

1

Fill in the blanks.

a.

×	3	7
<input type="text"/>	21	<input type="text"/>
<input type="text"/>	9	21

b.

×	<input type="text"/>	5
6	24	<input type="text"/>
<input type="text"/>	12	15

c.

×	4	<input type="text"/>
9	36	45
<input type="text"/>	16	<input type="text"/>

ANSWER a.

×	3	7
7	21	49
3	9	21

b.

×	4	5
6	24	30
3	12	15

c.

×	4	5
9	36	45
4	16	20

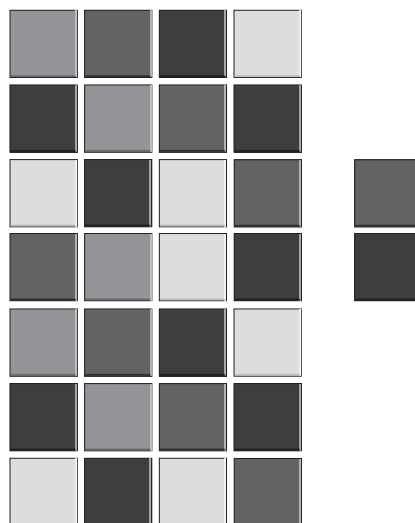
COMMENTS & EXTENSIONS In some of these, the question is, “Where should I start?” Make up similar activities by drawing the full grid and deleting some of the numbers. Be sure to try the grid yourself to see if it is able to be solved before challenging students.

Try This

Mr. Holsten wants to grow vegetables in 7 containers on his patio. He has a packet of 30 cucumber seeds, and he believes he can plant 4 seeds in each container without having any seeds left over. Is Mr. Holsten correct?

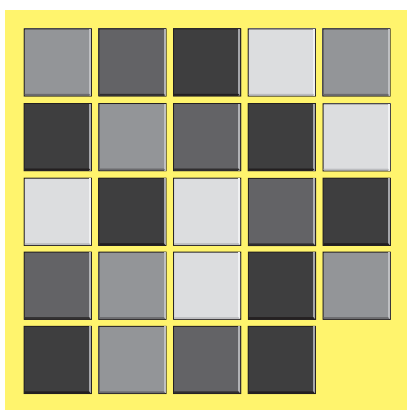
- Use Color Tiles.
- Build and draw a model to solve the problem.

Mr. Holsten is not correct.
He will have 2 seeds left over.



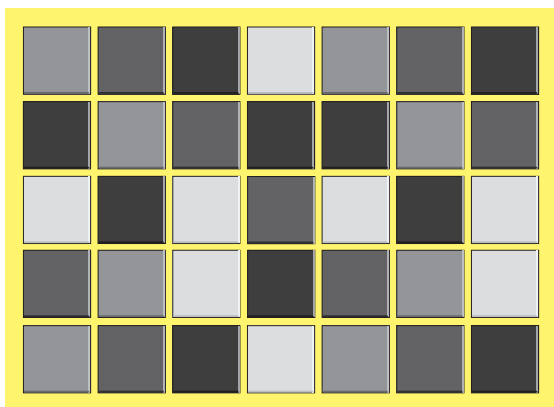
1. Jack is building an obstacle course for his hamster Fluffy. Each hurdle takes 5 blocks, and Jack has 24 blocks. If Jack builds as many hurdles as he can with the blocks, will he have any blocks left over?

If so, how many? Yes, 4 blocks.



2. Jose is also building an obstacle course for his hamster. Each hurdle takes 7 blocks, and Jose has 35 blocks. If Jose builds as many hurdles as he can with the blocks, will he have any blocks left over?

If so, how many? No.



Solve the problem.

3. On June 3, the community pool will begin offering swimming lessons that will take place every 3 days. Circle the days Samantha can take swimming lessons. What does the pattern tell you about multiples?

3, 6, 9, 12, 15, 18, 21, 24, 27, and 30 are multiples of 3.

