Count Your Choices! Exploring the Fundamental Counting Principle

Introduction: The Outfit Dilemma! (5-10 mins)

Imagine you're getting dressed. You have **3 favorite shirts** (red, blue, green) and **2 favorite pairs of pants** (jeans, shorts). How many different outfits can you make? Let's lay them out and see! We could pair:

- Red shirt + Jeans
- Red shirt + Shorts
- Blue shirt + Jeans
- Blue shirt + Shorts
- Green shirt + Jeans
- Green shirt + Shorts

That's 6 outfits! Did you notice a shortcut? 3 shirts x 2 pants = 6 outfits! This is the idea behind the Fundamental Counting Principle!

What is the Fundamental Counting Principle (FCP)? (10 mins)

The **Fundamental Counting Principle** is a simple way to figure out the *total number of possibilities* when you have a sequence of choices or events.

It states: If there are **'m' ways** to do one thing, and **'n' ways** to do another thing *after* that, then there are **m × n ways** to do both things in sequence.

Think of it like multiplying the number of options you have at each step!

Let's Practice with Examples! (15-20 mins)

Example 1: Ice Cream Fun!

An ice cream shop offers **2 types of cones** (waffle, sugar) and **4 flavors of ice cream** (vanilla, chocolate, strawberry, mint). How many different single-scoop ice cream cones can you order?

- Step 1: How many choices for the cone? (m = 2)
- Step 2: How many choices for the flavor? (n = 4)
- Total combinations: m × n = 2 × 4 = 8 different cones!

(Optional: Draw a tree diagram on a whiteboard to visualize this).

Example 2: Lunch Time!

For lunch, you can choose **1 main dish** (sandwich, soup, salad) and **1 drink** (water, juice). How many different lunch combinations are possible?

- Step 1: Choices for main dish? (m = 3)
- Step 2: Choices for drink? (n = 2)
- Total combinations: m × n = 3 × 2 = 6 different lunches!

Example 3: Flipping and Rolling!

What happens if you flip a coin and then roll a standard 6-sided die? How many possible outcomes are there?

- Step 1: Outcomes for coin flip? (Heads, Tails) (m = 2)
- Step 2: Outcomes for die roll? (1, 2, 3, 4, 5, 6) (n = 6)
- Total outcomes: m × n = 2 × 6 = 12 possible outcomes! (e.g., Heads-1, Heads-2, ..., Tails-6)

Activity: Build Your Own Combo! (10 mins)

Gather some items:

- 3 different colored blocks (or toys, or pieces of paper)
- 2 different small boxes (or bowls)
- 4 different small objects (like a coin, button, bead, eraser)

Task: Figure out how many ways you can first choose a colored block, then choose a box, and finally choose a small object to put in the box. Use the FCP!

(Answer: 3 blocks × 2 boxes × 4 objects = 24 combinations)

Wrap-up & Review (5 mins)

What did we learn today? The Fundamental Counting Principle!

When do we use it? When we want to find the total number of possibilities for a sequence of choices.

How do we use it? Multiply the number of options for each step!

Can you think of other places we could use this? (e.g., choosing password combinations, different ways to travel, ordering pizza toppings).