Important Concepts . . .

Preview Review

Mathematics Grade 4

W2 - Lesson 1: Multiplication 1

V5-07

Important Concepts of Grade 4 Mathematics

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W1 - Lesson 2 ..... Addition and Subtraction
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Materials Required

Mathematics Grade 4
Version 5
Preview/Review W2 - Lesson 1

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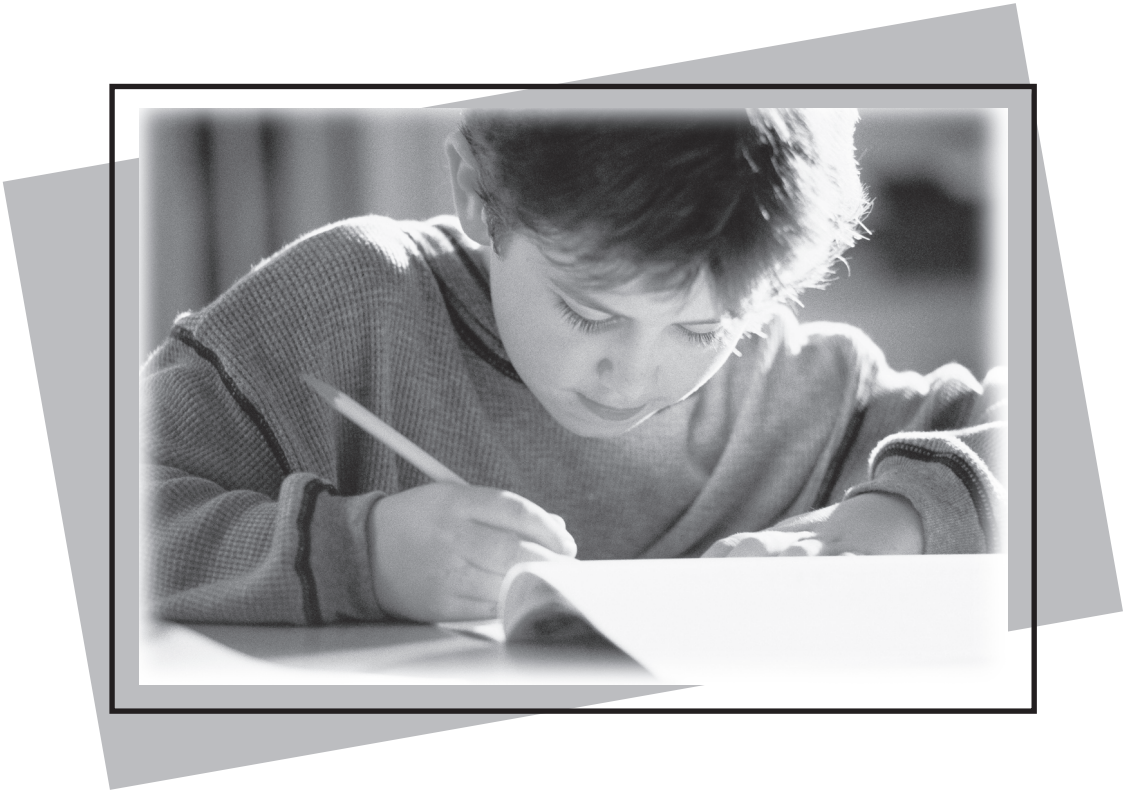
Preview/Review Concepts for Grade Four Mathematics



W2 - Lesson 1: Multiplication 1

OBJECTIVES

By the end of this lesson, you should

- recall the basic multiplication facts to 81
- solve problems when a number is multiplied by 0 or 1
- demonstrate that changing the order of factors does not change the product
- determine the four multiplication/division related facts that make up each fact family
- identify the *factors* and *product* in a multiplication question
- solve multiplication problems in the following ways:
  - repeated addition
  - skip counting
  - arrays
  - multiplication facts
- use the *Guess-and-Check* problem solving strategy

GLOSSARY

array - a group of objects arranged in rows and columns

factor - any of the numbers used to form the product of another number; for example, 4 and 7 are factors of 28 in $4 \times 7 = 28$

product - the number arrived at when two or more numbers are multiplied; for example, 32 is the product of 4×8

skip counting - counting in a pattern by omitting or skipping certain numbers; for example, 3, 6, 9, 12, 15...

