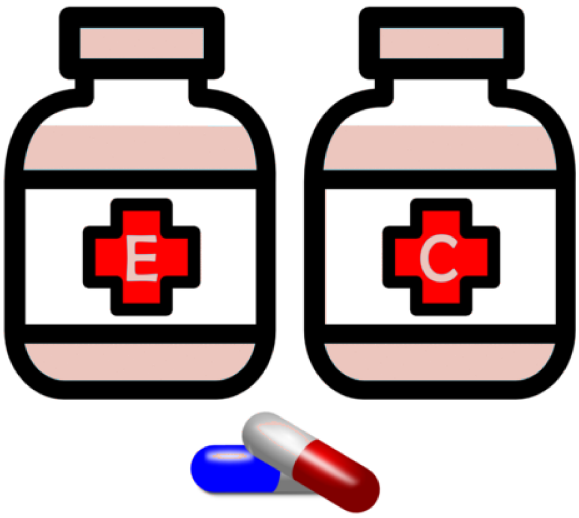
Elementary
Data Version

Medical Trial

21st Century 21 Math Projects



Medical Trial

Elementary Data Version

Ideal Unit: Measurement & Data	**Time Range**: 3-5 Days	**Supplies**: Pencil & Paper

Topics of Focus:

- Bar Graphs & Line Graphs
- Pictographs
- Line Plots

Driving Question *"How can statistics improve healthcare and save lives?"*

Culminating Experience Double blind healthcare studies

Common Core Alignment:

3.MD.B.3	Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.
3.MD.B.4	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.
4.MD.B.4	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots.

Procedures:

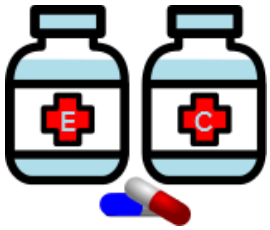
A) In "Help the Doctors", students will are given four different situations using four different types of data displays (bar graphs, line graphs, pictographs and line plots). The idea is that they help doctors decide if their new ideas work better than their old ideas (experimental and control groups for the big kids!). This can work as a station for four separate days or an as extended math activity.

B.) In "Placebo Effect", students are given two groups of data and are asked to create either bar graphs or line plots of it. They will compare the results from a group that gets medicine and a group that gets a placebo. Could the placebo effect be a real thing? This is practice for the final projects...

C) In "Medical Trial", students can work in a team of medical researchers. There are four different medical trials included, which can be used for 4 different groups. Within each trial there is an experiment and a traditional treatment being analyzed. The goal of the research is to determine if the experimental treatment is significantly different than the typical treatment.

To conclude the project, students can write an article for a medical journal. I have set this up with a pre-writing exercise that will be structured loosely like a college level research article. Of course it won't be as lengthy or rigorous, but it aims to get students familiar with that structure.

* Aspects of the project can be completed independently. The entire project does not need to be completed to have a great learning experience, though it is suggested because it will best scaffold the skills and context.



Help the Doctors!

Name _____ Date _____

Doctors and hospitals use research to make health decisions for patients. What is the best treatment? What will help the person the fastest? What will help the best? Doctors and hospitals keep track of what happens to each patient so they can learn what is best.

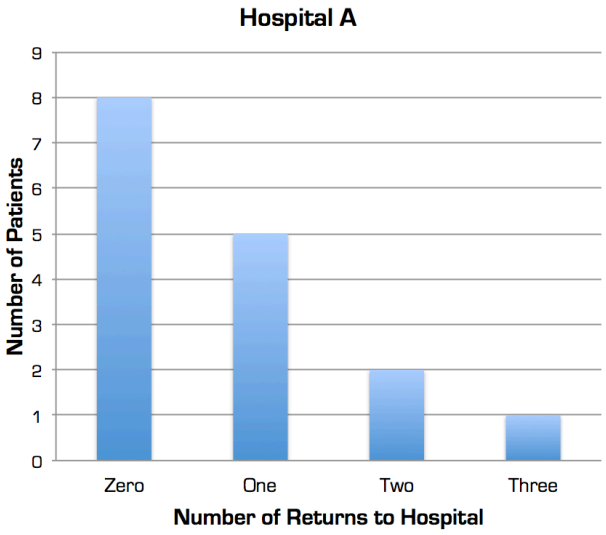
A group of doctors decided to do more research. They asked a lot of questions that you see below. They also kept track of the results. Can you help explain what is in the graphs to the doctors and help them make the best decision?

Study #1

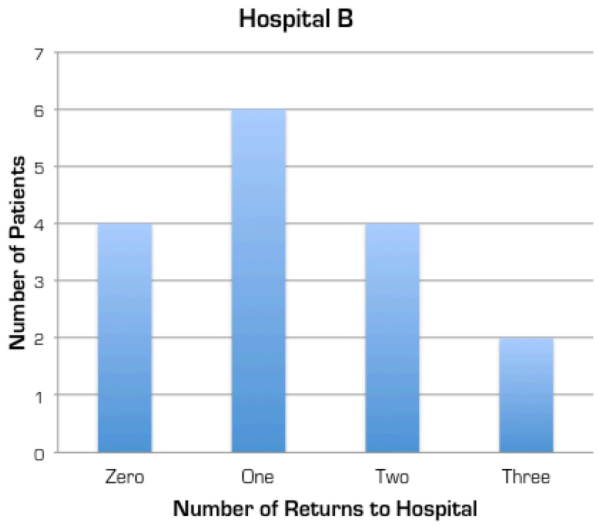
Doctors thought it made sense to tell flu patients to get more sleep to help them recover. The doctors at one hospital decided to try the idea. They told patients to sleep at least 8 hours along with regular treatment. At another hospital, they did not mention sleep.

