9 bags home. He had 7 more bags to carry. How many bags will he have at home when he is finally finished?

$$\underline{\quad\quad} + \underline{\quad\quad} = \underline{\quad\quad}$$

2. The distance between Mr. Slaptail's front door and his mailbox is 26 meters. Mr. Slaptail walked from his door to the mailbox and back to his door. How many meters did Mr. Slaptail walk?

$$\underline{\quad\quad} + \underline{\quad\quad} = \underline{\quad\quad}$$

3. The posts in Mr. Slaptail's fence need to be fixed. His fence has 25 fence posts in all, but 10 posts are broken. How many fence posts do not need to be fixed?

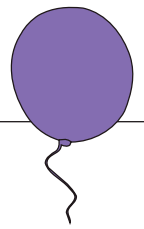
$$\underline{\quad\quad} - \underline{\quad\quad} = \underline{\quad\quad}$$

4. Riff wanted to use old wash tubs to make lungometers for Mrs. Warthog's students. Mr. Slaptail had 15 wash tubs in his yard. He gave Riff 11 wash tubs. How many wash tubs does Mr. Slaptail still have?

$$\underline{\quad\quad} - \underline{\quad\quad} = \underline{\quad\quad}$$



# Fractions as Numbers and Pictures



You can use pictures to describe or understand fractions. Look at the pictures below and follow the instructions given in each sentence.

1. Riff brought a flyer to Rosie's house. Draw a circle around  $\frac{1}{6}$  of the flyers below.



2. Write a fraction in the box to describe how many of the flyers do not have stripes.



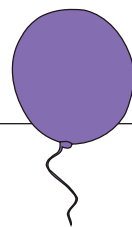
3. Dust mites can cause allergies in some people. Draw an X over  $\frac{5}{8}$  of the dust mite's legs.



4. Draw a circle around  $\frac{1}{4}$  of the dust mite's legs.

5. If a dust mite lost half his legs, how many legs would remain? Write a fraction in the box that shows how many of the dust mite's legs would remain.

# Fractions as Numbers and Pictures (cont.)

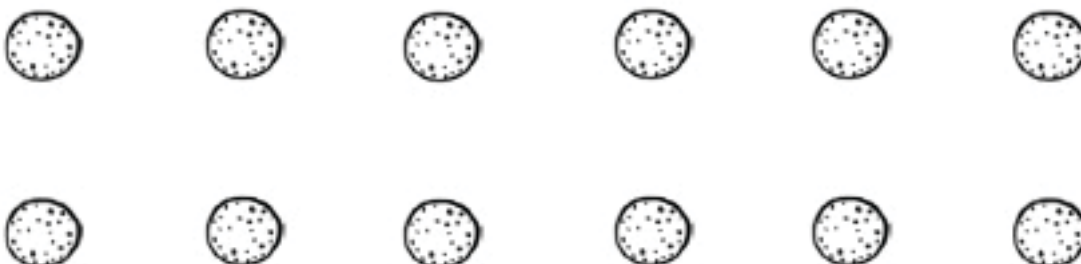


6. You can look at very tiny things, like pollen grains or mold spores, with a microscope. Color  $\frac{3}{4}$  of the microscopes.



7. Write a fraction in the box that shows how many of the microscopes you left uncolored.

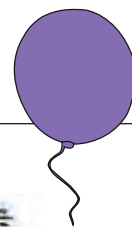

8. Mold spores also can cause allergies in some people. Color  $\frac{2}{3}$  of the mold spores. Do not color the rest of them.



9. Write a fraction in the box that shows how many of the mold spores are not colored.




# Fractions as Numbers



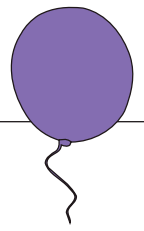
A **fraction** describes equal parts of a whole. The **bottom number** tells you how many parts there are in all. The **top number** tells you how many parts of the whole to look at. Read each sentence carefully and write the matching fraction in the box.



