



Name: _____ Date: _____

Student Exploration: Polling: Neighborhood

Vocabulary: error, poll, population, sample

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

Shortly before the election for governor, two **polls** of likely voters are released. The first poll, based on a survey of 1,000 voters in rural areas, predicts a victory for candidate A. The second poll, based on a survey of 400 voters in a large city, predicts a solid victory for candidate B.

1. Why do you think the two polls reached such different conclusions? _____

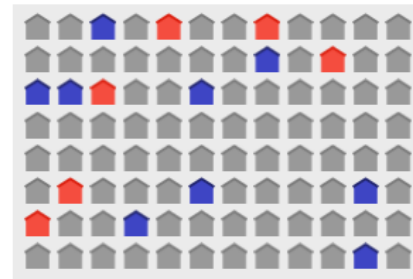
2. How would you design a poll to predict the election results most accurately? _____

Gizmo Warm-up

During campaigns, political strategists and the media spend hours analyzing poll results. With the *Polling: Neighborhood* Gizmo, you can investigate how reliably polls predict results. The Gizmo shows the “Yes” and “No” votes for a ballot measure in a neighborhood of 200 homes.

To begin, check that **Show all votes** is off. The **Poll** map shows the votes of homes that have been polled. The **Neighborhood** map will show the election results from the whole **population**, which in this case is the neighborhood.

Yes: 26



Poll

1. Below the **Poll** map, click **Poll** 10 times to take a **sample** of 10 voters.

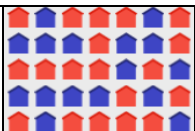
A. What were your sample results? Yes: _____ No: _____

B. Based on your poll, how many “Yes” and “No” votes do you predict for the entire 200-home population? Yes: _____ No: _____

2. Select **Show all votes**. What were the actual “Yes” and “No” vote totals in the population?

Yes: _____ No: _____



Activity A: Estimating public opinion	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> • Turn off Show all votes. • Click New to generate a new set of votes. 	
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1. Click **Poll** 20 times to take a sample of 20 voters.

- Of the 20 homes polled, how many voted “Yes”? _____
- What is your estimate of how many total “Yes” votes there will be in the whole population (the 200-person neighborhood)? _____
- Select the **CALCULATE** tab. Write the steps of the calculation in the space to the right.
- In the poll, what percentage of voters voted “Yes”? _____
- Suppose a poll of 30 people in a neighborhood recorded 17 “Yes” votes. What would be the best estimate of the total number of “Yes” votes in the neighborhood if it consists of 750 total voters? Show your work in the space to the right.

Estimated “Yes” votes for 750 homes: _____

2. Turn on **Show all votes** and select the **GRAPH** tab.

- What is the actual number of “Yes” votes in the neighborhood? _____
- What is the percentage of “Yes” votes in the neighborhood? _____
- To find the **error** of a poll, subtract the actual percentage of “Yes” votes from the number estimated in the poll. For example, if the poll percentage of “Yes” votes is 40% and the actual percentage is 36%, the error is 4%.

What is the error for this poll? _____

3. How do you expect the error to change as the sample size increases? Explain your answer.

(Activity A continued on next page)



Activity A (continued from previous page)

4. Turn off **Show all votes**, and click **New**. Click **Poll** 10 times. In the first line of the table, record the number of “Yes” votes in the poll and the percentage of “Yes” votes in the poll. Then, click **Reset** and repeat this procedure for two more 10-person polls.

Homes polled	“Yes” votes in poll	“Yes” % in poll	Actual “Yes” % in neighborhood	Error
10				
10				
10				

When all three polls are complete, turn on **Show all votes**. Record the actual percentage of “Yes” votes and determine the error for each poll. Record the absolute value of each error (**|Error|**) in the table above. (Absolute values are used so the errors don’t cancel out.)

What is the mean |error| of these three 10-home polls? _____

5. Click **Reset**. Using your mouse, click on the house in the upper left corner of the **Poll** map, and drag to select the first two rows of the map. Record the results of this 50-home poll and calculate the absolute value of the error in the table below. Repeat for a total of three polls, using a different set of two rows in the map for each poll.

Homes polled	“Yes” votes in poll	“Yes” % in poll	Actual “Yes” % in neighborhood	Error
50				
50				
50				


When all three polls are complete, turn on **Show all votes**. Record the actual percentage of “Yes” votes and determine the error for each poll. Record the absolute value of each error in the table above.

What is the mean |error| of these three 50-home polls? _____

6. Based on your two experiments, how does increasing the number of subjects in the poll affect the accuracy of the poll’s results? _____

Why do you think this is true? _____



Activity B:	<u>Get the Gizmo ready:</u>	
Random vs. non-random sampling	<ul style="list-style-type: none"> • Turn off Show all votes. • Click New to generate a new set of votes. 	

Introduction: In the Gizmo, votes have been distributed randomly through the population. In real life, voting patterns are often nonrandom. For example, urban and rural neighborhoods may exhibit very different voting patterns.

1. In the **Neighborhood** map, you can change a household's vote by clicking on the house or by clicking and dragging to select multiple houses. Create a map in which most of the votes in the top half are "Yes" (blue) and most of the votes in the bottom half are "No" (red).

What is the total number of "Yes" votes in your neighborhood? _____

2. Click **Poll** 25 times to survey 25 randomly-selected homes in the neighborhood. Based on the poll, estimate the total number of "Yes" votes and find the |error|. Click **Reset** and repeat this poll two more times for a total of three 25-home polls. Record your results below.

Homes polled	"Yes" votes in poll	"Yes" % in poll	Actual "Yes" % in neighborhood	Error
25				
25				
25				

What is the mean |error| of these three random polls? _____

3. Click **Reset**. Suppose a pollster walked door-to-door down a single street. To model this, click on the left-most house in a row of the **Poll** map, and drag across to poll all the houses in that horizontal "street." Record your results in the table, and then repeat the experiment with two more horizontal "streets," or rows, on the map.

Homes polled	"Yes" votes in poll	"Yes" % in poll	Actual "Yes" % in neighborhood	Error
25				
25				
25				

What is the mean |error| of these three nonrandom polls? _____

4. When taking a poll, why is it important to select voters as randomly as possible? _____

