Factor Detectives

Sort numbers by their factors.

4.NOS.C.8 "Explain and apply concepts of factors, multiples, and prime and composite numbers for whole numbers in the range of 1-100. Identify factor pairs for a whole number in the range of 1–100..."

NAME _____ DATE _____

PRIME

A prime number is greater than 1 and has exactly two factors: 1 and itself.

17 has only two factors: 1 and 17.

COMPOSITE

A composite number is greater than 1 and has more than two factors.

24 is composite because 4 × 6 = 24, so 4 and 6 are factors too.

1 SORT

8 items

In Part 1, circle PRIME or COMPOSITE for each number; in Part 2, pick one number from each group and explain how its factors helped you decide.

1.	1. 2	PRIME COMPOSITE
2.	2. 21	PRIME COMPOSITE
3.	3. 33	PRIME COMPOSITE
4.	4. 29	PRIME COMPOSITE
5.	5. 41	PRIME COMPOSITE
6.	6. 53	PRIME COMPOSITE
7.	7. 77	PRIME COMPOSITE
8.	8. 67	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 from 1 to 100 that are not shown above, and give a factor pair for your composite number besides 1 and itself.

PRIME _____

COMPOSITE _____

CHALLENGE

Find a composite number from 1 to 100 with exactly three factors, and list all its factors.

ANSWER KEY # Factor Detectives

PART 1 · SORT

#	ITEM	CATEGORY	WHY
1	1. 2	**PRIME**	Its only factors are 1 and 2.
2	2. 21	**COMPOSITE**	3 × 7 = 21, so it has more than two factors.
3	3. 33	**COMPOSITE**	3 × 11 = 33, so it has more than two factors.
4	4. 29	**PRIME**	Its only factors are 1 and 29.
5	5. 41	**PRIME**	Its only factors are 1 and 41.
6	6. 53	**PRIME**	Its only factors are 1 and 53.
7	7. 77	**COMPOSITE**	7 × 11 = 77, so it has more than two factors.
8	8. 67	**PRIME**	Its only factors are 1 and 67.

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**: 37 is prime.
- **COMPOSITE**: 42 is composite because 6 × 7 = 42.

Challenge: 25 is composite. Its factors are 1, 5, and 25.

For Part 2, accept explanations that identify the number's factors or show a factor pair beyond 1 and itself. The number 1 belongs to neither category and does not appear in the sort.