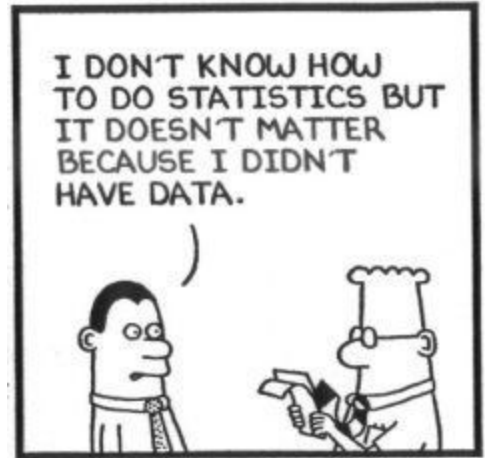


Name \_\_\_\_\_

# Math 3 Honors Unit 9: Statistics



Monday	Tuesday	Wednesday	Thursday	Friday						
<p><b>May 20</b></p> <ul style="list-style-type: none"> <li>• Sampling</li> <li>• Bias</li> </ul> <p>HW: worksheets 9.1a, 9.1b, 9.1c</p> <table border="1" style="width: 100%; height: 60px; margin-top: 10px;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> </table>					<p><b>May 21</b></p> <ul style="list-style-type: none"> <li>• Parameter vs statistic</li> <li>• Margin of error</li> </ul> <p>HW: worksheet 9.2a, 9.2b</p> <table border="1" style="width: 100%; height: 60px; margin-top: 10px;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> </table>			<p><b>May 22</b></p> <ul style="list-style-type: none"> <li>• Simulations</li> <li>• Unit 8 RAMP UP</li> </ul> <p>HW: worksheet 9.3</p>	<p><b>May 23</b></p> <ul style="list-style-type: none"> <li>• Review for quest</li> </ul> <p>HW: finish review</p>	<p><b>May 24</b></p> <ul style="list-style-type: none"> <li>• QUEST!! (too big to call it a quiz, too small to call it a test)</li> </ul>

### 9.1a - Data Collection

For each situation, determine whether the research conducted is an observational study or an experiment. Explain your reasoning.

1. The muscles of men aged 40 - 50 were 40% to 50% stronger after they participated in a 10 week, high-intensity, resistance training program twice a week.	
2. Among a group of women aged 65 and older who were tracked for several years, those who had a vitamin B <sub>12</sub> deficiency were twice as likely to suffer severe depression as those who did not.	
3. Forty volunteers suffering from insomnia were divided into two groups. The first group was assigned to a special no-desserts diet while the other continued desserts as usual. Half of the people in these groups were randomly assigned to an exercise program, while the others did not exercise. Those who ate no desserts and engaged in exercise showed the most improvement.	
4. Some gardens prefer to use nonchemical methods to control insect pests in their gardens. Researchers have designed two kinds of traps and want to know which design will be more effective. They randomly choose 10 locations in a large garden and place one of each kind of trap at each location. After a week, they count the number of bugs in each trap.	
5. In 2001, a report in the <i>Journal of the American Cancer Institute</i> indicated that women who work nights have a 60% greater risk of developing breast cancer. Researchers based these findings on the work histories of 763 women with breast cancer and 741 women without the disease.	
6. Scientists at a major pharmaceutical firm investigated the effectiveness of an herbal compound to treat the common cold. They exposed each subject to a cold virus, and then gave him or her either the herbal compound or a sugar solution known to have no effect. Several days later, they assessed the patient's condition, using a cold severity scale of 0 to 5.	
7. To research the effects of dietary patterns on blood pressure in 459 subjects, subjects were randomly assigned to three groups and had their meals prepared by dietitians. Those who were fed a diet low in fat and cholesterol lowered their systolic blood pressure by an average of 6.7 points when compared with subjects fed a control diet.	
8. Some people who race greyhounds give the dogs large doses of vitamin C in the belief that the dogs will run faster. Investigators at the University of Florida tried three different diets on three different groups of racing greyhounds. They were surprised to find that when the dogs ate high amounts of vitamin C, they ran more slowly.	

### 9.1b - Sampling

For each situation, identify the sampling technique used (simple random, cluster, stratified, convenience, voluntary response, or systematic):

9. Every 7th person entering the football game must have their bags searched.	
10. At a local community College, five math classes are randomly selected out of 20 and all of the students from each class are interviewed.	
11. A researcher randomly selects and interviews fifty high school baseball players and fifty collegiate baseball players.	
12. A principal interviews all students on four randomly selected busses.	
13. Based on 12,500 responses from 42,000 surveys sent to its alumni, a major university estimated that the annual salary of its alumni was 92,500.	
14. A community college student interviews the first 100 students to enter the building to determine the percentage of students that own a car.	
15. A market researcher randomly selects 200 drivers under 35 years of age and 100 drivers over 35 years of age.	
16. All of the teachers from 85 randomly selected nation's middle schools were interviewed.	
17. To avoid working late, the quality control manager inspects the last 10 items produced that day.	
18. The names of 70 contestants are written on 70 cards. The cards are placed in a bag, and three names are picked from the bag.	
19. 32 sophomores, 35 juniors and 49 seniors are randomly selected from 230 sophomores, 280 juniors, 577 seniors at a certain high school.	
20. To ensure customer satisfaction, every 35th phone call received by customer service will be monitored.	
21. Calling randomly generated telephone numbers, a study asked 855 U.S. adults which medical conditions could be prevented by their diet.	
22. A pregnancy study in Chicago, randomly selected 25 communities from the metropolitan area, then interviewed all pregnant women in these communities.	

