interact®
Learn Through Experience

Downloadable Reproducible eBooks

Thank you for purchasing this eBook from
www.socialstudies.com or www.teachinteract.com

To browse more eBook titles, visit
http://www.teachinteract.com/ebooks.html

To learn more about eBooks, visit our help page at
http://www.teachinteract.com/ebookshelp.html

For questions, please e-mail access@teachinteract.com

Free E-mail Newsletter–Sign up Today!

To learn about new and notable titles, professional development resources, and catalogs in the mail, sign up for our monthly e-mail newsletter at http://www.teachinteract.com/

POLLS

Conducting and Analyzing a Scientific Poll

DARYL J. MAREK has taught both within the United States and in schools in Korea and Germany. He holds a Masters degree in gifted education and has experience both teaching and being a program coordinator of gifted programs. He has written many curriculum study units for several grade levels. He currently teaches gifted classes in Fort Worth, Texas.

10200 Jefferson Boulevard
Culver city, CA 90232
(800) 359-0961 • www.teachinteract.com
ISBN# 978-1-57336-379-2

Project Editor: Fran Lyons Sammons
Layout Editor: Sharon Keenan
Graphics Editor: Steve Roberts
Managing Editor: Stacy Yount

The nationwide movement for high standards has not only determined what students should learn, but also has mandated that students demonstrate what they know. POLLS is a standards-based program addressing National Mathematics, Language Arts, and Social Studies Standards. POLLS provides many opportunities for performance assessments when students apply their math skills and creativity in a true-to-life situation—designing, conducting, and analyzing a poll. The cooperation, peer-teaching, and group decision-making required throughout POLLS address Applied Learning Standards.

National Standards for School Mathematics

Data Analysis and Probability Standard

- 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.

Number and Operations Standard

- Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
- Compute fluently and make reasonable estimates.

Communication Standard

- Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.

Representation Standard

- Use representations to model and interpret physical, social, and mathematical phenomena.

NCTE Standards for the English Language Arts

Standard 4: Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate with different audiences for a variety of purposes.

Standard 5: Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.

Standard 6: Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language, and genre to create, critique, and discuss print and non-print texts.

Standard 7: Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g. print and non-print texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.

Standard 12: Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information).

NCSS Curriculum Standards for Social Studies

Strand 10: Civic Ideals & Practices

The learner can:

- Practice forms of civic discussion and participation consistent with the ideals of citizens in a democratic republic
- Explain and analyze various forms of citizen action that influence public policy decisions
- Analyze the influence of diverse forms of public opinion on the development of public policy and decision-making

California Applied Learning Standards

Standard 2. Students will understand how to solve problems through planning and organization. Students will plan an activity.

Standard 3. Students will understand how to solve problems through teaching and learning. Students will develop and implement a teaching-learning program.

Standard 6. Students will understand how to apply communication skills and techniques. Students will demonstrate ability to communicate orally and in writing.

Standard 8. Students will understand the importance of teamwork. Students will work on teams to achieve project objectives.

Standard 9. Students will understand personal skill development and its impact on their employability and success. Students will exhibit self-confidence, honesty, perseverance, self-discipline, and personal hygiene.

TABLE OF CONTENTS

CONTENTS

TABLE OF CONTENTS

CONTENTS

The quest for knowledge is an ongoing process and doing research is a method of gaining information. An important tool of research is conducting a poll, also called a survey.

In POLLS students will conduct a scientific opinion poll. They will first learn about polls, then develop a questionnaire, conduct their poll, compute the results, and analyze their findings. When finished, students will present these findings in a variety of ways.

POLLS is easy to use, encompasses many different thinking skills, and is standards-based. It is flexible since it can be used as an individual student contract, a small group project, or a whole class activity. It can be integrated within several subject areas and can be used by students and teachers in grades four through twelve. The class can complete this unit within several class periods, or it can be expanded to cover a longer period of time. The Teacher Guide and Student Guide provide activities and instructions, plus other useful information.

Through their work in POLLS your students will understand and experience the following:

Knowledge

- Learn about polls and surveys
- Learn the vocabulary of polls and polling

Skills

- Assume the roles of pollster and researcher
- Develop valid questions for a poll
- Conduct a poll
- Tally the results of a poll and convert raw data into percentages
- Analyze and form conclusions from polling results
- Share polling results in several different ways
- Read and interpret results of polls conducted by others
- Recognize bias

Attitudes

- Appreciate the opportunity to engage in genuine research
- Appreciate that the results of a poll can serve as a springboard for further action or activities
- Appreciate the importance of creating a clear list of questions
- Appreciate that poll results can be biased
- Appreciate the value of polling in a democratic society

PURPOSE

OVERVIEW

POLLS is organized into three phases. First students learn about polls and polling, then they design and conduct a poll, and finally they analyze their polling results and share what they have learned.

Phase One — Learning about Polls
Students learn what a poll is and the basic vocabulary of polling. They will choose a topic to investigate and a population to poll. FIRST POLL, the first activity, allows students to participate in a poll. It also determines the students' prior knowledge of polls. (Recognizing students' prior knowledge helps teachers know which areas to emphasize during the simulation. Re-administering this poll at the end of the unit provides an assessment of the class' overall progress.)

Phase Two — Designing and Conducting a Poll
Students learn the purpose of random sampling and strategies to create a poll without bias. In teams students learn how to write clear polling questions so that the poll provides the information they need. They will also learn how poorly worded questions invalidate polling results because of confusion or bias. The students conduct their poll using good polling techniques. They carefully and fairly record the results of the poll.

Phase Three — Analyzing and Presenting Poll Results
Students convert the raw data from their poll to percentages in order to analyze and interpret the results of their poll. They learn how to present these results in a variety of ways including charts and graphs. Students share with their classmates their polls, polling results, and analysis of these results.

Optional Activities
There are many optional activities that students may pursue at the end of Phase Three. They may participate in a culminating event (*The Results Are In*) and present their results before invited guests. Students can retake FIRST POLL and using their analysis skills determine how much the class has learned since taking the poll on Day 1. The students can also learn about mode, median, and mean, and how these are used in polling. Depending on your classroom situation, students may take additional action based on the results of their poll, including writing letters or making a presentation to an interested party such as the school board/committee or town council.

Differentiated Instruction
Like all Interact units, POLLS provides differentiated instruction through its various learning opportunities. Students learn and experience the knowledge, skills, and attitudes through all domains of language (reading, writing, speaking, and listening). Adjust the level of difficulty to best fit the needs of your students. Assist special needs students in selecting activities that utilize their strengths and allow them to succeed. Work together with the Resource Specialist teacher, Gifted and Talented teacher, or other specialist to coordinate instruction.

1. **Before You Begin**
   Read this entire Teacher Guide and the Student Guide. Decide how you will use POLLS in your classroom and curriculum. (See **Setup Directions #8, Using POLLS within Your Curriculum** on page 6 for ideas.) Please feel free to modify the procedures outlined for POLLS any way you wish to best fit your teaching preferences and your students' needs.

2. **Using the Teacher Guide**
   Throughout the Teacher Guide Interact employs certain editorial conventions to identify materials.
   a. In preparing materials, *class set* means *one per student.*
   b. One *Day* on the Unit Time Chart is the length of a normal *class period*—45 minutes to one hour.
   c. All transparency masters and student handouts are listed by name using ALL CAPITAL LETTERS.
   d. Teacher reference pages are named in **Bold**.
   e. Student-created materials appear in plain text, beginning with capital letters (e.g., the Class Polling Protocol).
   f. Special events appear in *Italics* (e.g., *The Results are In*).
   g. POLLS activities often switch between team and whole class activities. We have placed a *Team* or *Whole Class* activity icon in the margin of the Daily Directions to provide a quick visual clue for you to direct your students.

3. **Using the Student Guide**
   The Student Guide introduces students to the simulation. It includes step-by-step instructions on how to create and conduct a successful poll and how to analyze poll results. It also includes sample graphs and a polling vocabulary.

4. **Planning your Schedule**
   a. Study the **Unit Time Chart** (pages 14 and 15). The daily lesson plans describe 14+ days of lessons. This is only a recommendation. Adjust the timeline to accommodate your own teaching objectives and the needs and capabilities of your students.
   b. Give the class a general time frame or specific deadlines for when the steps should be completed.
      - The teacher acts as a guide while the students progress through the steps.
      - The teacher checks for proper completion of each step and is free to expand upon any item or area as needed.

14+ days

Although the Unit Time Chart suggests a schedule, the pacing of each step is the teacher's decision.

c. If your students are familiar with graphing and changing data into percentages, you can abbreviate these lessons to shorten the lesson plans.
d. Look at **Setup Directions #14, Optional Activities** on page 9 for ideas to extend the time.

5. **Organizational Options for Middle School**
   a. POLLS is designed for students working in teams that are part of a whole-class project.
   b. If you feel that you can handle two polls at once, divide your class in half by lot, by interest, or by assignment and run the lessons for two separate polls.
   c. If you want or need to conduct multiple polls, consider running them one after another rather than at the same time. As an alternative, consider choosing populations outside the school setting to avoid disrupting other classes.

The teaching directions are designed for one whole-class poll.

Generally speaking, you should not consider running more than two polls in a middle school classroom at one time. The logistics of tracking more than two polls can be daunting. Also the interruptions and disruptions they will cause in other classes is probably unacceptable.

