D4 Gerrymandering and Solutions - SOLUTIONS

Group Activities

1. Azavea, a data analytics organization, has calculated the efficiency gap for all 50 states. We will first look at the infographics together.
https://www.azavea.com/blog/2017/07/19/gerrymandered-states-ranked-efficiency-gap-seat-advantage/

2. You have just been hired as consultants to your state legislature in the re-districting of the state. To assess the current map below, calculate the efficiency gap.

Election Results:

Democrats win

___3_____ seats

Republicans win

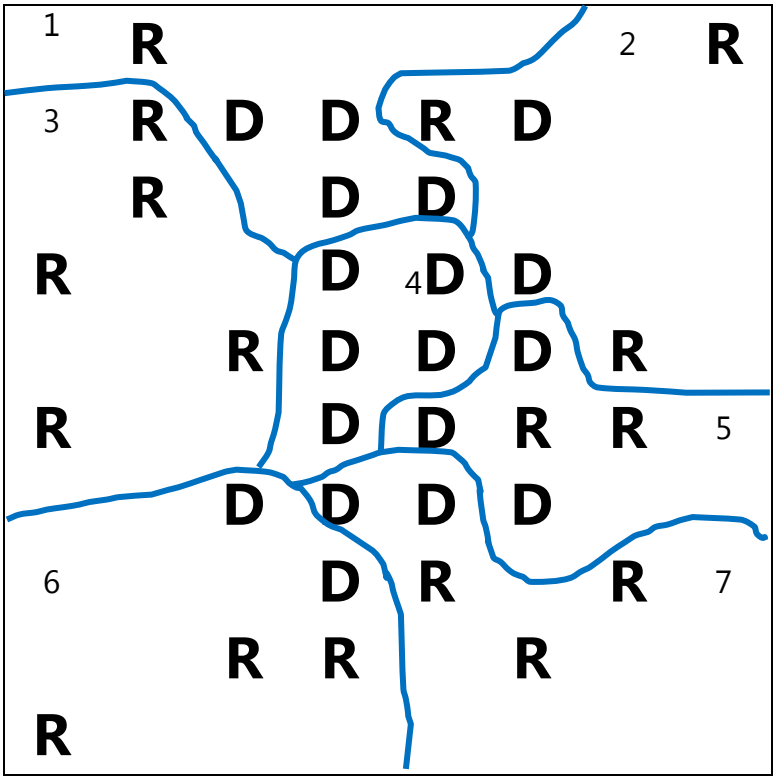
__4_____ seats

District	D Votes	R Votes	D Surplus or Wasted Votes	R Surplus or Wasted Votes
1	4	1	4-3=1	1
2	2	3	2	3-3=0
3	0	5	0	5-3=2
4	5	0	5-3=2	0
5	3	2	3-3=0	2
6	2	3	2	3-3=0
7	2	3	2	3-3=0
Total	18	17	9	5

Efficiency Gap =

$$\frac{\text{Party A Wasted Votes} - \text{Party B Wasted Votes}}{\text{Total Votes}}$$

$$= \frac{4}{35} \approx 0.114 \text{ or } 11.4\%$$



3. Calculate the percentage of voters that each seat represents.

$$100\% \div 7 \approx 14.3\%$$

4. Is the efficiency gap worth one seat or more? How many seats?

The gap is worth just less than one seat.

5. Is this a fair map? Why or why not?

6. Now it is time for re-districting and you get to draw the lines. There are three rules:

Rules
1. All legislative districts must contain the same number of people.
2. Districts must not be drawn according to race or ethnicity.
3. District must be contiguous – no split districts allowed

a. Use packing and cracking to win as many seats as possible for the **Democrats** and calculate the efficiency gap.

