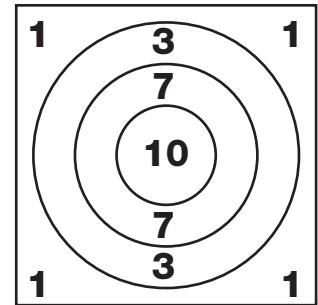


1

- a. With 3 darts, what is the highest total possible?
- b. With 3 darts, what is the lowest total possible?
- c. Jacob scored 24 points with 3 darts.
Was this possible or not?



ANSWER: a. 30; b. 3; c. possible, two 7s and one 10

COMMENTS & EXTENSIONS: In Part c students have to look at various combinations to determine if a number is possible. Are they systematic in doing so? Do they realize which combinations are obviously not possible?



What scores are possible with exactly 3 darts?

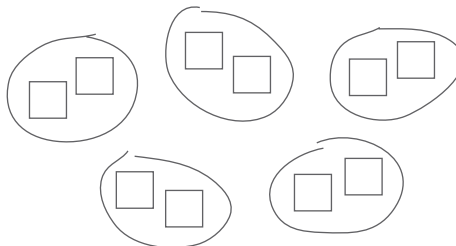
Try This

Michelle has 5 bracelets. She puts 2 charms on each bracelet. How many charms does she have in all?

5 groups of 2 make 10.

$$5 \times 2 = 10$$

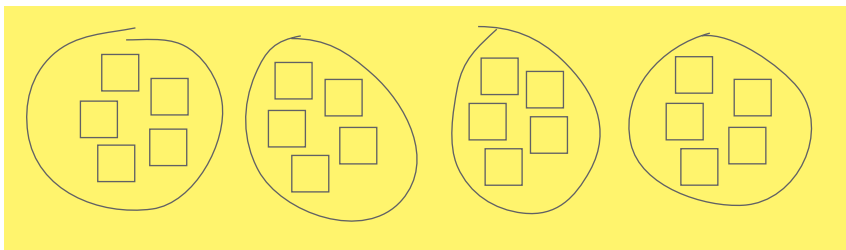
- Use Centimeter Cubes to model the problem.
- Draw your model.
- Write the number sentence to show the answer.



1. 4 boxes. 5 markers in each box. How many markers in all?

4 groups of 5 make 20.

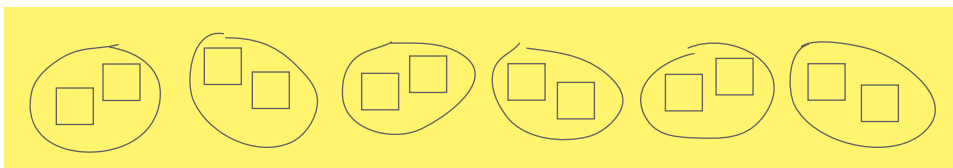
$$\underline{4} \times \underline{5} = \underline{20}$$



2. 6 ducks. Each duck has 2 feet. How many feet in all?

6 groups of 2 make 12.

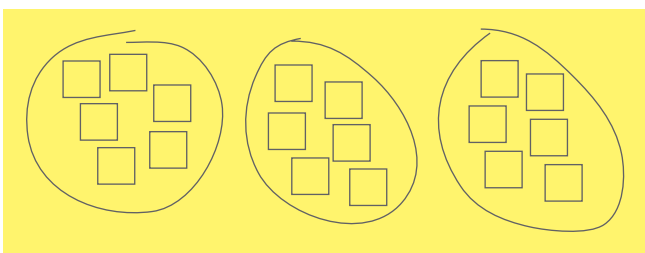
$$\underline{6} \times \underline{2} = \underline{12}$$



3. 6 drinks in each pack. 3 packs of drinks. How many drinks in all?

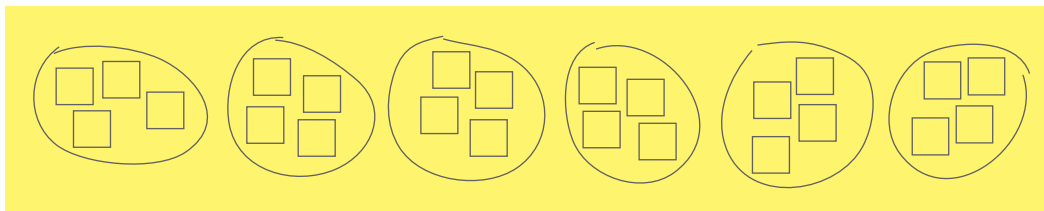
3 groups of 6 make 18.

$$\underline{3} \times \underline{6} = \underline{18}$$

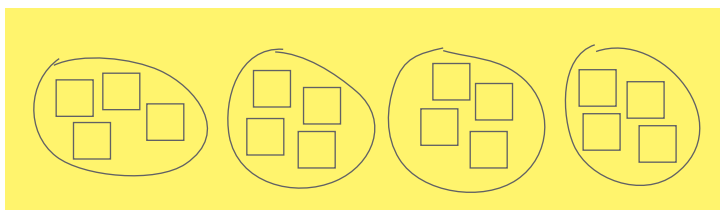


Multiply. Draw a model to explain your answer.

4. $6 \times 4 =$ 24



5. $4 \times 4 =$ 16



**Write a problem you can solve using the given number sentence.
Draw a picture. Write the answer to your problem.**

6. $5 \times 7 =$ 35

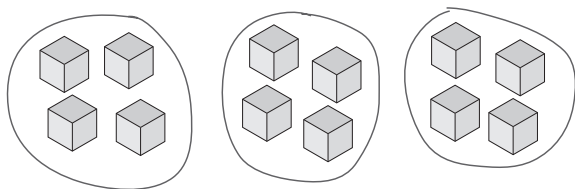
Problems and drawings will vary.
Check students' work.