6. **Organizational Options for High School or Gifted Pull-Out Programs**
   You may run POLLS as an activity designed for individuals working alone, for a small group of students working as teams, or as a whole-class project.
   a. Older students and/or students requiring less guidance may design polls to conduct outside the school community. **Note**: If you plan to have your students conduct a poll away from school, be sure to check with school authorities as to what procedures and safeguards the students should follow.
   b. Generally older students can learn the vocabulary and follow the instructions in the Student Guide independently.
      - Distribute HOW TO TEACH AND LEARN VOCABULARY so that students can think about the best way to teach themselves vocabulary.
      - Give clear and specific deadlines and touch base with each team on a regular basis.
   c. If the disruption to other classes is minimal, multiple polls can work.
   d. Another option is to create a single poll, but to survey very different populations (such as the home community vs. a neighboring community; partner schools in different towns or states; school age vs. old age populations, etc.)

Collecting answers to the same questions from different populations of respondents provides a wonderful opportunity for analysis.

7. **Grouping Students**
   Arrange your class into heterogeneous teams of six students. These teams work independently on different parts of the design of the poll, and then share their work with the whole class.
   a. There are three named roles: Leader, Recorder, and Peer-teacher.
      - Each role has a primary responsibility for the day, but all members of the team must help one another to get the jobs done successfully and on time.
      - The role of Peer-teacher may not be appropriate for older students who can assume the responsibility of learning vocabulary on their own.
      - When not filling a named role, a student becomes a Member of the team.
   b. The roles rotate daily, at the beginning of each class. After establishing teams on Day 1, make a daily chart like the sample below.

Sample Schedule
Six-student team for six days. Repeat.

Student	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Joe	L	R	P	M	M	M
Meg	M	L	R	P	M	M
Sam	M	M	L	R	P	M
Sue	M	M	M	L	R	P
Tom	P	M	M	M	L	R
Ann	R	P	M	M	M	L

      - Post the chart to minimize confusion about role rotation.
      - Once the schedule is written, absences do not affect the rotation. If a student is absent on a day he/she is supposed to be Leader, another Member will substitute, and the absentee student will return the next day in the role of Recorder.
   c. Consider expanding the role of Peer-teacher.
      Options
      - Either assign or allow students to select mini-research projects on polls using encyclopedias or the Internet.
      - Either assign or allow students to select polls from the real world to research and analyze.

      Procedure
      - Students receive the assignment on the day they fill the Peer-teacher role, and share their information on the next day they fill the role.
      - They prepare handouts or short lessons for their team or the entire class.

Consider making some extension assignment on a regular basis throughout the unit. Beginning with the first rotation through the roles allows every student the chance to participate in this extension of learning.

d. Remember that an important aspect of cooperative learning is to develop positive team dynamics and to promote self-confidence. Take some risks when deciding grouping, but create teams that will succeed with minimal behavioral issues.
e. Use the COOPERATIVE GROUP WORK RUBRIC as often as necessary to reinforce good behavior and to give concrete feedback to students who are not working cooperatively.

8. **Using POLLS within Your Curriculum**
There are many possibilities for integrating POLLS into your school's curriculum.
   a. POLLS can be part of a social studies unit, an applied math unit, a science study, or a reading/language arts unit.
   b. It can be part of problem-solving activity, or even a community service project.
   c. Instead of doing a traditional research report, which typically involves a review of literature and extensive writing, students conduct genuine research via completing a poll project.
      - Students create methods to share their poll results.
      - Students may also engage in further spin-off activities.
   d. To add more challenge, integrate technology into all elements of the unit.
      - Create questionnaires using word processors.
      - Create spreadsheets for recording data.
      - Use dedicated software to make graphs.
      - Post the results on the school website.

9. **Preparing Your Classroom**
   a. Set up a large bulletin board to display results of polls that you or students find in newspapers, magazines, etc. Use the Internet to find pictures, poll samples, information on polls, etc., to download.
   b. Speakers — Consider contacting a local newspaper reporter and/or political consultant to talk about how they use polls in their careers.
   c. Students may need a work area large enough to lay out materials, hold discussions, and construct graphs. A double student desk is usually adequate for any work.
   d. At the end of each day, insist that students collect all their materials and store them safely in a designated area. If the materials are too bulky for the team folders, put all work in large paper bags marked with the team's names.

10. **Duplication Materials**
Copy the following in the quantity indicated in *Italics*. You may duplicate all the materials needed for the unit before starting the unit, or duplicate as you go along. It is a good idea to store each set in its own manila folder.

Teacher Reference

- **Sample Teacher Notice** — *as needed*

Student Handouts

- FIRST POLL — *class set (second set optional)*
- COOPERATIVE GROUP WORK RUBRIC — *transparency + as needed*
- HOW TO TEACH AND LEARN VOCABULARY — *class set*
- FLASHCARDS — *class set (of 24 definitions)*
- CHOOSING A POLLING TOPIC — *class set*
- SAMPLE POLL — *class set*
- SAMPLING AND BIAS — *class set*
- BIAS ACTIVITY #1 — *class set*
- OTHER SOURCES OF BIAS — *class set*
- QUESTION CORRECTION — *class set*
- QUESTION CORRECTION ANSWER KEY — *class set*
- BIAS ACTIVITY #2 — *class set*
- BIAS ACTIVITY #3 — *class set*
- POLLING PROTOCOL — *one per team*
- POLLING SCRIPT — *class set*
- BIAS ACTIVITY #4 — *class set*
- STRAW POLLS, SCIENTIFIC POLLS, AND THE MARGIN OF ERROR — *class set*
- GRAPH ASSIGNMENT AND RUBRIC — *class set or one per student pair*
- ANALYSIS ASSIGNMENT AND RUBRIC — *class set*
- POSTTEST — *class set*
- MODE, MEDIAN, AND MEAN — *class set (optional)*
- AWARD for EXEMPLARY POLLING — *as needed*
- AWARD for EXEMPLARY GRAPHING — *as needed*
- AWARD for EXEMPLARY COOPERATIVE WORK — *as needed*

11. **Organizing Duplication Materials**
    a. Store the duplication sets in the order that they are used. (See the **Unit Time Chart** on pages 14 and 15.) If a set is used more than once like FIRST POLL, you may make two separate manila folders, or just move the folder to its new position after you use it the first time.

b. The number to be duplicated is a minimum. Make a few extras in case some are lost or must be redone. Consider making a large poster of the COOPERATIVE GROUP WORK rubric to hang at the front of the class.
c. The FLASH CARDS pages provide only the definitions. Students must write the correct vocabulary word on the front. There are eight boxed definitions per page.
d. Be sure to return the originals to the Teacher Guide.

12. **Organizing Team Folders**
Each team will need a pocket folder or large envelope in which to store its daily work, activity sheets, etc.
a. The Leader is responsible for the team folder at the end of the day.
b. If there are more materials than the folder can hold, place them in a large brown paper grocery bag, label, and store in a safe place in your classroom.
c. Put enough Student Guides into each team folder for each team member.

13. **Other Materials**
- Brown paper shopping bags — *one per team (optional)*
- Calculators — *one for every two students*
- Chart Paper (4' x 5') — *20 or more*
- Collection of polling articles, graphed results, etc. — *for bulletin board (see **Setup Directions #9, Preparing Your Classroom** on page 6)*
- Computer and color printer — *one or more (optional)*
- Construction paper (12" x 18") — *enough for students (for graphs, optional)*
- Felt pens or markers — *optional*
- Graph Paper — *enough for students (optional)*
- Lined paper — *one per question*
- Manila folders — *one per DUPLICATION page (optional)*
- Pocket folders or large brown envelopes — *one per team*
- Reference materials (Internet, encyclopedia, newspapers) — *as needed (optional)*
- Rulers — *class set (for graphs, optional)*
- Spreadsheet software with graphing capabilities — *optional*

Polling Materials
- Clip boards — *one per pollster or polling team (optional)*
- Pencils — *enough for polling population*
- Questionnaires — *enough for polling population*
- Response sheets — *enough for polling population*

14. **Optional Activities**
    a. There are lesson plans for a Culminating Activity called *The Results Are In.* If you intend to use it, you should decide early in the unit how big an event you want it to be. You can keep it modest, or you can make this a bigger event by inviting other classes, school administrators, and parents. You may consider inviting guests in polling careers, local newspapers, or people associated with any topics polled. Students need time to present their own work and enjoy the refreshments that may be served. If you invite speakers plan more time or ask the guest to speak *very briefly* at the end of the student presentations.
    b. Another optional lesson is to rerun the FIRST POLL. The teacher can ask students to retake the poll, tally the results, and compare the results to the first poll in one period. The results of the second poll will confirm how much students have learned during the unit, and will give a concrete example of how polls can be used in education.
    c. The last optional lesson is to investigate the basic statistics of *mode*, *median,* and *mean*. The one-page lesson teaches the students what the words mean and asks them to discuss when it is appropriate to choose one over the other.

