

Name \_\_\_\_\_

## Investigation 10: Is There an Association?

### Worksheet 10.1 Scenario 1

#### Scenario for Problem 1

A recent internet posting indicated that a key factor in improving academic success for high school students is to spend time outdoors. It was discussed by the students in the Rufus King project that students involved in their school's athletic programs were more likely to spend time outdoors. An interest in this possible connection was incorporated in the survey they designed to understand the students in their school.

([https://www.health.harvard.edu/press\\_releases/spending-time-outdoors-is-good-for-you](https://www.health.harvard.edu/press_releases/spending-time-outdoors-is-good-for-you))

**Question 5:** Do you participate in one or more of the athletic programs at your school (basketball, football, soccer, hockey, tennis, volleyball, etc.)

\_\_\_\_ Yes (Y) \_\_\_\_ No (N)

**Question 7:** Do you spend at least 1 hour a week involved in an outdoor activity (walking, running, playing a game etc.)?

\_\_\_\_ Yes (Y) \_\_\_\_ No (N)

#### Statistical Question \_\_\_\_\_

For each of the following four examples describe each of the following students based on their survey responses:

##### Example 1: Survey 1

Survey Number					Q5		Q7		
1					N		N		

Do you think this student indicates a connection between participating in the athletic program and spending time outdoors? Explain.

##### Example 2: Survey 2

Survey Number					Q5		Q7		
2					Y		Y		

Do you think this student indicates a connection between participating in the athletic program and spending time outdoors? Explain.

**Example 3: Survey 3**

Survey Number					Q5		Q7		
3					Y		N		

Do you think this student indicates a connection between participating in the athletic program and spending time outdoors? Explain.

**Example 4: Survey 10**

Survey Number					Q5		Q7		
10					N		Y		

Do you think this student indicates a connection between participating in the athletic program and spending time outdoors? Explain.

Based on Question 7, label the columns in the table below.

Based on Question 5, label the rows in the table below.

**Frequency table**

			Total
	Cell 1	Cell 2	Cell 3
	Cell 4	Cell 5	Cell 6
Total	Cell 7	Cell 8	Cell 9

1. Based on your table, in what cell would you count Survey Response 1?
2. Based on your table, in what cell would you count Survey Response 2?
3. Based on your table, in what cell would you count Survey Response 3?
4. Based on your table, in what cell would you count Survey Response 10?

Using the results on worksheet 10.3, complete the frequency table below by determining which cells each of the surveys would be counted.

**Frequency Table**

	Spend time outdoors	Do not spend time outdoors	Total
Participate in athletic program	Cell 1	Cell 2	Cell 3
Do not participate in athletic program	Cell 4	Cell 5	Cell 6
Total	Cell 7	Cell 8	Cell 9

5. What proportion of the survey takers answered that they spend time outdoors and participate in an athletic program?
6. What proportion of the survey takers answered that they do not spend time outdoors and do not participate in an athletic program?
7. Of the students in the survey, how many participated in an athletic program?
8. Of those that participated in an athletic program, how many spent time outdoors?
9. What proportion of students who participated in an athletic program spent time outdoors?
10. Calculate the row conditional relative frequencies for each of the cells in the table below.

**Conditional Relative Frequency Table**

	Spend time outdoors	Do not spend time outdoors	Total
Participate in athletic program	Cell 1	Cell 2	Cell 3
Do not participate in athletic program	Cell	Cell 5	Cell 6 %
Total	Cell 7	Cell 8	Cell 9

### Interpret the Results in the Context of the Original Statistical Question

11. What is the proportion of students who spend time outdoors?
12. What is the conditional relative frequency ***of the 30 students in the athletic program*** who spend time outdoors?
13. What is the conditional relative frequency ***of the 20 students who do not participate in athletic program*** who spend time outdoors?
14. If a student completing the survey participated in an athletic program, what is your estimate she or he spends time outdoors?
15. If a student completing the survey did not participate in an athletic program, what is your estimate she or he does not spend time outdoors?
16. Does knowing if a student participates or does not participate in the athletic program change your estimate of whether or not they spend time outdoors?
17. Do you think the questions about an athletic program and spending time outdoors are connected? Explain your answer.