June						
1	2	(3)	4	5	(6)	7
8	(9)	10	11	(12)	13	14
(15)	16	17	(18)	19	20	(21)
22	23	(24)	25	26	(27)	28
29	(30)					

4. Fill in the missing multiples.

Multiples of 4	32	36	40	44	48	52	56	60	64
----------------	----	----	----	----	----	----	----	----	----

Multiples of 9	18	27	36	45	54	63	72	81	90
----------------	----	----	----	----	----	----	----	----	----

5. Which number does not belong? 10

Explain why. 10 is not a multiple of 3.

3	6	10	12	15	18
---	---	----	----	----	----

6. Is 42 a multiple of 7?

Explain. Yes, $6 \times 7 = 42$

7. Is 48 a multiple of 9?

Explain. No, $5 \times 9 = 45$ and $6 \times 9 = 54$

8. Is 56 a multiple of 3?

Explain. No, $18 \times 3 = 54$ and $19 \times 3 = 57$

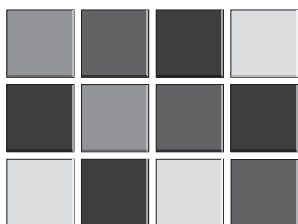
9. Is 72 a multiple of 6?

Explain. Yes, $12 \times 6 = 72$

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

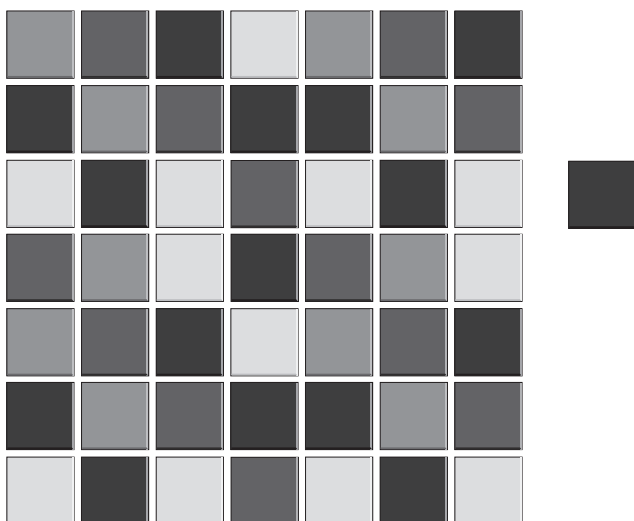
- Kevin would like to share his 12 comic books equally between his 3 cousins. Tell how Kevin can share the comic books so that each cousin receives the same number.

Each cousin receives 4 comic books.



- Cunxin has a bag of 50 pens. He was told to give the same number of pens to each of the 7 fourth grade teachers. Can he divide all the pens equally among the 7 teachers? Why or why not?

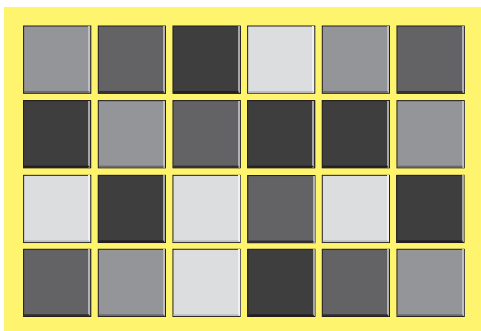
No, he will have 1 pen left over; 50 is not a multiple of 7.



Use Color Tiles. Build and draw a model to solve the problem.

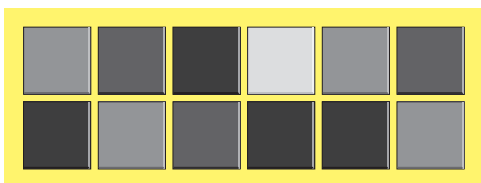
3. Mr. Anders, the gymnastics teacher, is arranging 24 mats in the gym for a tumbling show. Can the mats be arranged in rows of 6 with no mats left over? If so, how many rows will there be? If not, why?

Yes, there will be 4 rows.



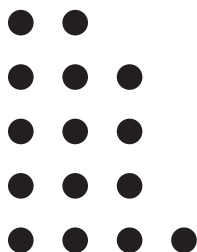
How many more mats will Mr. Anders need if he adds 2 more rows?
Show your work.

12 mats.



Solve the problem.

4. Rhoda created this drawing to show that 15 is a multiple of 3.



Is Rhoda correct? Explain your thinking.

