

## The Fundamental Counting Principle

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### Warm-Up!

*Try these problems before watching the lesson.*

1. To make an ice cream sundae, Shelby chooses one scoop of chocolate, vanilla or strawberry ice cream and tops it with either sprinkles or whipped cream. How many different sundaes can she make?
2. How many different outcomes are possible when Tanya flips two coins, a dime and a quarter?
3. How many different seating arrangements are possible if Kendra, Mary and Darla reserved the first three seats in the last row of the movie theatre?
4. How many different outfits, each consisting of a sweater and a pair of jeans, can Jelena make choosing from four sweaters and three pairs of jeans?



### The Problems

*Take a look at the following problems and follow along as they are explained in the video.*

5. Manny has 5 shirts, 3 pairs of pants, 2 ties and 4 pairs of shoes. If Manny's school uniform consists of a shirt, a pair of pants, a tie and a pair of shoes, how many different uniforms can he wear to school?



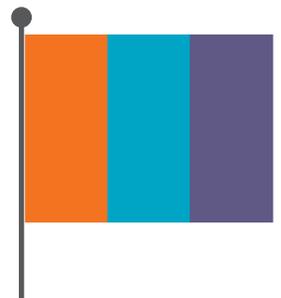
# Piece It Together

Use the skills you practiced in the warm-up and strategies from the video to solve the following problems.

6. If Molly can choose from 5 kinds of fruit, 3 salads and 4 beverages for her lunch, how many different combinations of a fruit, a salad and a beverage can she make?
7. Bob has stencils to paint the digits 2, 5 and 8. How many distinct three digit house numbers can he paint, using only the stencils?
8. A deli specializes in gourmet sandwiches. Each sandwich has one type of bread, one type of meat and possibly a condiment. The choices for bread are wheat, white, rye or poppyseed. The choices for meat are ham, salami or turkey. Finally, the sandwich can have mayonnaise, mustard or no condiment. How many different sandwiches can this deli make?
9. License plates are issued that contain four digits followed by one letter. If the letters O and I cannot be used, how many different license plates are possible?



10. A flag is to be designed using 3 differently colored vertical stripes. If 5 colors are available, how many distinct flags are possible?





# Optional Extension

*To extend your understanding and have a little fun with math, try the following activities.*

Now that you have applied The Fundamental Counting Principle to problems asking for the number of combinations for one type of event, try thinking about how to use it in a problem with multiple possible event outcomes. For example, look back at problem number 7 which asked how many distinct three digit house numbers can Bob paint using only the three stencils 2, 5 and 8. How might you change your application of The Fundamental Counting Principle to solve the problem if we changed it to read:

*Bob has stencils to paint the digits 2, 5 and 8. How many distinct, one, two or three digit house numbers can he paint, using only the stencils?*

If you are looking for another challenge to your counting abilities, try the following problem which adds some constraints to the possible outcomes:

*Lily is going to the movies with Abby, Bea and Jacly. Abby wants to sit at the end of the row, and Bea only cares that she is seated next to Jaclyn. In how many different ways can the girls be seated in a single row that has only four seats?*