CHAPTER 1

A MANIPULATIVE APPROACH

USE SLIPS OF PAPER

Put 3 slips of paper in a row like this:


Then put 1 more slip on the end of the row:


How many slips are in the row now?

Put 5 slips of paper in a row:


Then put on 2 more slips.
How many slips are in the row now?

Put 6 slips of paper in a row.
Then put on 2 more slips.
How many slips are in the row now?

BANANAS
If you don't have any bananas, use slips of paper and pretend:

Put 5 bananas in a row like this:


Then take 2 of the bananas away:


How many bananas are left?
Put 4 bananas in a row:


Then take 3 of the bananas away. How many bananas are left?

Put 6 bananas in a row.
Then take 2 of the bananas away.
How many bananas are left?
hamburgers
If you don't have any hamburgers, use slips of paper and pretend:

Put 5 hamburgers in a row like this:

Then take away all of the hamburgers except for 2:


How many did you take away?
Put 5 hamburgers in a row:
00000
Then take away all of the hamburgers except for 3 .
How many did you take away?
Put 4 hamburgers in a row.
Then take away all of the hamburgers except for 1.
How many did you take away?

PINEAPPLES
If you don't have any pineapples, use slips of paper and pretend:

Put 4 pineapples in a row like this:


Then maze another row with 3 pineapples:


Altogether, how many pineapples are on the table?
Put 5 pineapples in a row:


Then make another row with 3 new pineapples. Altogether, how many pineapples did you use?

Put 6 pineapples in a row.
Then make another row with 4 new pineapples.
Altogether, how many pineapples did you use?

PANCAKES
Use slips of paper. Pretend that they are pancakes:
Put 3 pancakes in the first row; then start making a new row:


Stop as soon as there are 7 pancakes on the whole table:


How many pancakes are in the second row?
Put 5 pancakes in the first row; then start making a new row:


Stop as soon as there are 9 pancakes on the whole table.
How many pancakes are in the second row?
Put 3 pancakes in the first row; then start making a new row.
Stop as soon as there are 8 pancakes on the whole table.
How many pancakes are in the second row?

WAFFLES
Use slips of paper. Pretend that they are waffles.
Make two rows. Put 6 waffles in the first row; put 4 waffles in the second row.


Which row has more waffles in it?
How many more waffles does it have?
Put 5 waffles in the first row.
Put 4 waffles in the second row.


Which row has more waffles in it? How many more waffles does it hare?

Put 5 waffles in the first row.
Put 3 waffles in the second row.
Which row has more waffles in it?
How many more waffles does it have?

PICKLES
Use slips of paper. Pretend they are pickles.
First put 4 pickles in a row like this:


Then make a new row that has 1 more pickle in it than the first row:


How many pickles are in the second row?
First put 3 pickles in a row:


Then make a new row that has 2 more pickles in it than the first row.
How many pickles are in the second row?
First put 4 pickles in a row.
Then make a new row that has 2 more pickles in it than the first row.
How many pickles are in the second row?

CARROTS
Use slips of paper. Pretend they are carrots.
First put 5 carrots in a row like this:


Then make a new row that has 1 fewer carrot in it than the first row:


How many carrots are in the second row?
First put 6 carrots in a row:


Then make a new row that has 2 fewer carrots in it than the first row. How many carrots are in the second row?

First put 5 carrots in a row. Then make a new row that has 3 fewer carrots in it than the first row.
How many carrots are in the second row?

POTATO CHIPS
Use slips of paper. Pretend they are potato chips.
Make 3 rows. Put 4 potato chips in each row like this:


Altogether, how many potato chips did you use?

Make 3 rows. Put 5 potato chips in each row.

How many potato chips did you use?

Make 2 rows. Put 6 potato chips in each row.
How many potato chips did you use?

COOKIES
Use slips of paper. Pretend they are cookies.
Hold 12 cookies in your hand:


Then put them on a table -put 4 cookies in each row like this:


How many rows did you make?
Hold 10 cookies in your hand:

Then put them on a table - put 5 cookies in each row.
How many rows did you make?
Hold 8 cookies in your hand.
Then put them on a table - put
2 cookies in each row.
How many rows did you make?