15. **Extensions**

    There are other options, but no written lessons, for extended "spin-off" activities such as writing letters and taking action on the results of the poll, or doing more research on polls or the topics that they investigated.
    a. This simulation can provide a starting point for more significant teaching and learning.
    b. To find information on other famous polls and pollsters, research the following:
        - Fortune Survey 1936, by Elmo Roper
        - Crossley Poll, 1936
        - Harris Survey, 1956
        - Princeton Office of Public Opinion Research, 1940
        - National Opinion Research Center, 1941
        - National Council of Public Polls

16. **Awards**
    Research has shown that middle level students do not do as well if there is stressful competition. However, awarding certificates for exemplary work is not competitive. Every student and team has the opportunity to strive to reach EXEMPLARY scores on all their work regardless of what the rest of the class is doing.
    a. POLLS provides several awards that you can give to students for exemplary polling technique, exemplary graphs, and for exemplary cooperative work. See pages 76 to 78.
    b. Use the rubrics to help you decide who should earn the awards.
    c. Award these on Day 13 or when returning the POSTTEST results.

17. **Using the Internet**
    If you have access to the Internet, your students will benefit from up-to-date information regarding polls and polling. Before using the Internet, become familiar with your school's Acceptable Use Policy. Always preview any website you make available to your students.
    a. If your students do not have classroom access to the Internet, you may access the Internet and build a notebook of information printed off the various websites you locate.
    b. Interact's Internet Resource List
       Several recommended website addresses are listed on a *Resource* page available through the Interact web page. To find the POLLS Resource page, complete the following steps:
       - Connect to the Internet
       - Go to Interact's site at: www.teachinteract.com
       - Click the "Resources" button
       - Click the "POLLS" link
       - Click any links of interest
       - Click the "Back" button to return to Interact's home page
    c. Advise your students that they may find both reliable and unreliable information on the Internet. Suggest that they check source information carefully.

POLLS provides many opportunities to assess student learning.

1. **Pre- and Post-Unit Assessment**
   To assess student pre-knowledge of polls and polling, administer FIRST POLL and conduct a class discussion on Day 1. Re-administer FIRST POLL at the conclusion of the unit. Have students evaluate and quantify their own growth in understanding through a statistical analysis of the two poll results.

2. **Cooperative Group Work**
   Assess cooperative group work using the COOPERATIVE GROUP WORK RUBRIC throughout the unit to reinforce positive group behavior.
   a. Remind students that this rubric is in their Student Guides.
   b. At first you may use the rubric daily, but as students become more aware of what you expect, you may use it less frequently.
   c. Remind students that in the world of work, having good cooperative skills is a valuable asset.

3. **Specialized Rubrics**
   The major activities have a separate rubric to assess most individual and/or team work.
   a. Go over each assignment and rubric carefully before students begin to work.
   b. The rubric will describe how well they meet the assignment guidelines. If they do what is expected, they will earn a "3."
   c. If they go significantly beyond what was expected so that their work is exemplary, then they will earn a "4."
   d. These rubrics can be used for a team or for a student if he/she worked individually on separate questions or graphs.
   e. On assessments and on assignments allow students to use calculators to convert raw data into percentages unless you are using this unit to reinforce math skills.

4. **What do Rubric Scores Mean?**
   a. Rubrics help teachers and students to describe student work. The student's goal is the create work or perform a skill at an "expected" level to meet a standard. The teacher's goal is to fairly and reliably describe student work or performance referencing a standard.

b. When completing performance assessments, focus on "student work." This work is *not* limited to written work. It includes demonstrated skills, oral exchanges, individual and cooperative group behavior, processes, strategies, and any other evidence that proves that the students have learned the targeted content or skill and can apply what they know.
c. The philosophy of standards-based assessment and instruction requires that students correct work until it "meets" the standard. At first this may seem problematic with the heavy correcting load most teachers carry. However, once students know that you will not accept work that does not meet your expected standard and will require them to redo it, they begin to do their best the first time. Also, only by warranting that students really do understand content or a skill, can you confidently move on to new subject material that builds on what you have taught.

4 — Exemplary — Generally this rating describes student work that exceeds the standard for the activity. The descriptor includes words such as "consistently," "complete," "with detail," "actively," and "willingly." Students who earn a "4" demonstrate leadership and knowledge during participation in the simulation.

3 — Expected — Generally this rating describes work that meets the standard with quality. The descriptors lack some of the positive adjectives of a "4," but this student has mastered the content or skill and can demonstrate his/her understanding in an application setting.

2 — Nearly There — Generally this rating describes work that almost meets the standard. Sometimes inconsistent effort or a misconception of the content will result in a "2" rating. This student needs to try a little harder, or needs to revise his/her work in order to meet the standards described.

1 — Incomplete — Generally this rating describes work that has not yet met the standard in content and/or skill. This student will require more instruction and another opportunity to demonstrate a knowledge or skill, or will require alternative instruction and assessment.

4. **Content Assessment**
   Administer the POSTTEST on the last day of the unit to assess student understanding of content.
   a. You can "grade" the POSTTEST traditionally using percentages.
   b. However, a more valid way might be to determine what you feel the students at your grade level need to do to "meet" the standard of content for this simulation.
      - Correct the tests, and if a student demonstrates enough knowledge of content to "meet" the standard, then award a "3 — Expected."
      - If the student demonstrates more mastery of content than expected, award a "4 — Exemplary."
      - If a student does not demonstrate enough knowledge of content, take the time to determine the misperceptions and/or re-teach. Insist that the student learn the content and allow him/her to retake the POSTTEST.

UNIT TIME CHART

<table>
<tr><th colspan="2">PHASE ONE</th><th>PHASE TWO</th></tr>
<tr><th>DAY 1</th><th>DAY 2</th><th>DAY 3</th></tr>
<tr>
<td>• Pre-unit discussion
• Introduce unit
• Form and name teams, assume roles
• Student Guide, pages 1–3
• FIRST POLL
• COOPERATIVE GROUP WORK RUBRIC</td>
<td>• Review FIRST POLL results
• Begin vocabulary study and review
• Learn how to choose a polling topic
• Student Guide, page 7
• HOW TO TEACH AND LEARN VOCABULARY
• FLASHCARDS
• CHOOSING A POLLING TOPIC
• SAMPLE POLL</td>
<td>• Recognize bias in population selection
• Choose a topic and population to poll
• Choose sampling technique and number to poll
• Student Guide, page 4
• SAMPLING AND BIAS
• BIAS ACTIVITY #1
Teacher Reference
• Sample Teacher Notice</td>
</tr>
<tr><th colspan="3">PHASE TWO</th></tr>
<tr><th>DAY 4</th><th>DAY 5</th><th>DAY 6</th></tr>
<tr>
<td>• Expand understanding of bias
• Begin developing poll questions
• Student Guide, page 4
• OTHER SOURCES OF BIAS
• QUESTION CORRECTION
• QUESTION CORRECTION ANSWER KEY</td>
<td>• Recognize bias in sampling
• Evaluate and polish questions and establish order
• Student Guide, page 5
• BIAS ACTIVITY #2</td>
<td>• Recognize bias in questions
• Finalize questionnaire
• Choose how to conduct the poll
• Student Guide, page 5
• Create and rehearse Class Polling Protocol
• BIAS ACTIVITY #3
• POLLING PROTOCOL
• POLLING SCRIPT
• Form hypotheses of results (optional)
• Field test questions (optional)</td>
</tr>
<tr><th>PHASE TWO</th><th colspan="2">PHASE THREE</th></tr>
<tr><th>DAY 7</th><th>DAY 8</th><th>DAY 9</th></tr>
<tr>
<td>• Conduct the poll
• Report polling experience
• Student Guide, page 5</td>
<td>• Recognize bias in procedure
• Tally raw scores and convert to percentages
• Create master list of polling results
• Student Guide, page 6
• BIAS ACTIVITY #4</td>
<td>• Distinguish straw polls from scientific polls
• Understand margin of error
• Graph polling results
• STRAW POLLS, SCIENTIFIC POLLS AND THE MARGIN OF ERROR
• GRAPH ASSIGNMENT AND RUBRIC
• Convert percentages into degrees of a circle for a pie graph (optional)</td>
</tr>
</table>

UNIT TIME CHART

PHASE THREE		
DAY 10	**DAY 11**	**DAY 12**
• Finish graphing poll results • Finalize invitations and arrangements for *The Results Are In* Presentation Day (optional)	• Analyze results question-by-question • Write analysis statements and summary paragraphs of results • Student Guide, page 6 • ANALYSIS ASSIGNMENT AND RUBRIC	• Class shares poll results using graphs and summary analyses • Prepare awards (optional)
PHASE THREE		
DAY 13	**DAY 14 +**	
• Objective Assessment • Debrief simulation • POSTTEST • Decide what to do with poll results (optional) • Distribute AWARDS (optional)	**Option 1** • *The Results Are In* Presentation Day **Option 2** • Re-administer FIRST POLL and analyze differences **Option 3** • Learn about *mode*, *median*, and *mean* • MODE, MEDIAN, AND MEAN	

PHASE ONE: DAY 1
DAILY DIRECTIONS

TEACHING TIP

These lesson plans are meant to guide, not to limit what happens in your classroom. Always consider the needs of your students and the limitations of your schedule and classroom. You may adapt POLLS to make it even more meaningful for your students. Please modify these suggestions to best suit your teaching style and your students.

Whole Class

This discussion and the FIRST POLL will give you some idea of the students' prior knowledge and also help you gauge how much new learning takes place by the end of the simulation.

Objectives

- Pre-unit discussion
- Introduce unit
- Form and name teams, assume roles
- Student Guide, pages 1–3

Materials

- FIRST POLL — *class set*
- COOPERATIVE GROUP WORK RUBRIC — *transparency + as needed*
- Chart paper (4' x 5') — *two* (*optional)*
- Team folders — *one per team*
  —Student Guides — *one per team member*

Procedure

1. Distribute FIRST POLL. Read the questions and have students write their answers. Collect and tally results for the eight questions. Change the raw data to percentages. Share on Day 2.