No, an array has to have an equal number of items in each row.
The correct array would be 3 rows of 5.

- 5.** Write the first 5 multiples of 10.

10, 20, 30, 40, 50.

- 6.** Is 32 a multiple of 3? Explain your answer.

No , $10 \times 3 = 30$ and $11 \times 3 = 33$

- 7.** Is 25 a multiple of 2? Explain your answer.

No , $12 \times 2 = 24$ and $13 \times 2 = 26$

- 8.** Is 64 a multiple of 4? Explain your answer.

Yes, $16 \times 4 = 64$

- 9.** Is 63 a multiple of 7? Explain your answer.

Yes, $9 \times 7 = 63$

2

12 is a multiple of 3. So is 21. If you add 12 and 21, you get a multiple of 3.

- a. If you add any two multiples of 3, will you get a multiple of 3?
- b. Explain why or why not.

ANSWER: a. yes; b. Sample: A multiple of 3 is a number of marbles you can share equally over 3 people. Suppose you have 3 people equally sharing a number of marbles and a second group of 3 people equally sharing a number of marbles. Now suppose the first group and the second group give their marbles to a third group of 3 people. The marbles can be equally shared by the third group.

COMMENTS & EXTENSIONS: Do the findings here for 3 hold for any number? What can be said if you multiply two numbers, each of which is a multiple of 3?

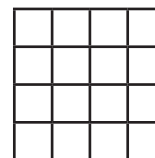


Try This

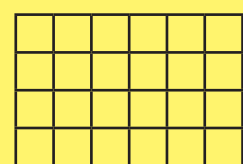
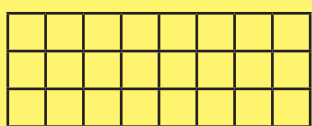
Joseph is creating a mural for the new town center using 16 paintings. He will arrange the paintings on a wall in rows and columns. What are the possible arrays Joseph can create to display the 16 paintings?

- Use Color Tiles to build models for the problem.
- Draw the models.
- Use the models to answer the question.

The possible arrays are 1×16 , 2×8 , 4×4 , and the reverses 16×1 and 8×2 .



1. Aisha is arranging prizes for the annual bake off competition on a table. She wants to organize the prizes in rows and columns so she can easily distribute them to the winners. What are the possible arrays Aisha can use to set up the 24 prizes?



The possible arrays are 1×24 , 2×12 , 3×8 , 4×6 , and the reverses 24×1 , 12×2 , 8×3 , and 6×4 .

2. Maria would like to use containers to organize 28 bracelets. How many different ways can Maria sort the bracelets so that each container has the same number of bracelets? Use what you know about factor pairs to help you complete the chart.

Number of containers	×	Number of bracelets in each container
1	×	28
2	×	14
4	×	7
7	×	4
14	×	2
28	×	1

Students may draw models that depict 1 group of 28, 2 groups of 14, 4 groups of 7, 7 groups of 4, 14 groups of 2, and 28 groups of 1.

List all the factor pairs for the number.

3. 45

3 × 15, 15 × 3, 5 × 9, 9 × 5, 1 × 45, 45 × 1

4. 77

7 × 11, 11 × 7, 1 × 77, 77 × 1

5. 52

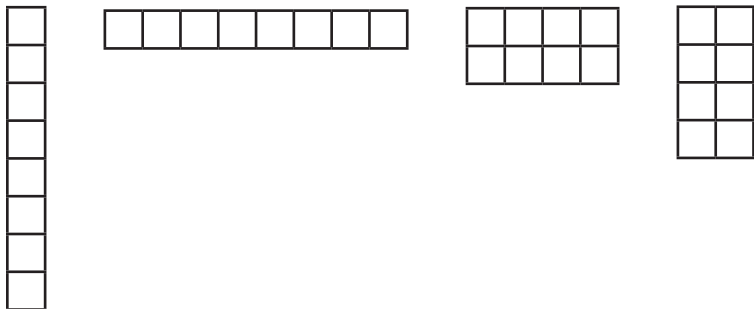
2 × 26, 26 × 2, 4 × 13, 13 × 4, 1 × 52, 52 × 1

6. 100

2 × 50, 50 × 2, 4 × 25, 25 × 4, 5 × 20, 20 × 5, 10 × 10, 1 × 100, 100 × 1

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

1. Lucy would like to organize 8 photos in rows and columns on her wall. How many different arrays of 8 photos are possible? Write all the factor pairs modeled by the arrays.

