LESSON MAKER PRO

Prime Factor Quest

Break numbers down to solve grouping questions.

GRADE 6 · 6.NS.B.8.a

6.NS.B.8.a "Use factors and multiples to determine prime factorization."

NAME _____ DATE _____

THE BIG IDEA

A prime factorization writes a number as a product of prime numbers. Break a number into factors, then keep breaking any factor that is not prime until only primes remain.

WORKED EXAMPLE

Find the prime factorization of 90.

1. 90 = 9 × 10.
2. 9 = 3 × 3, and 10 = 2 × 5.
3. 90 = 2 × 3 × 3 × 5.

Answer: $90 = 2 \times 3^2 \times 5$

PRACTICE 6 problems

1 Find the prime factorization of 42.

ANSWER _____

2 Find the prime factorization of 64.

ANSWER _____

3 Find the prime factorization of 75.

ANSWER _____

4 Find the prime factorization of 108.

ANSWER _____

5 Find the prime factorization of 143.

ANSWER _____

6 Find the prime factorization of 180.

ANSWER _____

APPLY IT Show your work

1 A gaming club saved 96 video clips. They want to put the same number in each of 12 folders. Find the prime factorization of 96, then decide whether they can do this with no clips left over. How many clips would go in each folder?

WORK SPACE

ANSWER _____

2 An art class has 132 digital images to share equally among 18 students. Find the prime factorization of 132, then decide whether each student can get the same whole number of images.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A student says 2 × 3 × 5 × 7 is the prime factorization of 420. Is the student correct? Explain using a product, then give the correct prime factorization of 420.

WORK SPACE AND ANSWER

ANSWER KEY

Prime Factor Quest

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the prime factorization of 42.	**$42 = 2 \times 3 \times 7$**
2	Find the prime factorization of 64.	**$64 = 2^6$**
3	Find the prime factorization of 75.	**$75 = 3 \times 5^2$**
4	Find the prime factorization of 108.	**$108 = 2^2 \times 3^3$**
5	Find the prime factorization of 143.	**$143 = 11 \times 13$**
6	Find the prime factorization of 180.	**$180 = 2^2 \times 3^2 \times 5$**

PART 2 · APPLY IT

1. **$96 = 2^5 \times 3$. Yes, they can put 8 clips in each folder.** Since $12 = 2^2 \times 3$, its prime factors are included in 96. Dividing 96 by 12 gives 8.
2. **$132 = 2^2 \times 3 \times 11$. No, the images cannot be shared equally among 18 students.** Since $18 = 2 \times 3^2$, it needs two factors of 3. The prime factorization of 132 has only one factor of 3, so 18 is not a factor of 132.

CHALLENGE

No, $2 \times 3 \times 5 \times 7 = 210$, not 420. The prime factorization of 420 is $2^2 \times 3 \times 5 \times 7$.

Accept prime factors in any order and repeated multiplication in place of exponents. For the word problems, accept any correct factor-based explanation of whether the groups can be equal.