Use Centimeter Cubes to build the model. Use the model to complete the problem.

1. Roberto has 3 model cars. Each car has 4 wheels. How many wheels are there in all?

3 groups of 4 make 12.

$$3 \times 4 = \underline{12}$$

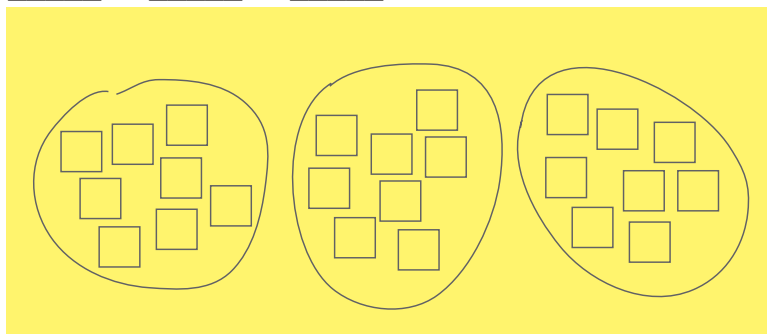


Using Centimeter Cubes, build a model for the problem. Draw your model to complete the problem.

2. You have 3 pet spiders. Each spider has 8 legs. How many legs in all?

3 groups of 8 make 24.

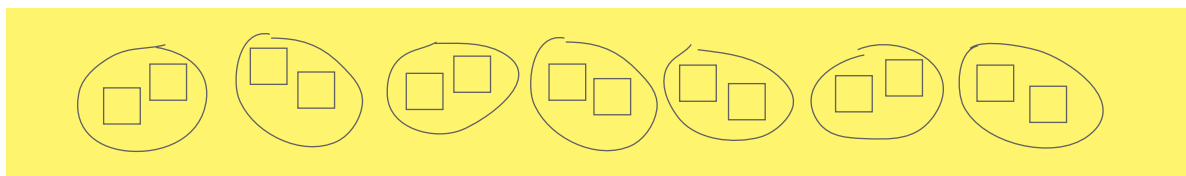
$$\underline{3} \times \underline{8} = \underline{24}$$



3. You see 7 ducks. Each duck has 2 feet. How many feet in all?

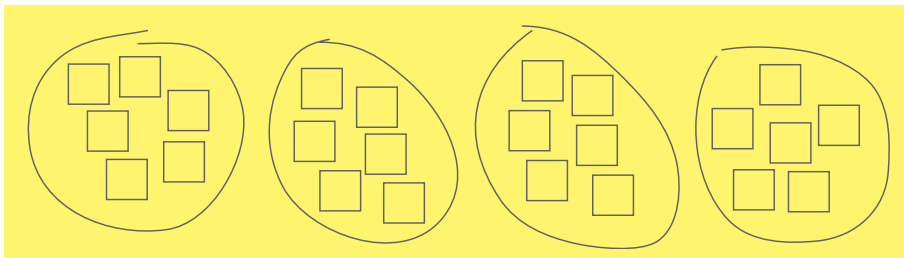
7 groups of 2 make 14.

$$\underline{7} \times \underline{2} = \underline{14}$$



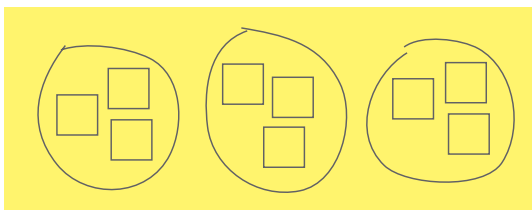
4. You have 4 packs of pencils. Each pack has 6 pencils. How many pencils in all?

4 groups of 6 make 24.
4 × 6 = 24

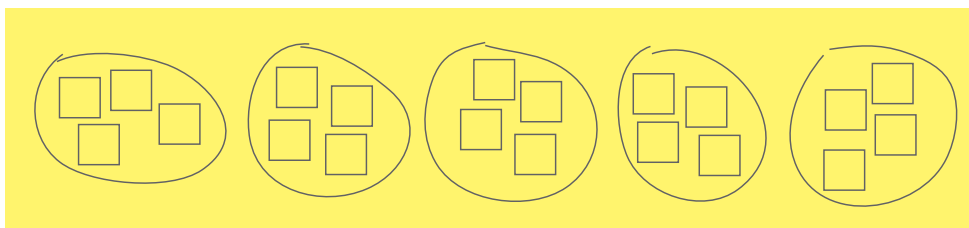


Multiply. Draw a model to explain your answer.

5. $3 \times 3 =$ 9



6. $5 \times 4 =$ 20



Name Answer Key

2



- a. If the black—white pattern continues, what color is box 15? 20? 25?
- b. How many white boxes are there in boxes 1 to 20?

ANSWER: a. black, white, black; b. 10 white boxes

COMMENTS & EXTENSIONS: Pose the same questions using the words BING and BONG (said out loud) in the pattern instead of the black and white colors.



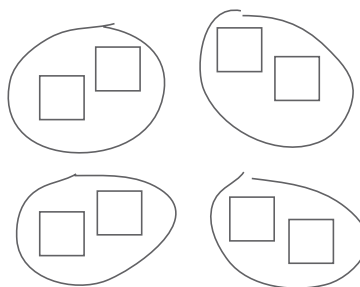
Make believe your class works blindfolded. Present other tasks like this in non-visual formats.