W2 - Lesson 1: Multiplication 1

A. Introduction

Multiplication is an important and useful skill. It is a quick way to add the same number many times. Addition and multiplication are related to each other.

In Grade Three, you learned the basic multiplication facts all the way to $7 \times 7 = 49$. In Grade Four, you will review those basic multiplication facts again and learn the facts up to $9 \times 9 = 81$.

B. The Basic Multiplication Facts

Look at the multiplication table on the next page.

1. Complete as much of it as you can. Use the patterns in each row or column to help you calculate the number facts you do not know.

Example: Suppose you know that seven 7s are 49 ($7 \times 7 = 49$). Using the pattern, "Add 7", it's easy to figure out what eight 7s equals. Just add one more 7.

$$\begin{array}{r} 7 \\ \times\ 8 \\ \hline \end{array}$$

Think	
$7 \times 7 = 49$	Seven 7s are 49.
$(7 \times 7) + 7 = 56$	Add one more 7.
$8 \times 7 = 56$	Eight 7s are 56.

Multiplication Chart

It is **very important** to learn and remember the multiplication facts. You will be using them for the rest of your life!

x	1	2	3	4	5	6	7	8	9
1	1	2	3	*4*	*5*	*6*	*7*	*8*	*9*
2	2	4	*6*	*8*	*10*	*12*	*14*	*16*	*18*
3	3	*6*	*9*	*12*	*15*	*18*	*21*	*24*	*27*
4	*4*	*8*	*12*	*16*	*20*	*24*	*28*	*32*	*36*
5	*5*	*10*	*15*	*20*	*25*	*30*	*35*	*40*	*45*
6	*6*	*12*	*18*	*24*	*30*	*36*	*42*	*48*	*54*
7	*7*	*14*	*21*	*28*	*35*	*42*	49	*56*	*63*
8	*8*	*16*	*24*	*32*	*40*	*48*	56	*64*	*72*
9	*9*	*18*	*27*	*36*	*45*	*54*	*63*	*72*	*81*

Multiplying By Zero

When you multiply any number by 0, the answer is always zero.

Examples:

$6 \times 0 = 0$ $9 \times 0 = 0$ $876 \times 0 = 0$

Remember: *Any number times zero equals zero.*

2. Directions: Fill in the blanks.

a. $4 \times 0 =$ ____ b. $0 \times 53 =$ ____ c. $101 \times 0 =$ ____

d. $20 \times 0 =$ ____ e. $0 \times 0 =$ ____

Multiplying By One

When you multiply any number by 1 the answer is always that number.

Examples:

$7 \times 1 = 7$ $1 \times 8 = 8$ $74 \times 1 = 74$

Remember: *The product of 1 and any number is that number.*

3. Directions: Fill in the blanks.

a. $1 \times 86 =$ ____ b. $44 \times 1 =$ ____ c. $1 \times 161 =$ ____

d. $1 \times 1 =$ ____ e. $0 \times 1 =$ ____

Order of Factors

When learning the multiplication facts, remember that the order of the factors does not matter.

Example:

$6 \times 9 = 54$
$9 \times 6 = 54$

Remember: *Changing the order of the factors does not change the product.*

Remembering this rule makes learning the multiplication facts easier. Every time you learn a new basic fact, you are actually learning two facts.

Example:

When you learn that $5 \times 9 = 45$, you have also learned that $9 \times 5 = 45$.

