

Agenda

- Warm Up 10 min
- “Pick a question” 15 min
- Lecture: SOCS 20 min
- Mini-Quiz 40 min
 - ~~Copies~~
 - **Need 45 minutes**
- Introduce Project #1 5 min
 - Find examples
 - ~~Make copies~~

Warm Up

Let's say I want to determine if a certain plant, *Plantus Madeupus*, grows more quickly in Sacramento compared to Lake Tahoe.

Classify each of the following as a survey, observational study, or experiment. Briefly justify your answer.

1. I find a specimen of this plant in Sacramento and another specimen of this plant in Lake Tahoe. I compare their growth rates over the next year.
2. I have two specimens of this plant. I put one in Sacramento and another in Lake Tahoe. I compare their growth rates over the next year.
3. I ask a sample of experts whether they think this plant grows more quickly in Sacramento or Lake Tahoe.

Do you understand?

How would you answer this question?

Survey

Observational study

Experiment

EXAMPLE. Do men have better navigational abilities than women?

- 1. What percentage of high school students know the name of our current vice president?*
- 2. Is global warming really happening?*
- 3. Do people think global warming is really happening?*
- 4. Is smoking bad for you?*

“Pick a Question”

- Choose a question from the list (next slide), and brainstorm the following:

1. Which would you do?

- Survey, observational study, or experiment

2. How? Give details (briefly)

- Survey → Who will you ask? What will you say?
- Observational → How will you observe but not influence?
- Experiment → What/who will you manipulate? How will you keep everything else the same?

“Pick a Question”

1. Make up your own question. (or choose from below)
2. Who will win the 2020 presidential election?
3. Do high school students prefer Coke or Pepsi?
4. Does students with Macs have higher grades?
5. How many hours a week do students spend on a computer?
6. Does more Facebook friends mean more real friends?
7. Does alcohol make you worse at driving?
8. What is the most popular restaurant in West Sacramento?
9. Are teenagers worse at driving than everyone else?
10. Do people commit more crimes when it's hotter outside?
11. Does perfume/cologne make people more attractive?
12. Does Vitamin C help cure a cold?
13. Are blondes less intelligent?

How? Give details (briefly)

Survey → Who will you ask? What will you say?

Observ. → How will you observe but not influence?

Experiment → What/who will you manipulate?

How will you keep everything else the same?

“Pick a Question”

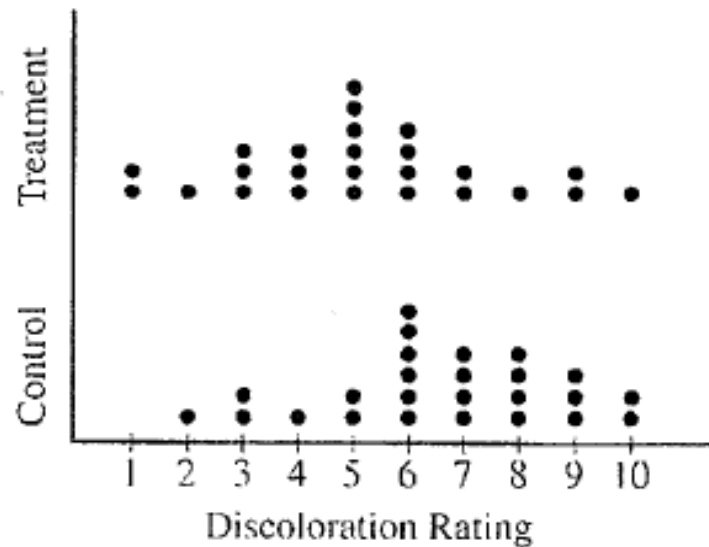
- Survey → Who will you ask? What will you say
 - Observational → How will you observe without influencing?
 - Experiment → What will you manipulate? How will everything else stay the same?
1. Share with your partner.
 2. Two strengths in your partner’s design.
 3. Two flaws in your partner’s design.

Commenting on Data

SOCS

Brown strawberries...gross.

Scientists at a university want to determine whether a preservative was effective in reducing discoloration in frozen strawberries. A sample of 50 ripe strawberries is prepared for freezing. Then the sample is randomly divided into two groups of 25 strawberries each. The strawberries in the treatment group are sprayed with a preservative, then all the strawberries are placed in individual plastic bags. All bags are put in a freezer for 6 months, then thawed. Each strawberries discoloration is rated from 1 to 10, with a low score indicating little discoloration.



