

Title: Presidential Probability

Brief Overview:

With the presidential election coming up in November, 2004, we are incorporating the scientific method of inquiry in order to have the students pose a question, answer data, and make a prediction based on current and historical data.

NCTM Content Standard/National Science Education Standard:

NCTM Data Analysis and Probability Standards for grades 3-5:

- formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them
- select and use appropriate statistical methods to analyze data
- develop and evaluate inferences and predictions that are based on data
- understand and apply basic concepts of probability

NSES Science as Inquiry for grades K-4:

- develop abilities necessary to do scientific inquiry:
 - ask a question
 - plan and conduct a simple investigation
 - gather data
 - use data to construct a reasonable explanation
 - communicate investigations and explanations

Grade/Level:

3

Duration/Length:

5 days (45 minutes each lesson)

Student Outcomes:

Students will:

- address a question and organize collected data,
- make predictions based on data,
- represent data in statistical form,
- draw a conclusion based on data
- communicate an explanation through writing a paragraph, presenting an interpretation of a graph, or drawing a Venn diagram.
- complete a post-assessment question in the form of a Brief Constructed Response

Materials and Resources:

So You Want to Be President by Judith St. George
Teacher Resource Pages ()
Student Resource Pages ()
Transparency, Chart Paper, and/or Dry Erase Board
Index Cards
Calculators
Answer Keys ()
Plastic tape (for probability line)

Development/Procedures:

Lesson 1 Beginning an Investigation

Introduction:

- Read *So You Want to Be President* by Judith St. George and link to the upcoming election in November, 2004. Let students make their own predictions about who they think the winner will be: John Kerry or George W. Bush.
- On a sheet of paper, ask students to list what characteristics would make them vote for a particular candidate. Discuss characteristics and tell students that we will use historical characteristics to predict the winner of the November election.

Preassessment :

- Give students data on index cards describing President Abraham Lincoln. The short paragraph will read like this: "Abraham Lincoln was 52 years old when he became president and was 6 feet 4 inches tall. He was born in Kentucky and had 4 children."
- Tell students that we will be looking at all of the presidents and their ages, heights, birthplaces, and number of children. Ask students if there is an easier way to view this information. Answers will vary. Guide students to organize information by categories.

Launch:

- Give students information about 7 more presidents on index cards. The cards will read like this:
 1. George Washington was 57 years old when he became president and was 6 feet 1 ½ inches tall. He was born in Virginia and had 2 children.
 2. Thomas Jefferson was 57 years old when he became president and was 6 feet 2 ½ inches tall. He was born in Virginia and had 4 children.
 3. Theodore Roosevelt was 42 years old when he became president and was 5 feet 8 inches tall. He was born in New York and had 6 children.
 4. John F. Kennedy was 43 years old when he became president and was 6 feet tall. He was born in Massachusetts and had 3 children.

5. Ronald Reagan was 69 years old when he became president and was 6 feet 1 inch tall. He was born in Illinois and had 4 children.
 6. Bill Clinton was 46 years old when he became president and was 6 feet 2 ½ inches tall. He was born in Arkansas and had 1 child.
 7. George W. Bush was 54 years old when he became president and was 5 feet 11 inches tall. He was born in Texas and had 2 children.
- Emphasize again how looking at this information is easier when put into different categories.

Teacher Facilitation:

- Present a chart on the chalkboard/overhead with the categories of president, age, birthplace, children, and height. Invite volunteers to fill out the chart and discuss how viewing the data on a chart is much easier than in paragraph form. This procedure will model the skill of organizing data. When the volunteers are finished, the chart will look like this:

President	Age	Birthplace	# of children	Height
Washington	57	Virginia	2	6' 1 1/2"
Jefferson	57	Virginia	4	6' 2 1/2"
T. Roosevelt	42	New York	6	5' 8"
Kennedy	43	Massachusetts	3	6' 0"
Reagan	69	Illinois	4	6' 1"
Clinton	46	Arkansas	1	6' 2 1/2"
GW Bush	54	Texas	2	5' 11"

- Distribute blank president worksheet (Student Resource Sheet 1) and have the students fill in the information on the chalkboard/overhead.

Student Application

- Present information about the other 35 presidents on index cards. Divide cards evenly as best you can. For example, for a class size of 25 students, put them in 5 groups, each group working on 7 presidents. Index cards will have information on the rest of the presidents in the same format as presidents Washington, Jefferson, Roosevelt, Kennedy, Reagan, Clinton, and Bush (Teacher Resource Sheet 1).
- Working in their groups, students will put their information into their charts.

Embedded Assessment

- As a class, fill out information of remaining presidents on the president worksheet. Invite volunteers to write on chalkboard/overhead while the rest of the class writes down the information on their worksheets (completed worksheet: Teacher Resource Sheet 2).

Reteaching/Extension

- For those who have not completely understood the lesson, show how information was taken from the index cards and placed into the chart. Use example of George Washington again. Check for understanding by reviewing more examples.
- For those who have understood the chart, show how asking questions such as uses the chart: How many presidents were born in Virginia? South Carolina? North Carolina? New York?
- Remind them that a way of taking counts is through the use of tallies. Put the chart on the chalkboard/overhead using the birthplace categories that were just discussed. This chart will look like this:

Birthplace of Presidents	
Virginia	
South Carolina	
North Carolina	
New York	

Lesson 2: Organizing and Displaying Data

Lesson 1-Day 1

Preassessment

- Have random symbols for Democratic, Republican, and Independent parties sitting on each desk (Teacher Resource Sheet 2.0). Teacher asks students to raise their hand if they have Democratic symbol and completes tally chart on board or overhead. Same procedure completed for Republican and Independent parties. Class count for totals in each area. Discuss which party was randomly represented the most in our classroom.

