

Lesson 3

Split Numbers to Multiply

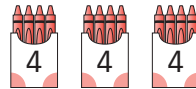
Name: _____

Prerequisite: Show Multiplication as Equal Groups

Study the example problem showing a multiplication sentence for a picture of equal groups. Then solve problems 1–10.

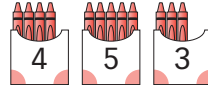
Example

Elmo has 3 boxes of crayons.
Each box has 4 crayons.
Elmo's boxes show equal groups.
He can write a multiplication sentence to find the total.



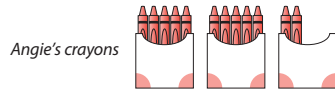
$$3 \times 4 = 12 \text{ crayons}$$

Shelly has 3 boxes of crayons.
The boxes have 4, 5, and 3 crayons.
Shelly's boxes do not show equal groups.
She cannot write a multiplication sentence to find the total. She has to add.



$$4 + 5 + 3 = 12 \text{ crayons}$$

Use the picture below to answer problems 1–3.

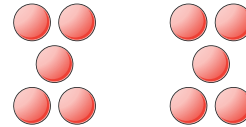


- B 1** How many boxes of crayons does Angie have? 3
- B 2** How many crayons are in each box? 5, 5, and 2
- C 3** How many crayons does Angie have altogether? Can you write a multiplication sentence to find the total? Explain.

Possible answer: Add to find the total number of crayons: $5 + 5 + 2 = 12$. The boxes of crayons are not equal groups, so you cannot write a multiplication sentence to find the total.

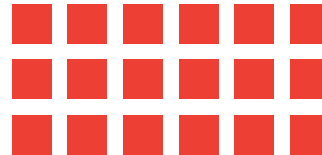
Solve.

Use the picture below to answer problems 4–6.

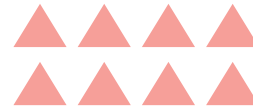


- B 4** How many groups are there? 2
- B 5** How many balls are there in each group? 5
- M 6** Write a multiplication sentence to show how many balls there are altogether.
2 $\times$ 5 = 10

Use the picture below to answer problems 7–9.



- B 7** How many rows are in this array? 3
- B 8** How many squares are in each row? 6
- M 9** Write a multiplication sentence to show how many squares there are altogether.
3 $\times$ 6 = 18
- C 10** Draw an array for the multiplication sentence $2 \times 4 = 8$.
Students draw an array with 2 rows and 4 columns or with 4 rows and 2 columns.
Possible drawing:



Key

B Basic

M Medium

C Challenge



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Break Apart Numbers to Multiply

Study the example problem showing how to break apart a number to multiply. Then solve problems 1–7.

Example

Owen has 8 bags of plums. There are 3 plums in each bag. How many plums does Owen have altogether?

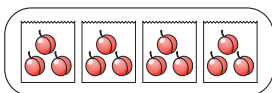
$$8 \times 3 = ?$$

You might break apart the 8 into 4 and 4.

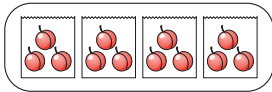
Multiply each part by 3.

Then, add the two products.
 $12 + 12 = 24$.

So $8 \times 3 = 24$.



$$4 \times 3 = 12$$



$$4 \times 3 = 12$$

- B** 1 How many rows and columns are in the array? Fill in the blanks.

7 rows and 6 columns.

- M** 2 Circle rows to break apart the array into two parts.

Possible answer:

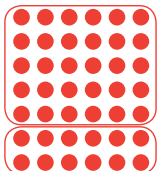
- M** 3 Write multiplication sentences to show the total for each part of the array. **Possible answer:**

$$\underline{5} \times \underline{6} = \underline{30} \quad \underline{2} \times \underline{6} = \underline{12}$$

- C** 4 How can you use your answer to problem 3 to find the product of 7×6 ? Explain.

Possible answer: Add the products to find the total in the whole array.

$$30 + 12 = 42; 7 \times 6 = 42$$



Solve.

- 5** Draw a line to the pair of multiplication sentences that can be used to solve each problem.

M

$$8 \times 4 = ?$$

$$5 \times 7 = 35$$

$$3 \times 7 = 21$$

M

$$3 \times 9 = ?$$

$$6 \times 5 = 30$$

$$6 \times 2 = 12$$

M

$$6 \times 7 = ?$$

$$3 \times 5 = 15$$

$$3 \times 4 = 12$$

M

$$8 \times 7 = ?$$

$$5 \times 8 = 40$$

$$4 \times 8 = 32$$

M

$$9 \times 8 = ?$$

$$5 \times 4 = 20$$

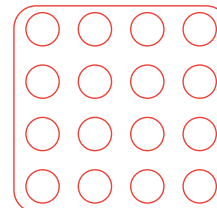
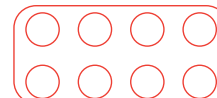
$$3 \times 4 = 12$$

B

- 6** Draw an array to show 6×4 .

Students draw an array with 4 rows and 6 columns or with 6 rows and 4 columns.

Possible answer for problems 6 and 7:



C

- 7** Circle rows to break the array in two parts. Show how to use the parts to find 6×4 .

Possible answer: $2 \times 4 = 8$ and $4 \times 4 = 16$;

$8 + 16 = 24$; So, $6 \times 4 = 24$.



