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| **Names of Students Teaching: Mary Margaret Sanford, Madison Pratt, and Daniel Loper** | | **Mentor’s name:** Jackie Bryant **Mentor’s school:** McKinley Middle Magnet School **Subject/Grade level:** 7th Grade Math |
| **Lesson #: 3 Date lesson will be taught: -**  **Time lesson will be taught: -  Length of lesson:** 90 minutes | | **Title of lesson:**  **Technology lesson: Yes No**  **Lesson source:** N/A |
| **Concept statement/Main idea: *In paragraph form, write the concepts and vocabulary of this activity. Include a statement indicating why this concept is important to teach.***  For this lesson, students will be running their own statistical experiment to predict a feature of their choice about a population based on a sample. For this, students will learn the vocabulary: population, sample, prediction, biased. This is an important concept because, for students, this is how most surveys will be done as they grow up. The students should be able to recognize when a survey they come across (in the news or online) is trustworthy or not. | | |
| **Louisiana Students Standards for Mathematics: List the appropriate content standards for your lesson.**  **7.SP.A.2 -** Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. | **Standards for Mathematical Practice: List the appropriate practice standards for your lesson.**  3. Construct viable arguments and critique the reasoning of others  4. Model with Mathematics  5. Use appropriate tools strategically | |
| **Objective/s– Write objective/s in SWBAT form.**  **The Students Will Be Able to:**  SWBAT: make predictions about populations using sample data  SWBAT: collect data through surveys  SWBAT: demonstrate which samples will be a better representative of a population | **Evaluation**  *Based on your objectives, draft the content of the questions you will ask on your pre- and post- assessments; at least one question for each objective. Questions do not have to be multiple choice. The actual pre- and post- assessments are required at the end of this lesson plan.* | |
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| **Prior Student Knowledge** *What information/skills does the learner have before new information is given?*     * They should have basic computer function * know what a bar chart is * know how to represent data on a graph * know what an axes is | **Possible Student Preconceptions/Misconceptions** *What incorrect information does the student possess?*   * students might think that small sample sizes are better * could have misconceptions on the definition of “bias” |
| **MATERIALS LIST** (**BE SPECIFIC** about quantities; transfer this information to the materials list at the end of this document) **Include handouts** at the end of this lesson plan document. List handouts in your materials list below.  **For whole class:** none  **Per group:** one chromebook  **Per student:** experiment packet  **ADVANCE PREPARATION:** print and collate packets  **ACCOMMODATIONS:** any students who need accommodations can have the packet read to them | **Safety Considerations:** Include a general statement and any specific safety concerns.  Engagement: none  Exploration: none  Explanation: none  Elaboration: none  Evaluation: none |

## Engagement - Estimated time: 5 minutes

## Description of Activity: The students will have a discussion about what it means to sample a population.

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| **What the teacher does and how the teacher will direct students (directions):** | **Probing Questions:** Critical questions that will connect prior knowledge and create a “Need to Know” **Expected Student Responses –** *think like a student to consider possible student responses* | **What the students are doing:** |
| **Ask students probing questions to introduce the concept of sampling a population.**  **“sometimes we can use small amounts of people to predict what the actual population believes. This is called “sampling.”** | **“How could we find out what the best TV show is?”**  **A: The one that most people like**  **“How do we know which one most people like?”**  **A: Ask everybody**  **“It would be very hard to ask everybody in the world what their favorite TV show is. Can anybody think of an easier way to get this answer?”**  **A: Some students may not know, hopefully at least one will suggest taking a sample. If not, teacher should suggest this.** | **Students are answering questions to pique interest.** |
| **Transition:**  The teachers will start passing out the materials for their experiment. They will have the students take out their chromebooks but not have the students open them. | | |

## Exploration - Estimated time: 40 minutes

## Description of Activity: The students will run their own statistical experiment for the class based off a question of their choosing.

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| **What the teacher does and how the teacher will direct students (directions):** | **Probing Questions:** Critical questions that will guide students to a “common set of experiences.” **Expected Student Responses –** *think like a student to consider student responses* | **What the students do:** |
| **The teachers will give instructions to the students and have a student read the instructions off of the worksheet to the class. (The worksheet will include the Excel directions as well as the directions for the students).**  **The teachers will suggest questions for the students to ask if they are stuck.**   * **what is your favorite type of candy?** * **What is your favorite TV show?** * **How many siblings do you have?** * **How many pets do you have?**   **The teachers will have the students split up into a speed-dating-style arrangement to allow for an organized way of asking questions to the whole class.** | **“What information do you want to gain from your experiment?”**  **A: Students will tell the teacher their question that they are choosing to ask.**  **“Do you notice a difference between the sample of just your group vs. the sample of the whole class?”**  **A: There should be a difference.**  **“Which sample to you think is more accurate? Your group’s or the whole class?”**  **A: The whole class because it is a larger sample size.**  **“What information does your graph tell you?”**  **A: How the class feels about….**  **“Can you use this graph to tell you anything about how the entire population feels about …?”**  **A: Yes** | **The students will break up into groups and decide what question they would like to ask. Then they will write down their answers to the question.**  **Afterwards they will sample the class, and follow the directions from the worksheet to create a graph in Excel for their results.** |
| **Transition: “Everyone prepare your results to be presented to the class.”** | | |

