

Title: Fundamental Counting Principle
Materials: Teacher script (<i>This page</i>). Student note sheet. (<i>Make a copy for each student and make one overhead transparency.</i>) Student assignment. (<i>Make a copy for each student.</i>)
Previous Knowledge Needed: None
Important Concepts/Methods: Students will learn to recognize and use the Fundamental Counting Principle.
Script: Teacher shows transparency “How many ways...” and reads along with students. Emphasize the <u>3 ways</u> to visualize the situation: a tree diagram, list, blanks to fill in. Problems like this require the Fundamental Counting Principle. Emphasize: the answers seem to be larger than one would expect until a list is made and then you can see why there are so many choices. After going over the transparency, ask students to make suggestions for an outfit to wear to school. “What decisions should we make?” (Shirt, jacket, pants, skirt, shoes, jewelry may be suggested. Narrow to 3 or 4.) “Let’s use the fill in the blanks method.” (Draw the blanks) “How many _____ should we choose from?” (Fill in number) “How many _____ might we have to choose from?” (Fill in number and continue until all blanks are filled in.) “Should we add or multiply these numbers?” (Multiply) “That seems like a lot of choices. Let’s make a list.” (Start the list and even if it gets long, the point will be made after a few entries.) Pass out assignment for students to try. Answers are included for self checking.
Common Mistakes: Adding instead of multiplying
Student Problems: None
Assignment: Worksheet “So Many Choices, So Little Time!”

SO MANY CHOICES, SO LITTLE TIME!

Name _____

Date _____

1. How many outfits can be made from 4 pairs of pants, 3 shirts, and 2 pairs of shoes?
Use the *fill in the blanks method*.

(Did you get 24 outfits? That's correct!)

2. Make a *tree diagram* to answer this one. How many ways can you arrange a fun evening out if you have 3 choices for restaurants, 3 choices for movies, and 2 choices for a friend to take along? You choose the names of the movies, restaurants, and friends.

(Does your tree have 18
"end" branches? Yeah!)

3. How many ways can you arrange 4 books on the same shelf? Make a *list*. You can use a single letter to represent a book title (such as A, B, C, and D). (Hint: there are 4 to choose from for the first position, leaving 3 to choose from for the second position, etc.)

(24? Good for you.)

4. How many different versions of brownies can be created if you have these choices:
frosting (mint, fudge, none), nuts (pecans, walnuts, none) chips (peanut butter, chocolate)?
Use your *favorite method*: tree diagram, list, or fill in the blanks.

(If you got 18, you're an expert in the
Fundamental Counting Principle.)

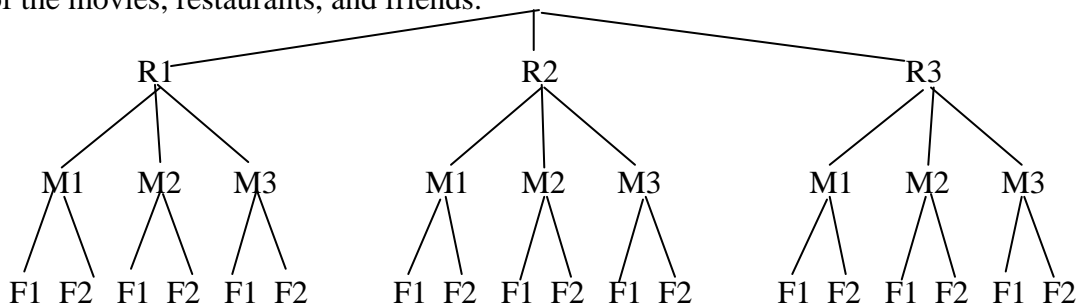
Student Assignment

SO MANY CHOICES, SO LITTLE TIME! Solutions

1. How many outfits can be made from 4 pairs of pants, 3 shirts, and 2 pairs of shoes?
Use the *fill in the blanks method*.

$$\underline{4} \cdot \underline{3} \cdot \underline{2} = 24$$

2. Make a *tree diagram* to answer this one. How many ways can you arrange a fun evening out if you have 3 choices for restaurants, 3 choices for movies, and 2 choices for a friend to take along? You choose the names of the movies, restaurants, and friends.

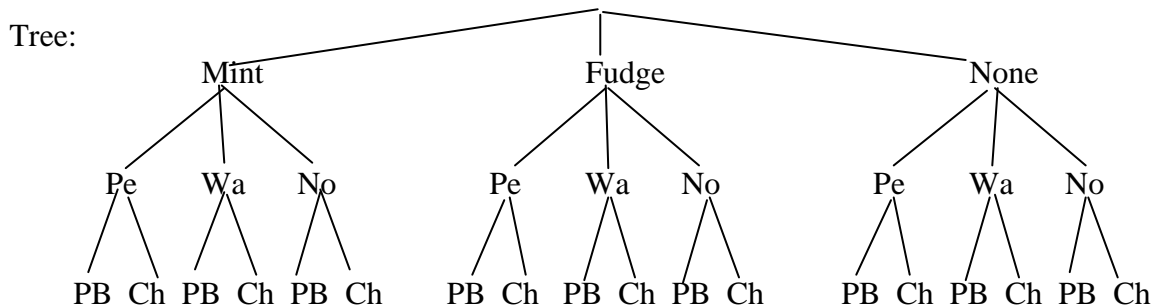


18 end branches

3. How many ways can you arrange 4 books on the same shelf? Make a *list*. You can use a single letter to represent a book title. (Hint: there are 4 to choose from for the first position, leaving 3 to choose from for the second position, etc.)

ABCD	ADBC	BCAD	CABD	CDAB	DBAC	
ABDC	ADCB	BCDA	CADB	CDBA	DBCA	
ACBD	BACD	BDAC	CBAD	DABC	DCAB	
ACDB	BADC	BDCA	CBDA	DACB	DCBA	24 choices

4. How many different versions of brownies can be created if you have these choices:
frosting (mint, fudge, none), nuts (pecans, walnuts, none) chips (peanut butter, chocolate)?
Use your *favorite method*: tree diagram, list, or fill in the blanks.



Blanks: $\underline{3} \cdot \underline{3} \cdot \underline{2} = 18$

18 end branches

List: MPP MPC MWP MWC MNP MNC
 FPP FPC FWP FWC FNP FNC
 NPP NPC NWP NWC NNP NNC

18 Choices