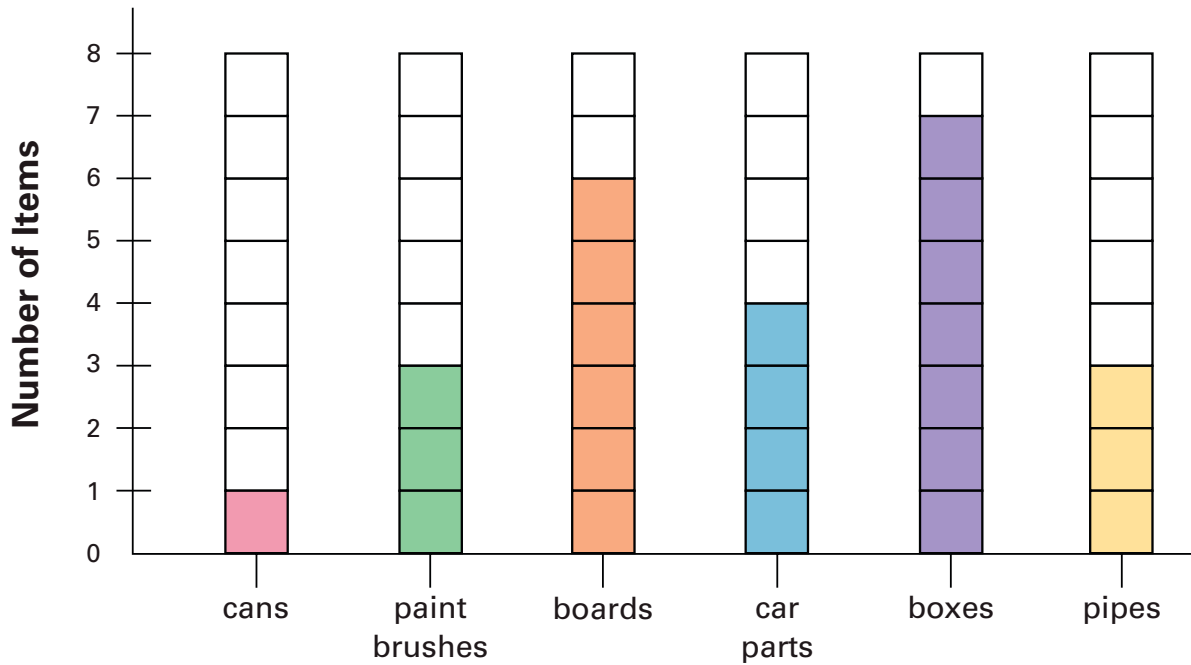
<p>1. Riff made 3 flyers out of paper and the rest out of soda cans. He ended up with 12 flyers, so how many flyers did he make with cans?</p> <p>_____</p> <p>Write a fraction to show how many of Riff's flyers were made out of cans.</p> <table border="1" data-bbox="675 919 800 1209"><tr><td></td></tr><tr><td></td></tr></table>			<p>2. Rosie bought some astronaut cards. Riff gave her 4 cards. Now she has 10 cards in all. How many cards did she buy?</p> <p>_____</p> <p>Write a fraction to show how many of the astronaut cards Rosie bought.</p> <table border="1" data-bbox="1268 919 1393 1209"><tr><td></td></tr><tr><td></td></tr></table>		
<p>3. Mr. Slaptail's friends came to help him clean his house. He has 7 rooms. His friends helped him clean 5 rooms. How many of the rooms were not cleaned?</p> <p>_____</p> <p>Write a fraction to show how many rooms in Mr. Slaptail's house were not cleaned.</p> <table border="1" data-bbox="675 1570 800 1860"><tr><td></td></tr><tr><td></td></tr></table>			<p>4. There were 8 riders on the bus with Riff. He taught 7 of them to make paper airplanes. How many riders did not learn how to make an airplane?</p> <p>_____</p> <p>Write a fraction that shows how many riders did not learn to make paper airplanes.</p> <table border="1" data-bbox="1268 1570 1393 1860"><tr><td></td></tr><tr><td></td></tr></table>		



# Graphs



A **bar graph** compares different numbers of items. The graph below shows some of the things that Riff and Rosie might find in Mr. Slaptail's yard. Use the information from the graph to create number sentences for each question. Record your answers.



