Playing With Parity (K-3)

Compiled by session leaders:
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1) Treasure Hunting (Gr. K+)

While treasure hunting, Gregory crossed the stream 7 times starting from his tent in the campground. Does he have to cross the stream one more time to get back to his tent?

2) Teacher's Trick (Gr. K+)

Write down several odd numbers, and tell me how many numbers there are. I promise to tell you whether the sum is odd or even, without even looking at the numbers. How do I know?
Extension: Prove that there are no 5 odd numbers that can add up to 100.

3) Flipping Cups

You are given 4 plastic glasses. 3 stay up and 1 stays upside down. Can you put them all upside up or upside down by turning 2 glasses at once?

4) Fingers Multiplication

"We are going to count three, two, one, GO and show some number of fingers. Then we will multiply the numbers. If the product is odd, you win, if the product is even, I win. OK, let's play!"

5) Penny and Dime Magic Trick

(1) Place one coin in each hand.
(2) Multiply the value of the coin in your left hand by *any* odd number.
(3) Multiply the value of the coin in your left hand by *any* even number.
(4) Add together the results from steps (2) and (3).

Can you predict which hand your friend's penny is in based on their sum? Investigate!
Hint: If the sum is odd, then the penny is in your left hand.

6) Parity Bit Trick

Using Post-its in two different colors (say blue and yellow), have two volunteers make a 5x5 grid on the wall. They should place the Post-its randomly so that there is no apparent pattern. Make the grid even "harder" to memorize by adding a sixth row and column. Encode the grid by placing the Post-its so that each row and each column has an even (or odd) number of yellow Post-its. Cover your eyes and have a volunteer remove exactly one Post-it, switching it with an extra Post-it of the other color. Open your eyes and find the changed Post-it. It will be in the only row and the only column with an odd (or even) number of yellow Post-its.

7) Vicky and Her Friends

Vicky and her friends sit in a circle. It turns out that both neighbors of each child are of the same gender. If there are 5 boys in the circle, how many girls are there? (Can be adjusted for the number of kids in the classroom.) Play it out!

8) Red Riding Hood and Her Tricky Grandma (Gr. K+)

Grandma suggested the following game: There are 2 piles of raisins with seven raisins in one pile, and 8 raisins in the other. Grandma divides one of the piles in two (not necessarily equal), then Red Riding Hood divides any of the piles in two and so on. The one who can't continue on is the looser.

Try this game with a partner. Who will win? Why?

9) Flipping Coins

You have 5 coins and they are all heads-up. Your friend hides the coins and makes 4 flips (flip = turning any coin over once; the same coin can get flipped more than once, as long as there are 4 flips total). Your friend shows you 4 of the coins. Can you predict if the hidden coin is heads-up or heads-down? (All variables can be adjusted.)

10) Line Segments

6 line segments are connected end-to-end, so that they form a path. Is it possible that each of these line segments crosses exactly one of the other segments? What if there are 7 line segments?

11) Adding and Subtracting

Insert + and - signs in the expression 5 __ 4 __ 3 __ 2 __ 1 in order to make different outcomes. Do you notice any patterns? What explains the patterns you see?

12) Getting Zero (Gr. 1+)

10, 9, 8, 7, 6, 5, 4, 3, 2, 1 With the numbers here, using plus and minus signs, is it possible to get zero for the final answer? (You can move the numbers around if you'd like.)

13) Cat in The Hat's Delusion (Gr.2 +)

Cat in the Hat tries to persuade us that he knows 4 natural numbers so that their sum and product are odd. Should we believe him? Why?