In fact, you have also learned two division facts as well:

$$45 \div 9 = 5$$
$$45 \div 5 = 9$$

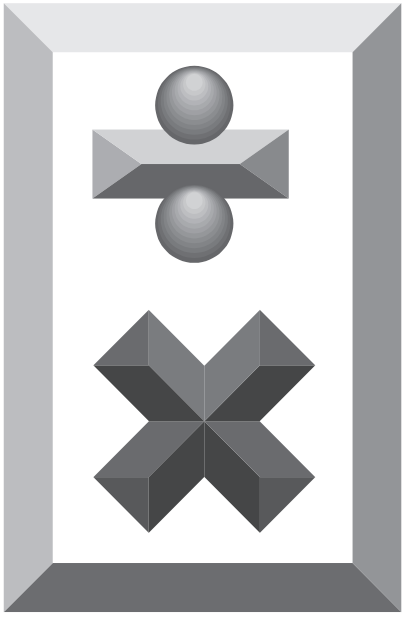
Number Fact Families

You have learned that four related facts make up an adding/subtracting fact family. This is also true for the multiplying/dividing number facts.

The number fact $6 \times 7 = 42$ is related to $7 \times 6 = 42$
$42 \div 7 = 6$
$42 \div 6 = 7$

The four different ways that the numbers 6, 7, and 42 can be written using multiplying and dividing are called **related** facts. The four related facts make up a **number fact family**.

Why is this important? When you learn one of the number facts in a fact family, you are also learning the other three facts at the same time.



4. Look at each family of numbers below. Write the multiplication and division number facts for each family.

a. 6, 5, 30

_____

_____

_____

_____

b. 6, 8, 48

_____

_____

_____

_____

c. 7, 9, 63

_____

_____

_____

_____

d. 8, 7, 56

_____

_____

_____

_____

e. 5, 8, 40

_____

_____

_____

_____

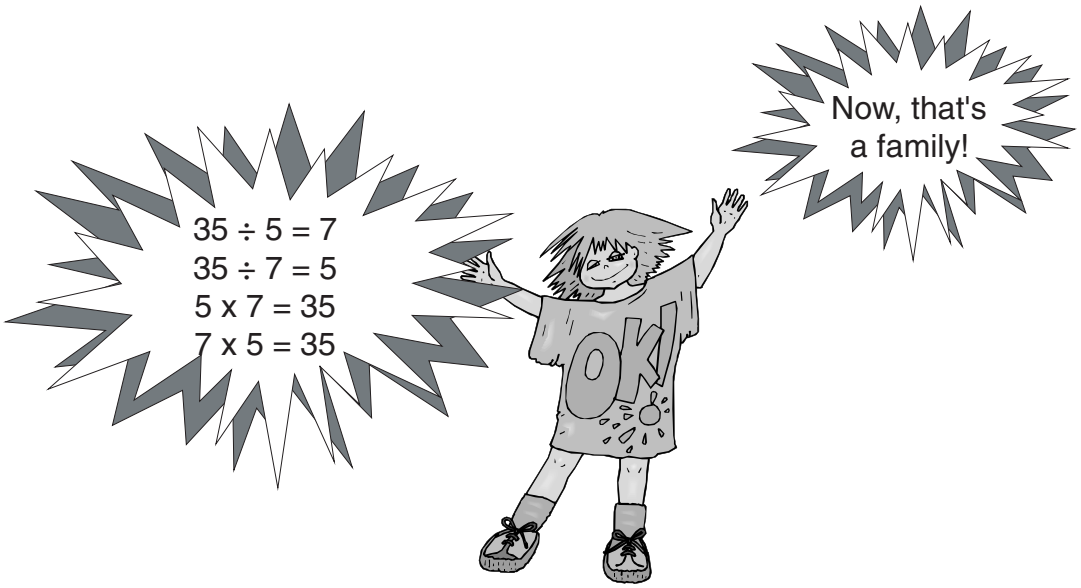
f. 9, 8, 72

_____

_____

_____

_____



Working with the Nines

The $9\times$ tables have something very interesting. When you add up the digits in each of the products of the $9\times$ table, the sum always comes out to 9!