Election Results:

Democrats win

___6_____ seats

Republicans win

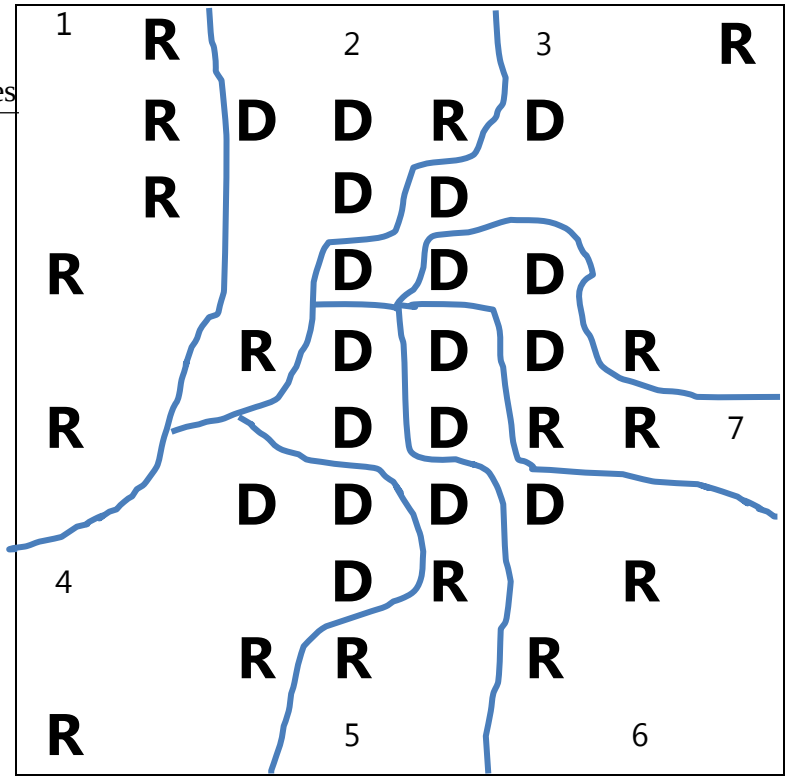
__1_____ seats

District	D Votes	R Votes	D Surplus or Wasted Votes	R Surplus or Wasted Votes
1	0	5	0	5-3=2
2	3	2	3-3=0	2
3	3	2	3-3=0	2
4	3	2	3-3=0	2
5	3	2	3-3=0	2
6	3	2	3-3=0	2
7	3	2	3-3=0	2
Total	18	17	0	14

Efficiency Gap =

$$\frac{\text{Party A Wasted Votes} - \text{Party B Wasted Votes}}{\text{Total Votes}}$$

$\frac{14-0}{35} = \frac{14}{35} =$ **40%**



b. Use packing and cracking to win as many seats as possible for the **Republicans** and calculate the efficiency gap.

Election Results:

Democrats win

__2__ seats

Republicans win

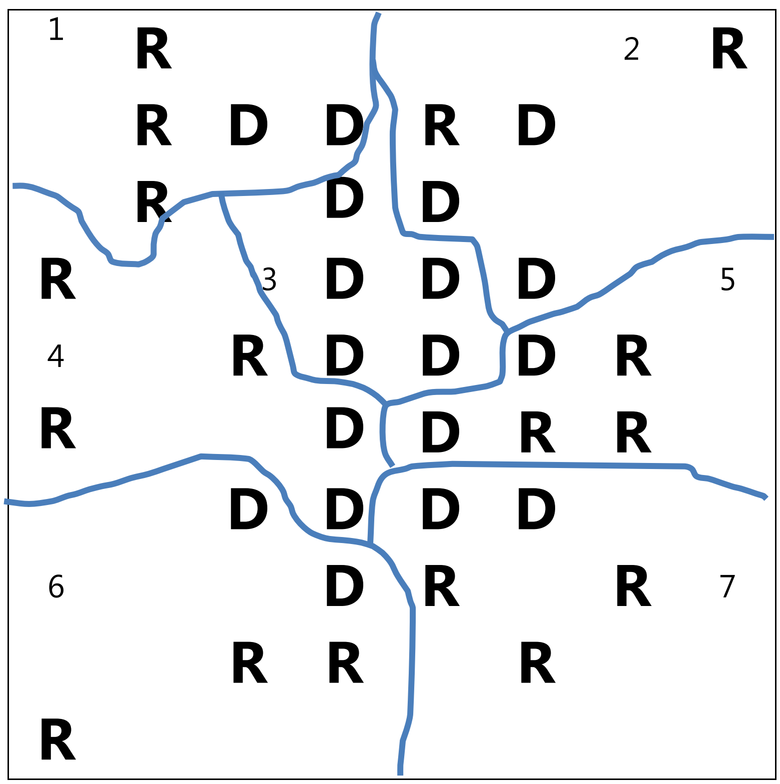
__5__ seats

District	D Votes	R Votes	D Surplus or Wasted Votes	R Surplus or Wasted Votes
1	2	3	2	3-3=0
2	3	2	3-3=0	2
3	5	0	5-3=2	0
4	2	3	2	3-3=0
5	2	3	2	3-3=0
6	2	3	2	3-3=0
7	2	3	2	3-3=0
Total	18	17	12	2