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Use Grouping to Multiply

Study the example showing how to break apart a factor to multiply. Then solve problems 1–7.

Example

Grace gives grapes to 6 friends. She gives each friend 7 grapes. How many grapes does Grace share altogether?

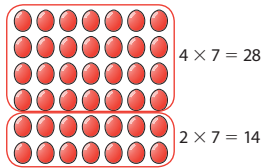
$$6 \times 7 = ?$$

You might break apart the 6 into 4 + 2.

Multiply each part by 7. $(4 \times 7) + (2 \times 7) = ?$

Then, add the two products. $28 + 14 = 42$.

$$\text{So } 6 \times 7 = 42.$$



Tony has 8 boxes of toy cars. Each box has 6 cars in it.

- B 1** Write a multiplication sentence for this story.

$$8 \times 6 = ?$$

- M 2** To help you find 8×6 , you might break apart the 8 into 5 and 3. Write the two multiplication problems this would give you.

$$5 \times 6 = 30$$

$$3 \times 6 = 18$$

- M 3** Add the two products in problem 2. How many toy cars does Tony have?

$$30 + 18 = 48$$

Tony has 48 toy cars.

Solve.

- B 4** Ron drew this array. What multiplication sentence can he solve using this array?

$$6 \times 6 = ?$$

- M 5** Circle rows or columns to break the array into 2 parts. Then fill in the blanks to show how to use the parts to find the answer to problem 4.

Possible answer

$$6 \times 6 = (5 \times 6) + (1 \times 6).$$

$$\text{So, } 6 \times 6 = 30 + 6.$$

$$\text{So, } 6 \times 6 = 36.$$

- C 6** Write the multiplication sentence you solved in problems 4 and 5. How can you use that answer to find the product of 6×9 ? Explain.

$$6 \times 6 = 36$$

Possible explanation: Break apart 9 into 6 and 3. Multiply $6 \times 6 = 36$ and

$$6 \times 3 = 18. \text{ Add } 36 + 18 = 54. \text{ So, } 6 \times 9 = 54.$$

- M 7** Draw a line from each box to the multiplication fact it could help you find.

$$(2 \times 5) + (6 \times 5)$$

$$(2 \times 8) + (5 \times 8)$$

$$(2 \times 7) + (5 \times 7)$$

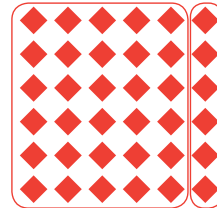
$$7 \times 7 = 49$$

$$8 \times 5 = 40$$

$$6 \times 8 = 48$$

$$7 \times 8 = 56$$

Possible answer for problem 5:



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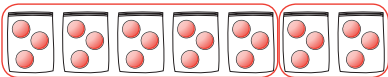
Break Apart Numbers to Multiply

Solve the problems.

B

- 1 Finn has 7 bags of marbles. Each bag has 3 marbles. Show one way to break apart the 7 to multiply. Then find the total number of marbles.

Possible work:



$(5 \times 3) + (2 \times 3) = 15 + 6$, or 21;
There are 21 marbles.

I think there is more than one way to break apart the bags.



C

- 2 Tawny breaks apart 9 to solve 9×5 . Show one way Tawny can do this. Then solve the problem.

Possible answer:

$9 \times 5 = ?$
 $4 \times 5 = 20$ and $5 \times 5 = 25$
 $20 + 25 = 45$
 $9 \times 5 = 45$

What are different ways to break apart 9?



M

- 3 Which of these are ways you can break apart a factor to solve 6×3 ? Circle all the correct answers.

- ☐ A $3 \times 3 = 9$ and $3 \times 3 = 9$
☐ B $4 \times 3 = 12$ and $2 \times 3 = 6$
☐ C $6 \times 2 = 12$ and $4 \times 3 = 12$
☐ D $6 \times 1 = 6$ and $6 \times 2 = 12$

You can break apart either factor.



Solve.

C

- 4 Sandy wants to multiply 7×5 . She breaks apart the 7 into 4 and 3. What is Sandy's next step? Circle the letter of the correct answer.

- A $7 \times 4 = 28$ and $7 \times 3 = 21$
B $7 \times 5 = 35$ and $5 \times 4 = 20$
☒ C $4 \times 5 = 20$ and $3 \times 5 = 15$
D $4 \times 3 = 12$ and $7 \times 5 = 35$

Mitch chose A as the correct answer. How did he get that answer?

Possible answer: Mitch broke apart the 7 into 4 and 3. He multiplied the 4 and the 3 by 7 instead of by 5.

Look back at the first multiplication problem to check your answer.



M

- 5 Tia solved 9×7 by breaking apart 7 into 5 and 2. Fill in the blanks to show how she did it.

$$\begin{array}{r} 9 \times 7 \\ \swarrow \quad \searrow \\ 9 \times 5 \quad 9 \times 2 \\ \downarrow \quad \downarrow \\ 45 \quad + \quad 18 = 63 \end{array}$$

What do the red arrows show you?



M

- 6 Look at problem 5. Show a different way to break apart factors to solve the problem.

Possible answer:

$$\begin{aligned} 9 \times 7 &= (4 \times 7) + (5 \times 7) \\ &= 28 + 35 \\ &= 63 \end{aligned}$$

Can you break apart 7 in a different way? Can you break apart 9?

