Do Choices Change?

Sort two-step counting situations.

FM.AC.A.7 "Develop and use the Fundamental Counting Principle for counting independent and dependent events. a. Use various counting models (including tree diagrams and lists) to identify the distinguishing factors of a context in which the..."

NAME _____ DATE _____

SAME OPTIONS

The options for the next step stay the same no matter what you chose first. Multiply the number of choices at each step to count the outcomes.

Choose a sandwich filling, then a drink. Every drink is available with every filling.

OPTIONS CHANGE

What you choose first changes the options for the next step. A list or tree can help you count. You can still multiply if every first choice leaves the same number of choices for the next step.

Choose a song for the opening, then a different song from the same playlist for the ending.

1 SORT

8 items

Circle STEADY or CHANGES for each item, then choose one item from each category and explain how you knew.

1.	Choose a backpack color, then a zipper color. Every zipper color works with every backpack color.	STEADY	CHANGES
2.	Flip a coin, then roll a standard die.	STEADY	CHANGES
3.	Choose a first digit from 1 to 8, then a second digit from 1 to 9 that is larger than the first.	STEADY	CHANGES
4.	Choose a bus route, then a departure time. Every time is offered on every route.	STEADY	CHANGES
5.	Choose a team captain, then choose a different player from the same team as co-captain.	STEADY	CHANGES
6.	Choose a dessert, then a topping. A fruit topping is available with cake but not with pie.	STEADY	CHANGES
7.	Choose a notebook cover, then a pen color. Every pen color is available with every cover.	STEADY	CHANGES
8.	Choose a movie genre, then a ticket type. Every ticket type is available for every genre.	STEADY	CHANGES

2 PROVE IT

Explain your thinking

Choose one item from each category and explain how you knew.

ITEM # _____ **HOW I KNEW** _____

ITEM # _____ **HOW I KNEW** _____

3 MAKE YOUR OWN

One of each

Write one new two-step situation with STEADY options and one with CHANGES options. Label each situation.

STEADY _____

CHANGES _____

CHALLENGE

Write a CHANGES situation in which you can still multiply two numbers to count the outcomes. Give the product and explain why it works.

ANSWER KEY

Do Choices Change?

PART 1 · SORT

#	ITEM	CATEGORY	WHY
1	Choose a backpack color, then a zipper color. Every zipper color works with every backpack color.	**STEADY**	The first color does not limit the zipper colors.
2	Flip a coin, then roll a standard die.	**STEADY**	The die has the same six possible results after either coin result.
3	Choose a first digit from 1 to 8, then a second digit from 1 to 9 that is larger than the first.	**CHANGES**	The first digit determines which second digits are allowed.
4	Choose a bus route, then a departure time. Every time is offered on every route.	**STEADY**	The available times are the same for every route.
5	Choose a team captain, then choose a different player from the same team as co-captain.	**CHANGES**	The captain cannot also be co-captain, so the available players change.
6	Choose a dessert, then a topping. A fruit topping is available with cake but not with pie.	**CHANGES**	The available toppings depend on the dessert.
7	Choose a notebook cover, then a pen color. Every pen color is available with every cover.	**STEADY**	The cover does not change the available pen colors.
8	Choose a movie genre, then a ticket type. Every ticket type is available for every genre.	**STEADY**	The ticket types stay the same for every genre.

PART 2 · PROVE IT

Task: Choose one item from each category and explain how you knew.
Accept any explanation that names the deciding feature from the rule box for the chosen item.

PART 3 · MAKE YOUR OWN (SAMPLE ANSWERS)

- **STEADY**: Choose one of three hats, then one of two pairs of gloves. Either pair of gloves is available with every hat.
- **CHANGES**: Choose one of four books to lend to a friend, then choose a different book from the same four to keep.

Challenge: Five students can be president or vice president, but no student can hold both roles. There are 5 choices for president and 4 choices for vice president, giving $5 \times 4 = 20$ outcomes. The available students change, but every president leaves 4 choices.

For Part 2, an explanation should identify whether the first step changes the available options for the second. The challenge shows that changing options can still leave a fixed number of choices on every branch.