Try This

4 dogs have some toys. Each dog has the same number of toys. There are 8 toys in all. How many toys does each dog have?

- Use Centimeter Cubes to build a model for the problem.
- Draw your model.
- Use the model to find the answer.

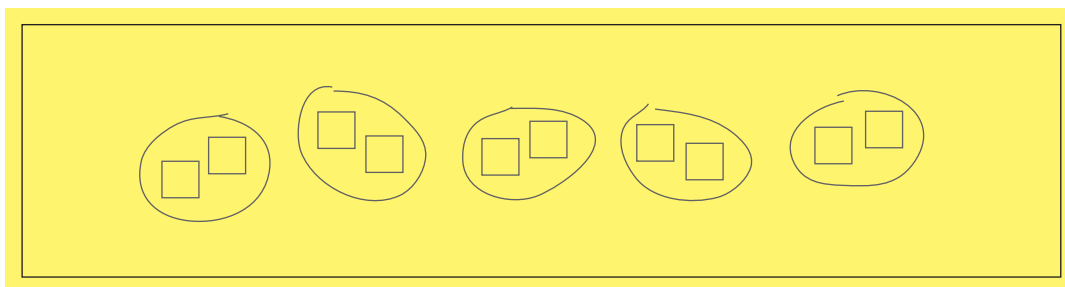
$$4 \times \underline{\quad} = 8$$



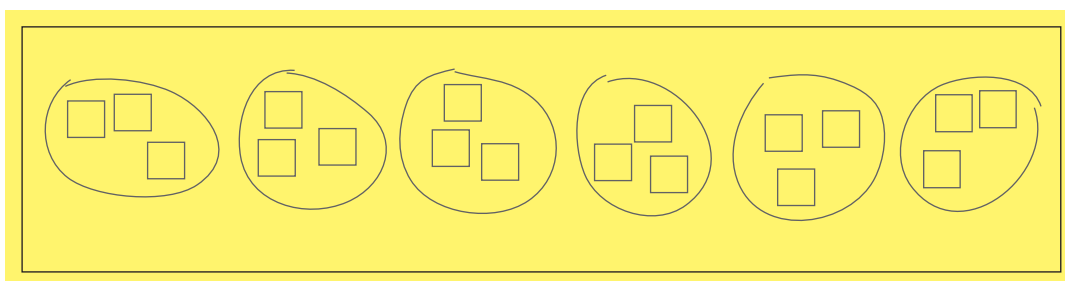
The 4 groups have 2 cubes each. So each dog has 2 toys.

$$4 \times 2 = 8$$

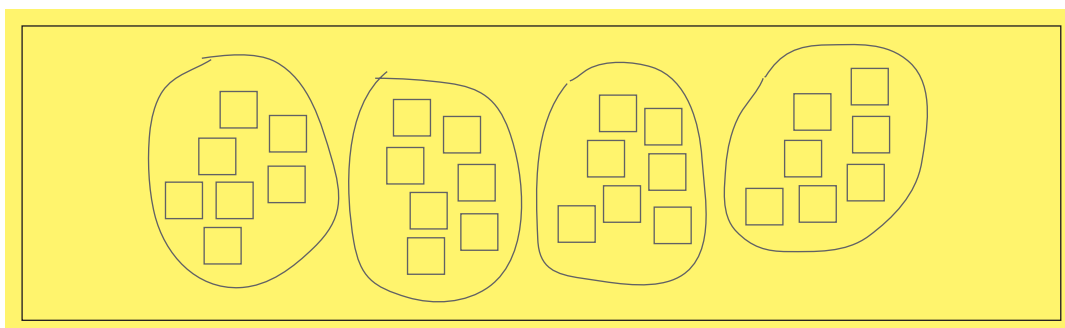
1. $5 \times \underline{2} = 10$



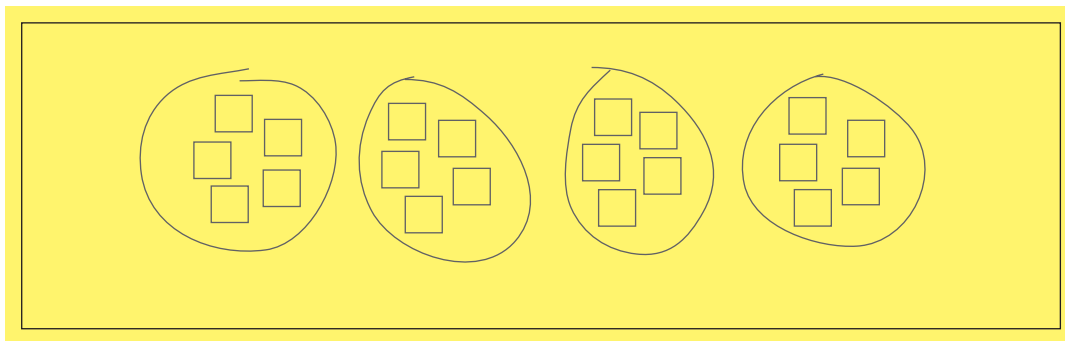
2. $6 \times \underline{3} = 18$



3. $\underline{4} \times 7 = 28$



4. 4 $\times 5 = 20$



Solve the problem. Write a number sentence that shows your answer.

5. Three friends took an art class together. They all painted the same number of pictures. They painted 24 pictures in all. How many pictures did each friend paint?

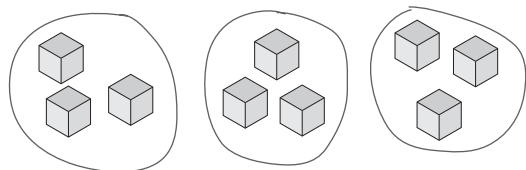
8 pictures; $3 \times 8 = 24$

6. Omar scored 5 points in every one of his basketball games. He scored 45 points in all. How many games did he play?

9 games; $9 \times 5 = 45$

Use Centimeter Cubes to build the model. Use the model to complete the problem.

