

Array Factor Detectives

Use dot arrays to spot prime and composite numbers.

5.4 "Algebraic reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to: identify prime and composite numbers..."

NAME _____

DATE _____

PRIME NUMBER

A prime number has exactly two factors, 1 and itself. Other than turning it around, its dots make only a 1-by-number array.

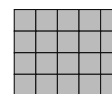
3 can make a 1-by-3 array.



COMPOSITE NUMBER

A composite number has more than two factors. Its dots can make an array with more than one row and more than one column.

20 can make a 4-by-5 array.



1 SORT

8 items

Circle PRIME or COMPOSITE for each figure, then choose two figures and explain how the array helped you decide.

1.



Figure 1

PRIME

COMPOSITE

2.



Figure 2

PRIME

COMPOSITE

3.



Figure 3

PRIME

COMPOSITE

4.



Figure 4

PRIME

COMPOSITE

5.



Figure 5

PRIME

COMPOSITE

6.

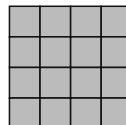


Figure 6

PRIME

COMPOSITE

7.



Figure 7

PRIME

COMPOSITE

8.



Figure 8

PRIME

COMPOSITE

2

PROVE IT

Explain your thinking

Pick two items from Part 1. For each one, tell how you knew where it belonged.

ITEM # _____ HOW I KNEW _____

ITEM # _____ HOW I KNEW _____

3

MAKE YOUR OWN

One of each

Write one new prime number and one new composite number. For each number, write a factor pair that supports your choice.

PRIME _____

COMPOSITE _____

CHALLENGE

Choose a composite number from 20 through 30. Write two different factor pairs for it, then explain why it is composite.

PART 1 • SORT

#	ITEM	CATEGORY	WHY
1	Figure 1 (array)	COMPOSITE	The 12 dots make a 2-by-6 array, so 12 has factors other than 1 and 12.
2	Figure 2 (array)	PRIME	The 11 dots make only a 1-by-11 array, so 11 is prime.
3	Figure 3 (array)	PRIME	The 5 dots make only a 1-by-5 array, so 5 is prime.
4	Figure 4 (array)	COMPOSITE	The 9 dots make a 3-by-3 array, so 9 is composite.
5	Figure 5 (array)	COMPOSITE	The 8 dots make a 2-by-4 array, so 8 is composite.
6	Figure 6 (array)	COMPOSITE	The 16 dots make a 4-by-4 array, so 16 is composite.
7	Figure 7 (array)	PRIME	The 7 dots make only a 1-by-7 array, so 7 is prime.
8	Figure 8 (array)	COMPOSITE	The 12 dots make a 3-by-4 array, so 12 is composite.

PART 2 • PROVE IT

Accept any explanation that names the deciding feature from the rule box for the chosen item.

PART 3 • MAKE YOUR OWN (SAMPLE ANSWERS)

- **PRIME:** 13, only factor pair 1×13 .
- **COMPOSITE:** 15, factor pair 3×5 .

Challenge: 24 has factor pairs 3×8 and 4×6 . It is composite because it has factors other than 1 and 24.

Accept rotated arrays as the same array. In Part 2, students should refer to the number of rows and columns or to factor pairs in their explanations.