Efficiency Gap =

$$\frac{\text{Party A Wasted Votes} - \text{Party B Wasted Votes}}{\text{Total Votes}}$$

$\frac{12-2}{35} = \frac{10}{35} =$ **29%**



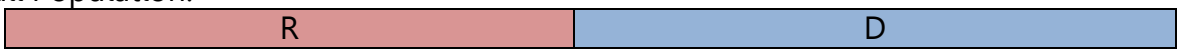
7. Now let's check proportionality.

a. Find the overall percentage of Democrats in the state, and the percentage of Republicans. Shade the percentages in the overall population bar below.

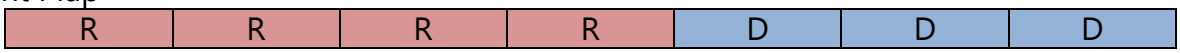
$\frac{18}{35} \approx 0.514$ **or 51.4%**

b. Then shade in the number of seats won with each map.

Overall Population:



Current Map

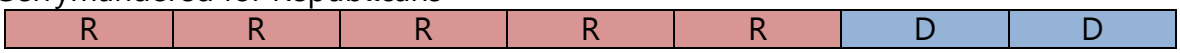


Efficiency Gap: **11.4%**

Map Gerrymandered for Democrats

Efficiency Gap: **40%**

