Problem of the Month

Got Your Number

Level A:

Carol and Melissa are playing a game. They have a deck of 36 cards with just the numbers 1 through 9. After they mix up the cards, they put them into a pile. Below are the rules:

- Deal five number cards to each player.
- Use any three of your cards.
- Pick three numbers that add to a number near 20.
- Write a number sentence with your three cards and the total that is near 20.
- Find your score. Your score is the difference between your total and 20.
- For example you picked the cards 6, 9, 7. 6 + 9 + 7 = 22. So your total is 22. To find your score, subtract 20 from 22. 22 – 20 = 2.
- Shuffle the cards and replay another round.

Play the game seven times. At the end of the game, sum all seven scores for each player. The player with the lowest total is the winner.

Level B:

Sandy and Sally are playing a game. They have a deck of 36 cards with just the numbers 1 through 9. After they mix up the cards, they put them into a pile. Below are the rules:

- Deal six digit cards to each player.
- Select any four of your cards to make 2 numbers. Each number would be a two-digit number.
- Arrange the numbers and then add them to get a sum as near 100 as possible.
- Once you have selected the two numbers and found the sum, write out the equations.
- Determine your score by finding the difference (distance) between your number and 100.
- Shuffle the cards and replay another round.
- Play the game seven times. At the end of the game, sum all seven scores for each player. The player with the lowest total is the winner.

Explain the strategy you used to try and win the games. Explain why you chose that strategy.

Level C:

Jake and Linda are playing a game. They have a deck of 36 cards with just the numbers 1 through 9. After they mix up the cards, they put them into a pile. Below are the rules:

- Deal four digit cards to each player.
- Spin the spinner to select an operation.
- Arrange the digits into two fractions, such that the result of that operation upon the two fractions will produce the smallest possible outcome.
- Once you have selected the two fractions and found the outcome, write out the equations.
- The calculated outcome becomes your score for that round.
- Shuffle the cards and replay another round.
- Play the game seven times. At the end of the game, sum all seven scores for each player. The player with the lowest total is the winner.

Explain the strategy you used to try and win the games. Explain why you chose that strategy.

Level D:

Jean and Ford are playing a game. They each have a deck of 6 cards with just the numbers 1 through 6. After they each mix up the cards they put them into a pile. The goal of the game is to make the largest three-digit number. The first player picks the top card. On that player's turn, the player can place the number in either the ones, tens or hundreds place. The second player then picks a card and has the same options. Once a card is put in a location, it cannot be moved. Continue playing until all the places are filled. When each has created a three-digit number, determine which player has the largest number. That player is the winner! Note: The players are not able to see the other players' cards or placement until all the cards are drawn and played.

Play the game several times. Keep track of the results.

Write a detailed strategy for this game. Given specific cards, explain where you would put that number to insure the best probability of winning. Be thorough in developing a strategy. For example, if you drew a four as your second card, where would you put it? Of course you would need to explain options depending on where your first card is placed.

Level E:

In the game that Jean and Ford are playing, suppose you drew a 4 on your first turn, explain what place value location (hundreds, tens or ones) you would place that card in order to give you the best chance of winning the game. Justify your answer with a mathematical argument.

Suppose you drew a 3 on your first turn, explain what place value location you would place that card and justify your answers.

Justify your strategy proving why you would place any given card in any given location. Your justification should be complete and provide a valid argument for where each card should be placed given any situation.

Problem of the Month

Got Your Number

Primary Version Level A

Materials: The deck of cards (1-9) for each pair.

Discussion on the rug: (Teacher starts a discussion about the number 10) "Why is the number 10 an important number?" (The teacher invites ideas from the class). "We are going to play a fun game today. It is called Make Ten."
(Teacher demonstrates how to play the game with two players). "We play in pair with a deck of number cards. Each player picks 7 cards from the deck. Look at your cards and find two cards that add-up (count up) to 10. For example: 8 and 2 makes 10. If you can make ten, then put those two cards together in a 10-pairs pile and then pick two more cards. If you can't make ten, then say 'pass' and pick a new card. Switch turns with each other until all the cards on the deck are picked and all the pairs that make ten are found. We will examine our 10-pairs pile all together."

In small groups: (Each group plays the game until the deck is used and all pairs of ten made. Have them look over and count up how many 10-pairs they made. After the games, the teacher asks the class to list the 10-pairs that the students made.)
(Teacher asks the following questions)
"Suppose you are playing this game with a new friend. Explain to your friend how you play the game and which cards you need to put together to make 10-pairs"
(At the end of the investigation have students either discuss or dictate a response to these summary questions above)

Operation Spinner