

Name \_\_\_\_\_

## Investigation 9: Survey Says?

### Worksheet 9.1 Scenario

#### Scenario

The administration at Rufus King High School, a United States urban high school of students in grades 9 to 12, was in the process of evaluating the school's academic and extracurricular programs. The high-school administration considered distributing and analyzing a survey addressing the school's programs that would be similar to the process businesses use to evaluate their products and services. They asked the students enrolled in an 11th grade mathematics class if they would help with the design, distribution, and analysis of a survey project.

Statistical studies about a school's services might result in decisions that alter a school's daily schedule, curriculum, course offerings, extracurricular opportunities, etc. Rufus King students wanted to be part of a study that might alter their school's academic and extracurricular programs. Students designed a survey they thought would address several important statistical questions related to the school's academic and extracurricular programs. A few of the survey questions are listed below.

- Question 1:** Indicate your gender:  
 Female (F)     Male (M)     Prefer not want to respond
- Question 2:** Indicate your grade level in high school:  
 9<sup>th</sup> grade     10<sup>th</sup> grade     11<sup>th</sup> grade     12<sup>th</sup> grade
- Question 3:** Do you consider yourself a dog person, a cat person, or neither?  
 A. I consider myself a dog person.  
 B. I consider myself a cat person.  
 C. I do not consider myself a dog or cat person.
- Question 4:** What is your main goal after you completing high school?  
 A. To attend a college, university, or technical school.  
 B. To get a job.  
 C. To enlist in the military.  
 D. Other
- 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 6:** Do you exercise daily?  
 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)
- Question 8:** Are you involved in any community service activity?  
 Yes (Y)     No (N)

**Statistical Question:** \_\_\_\_\_

### **Ways to Collect Appropriate Data**

For each of the following four options, answer the two questions:

- Do you think this option will provide an accurate summary of the responses from students in the school?
- If this option is used, are there any groups of students who may not be represented? Explain your answer.

#### **Option 1:**

Consider placing computers at various locations around school (e.g., the cafeteria, library, computer lab) that are monitored by students from the mathematics class involved with this project. Students in the vicinity of the computers would be asked to complete the survey provided on the computer. After a student completed the survey, the students monitoring the computer would save the results and load a new survey for the next student to complete. At the end of the day, the responses from the completed surveys would represent the representative sample for analyzing the questions.

#### **Option 2:**

There are 35 students in the mathematics class involved with this project. Each member of the class would be encouraged to anonymously complete the survey. The completed surveys would comprise the representative sample for analyzing the questions.

#### **Option 3:**

Students in the mathematics class involved with this project would post the survey online using a service provided by a private company. Each member of the class would encourage friends to complete the survey, both through word of mouth and also through their social media accounts. The online service would provide completed surveys that comprise the representative sample for analyzing the questions.

#### **Option 4:**

Students enrolled in the mathematics class would distribute surveys both before or after school at various locations in the school building. At the end of the day, the completed surveys would comprise the representative sample for analyzing the questions.

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### **Worksheet 9.2 Data Collection Methods**

#### **Plan to Collect Data**

The following is a summary of the plan implemented at Rufus King High School.

All students attending Rufus King are required to take an English course. Students involved in the survey project arranged providing the option of completing a survey during an English class with the school's English teachers. They estimated it would take fewer than five minutes to complete the survey. A specific day was identified to complete the survey. Students were also told by their English teachers that they did not have to complete the survey. Students involved in organizing this project provided an explanation of the project to the students several days before the survey was distributed by way of an all-school announcement. In addition, a flier was sent home to inform parents and guardians about the project. The number of students who completed the survey was 1103.

Each survey was collected and given a specific identification number. Identification numbers from 1 to 1103 were assigned to the completed surveys. It was decided that 50 randomly selected surveys would form the sample for this study. Students generated 50 random numbers from 1 to 1103 using a graphing calculator. The 50 numbers generated by the calculator represented the 50 identification numbers and the 50 surveys selected to form the sample.

1. Do you think the above plan resulted in a sample that provided all students an equal chance to be selected in the sample? Explain your answer.
2. Why do you think it was important to inform students about the project before they received the survey?
3. Why do you think it was important to inform parents and guardians about the project?
4. Using the plan described, which students would not have completed the survey?
5. Do you think the sample of 50 completed surveys represents a representative sample of all students?