Based on the dotplots, comment on the effectiveness of the preservative in lowering the amount of discoloration in strawberries.

“Comment”

- When you are asked to “comment on” (or “describe” or “compare”) a distribution, think:

Shape

Outliers

Center

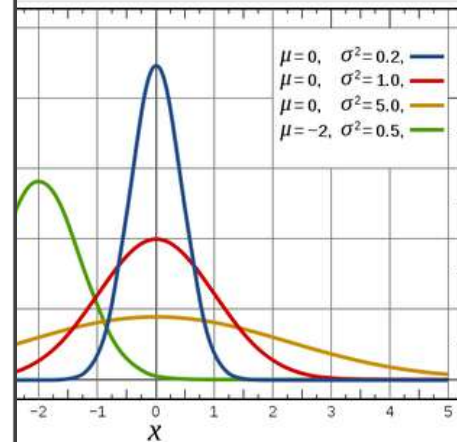
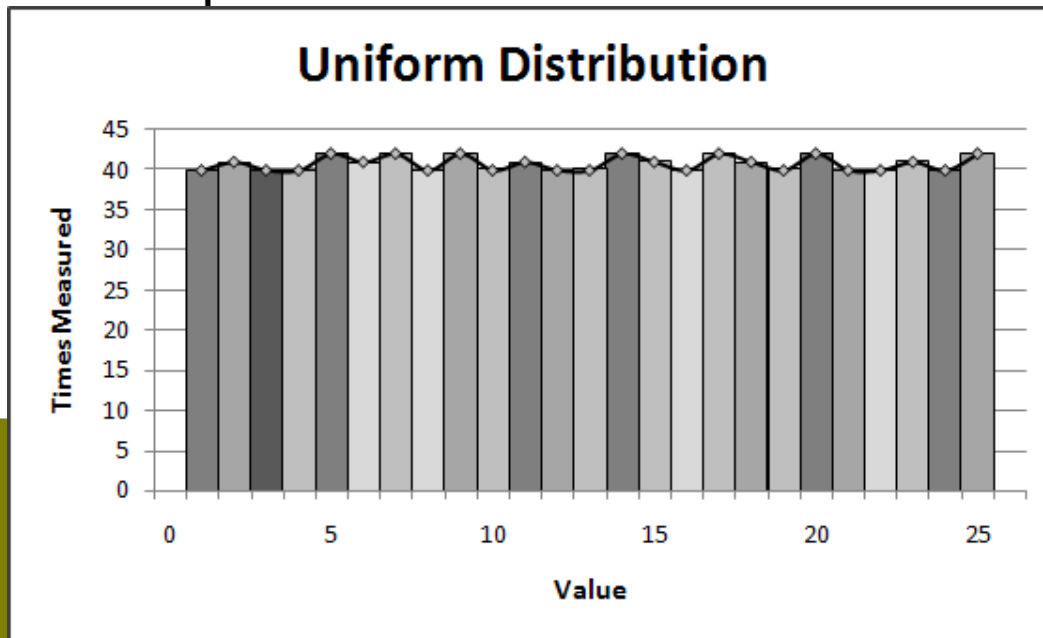
Spread



Leave space (~1") for notes between each

- Shape (1 of 4)
 - Symmetric vs. skewed
 - Bimodal (two peaks)
 - Uniform, clusters, gaps
 - Approximately normal