2. Having just experienced a poll, ask students what else they know about polls. Write their ideas and observations on the chalkboard or butcher paper. Keep to use during the debriefing on Day 13.

3. Announce team assignments (see **Setup Directions #7, Grouping Students** on page 5 for more information) and ask students to sit together as a team. Each day students should sit as a team unless you tell them otherwise.

4. Distribute the team folders and read **Welcome to POLLS** on page 1 of the Student Guide as a whole class activity.

5. Go over individual roles and team responsibilities as outlined in **Roles and Responsibilities**. The roles rotate in order; that is, the Leader becomes the Recorder who becomes the Peer-teacher, etc. Team members who are not in named roles today will enter the rotation on subsequent days.

6. Start roles today. Students will rotate through roles about 11 times. You may assign the opening roles, or allow students to determine the rotation. Each day the Leader is responsible for directing the group discussion and taking care of the team's folder. The Peer-teacher does not have any responsibilities today. **Option**: Consider assigning research tasks for the Peer-teacher. See **Setup Directions #7, Grouping Students** on page 5 for more information.

7. With the students turn to pages 2 and 3 Read with the students. **Phase One: Learning about Polls** is organized in a Q & A format. Words in *Italics* are **Vocabulary Words** found on page 8 of the Student Guide. Take extra time to explain the question/answers of **What other information can polls provide?** and **What is wrong with some polls?**

8. Direct teams to take a few minutes to name their polling team. The Leader conducts the discussion and the Recorder writes the choices and final choice. You might suggest that their names include a term from **Vocabulary Words** on page 8 of the Student Guide.

9. Because the team name-choosing activity is the first cooperative group decision, use the opportunity to discuss what you expect in cooperative group behavior. Using the transparency, share the COOPERATIVE GROUP WORK RUBRIC and tell students that this is an individual rubric. Remind them that this rubric is on page 8 of their Student Guides.

10. For homework, direct students to look in newspapers, magazines, and online for more examples of polls or reports of polling results. Ask students to bring in poll samples and post them on a bulletin board.

11. Prior to class on Day 2, prepare the results of FIRST POLL.
    a. Tally results to get raw data and convert data into percentages.
    b. If possible, create a pie or bar graph to demonstrate poll results.

Assure students that they will be learning more about bias as they go along.

Teams

PHASE ONE: DAY 2
DAILY DIRECTIONS

Objectives
- Review FIRST POLL results
- Begin vocabulary study and review
- Learn how to choose a polling topic
- Student Guide, page 7

Materials
- HOW TO TEACH AND LEARN VOCABULARY — *class set*
- FLASHCARDS — *class set (24 cards per set)*
- CHOOSING A POLLING TOPIC — *class set*
- SAMPLE POLL — *class set (optional)*
- *First Poll* results — *transparency or handout (from Day 1)*
- Team folders — *one per team*

Vocabulary

Poll *Survey* *Pollster* *Opinion*

Preparation

1. Prior to class, tally the results of FIRST POLL from Day 1 and convert the raw data into percentages.

Procedure

Whole class

1. Rotate roles. This will be the first task for every day of the simulation.

2. Discuss the FIRST POLL they took on Day 1. What did they notice about the questions? Were any of the questions confusing? Did they notice that they are allowed to have *no opinion*, or can say they *don't recall*? If it fits with your teaching objectives and schedule, tell them that they will repeat the FIRST POLL at the end of the unit.

3. Share the results of FIRST POLL.
   a. For each question, give both the raw data and the percentages.
   b. Discuss how results can be shown as raw data, as percentages, and even graphically on pie and bar graphs. Briefly refer students to **Graphing** on page 7 of the Student Guide to study the sample graphs.
   c. Discuss how you will use these poll results to determine how much the students will have learned in the unit.

4. Briefly review today's vocabulary words listed above. Show how they are used in the context of the Phase One information. Remind students of the **Vocabulary** on page 8 of the Student Guide.

5. Remind students that they will all assume the role of Peer-teacher, and they should be ready to help their team members to learn the POLLS vocabulary. Distribute HOW TO TEACH AND LEARN VOCABULARY. Discuss as a class.

6. Distribute the FLASHCARDS as one way to study vocabulary. For homework, students should write the correct vocabulary word on the side opposite the definition.

7. Ask the Peer-teachers to determine how each team member likes to learn. The team can brainstorm how they will learn today's four words. After a few minutes, direct the Peer-teachers to give a short quiz. If a team made special vocabulary materials, be sure to store them in the team folder.

   Option: Consider assigning additional tasks for the Peer-teachers in addition to reviewing vocabulary. See **Setup Directions #7, Grouping Students** on page 5 for more information.

8. Distribute and have students read CHOOSING A POLLING TOPIC. Discuss **General Information Polls** vs. **Topic-specific Polls**. Ask students to look back at some sample polls and identify each type.

9. Ask students to think about what kind of poll they would like to conduct. They will vote tomorrow.

10. Distribute SAMPLE POLL only if students will not be creating polling questions about their own cafeteria. It provides a valuable example, but may preclude students from developing an original poll.

TEACHING TIP

Even if you are not going to use the role of Peer-teacher, you may want to share this handout to help students learn vocabulary on their own.

Share your own special teaching strategies for vocabulary acquisition including creating quizzes, acting out the word, charades, drawings, etc.

Teams

TEACHING TIP

You may decide the kind of poll they will conduct and skip the vote.

PHASE TWO: DAY 3
DAILY DIRECTIONS

TEACHING TIP

*Today your students will complete Phase 2, Steps 1 and 2. Although the **Unit Time Chart** suggests a schedule, the pacing of each step is the teacher's decision.*

If your class has already chosen a specific topic, skip Step 1. All teams will instead decide on the subtopics they want to investigate for that topic. Thus, a class that has already chosen to study their cafeteria might have the following as some of the subtopics: menu, vending machines, time allowed for eating, or seating.

TEACHING TIP

Do not overload the students with the whole project. It is separated into manageable steps.

If your class already has a topic in mind then skip to #6 below or use the extra time to look over sample polls or enhance learning in some other way.

Whole class

Objectives
- Recognize *bias in population selection*
- Choose a topic and population to poll
- Choose sampling technique and number to poll
- Student Guide, page 4

Materials
- **Sample Teacher Notice (Teacher reference)** — *as needed*
- SAMPLING AND BIAS — *class set*
- BIAS ACTIVITY #1 — *class set*
- COOPERATIVE GROUP WORK RUBRIC — *as needed*
- Chart paper (4' x 5') — *one per team (optional)*
- Team folders — *one per team*

Vocabulary

Population *Respondent* *Response Rate* *Bias*

Procedure

1. Convene the whole class and review what they discussed yesterday. Ask students to vote whether they want to create a *General Information Poll* or *Topic-specific Poll*.

2. Have students turn to **Phase Two: Designing and Conducting a Poll** on page 4 of the Student Guide. With the class read Step 1: **Brainstorm ideas for a poll topic** and Step 2: **Determine the population**. Give the class a general time frame or specific deadlines for when Steps 1 and 2 should be completed.

3. Send students to their teams to determine what topic (or subtopic in the case of Topic-specific Polls) they want to poll.

4. Allow students five to 10 minutes to brainstorm, list, or web their ideas for a polling topic. The team member who has the role of Recorder today will write the list on a paper large enough for all to see.

5. After a team has a good list, they need to narrow down their choices. This requires a team discussion conducted by the student whose role is Leader today. Warn them two minutes before time is up, and tell them they must choose their topic (or subtopic).

6. Reconvene the whole class and ask Recorders to report what topic/subtopic the team chose. After students have listened to all the team reports, help students to clarify what they will poll.

7. Begin Step 2: **Determine the population**. This step may require your guidance. Help students to determine who will be sampled. A poll's respondents should understand and care about what is being asked.

8. Another decision to make is to decide what size population to survey. Your students' ability levels, their topic, the resources and time available, and/or other factors will affect this decision.

9. Distribute SAMPLING AND BIAS for the students to read and discuss with class.

10. If students choose to use a *stratified random sample,* follow this Lotto-style procedure.
    a. Pollsters prepare a hat or other container with papers labeled with the numbers 1, 2, 3, etc., equal to the number of students in the class.
    b. When the pollsters come to the classrooms, they explain briefly about the poll survey and ask the students to count off by ones so that each student in the classroom has a number.
    c. The pollster draws a predetermined number (two to five, depending on how many students they intend to poll) of papers from a hat.
    d. The pollster matches the selected papers to the students' numbers to form the random sample to be surveyed.

    This is is how it should work: Suppose a class has 25 students. The pollster wants to randomly select three.
    1. Prepare a hat with 25 papers numbered from 1 to 25.
    2. Students in the class count off from 1 to 25.
    3. The Pollster chooses three slips of paper from the hat (say, 5, 11, and 14).
    4. The students whose counted-off numbers match the three slips of paper participate in the poll.

11. Direct students to meet as teams. Distribute BIAS ACTIVITY #1 for them to read and complete.

12. Ask the teams to discuss the population choice and sampling and decide if there is any bias. The Leader will conduct the discussion and the Recorder will record what was decided. The teams should use the **Bias Barometer** scale, and be ready to support their position with specifics.