### 9.1c - Bias

For the following examples, determine whether the survey sample is biased or unbiased. Explain your answers.

1. Question: What is your favorite sport? Sample is chosen from people attending a soccer game.	
2. Question: What is your favorite soft drink? Sample is chosen by picking names out of a telephone book.	
3. Question: Should more money be put into athletic programs or music programs at school? Sample is chosen from students in the band program.	
4. Question: What is your favorite vacation destination? Sample is chosen by asking every student in the class.	

Tell whether the question is potentially biased. Explain your answer. If the question is potentially biased, rewrite it so that it is not.

5. Don't you agree that the voting age should be lowered to 16 because many 16-year-olds are responsible and informed?	
6. Do you think the city should risk an increase in pollution by allowing expansion of the Northern Industrial Park?	
7. In a survey about Americans' interest in soccer, the first 25 people admitted to a high school soccer game were asked, "How interested are you in the world's most popular sport, soccer?"	
8. Don't you agree that the school needs a new baseball field more than a new science lab?	
9. Would you pay even higher concert ticket prices to finance a new arena?	
10. The budget of the Wake County Public School System is short of funds. Should taxes be raised in order for this district to fund extra-curricular sports programs?	
11. Due to diminishing resources, should a law be made to require people to recycle?	

12. You want to determine whether to serve hamburgers or pizza at a soccer team party.

- Write a survey question that would likely produce biased results.
- Write a survey question that would likely produce unbiased results.

13. You want to find students' opinions on the current attendance policy. Give two ways that your sample for the survey might be selected. The first must be an example of a biased sample and the second must be an example of an unbiased sample. Thoroughly explain your answers.

### **9.2a - Parameter vs. Statistic**

1. *Identify the population and the sample:*

- a. A survey of 1353 American households found that 18% of the households own computer.
  
- b. A recent survey of 2625 elementary school children found that 28% of the children could be classified obese.
  
- c. The average weight of every sixth person entering the mall within 3 hour period was 146 lb.

2. *Determine whether the numerical value is a parameter or a statistic:*

- a. A recent survey by the alumni of a major university indicated that the average salary of 10,000 of its 300,000 graduates was 125,000.
  
- b. The average salary of all assembly-line employees at a certain car manufacturer is \$33,000.
  
- c. The average late fee for 360 credit card holders was found to be \$56.75.

3. *For the studies described, identify the population, sample, population parameters, and sample statistics:*

- a. In a USA Today Internet poll, readers responded voluntarily to the question "Do you consume at least one caffeinated beverage every day?"
  
  
  
  
  
  
  
  
  
  
- b. Astronomers typically determine the distance to galaxy (a galaxy is a huge collection of billions of stars) by measuring the distances to just a few stars within it and taking the mean (average) of these distance measurements.

### **9.2b - Margin of Error**

*Find the margin of error for a survey that has the given sample size. Round your answer to the nearest tenth of a percent.*

1. 200

2. 350

3. 1100

4. 2600

*Find the sample size required to achieve the given margin of error. Round your answer to the nearest whole number.*

5.  $\pm 2\%$

6.  $\pm 4\%$

7.  $\pm 9.5\%$

8.  $\pm 2.7\%$

*In a survey of 504 people in the United States, about 11% said that the influx of new technologies such as computers has left them feeling overwhelmed.*

9. What is the margin of error for the survey? Round your answer to the nearest tenth of a percent.

10. Give an interval that is likely to contain the exact percent of all people in the United States who feel overwhelmed by the influx of new technologies.

*A survey reported that 510 kids ages 8 to 18, or 68% of those surveyed, have a TV in their bedroom.*

11. How many kids ages 8 to 18 were surveyed?

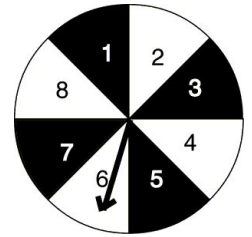
12. What is the margin of error for the survey? Round your answer to the nearest tenth of a percent.

13. Give an interval that is likely to contain the exact percent of all kids ages 8 to 18 who have a TV in their bedroom.

14. About how many kids ages 8 to 18 should be surveyed to have a margin of error of 2.5%?

### 9.3 - Simulations

1. Explain how you could use the spinner at the right to simulate whether a person picks a spade from a deck of 52 cards.



Each package of Gooney Gum contains a mystery flavor piece of gum in it. Each of the 6 mystery flavors is equally likely. You purchase 8 packages of Gooney Gum. Find the probability that you get at least 5 different mystery flavors.

#### Trial Outcomes

Trial	Flavors in the Package							
1	6	6	1	5	1	6	6	4
2	1	6	2	4	4	2	6	5
3	5	6	3	1	1	6	2	1
4	6	2	1	2	3	3	2	6
5	3	5	4	4	3	4	2	4
6	5	6	1	1	5	1	1	3
7	2	4	4	6	5	6	2	6
8	3	2	5	4	3	3	1	2
9	1	4	6	4	4	4	2	3
10	4	4	1	2	4	5	3	6

2. Based on the trials, what do you think they used to simulate the situation?

3. What does each number represent?

4. Why did they look at 8 single digits at a time?

5. Complete the frequency table below based on the trials provided.

Number of Different Mystery Flavors	Frequency
3	
4	
5	
6	

6. Based on the results in your table, what is the probability that you will get exactly 5 different types of mystery gum?

7. Based on the results in your table, what is the probability that you will get at least 5 different types of mystery gum?