6. Based on the survey results worksheet, complete the following:

**Q1** Proportion of females:

Proportion of males:

**Q2** Proportion of students in 9<sup>th</sup> grade:

Proportion of students in 10<sup>th</sup> grade:

Proportion of students in 11<sup>th</sup> grade:

Proportion of students in 12<sup>th</sup> grade:

**Q3** Proportion of students who indicate they are a “dog person”:

Proportion of students who indicate they are a “cat person”:

Proportion of students who indicate they are neither:

**Q4** Proportion of students who plan to attend college after high school:

Proportion of students who plan to get a job after high school:

Proportion of students who plan to enlist in the military after high school:

Proportion of students who selected other:

**Q5** Proportion of students who participate in the school’s athletic program:

**Q6** Proportion of students who exercise daily:

**Q7** Proportion of students who spend at least one hour per week outdoors:

**Q8** Proportion of students involved in community service:

7. Based on the above summaries, provide a brief description of the students attending this high school.

8. What is your estimate of the *number of* students who participate in an athletic program from the total enrollment of 1204 students? Do you think your estimate is the exact number of students who participate in an athletic program?
  
9. Why might it be important to know the number of students and the proportion of students who participate in a school athletic program?
  
10. What is your estimate of the students who participate in community service? Do you think your estimate is the exact number of students who participate in community service?
  
11. Why might it be important to know the number and proportion of students who participate in community service?
  
12. Why might it be important to know the proportion of students who spend at least one hour involved in outdoor activities?

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**Worksheet 9.3 Survey Results**

The following table summarizes the 50 randomly selected surveys:

Survey Number	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
1	M	12	A	A	N	N	N	N
2	M	12	A	A	Y	Y	Y	N
3	F	10	B	A	Y	Y	N	Y
4	F	11	B	B	Y	Y	N	Y
5	F	10	B	A	N	N	N	N
6	F	10	C	A	Y	Y	Y	Y
7	F	10	B	A	N	N	N	N
8	F	11	B	B	N	N	N	N
9	M	11	A	A	Y	Y	N	N
10	M	9	A	A	N	N	Y	N
11	F	9	B	A	Y	Y	N	N
12	F	11	B	A	Y	Y	N	Y
13	F	11	A	A	Y	Y	N	N
14	M	9	A	C	N	N	Y	N
15	F	11	B	A	Y	Y	N	Y
16	M	11	A	B	Y	Y	N	Y
17	F	9	B	A	N	N	N	N
18	F	10	C	D	N	N	N	Y
19	F	11	C	B	Y	Y	N	Y
20	M	9	A	A	Y	Y	N	Y
21	F	12	A	A	Y	Y	Y	N
22	F	10	B	D	Y	Y	N	N
23	F	10	B	A	N	N	Y	Y
24	F	10	B	B	N	N	N	Y
25	M	10	B	A	N	N	N	N

Survey Number	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
26	M	12	A	A	Y	Y	Y	Y
27	M	9	A	A	Y	Y	N	N
28	F	11	B	A	N	N	Y	N
29	F	12	B	C	N	N	N	Y
30	F	10	B	A	Y	Y	N	Y
31	M	11	A	D	N	N	N	N
32	F	10	A	A	Y	Y	N	N
33	F	9	B	A	N	N	N	N
34	F	9	B	A	N	N	N	Y
35	M	11	B	C	Y	Y	Y	Y
36	M	11	A	B	Y	Y	N	N
37	F	11	B	C	Y	Y	N	Y
38	M	9	A	B	Y	Y	N	Y
39	M	9	A	A	Y	Y	N	N
40	F	9	A	A	Y	Y	Y	Y
41	F	10	A	D	N	N	N	Y
42	F	10	B	A	Y	Y	N	N
43	M	11	A	B	Y	Y	N	N
44	F	9	A	C	Y	Y	N	Y
45	F	9	B	C	N	N	N	Y
46	F	9	B	B	Y	Y	N	N
47	F	11	A	D	Y	Y	N	Y
48	F	10	B	A	N	N	N	N
49	F	11	A	A	N	N	N	N
50	M	9	A	A	Y	Y	N	N