Launch

- Distribute Teacher Resource Sheet 2.1. Have students read tally results from categories 1-6.
- Facilitate discussion concerning most prominent vote in each category. Purpose of chart is to show which trait is favorable in each category. Questions to ask:
 - Are you more likely to become president if you have pets?
 - Which faith did more presidents share?
 - Does it help to have the same first name as shared by other presidents?
 - Is it in your favor if your relative was president?
 - Does it improve your chances if you were a vice president before you became president?
 - Does it help if you served in the military?
- Distribute Student Resource Sheet 2. Students use their presidential chart (Student Resource 1) completed on day # 1 to fill in tally categories 7-10. (Age, birthplace, number of children, height.)

Teacher Facilitation

- Distribute Student Resource Sheet 2. Information on Bush is completed. Students read paragraph on Kerry and place his information on the chart under Bush's information. This is similar to Day #1's activity. The purpose is to compare Bush and Kerry using favorable traits (top portion).

Student Application

- Students will continue to work in small groups. They will select 7 favorable traits from the original 10 that they believe are the most important.

Embedded Assessment

- Review results of group work. Students will have selected 7 traits and be able to total their Bush/Kerry advantage columns.
- Students will complete the bottom portion of Student Resource Sheet 2.

Lesson 2 – Day 2

Launch

- Review Bush/Kerry chart from previous day. Discuss ways that they are similar and ways that they are different. For example, Bush had a relative that was president while Kerry did not.

Teacher Facilitation

- Students will be able to take information from tally chart and answer questions on Student Resource 4. Working in small groups, students take each tally category and decide which grouping more presidents share. (Categories # 1 and # 2 are finished for the students.)
- Observations and sharing with the full class will be made concerning each category. Students will also compare their information on Bush and Kerry to these categories.
- Encourage students to use categories to compare data. Move among the groups to make sure that each Resource Sheet is completed correctly. Allow students to use calculators to check totals.

Student Application

- Take results for 7 favorable traits (Student Resource Sheet 2).
- Create a Double Line Plot on Bush and Kerry within groups. To model skill of creating a Double Line Plot, teacher will take group 1's results and put results on Line Plot on chalkboard/overhead (Student Resource Sheet 5).
- Each group will be assigned a color (red, yellow, green, blue) and will complete their own Double Line Plot.
- Complete a class Double Line Plot on the chalkboard/overhead based on student information using different colors.

Embedded Assessment

- Generate a conclusion based on class line plot as to which candidate is most likely to win the 2004 election: group discussion.

Reteaching/Extension

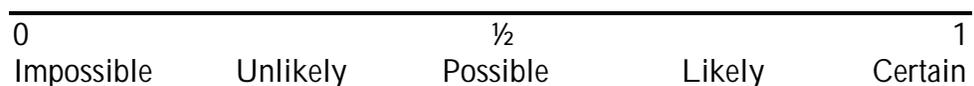
- Have students write a short essay on whether or not these tally categories are characteristics needed to be president. Are these the qualities which best suit a person for the office of president? Do you think other qualities matter more? If so, what qualities do you think are important for a person to become president?

Lesson 3 Drawing a Conclusion

Preassessment/Launch (10 minutes)- To assess what the students know about drawing a conclusion based on data and communicating their explanation, the teacher will facilitate the construction of a "human" line plot showing the probability of each candidate's likelihood to be elected president.

- Cut apart and distribute the pieces of the Data Range sheet (SRS 7) to five students who will stand as the points on the probability number line plot. One student will hold the place "0", which will stand for likelihood "Impossible"; one student will hold the place "1", which will stand for likelihood "Certain"; and one student will hold the place "1/2", which will stand for "Possible". Two additional students will stand in between data points and hold the place for "Likely" and "Unlikely" outcomes. (You may want to choose students for these positions who are uncomfortable giving answers in class so they may participate in a role they are comfortable holding.)

The human probability number line plot should resemble this:



- Distribute Presidential Data sheet (SRS 8) to remaining students or display it as an overhead transparency to the entire class (depending on availability of classroom resources). Ask the students to examine the data for a minute and instruct the students to tally the totals (see Presidential Data Answer Sheet, TRS 6). After a minute, ask several questions:

-“How is this data organized?” or “What kind of chart is displayed?”
 Prompt the student response, “a *tally chart*”.

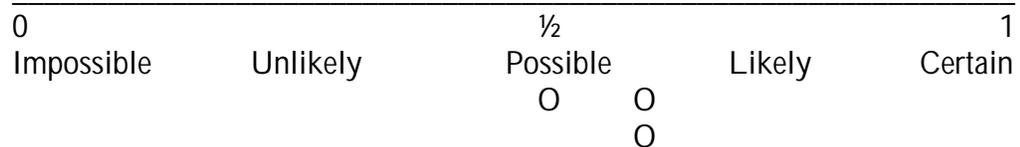
-“What information does this chart display?” Prompt the response,
 “Number of Presidents Who Have Served a Previous Term in the Office of President”.