TOMATOES
Use slips of paper. Pretend they are tomatoes.
Hold 10 tomatoes in your hand:


Then use them to make 2 rows. Try to end up with the same number of tomatoes in each row:


How many tomatoes ended up in each row?
Hold 12 tomatoes in your hand:
Then use them to make 3 rows. Try to end up with the same number in each row.
How many tomatoes ended up in each row?
Hold 6 tomatoes in your hand.
Use them to make 2 rows. Try to end up with the same number in each row.
How many tomatoes ended up in exch row?

Chapter 2

A PICTORIAL
APPROACH

CIRCLES

Draw 4 circles on a sheet of paper:


Then draw 1 more circle:


How many circles are on the paper now?
Draw 3 circles on a sheet of paper:


Then draw 2 more circles.
How many circles are on the paper now?

Draw 5 circles on a sheet of paper. Then draw 1 more circle.
How many circles are on the paper now?

## MEATBALLS

Draw a picture of 5 meatballs:


Then cover up 2 of the meatballs with your hand like this:


How many meatballs can you see now?
Draw a picture of 4 meatballs:


Then cover up 1 of the meatballs with your hand.
How many meatballs can you see now?
Drew a picture of 6 meatballs. Then cover up 2 of the meatballs.
How many meatballs can you see now?

## TOMATOES

Draw 5 tomatoes in a row like this:


Then use your hand to cover up all the tomatoes except for 2:


How many tomatoes are under your hand?
Draw 3 tomatoes in a row like this:


Then use your hand to cover up all the tomatoes except for 1 .
How many tomatoes are under your hand?
Draw 4 tomatoes.
Then cover up all the tomatoes except for 1 .
How many tomatoes are under your hand?

ROCKS
Draw pictures of rocks:
Start with 4 block rocks in a row like this:


Then draw a row with 3 white rocks:


Altogether, how many rocks did you draw?

Start with 5 black rocks in a row like this:


Then draw a row with 4 white rocks.
Altogether, how many rocks did you draw?
Start with 6 black rocks in a row.
Then draw a row with 2 white rocks.
Altogether, how many rocks did you draw?

COOKIES
Draw pictures of cookies:
Draw 2 chocolate cookies, then start making vanilla cookies:


Stop drawing as soon as there are 6 cookies altogether:


How many vanilla cookies did you draw?
Draw 3 chocolate cookies, then start making vanilla cookies:


Stop when there are 7 cookies altogether.
How many vanilla cookies did you drew?
Draw 5 chocolate cookies, then start making vanilla cookies.
Stop when there are 8 cookies altogether.
How many vanilla cookies did you draw?

Potatoes
Draw pictures of potatoes:


TENNIS BALLS
Draw pictures of tennis balls:
First put 4 tennis balls in a row:

$$
0000
$$

Then make a new row that has 1 more tennis ball in it then the first row:

$$
\begin{array}{|}
0000 \\
00000 \\
\hline
\end{array}
$$

How many tennis bells are in the new row?
First put 4 tennis balls in a row:


Then make a new row that has 2 more tennis balls in it than the first row.
How many tennis balls are in the second row?
First put 3 tennis balls in a row.
Then make a new row that has 1 more tennis ball in it then the first row.
How many tennis bolls are in the second row?

EGGS
Draw pictures of egos:
First put 5 eggs in a row:


Then make a new row that has 1 fewer es in it then the first row:


How many eggs are in the second row?
First put 5 eggs in a row:


Then make a new row that has 2 fewer eggs in it than the first row.
How many eggs are in the second row?
First put 6 eggs in a row.
Then make a new row that has 1 fewer egg in it than the first row. How many eggs are in the second row?

PICTURES OF GRAPES
Make 3 rows. Put 5 grapes in each row like this:


Altogether, how many grapes are on the paper?

Make 2 rows. Put 6 grapes in each row.

How many grapes are on the paper?
Make 3 rows. Put 4 grapes in each row.

How many grapes are on the paper?

PICTURES OF PRUNES
Put 5 prunes in each row. Keep making new rows until there are 20 prunes on the paper:


How many rows did you have to make?