Besides being amazing, this is also useful. Whenever you write an answer to a $9\times$ multiplication fact, check to see if the two digits in the answer add to 9. If they don't, maybe you've written the wrong answer!

5. Fill in the blanks below. Show which two digits added together will add to 9. The first one is done for you.

a. $9 \times 2 = 18$ $(1 + 8 = \_\_\_\_)$ b. $9 \times 3 = 27$ $(\_\_\_\_ + \_\_\_\_ = 9)$

c. $9 \times 4 = 36$ $(\_\_\_\_ + \_\_\_\_ = 9)$ d. $9 \times 5 = 45$ $(\_\_\_\_ + \_\_\_\_ = 9)$

e. $9 \times 6 = 54$ $(\_\_\_\_ + \_\_\_\_ = 9)$ f. $9 \times 7 = 63$ $(\_\_\_\_ + \_\_\_\_ = 9)$

g. $9 \times 8 = 72$ $(\_\_\_\_ + \_\_\_\_ = 9)$ h. $9 \times 9 = 81$ $(\_\_\_\_ + \_\_\_\_ = 9)$

C. Addition and Multiplication

Mark bought 4 packs of pop. Each pack has 6 cans in it. How many cans of pop does Mark have?

You can use repeated addition to help you solve this question.

Addition sentence:

6 + 6 + 6 + 6 = 24 cans of pop

You can also use multiplication to find the answer.

Multiplication sentence: $4 \times 6 = 24$

(Think: 4 groups of 6)

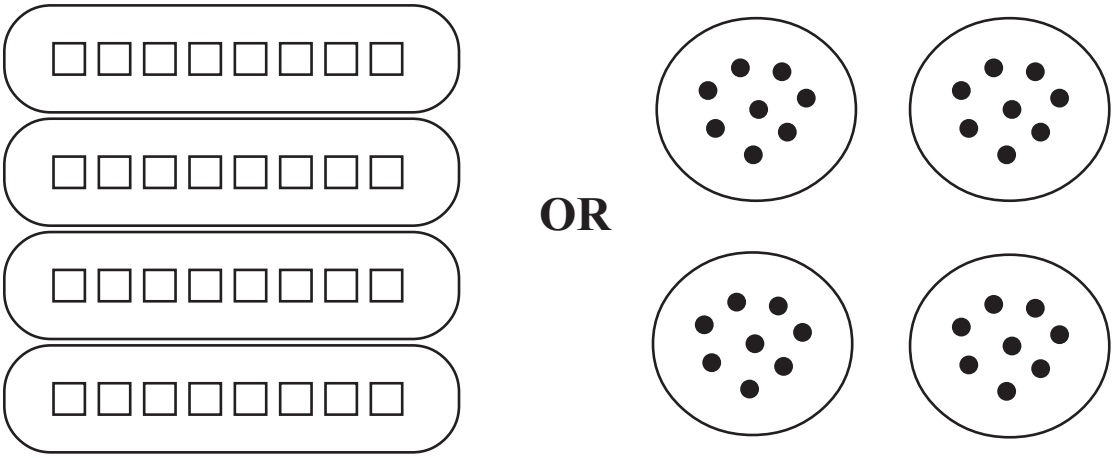
24 cans of pop

The answer is 24 cans. The answer is the same whether you add or multiply.

Use counters (buttons, blocks, bingo chips, or other small objects) to make the following groups.

1. Make 4 groups of 8 using your counters.

   a. Draw the groups that you made.
   Answers will vary. Students may draw random groups or arrays. For example:



   b. Write an addition sentence for 4 groups of 8.

   _____

   c. Write a multiplication sentence for 4 groups of 8.

   _____

2. Make 8 groups of 7 using your counters.

   a. Write an addition sentence for 8 groups of 7.

   _____

   b. Write a multiplication sentence for 8 groups of 7.

