

## M113: Modeling with Probability

### Pre-Badge Task

#### New Badge Alert!

This task will provide a preview of what we will be learning during the M113 - Modeling with Probability Badge. You already know so much math, so use this task to share any understanding that you have before we start our learning. You will have a chance to do the same task at the end of the badge to see how your thinking has evolved.

#### The Task

A company is considering launching a new snack product—high-protein, gluten-free chips. The company conducted a market survey to understand how likely different demographic groups are to purchase this product. The survey asked 500 participants about their preferences for snack types and whether they were interested in trying this new product, which is marketed as both gluten-free and high in protein. Three different age groups were surveyed—teens aged 13-19, adults aged 20-40, and adults aged 41 and older.

The company would like to estimate the potential market share for this new product based on the survey results and use the data to help make marketing decisions.

**QUESTION 1** Of the three different age groups, which do you believe may be the most interested in a high-protein, gluten-free chip? Why?



Below is a two-way frequency table that summarizes the data collected from the survey:

	Interested	Not Interested	Total
Teens (Aged 13-19)	82	18	100
Adults (Aged 20-40)	115	85	200
Older Adults (Aged 41+)	43	157	200
Total	240	260	500

**QUESTION 2** Based on the survey data, would you recommend targeting teens, adults, or older adults for the initial launch of the gluten-free chips? Justify your recommendation



**QUESTION 3** Are the categories “age group” and “interest” independent or dependent? How do you know?



**QUESTION 4** Using the two-way frequency table from the survey, calculate the probability that a randomly selected person from the survey is:

- A teen and interested in the product.
- An older adult (41+) or not interested in the product.

What do these probabilities suggest about preferences of the product or how the company should market the product?



**QUESTION 5** Imagine that the company finds that 6% of all individuals surveyed are gluten-intolerant. If 10% of the surveyed individuals who are interested in the new chip are gluten-intolerant, what percentage of the non-interested individuals are gluten-intolerant? What do these probabilities suggest about how the company should market the product?

