

The Factor Game

6674

Introduction

In this activity, the teacher and students play a game which involves identifying the factors of a number.

Grades 6-8

NCTM Number and Operations Standards

- Understand numbers, ways of representing numbers, relationships among numbers, and number systems
- Use factors, multiples, prime factorization, and relatively prime numbers to solve problems

Files/Materials Needed

Factor1.act, Factor2.act, Factor3.act, Classify.act, Classify.edc

1

- a. Launch TI-Navigator™ on the computer and start the session.
- b. Have students work in pairs.
- c. Each pair of students should log into NavNet using one calculator.

2

- a. Load the **Factor1.act** activity settings file into Activity Center. The diagram in activity center shows a grid with the numbers 1 – 36. This image will also appear on the student calculators.
- b. Tell students that they will be playing a game against you in which they must identify the factors of a number. The rules are as follows:
 - The teacher chooses a number on the game board by moving the cursor to that square and marking a green point. (Note: The teacher must be logged into the NavNet application on a calculator as a teacher.)
 - A pair of students will then mark points on all the proper factors of the teacher's number. (The proper factors of a number are all the factors of that number, except the number itself. For example, the proper factors of 12 are 1, 2, 3, 4, and 6. Although 12 is a factor of 12, it is not considered a proper factor.) All of the proper factors that the students select will be marked white. It is important that students agree as to which numbers should be marked and that only one student marks the numbers.

- The teacher and the students reverse roles. On the next turn, another pair of students marks a new number and the teacher marks all the proper factors of the number that are not already marked.
 - The teacher and students take turns choosing numbers and marking factors.
 - If a player chooses a number with no unmarked factors remaining, that player loses their next turn.
 - The game ends when there are no numbers remaining with unmarked factors.
 - The students add the numbers that are marked white. The teacher adds the numbers that are marked green. The player with the greater total is the winner.
- c. Students will not have the option to resubmit points. However, if they make a mistake, you can click the 'List-Graph' tab, highlight the incorrect point and click 'Hide'. Then ask students to mark the correct point.
 - d. After playing the game once, ask students the following questions, which can be answered using **Quick Poll**
 - Which numbers were prime numbers
 - What number is the best first move in this game?
 - What number is the worst first move?
 - e. You can also call out a specific number and ask students how many points a player and his/her opponent will get. Answers can be collected using **Quick Poll**.

The Factor Game

3

- a. Load the **Factor2.act** activity settings file into Activity Center.
- b. Explain to students that they will play the same game as before, this time using the numbers 1 – 49.
- c. For an even larger game board (1 – 100), load **Factor3.act**.

EXTENSION

4

- a. Load the **Classify.act** activity settings file into Activity Center. Challenge students to figure out what each label means and why each circle has the given number in it. They should realize that *abundant* numbers are numbers whose proper factors have a sum greater than the number itself. *Deficient* numbers are numbers whose proper factors have a sum less than the number itself. *Perfect* numbers are numbers whose proper factors have a sum equal to the number itself.
- b. Send students the LearningCheck™ file **Classify.edc**. The first three questions ask students to determine the abundant, deficient, and perfect numbers from 1 to 25. The next three questions ask students to determine the abundant, deficient, and perfect numbers from 26 to 50. You might want to mention that all numbers fall into one of these three categories. Use **Class Analysis** to collect and review the results.