TEACHING TIP

Explain that the population polled needs to know and care about the topic. For example, if the poll is about a presidential election, the whole USA could be the population to be sampled. If your poll is about a local bond issue, then only local residents would be part of your population.

Whenever the author did this unit, the polls focused on issues related to school. The population chosen was their elementary school. Usually 100 students were surveyed in grades 1 through 6. This was roughly 15% of the school's population or about 16 pupils per grade level, which was the sample size.

Teams

Use the COOPERATIVE GROUP WORK RUBRIC to reinforce good group behavior.

Whole class

13. Reconvene the whole class and discuss BIAS ACTIVITY #1 with the whole class. Answer Key to Bias Activity #1:

Answer

- This a *Very biased* poll.

Problems

- The Mayor has chosen a small group to poll who may or may not know or care about the skateboard park.
- There should definitely be representatives from the South side of the town because they will be affected.
- There should also be parents of the Middle School level whose children would use the park.

Solution

- Poll a random sample of the whole town because this is a town issue (cost) as well as a kid issue.
- They might consider a *quota sample* or *stratified random sample* from each area of the town (North, South, East, and West sections.)

14. Discuss how your students will conduct their poll. Three choices to consider are:
    a. "Mail-in" — Put the poll in paper form and ask respondents to fill it in and return it by a specific date.
        - This would not necessarily require that the poll be mailed.
        - Student pollsters could drop off questionnaires and return to pick them up later at a specified time.
        - This technique is acceptable, but it may not be the best unless safeguards are in place to protect against one person submitting multiple copies of his/her responses.
    b. Interview — Create a questionnaire response form for each respondent.
        - Pollsters go to the respondents, read the questions, and ask them to answer them.
        - Respondents mark the answers on the response forms, or the pollster may record the responses on a master form.
        - Having the respondents read and mark their <u>own</u> responses seems to insure greater privacy and reliability.
    c. Telephone Interview — Students complete the interview by telephone rather than in person.
        - If you plan on doing a survey in your community with a telephone survey, check with the appropriate school officials regarding proper procedures and safeguards that may be required.

If students will be polling outside of the school environment, be certain to get permission and set up a protocol to ensure their safety.

15. Determine and announce the date and time span when the actual poll will take place. If your students will poll a school population, notify the affected teachers as soon as possible and ask their permission to conduct this poll. Try to accommodate the best time for them. It is essential that you give ample notice and minimize disruption to other classrooms. Copy or adapt the **Sample Teacher Notice**.

16. Use the remaining time for the day's Peer-teachers to teach today's vocabulary and to review vocabulary from Day 2. If there is too little or no time, tell the Peer-teachers to try to find time during the rest of the school day to teach or review vocabulary.

    Option: Consider assigning additional tasks for the Peer-teachers in addition to reviewing vocabulary. See **Setup Directions #7, Grouping Students** on page 5 for more information.

Teams

PHASE TWO: DAY 4
DAILY DIRECTIONS

Objectives
- Expand understanding of *bias*
- Begin developing poll questions
- Student Guide, page 4

Materials
- OTHER SOURCES OF BIAS — *class set*
- QUESTION CORRECTION — *class set*
- QUESTION CORRECTION ANSWER KEY — *class set*
- Team folders — *one per team*

Vocabulary

Sample *Representative sample* *Random sampling* *Stratified random sample*

Whole class

Teams

Whole class

Teams

Procedure

1. Distribute OTHER SOURCES OF BIAS for students to read and discuss with the whole class. Answer any questions they may have. Tell them that they will be looking at how to correct bias in questioning today.

2. Distribute QUESTION CORRECTION. Read aloud the **How to Evaluate Questions**, items 1–6 to help students focus on how they are to evaluate the listed poll questions. Model recognizing and correcting problems for the first two or three examples of questionnaire questions. Send students to their teams to complete the rest of the activity as a team. It is essential that they complete this activity before trying to write their own questions.

3. Call students back together as a class and distribute QUESTION CORRECTION ANSWER KEY. Go over their answers and the given answers of the activity.

4. Announce that they are ready to write their own questions. Have students take out their Student Guides and turn to page 4. Read out loud Step 3: **Create a questionnaire**. Write the poll topic on the board so there is no misunderstanding. They will first work as a team and then reconvene as a class.

5. Assign deadlines for the teams to complete the steps. Students should finish writing the questions by Day 5, if they are not having difficulties. They should polish the questions (Step 4) and establish the order (Step 5) by the following day.

6. For Step 3 the team will start with the brainstorming activity. The day's Leader will conduct the discussion, and the day's Recorder will write the questions that the team generates. Suggest that if there are many questions, the Leader may appoint a second recorder for the day to help write the questions.

7. If a team is having difficulty, encourage the students to think of all the words related to their poll topic/subtopic and create a master word list. Using the word list as a stimulus, they can begin to develop questions for their poll. The teams or class should create as many questions as possible.

8. Discuss "answer" formats they may have seen on the sample polls. Some work better than others. Stress that *fill-in-the-blank* responses may be difficult to categorize and tally later. The best ones are usually *multiple choice*, *yes–no*, *strongly agree/strongly disagree*, etc.

9. Tell students to write each question on a separate piece of paper, and to keep the list of the questions they generate in their folder for a bank of possible poll questions.

10. Five to 10 minutes before the end of the period, ask the day's Peer-teachers to review the previous vocabulary and teach today's new vocabulary.

    Option: Consider assigning additional tasks for the Peer-teachers. See **Setup Directions #7, Grouping Students** on page 5 for more information.

This is often the toughest part of this unit. The list of words gives them ideas for possible questions. If more time is needed, assign as homework and/or spend more class time on question development.

To save paper, give students half sheets of lined paper or ask them to use blank sides of scrap paper.

PHASE TWO: DAY 5
DAILY DIRECTIONS

Objectives
- Recognize *bias in sampling*
- Evaluate and polish questions and establish order
- Student Guide, page 5

Materials
- BIAS ACTIVITY #2 — *class set*
- Scrap paper (half-sheets) — *class set or as needed**
- Team folders — *one per team*

*The number of questions may depend on the number of students in the class.

Vocabulary

Questionnaire

Procedure

1. Direct students to meet as teams. Distribute BIAS ACTIVITY #2 for students to read and complete.

2. Ask them to discuss the population choice and sampling and decide if there is any bias. The teams should use the **Bias Barometer** scale, and be ready to support their position with specifics.

3. Reconvene the whole class and discuss BIAS ACTIVITY #2.

   Answer
   - This may be scored as either a *Some bias* or *Very biased* poll.

   Problems
   - The Principal has probably chosen too small a group (8).
   - Because he has chosen at random, rather than random stratified, it is possible that he could end up with six fifth graders and two from the other grades.
   - The playground will affect all grades of children who want different equipment.

   Solution
   - Poll a stratified random sample of the school with at least three or more representatives from each grade level.

TEACHING TIP

Try to keep your questionnaire to less than 20 questions. Allow only one question per student up to 20 students. Choose one question for every two students for larger classes.

Teams

Whole class

4. When the class has finished BIAS ACTIVITY #2, direct teams again to the Student Guide, Step 4: **Polish the questions**. They should take another look at the bank of questions they wrote on Day 4.
   a. They should evaluate each question to see if it meets their criteria including topic relevance, proper wording, and clear interpretation. (Use the same evaluations that were listed on the top of QUESTION CORRECTION.)
   b. Some questions may need to be reworked or modified.

5. Direct teams to select a certain number of questions to be included in the class poll.
   a. Students write their selected question(s), one question on a half-sheet of paper.
   b. They should also determine in what order they want to ask these questions.
   c. They will read the questions to the entire class when the class reconvenes as a whole.

6. When all the teams are ready, reconvene the whole class and ask teams to share their questions.
   a. The teacher should ask each team to read a question with possible answers.
   b. Next the teacher will ask for whole-class feedback. If it is okay, the teacher collects the question.
   c. Set aside questions that need editing and cull those that are redundant. Decide on a final order of questions.

7. Use the remaining time for the day's Peer-teachers to teach today's and review previous vocabulary. If there is too little or no time, tell the Peer-teachers to try to find time during the rest of the school day to teach or review vocabulary.

   Option: Consider assigning additional tasks for the Peer-teachers. See **Setup Directions #7, Grouping Students** on page 5 for more information.

8. If you have decided to do the optional activity *The Results are In*, begin to organize the event by reading preparation information from the **Setup Directions 14, Optional Activities** on page 9 and the **Daily Directions** for **Phase Three: Day 14+ Option 1** on page 42.

Teams

Whole class

Direct teams to re-word questions needing editing.

PHASE TWO: DAY 6
DAILY DIRECTIONS

Objectives
- Recognize *bias in questions*
- Finalize questionnaire
- Choose how to conduct the poll
- Create and rehearse class polling protocol
- Student Guide, page 5
- Form hypotheses of polling results (optional)
- Field test questions (optional)

Materials
- BIAS ACTIVITY #3 — *class set*
- POLLING PROTOCOL — *one per team*
- POLLING SCRIPT — *class set*
- Chart paper — *two large sheets (optional)*
- Team folders — *one per team*

Vocabulary

Interview *Protocol* *Hypothesis*

Teams

Whole class

Procedure

1. Direct students to meet as teams. Distribute BIAS ACTIVITY #3 for them to read and complete.

2. The Leader should conduct the discussion of the wording of the question. The teams should use the **Bias Barometer** scale, and be ready to support their position with specifics. The Recorder should write the reworded unbiased question.

