

Array Detectives

Use equal-row arrays to spot prime and composite numbers.

5.NS.2.a “Given a whole number up to 100, create a concrete or pictorial representation to demonstrate whether the number is prime or composite, and justify reasoning.”

NAME _____

DATE _____

PRIME

A prime number has exactly two factors, 1 and itself. It can make only a 1-by-number array using whole-number rows and columns.

23 is prime because its only array is 1 by 23.

COMPOSITE

A composite number has more than two factors. It can make a whole-number array besides 1 by the number.

18 is composite because it can make a 3-by-6 array.

1 SORT _____ 8 items

Circle PRIME or COMPOSITE for each number, then choose two numbers, draw equal-row arrays, and write why each array proves your choice.

1. 29	PRIME	COMPOSITE
2. 31	PRIME	COMPOSITE
3. 24	PRIME	COMPOSITE
4. 49	PRIME	COMPOSITE
5. 37	PRIME	COMPOSITE
6. 57	PRIME	COMPOSITE
7. 64	PRIME	COMPOSITE
8. 83	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 whole number from 2 to 100 for each category that is not already on this page. Draw an equal-row array for each number and write a reason.

PRIME _____

COMPOSITE _____

CHALLENGE

Choose a composite number from 50 to 100 that is not on this page. Draw two different equal-row arrays for it, then explain why it is composite.

PART 1 • SORT

#	ITEM	CATEGORY	WHY
1	29	PRIME	29 has only the factor pair 1 and 29.
2	31	PRIME	31 has only the factor pair 1 and 31.
3	24	COMPOSITE	24 has factor pairs such as 2 and 12, or 3 and 8.
4	49	COMPOSITE	49 has factor pair 7 and 7.
5	37	PRIME	37 has only the factor pair 1 and 37.
6	57	COMPOSITE	57 has factor pair 3 and 19.
7	64	COMPOSITE	64 has factor pairs such as 2 and 32, or 8 and 8.
8	83	PRIME	83 has only the factor pair 1 and 83.

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:** 41. Draw 1 row of 41. It has only the factors 1 and 41.
- **COMPOSITE:** 36. Draw 4 rows of 9. It has factors besides 1 and 36.

Challenge: 72: Draw 3 rows of 24 and 8 rows of 9. Since 72 has factor pairs besides 1 and 72, it is composite.

For Part 2, accept any correct equal-row array and factor explanation for two selected items. Rotated arrays, such as 3 by 19 and 19 by 3, show the same factor pair.