Put 3 prunes in each row. Keep making new rows until there are 15 prunes on the paper.
How many rows did you have to make?
Put 4 prunes in each row. Keep making new rows until there are 12 prunes on the paper.
How many rows did you have to make?

PICTURES OF PEACHES
Make 2 rows. Put the same number of peaches in each row. Try to end up with 8 peaches on the paper:


How many peaches did you put in each row?

Make 3 rows. Put the same number of peaches in each row. Try to end up with 15 peaches on the paper.
How many peaches are in each row?
Make 2 rows. Put the same number of peaches in each row. Try to end up with 12 peaches on the paper.
How many peaches are in each row?

THE SAME ANSUER
Chapter 3

CHOOSING AN OPERATION

RED AND GREEN

There are 6 red apples on a table.
There are 2 green apples on the table.


Altogether, how many apples are on the table?


Which problem goes with the apple question?

BANANAS
Only one of the questions below goes with this code:


Try to guess which question goes with the code.
There are 5 bananas on a green table.
There is 1 banana on a red table. Which table has more bananas on it?

There are 5 bananas in a box. If you put 1 more banana in the box, how many bananas will be in the box?

ORANGES
Use a pencil and paper.
Try to write the code that goes with the question in the box below.


There are 4 oranges on a table.
There are 3 oranges on a chair.
Altogether, how many oranges are in this story?

EGGS


How many eşss are still white?

Which of these problems has the same answer as the egg question?
$\begin{array}{r}3 \\ \times 2 \\ \hline\end{array}$

WATERMELONS


There are 4 watermelons on the table.
If 1 of them falls off, how many will be left on the table?


Which problem goes with the watermelon question?

POTATOES
Only one of the questions below goes with this code:


Try to guess which question goes with the code.
There are 5 potatoes inside a bay. If you put 2 more potatoes into the bag, how many potatoes will be inside?

There are 5 potatoes inside a bag. If you take 2 of the potatoes out of the bag, how many potatoes will be left inside?

BALLOONS
Do not answer the questions on this page. Just try to guess which question goes with this code:

$$
\begin{array}{r}
25 \\
-6 \\
\hline
\end{array}
$$

There are 25 balloons on a table.
If 6 of the balloons pop, how many balloons will be left?

There are 25 balloons on a table. If you put 6 more balloons on the table, how many balloons will there be?

RockS
Use a pencil and paper. Try to write the code that goes with the question on this perse. (You do not have to answer the question.)


There are 32 rocks in a bays. If you take 6 of the rocks out of the bags, how many rocks will still be inside?

PEOPLE IN BOXES


Altogether, how many people are in this picture?
$\begin{array}{r}2 \\ +3 \\ \hline\end{array}$

$$
\begin{array}{r}
2 \\
\times 3 \\
\hline
\end{array}
$$

Which problem has the same answer as the people question?

PILES OF TOMATOES


There are 4 tomatoes in each pile.
There are 3 piles. Altogether, how many tomatoes are on the table?


Which problem goes with the tomato question?

CARROTS
Only one of the questions below gooses with this code:


Try to guess which question goes with the code.
There are 5 carrots in each pile.
There are 2 piles. Altogether, how many carrots are in this story?

There are 5 carrots in a pile. If you take 2 of the carrots away, how many will be left in the pile?

PEOPLE AND THEIR FEET
Do not answer the questions on this page. Just try to guess which question goes with this code:

$$
\begin{array}{r}
10 \\
\times 13 \\
\hline
\end{array}
$$

There are 10 people standing on the floor. There are 13 people standing on a table. Altogether, how many people are standing?

Each person has 10 toes. There are 13 people standing on a table. Altogether, how many toes ore on the table?

RAISINS
Use a pencil and paper. Try to write the code that goes with the question on this page. (You do not have to answer the question.)


There are 37 raisins in each pile. There are 14 piles. Altogether, how many raisins are in this story?

PAIRS OF Socks


How many pairs of socks do you see in this picture?


Which code goes with the socks question?

