

Prime Factorization -- From Fingerprints to Factorprints

Summary

This activity provides an introduction to composite numbers and prime numbers through factorization.

Materials

Invitation to Learn

- Ink pads (1 per group)
- 1 1/2" x 2" Post-it® Notes
- Wet wipes
- Poster of main fingerprint patterns

Instructional Procedures

- Overhead color tiles
- Overhead markers
- Centimeter graph paper
- Colored pencils
- [Prime Factorization](#) (pdf)
- Centimeter cubes
- [Prime Factorization -- Centimeter Cubes](#) (pdf)
- [GCF Mat \(laminated\)](#) (pdf)
- [LCM Mat \(laminated\)](#) (pdf)
- Dry-erase markers
- Paper towels

Additional Resources

Books

Discovering Mathematics with the TI-73: Activities for Grades 5 and 6, by Melissa Nast; ISBN 1-8886309-22-1

Background for Teachers

The number one is a unique number because it only has itself as a factor. A prime number is a counting number larger than one that has exactly two factors. The two factors are one and the number itself. A composite number is a counting number that has more than two factors. Each composite number is divisible by three or more whole numbers.

Each composite number can be renamed as a product of prime numbers. This is known as prime factorization. Understanding prime factorization helps students understand the composition and decomposition of numbers.

Prime factorization is a strategy students may employ to find the Greatest Common Factor (GCF) of two or more numbers. Students may also use prime factorization to find the Least Common Multiple (LCM) of two or more numbers. It may be interesting to note that the product of the LCM and the GCF of two numbers is equal to the product of the two numbers themselves.

Instructional Procedures

Extensions

- Find the prime factorization of a number using the tree method.
- Find the prime factorization of a number using the cake method.
- Find the Greatest Common Factor of two numbers using the prime factorization of the numbers from the color tile activity.

Find the Least Common Multiple of two numbers using the prime factorization of the numbers from the color tile activity.

Family Connections

Have students share their graph paper patterns of prime factorization with parents.

Ask students to explain to parents the difference between unique, prime, and composite numbers.

Have students explain how a composite number may be renamed as a product of prime numbers to their parents.

Have parents select a composite number under fifty and have students share a strategy for determining the prime factorization of that number.

Have students teach parents how to find the GCF and LCM of two numbers using prime factorization.

Assessment Plan

Informal assessment includes observation of students as they complete the color tile activity to the number 50.

Have a class discussion of answers for the numbers 21 through 50. Model the answers on the overhead projector using color tiles or pictorial representations.

Correct the handout *Prime Factorization* with the expressions from the color tile activity. Have students save this in a math journal or portfolio for future reference.

Make a concentration game with 20 index cards. Put composite numbers on ten different cards, and put the prime factorization of the selected composite numbers on the other ten cards.

Bibliography

Gerlic, I., & Jausovec, N. Multimedia: Differences in cognitive processes observed with EEG.

Educational technology research and development, September 1999, Vol. 47, Number 3, p5-14.

This study investigated the cognitive processes involved in learning information presented in three different methods: with text; with text, sound, and picture; and with text, sound, and video. Students' brain activity was measured using an EEG in each format. Less mental activity was found using the text only presentation. The results showed higher mental activity with the video and picture presentations, confirming the assumption that these methods induced visualization strategies on the part of the learners.

Zazkis, R., & Liljedahl, P. Understanding primes: The role of representation. *Journal for research in mathematics education*, May 2004, Vol. 35 Issue 3, p164-186.

The authors of this article investigated how preservice elementary teachers understood the concept of prime numbers. They attempted to describe the factors that influenced their understanding. The authors suggested that an obstacle to a full conceptual understanding is a lack of a representation for a prime number. The importance of representations in understanding math concepts is examined.

Authors

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