Number Ray Investigators

Reporting Categories Computation and Estimation and Number and Number Sense

Topic Understanding the relationships between common multiples and factors

Primary SOL 4.5 The student will

a) determine common multiples and factors, including least common multiple and greatest common factor.

Related SOL 4.2a, b, c, 4.3a, b, c, d

Materials

- Number Ray Investigators handout (attached)
- Number Ray Investigators Recording Sheet (attached)
- Index cards
- Markers or crayons

Vocabulary

factor, multiples, common factors, common multiples, greatest common factor (GCF), least common multiple (LCM), multiplication/division related facts

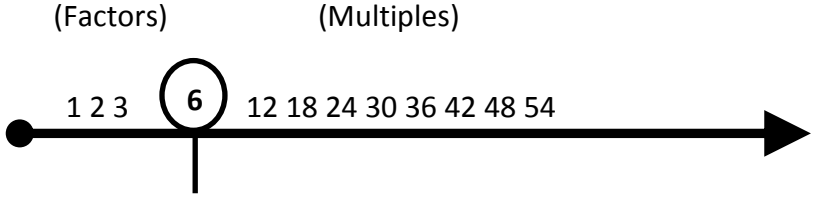
Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Note: At this point, students have already been exposed to lessons or activities about factors and multiples. The goal for this lesson is for students to make connections and understand the relationships between factors and multiples of a given number. The students will not be given any clues. They can play the game as a class, small groups, or individually.

Before undertaking this activity, prepare index cards with the factors and multiples of the number ray you will model for students. It is a good idea to color code the factors and multiples in contrasting colors.

1. Distribute copies of the Number Ray Investigators handout and the Number Ray Investigators Recording Sheet. Have students play Number Ray Investigators as follows:
   - Display a large number ray, as shown on the handout.
   - Give students a "bubble number" to be placed in the bubble on their number ray.
   - Explain to students that they are investigators and their task is to investigate specific relationships of the bubble number to other numbers. Do not give any clues or hints that will cause students to realize they are working with factors and multiples. Students need to make the connection and discover on their own how the bubble number relates to the other numbers. You may want to limit the other numbers to those up to 100.
   - Allow students or teams to start guessing numbers that relate in some way to the bubble number. When students guess a factor or multiple of the bubble number, place the number in its proper place on the number ray—i.e., factors to the left of the bubble and multiples to the right. When students guess numbers that are not factors or multiples of the bubble number, write those numbers on blank index cards, and place them in the "Misfits" pile.

- After a couple of factors and multiples are on the number ray, have students, either with partners or in small groups, discuss what they think is going on—i.e., investigate the relationships that could exist between these numbers and the bubble number. Do not indicate whether their suppositions are correct or incorrect.
- Continue playing the game, stopping periodically to have students investigate the numbers as more and more are added to the number ray.
- Once all of the factors and at least five multiples have been added to the number ray, have each pair or group write what relationship each of these numbers could have to the bubble number.



2. Have students repeat the game with other bubble numbers, recording their results on their Number Ray Investigators Recording Sheet. You may need more blank index cards for noting "misfits."

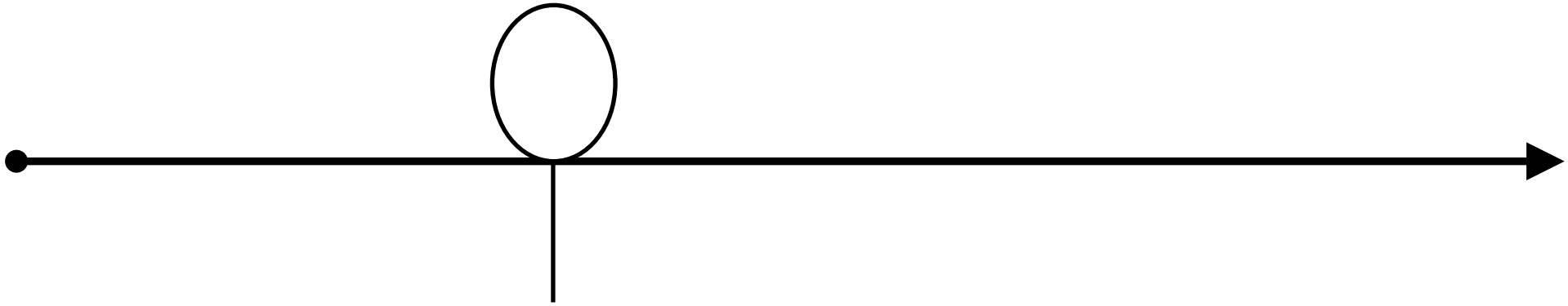
Assessment

- **Questions**
  - What kinds of relationships do you notice?
  - Do the numbers on each side of the bubble number relate to one another?
  - Do the numbers on each side of the bubble number relate to the bubble number in the same way? If yes, how? If not, how does each set relate to the bubble number?
- **Journal/Writing Prompts**
  - Create a number ray with a bubble number in your journal, and trade with a partner. Try to write numbers on the ray that have the same relationships to the bubble number as the one modeled for the class.
  - Can you relate the number ray to any other concept in mathematics, specifically the location of the numbers in relation to the bubble number? (number lines)

Extensions and Connections (for all students)

- Once two number rays have been completed, have students put the factors into a Venn diagram and find the greatest common factor. Also, have them do the same with the multiples and find the least common multiple.

Number Ray Investigators



MISFITS

Number Ray Investigators Recording Sheet