Distribute Candidate Cards (SRS 9) to remaining students and ask them to evaluate where their candidate would fall on the human probability line plot based on whether they have served a previous term in the office of president. Review the data range (from 0-1) and the values in between data points (unlikely-likely). Select students individually to stand in the place they determine appropriate for their candidate, forming a double line plot (One line for each candidate, lining up additional students perpendicular to the number line.)

The students should begin to position themselves like this:

George W. Bush Candidate Card Holders

X
 X
 X X



John Kerry Candidate Card Holders

- Ask several questions:

-“How is this data organized now?” Prompt the response, “a *line plot*”, or “a double *line plot*”.

-“What *information* does this graph display?” Prompt the response indicating, “*probability* (or *likelihood*) of being elected president”.

-“What is our *data range*?” Await the response, “0-1” or “*impossible to certain*”.

-“How many *values* of data did we display?” Await the response, “2 (the total number of candidates)”.

-“How many *pieces* of data did we display?” Count the number of students with Candidate Cards standing and determine this number with the class.

-“Based on our human line plot, which candidate looks *more likely* to be elected president?” Correct any misunderstandings and listen to responses to determine students’ understanding of drawing a conclusion based on data results.

- Tape the Data Analysis Vocabulary Cards (SRS 10) to the chalkboard or other visible surface. Tell the students that these are the words they will use as they write an explanation to their conclusion.

Teacher Facilitation (5-10 minutes)- Using a paragraph template (SRS 11), and overhead transparency copy, guide the students to compose a scientific conclusion using evidence to support the answer to the previous question (from the Launch): “Based on our data and our line plot, which candidate is *more likely* to be elected president?” Call on students to select words from the Data Analysis Vocabulary Cards to assist in completion of their scientific paragraph. Use Scientific Conclusion Answer Sheet (TRS 7) as a guide.

Student Application (20 minutes)- Present three options to the students to compose a scientific explanation to the question: “Based on our class *line plot* comparing all of our presidential data (*Bush/Kerry Double Line Plot* from Lesson 2), which candidate is *more likely* to be elected president?”

- Option 1: The students will use the same paragraph template from Teacher Facilitation (SRS 11) and Data Analysis Vocabulary to compose a scientific conclusion, using evidence to support the answer to the question. Use Scientific Conclusion Answer Sheet (SRS 13) as a guide for scoring.
- Option 2: The students will use a Venn Diagram (SRS 14) to organize and display the data collected about both candidates. Students will place the name of each category under the candidate who has the advantage based on that category (e.g., birthplace). For categories where both candidates have an equal advantage, the students will place the category in the overlapping area of the diagram. Introduce this option using an overhead transparency and model placement for several pieces of information.
- Option 3: The students will make a presentation to communicate their conclusion. The students will display his or her class line plot onto poster-sized paper to use in presentation. The students will also have a copy of the Data Analysis Vocabulary Cards that they will use to make sure they include all of

these words in their presentation. Use Constructed Response/Presentation Scoring Rubric (TRS 9) to score.

Embedded Assessment- Post-assess the student's understanding of drawing a conclusion based on data and communicating a scientific explanation from the student's performance on one of the three options above. Use Constructed Response/Presentation Scoring Rubric (TRS 9) to score.

Reteaching/Extension- Review the steps of the scientific inquiry process that were used in answering the original question: "Who is more likely to be elected president: George W. Bush or John Kerry?" Using Scientific Inquiry Sheet (RS 3.11), an overhead transparency copy, and Scientific Inquiry Vocabulary Cards (RS 3.12), students will use science vocabulary to see how the scientific method of inquiry can be used to investigate and research the answer any question, whether in science or politics. The students will come up with a new question to ask and list these new questions at the top of her overhead. If further extension is desired, the teacher may assign some of these questions to groups to conduct a new investigation.

Summative Assessment:

Post-assess the students' understanding of data analysis, probability, and scientific inquiry from their performance on options 1, 2, or 3 from the final lesson. (Option 1: scientific conclusion; option 2: Venn diagram; option 3: oral presentation.) Review the Constructed Response/Presentation Scoring Rubric (TRS 9) with the students so they know what to include in their answer.

Resources Used:

St. George, Judith and David Small, *So You Want to be President*, 2000, Philomel Books, New York.

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Teacher Resource Sheet 1

1. George Washington was 57 years old when he became president and was 6 feet 1 ½ inches tall. He was born in Virginia and had 2 children.
2. Thomas Jefferson was 57 years old when he became president and was 6 feet 2 ½ inches tall. He was born in Virginia and had 4 children.
3. Theodore Roosevelt was 42 years old when he became president and was 5 feet 8 inches tall. He was born in New York and had 6 children.
4. John F. Kennedy was 43 years old when he became president and was 6 feet tall. He was born in Massachusetts and had 3 children.
5. Ronald Reagan was 69 years old when he became president and was 6 feet 1 inch tall. He was born in Illinois and had 4 children.
6. Bill Clinton was 46 years old when he became president and was 6 feet 2 ½ inches tall. He was born in Arkansas and had 1 child.
7. George W. Bush was 54 years old when he became president and was 5 feet 11 inches tall. He was born in Texas and had 2 children.
8. Abraham Lincoln was 52 years old when he became president and was 6 feet 4 inches tall. He was born in Kentucky and had 4 children.”
9. John Adams was 61 years old when he became president and was 5 feet 7 inches tall. He was born in Massachusetts and had 5 children.
10. James Monroe was 58 years old when he became president and was 6 feet tall. He was born in Virginia and had 2 children.
11. James Madison was 57 years old when he became president and was 5 feet 4 inches tall. He was born in Virginia and had no children.

