Rate Detective

Invented data from a Montana community learning day planned with Indigenous educators.

MT.CORE.DATA.INT.7 "Analyze the relationship between two categorical variables in context. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities by: Summarizing categorical data for two categories in..."

NAME _____ DATE _____

SAME RATES

Divide each group's yes count by its total. If the rates match, these data show no difference between the groups for that choice.

At a library, 2 of 8 weekday visitors borrowed a novel, and 5 of 20 weekend visitors borrowed a novel. Both rates are 25%.

DIFFERENT RATES

If the groups have different yes rates, these data show a possible association between the group and the choice. Compare rates, not just yes counts.

At a farm stand, 6 of 10 cash customers brought a bag, and 4 of 20 card customers brought a bag. The rates are 60% and 20%.

1 SORT

8 items

For each numbered pair, circle SAME or DIFFERENT, then choose two items and explain your choices using the yes rates.

1.	1. Morning: 12 of 20 took a guide. Afternoon: 6 of 20 took a guide.	SAME DIFFERENT
2.	2. Room A: 9 of 15 asked a question. Room B: 12 of 20 asked a question.	SAME DIFFERENT
3.	3. First session: 4 of 10 chose a follow-up. Second session: 10 of 25 chose a follow-up.	SAME DIFFERENT
4.	4. Live session: 9 of 12 completed a survey. Recorded session: 6 of 24 completed a survey.	SAME DIFFERENT
5.	5. Saturday: 8 of 16 joined a discussion. Sunday: 4 of 16 joined a discussion.	SAME DIFFERENT
6.	6. Group 1: 7 of 14 requested a reading list. Group 2: 5 of 10 requested a reading list.	SAME DIFFERENT
7.	7. Early arrivals: 3 of 12 shared a question. Later arrivals: 9 of 12 shared a question.	SAME DIFFERENT
8.	8. Station 1: 15 of 25 tried an activity. Station 2: 2 of 10 tried an activity.	SAME DIFFERENT

2 PROVE IT

Explain your thinking

Pick two items from Part 1. For each one, tell how you knew where it belonged.

ITEM # _____ **HOW I KNEW** _____

ITEM # _____ **HOW I KNEW** _____

3 MAKE YOUR OWN

One of each

Write two new pairs of group counts from this event, one with SAME rates and one with DIFFERENT rates; name the yes-or-no choice in each pair.

SAME

DIFFERENT

CHALLENGE

Write a pair with unequal group totals where the group with more yes responses has a lower yes rate; explain which category fits.

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PART 1 · SORT

#	ITEM	CATEGORY	WHY
1	1. Morning: 12 of 20 took a guide. Afternoon: 6 of 20 took a guide.	**DIFFERENT**	The rates are 60% and 30%.
2	2. Room A: 9 of 15 asked a question. Room B: 12 of 20 asked a question.	**SAME**	Both rates are 60%.
3	3. First session: 4 of 10 chose a follow-up. Second session: 10 of 25 chose a follow-up.	**SAME**	Both rates are 40%.
4	4. Live session: 9 of 12 completed a survey. Recorded session: 6 of 24 completed a survey.	**DIFFERENT**	The rates are 75% and 25%.
5	5. Saturday: 8 of 16 joined a discussion. Sunday: 4 of 16 joined a discussion.	**DIFFERENT**	The rates are 50% and 25%.
6	6. Group 1: 7 of 14 requested a reading list. Group 2: 5 of 10 requested a reading list.	**SAME**	Both rates are 50%.
7	7. Early arrivals: 3 of 12 shared a question. Later arrivals: 9 of 12 shared a question.	**DIFFERENT**	The rates are 25% and 75%.
8	8. Station 1: 15 of 25 tried an activity. Station 2: 2 of 10 tried an activity.	**DIFFERENT**	The rates are 60% and 20%.

PART 2 · PROVE IT

Accept any explanation that names the deciding feature from the rule box for the chosen item.

PART 3 · MAKE YOUR OWN (SAMPLE ANSWERS)

- **SAME**: Workshop A: 6 of 12 requested a map. Workshop B: 8 of 16 requested a map. SAME, both rates are 50%.
- **DIFFERENT**: Welcome session: 8 of 10 downloaded a resource. Closing session: 3 of 10 downloaded a resource. DIFFERENT, the rates are 80% and 30%.

Challenge: Group A: 12 of 40 requested notes. Group B: 8 of 10 requested notes. DIFFERENT fits because 12 is more than 8, but 30% is less than 80%.

Each pair gives counts for a yes-or-no choice in two groups, so students can compare the conditional yes rates. Matching rates in these invented data do not prove that the variables are independent in a wider population.