Cat and Mice

2 players

Calculating difference

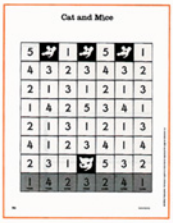
Purpose

In this game, students find the difference between two numbers. Manipulatives are used to help students see that the difference can be calculated by taking away the part that is the same.

Materials

Each pair of players will need

- A 'Cat and Mice' game board (page 34) as shown below.
- Two (2) number cubes made from blank wooden cubes showing numerals 5-10.
- One (1) counter to represent the cat.
- Three (3) counters (a different color to the cat) to represent the mice.
- Forty-five (45) linking cubes. Connect the cubes to make a train to represent each of the numbers 5-10.



How to Play

The aim is for the cat is to 'capture' the three mice as they try to reach the safety of 'home' at the other end of the board.

- One player elects to play the cat.
- The other player controls the three mice.
- The players place their counters on the appropriate pictures on the game board.
- The player for the mice rolls the number cubes and states the difference between the two numbers.
- The player then selects two trains of linking cubes to match the numbers rolled, places them side-by-side, and states the difference again.
- If the player is correct, he or she can move one of the three mice to an adjoining square that shows that difference. The move can be forward, backward, sideways, or diagonally across. If the player is incorrect or the difference is not in a neighboring position, the player misses a turn.
- There are no positions showing '0', so if a player rolls two numbers the same, he or she misses a turn.
- The player for the cat has a turn.
- If the cat moves to a position occupied by a mouse, that mouse is 'captured' and is removed from the board.
- Play ends when all three mice have been removed or when the last mouse reaches 'home'.
- The player for the cat wins if he or she 'captures' all three mice.
- The player for the mice wins if he or she moves the last mouse 'home' safely.

Reading the Research

Research has shown that manipulatives can help students to correct their own errors (Fuson, 1986).

Before the Game

Demonstrate how to use linking cubes to find the difference between two numbers. Select the trains showing 5 and 8. Place them side-by-side and cover up or remove the parts of both trains that are the same. The difference is the amount that is left over.

During the Game

Invite students to explain their thinking strategy before they use the cubes to check their answers. Do they count up from the smaller number or count down from the greater number? Do they use the same strategy for each and every combination of numbers or do they use an alternative method that is better suited to a particular pair of numbers. For example, given 8 and 6, a student may count down from 8 or count up from 6. However, given 10 and 5, the student may simply know the difference is 5 because double 5 is 10.

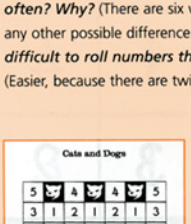
Ask a player to point to a square that he or she would like to move to next. Ask, ***What roll would you need to make that score? How do you know?***

After the Game

Have the students work in pairs to figure out all the rolls that would give a difference of one. They could repeat the activity to find all the rolls that would give a difference of 2, 3, 4, 5, and zero. The chart (right) summarizes the results.

Rolls	Difference 0	1	2	3	4	5
	10, 10	10, 9	10, 8	10, 7	10, 6	10, 5
	9, 9	9, 8	9, 7	9, 6	9, 5	
	8, 8	8, 7	8, 6	8, 5		
	7, 7	7, 6	7, 5			
	6, 6	6, 5				
	5, 5					

Ask questions such as, ***Which difference do you think would appear most often? Why?*** (There are six ways of obtaining a difference of zero - more than any other possible difference.) ***Do you think it would be easier or more difficult to roll numbers that had a difference of 2 than 4? Why?*** (Easier, because there are twice the number of ways to obtain a difference of 2.)



Beyond the Game

- The same game board will work for number cubes that show any counting sequence of six numbers. For example, the students may want to make and use the number cubes that show numerals 10-15.
- Two students may want to play 'Cats and Dogs' using the game board on page 35 (illustrated). They will need the two number cubes used to play 'Cat and Mice'. Each player places his or her three counters as indicated. The object is to capture all their opponent's pieces by moving onto the squares that they occupy. Again, the players move by calculating the difference between the two numbers rolled.

Cat and Mice

5		1		5		1
4	3	2	3	4	3	2
2	1	3	1	2	1	3
1	4	2	5	3	4	1
2	1	3	1	2	1	3
4	1	2	3	4	1	4
2	3	1		5	3	2
1 HOME	4 HOME	2 HOME	3 HOME	2 HOME	4 HOME	1 HOME

Cats and Dogs

5		4		4		5
3	1	2	1	2	1	3
4	2	1	5	1	2	4
3	1	2	4	3	1	2
2	1	3	4	2	1	3
4	2	1	5	1	2	4
3	1	2	1	2	1	3
5		4		4		5