12. John Quincy Adams was 57 years old when he became president and was 5 feet 7 inches tall. He was born in Massachusetts and had 4 children.
13. Andrew Jackson was 61 years old when he became president and was 6 feet tall. He was born in South Carolina and had no children.
14. Martin Van Buren was 54 years old when he became president and was 5 feet 6 inches tall. He was born in New York and had 4 children.
15. William H. Harrison was 68 years old when he became president and was 5 feet 8 inches tall. He was born in Virginia and had 10 children.
16. John Tyler was 51 years old when he became president and was 6 feet tall. He was born in Virginia and had 15 children.
17. James Polk was 49 years old when he became president and was 5 feet 8 inches tall. He was born in North Carolina and had no children.
18. Zachary Taylor was 64 years old when he became president and was 5 feet 8 inches tall. He was born in Virginia and had 6 children.
19. Millard Fillmore was 60 years old when he became president and was 5 feet 9 inches tall. He was born in New York and had 2 children.
20. Franklin Pierce was 48 years old when he became president and was 5 feet 10 inches tall. He was born in New Hampshire and had 3 children.
21. James Buchanan was 65 years old when he became president and was 6 feet tall. He was born in Pennsylvania and had no children.
22. Andrew Johnson was 56 years old when he became president and was 5 feet 10 inches tall. He was born in North Carolina and had 5 children.

23. Ulysses Grant was 46 when he became president and was 5 feet 8 inches tall. He was born in Ohio and had 4 children.
24. Rutherford Hayes was 54 years old when he became president and was 5 feet 8 ½ inches tall. He was born in Ohio and had 8 children.
25. James Garfield was 49 years old when he became president and was 6 feet tall. He was born in Ohio and had 7 children.
26. Chester Arthur was 50 years old when he became president and was 6 feet 2 inches tall. He was born in Vermont and had 3 children.
27. Grover Cleveland was 47 when he became president and was 5 feet 11 inches tall. He was born in New Jersey and had 5 children.
28. Ben Harrison was 55 when he became president and was 5 feet 6 inches tall. He was born in Ohio and had 3 children.
29. Grover Cleveland was 55 when he became president and was 5 feet 6 inches tall. He was born in Ohio and had 3 children.
30. William McKinley was 54 years old when he became president and was 5 feet 7 inches tall. He was born in Ohio and had 2 children.
31. William Taft was 51 years old when he became president and was 6 feet tall. He was born in Ohio and had 3 children.
32. Woodrow Wilson was 56 years old when he became president and was 5 feet 11 inches tall. He was born in Virginia and had 3 children.
33. Warren Harding was 55 when he became president and was 6 feet tall. He was born in Ohio and had no children.

34. Calvin Coolidge was 51 when he became president and was 5 feet 10 inches tall.

He was born in Vermont and had 2 children.

35. Herbert Hoover was 54 when he became president and was 5 feet 11 inches tall.

He was born in Iowa and had 2 children.

36. Franklin D. Roosevelt was 51 when he became president and was 6 feet 2 inches tall. He was born in New York and had 6 children.

37. Harry S. Truman was 60 years old when he became president and was 5 feet 9 inches tall. He was born in Montana and had 1 child.

38. Dwight Eisenhower was 62 years old when he became president and was 5 feet 10 inches tall. He was born in Texas and had 2 children.

39. Lyndon Johnson was 55 years old when he became president and was 6 feet 3 inches tall. He was born in Texas and had 2 children.

40. Richard Nixon was 56 years old when he became president and was 5 feet 11 inches tall. He was born in California and had 2 children.

41. Gerald Ford was 61 years old when he became president and was 6 feet tall. He was born in Nebraska and had 4 children.