1. How many cans and boxes did Riff and Rosie find all together?

$$\underline{\quad\quad} + \underline{\quad\quad} = \underline{\quad\quad}$$

2. How many boxes and boards were in Mr. Slaptail's yard?

$$\underline{\quad\quad} + \underline{\quad\quad} = \underline{\quad\quad}$$

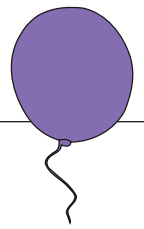
3. How many more car parts were there than cans?

$$\underline{\quad\quad} - \underline{\quad\quad} = \underline{\quad\quad}$$

4. How many more boxes were there than paint brushes?

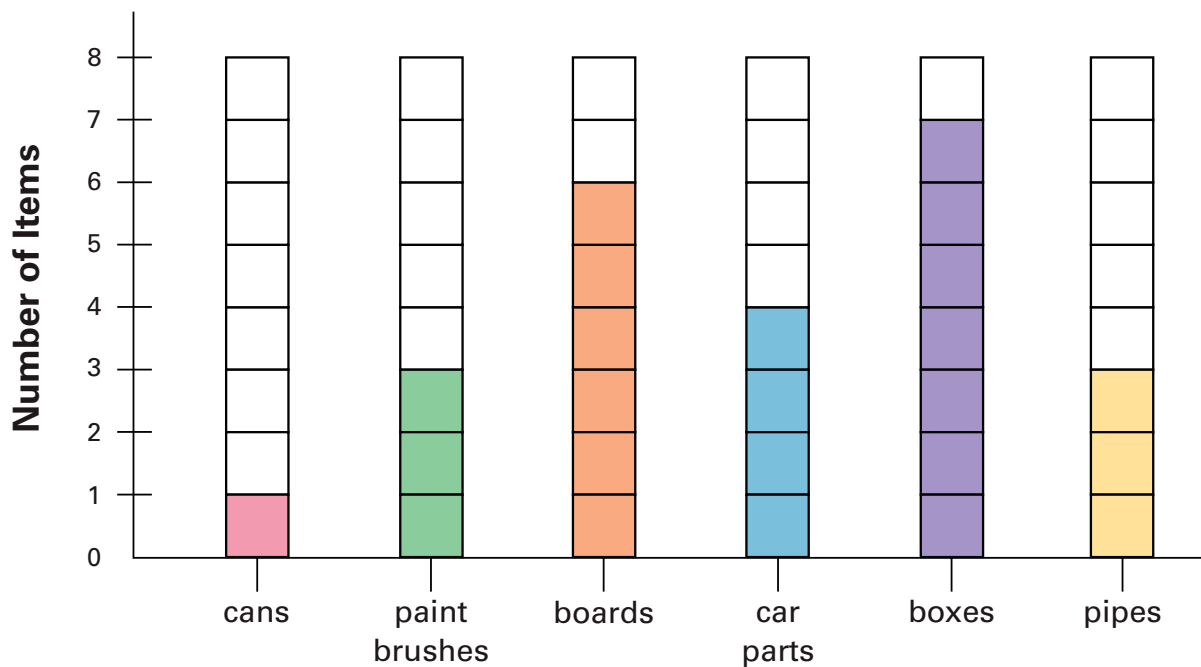
$$\underline{\quad\quad} - \underline{\quad\quad} = \underline{\quad\quad}$$





Symbols can be used in place of words. Symbols can show whether something is **greater than**, **less than** or **equal to** another item. Use the information from the graph and one symbol from the list on the right to make each phrase true.