   _____

3. Make 5 groups of 4 using your counters.

   a. Write an addition sentence for 5 groups of 4.

   _____

   b. Write a multiplication sentence for 5 groups of 4.

   _____

4. Make 6 groups of 5 using your counters.

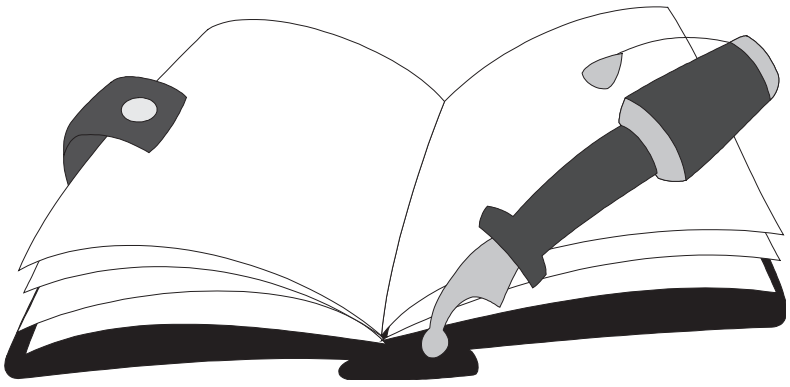
   a. Write an addition sentence for 6 groups of 5.

   _____

   b. Write a multiplication sentence for 6 groups of 5.

   _____

***Remember**: Repeated addition and multiplication are related. You can get the same answer by adding the same number several times* $(4 + 4 + 4 = 12)$ *or by multiplying* $(3 \times 4 = 12)$.

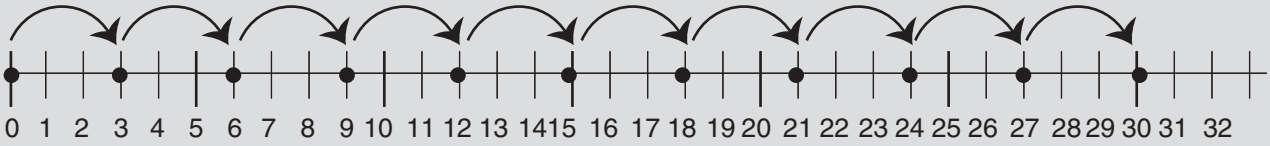


D. Skip Counting

Skip counting is counting in a pattern by omitting or skipping certain numbers. For example, when you skip count by 2, you count only every second number (2, 4, 6, 8, 10...).

Skip counting is a lot like repeated addition because one number is repeated many times. Skip counting can also help you understand what happens when you multiply.

Example: Skip count by 3 up to 30 on the number line below.



Each skip is like a jump of 3. If you make 10 jumps of 3, you reach 30.

$10 \times 3 = 30$

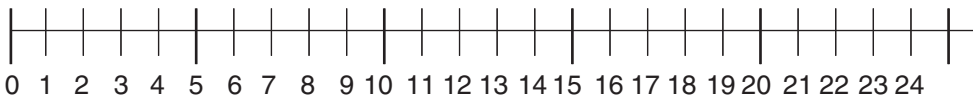
1. Skip count by 5 to 30 on the number line below. Show the jumps.

Show the multiplication sentences that go with each skip on the above number line. [Think: 1 jump of 5 ($1 \times 5 = 5$)
2 jumps of 5 ($2 \times 5 = 10$), etc.]

_____ , _____ , _____,

_____ , _____ , _____.

2. Skip count by 2 up to 20 on the number line below. Show the jumps.

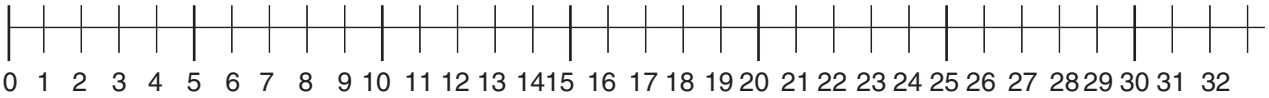


Show the multiplication sentences that go with each skip on the above number line.