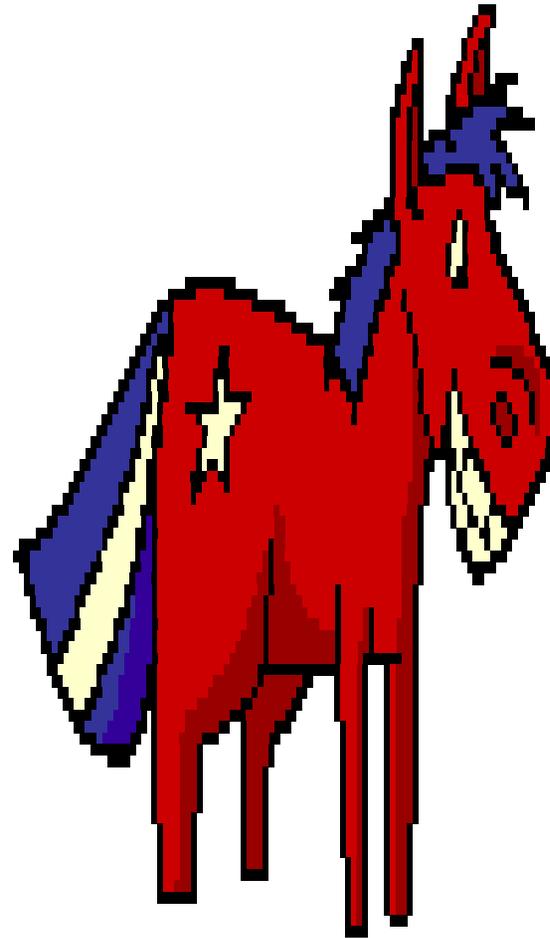
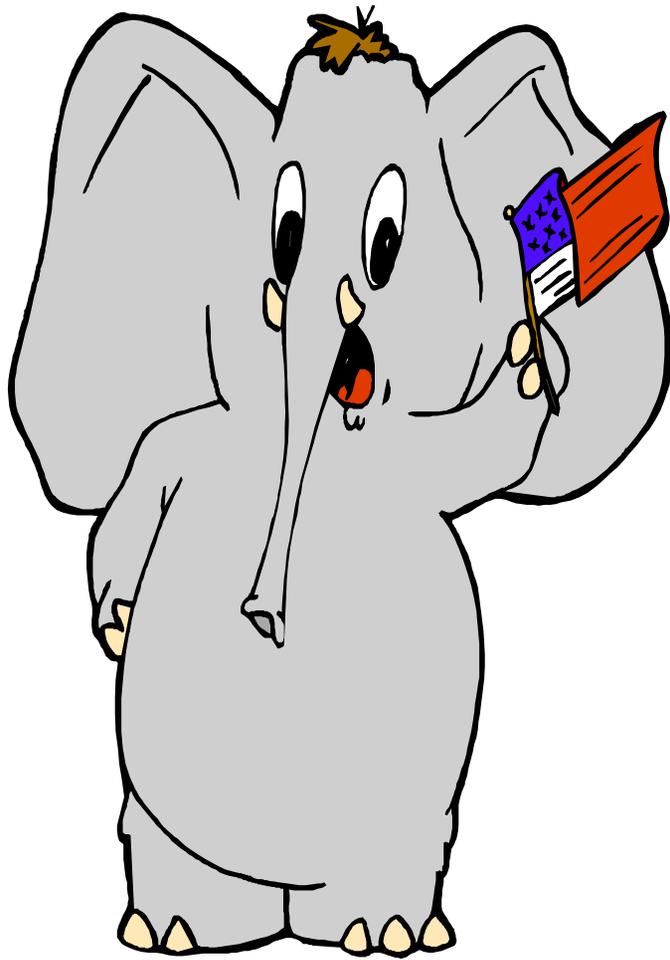
42. Jimmy Carter was 52 years old when he became president and was 5 feet 9 inches tall. He was born in Georgia and had 4 children.

43. George H. Bush was 64 when he became president and was 6 feet 2 inches tall.

He was born in Massachusetts and had 6 children.

Teacher Resource Sheet 2

President	Age	Birthplace	# of children	Height
Washington	57	Virginia	2	6' 1 1/2"
J. Adams	61	Massachusetts	5	5' 7"
Jefferson	57	Virginia	4	6' 2 1/2"
Madison	57	Virginia	0	5' 4"
Monroe	58	Virginia	2	6' 0"
J.Q. Adams	57	Massachusetts	4	5' 7"
Jackson	61	South Carolina	0	6' 0"
Van Buren	54	New York	4	5' 6"
W.H. Harrison	68	Virginia	10	5' 8"
Tyler	51	Virginia	15	6' 0"
Polk	49	North Carolina	0	5' 8"
Taylor	64	Virginia	6	5' 8"
Fillmore	50	New York	2	5' 9"
Pierce	48	New Hampshire	3	5' 10"
Buchanan	65	Pennsylvania	0	6' 0"
Lincoln	52	Kentucky	4	6' 4"
A. Johnson	56	North Carolina	5	5' 10"
Grant	46	Ohio	4	5' 8"
Hayes	54	Ohio	8	5' 8 1/2"
Garfield	49	Ohio	7	6' 0"
Arthur	50	Vermont	3	6' 2"
Cleveland	47	New Jersey	5	5' 11"
B. Harrison	55	Ohio	3	5' 6"
Cleveland	55	New Jersey	5	5' 11"
McKinley	54	Ohio	2	5' 7"
T. Roosevelt	42	New York	6	5' 8"
Taft	51	Ohio	3	6' 0"
Wilson	56	Virginia	3	5' 11"
Harding	55	Ohio	0	6' 0"
Coolidge	51	Vermont	2	5' 10"
Hoover	54	Iowa	2	5' 11"
FD Roosevelt	51	New York	6	6' 2"
Truman	60	Montana	1	5' 9"
Eisenhower	62	Texas	2	5' 10"
Kennedy	43	Massachusetts	3	6' 0"
LB Johnson	55	Texas	2	6' 3"
Nixon	56	California	2	5' 11"
Ford	61	Nebraska	4	6' 0"
Carter	52	Georgia	4	5' 9"
Reagan	69	Illinois	4	6' 1"
GHW Bush	64	Massachusetts	6	6' 2"
Clinton	46	Arkansas	1	6' 2 1/2"
GW Bush	54	Texas	2	5' 11"



Student Resource Sheet 2

Pets	Yes	/ / / / / / /
	No	
Religion	Protestant	/ / / / / / /
	Catholic	
	Other	
First Name	Name of president 2 or more times	/ / /
	Less than 2 times	/
Relative was president	Yes	
	No	/ / / / / / /
Was Vice President	Yes	/
	No	/ / / /
Military Service	Yes	/ / / / /
	No	/



Student Resource Sheet 2

Directions: Use your Presidential Chart to complete Tally Categories # 7-10.