1. Seth has some boxes of toy dinosaurs. Each box has 3 dinosaurs. There are 9 dinosaurs in all. How many boxes of dinosaurs does Seth have?

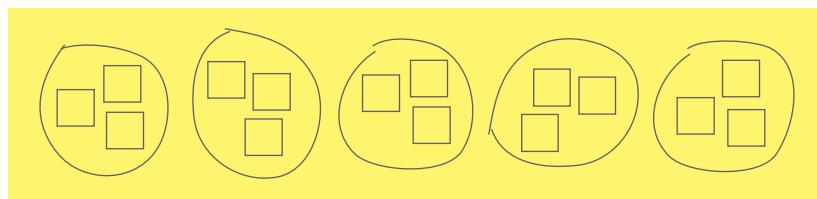


$$\begin{array}{r} 3 \\ 3 \end{array} \text{ groups of 3 make 9.}$$

$$\begin{array}{r} 3 \\ 3 \end{array} \times 3 = 9$$

Use Centimeter Cubes to model the problem. Draw your model.
Use it to complete the problem.

2. You have 5 equal groups of oranges. There are 15 oranges in all. How many oranges are in each group?



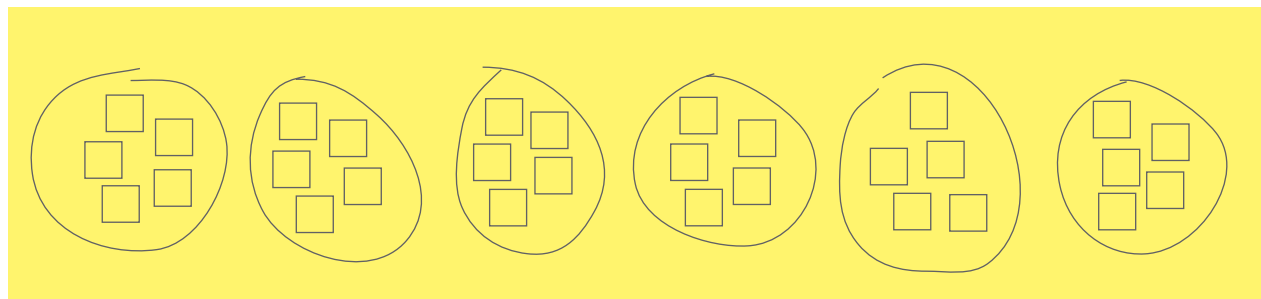
$$5 \text{ groups of } \begin{array}{r} 3 \\ 3 \end{array} \text{ make 15.}$$

$$5 \times \begin{array}{r} 3 \\ 3 \end{array} = 15$$

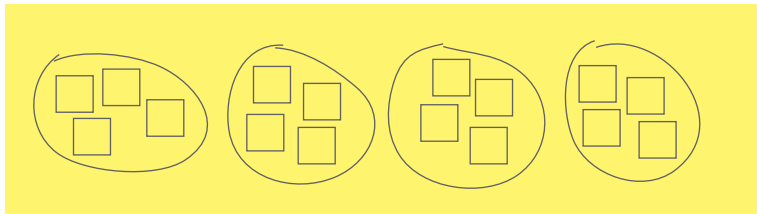
3. There are 6 tables in the study room. Every table has the same number of chairs. There are 30 chairs in all. How many chairs are at each table?

$$6 \text{ groups of } \begin{array}{r} 5 \\ 5 \end{array} \text{ make 30.}$$

$$6 \times \begin{array}{r} 5 \\ 5 \end{array} = 30$$



4. There are 4 legs on each table in the reading lab. There are 16 legs in all. How many tables are in the reading lab?



$$\begin{array}{r} 4 \\ \hline 4 \end{array} \text{ groups of 4 make 16.}$$

$$\begin{array}{r} 4 \\ \hline 4 \end{array} \times 4 = 16$$

Find the unknown.

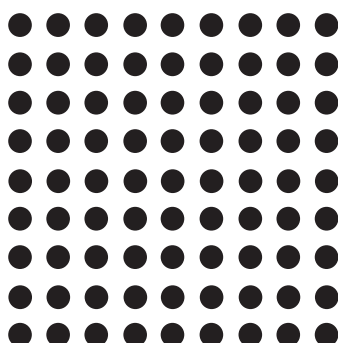
5. $4 \times \underline{9} = 36$

6. $\underline{7} \times 5 = 35$

Name Answer Key

3

How many dots are there?



Now go back and complete the activity a different way.

ANSWER: 81 dots

COMMENTS & EXTENSIONS: Ask students to describe how they solved the activity. Some of them are likely to have counted by 1s, others by 9s, still others may have multiplied 9×9 .



Tell why it is important to be able to solve an activity using two different methods.

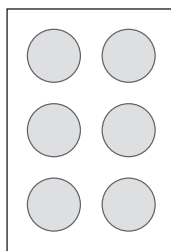
Try This

A weekend is 2 days.

How many weekends make 6 days?

- Use Two-Color Counters to build an array for the problem.
- Draw your array.
- Use the array to find the answer.