3. After a few minutes, reconvene the whole class and discuss BIAS ACTIVITY #3.

   Answer
   - This is a *Very biased* poll.

   Problems
   - The question uses words such as "all-American" and implies that Tim Smith is not all-American because his grandmother was an immigrant.
   - The question also did not give the respondent the chance to choose a different candidate or to answer *no opinion* or *no vote*.

   Solution
   - Reword the question.
     Who will you vote for?: __John Jones, __Tim Smith, __another candidate, __no opinion or not vote

4. Directs students to page 5 of the Student Guide. Read and discuss Steps 5–7: **Finalize the questionnaire**, **Make final preparations**, and **Stage a rehearsal**.

5. Make final decisions on the questions, order of questions, population, and sampling technique. Review the questionnaire in its final form. Make plans to have copies made for polling day.

6. At this point you could ask teams to make a hypothesis of the results this poll. Have students guess what the results might be for each question on the questionnaire. (Ask, "Which answer choice for this question do you believe will be chosen the most often?") After the poll is completed, students can compare to see how close their predictions are to the actual results.

7. Distribute POLLING PROTOCOL. Ask teams to develop a list of polling procedures that each student pollster should follow.

8. After 10 minutes, reconvene the class and ask teams to share the procedures that each team developed. Make of list of the class protocol on chart paper or the chalkboard. Things to stress:
   a. Pollsters are always polite and try not to disrupt, upset, or embarrass the respondents.
   b. Pollsters try to read the questions clearly, and without bias. (No snickering or sarcasm when reading choices.)
   c. When a respondent gives an answer, pollsters do not make remarks or display body language that disparages the respondent's answer.
   d. Pollsters honestly record the answer, or check to be sure that respondents are marking responses on their supplied poll form.
   e. Pollsters have established guidelines so they know how to introduce themselves and know what to say if respondents ask questions.
   f. All Pollsters should follow the established protocol and random sampling method closely to minimize bias.

9. Make a master list of the responsibilities of each team of pollsters.
   a. What area (grade, classroom, neighborhood, etc.) will they poll?
   b. What time will they poll?
   c. Also make a list of materials that each team of pollsters must carry. (See **Setup Directions #13, Other Materials** on page 8 for more information.)

Whole class

You may choose to conduct a field test of the questionnaire first by trying it out on some other students to ensure that the questions are clear and understandable.

Pollsters should be neutral. If, by making a hypothesis, you feel your student pollsters may demonstrate bias when conducting the poll, then skip this step.

Teams

For many reasons, it is better for students to create their own protocol. Try to make sure that the elements of this list are included. Also include special instructions if there are special circumstances for your class(es).

A master list will make sure that all students have an opportunity to act as pollsters.

Either collect the POLLING SCRIPT or ask students to keep it in a safe place. They will need the script when they go out to conduct their poll.

10. Distribute and review the POLLING SCRIPT. Allow students to rehearse asking their questions before the whole class. Reinforce any of the guidelines established in the Class Polling Protocol. Review the random sampling technique they will use.

11. If the students are polling in the school, send a reminder to the teachers about the time of the poll.

12. If you are polling outside the school, be sure you have sought and acquired all the permits and know the school's policies. Also, require student permission slips signed by parents.

13. Use the remaining time for the day's Peer-teachers to teach today's and review yesterday's vocabulary. If there is too little or no time, tell the Peer-teachers to try to find time during the rest of the school day to teach or review vocabulary.

    Option: Consider assigning additional tasks for the Peer-teachers. See **Setup Directions #7, Grouping Students** on page 5 for more information.

14. Be certain to have all supplies (questionnaires, response sheets, clipboards, pencils, etc.) ready for the day of the poll. (See **Setup Directions #13, Other Materials** on page 8for additional information about polling materials.)

Objectives

- Conduct the poll
- Report polling experience
- Student Guide, page 5

Materials

- POLLING SCRIPT — *from previous day*
- Chart paper (4' x 5') — *several sheets*
- Polling materials — *as needed for each team*
- Team folders — *one per team*

Vocabulary

none today

Procedure

1. Before students begin polling, review the Class Polling Protocol that the group has agreed to. Review the random sampling technique they will use. Remind students that you will be observing and assessing their work.

Whole class

2. Have students take out their Student Guides, turn to page 5, and read Step 8: **Conduct the poll**.

3. Have students take out the POLLING SCRIPT from their Team folders and review.

4. Send students to conduct the poll. Tell them to return to class as soon as they have finished.

Whole class

5. After the polling is completed, reconvene the class and discuss with the pollsters what happened.
   a. Ask students for their observations and thoughts.
   b. Ask if any unexpected problems came up, any surprising responses, etc.

6. Use the remaining time for the day's Peer-teachers to review all vocabulary they have had so far. If there is too little or no time, tell the Peer-teachers to try to find time during the rest of the school day to teach or review vocabulary or share other information about poll if previously assigned.

   Option: Have Peer-teachers share the information discovered via researching or looking for samples of polls.

Remember that it is best to make each part a learning opportunity that includes discussing the students' observations and thoughts. It is also interesting to hear students' polling experiences.

PHASE THREE: DAY 8
DAILY DIRECTIONS

Objectives
- Recognize *bias in procedure*
- Tally raw scores and convert to percentages
- Create master list of polling results
- Student Guide, page 6

Materials
- BIAS ACTIVITY #4 — *class set*
- Brown paper shopping bags — *one per team (to supplement team folders, optional)*
- Calculators — *one per pair of students*
- Chart paper — *five to six large pieces*
- Team folders — *one per team*

Vocabulary

Data *Percentage* *Raw count* *Statistician* *Tally*

Teams

Whole class

Procedure

1. Direct students to meet as teams. Distribute BIAS ACTIVITY #4 for teams to read and complete. Team Leaders conduct a discussion about the polling procedure. Teams will use the **Bias Barometer** scale, and prepare to support their position with specifics. The Recorder will keep a record of the discussion.

2. Convene the whole class and discuss BIAS ACTIVITY #4.
   Answer
   - This is a *Very biased* poll.

   Problems
   - The polling procedures are terrible even if the cause is important.
   - The activists harass people leaving the store and threaten them if they don't participate.
   - There is also a problem with the sample; it is probably not representative.

   Solution
   - Be sure the poll questions are not biased.
   - Set up a protocol to invite participation by respondents.
   - If they refuse, thank them anyway. Pollsters must be polite and non-threatening.

3. Compliment the students that their poll yesterday had good polling procedures.

4. Directs students to **Phase Three: Analyzing and Presenting Poll Results** on page 6 of the Student Guide. Read and discuss. Steps1–2: **Tally the questionnaire results** and **Convert the raw scores into percentages**.

5. Tell students that today they are all going to be *statisticians*. Show them how to tally using the *###* five-count. Divide the work, if necessary, and have the student(s) begin a tally of the questionnaire responses using a blank tally paper for their counts.

   To help minimize errors, prepare a blank tally counting form that is sectioned according to the poll's questions. Include the number of each question and enough space for the students to tally responses to each poll question. Example:

1.	A.	B.	C.	D.
2.	A.	B.	C.	D.
3.	Yes	No	No Comment	

6. On a master chart paper at the front of the room, combine the tallies and create a grand total tally for all the questions from all the questionnaires.

7. Show students how to convert raw scores into percentages. Let them use calculators unless this is part of a math unit. Use this formula: Divide the number of a *specific answer* to a question by the *total number of answers* to the question times 100.
   For example, 12 of 48 respondents chose A.
   12 divided by 48 = 0.25 x 100 = 25.
   This means that 25% of the respondents chose A.
   Remind students that when adding the percentages of all the answers, the sum cannot equal more than 100. If rounding causes the total to be higher than 100%, adjust the percents to include decimals.

8. If students made hypotheses of the results, ask them to compare their guesses to the outcome.
   a. Ask if there were any surprises and how close were the students' hypotheses for each question.
   b. If results vary widely from hypotheses, then brainstorm reasons to possibly explain why.

9. Use the remaining time for the day's Peer-teachers to teach the last of the vocabulary. If there is too little or no time, tell the Peer-teachers to try to find time during the rest of the school day to teach or review vocabulary.

   Option: Have Peer-teachers share the information discovered via researching or looking for samples of polls.

Teams

Whole class

This may take some time depending upon the length of the poll and the students' ability levels. Remind students to be cautious in order to assure accuracy in their counting and tallying.

Depending on the grade level and ability of your students, they may need a few lessons on computing percentages and calculator use prior to doing this. Check math resources, such as a regular math textbook for lesson ideas.

Comparing hypotheses to results can be a very valuable activity. If you have the time, allow students to explain how they knew, or why they were surprised.

PHASE THREE: DAY 9
DAILY DIRECTIONS

Objectives
- Understand *margin of error*
- Learn to distinguish straw polls from scientific polls
- Graph polling results
- Student Guide, pages 6 and 7
- Convert percentages into degrees of a circle for a pie graph (optional)

Materials
- STRAW POLLS, SCIENTIFIC POLLS, AND THE MARGIN OF ERROR — *class set*
- GRAPH ASSIGNMENT AND RUBRIC — *class set or one per student pair*
- Calculators — *one to two per team*
- Computer and color printer — *one or more (optional)*
- Graphing materials (construction paper, graph paper) — *enough for students*
- Rulers — *class set (for graphs, optional)*
- Spreadsheet software with graphing capabilities — *optional*
- Team folders — *one per team*

Vocabulary

Margin of Error *Straw Poll*

Whole class

Procedure

1. Convene the teams as a whole class. Distribute, read, and discuss STRAW POLLS, SCIENTIFIC POLLS, AND THE MARGIN OF ERROR.