7. **Age When Inaugurated** **Tallies**

55 and under	
Over 55	

8. **Birthplace** **Tallies**

Eastern Region	
Midwest	
Western Region	

9. **Number of Children** **Tallies**

0 -1	
2 -4	
5 or more	

10. **Height** **Tallies**

Under 6 Feet	
6 Feet and Over	

Directions: Read the paragraph on Kerry. Take the information in the paragraph and place it in the correct category on the chart.

John Kerry

John Kerry is running for President in the 2004 election. He was born in Colorado in Dec. 1943. Kerry is 6feet 4 inches tall and has five children. He served in the United States Navy but he was never Vice president. Kerry is Catholic and he never had a relative who was president. He does have a pet.

	Pets	Religion	First Name	Relative Was President	V.P. Before President	Military Service	Age at Inaug.	Birthplace	# of Children	Ht.
Bush	Yes	Protestant	George	Yes	No	Yes	58	Texas	2	5'11"
Kerry										

Directions:

As a group, select 7 favorable categories that you think are important to be president from the chart. List those categories on the lines below. Then put a check under Bush or Kerry if they have an advantage in that category. Total your Bush and Kerry advantages.

	Bush	Kerry
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____
5. _____	_____	_____
6. _____	_____	_____
7. _____	_____	_____

Total _____ _____

Directions: Record your group information on the double line plot. You are marking with an X the number of advantages each candidate has.

**DOUBLE LINE PLOT ON FAVORABLE PRESIDENTIAL
CHARACTERISTICS FOR BUSH AND KERRY**

K
E
R
R
Y



B
U
S
H

0 = Impossible

Unlikely

$\frac{1}{2}$ = Possible

Likely

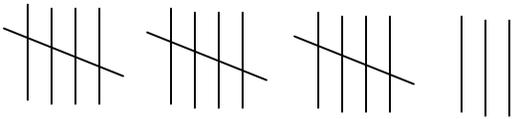
1 = Certain



Presidential Data:

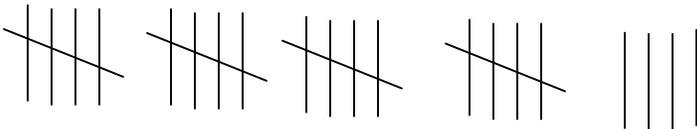
Name _____

Number of Presidents Elected Who Served a Previous Term in the Office of President:



Total: _____

Number of Presidents Elected Who Had NOT Served a Previous Term in the Office of President:



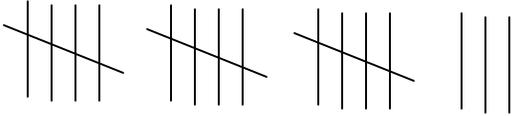
Total: _____



Presidential Data:

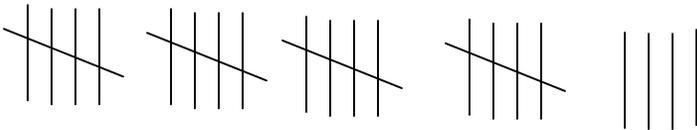
Name _____

Number of Presidents Elected Who Served a Previous Term in the Office of President:



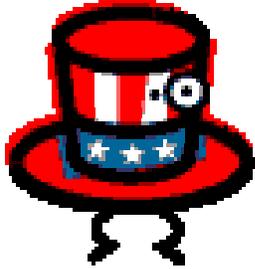
Total: 18

Number of Presidents Elected Who Had NOT Served a Previous Term in the Office of President:

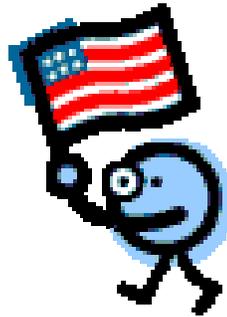


Total: 24

Candidate Cards



George W. Bush



**John
Kerry**

Name _____

Data Analysis Vocabulary Cards

For a STRONG conclusion = use LOTS of these words!

tally chart	line plot
information	probability
likelihood	data range
value	data pieces
more likely	less likely
impossible	certain
data	possible

Writing a Scientific Conclusion

Paragraph Template: Student Resource Sheet 11

_____ Name _____
(Title)

The *question* we investigated was: _____
(Restate the question)

_____.

We used a _____ to display our data.
(Type of chart/graph)

The type of *information* displayed was _____.
(Type of information)

Our *data range* was _____.
(Values of data)

We had _____ *categories* of data: _____.
(Number) (Name of categories)

The *shape* of our data is _____.
(Describe position/patterns in data)

From this we can *infer* _____.
(Draw a conclusion)

Therefore, our *evidence* supports our *conclusion* that _____

(Restate the answer to your original question)

Writing a Scientific Conclusion (page 2)

Include any *charts*, *graphs*, or *evidence* below:

Paragraph Template: Student Resource Sheet 11

Writing a Scientific Conclusion

Paragraph Template

Answer Sheet: Teacher Resource Sheet 7

Bush/Kerry Presidential Advantages
(Title)

Name _____

The **question** we investigated was: Based on whether they have served a previous term in the office of president, which candidate, George W. Bush or John Kerry, is more likely to be elected president?
(Restate the question) _____.

