Finding Multiples

Math Concepts: Division / Remainder Rules
Materials: Playing cards
Players: 2 - 6

Set up: Remove the face cards and the tens from a deck of playing cards. Deal five cards to each player.

Play: At the start of each round, a target number is chosen whose multiples will be searched for. Each player in turn picks, if they can, some of their cards to be used as digits to form a number that is a multiple of the target number.

For example, suppose multiples of 6 are being searched for and the player has the cards 2, 4, 4, 5, and 8. Then 24, 54, and 2454 are some of the possibilities to put down. For each round, the goal is to play as many cards as possible in that single number - in this example, 2454 would be a good play.

The cards played are put aside for each player, and they are replaced by picking that many cards from the draw pile. When the draw pile is empty, that is the last round.

Goal: To have the largest number of cards put aside at the end of the game.

– DISCUSSION AND TIPS –

After a play, ask if there are other choices the player might have made. In the example given, not only does 2454 work, but so does 4254, 5244, 2544, 4524, 5244, 5442,4452, and 4542. Why do so many of these rearrangements work? Which new possibilities would work if we were only looking for multiples of 3?

This line of inquiry can lead to understandings such as: a number is divisible by 6 if and only if it is divisible by 2 and 3. Which pairs of numbers can statements like this be made for?

This can also lead very naturally to discovering the divisibility and remainder rules. For example, to find the remainder when a number is divided by 3 or 9, simply add up the digits - that sum will have the same remainder as the original number. Another rule is that the remainder when dividing by 2 or 5 is completely determined by the last digit, the remainder for 4 is determined by the last two digits, and the remainder for 8 by the last three digits. Why do these work?

– VARIATIONS –

Instead of specifying just the number whose multiples you are finding, specify that you want all numbers that have a specific remainder when divided by your number. For example, specify that you want all numbers that have a remainder of 1 when divided by 6.