Skewed left



“Comment” on a display

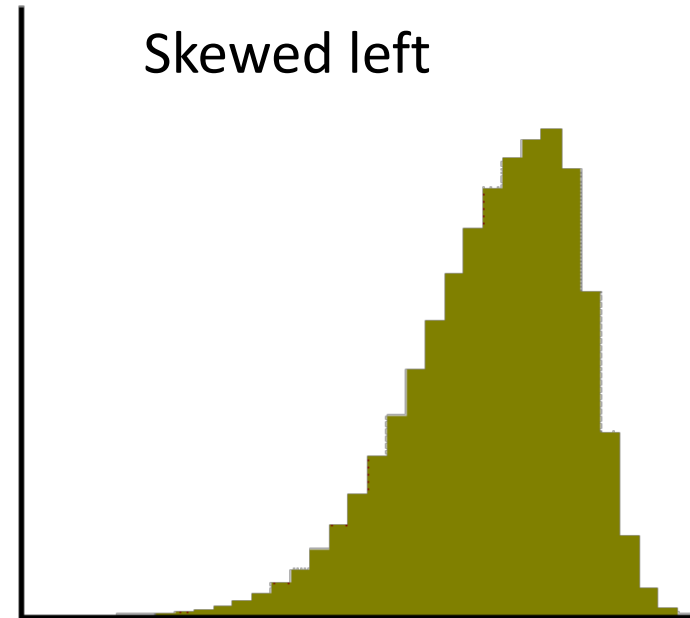
- Outliers (2 of 4)
 - “An individual value that falls outside the overall pattern”
 - $1.5 \cdot \text{IQR}$ (*next week*)
 - BUT just use your judgment
-
- *What is an example of a set of data that might have outliers?*

“Comment” on a display

- Center (3 of 4)
 - Median
 - Mean
-

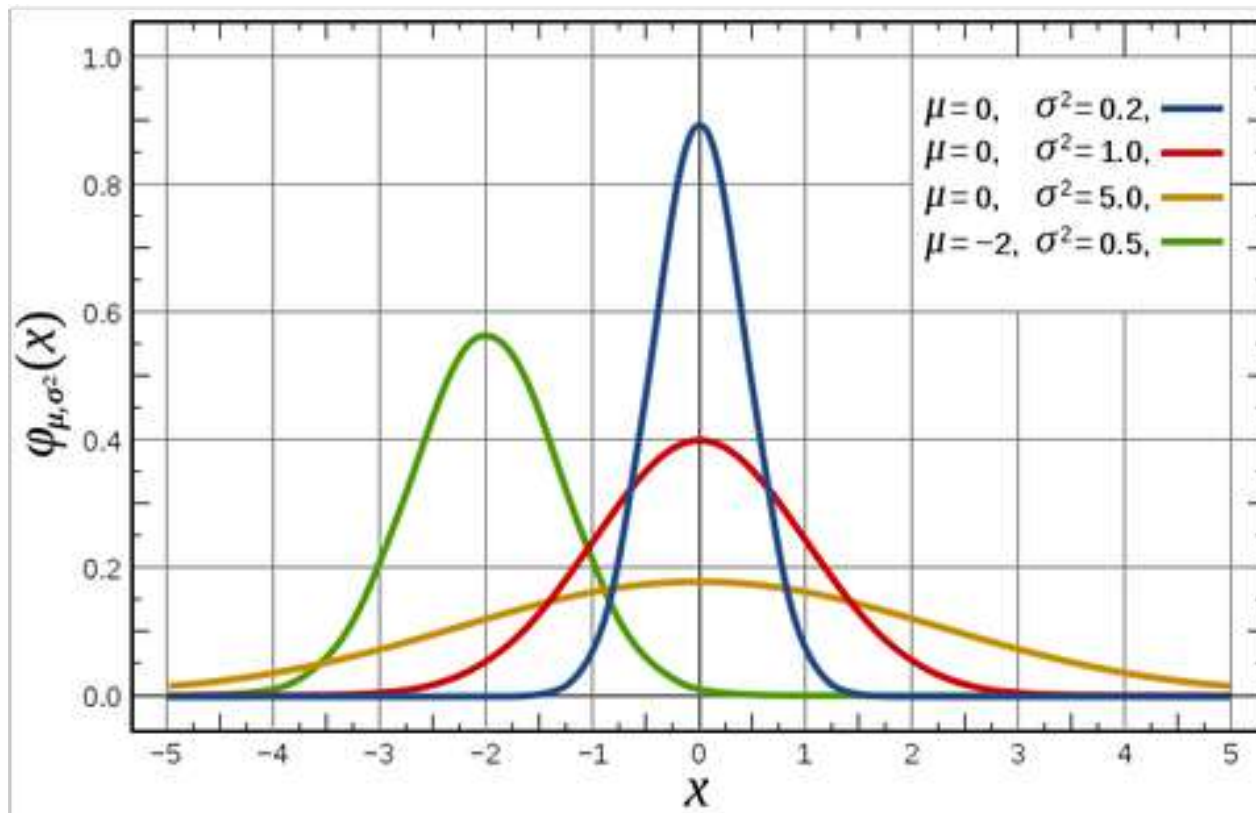
W. If a distribution is skewed left, compare the median and mean. Which is larger?