We used a tally chart and human line plot to display our data.
(Type of chart/graph)

The type of **information** displayed was probability of being elected president.
(Type of information)

Our **data range** was from 0 to 1 (Impossible to Certain).
(Values of data)

We had 2 **categories** of data: George W. Bush and John Kerry.
(Number) (Name of categories)

The **shape** of our data is clustered at numbers/points (answers will vary).
(Describe position/patterns in data)

From this we can **infer** (George W. Bush or John Kerry) is more likely to be elected.
(Draw a conclusion)

Therefore, our **evidence** supports our **conclusion** that based on whether they have served a previous term in the office of president, (George W. Bush or John Kerry) is more likely to be elected.
(Restate the answer to your original question)

Writing a Scientific Conclusion (page 2)

Paragraph Template Answer Sheet: Student Resource Sheet 12

Include any *charts, graphs, or evidence* below:

Construction of human probability line plot:

Class results will vary depending on where students have positioned themselves with their Candidate Cards.

Mark X= George Bush

Mark O= John Kerry

0		$\frac{1}{2}$		1
Impossible	Unlikely	Possible	Likely	Certain

Writing a Scientific Conclusion

Paragraph Template

Answer Sheet: Teacher Resource Sheet 8

Bush/Kerry Presidential Advantages
(Title)

Name _____

The **question** we investigated was: Based on our class *line plot* comparing all of our presidential data, which candidate, George W. Bush or John Kerry, is more likely to be elected president?
(Restate the question)

We used a *tally chart* and (double) *line plot* to display our data.
(Type of chart/graph)

The type of **information** displayed was the total number of advantages for each candidate.
(Type of information)

Our **data range** was from 0 to 7 (total possible number of advantages).
(Values of data)

We had 2 **categories** of data: George W. Bush and John Kerry.
(Number) (Name of categories)

The **shape** of our data is clustered at numbers/points (answers will vary).
(Describe position/patterns in data)

From this we can **infer** (George W. Bush or John Kerry) is more likely to be elected.
(Draw a conclusion)

Therefore, our *evidence* supports our *conclusion* that ___ based on our class *line plot* comparing all of our presidential data, (George W. Bush or John Kerry) is more likely to be elected.

(Restate the answer to your original question)

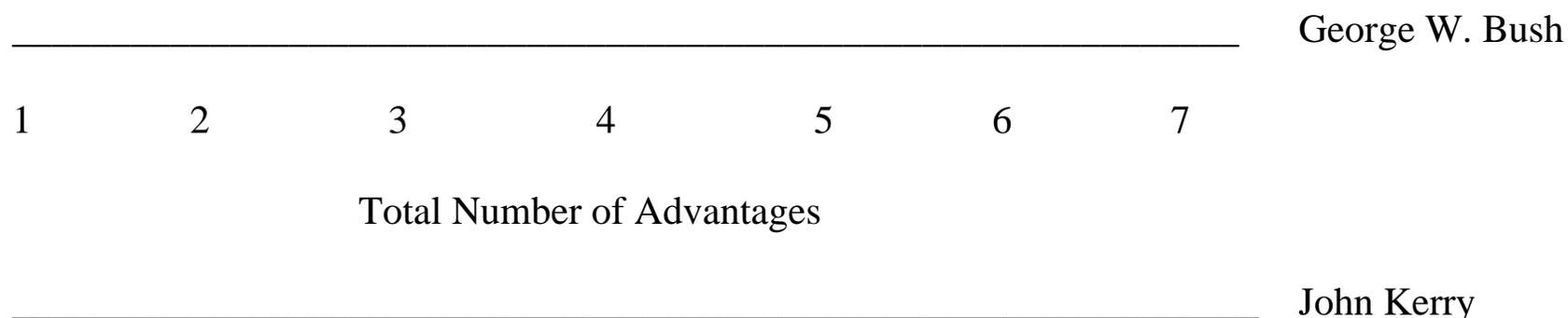
Writing a Scientific Conclusion (page 2)

Paragraph Template Answer Sheet: Student Resource Sheet 13

Include any *charts, graphs, or evidence* below:

Construction of class double line plot:

Class results will vary depending on which categories each group has selected.