Symbol	Meaning
>	greater than
<	less than
=	equal to



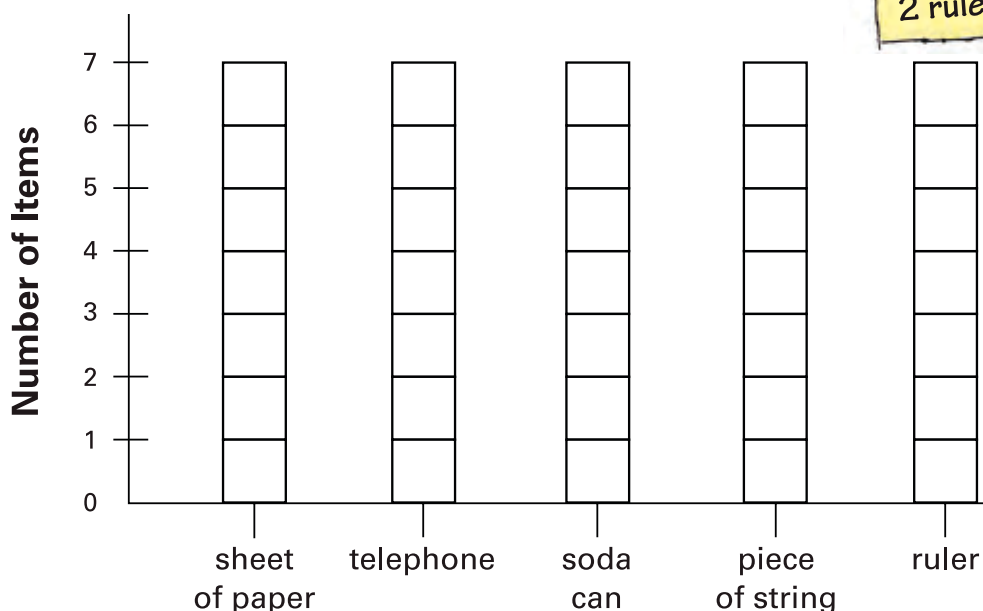
- cans pipes
- paint brushes cans
- boards car parts
- boxes pipe
- paint brushes\_pipes
- pipes car parts
- boards pipes
- cans boxes
- boxes paint brushes
- boxes boards



# Graphs and Symbols



Like Mr. Slaptail, Riff likes to collect all sorts of things. Riff made a list of what he wanted to take to Rosie's house. Read the list of Riff's Treasures. Color in the correct number of boxes for each kind of treasure on the graph. Then answer the questions.



1. How many pieces of string and rulers did Riff take all together?

$$\underline{\quad\quad} + \underline{\quad\quad} = \underline{\quad\quad}$$

2. How many more sheets of paper did Riff take than soda cans?

$$\underline{\quad\quad} - \underline{\quad\quad} = \underline{\quad\quad}$$

3. Use one symbol to make each phrase true:  $< > =$

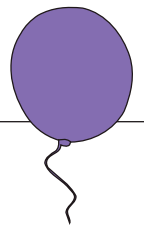
soda cans telephones

sheets of paper rulers

rulers pieces of string

rulers soda cans

# Estimating and Measuring Time



1. Fill in the circle by the phrase or item that best answers each question.

a. What will Rosie use to see if it is time to go home from Mr. Slaptail's house?



b. What would be a reasonable time for Riff and Rosie to wake up in the morning?



2. Study the statements and pictures of the clocks. Record your answer.

a. Rosie was still sleeping when Riff woke her up. What time did Riff wake Rosie up?

\_\_\_\_\_ a.m.



b. After Riff and Rosie ate breakfast, they went to look for Riff's flyer. What time did they leave?

\_\_\_\_\_ a.m.

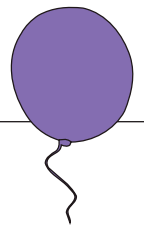


c. After a full day at Mr. Slaptail's house, Riff and Rosie went back to Rosie's house. What time did Riff and Rosie go to bed?

\_\_\_\_\_ p.m.



# Estimating and Measuring Things



1. Mr. Slaptail told Riff that a new pencil weighs about 5 grams and a one-liter bottle of water weighs about 1 kilogram. Compare these two items to the objects listed below. Estimate what each object might weigh. Draw a line from each object to the amount you think it might weigh.

Object	Amount (1 kilogram = 1000 grams)
paper airplane	4 kilograms
Mr. Slaptail	40 kilograms
full milk jug	5 grams
plastic toy rocket	100 grams

2. Fill in the circle by the phrase or item that best answers each question.

- a. One of Riff's flyers, made out of an empty soda can, might weigh about how much?

- 15 grams
- 1 kilogram
- 150 kilograms



- b. Mr. Slaptail and Rosie need to fill a tub in order to make a lungometer. How much water will they use to fill the tub?

- 1 liter
- 5 liters
- 100 liters

- c. Is the amount of water needed to fill the wash tub greater than, less than or equal to the amount of water used to fill a milk jug? Use a symbol to record your answer below.