## Explanation - Estimated time: 20 minutes

## Description of Activity: The students will present their results to the class.

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| **What the teacher does and how the teacher will direct students (directions):** | **Probing Questions:** Critical questions that will help students “clarify their understanding” and introduce information related to the lesson concepts and vocabulary **Expected Student Responses –** *think like a student to consider possible student responses* | **What the students are doing:** |
| **Teacher will ask questions about the presentations.**  **If students do not answer the probing questions correctly or if they disagree, allow them to explain their thoughts and correct them.** | **“Overall, do you think large or small sample sizes are the most accurate?”**  **A: Large because it represents a larger portion of the population.**  **“So, which is more accurate, the group’s sample or the whole class’s sample?”**  **A: Whole class** | **Students will present their graphs and results to the class. They will show the class their group’s sample and the whole class sample.**  **Students who are not presenting will be observing quietly** |
| **Transition: Have the students put away their chromebooks but leave out their packet. Have the students arrange all of the desks in a horseshoe format to allow better discussion.** | | |

## Elaboration - Estimated time: 20 minutes

## Description of Activity: Discussion of Real World Applications of Surveying and on Bias

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| **What the teacher does and how the teacher will direct students (directions):** | **Probing Questions:** Critical questions that will help students “extend or apply” their newly acquired concepts/skills in new situations **Expected Student Responses –** *think like a student to consider student responses* | **What the students are doing:** |
| **Teacher initiates a group discussion about ways Surveys and Data Collection is used in Real life**  **Guides the conversation to a close and shifts the subject towards Good vs. Bad polling practices.**  **Constantly monitors to make sure all students are participating, and calls on students who seem disengaged.** | **Q- What are some ways surveys are used in the real world?**  **A- Polling for Elections, Advertisement Statistics, Ranking Sports teams, etc.**  **Q- What are some ways a survey could be mishandled to create a bias?**  **A- Asking too many of the same type of people, and claiming it represents the population as a whole, or skewing averages by only including certain responses, etc.**  **Q- Would someone ever use a poll to misrepresent data on purpose, and why? How can we recognize this so we can prevent being misled?**  **A- Yes because they want to persuade people. Everyone has a bias in a way, but good surveying must be unbiased.** | **Actively participating in the discussion, by providing examples and asking questions.**  **Contemplate these hard questions, mostly in the form of “think, pair, share”**  **Take notes on what they learn from the discussion.** |
| **Transition: If you want to change any of your answers from your work sheet now , do this and then turn it in on your way out the door for a grade, you have 5 minutes.** | | |

## Evaluation: - Estimated time: 5 minutes

## Description of Activity: The students will change their answers from the explore activity (if necessary) after the elaboration discussion.

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| **Critical questions that ask students to demonstrate their understanding of the lesson’s performance objectives.** |
| **Formative Assessment(s):** In addition to the pre and post assessments, if applicable, how will you determine if the students mastered the objectives for this lesson (i.e., observations, student responses/elaborations, white boards, student questions, etc.)?  The teacher will observe the student presentations and see if students answer the questions correctly as a formative assessment. |
| **Summative Assessment:** *Provide a student copy of the exit questions or post assessment (attach extra pages to this document).*  In lou of an exit ticket, the teacher will take up the exploration worksheet and grade this. |

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| **LSU Teaching Team**: Daniel Loper, Maddie Pratt, and Mary Margaret Sanford | **Mentor Teacher**: Jackie Bryant | **Lesson Source**: |
| **Lesson Date**: | **School**: McKinley Middle Magnet School | **Classroom Number:** |
| **Lesson Time:** | **Grade Level/Course:** 7th Grade Math | **Lesson Topic**: Statistical Analysis |
| **Items Requested** | **# Requested** | **# Returned** |
| Worksheet | 25 |  |
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| **Collected By:** |
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Names of group members: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Directions: Answer each question below. Follow the step-by-step instructions to create a chart on Excel.

1. Choose one question to ask each of your classmates about a topic of your choosing. Write your question below.

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1. Each of you write your answer to your group’s question in the table below.

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| **Name** | **Answer** |
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1. Now go to your assigned group and ask your question. We will rotate groups after five minutes. (You will notice there are four columns this time. It is the same layout as the above table, it just has two columns for names and answers in case you run out of room.)

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| **Name** | **Answer** | **Name** | **Answer** |
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1. Now that you have all of your results, open Excel.
2. In slot A1, write “Class Name” and in slot B1, write “Class Answer” (Do not actually put the quotation marks).
3. In column A, write your class’s names and in column B write your class’s answers; include your group’s names and answers as well.
4. After you are finished entering the names and answers, highlight columns A and B and click on the Insert Tab at the top of the document.
5. Click on Recommended Chart and a Clustered Column chart should appear. Click OK. Excel will change your table a little when doing this, that is okay.
6. Double click on the chart’s title and change the title to the question you asked - group (For example, this title could be “What is your favorite candy? - Class”. Excel will change the way your table looks automatically, that is okay.
7. Draw a picture of what your graph look like below. Include the title of your graph and the axes. Include a bar graph of the results from just your group’s answers.
8. Which result won? How many votes did it have?

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1. How can we use this to predict what our graph would look like if we asked everyone in Baton Rouge? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Do you believe this sample is biased? Why or why not?

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(Sample results to show the class if they are confused)

 