D. What is an example of a set of data that might be skewed right?



“Comment” on a display

- Spread (4 of 4)

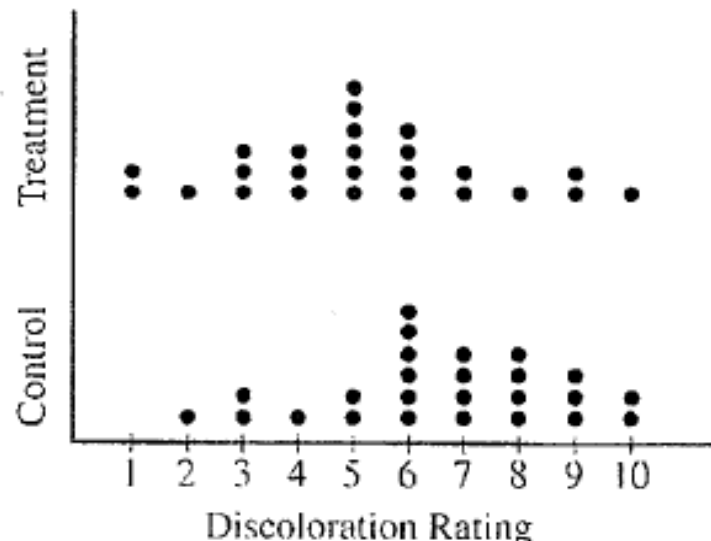


Free-response #1, 2007

1. The department of agriculture at a university was interested in determining whether a preservative was effective in reducing discoloration in frozen strawberries. A sample of 50 ripe strawberries was prepared for freezing. Then the sample was randomly divided into two groups of 25 strawberries each. Each strawberry was placed into a small plastic bag.

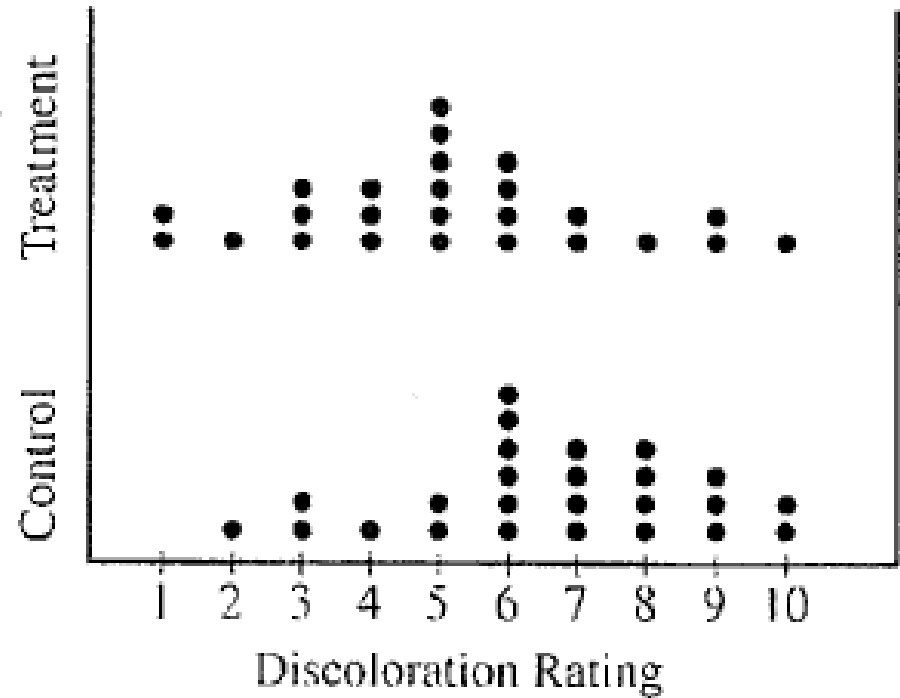
The 25 bags in the control group were sealed. The preservative was added to the 25 bags containing strawberries in the treatment group, and then those bags were sealed. All bags were stored at 0°C for a period of 6 months. At the end of this time, after the strawberries were thawed, a technician rated each strawberry's discoloration from 1 to 10, with a low score indicating little discoloration.