_____ , _____ , _____ , _____ , _____ ,

_____ , _____ , _____ , _____ , _____

3. Skip count by 4 up to 32 on the number line below.



Show the multiplication sentences that go with each skip on the above number line.

_____ , _____ , _____ , _____ , _____ ,

_____ , _____ , _____

4. Write the missing numbers.

a. 2, 4, _____, _____, _____, _____, _____, 16, _____, _____, _____, 24

b. _____, 20, 25, _____, _____, _____, _____, _____, 55, _____, _____

c. _____, 12, _____, 24, 30, 36, _____, _____, _____, _____,

d. _____, _____, 9, 12, 15, _____, _____, _____, _____, _____, 33

E. Factors and Products

Numbers that are multiplied together are called **factors.**

The answer that you get when you multiply two numbers is called the **product.**

In $9 \times 8 = 72$, the 9 and the 8 are **factors**. The 72 is the **product**.

Your Turn!

1. In the sentence $7 \times 8 = 56$, name the product and the factors.

   a. The number 8 is a _____.

   b. The number 56 is a _____.

   c. The number 7 is a _____.

2. Tell whether each number that is underlined is a product or a factor.

Example: $7 \times 9 = \underline{\mathbf{63}}$ product

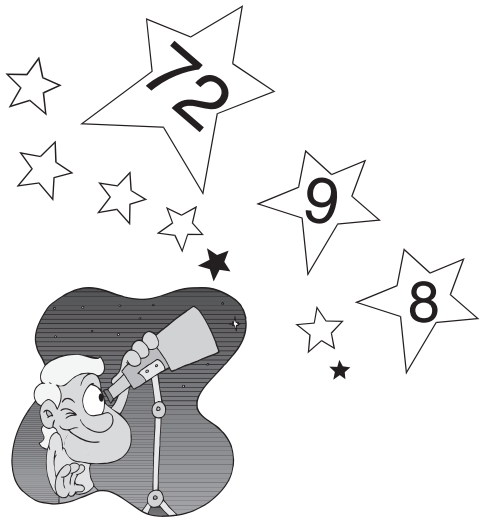
a. $8 \times \underline{\mathbf{5}} = 40$ _____

b. $6 \times \underline{\mathbf{9}} = 54$ _____

c. $6 \times 8 = \underline{\mathbf{48}}$ _____

d. $\underline{\mathbf{7}} \times 3 = 21$ _____

e. $5 \times \underline{\mathbf{7}} = 35$ _____



3. Find the products of these factors.

a. $9 \times 6 =$ _____ b. $4 \times 8 =$ _____ c. $8 \times 9 =$ _____

d. $8 \times 3 =$ _____ e. $7 \times 6 =$ _____ f. $9 \times 4 =$ _____

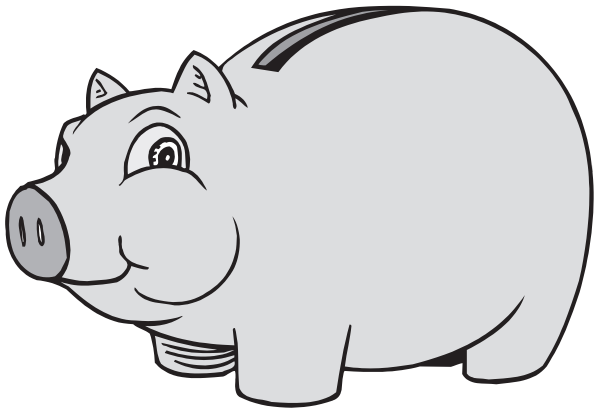
g. $8 \times 7 =$ _____ h. $5 \times 9 =$ _____ i. $8 \times 6 =$ _____