If patients get more sleep, are they less likely to return to the hospital with the same flu?

More Sleep



No Mention of Sleep



Follow-Ups

1. How many more patients returned to Hospital B than Hospital A?

2. How many more patients returned three times to Hospital B than Hospital A?

3. How many flu patients did both hospitals use in this study?

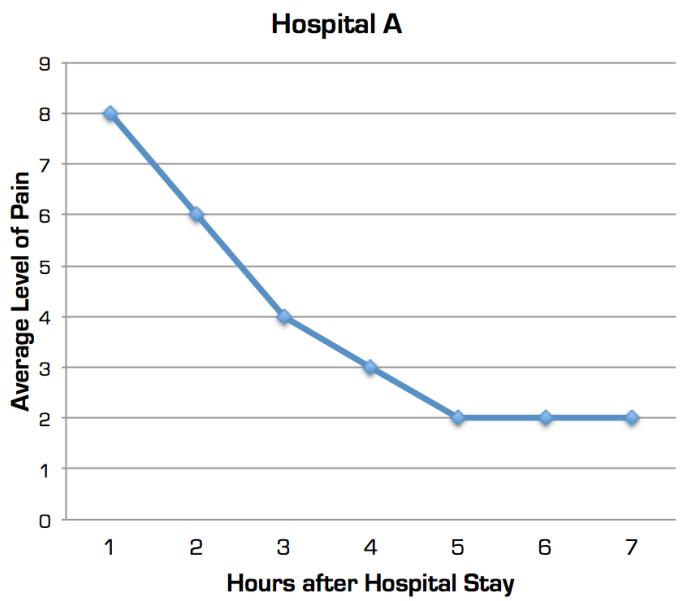
4. What do you think is the best choice?

Study #2

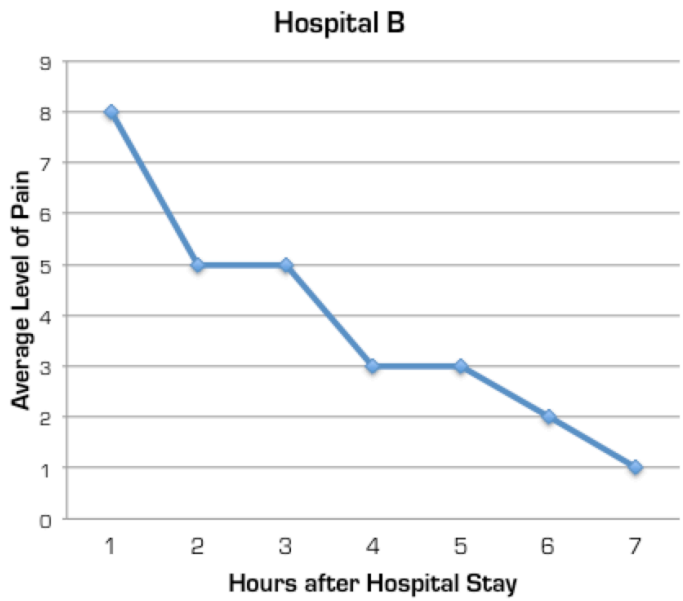
Doctors wondered if you give patients a multi-vitamin along with pain medicine, whether it will help them feel better faster. The doctors at one hospital decided to try the idea. They gave their patients a multi-vitamin when they gave pain medicine. At another hospital, they did not give a multi-vitamin.

Do the patients that get the multi-vitamin have less pain faster?

Multi-Vitamin



No Multi-Vitamin



Follow-Ups

1. Describe what happens to the graph at Hospital A.

2. Describe what happens to the graph at Hospital B.

3. After one hour, what is the difference in Level of Pain between the hospitals?

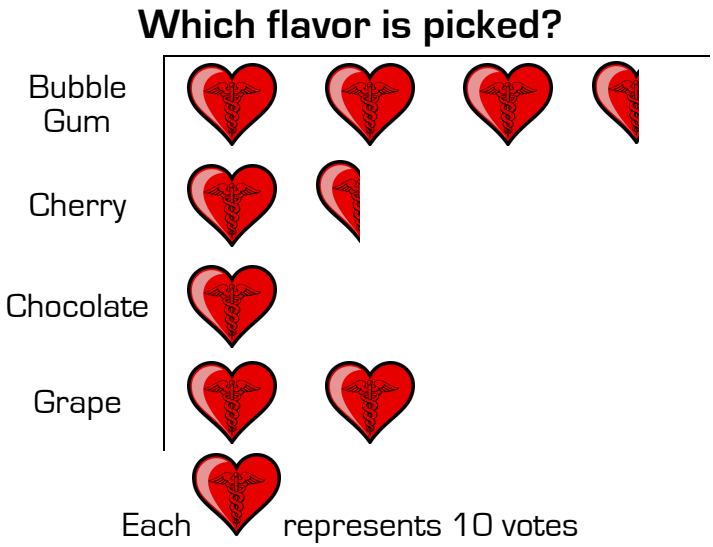
4. Are the graphs different enough to have a best choice? Which is best?