Name _____

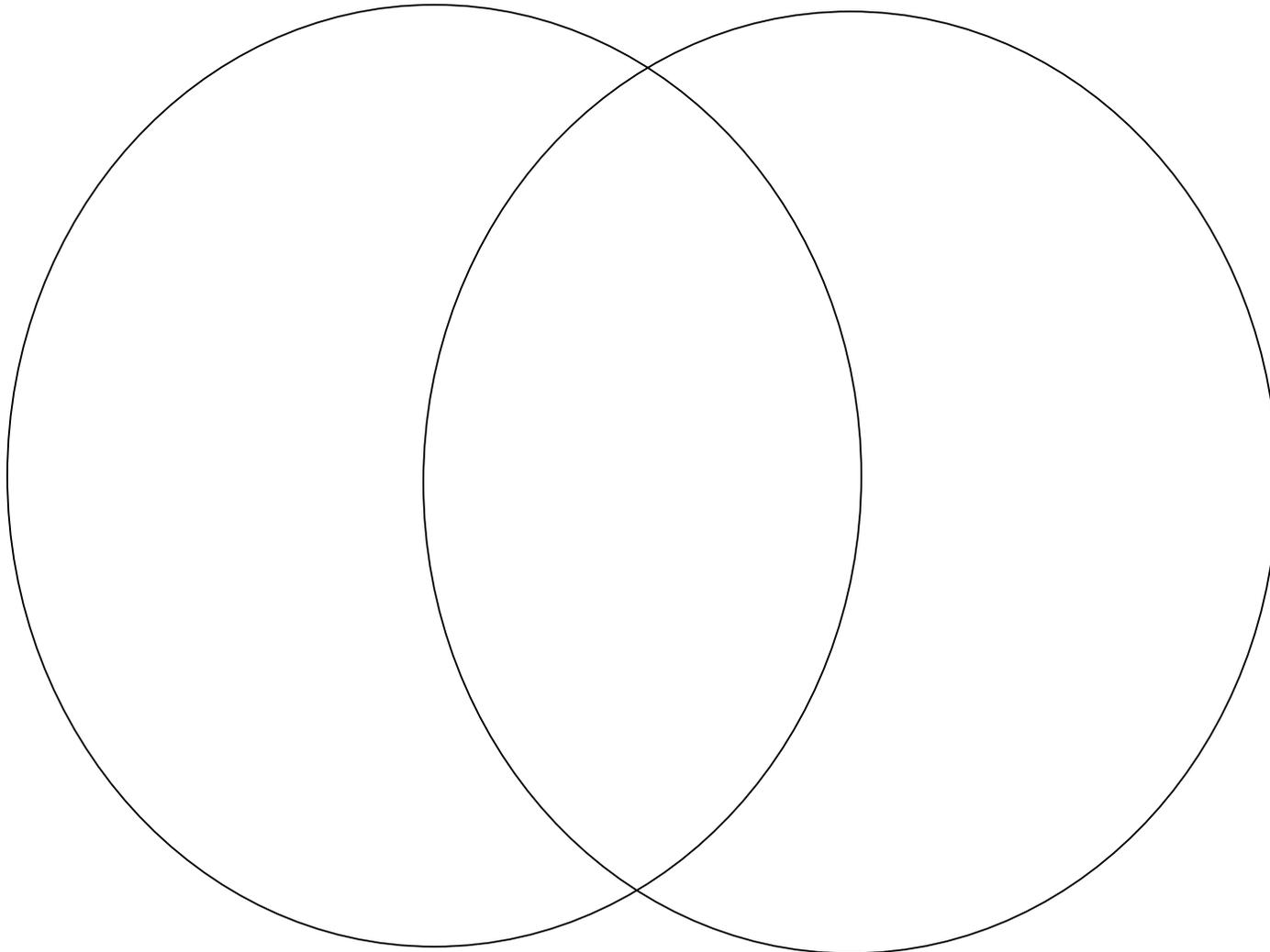
Venn Diagram

Write the name of each category that gives each candidate an advantage. Write the categories that give an equal advantage to both candidates in the middle.

**George W. Bush
Advantage**

**Equal
Advantage**

**John Kerry
Advantage**



Constructed Response/Presentation Scoring Rubric

Score	Qualities of Performance
2	<p>My answer shows I answered the question and used evidence to explain my conclusion:</p> <ul style="list-style-type: none"> • I used a chart or graph to display and/or organize my data CORRECTLY. • I used <i>at least 7</i> Data Analysis Vocabulary words to explain my investigation. • I used numbers, words, and/or pictures in my explanation.
1	<p>My answer shows I answered the question and used some reasoning to explain my conclusion:</p> <ul style="list-style-type: none"> • I used a chart or graph to display and/or organize my data (may be PARTIALLY correct). • I used <i>some</i> Data Analysis Vocabulary words to explain my investigation. • I used numbers, words, and/or pictures in my explanation (may be PARTIALLY correct).
0	<p>My answer shows I didn't understand the question or how to explain a conclusion:</p> <ul style="list-style-type: none"> • I wasn't able to use a chart or graph to display and/or organize my data (may be incorrect). <ul style="list-style-type: none"> • I wasn't able to use any Data Analysis Vocabulary words to explain my investigation. • I used numbers, word, and/or pictures in my explanation incorrectly.

Name _____

Scientific Inquiry
Vocabulary Cards

inquire	research
collect	organize
data	evaluate
compare	conclusion
evidence	investigate
significant	

Name _____

Summative

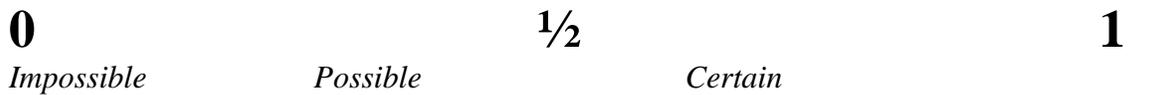
Assessment:

Student Resource Sheet 16

Brief Constructed Response

Making Predictions Based on Probability

Part A Using the line plot constructed using class data on the 42 presidents, locate a position for each presidential candidate on the probability number line.



Part B Use what you know about **probability** to explain why your answer is correct. Use words, numbers, and/or pictures in your explanation.
