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# Lesson Plan: The Great Dice Race! An Introduction to Probability

**Subject:** Math (Probability and Data)

**Grade Level:** Approximately 2nd Grade (Age 7)

**Time Allotment:** 45-60 minutes

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## Materials Needed

- Two standard six-sided dice
- One piece of paper (or a small whiteboard)
- Crayons, markers, or a pencil
- Ruler (optional, for making a neat chart)

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## 1. Learning Objectives

By the end of this lesson, the student will be able to:

- Define probability in simple terms as "how likely something is to happen."
- Make a prediction about the outcome of a repeated event (rolling two dice).
- Record data from an experiment using a simple bar chart.
- Explain why some outcomes (sums of the dice) are more likely than others based on the recorded data.

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## 2. Lesson Activities & Procedure

### Part 1: The Spark - What is "Likely"? (5 minutes)

1. **Engage with a Question:** Start by asking, "If you could only bet on one number when rolling a single die, which number would you pick? A 1, a 4, a 6?" Let the student answer.
2. **Explain "Equally Likely":** Guide them to the understanding that every number on one die has the same chance of being rolled. No number is "luckier" than another. Introduce the term **equally likely**. Each side has a 1 in 6 chance.
3. **Introduce the Twist:** Now say, "But what happens if we roll *two* dice and add the numbers together? Do you think a 2 is just as likely as a 7? Let's become scientists and find out!"

### Part 2: The Great Dice Race - The Experiment (20 minutes)

1. **Create the Racetrack:**
    - On the piece of paper, draw a simple bar chart. Along the bottom (x-axis), write the numbers 2 through 12, with some space between them. These are the "racehorses."
    - Draw 10-15 empty boxes stacked vertically above each number. This is the "racetrack." The first number whose boxes are all filled in wins the race.

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Teacher Tip: Let the student draw the chart themselves to give them ownership of the activity. It doesn't have to be perfect!

2. **Make a Prediction:** Before you start, ask the student to make a **prediction**. "Which number do you think will win the race? Which number do you think will be the slowest? Put a star next to your prediction."
3. **Run the Race & Record Data:**
    - The student rolls the two dice.
    - They add the two numbers together to find the sum.
    - They find that sum on their chart and color in one box above it.
    - Repeat this process until one of the numbers has all of its boxes colored in and reaches the "finish line." Announce the winner!

Part 3: The Discovery - Why Did That Happen? (15 minutes)

1. **Analyze the Results:** Look at the completed chart together. Ask questions like:
    - "Which number won the race? Was it the one you predicted?"
    - "Which numbers were the slowest? Why do you think they didn't get rolled very often?"
    - "Look at the shape of our graph. Where are the tallest columns? (In the middle). Where are the shortest? (On the ends)."
2. **Explain the "Why":** This is the core concept of probability.
    - Ask, "How many ways can you make the number 2 with two dice?" (Only one way: 1 + 1).
    - Ask, "How many ways can you make the number 12?" (Only one way: 6 + 6).
    - Now ask, "How many ways can you make a 7?" Guide them to find all the combinations: (1+6, 6+1, 2+5, 5+2, 3+4, 4+3). There are six ways!
    - Explain: "Because there are so many more ways to roll a 7, it is **more likely** to happen. A 2 is **less likely** to happen because there's only one way to roll it. This is probability!"

Part 4: Conclusion & Creative Application (5 minutes)

1. **Summarize:** Recap the main idea: "So, probability helps us predict what is most likely to happen. When we roll two dice, the middle numbers, especially 7, are the most likely sums."
2. **Creative Challenge:** Ask, "If you were designing a board game and there was a 'treasure' square and a 'lose a turn' square, where would you place them? Which dice roll sum would you assign to the treasure to make it harder to get? Which sum would you use for 'lose a turn' to make it happen more often?" This connects the concept to a real-world, creative application.

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3. Assessment & Differentiation

- **Assessment:**
    - **Formative (during the lesson):** Observe the student's ability to record the data accurately. Listen to their reasoning when they make their initial prediction.
    - **Summative (at the end):** The student's ability to answer the "Why did that happen?" and "Creative Challenge" questions serves as the main assessment. Can they explain in their own words why 7 is more likely than 2?
- **Differentiation & Inclusivity:**
    - **For extra support:** Use a smaller racetrack (fewer boxes) to finish the game faster. Focus only on the concept of "more" and "less" without counting all the combinations. You can pre-draw the chart for them.
    - **For an advanced challenge:** After the game, work together to create a chart listing all 36 possible combinations of two dice. Have the student calculate the probability as a fraction for each sum (e.g., The probability of rolling a 2 is 1/36; the probability of rolling

a 7 is 6/36).

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