The dotplots below show the distributions of discoloration rating for the control and treatment groups.



- (a) The standard deviation of ratings for the control group is 2.141. Explain how this value summarizes variability in the control group.
- (b) Based on the dotplots, comment on the effectiveness of the preservative in lowering the amount of discoloration in strawberries. (No calculations are necessary.)

Few points



Treatment

Roughly symmetric

No outliers

Mean = 5

More spread

Control

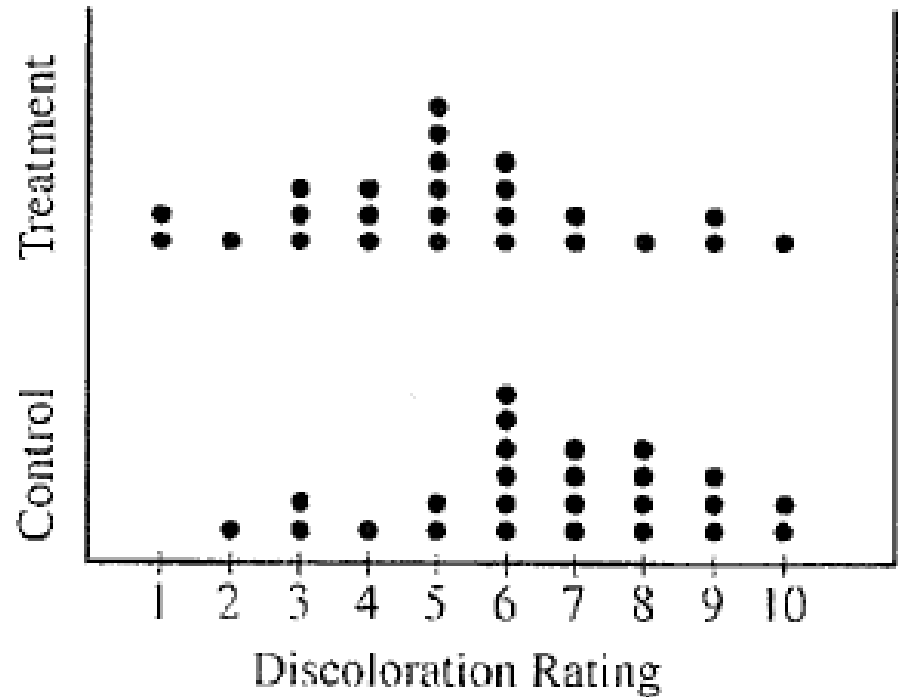
Skewed left

No outliers

Median = 7

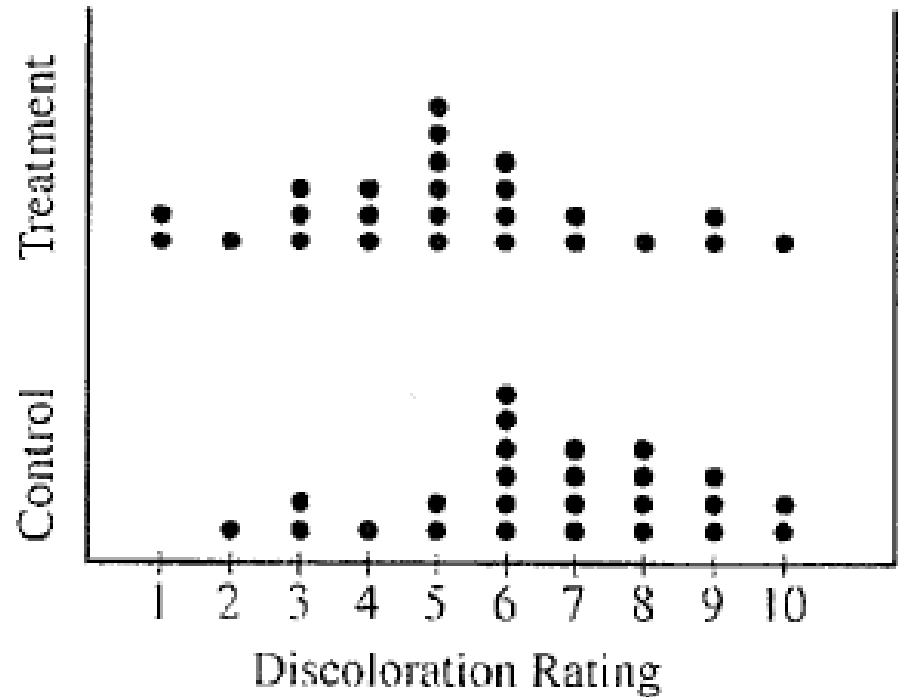
Less spread

Most points



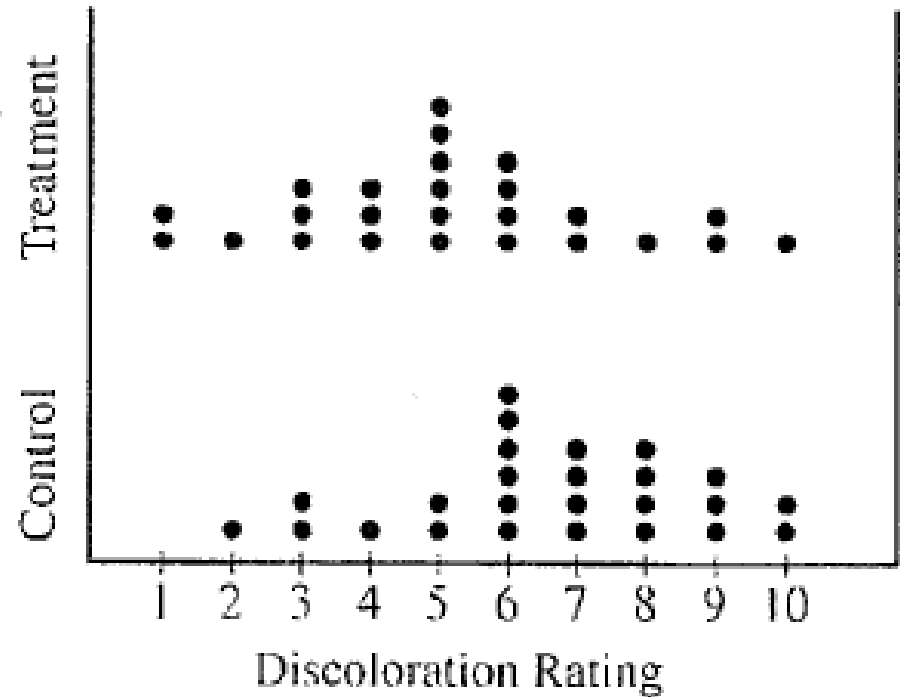
The treatment group is symmetric, while the control group is skewed left. Neither group has any outliers. The treatment group has a lower median discoloration rating of approximately 5, while the control group has a higher median discoloration rating of approximately 7. The treatment group also seems more spread out than the control group.

Full points



The treatment group is roughly symmetric, while the control group is skewed left. Neither group has any obvious outliers. The treatment group has a lower median discoloration rating of approximately 5, while the control group has a higher median discoloration rating of approximately 7. The treatment group also seems more spread out than the control group. This treatment apparently results in less discoloration of frozen strawberries.

Full points



The treatment group is **roughly** symmetric, while the control group is skewed left. Neither group has any **obvious** outliers. The treatment group has a lower median discoloration rating of approximately 5, while the control group has a higher median discoloration rating of approximately 7. The treatment group also seems more spread out than the control group. **This treatment apparently results in less discoloration of frozen strawberries.**

