**Gerrymandering Lesson Plan**

In this lesson, students will perform methods on tables and write functions to analyze data from a dataset of Republican and Democratic votes for US Representatives from 2018 in order to investigate Gerrymandering. The dataset comes from bootstrapworld.org and is based on US Census Bureau data. The lesson was written by Marisa Laks with help from Alex Moore.

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| Aim: How do we write and use table methods and functions in order to analyze data about Gerrymandering?<br><br>SWBAT: define variables, write table methods and display data in charts.<br><br>This lesson will most likely take two periods. | NYS Standards:<br><br>9-12.IC.3 Debate issues of ethics related to real world computing technologies.<br>9-12.CT.2 Collect and evaluate data from multiple sources for use in a computational artifact.<br>9-12.CT.3 Refine and visualize complex data sets to tell different stories with the same data set. |
| Materials: Google Slides, Computer, Internet, Pyret starter files | Vocabulary: Function, Domain, Range, Contract, Row, Column, Number, String, Image, Boolean, Method, Definitions Area, Design Recipe, Purpose Statement |

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| 10 min | **Do Now:**<br><br>Click on the link for the Spreadsheet.<br><br>Write two statements for each of the following:<br><br>**I wonder....**<br>**I notice....**<br><br>Call on students to share their responses or read them from the peardeck. | Teacher Notes:<br><br>Instruct students to click on the link for peardeck and sign in with google.<br><br>https://docs.google.com/spreadsheets/d/1bqk6Elrt3bInX5Ysvl8-SvoCo2ZoiEhHziwV7GDfwEM/edit?usp=sharing |
| 15 min | **Mini-Lesson:**<br><br>What is Gerrymandering?<br>Gerrymandering is the manipulation of boundaries for districts in order to favor one political party or class.<br>It frequently happens for representatives in the US House of representatives and at the state level.<br><br>Gerrymandering Explained:<br>Show students the article from the Brennan Center for Justice.<br>Show Washington Post video. (2:42)<br><br>Check-In: What thoughts do you have about Gerrymandering? Do you think Gerrymandering is ethical? Why or why not?<br><br>Go to code.pyret.org and log in. Then click on the link for the "Gerrymandering Project." Save a copy of the file and add your name to the file name. Run the file. Enter the code for election-table in the interactions area. What do you see? | Brennan Center for Justice:<br>https://www.brennancenter.org/our-work/research-reports/gerrymandering-explained<br><br>Washington Post Video:<br>https://youtu.be/bGLRJ12uqmk<br><br>Gerrymandering Project Code:<br>https://code.pyret.org/editor#share=1A1PFNF0bx6bNNkOIhlWUMIpCW-3JqJFw&v=1904b2c<br><br>The code from lines 4 to 20 in the pyret file were downloaded from bootstrapworld.org. The rest of the project was written by Marisa Laks with help from Alexander Moore. |

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| | **Helpful References:**<br><br>**Reference List of Data Displays**<br>pie-chart(Table, “column”)<br>bar-chart(Table, “column”)<br>histogram(Table, “column”, bin width)<br>scatter-plot(Table, “label”, “column 1”, “column 2”)<br><br>**Reference List of Table Methods**<br><Table>.row-n(index)<br><Table>.order-by(“Column”, Boolean)<br><Table>.filter(Boolean function)<br><Table>.build-column(“Column”, function)<br><br>**Design Recipe for Writing Functions :** The design recipe has three parts:<br>1) Write a contract and purpose statement.<br>2) Write examples.<br>3) Write the function. | These slides are for student reference when writing their code. The arguments are not the exact words students should enter. They are a hybrid of the contract and the actual arguments.<br><br>The design recipe is from bootstrapworld.org. |
| 45 min | **Activity:**<br><br>Students will follow the prompts in the code to investigate whether Gerrymandering appears to be occurring based on the data in the Election-Table.<br><br>**Part 1:** Look at the spreadsheet "Gerrymandering Dataset (Bootstrap)." Choose three states and define the rows below.<br><br>**Part 2**: Define a table called "seats-sort" that sorts the table by total seats starting with the most seats.<br><br>**Part 3a**: Write a function called "is-dem-win" that consumes a row and produces a Boolean that returns true if the winning party is Democratic.<br><br>-Write three examples using your rows defined above.<br>-Define the function.<br><br>**Part 3b:** Define a table that only contains rows of states where the Democrats were the winning party.<br><br>**Part 4:** Repeat the process from part 3 to create a function and table where the winning party was Republican.<br><br>**Part 5a**: Given the function "do-seats-match-vote." Write a purpose statement for what the function does. It is helpful to apply the function to your defined rows first.<br><br>fun do-seats-match-vote(row):row["seats-match-vote"] == false end<br><br>Purpose statement: | As students are working, teachers should circulate and help address student errors and misconceptions.<br><br>Students can also work in pairs using the driver-navigator model to write the code.<br><br>Purpose Statement: The function "do-seats-match-vote" consumes a row and returns true if the seats do not match the vote.<br><br>This may be challenging for students to interpret since the function produces a Boolean that is true when the original input is false. Which means |

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| | **Part 5b**: Define a table called "seats-vote" that filters the table by the function "do-seats-match-vote".<br><br>**Part 6:** Create at least three data displays for your defined tables. Write the code for each in the definitions area. Explain what the charts show.<br><br>**Part 7:** What can you conclude about Gerrymandering from the exploration in the previous parts?<br><br>**Extension**: Demonstrate anything else we've done in this class. For example, you can define other tables or show different displays. Explain what your code does. | that the function will return false when the input is true. |
| 5 Min | Summary:<br><br>What can you conclude about Gerrymandering from your explorations?<br><br>***Remember to save your code and submit your link.** | Sample answer: Although gerrymandering appears to happen in both political parties, it appears to happen more frequently in states with more Republican control. |