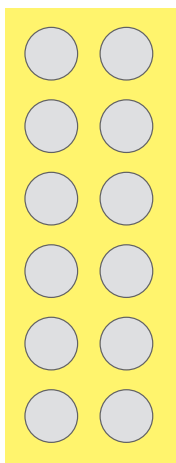
$$\underline{\quad} \times 2 = 6$$



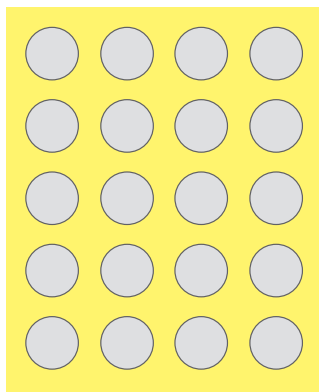
There are 3 rows of 2, so 3 weekends make 6 days.

$$3 \times 2 = 6$$

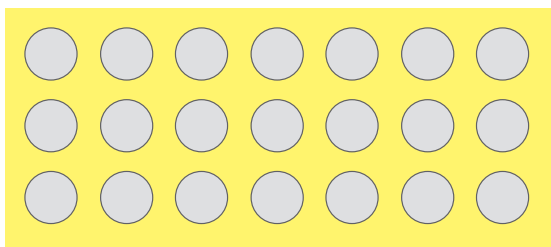
1. $6 \times \underline{2} = 12$



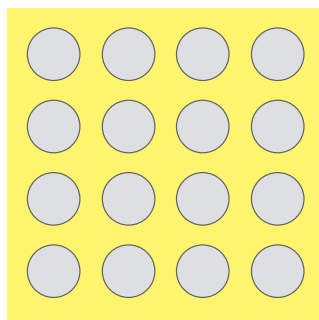
2. $5 \times \underline{4} = 20$



3. $\underline{3} \times 7 = 21$



4. $\underline{4} \times 4 = 16$



Solve the problem.

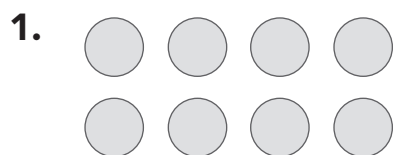
5. Your teacher has 4 new boxes of erasers. If she has 28 erasers in all, how many erasers are in each box?

7

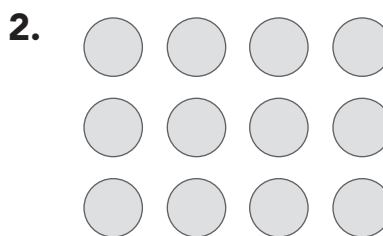
6. You ate 3 meals every day on your vacation. If you ate 24 meals in all, how many days was your vacation?

8

**Use Two-Color Counters to build the model.
Use the model to complete the problem.**



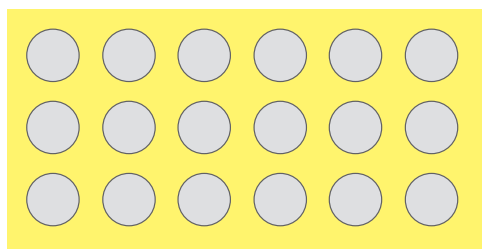
$$\begin{array}{l} 2 \text{ rows of } \underline{4} \\ 2 \text{ groups of } \underline{4} \\ 2 \times \underline{4} = \underline{8} \end{array}$$



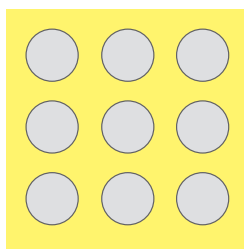
$$\begin{array}{l} \underline{3} \text{ rows of } 4 \\ \underline{3} \text{ groups of } 4 \\ \underline{3} \times 4 = 12 \end{array}$$

**Use Two-Color Counters to model the problem.
Draw your model. Complete the number sentence.**

3. $3 \times \underline{6} = 18$



4. $\underline{3} \times 3 = 9$



Solve the problem.

5. Two packs of gum have 10 pieces.
How many pieces are in each pack?

$\underline{5}$

6. Each math team has 4 students.
There are 24 students at the meet.
How many teams are at the meet?

$\underline{6}$

4

Here is the start of a pattern.

The pattern continues: black–gray–white.



- a. Continue the pattern for ten more boxes.
- b. What color is box 27? box 41? box 100?

ANSWER: a.

b. 27–white, 41–gray, 100–black

COMMENTS & EXTENSIONS: What numbers do the gray boxes have? Write them in order up to 50. What patterns do you see? Do the same or similar number patterns hold for the white boxes and the black boxes?

Try This

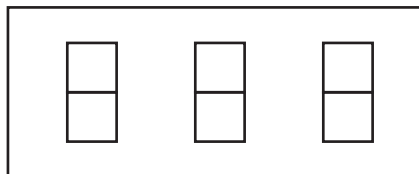
- Use tiles to model the situation.
- Draw your solution.
- Write your answer.
- Write a number sentence to describe the situation.
- Tell a story that can be shown with your model.

6 tiles in all

3 groups of tiles

How many in each group? 2 tiles

$$6 \div 3 = 2$$



Drawings and stories will vary. Check students' work.

1. 5 equal groups
4 tiles in each group
How many in all? 20 tiles

$$5 \times 4 = 20 \text{ or } 4 \times 5 = 20$$



2. 10 tiles in all
2 equal groups
How many in each group? 5 tiles

$$10 \div 2 = 5$$



3. 15 tiles in all
3 tiles in each group
How many groups? 5 groups

$$15 \div 3 = 5$$



4. 12 tiles in all
6 tiles in each group
How many groups? 2 groups

$$12 \div 6 = 2$$



Solve the problem.