\_\_\_\_\_

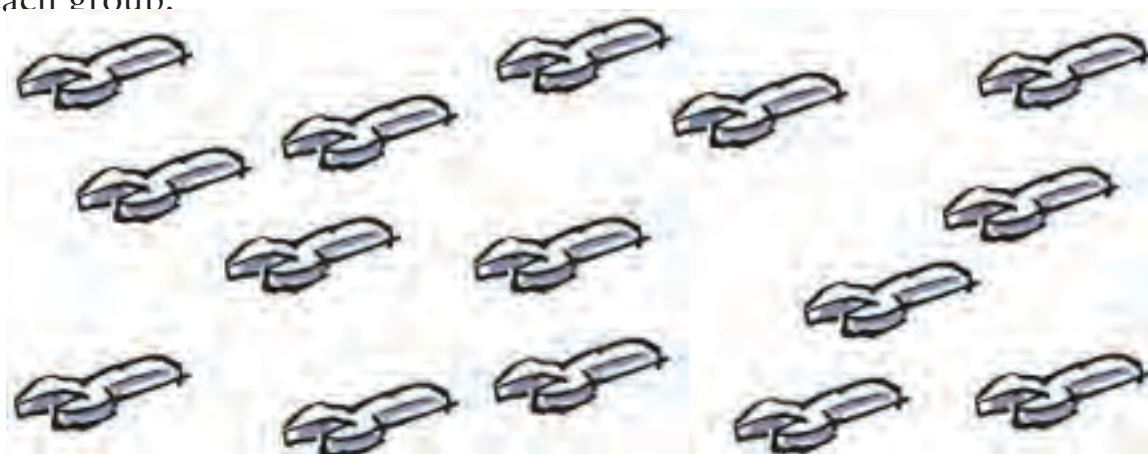
# Making Groups



Mr. Slaptail uses many kinds of tools. To count them quickly, he makes equal groups of each tool. Then Mr. Slaptail can multiply the number of tools in each group by the number of groups to find out how many of each kind of tool he has in all.



1. Make 3 equal groups of the wrenches below by drawing a circle around each group.



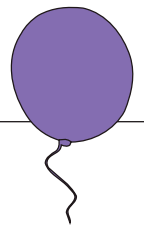
What is the total number of wrenches?

2. Make 5 equal groups of the saws below by drawing a circle around each group.

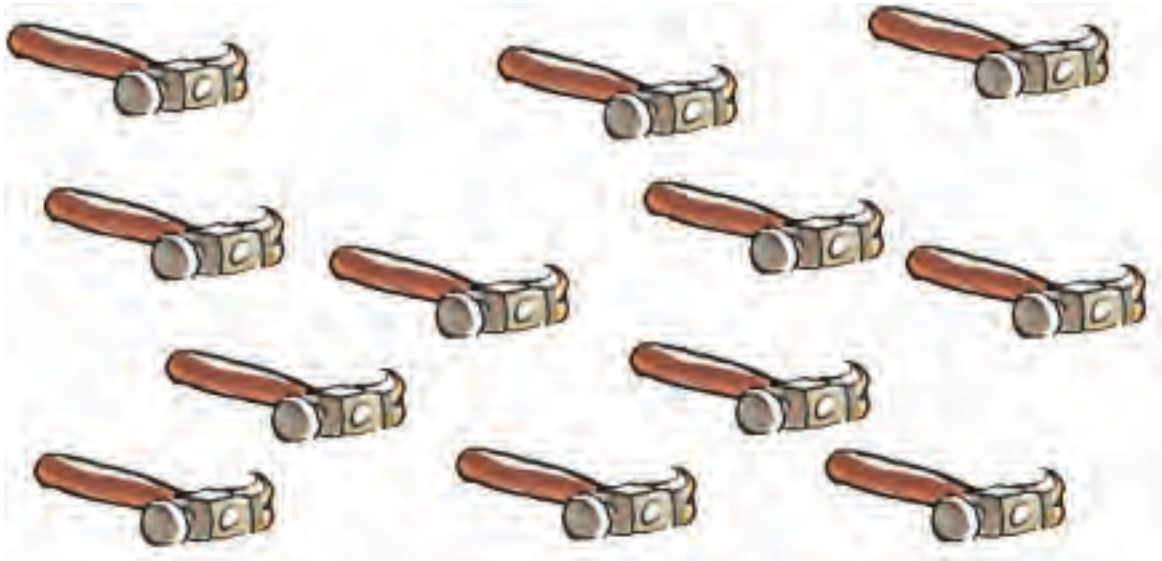


What is the total number of saws?