j. $9 \times 9 =$ _____ k. $6 \times 7 =$ _____ l. $3 \times 9 =$ _____

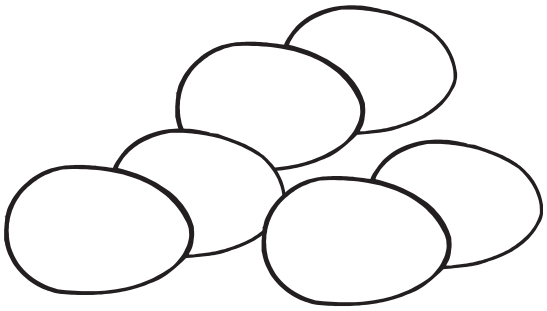
m. $8 \times 5 =$ _____ n. $7 \times 9 =$ _____ o. $7 \times 5 =$ _____

For each story problem, show the multiplication sentence you could use to solve the problem. Then, write a word answer.

4. Jane counted 9 nickels in her piggy bank. How much money did she have?



5. There are 6 eggs in a small carton of eggs. How many eggs are there in 8 small cartons of eggs?

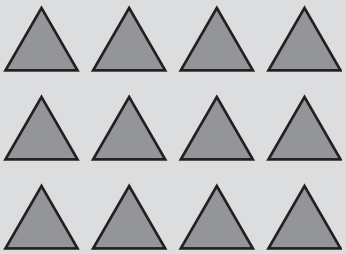


6. Eight teams are playing in a soccer tournament. Each team consists of 6 players and 2 spare players. How many players are in the tournament?

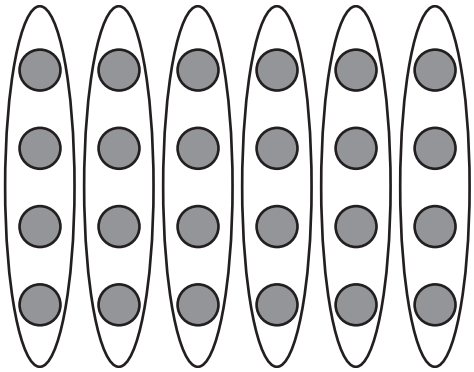
F. Arrays

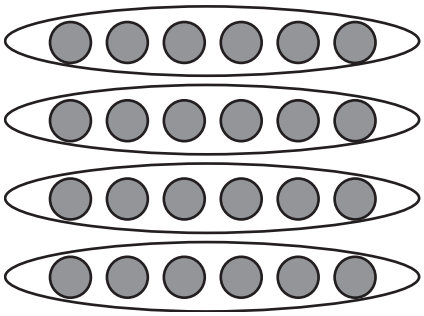
An **array** is a group of objects arranged in rows and columns.

For example, 3×4 can be shown as 3 equal groups of 4 objects.

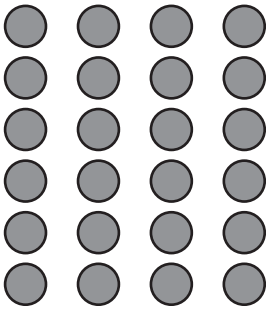


When any objects are shown in rows and columns, the arrangement is called an **array**. Use your counters (buttons, blocks, etc.) to show 4×6 as an array. You can think of this array in two ways.



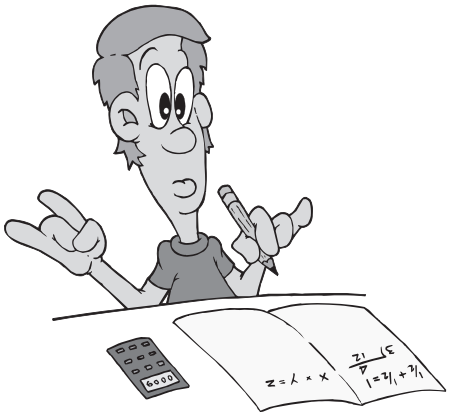


You could also have drawn the 4×6 array in another way:



