Factor Detectives

Sort numbers by their factors.

MT.4.OA.4 "Find all factor pairs for a whole number in the range 1-100, recognize that a whole number is a multiple of each of its factors, determine whether a given whole number in the range 1-1000 is a multiple of a given one-digit number..."

NAME _____ DATE _____

PRIME

A prime number has exactly two factors: 1 and itself. The number 1 is neither prime nor composite.

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

COMPOSITE

A composite number has more than two factors.

18 is composite because 2 × 9 = 18, so 2 and 9 are factors.

1 SORT

8 items

Circle PRIME or COMPOSITE for each number, then choose one prime and one composite number and explain how you know where each belongs.

1. 1. 21 PRIME COMPOSITE

2. 2. 29 PRIME COMPOSITE

3. 3. 37 PRIME COMPOSITE

4. 4. 35 PRIME COMPOSITE

5. 5. 49 PRIME COMPOSITE

6. 6. 57 PRIME COMPOSITE

7. 7. 41 PRIME COMPOSITE

8. 8. 77 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; do not use numbers from the rule box or the sort.

PRIME _____

COMPOSITE _____

CHALLENGE

Find a composite number from 80 to 100 that is not divisible by 2, 3, or 5; write a factor pair that proves it is composite.

ANSWER KEY # Factor Detectives

PART 1 · SORT

#	ITEM	CATEGORY	WHY
1	1. 21	**COMPOSITE**	3 × 7 = 21, so 21 has more than two factors.
2	2. 29	**PRIME**	Its only factors are 1 and 29.
3	3. 37	**PRIME**	Its only factors are 1 and 37.
4	4. 35	**COMPOSITE**	5 × 7 = 35, so 35 has more than two factors.
5	5. 49	**COMPOSITE**	7 × 7 = 49, so 7 is a factor besides 1 and 49.
6	6. 57	**COMPOSITE**	3 × 19 = 57, so 57 has more than two factors.
7	7. 41	**PRIME**	Its only factors are 1 and 41.
8	8. 77	**COMPOSITE**	7 × 11 = 77, so 77 has more than two factors.

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**: 17
- **COMPOSITE**: 24

Challenge: 91; 7 × 13 = 91.

For the proof, accept any correct explanation showing that the chosen prime has exactly two factors and the chosen composite has more than two. For the challenge, 91 is the only number that fits.