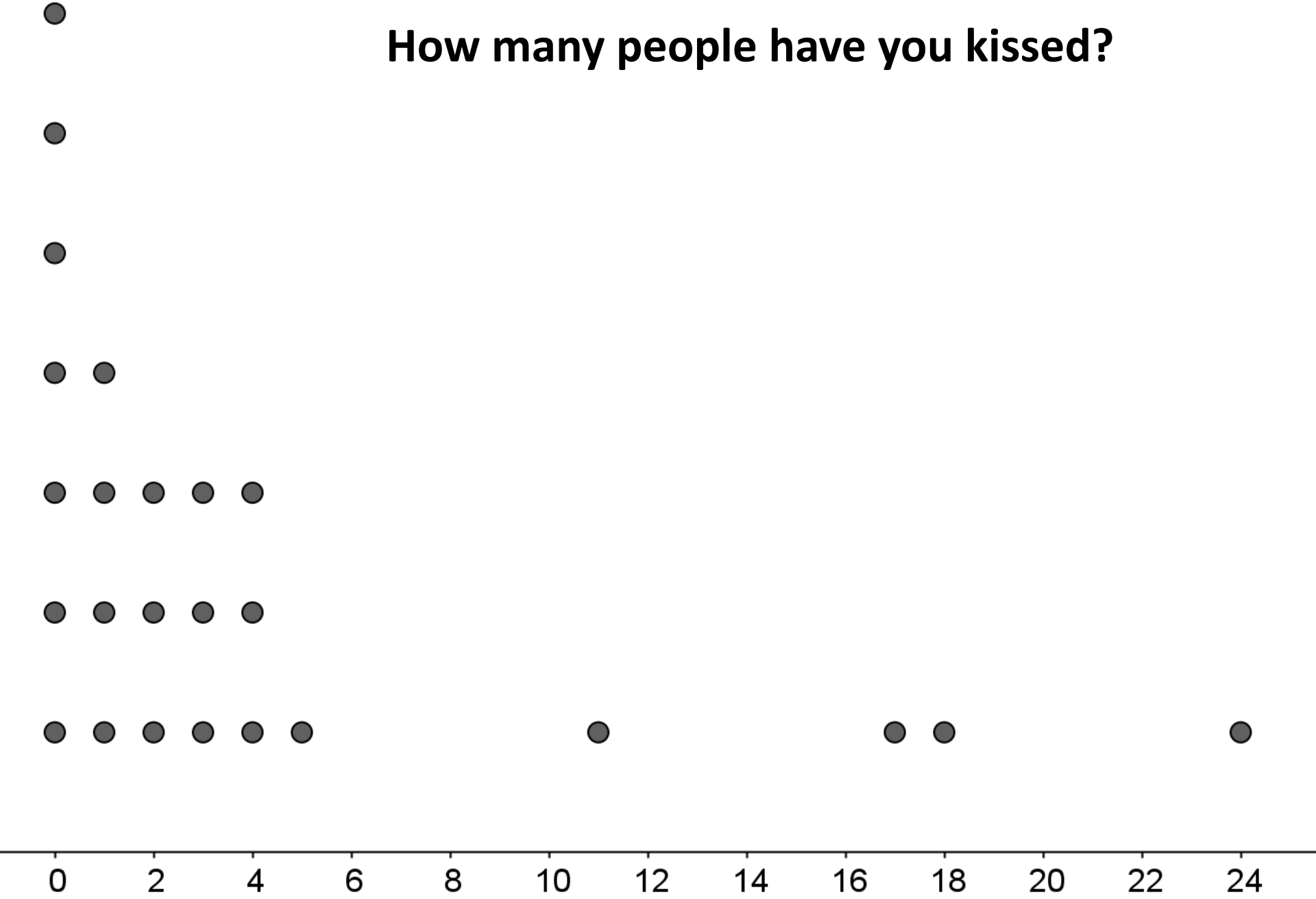
In Fall 2017, Gabby Baba asked a random sample of RCHS students, “How many people have you kissed?” These were the results:

0	2
0	3
0	3
0	3
0	4
0	4
0	4
1	5
1	11
1	17
1	18
2	24
2	

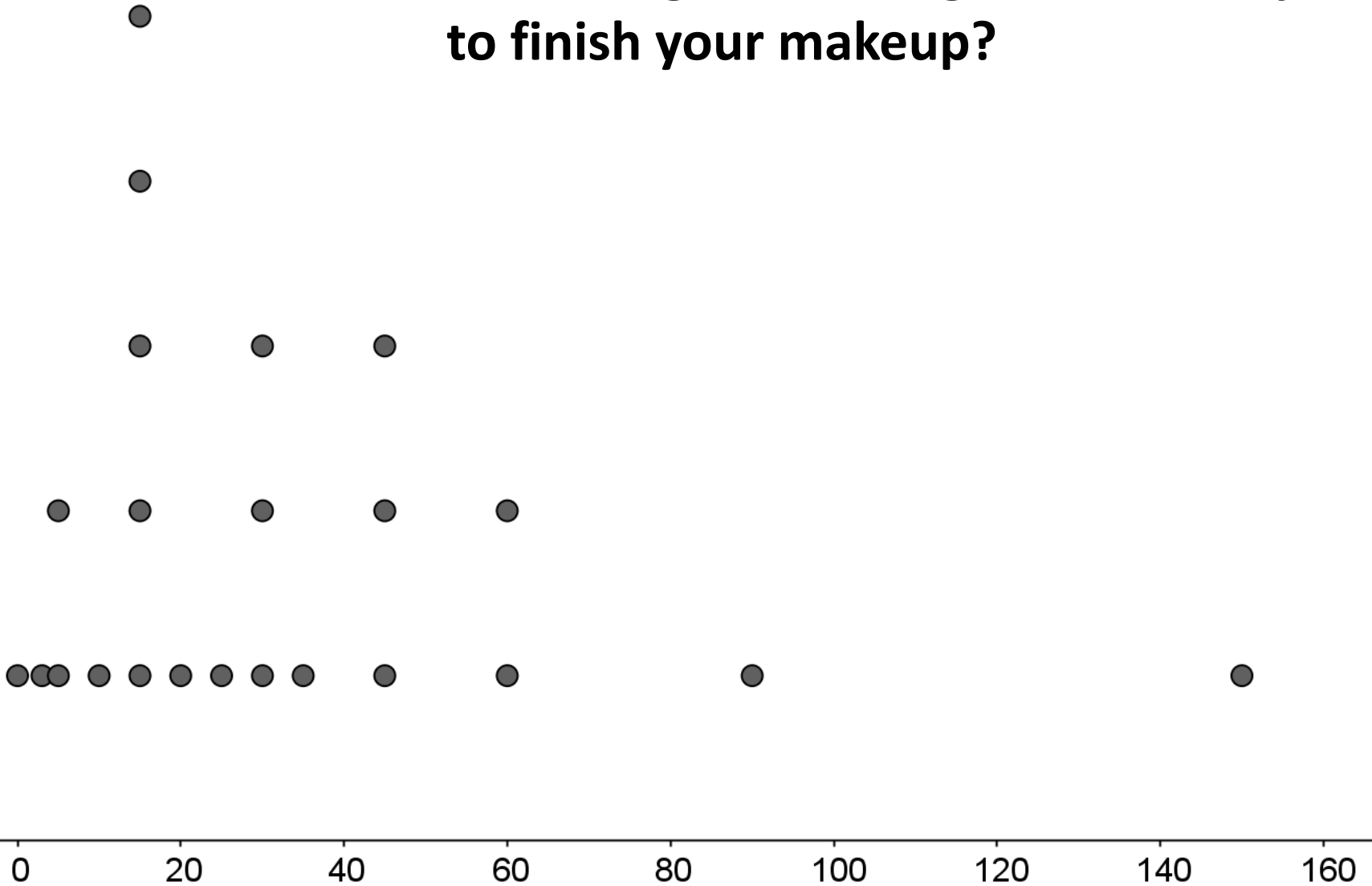
In Fall 2017, Jessika Garcia asked a random sample of RCHS students, “On average, how long does it take you to finish your makeup?” These were the results:

0	30
3	30
5	30
5	35
10	45
15	45
15	45
15	60
15	60
15	90
20	150
25	

How many people have you kissed?



On average, how long does it take you to finish your makeup?



Mini-Quiz ($\frac{1}{4}$ of Test)

- Put away whiteboards. Separate desks.
- You will need: pencil, eraser, calculator.

9 M.C., 1 pt each
1 FRQ, 9 pts

- WHEN YOU ARE DONE:

- Check your work. Don't leave anything blank!
- Write an "Expected Score".
- **Raise your hand, I will come collect your quiz.**
- After I collect your exam, you may use your phone.
- Please be silent for your classmates.

+1 point for correct
score guess

Project #1 (AP): “Exploring Quantitative Data”

- 28 points in *Projects* grade
- Due Tuesday 1/21
- Collect and use any quantitative data
- Sample projects by door
- You are responsible for reading the assignment handout, especially the rubrics.