Study #3

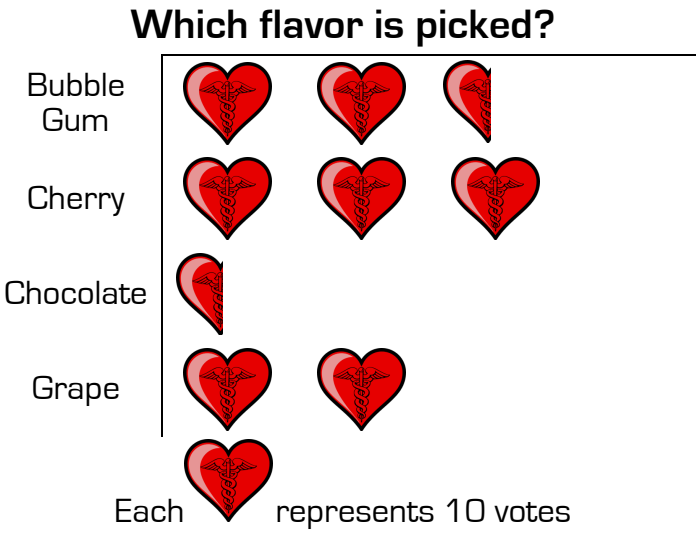
Sometimes when patients have to be put to sleep they get to pick a flavor of gas. Two doctors buy supplies together.

The doctors want to know if they can save money by buying more of the most popular flavor. They can also save money if they stop buying the least popular flavor. If they can save money, they can use it for other supplies that will help patients.

Doctor A



Doctor B



Follow-Ups

1. How many votes did each flavor get overall? Write them in the space below.

Bubble Gum	
Cherry	
Chocolate	
Grape	

2. How many more votes did the most popular flavor get than the least popular?

3. Which flavor had the biggest difference between the two doctors? What was that difference?

4. Should the doctors get rid of a flavor? Which one? Why?

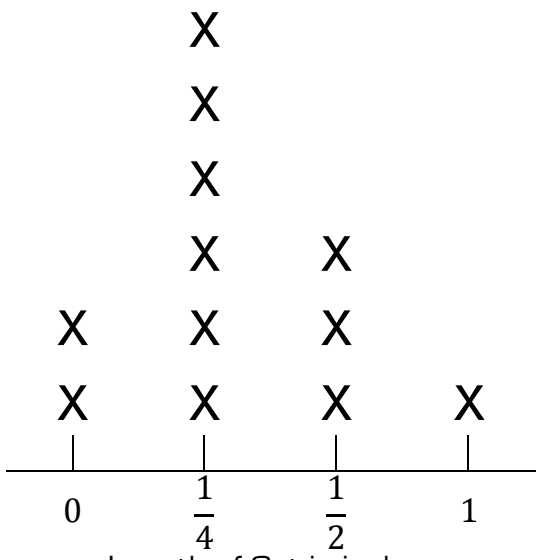
5. Should the doctors buy extra of a flavor? Which one? Why?

Study #4

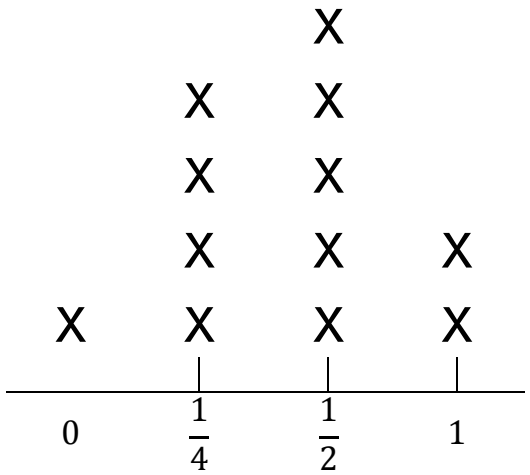
Doctors wondered if you rub aloe over a cut, if it will heal faster. Doctors at one hospital decided to try the idea. They gave their patients an aloe cream. At another hospital they did not give them the aloe cream. Each patient had a one-inch cut and went back to the doctor one week later.

Do the patients that use aloe have cuts that heal faster?

Aloe



No Aloe



Follow-Ups

1. How many patients in each group still had a cut $\frac{1}{2}$ inch or longer?

2. How many patients in each group still had a cut $\frac{1}{4}$ inch or shorter?

3. How many more patients had cuts shorter than $\frac{1}{4}$ inch of the people who used aloe than those that didn't?

4. Are the graphs different enough to have a best choice? Which is best?