Risk Rate Detective

Compare group rates, not just counts.

8A.DSP.E.41 "Use mathematical and statistical reasoning with bivariate categorical data in order to draw conclusions and assess risk."

NAME _____ DATE _____

HIGHER RISK

For each group, divide the number with the outcome by the group total. Choose HIGHER when the first group's share is greater.

Of 20 paper bags, 6 tore. Of 50 cloth bags, 5 tore. The paper bags had a higher tear rate: 30% compared with 10%.

LOWER RISK

Choose LOWER when the first group's share is smaller. A smaller count alone does not prove a lower risk.

Of 25 bike tires, 2 went flat. Of 40 scooter tires, 8 went flat. The bike tires had a lower flat rate: 8% compared with 20%.

1 SORT

8 items

For Part 1, circle HIGHER or LOWER for the first group's outcome rate in each item; for Part 2, choose two items and explain how you used the group totals to decide.

1.	Of 20 rainy-day deliveries, 6 arrived late; of 50 dry-day deliveries, 10 arrived late.	HIGHER LOWER
2.	Of 40 library books with paper covers, 4 were damaged; of 20 with plastic covers, 4 were damaged.	HIGHER LOWER
3.	Of 30 red pens, 3 stopped writing; of 40 blue pens, 8 stopped writing.	HIGHER LOWER
4.	Of 10 small boxes, 3 were crushed; of 40 large boxes, 8 were crushed.	HIGHER LOWER
5.	Of 50 phones with old batteries, 15 lost power; of 20 phones with new batteries, 2 lost power.	HIGHER LOWER
6.	Of 25 backpacks left outside, 5 got wet; of 50 backpacks left under a roof, 5 got wet.	HIGHER LOWER
7.	Of 20 morning buses, 2 ran late; of 30 afternoon buses, 6 ran late.	HIGHER LOWER
8.	Of 40 apples in bin A, 12 had bruises; of 20 apples in bin B, 4 had bruises.	HIGHER LOWER

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 one new example with a HIGHER rate and one with a LOWER rate. For each example, give the outcome count and total for both groups.

HIGHER

LOWER

CHALLENGE

Find an item where the first group has fewer cases of the outcome but a higher rate. Give both rates and explain why the counts alone could mislead you.

ANSWER KEY # Risk Rate Detective

GRADE 8 · 8A.DSP.E.41

PART 1 · SORT

#	ITEM	CATEGORY	WHY
1	Of 20 rainy-day deliveries, 6 arrived late; of 50 dry-day deliveries, 10 arrived late.	**HIGHER**	The late rates are 6/20 = 30% and 10/50 = 20%.
2	Of 40 library books with paper covers, 4 were damaged; of 20 with plastic covers, 4 were damaged.	**LOWER**	The damage rates are 4/40 = 10% and 4/20 = 20%.
3	Of 30 red pens, 3 stopped writing; of 40 blue pens, 8 stopped writing.	**LOWER**	The failure rates are 3/30 = 10% and 8/40 = 20%.
4	Of 10 small boxes, 3 were crushed; of 40 large boxes, 8 were crushed.	**HIGHER**	The crushed-box rates are 3/10 = 30% and 8/40 = 20%.
5	Of 50 phones with old batteries, 15 lost power; of 20 phones with new batteries, 2 lost power.	**HIGHER**	The power-loss rates are 15/50 = 30% and 2/20 = 10%.
6	Of 25 backpacks left outside, 5 got wet; of 50 backpacks left under a roof, 5 got wet.	**HIGHER**	The wet-backpack rates are 5/25 = 20% and 5/50 = 10%.
7	Of 20 morning buses, 2 ran late; of 30 afternoon buses, 6 ran late.	**LOWER**	The late-bus rates are 2/20 = 10% and 6/30 = 20%.
8	Of 40 apples in bin A, 12 had bruises; of 20 apples in bin B, 4 had bruises.	**HIGHER**	The bruise rates are 12/40 = 30% and 4/20 = 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)

- **HIGHER**: Of 10 green markers, 4 dried out; of 20 purple markers, 2 dried out. The rates are 40% and 10%.
- **LOWER**: Of 20 glass jars, 2 cracked; of 10 metal cans, 2 cracked. The rates are 10% and 20%.

Challenge: In item 1, 6 rainy-day deliveries were late, compared with 10 dry-day deliveries. But 6/20 = 30% and 10/50 = 20%, so the first group had a higher late rate despite having fewer late deliveries.

The item order is HIGHER, LOWER, LOWER, HIGHER, HIGHER, HIGHER, LOWER, HIGHER. Accept Part 2 explanations that correctly compare each group's outcome count to its own total.