2. Complete the short practice at the end of the worksheet.

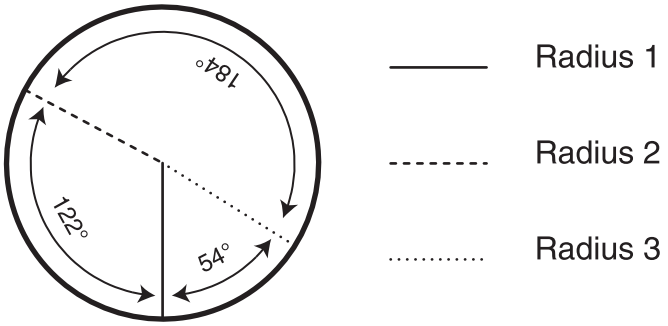
3. When you feel students have a firm understanding of a *Margin of Error*, direct students first to the Student Guide page 6 and read Step 3: **Prepare charts or graphs question-by-question**.

TEACHING TIP

4. Go to page 7 of the Student Guide and discuss kinds of graphs including bar graphs (horizontal and vertical), pictographs, and pie graphs.

5. Pie graphs are often the best graphs to use when trying to compare results. The sections of circles are easier to discern than a bar or pictograph if the results are close.

6. To teach how to make a pie graph, review page 7 of the Student Guide. Use information on charts to explain the circle graph.
   a. Ask students to find the number of degrees for peanut butter (51%) and tuna (34%).
   b. Multiply 360º times the percent to get the number of degrees.
   c. Tuna 34% of 360 = 122.4 (Enter 360 x 34 % on calculator.) Round to 122.
      Peanut butter 51% of 360 = 183.6 (Enter 360 x 51 % on calculator.) Round to 184.
   d. Remind students that the values should total 360º. When they round the numbers to 54 + 122 + 184, they equal 360.
   e. To draw these sections on a circle, first draw one radius.
      - Students place their protractor on this radius, measure the first angle, and draw a second radius.
      - They use the second radius to measure the next angle.



7. Let students choose, or assign each student or pair of students one question from the poll to graph. If there are fewer questions than students, then assign one question to two students. Ask students to decide which graphs will best present their results. In the case where partners have the same question, ask each to make a different kind of chart or graph.

8. Distribute and read the GRAPH ASSIGNMENT AND RUBRIC. Discuss the assignment and review the rubric. All students should be very aware of what you expect.

9. Five to 10 minutes before the end of the period ask Peer-teachers to review the vocabulary and the **Phase One: Learning about Polls** information in the Student Guide (pages 2–3).

   Option: Have Peer-teachers share the information discovered via researching or looking for samples of polls.

TEACHING TIP

Ask students to visualize the circle as a clock. Always start the first radius at the 6 o'clock position. Draw the angles in a clockwise direction around the circle. This allows for better comparisons.

Students may choose to create graphs using computer software. The technical coordinator of your school can help students use the spreadsheets and make the graphs. For instructions to make graphs using MS Excel or Appleworks see www.teachinteract.com. Click Resources and NET VENTURE.

Tell students of any other requirements to include in their graphs. In standards-based classrooms students have a clear idea of the assignment and work to meet its requirements. Any student or team that does not meet or exceed the standard must correct or redo the work.

Students may include the exact poll question and the date of the poll in their graph title.

PHASE THREE: DAY 10
DAILY DIRECTIONS

Objectives

- Finish graphing poll results
- Finalize invitations and arrangements for *The Results Are In* Presentation Day (optional)

Materials

- GRAPH ASSIGNMENT AND RUBRIC — *from previous day*
- Calculators — *one to two per team*
- Computer and color printer — *one or more (optional)*
- Graphing materials (construction paper, graph paper) — *enough for students*
- Rulers — *class set (for graphs, optional)*
- Spreadsheet software with graphing capabilities — *optional*
- Team folders — *one per team*

Procedure

1. Refer students again to the GRAPH ASSIGNMENT AND RUBRIC. Let them know what you expect. (Some may have forgotten titles and labels.)

2. Allow students time to finish graphs neatly and correctly.

3. If student finish early they may study vocabulary, or do additional research on famous pollsters and famous polls. (See **Setup Directions #15, Extensions** on page 9.)

   Option: Have Peer-teachers share the information discovered via researching or looking for samples of polls.

4. ***Optional***. If you have decided to host an event where students share their results with an audience, use today to write the invitations and finalize the arrangements. (See **Setup Directions #14, Optional Activities** on page 9 for more information.)

Remind students that the first part of the upcoming POSTTEST is a matching vocabulary test. Peer-teachers should make sure that each member of the team knows the vocabulary.

When students have finished their graphs, put them up on display on a class or school bulletin board.

Objectives

- Analyze results question-by-question
- Write analysis statements and summary paragraphs of results
- Student Guide, page 6

Materials

- ANALYSIS ASSIGNMENT AND RUBRIC — *class set*
- Lined paper — *one per question*
- Team folders — *one per team*

Procedure

1. Distribute the ANALYSIS ASSIGNMENT AND RUBRIC for the students to read. Each member of the team must write an analysis of the question that he or she graphed. Even if two students did one question and graph, insist that they both individually complete the analysis activity.

2. Discuss the assignment and how to generate statements from data.
   a. Impress on the students that they won't use every statement in the analysis paragraph of their question.
   b. Review the rubric.
   c. Students should be very aware of what you expect.

3. When the students finish writing the individual statements that describe the results, ask them to make a general conclusion based on the individual ones. Use the example on the ANALYSIS ASSIGNMENT AND RUBRIC to help students understand the activity.

4. Analysis Paragraph — Use the poll question, true statements, and conclusion to construct a summary paragraph.
   Follow this paragraph format:
   - The opening sentence explains who was polled and what was asked.
   - The three middle sentences use 3–4 of the true statements the student(s) made from the data.
   - The last sentence is the conclusion based on the results and supported by the true statements.

PHASE THREE: DAY 11
DAILY DIRECTIONS

TEACHING TIP

This unit does not teach writing or grammar, but writing statements and conclusions in an organized paragraph is required. If any student or student pair does not meet or exceed the standard, they must correct or redo the work. You may need to work with individuals with poor writing skills.

Walk around and check Student Guides to see how each team member is doing.

5. Review the rubric so that students understand that what they write must be accurate, organized, grammatically correct, with few (if any) spelling errors.

6. Direct students to page 6 in the Student Guide. Read aloud Step 4: **Analyze the findings question-by-question** and Step 5: **Analyze the findings of the whole poll**. They should check off each segment as they finish.

7. If you want your students to write a five-paragraph analysis essay instead of just a summary paragraph, use this outline:
   a. Opening paragraph describes what you were trying to find out.
   b. Second paragraph describes your population, sampling technique, and polling procedure
   c. Third paragraph summarizes the results. (You may refer to the graphs you made.)
   d. Fourth paragraph summarizes the conclusions you made.
   e. Fifth paragraph describes what you will do with the polling results.

8. Five minutes before the end of the period ask Peer-teachers to review the vocabulary and the handouts including the QUESTION CORRECTION and QUESTION CORRECTION ANSWER KEY.

   Option: Have Peer-teachers share the information discovered via researching or looking for samples of polls.

9. As an assignment, have students prepare for sharing their individual poll question results, graphs, and analysis paragraphs. Specify when and how their presentations will take place, and make clear your requirements for how long the presentations must be, etc.

Objectives

- Class shares poll results using graphs and analysis paragraphs
- Prepare AWARDS (optional)

Materials

- Chart paper — *several sheets*
- Team folders — *one per team*

Procedure

1. Ask students to share their individual question results, graphs, and analysis paragraph with the whole class.

2. When all the results are in, ask the class to look at all the questions on the polls and see if they can make true generalized statements about the whole poll's results. Did the answers reveal more information when taken as a whole rather than question by question?

3. Make a summary chart of the conclusions they make.

4. Ten to 15 minutes before the end of the period ask Peer-teachers to review the vocabulary and review the handouts including the STRAW POLLS, SCIENTIFIC POLLS, AND MARGIN OF ERROR.

   Option: Have Peer-teachers share the information discovered via researching or looking for samples of polls.

5. Announce that all students should study on their own tonight for the POSTTEST they will take on Day 13. The POSTTEST has a vocabulary section and questions from the handouts and Student Guide.

6. Prepare AWARDS if you intend to present them on Day 13 (optional).

If you are hosting The Results Are In *Presentation Day, students should use this sharing opportunity as a rehearsal before presenting in front of an audience. Remind them to use a clear and audible voice, maintain some eye contact, and to use the graphs as visual aids.*

PHASE THREE: DAY 13
DAILY DIRECTIONS

Objectives
- Objective assessment
- Debrief simulation
- Decide what to do with poll results (optional)
- Distribute AWARDS (optional)

Materials
- POSTTEST — *class set*
- AWARDS — *as needed (optional)*
- Chart paper — *several sheets (for debriefing notes and "What next?" (optional)*

Procedure

Allow more time for your students if they need it.