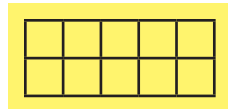


4 arrays are possible.

The factor pairs are $8 \times 1, 1 \times 8, 2 \times 4, 4 \times 2$

Use Color Tiles to model the problem. Draw your model. Use it to complete the problem.

2. Sam wants to arrange 10 model cars into an array on a display table. What are all the possible arrays he could make? Write the factor pairs modeled by the arrays.



The possible arrays are $1 \times 10, 2 \times 5$, and the reverses $5 \times 2, 10 \times 1$.

3. Mari wants to organize her 9 ceramic figurines in containers. How many different ways can she sort the figurines so that each container has the same number? Use what you know about factor pairs to help you complete the chart.

Number of containers	×	Number of figurines in each container
1	×	9
3	×	3
9	×	1
	×	

Students may draw models that depict 1 group of 9, 3 groups of 3, and 9 groups of 1.

List all the factor pairs for the number.

4. 27

1 × 27, 3 × 9, 9 × 3, 27 × 1

5. 32

1 × 32, 2 × 16, 4 × 8, 8 × 4, 16 × 2, 32 × 1

6. 44

1 × 44, 2 × 22, 4 × 11, 11 × 4, 22 × 2, 44 × 1

Name Answer Key

3

15 is a multiple of 5. 4 is not a multiple of 5. If you add 15 and 4, you get 19, which is not a multiple of 5.

If you add a multiple of 5 to a non-multiple of 5, is the sum ever a multiple of 5?

ANSWER: No

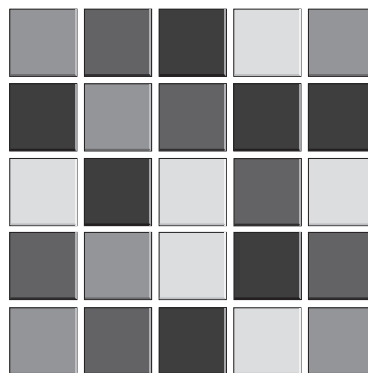
COMMENTS & EXTENSIONS: Do the patterns students find here hold for other numbers besides 5? Can two non-multiples of 5 ever add up to a multiple of 5?



Try This

Destiny is creating a cookie display at her bakery. She wants to arrange 25 cookies in equal rows. She hopes she can make at least 2 rows with 2 or more cookies in each row. Can she? If so, tell all the ways. Is 25 prime or composite?

- Use Color Tiles to model the problem.
- Draw any models that support your answer.

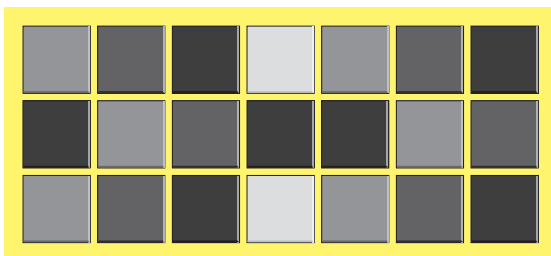


Yes, there is one way Destiny can make at least 2 equal rows of 2 or more cookies. She can make 5 rows of 5 cookies, or 5×5 . So 25 is a composite number, because it has a factor (5) other than 1 and itself.

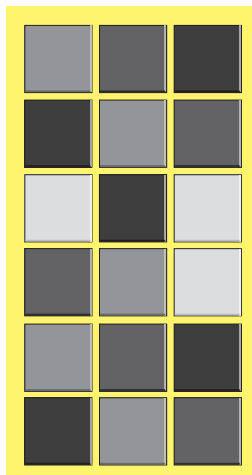
1. There are 19 chairs in an array. Can the array be 2 or more equal rows of at least 2 chairs? If so, tell all the ways. Is 19 prime or composite?

