

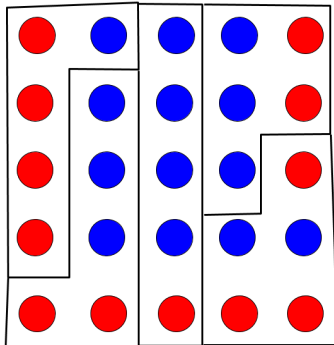
## Gerrymandering and Efficiency Gap

After completing this lesson, students should be able to:

- Calculate the number of wasted votes and the efficiency gap in “toy” examples.
- Describe the range of values possible for the efficiency gap and explain why this is the range.

## Wasted votes

How can you quantify the relative amount of gerrymandering in these districting maps in terms of *wasted votes*?



1. How many wasted votes are there for red and blue in each district?
2. What can we do with these numbers to get a measure of how gerrymandered the districting map is?
3. Why does it make sense to divide by the total number of votes?

## Efficiency Gap

The efficiency gap is a measure of gerrymandering in terms of wasted votes.

In each district, how do you count wasted votes for

- The party that wins that district?
  
- The party that loses that district?

To calculate efficiency gap (assuming only two parties)

1.

2.

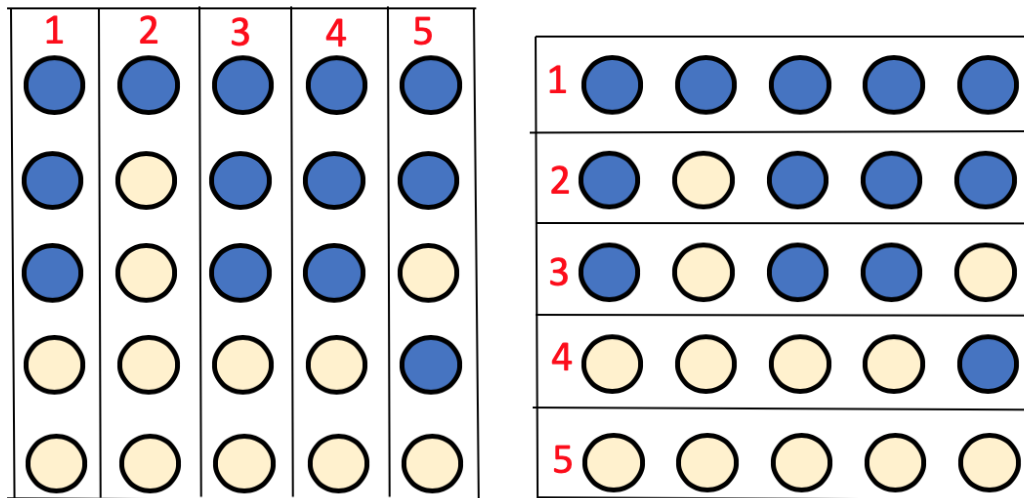
3.

4.

Efficiency Gap =

Group activity:

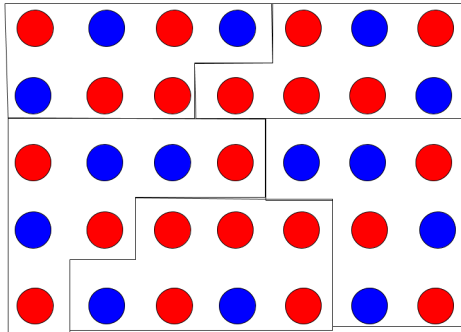
- Introduce yourselves, choose taskmaster, skeptic, explainer, and scribe.
- Discuss: which map do you predict will have a higher efficiency gap and why? Both maps have 12 yellow & 13 blue voters.
- Calculate: what are the efficiency gaps for map (a) and (b)? Calculate the numerators as wasted votes for yellow – wasted votes for blue.
- Record: answer the poll question on PollEverywhere.
- Discuss: are you surprised by the results?



- What does the positive or negative sign mean for the efficiency gap?
  
- Does an efficiency gap close to zero correspond to districts that are more or less gerrymandered?
  
  
  
  
  
  
  
  
  
  
- What is the maximum possible efficiency gap? (PollEv)
  - A. 0.1
  - B. 0.5
  - C. 1
  - D. 100
  - E. There is no maximum.

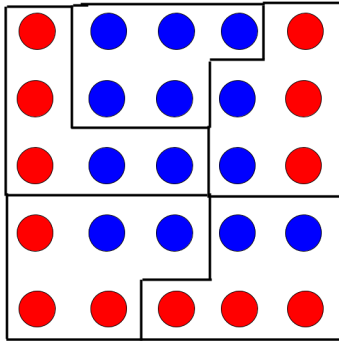
Extra examples

**Extra Example.** Find the efficiency gap. Does this map favor red or blue?



- A. 0
- B. 0.05, favoring blue
- C. 0.05, favoring red
- D. 0.15, favoring blue
- E. 0.15, favoring red
- F. 0.25, favoring blue
- G. 0.25, favoring red

**Extra Example.** What is the efficiency gap in this districting map example? Select the closest answer. (PollEv)



**Extra Example.** Try this gerrymandering puzzle.

- Create 5 districts, with as much advantage as possible for blue.
- Create 5 districts, with as much advantage as possible for red.
- What are the efficiency gaps?