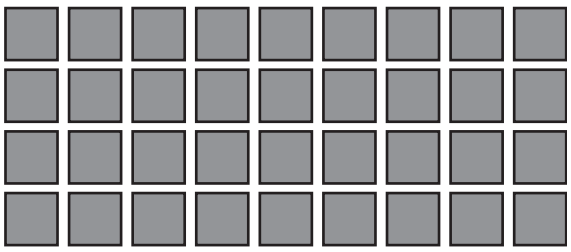
There are three ways to calculate the total number of objects in a 4×6 array:

- by repeated addition: (6 + 6 + 6 + 6 = 24 objects)
  (4 + 4 + 4 + 4 + 4 + 4 = 24 objects)
- by skip counting: 4, 8, 12, 16, 20, 24 objects
  6, 12, 18, 24 objects
- by multiplying: $6 \times 4 = 24$ objects or $4 \times 6 = 24$ objects



Your Turn!

1. Make a 4×9 array with your counters. It should have 4 rows of 9 objects in each row.



Show how you could find the total number of objects in this array using the following methods:

a. Repeated addition: _____

b Skip counting: _____

c. Multiplication: _____

G. Problem Solving

Some problems ask you to find all the combinations or all of the possible answers. To keep track of all the data, put your answers in an *organized list*. The list helps make sure you have listed all the possible answers and not listed any of the answers twice.

The *Make-A-List* Strategy

As you work through the following example, **use a pencil and paper to construct your own list**. Doing this will help you see how a list is constructed.

Example:

Brad has 35 cents to spend on candy. The candy shop sells suckers for 15 cents, gumballs for 5 cents, and peppermints for 10 cents. If Brad spends 35 cents, how many different combinations of candies can he buy? Make a list of your answers.

Step 1: Understand the problem.

Think: I need to find all the different ways that Brad can spend 35¢.
What different combinations of candies will total 35¢?

Step 2: Make a plan.

Because there are many possible answers, it would be helpful to make an **organized list** of all the ways Brad could spend 35¢ buying candy. To use the *Make-A-List* strategy, on a sheet of paper make a list like the one shown. →

Suckers 15¢	Mints 10¢	Gumballs 5¢

Step 3: Try the plan.

- First, think of all the possible combinations when Brad buys 2 suckers. (There is only one!)

Suckers 15¢	Mints 10¢	Gumballs 5¢
2	0	1

This row lists all the combinations when Brad buys 2 suckers. The line totals 35¢.

- Next, think of all the combinations when Brad buys 1 sucker. (There are 3 possible combinations.)

1	2	0
1	1	2
1	0	4

This section lists all the combinations when Brad buys 1 sucker. Each line totals 35¢.

- Finally, think of all the combinations when Brad buys 0 suckers. (There are 4 possible combinations.)

0	3	1
0	2	3
0	1	5
0	0	7

This section lists all the combinations when Brad buys 0 suckers. Each line totals 35¢.

- No more combinations are possible.

- Your completed list should look like this:

Suckers 15¢	Mints 10¢	Gumballs 5¢
2	0	1
1	2	0
1	1	2
1	0	4
0	3	1
0	2	3
0	1	5
0	0	7

- To find the answer to the problem, count how many different combinations you found.

Answer to the Problem:

There are 8 different combinations of candies that Brad could buy for 35¢.

Step 4: Look back.

Read the problem again. Then ask:

Did I answer the question being asked? Yes No

Does each line add up to 35¢? Yes No

Does my answer sound reasonable? Yes No

In W2 - Lesson 3, you will solve more problems using the *Make-A-List* strategy.

Homework

1. Draw an array that has 3 rows of 5 objects.

   Show how you could find the total number of objects in this array using the following methods:

   a. Repeated addition: _____

   b Skip counting: _____

   c. Multiplication: _____

2. Draw an array that has 6 rows of 7 objects.

   Show how you could find the total number of objects in this array using the following methods:

   a. Repeated addition: _____

   b Skip counting: _____

   c. Multiplication: _____