

Factor Detectives

Sort numbers by their factor clues.

5.NS.2 “The student will demonstrate an understanding of prime and composite numbers, and determine the prime factorization of a whole number up to 100. Given a whole number up to 100...”

NAME _____

DATE _____

PRIME NUMBER

A prime number has exactly two factors, 1 and itself.

17 is prime because its only factors are 1 and 17.

COMPOSITE NUMBER

A composite number has more than two factors.

18 is composite because 1, 2, 3, 6, 9, and 18 are factors.

1 SORT

8 items

For each number, circle PRIME or COMPOSITE, then choose two numbers and use factor pairs or an array to explain how you knew.

1. 29

PRIME

COMPOSITE

2. 24

PRIME

COMPOSITE

3. 45

PRIME

COMPOSITE

4. 47

PRIME

COMPOSITE

5. 53

PRIME

COMPOSITE

6. 71

PRIME

COMPOSITE

7. 64

PRIME

COMPOSITE

8. 97

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 that are less than 100.

PRIME _____

COMPOSITE _____

CHALLENGE

Choose a composite number less than 100 and write its prime factorization.

PART 1 • SORT

#	ITEM	CATEGORY	WHY
1	29	PRIME	29 has exactly two factors, 1 and 29.
2	24	COMPOSITE	24 has factor pairs such as 1×24 , 2×12 , 3×8 , and 4×6 .
3	45	COMPOSITE	45 has factors besides 1 and 45, including 3, 5, 9, and 15.
4	47	PRIME	47 has exactly two factors, 1 and 47.
5	53	PRIME	53 has exactly two factors, 1 and 53.
6	71	PRIME	71 has exactly two factors, 1 and 71.
7	64	COMPOSITE	64 has factors besides 1 and 64, including 2, 4, 8, 16, and 32.
8	97	PRIME	97 has exactly two factors, 1 and 97.

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:** 31
- **COMPOSITE:** 36

Challenge: $84 = 2 \times 2 \times 3 \times 7$

For Part 2, accept factor pairs, arrays, or a list of factors that correctly shows why each chosen number is prime or composite. For the challenge, accept any correct prime factorization of a composite number less than 100.