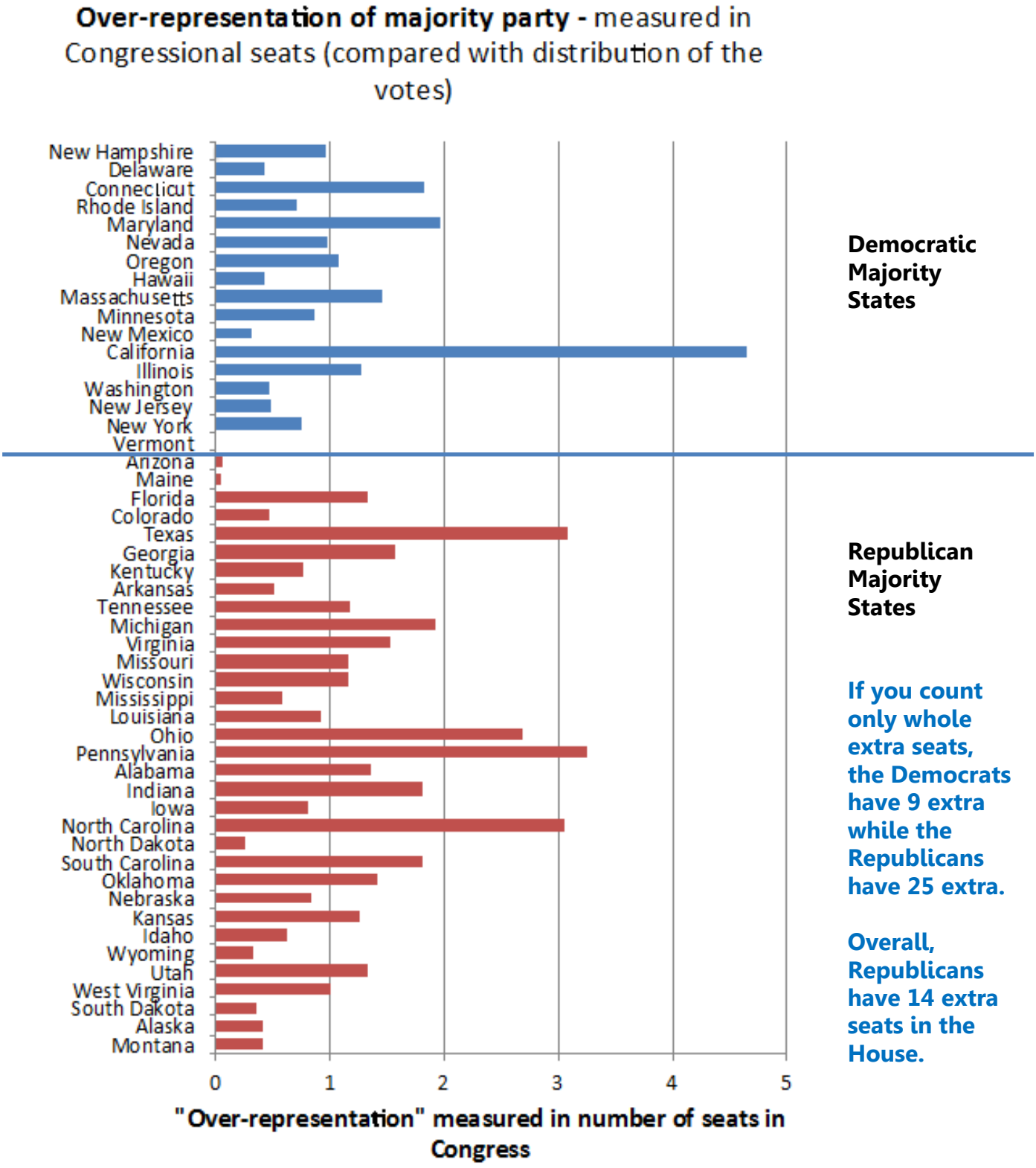
Map Gerrymandered for Republicans



Efficiency Gap: **29%**

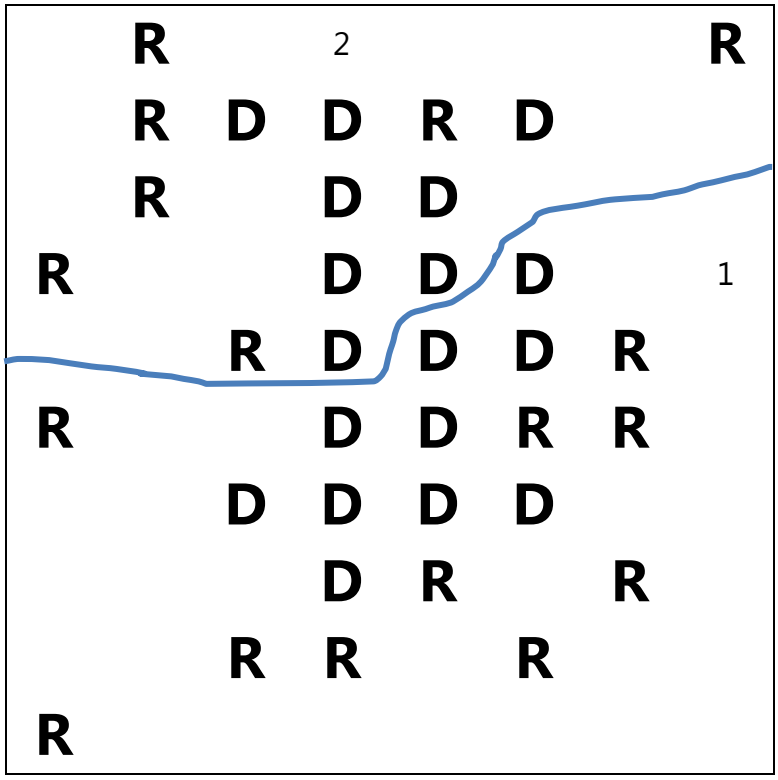
8. Using the graph below, estimate the number of extra seats held by the majority party in the current House of Representatives.

Source: https://www.brookings.edu/blog/fixgov/2017/02/22/misrepresentation-in-the-house/



Fair or Proportional Representation

8. Divide the state into two larger regions so that one will elect 4 representatives and the other will elect 3 representatives. Try to make the representation as proportional as possible.



District 1: 4 seats: 4x5=20 seats

10 R, 10 D

District 2: 3 seats: 3x5=15

7 R, 8 D

9. An extra map to play with.