FLOWERS


Here are 12 flowers. If you put them in bunches of 3. how many bunches could you make?

$$
3 \longdiv { 1 2 }
$$

$$
\begin{array}{r}
12 \\
-3 \\
\hline
\end{array}
$$

Which code goes with the flowers question?

HAMBURGERS
Do not answer the questions on this page. Just try to guess which question goes with this code:

$$
5 \longdiv { 1 5 }
$$

There are 15 hamburgers on a table. If you put 5 of the hamburgers in each pile, how many piles can you make?

There are 15 hamburgers on a table. If you put 5 more hamburgers on the table, how many hamburgers will there be?

PINEAPPLES
Don't answer the questions on this page. Just try to guess which question goes with this code:

$$
1 0 \longdiv { 7 0 }
$$

There are 70 pineapples in each pile.
There are 10 piles. Altogether, how many pineapples are in this story?

There are 70 pineapples. If you put 10 of the pineapples in each pile, how many piles can you make?

TELEVISIONS
Use a pencil and paper. Try to write the code that goes with the question on this page. (You do not have to answer the question.)


There are 84 television sets. If you put 12 of the televisions in each pile, how many piles can you make?

CHICKENS


5 chickens are on the left side. 2 chickens are on the right side. How many more are on the left side than are on the right side?


Which code goes with the chicken question?

LEMONS


The dog has 4 lemons.
The person has only I lemon.
How many more lemons clos the dog have?


Which code goes with the lemon question?

CATS
Do not answer the questions on this page. Just guess which question foes with this code:

$$
\begin{array}{r}
6 \\
-4 \\
\hline
\end{array}
$$

Your best friend has 6 cats.
you have 4 cats. How many more cats does your friend have?

Your best friend has 6 cats. You have 4 cats. If you put all the cats together, how many cats will there be?

TEAMS
Don't answer the questions on this page. Just guess which question goes with this code:

$$
\begin{array}{r}
38 \\
-32 \\
\hline
\end{array}
$$

Your team has 38 points.
Another team has 32 points. How far ahead is your team?

A team has 38 points.
If they get 32 more points, how many points will they have?

COCONUTS
Use a pencil and paper. Write the code that goes with the question on this page. (You don't have to answer the question.)

There are 67 coconuts in a bis pile.
Another pile has only 12 coconuts.
How many more are in the bis pile?

BEADS


There are 8 beads. If you cut the string into 2 pieces this way, how many beads will end up on each piece?


Which code goes with the bead question?

CANDLES


There are 6 candles. If you cut the cake into 3 pieces and get the same number of candles on each piece, how many candles will each piece have?


Which code goes with the candle question?

GRAPES
Don't answer the questions on this page. Just guess which question goes with this code:

$$
2 \longdiv { 4 0 }
$$

There are 40 grapes. There are 2 people. If they are fair, how many grapes should each person get?

There are 40 grapes in each pile. There are 2 piles. Altogether, how many grapes are in this story?

PEOPLE
Don't answer the questions on this page.
Just guess which question goes with this code:
$8 \longdiv { 9 6 }$
There are 96 people. If you want to make 8 even teams, how many people should you put on each team?

There are 96 people on one team. There are 8 people on another team. How many more people are on the big team?

Peanuts and elephants
Use a pencil and paper. Write the code that goes with the question on
 this page. (You don't have to answer the question.)

There are 126 peanuts.
There are 14 elephants. To be fair, how many peanuts should each elephant yet?

BATTERIES


The radio needs 4 batteries.
You have 3 batteries.
How many more do you need?


Which code goes with the batteries question?

CHAIRS


If you want 8 chairs but you only have 2, how many more chairs should you get?


Which code goes with the chair question?

SANDWICHES
Don't answer the questions on this page.
Just guess which question goes with this code:

$$
\begin{array}{r}
17 \\
-3 \\
\hline
\end{array}
$$

Your dog wants 17 sandwiches.
You have already made 3 sandwiches.
How many sandwiches do you still need to make?

Each dog wants 17 sandwiches.
There are 3 dogs.
Altogether, how many sandwiches will you need?

MONEY
Don't answer the questions on this page.
Just guess which question goes with this code:

$$
\begin{array}{r}
100 \\
-72 \\
\hline
\end{array}
$$

It costs 100 dollars to buy a cow. If you have 72 dollars, how much more money do you need?

