Factor Detective

Sort numbers by their factors.

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.

13 is prime because its only factors are 1 and 13.

COMPOSITE NUMBER

A composite number has more than two factors. It can make an array with more than 1 row and more than 1 column.

20 is composite because $4 \times 5 = 20$.

1 SORT

8 items

For Part 1, circle the category for each number; for Part 2, pick two numbers, draw or describe factor arrays for them, and explain how the arrays prove each category.

1.	17	PRIME COMPOSITE
2.	27	PRIME COMPOSITE
3.	49	PRIME COMPOSITE
4.	29	PRIME COMPOSITE
5.	21	PRIME COMPOSITE
6.	44	PRIME COMPOSITE
7.	77	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 not in Part 1.

PRIME _____

COMPOSITE _____

CHALLENGE

Choose a composite number up to 100 and write its prime factorization.

ANSWER KEY # Factor Detective

GRADE 5 · 5.NS.2

PART 1 · SORT

#	ITEM	CATEGORY	WHY
1	17	**PRIME**	17 has exactly two factors, 1 and 17.
2	27	**COMPOSITE**	27 has factors 1, 3, 9, and 27.
3	49	**COMPOSITE**	49 = 7 × 7.
4	29	**PRIME**	29 has exactly two factors, 1 and 29.
5	21	**COMPOSITE**	21 = 3 × 7.
6	44	**COMPOSITE**	44 = 4 × 11.
7	77	**COMPOSITE**	77 = 7 × 11.
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**: 19
- **COMPOSITE**: 36

Challenge: 84 = 2 × 2 × 3 × 7

Accept any correct factor-array drawing or factor explanation for Part 2. For the challenge, factors must all be prime, and the order of the prime factors may vary.