No, the array cannot be 2 or more equal rows of at least 2 chairs; 19 is a prime number.

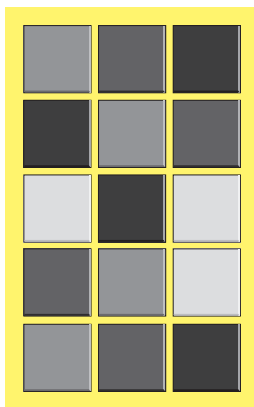
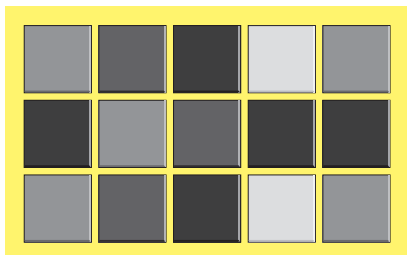
2. There are 21 paintings in an array on the wall. Can the array be 2 or more equal rows of at least 2 paintings? If so, tell all the ways. Is 21 prime or composite?



Yes, there are two ways the array can be 2 or more equal rows of at least 2 paintings, 3×7 and 7×3 ; 21 is a composite number.



3. A garden has 15 plants in an array. Can the array be 2 or more equal rows of at least 2 plants? If so, tell all the ways. Is 15 prime or composite?



Yes, there are two ways the array can be 2 or more equal rows of at least 2 plants, 3×5 and 5×3 ; 15 is a composite number.

List all the factors for the number and tell whether the number is prime or composite.

4. 18

1, 2, 3, 6, 9, 18; composite

5. 35

1, 5, 7, 35; composite

6. 37

1, 37; prime

7. 24

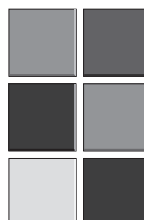
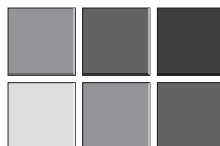
1, 2, 3, 4, 6, 8, 12, 24; composite

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

1. Mrs. Rodek would like to arrange 6 statues in equal rows. Can she make an arrangement of 2 or more equal rows having at least 2 statues in each row? If so, tell all the ways. Is 6 prime or composite?

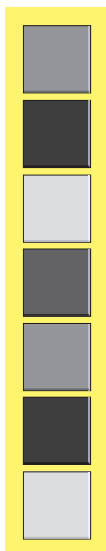


Yes, two of the possible arrangements are 2 or more rows having at least 2 statues in each row, 2×3 and 3×2 ; 6 is a composite number.



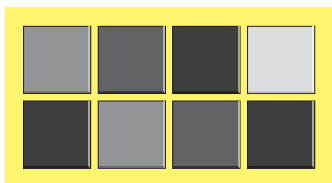
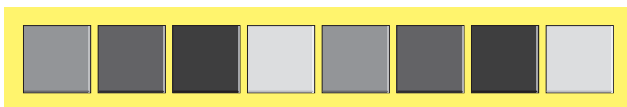
Use Color Tiles to model the problem. Draw your model. Use it to complete the problem.

2. A gardener wants to plant 7 tomato plants in equal rows. Can he make an arrangement of 2 or more equal rows having at least 2 plants in each row? If so, tell all the ways. Is 7 prime or composite?

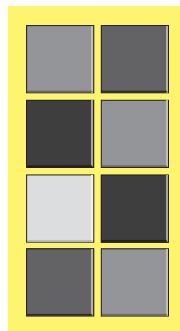
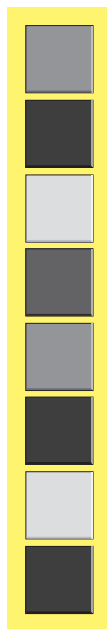


No, he cannot make 2 or more equal rows having at least 2 plants in each row; 7 is a prime number.

3. A king wants to display an array of 8 colorful flags. Can he make an array of 2 or more equal rows having at least 2 flags in each row? If so, tell all the ways. Is 8 prime or composite?



Yes, there are two ways; 2 rows of 4 (2×4) and 4 rows of 2 (4×2); 8 is a composite number.



Complete the problem.