It costs 100 dollars to buy a cow. It costs 72 dollars to buy a buffalo. How much would it cost to buy them both?
a giant cake
Use a pencil and paper.
Write the code that goes with the question on this page. (You don't have to answer the question.)

You will need 50 eggs to make a giant birthday cake. Right now you have 32 eggs. How many more eggs do you need?

REVIEW
You have seen all of the questions on this page before. See if you can remember how to write codes for all of them. Use a pencil and paper. (You don't have to answer the questions.)


1. There are 4 oranges on a table. There are 3 oranges on a chair. Altogether, how many oranges are in this story?
2. There are 32 rocks in a bag. If you take 6 of the rocks out of the bay, how many rocks will still be inside?
3. There are 37 raisins in each pile.

There are 14 piles. Altogether, how many raisins are in this story?

MORE REVIEW
You have seen all of these questions before. See if you can remember how to write codes for them. (You don't have to answer the questions.)


1. There are 84 television sets. If you put 12 of the televisions in each pile, how many piles can you make?
2. There are 67 coconuts in a big pile.

Another pile has only 12 coconuts. How many more are in the big pile?
3. There are 126 peanuts.

There are 14 elephants. To be fair, how many peanuts should each elephant get?
4. You will need 50 ers to make a giant birthday cake. Right now you have 32 eggs. How many more esse do you need?

NEW STORIES
Here are some stories you have not seen before. Try to write codes for all of them. (You don't have to answer the questions.)


1. There are 24 blueberries inside a bass. If you take 6 of the blueberries out of the bag, how many will still be inside?
2. There are 24 blueberries. There are 6 pigs. To be fair, how many blueberries should each pig get?
3. There are 24 blueberries inside a bar. If you put 6 more blueberries into the bays, how many blueberries will be in there?

MORE NEW STORIES
Here are some more stories.
write a code for each question. (you don't have to answer the questions.)


1. You need 24 blueberries. So far you only have 6. How many more do you need?
2. There are 24 blueberries in each bay. There are 6 bags. Altogether, how many blueberries are in this story?
3. There are 24 blueberries. If you put 6 of the blueberries into each bass, how many bags will you use?
4. You have 24 blueberries. Your friend has only 6. How many more blueberries do you have?

ANSWERS
Write a code for each story.
Then try to work out the answer for each code you write:


1. There are 4 meatballs on the table.

There are 3 meatballs in the refrigerator. Altogether, how many meatballs are in this story?

Your dog will want 6 meatballs.
2. Right now there are only 2 . How many more meatballs do you need?

MORE AnswERS
Write a code for each story. Then try to work out the answer for each code you write.

1. There are 12 meatballs. If you put 4 of the meatballs in each pile, how many piles can you make?
2. There are 7 meatballs on a plate. If you eat 3 of them, how many will be left?

STILL MORE ANSWERS
Write a code for each story. Then try to work out the answer for each code.


1. There are 4 meatballs on each plate. There are 3 plates. How many meatballs do you think there are?
2. There are 8 meat halls on a big plate. There are 3 meatballs on a little plate. How many more are on the big plate?
3. There are 10 meatballs. There are 2 plates. If you want the same amount on each plate, how many meatballs should you put on each plate?

LARGE NUMBERS
Write a code for each story. Then try to work out the answer for each code.

1. There are 24 pancakes.

There are 3 people.
To be fair, how many pancakes should each person get?
2. Your friend has 38 pancakes.

You have 16 pancakes. How many more does your friend have?
3. There are 22 pancakes on a plate.

There are 14 pancakes on the floor.
Altogether, how many pancakes are in this story?

MORE LARGE NUMBERS
Write a code for each story. Then try to work out the answer for each code.

1. There are 34 pancakes. If you eat II of them, how many pancakes will be left?
2. There are 20 pancakes on each plate. There are 3 plates. Altogether, how many pancakes are in this story?
3. You would like to have 33 pancakes, but so far you only have 21. How many more do you need?
4. There are 28 pancakes. If you put 2 of the pancakes on each plate, how many plates will you use?