5. Complete the number sentences. Use the same 3 numbers in every sentence. Two of the numbers will be equal to each other.

$$\underline{2} + \underline{2} = \underline{4}$$

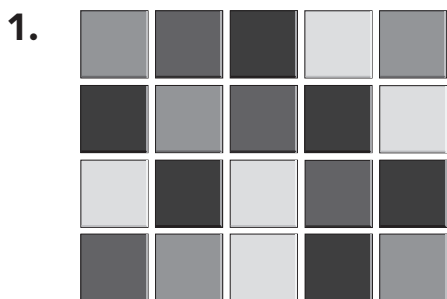
$$\underline{2} \times \underline{2} = \underline{4}$$

$$\underline{4} - \underline{2} = \underline{2}$$

$$\underline{4} \div \underline{2} = \underline{2}$$



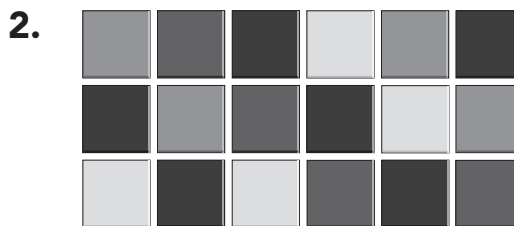
Use Color Tiles to build the model. Divide the tiles into equal groups. Write a division sentence that answers the question.



Divide into 4 groups.

How many in each group? 5

Division sentence: $20 \div 4 = 5$



Divide into groups of 6.

How many groups? 3

Division sentence:

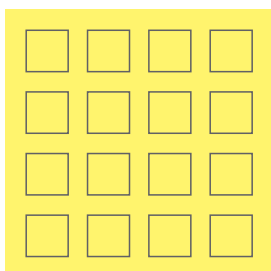
$18 \div 6 = 3$

Use Color Tiles to model the situation. Sketch the model. Write a division sentence that answers the question.

3. There are 16 tiles in all. There are 4 tiles in each group.

How many groups? 4

Division sentence: $16 \div 4 = 4$



Write a division sentence that answers the question

4. 24 tiles, 8 equal groups

How many in each group? 3

Division sentence:

$24 \div 8 = 3$

5. 35 tiles, 7 equal groups

How many in each group? 5

Division sentence:

$35 \div 7 = 5$

6. 27 tiles, 3 in each group

How many groups? 9

Division sentence:

$27 \div 3 = 9$

7. 42 tiles, 7 in each group

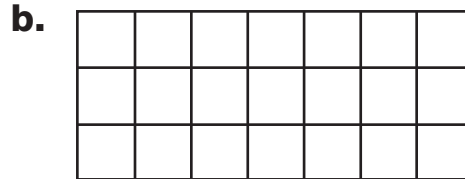
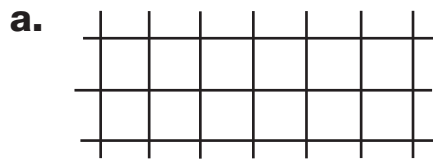
How many groups? 6

Division sentence:

$42 \div 7 = 6$

5

Which picture shows 3×7 ?



How are the pictures different? How are they the same?

ANSWER: Both **a.** and **b.** show 3×7 . The pictures are similar in that they both show that 3×7 is 21. One picture, however, uses crossings (points) while the other uses boxes.

COMMENTS & EXTENSIONS: These are simply two different ways to represent 3×7 . Both work effectively, and they show that multiplication can be shown pictorially.



Find two different ways to show $24 \div 6 = 4$. Explain how your two different representations are different.

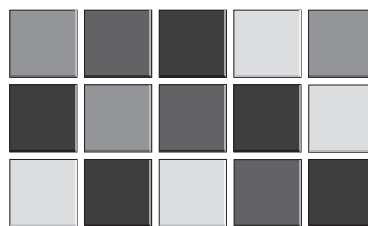
Try This

Peter read 15 pages for science.
How many days did he read if he
read 5 pages each day?

- Use Color Tiles to build an array for the problem.
- Draw your array.
- Use the array to find the answer and complete the equations.

$$15 \div ? = 5$$

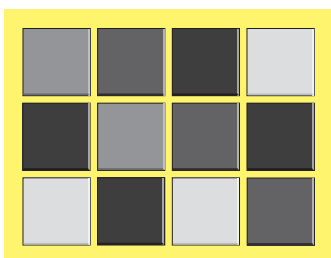
$$? \times 5 = 15$$



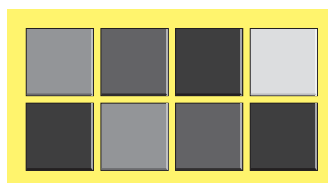
3 rows represent 3 days.
Peter read 3 days.

Arrays may vary; for example a 3×4 array is equivalent to a 4×3 array.

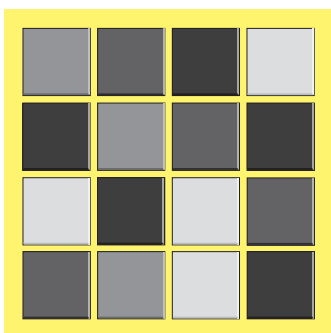
1. $12 \div \underline{3} = 4$
 $\underline{3} \times 4 = 12$



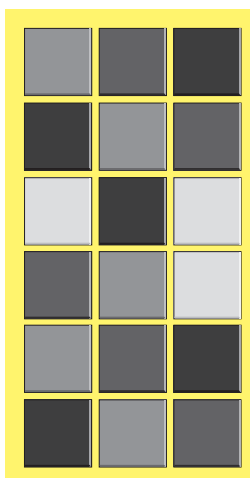
2. $\underline{8} \div 2 = 4$
 $2 \times 4 = \underline{8}$



3. $16 \div \underline{4} = 4$
 $\underline{4} \times 4 = 16$



4. $18 \div 6 = \underline{3}$
 $6 \times \underline{3} = 18$

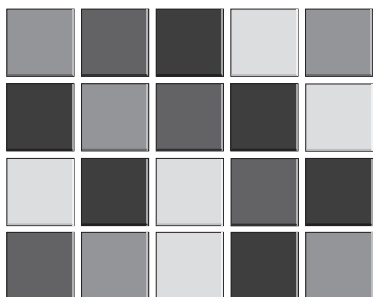


Solve the problem.

