Factor Matchup

Sort complete prime factorizations from incomplete ones.

5.NS.2.c "Determine the prime factorization for a whole number up to 100."

NAME _____ DATE _____

COMPLETE

A complete prime factorization has only prime numbers as factors. The factors multiply to the original number.

$70 = 2 \times 5 \times 7$

INCOMPLETE

An incomplete factorization has at least one composite number as a factor. Break the composite factor into prime factors to finish it.

$72 = 8 \times 3 \times 3$

1 SORT

8 items

For each equation, circle COMPLETE or INCOMPLETE, then choose two items and explain how you knew each choice.

1.	$54 = 2 \times 3 \times 3 \times 3$	COMPLETE INCOMPLETE
2.	$48 = 6 \times 2 \times 2 \times 2$	COMPLETE INCOMPLETE
3.	$75 = 15 \times 5$	COMPLETE INCOMPLETE
4.	$98 = 2 \times 7 \times 7$	COMPLETE INCOMPLETE
5.	$60 = 2 \times 2 \times 3 \times 5$	COMPLETE INCOMPLETE
6.	$81 = 3 \times 3 \times 3 \times 3$	COMPLETE INCOMPLETE
7.	$56 = 7 \times 4 \times 2$	COMPLETE INCOMPLETE
8.	$45 = 3 \times 3 \times 5$	COMPLETE INCOMPLETE

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 COMPLETE example and one new INCOMPLETE example. Each equation must equal the number on the left.

COMPLETE _____

INCOMPLETE _____

CHALLENGE

Write the complete prime factorization of 96. Then write a different factorization of 96 that is incomplete because it has a composite factor.

ANSWER KEY # Factor Matchup

GRADE 5 · 5.NS.2.c

PART 1 · SORT

#	ITEM	CATEGORY	WHY
1	54 = 2 × 3 × 3 × 3	**COMPLETE**	All factors are prime, and 2 × 3 × 3 × 3 = 54.
2	48 = 6 × 2 × 2 × 2	**INCOMPLETE**	The factors equal 48, but 6 is composite.
3	75 = 15 × 5	**INCOMPLETE**	The factors equal 75, but 15 is composite.
4	98 = 2 × 7 × 7	**COMPLETE**	All factors are prime, and 2 × 7 × 7 = 98.
5	60 = 2 × 2 × 3 × 5	**COMPLETE**	All factors are prime, and 2 × 2 × 3 × 5 = 60.
6	81 = 3 × 3 × 3 × 3	**COMPLETE**	All factors are prime, and 3 × 3 × 3 × 3 = 81.
7	56 = 7 × 4 × 2	**INCOMPLETE**	The factors equal 56, but 4 is composite.
8	45 = 3 × 3 × 5	**COMPLETE**	All factors are prime, and 3 × 3 × 5 = 45.

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)

- **COMPLETE**: 84 = 2 × 2 × 3 × 7
- **INCOMPLETE**: 90 = 9 × 2 × 5

Challenge: Challenge: 96 = 2 × 2 × 2 × 2 × 2 × 3. An incomplete factorization is 96 = 12 × 2 × 2 × 2 because 12 is composite.

Accept any explanation that names the deciding feature from the rule box for the chosen item. For explanations, students should identify the composite factor in incomplete equations or verify that every factor is prime in complete equations.