# Making Groups (cont.)

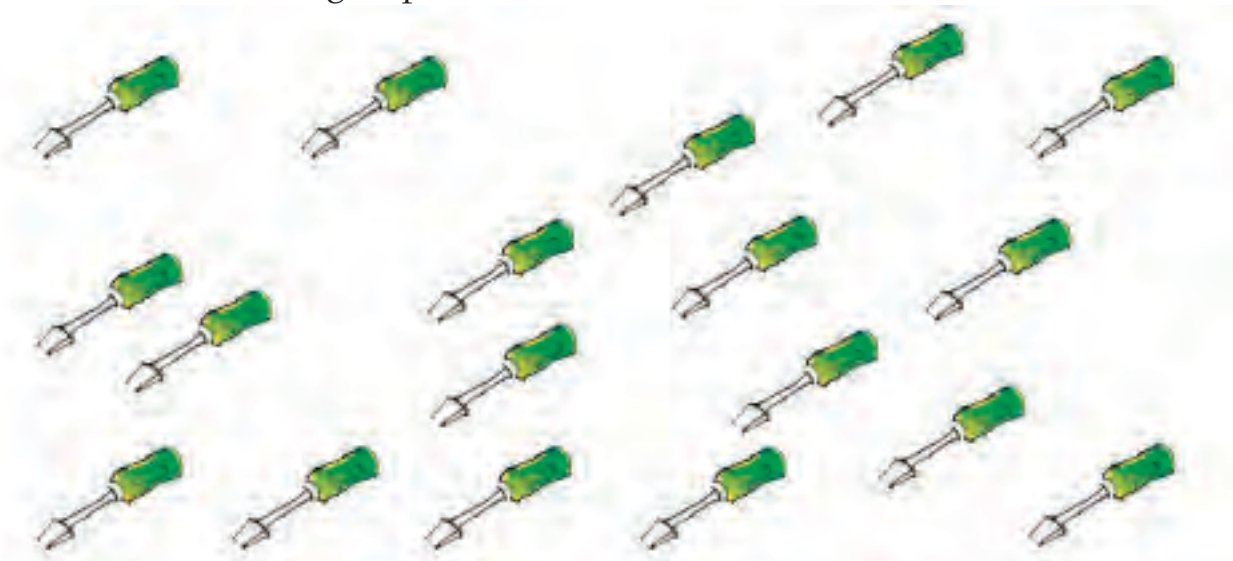


3. Make 4 equal groups of the hammers below by drawing a circle around each group.



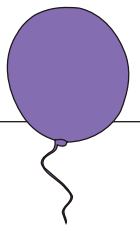
What is the total number of hammers?

4. Make 6 equal groups of the screwdrivers by drawing a circle around each group.



What is the total number of screwdrivers?

# Multiplication and Division Word Problems



You can use groups to find the answers to division or multiplication problems. Read the sentences below. Write your answer to each question in the form of a number sentence.

1. As they cleaned his house, Mr. Slaptail, Riff and Rosie picked up magazines. If they each picked up 7 magazines, how many did they pick up in all?

$$\underline{\quad\quad} \times \underline{\quad\quad} = \underline{\quad\quad}$$

2. To make one lungometer, Mr. Slaptail needs 3 meters of tubing. How many meters of tubing will he need to make 4 lungometers?

$$\underline{\quad\quad} \times \underline{\quad\quad} = \underline{\quad\quad}$$

3. Suppose Rosie has 20 toy rockets. If she separates her rockets into 4 equal groups, how many rockets will be in each group?

$$\underline{\quad\quad} \div \underline{\quad\quad} = \underline{\quad\quad}$$

4. There are 15 stair steps leading up from the cellar to the first floor in Mr. Slaptail's house. If you separate the stair steps into 3 equal groups, how many stair steps will be in each group?

$$\underline{\quad\quad} \div \underline{\quad\quad} = \underline{\quad\quad}$$