5. Aaron bought some bags of apples. He has 21 apples in all. If each bag holds 7 apples, how many bags did he buy? 3
6. The gym teacher arranged 30 students into groups. There are 5 students in each group. How many groups are there? 6

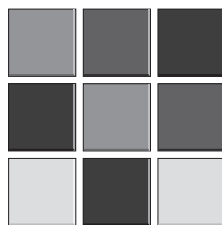
Use Color Tiles to build the array. Use the array to complete the problem.

1. 20 tiles



$$\begin{array}{l} \underline{4} \text{ rows of } \underline{5} \\ 20 \div \underline{4} = 5 \\ \underline{4} \times 5 = 20 \end{array}$$

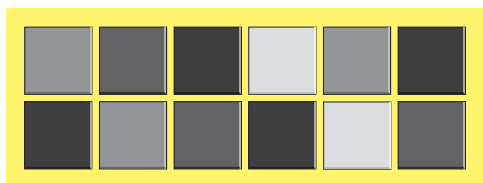
2. 9 tiles



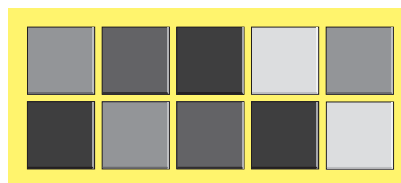
$$\begin{array}{l} 3 \text{ rows of } \underline{3} \\ 9 \div 3 = \underline{3} \\ 3 \times \underline{3} = 9 \end{array}$$

Use Color Tiles to build an array for the problem. Draw your array. Complete the number sentences.

3. $12 \div \underline{2} = 6$
 $\underline{2} \times 6 = 12$



4. $\underline{10} \div 2 = 5$
 $2 \times 5 = \underline{10}$



Arrays may vary; for example a 2×6 array is equivalent to a 6×2 array.

Solve the problem.

5. The teacher had some packs of pencils on her desk. There were 28 pencils in all. If each pack had 7 pencils, how many packs were there? 4

6. Wanda counted 15 baby birds in nests. If each nest holds 3 baby birds, how many nests did Wanda find? 5

6

A farmer raises cows (4 legs) and chickens (2 legs). He counts 22 legs altogether. What are the possible numbers of cows and chickens?

cows								
chickens								

ANSWER: 1 chicken and 5 cows, 3 chickens and 4 cows, 5 chickens and 3 cows, 7 chickens and 2 cows, 9 chickens and 1 cow, and 11 chickens

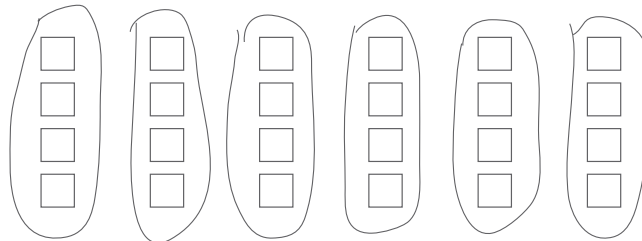
cows	5	4	3	2	1	0
chickens	1	3	5	7	9	11

COMMENTS & EXTENSIONS: Are students systematic? Are they exhaustive? Do they focus on cows and forget about chickens? Pose a similar problem except that this time there are 27 legs. [Impossible, if all the cows have 4 legs and all the chickens have 2 legs.]

Try This

Nina has 24 stickers. She will give an equal number to each of her 6 best friends. How many stickers will each friend get?

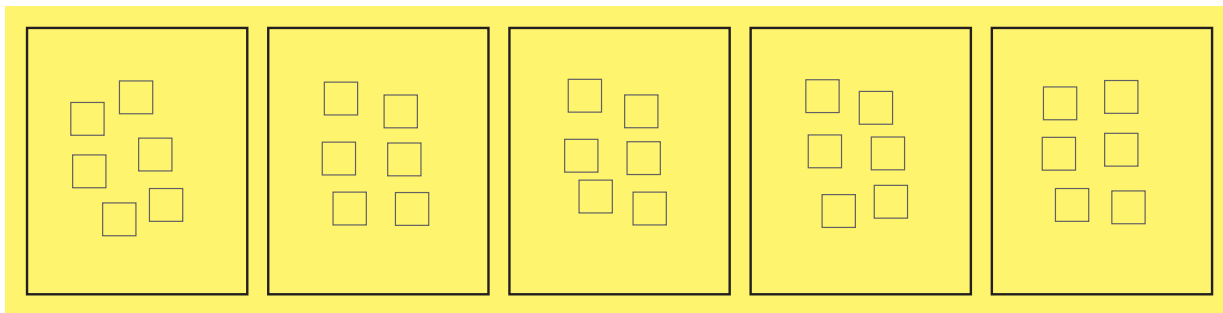
- Pick manipulatives and build a model.
- Draw your model.
- Give the answer, and write a number sentence for the problem.
- Think: 24 in all; divide into 6 groups.



Each friend gets 4 stickers; $24 \div 6 = 4$.

Models will vary. Check students' work.