4. Is 23 prime or composite? Explain how you know.

23 is a prime number, because it has only two factors, 1 and 23.

5. Is 10 prime or composite? Explain how you know.

10 is a composite number, because it has more than two factors, 1, 10, 2, and 5.

6. List all the factors for each number. Tell if the number is prime or composite.

Number	Factors	Prime or Composite?
17	1, 17	Prime
12	1, 2, 3, 4, 6, 12	Composite
26	1, 2, 13, 26	Composite
34	1, 2, 17, 34	Composite
2	1, 2	Prime

4

Here is the start of a $3\times$ table.

1	2	3	4	5	6	7	8	9	10	11	12

- Continue the table up to 48.
- List the multiples of 3 from 3 to 48. Write three true observations.

ANSWER: **a.** Students should continue the pattern, shading every multiple of 3. **b.** 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48. There is a pattern in the units place, 3, 6, 9, 2, 5, 8, 1, 4, 7, 0. This pattern uses every numeral and then repeats.

COMMENTS & EXTENSIONS: Challenge students to show a table of the $3\times$ table from 60 to 90 and make 3 true observations. Similar questions, of course, can be asked about any times table. Try the same questions with the $4\times$ table.

Try This

- Model the pattern with Centimeter Cubes.
- Draw your model.
- Describe the model.

1. Create a number pattern that repeats.

Patterns will vary.

Write the pattern using numbers.

Patterns will vary.

Describe the rule for the pattern.

Descriptions will vary.

Describe the pattern another way.

Descriptions will vary.

Describe other features of the numbers in the pattern.

Descriptions will vary.

Describe the 20th term in your pattern.

Descriptions will vary.

2. Create a number pattern that grows.

Patterns will vary.

Write the pattern using numbers.

Patterns will vary.

Describe the rule for the pattern.

Descriptions will vary.

Describe the pattern another way.

Descriptions will vary.

Describe other features of the numbers in the pattern.

Descriptions will vary.

Describe the 20th term in your pattern.

Descriptions will vary.

3. Create any number pattern.

Patterns will vary.

Write the pattern using numbers.

Patterns will vary.

Describe the rule for the pattern.

Descriptions will vary.

Describe the pattern another way.

Descriptions will vary.

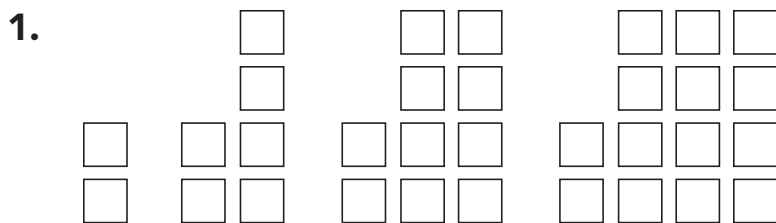
Describe other features of the numbers in the pattern.

Descriptions will vary.

Describe the 100th term in your pattern.

Descriptions will vary.

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



Write the first six terms of the pattern.

2, 6, 10, 14, 18, 22

What is the rule? What is the 10th term?

Start with 2. Add 4. The 10th term is 38.

What are two features of the numbers?

Each number is even. The numbers increase in value.

2. Build a model as follows: Place 5 cubes in the first term. Place 2 cubes in the second term. Place 5 cubes in the third term. Place 2 cubes in the fourth term.

Write the first six terms of the pattern.

5, 2, 5, 2, 5, 2

What is the rule? Tell the operations. What is the 10th term?

Start with 5. Subtract 3. Add 3. Repeat. The 10th term is 2.

What are two features of the numbers?

The numbers repeat. The numbers alternate between odd and even.

**Use Centimeter Cubes to create the pattern. Draw your model.
Describe the pattern.**

3. Create a repeating pattern.

Patterns will vary.

Write the first six terms of the pattern.

Patterns will vary.

What is the rule? What is the 10th term?

Rules will vary.

What are two features of the numbers?

Features will vary.

4. Create a growing pattern.

Patterns will vary.

Write the first six terms of the pattern.

Patterns will vary.

What is the rule? What is the 10th term?

Rules will vary.

What are two features of the numbers?

Features will vary.