1. There are 5 people on Ashton's team. Each person has 6 crayons. How many crayons in all?



There are 30 crayons in all.

Number sentence: $5 \times 6 = 30$

2. Jake ran 21 miles in one week. He ran the same amount each day. How many miles did he run each day?

orange				orange			w
green	green	green	green	green	green	green	

Jake ran 3 miles each day.

Number sentence: $21 \div 7 = 3$

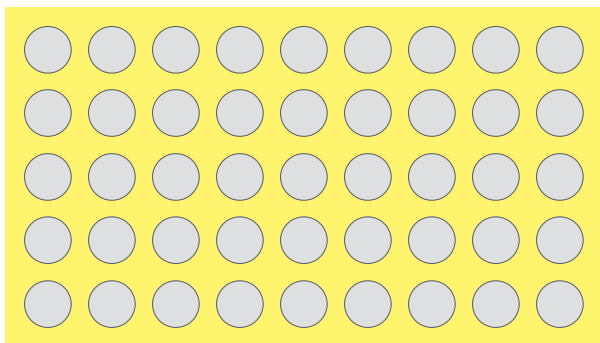
3. It takes 5 inches of ribbon to make a bow. Alice wants to make 4 bows. How many inches of ribbon does she need?

yellow	yellow	yellow	yellow
orange		orange	

Alice needs 20 inches of ribbon.

Number sentence: $4 \times 5 = 20$

4. The school band is setting up for a concert. They need 5 rows with 9 chairs in each row. How many chairs do they need?



The band needs 45 chairs.

Number sentence: $5 \times 9 = 45$

Model and write the word problem.

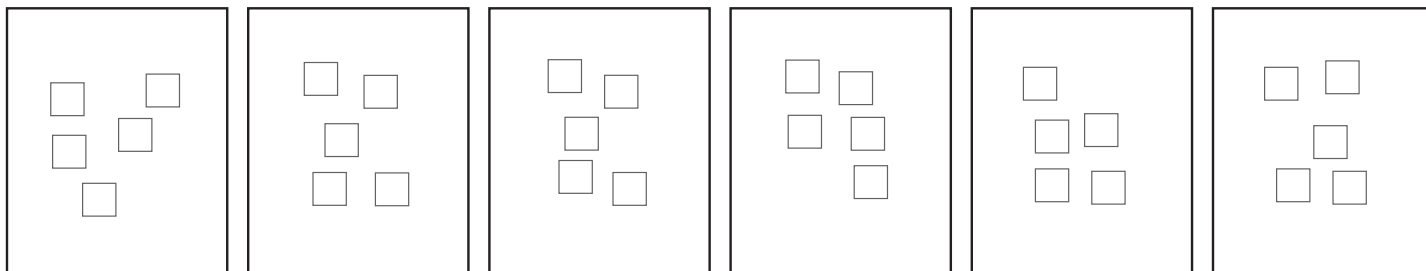
5. Using Centimeter Cubes, model a word problem in which you divide 40 into equal groups. Write your problem.

Answers will vary. Check students' work.

Use Centimeter Cubes to build the model.

Use the model to complete the problem.

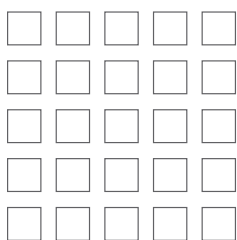
1. Five new computers will be added to each third grade classroom. There are 6 third grade classrooms. How many computers will be added in all?



30 computers will be added.

Number sentence: $6 \times 5 =$ **30**

2. Mrs. Little has 25 chairs. She wants 5 rows. How many chairs in each row?



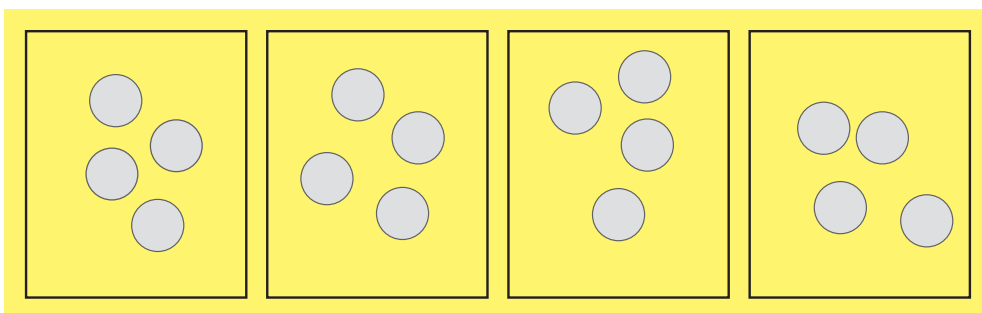
5 chairs in each row.

Number sentence: $25 \div 5 =$ **5**

Build a model for the problem. Draw your model.

Use the model to complete the problem.

3. There are 4 juice pouches in a box. There are 4 boxes in a case. How many juice pouches are in the case?



Models may vary.
Check students' work.

16 juice pouches in the case.

Number sentence: $4 \times 4 =$ **16**

continued on the next page

4. Lisa has 18 feet of wood. Each sign is 2 feet long.
How many signs can she make?

orange					brown			
red	red	red	red	red	red	red	red	red

Models may vary.
Check students' work.

Lisa can make 9 signs.

Number sentence: $18 \div 2 = 9$

Solve the problem. Write a number sentence to show the answer.

5. Randy read for 100 minutes.
He read for 10 minutes each day.
How many days did it take him
to read 100 minutes?

$100 \div 10 = 10$

6. Alan has 5 bags of seashells.
Each bag has 7 seashells in it.
How many seashells does he
have in all?

$5 \times 7 = 35$