1. Distribute the POSTTEST. Direct students to take this assessment as individuals, not teams. Allow at least 20 minutes for this assessment.

2. Collect finished POSTTEST to grade later. Use the following answer key:

Vocabulary and Synonyms

1. H	6. R	11. P	16. A	21. G
2. K	7. F	12. Q	17. U	22. I
3. E	8. I	13. T	18. L	23. U
4. O	9. N	14. S	19. B	24. Q
5. M	10. J	15. C	20. D	

Multiple Choice Questions

1. C 2. B, H 3. C, D, E, G 4. B
5. The percents add up to 105%
6. *Very biased*. Poor sample, the building of a school is a town-wide issue and all townspeople should be polled. Answers force only two choices. No place to voice a different option such as *four schools* and *no change*.
7. Which of these options should we pursue?
   - A One big school
   - B Two smaller schools
   - C Four smaller schools
   - D No change
   - E No opinion

3. Begin to debrief by conducting a class discussion of the students' entire POLLS experiences. Include the following:
   a. What were the successes and failures in completing tasks individually and in teams?
   b. What were the Team dynamics—level of cooperation, collaboration, encouragement, and support?
   c. What did students learn from the entire experience?
   d. How can the class use the skills, information, and data they learned in POLLS in other classroom experiences?
   e. What did they enjoy most and what did they enjoy least about this unit?

4. If there is time at the end of the period, ask students, "What next?" There are several ways to share the results of the poll besides conducting *The Results Are In* culminating activity. All are optional. Choose one that will be most worthwhile to your class.
   a. Create a mini-report or brochure.
   b. Post findings in a parent bulletin or present them at a PTO/PTA meeting.
   c. Make a hallway bulletin board display of the graphs and paragraphs.
   d. Write a newspaper article or use another media outlet.
   e. Make announcements or factual quips as part of school's morning announcements.
   f. Think about other presentations to interested or affected groups including seniors, town council, mayor's office, etc.
   g. Post the results on the school's web page.

5. ***Optional***. Ask students:
   "Do any of your poll question responses stimulate ideas for further action?
   "Can the results be used for some other project or learning activity?"

   Students may consider these other "spin-off" activities to use the results of their poll:
   a. Letter(s) of action or petition
   b. Developing another poll

6. Distribute Awards today or when you return the corrected POSTTESTS (optional).

Once the author's students discovered what the other students' views were on school lunch options, they decided to see if they could make some improvements in the school lunch program. They contacted the cafeteria director and presented their findings and results.With the poll results, they were able to create a positive change.

Objectives

- *The Results Are In* Presentation Day (Option 1)
- Retake FIRST POLL and analyze differences (Option 2)
- Learn about mode, median, and mean (Option 3)

Option 1
The Results Are In Presentation Day

Materials

- Student graphs and analysis paragraphs — *from previous days*

Preparation

1. Appoint student greeters if invited guests need to be escorted to the classroom, Send them to the office 10–15 minutes before the presentations begin.

2. Post the presentation schedule so teams know when they will present and which teams precede and follow theirs.

Procedure

1. It is helpful if you, the teacher, open the presentation with a short summary of what the students have done during the POLLS instructional unit. This helps set the stage for the student presentations by providing a solid background to the audience.

2. Introduce the first polling team to present. When the first team is finished, they will introduce the next presentation team and then leave the presentation area. Continue until all teams have presented.

3. All members should display their graphs during their presentation. Ask one student to point to the graph if another is reading the analysis paragraphs.

4. Encourage applause at the very end of the presentations. If time allows, facilitate a question/answer session between the audience and the young pollsters.

5. After the entire presentation is over, if you have not had a Q & A session, allow time for audience members to circulate around to take a closer look at the written reports and graphs and ask students and teams questions individually.

6. If you are providing refreshments, serve them at the end.

TEACHING TIP

Keep all teams on schedule so that everyone has a chance to present during the event.

When students leave the presentation area, they should take their graphs to a specified area so guests can see the graphs and ask questions after all the presentations are through.

Option 2
Re-administer FIRST POLL

Materials

- FIRST POLL (second copy) — *class set*
- Chart paper (4' x 5') — *one to two*

Preparation

1. Before class, prepare a summary of the first results of FIRST POLL taken on Day 1. Include raw data and percentages question by question.

Procedure

1. Distribute a new copy of FIRST POLL and direct students to complete it individually.

2. In teams, ask students to tally their polling answers question-by-question.

3. On a master chart at the front of the room, ask teams to report team totals question-by-question.

4. Assign teams to convert the raw data into percentages for whole class totals.

5. Compare the results of the Day 1's FIRST POLL to the results today after completing the activities of the unit. Discuss the difference in the percentages. Generally speaking, the results will confirm that students have learned a lot from their POLLS experience.

Teams

Whole class

Whole class

Teams

Whole class

Option 3
Learn about Mode, Median, and Mean

Materials

- MODE, MEDIAN, AND MEAN — *class set*

Procedure

1. Distribute MODE, MEDIAN, AND MEAN. Read out loud with class.

2. Spend time looking at the data and explaining the definitions carefully.

3. Take a minute to check their understanding by providing another list of numbers and ask them to determine the number, range, mode, median, and mean.

4. Discuss the advantages and disadvantages of each.

5. Direct students to teams and ask them to discuss the four questions at the bottom of the page. (The smaller groups should allow for more discussion participation.)

6. Reconvene the class and discuss the team's answers. Number 4 might be an interesting idea to explore with actual grades. Which method would be most "fair?"

SAMPLE TEACHER NOTICE

Date: _____

Dear Colleague,

The students in my class will be conducting a scientific opinion poll within our school. The purpose of this project is to learn polling procedures and protocols, and to gather information for our current poll research project. Could you help us with our poll? We will poll approximately _____ students in grades _____ through _____. This is how it will work:

A. One or more student pollsters will come to your room to conduct the poll. You will only need to provide moral support and a smile! Please note that not every classroom may be selected for the survey, as not every classroom will be polled.
   Tentative date and time are _____.

B. The pollster(s) will briefly explain to your class that he/she is conducting a poll and will be selecting respondents. Students in your classroom will count off from 1 to X (the number of students in your class). The pollsters will randomly draw from 5–10 numbers. The students matching those numbers will participate in the poll.

C. The 5–10 chosen students will answer the polling questions. They can move to a pod area or hallway, remain in their seats, move to the back of the room, whatever is best for you. All they will need is a pencil. The pollsters will distribute the questionnaire form and response sheet. The pollster student may be orally reading the questions for the students as they mark their answers on their own poll form. He/she will collect the completed poll items and return to my classroom.

Steps A through C should take less than 20 minutes. The results of our poll will be available at a later date.

If the date and time of our poll is inconvenient with your schedule, please let me know right away via a note in my mailbox.

My students and I thank you very much for your support and cooperation.

Sincerely,

FIRST POLL

Directions
Answer the questions as honestly as you can. Write the LETTER on the line in front of the question.

____ 1. Have you ever participated in a poll before today?
   A. Yes
   B. No
   C. Don't know or can't remember

____ 2. If you answered B or C to the previous question, skip to number 3. If you answered A to the previous question, answer this question:
   Not counting the poll you are taking now, when did you last participate in a poll?
   A. Less than 6 months ago
   B. More than 6 months ago
   C. Don't know or can't remember

____ 3. How would you describe your knowledge of *polls* and *polling*?
   A. I know a great deal about polls and polling
   B. I have some knowledge of polls and polling
   C. I know very little about polls and polling

____ 4. How would you describe your knowledge of *bias?*
   A. I know a great deal about bias.
   B. I have some knowledge of bias.
   C. I know very little about bias.

____ 5. How well do you know how to convert data into percentages?
   A. I can convert data into percentages without error.
   B. I need to review how to convert data into percentages
   C. I don't know how to convert data into percentages.

____ 6. Do you know the difference between a straw poll and a scientific poll?
   A. Yes
   B. No
   C. Don't know or can't remember

____ 7. Do you know how to collect a random sample?
   A. Yes
   B. No
   C. Don't know or can't remember

____ 8. Do you think polls and polling greatly affect you and your way of life?
   A. Yes
   B. No
   C. No opinion

COOPERATIVE GROUP WORK RUBRIC

Cooperative Group Work Rubric

Name: _____

4 — Exemplary — You *consistently* and *actively* helped your group achieve its goals by communicating well with group members, by encouraging the group to work together, and by *willingly* accepting and completing the necessary work of your daily role.

3 — Expected — You *usually* helped your group achieve its goals by communicating with other group members, by encouraging your group to work together, and by accepting and completing the necessary work of your daily role.

(If your evaluation is less than EXPECTED, try to use your cooperating skills more consistently.)

2 — You *sometimes* helped your group achieve its goals.

1 — You *did very little* to help your group achieve its goals.

Cooperative Group Work Rubric

Name: _____

4 — Exemplary — You *consistently* and *actively* helped your group achieve its goals by communicating well with group members, by encouraging the group to work together, and by *willingly* accepting and completing the necessary work of your daily role.

3 — Expected — You *usually* helped your group achieve its goals by communicating with other group members, by encouraging your group to work together, and by accepting and completing the necessary work of your daily role.

(If your evaluation is less than EXPECTED, try to use your cooperating skills more consistently.)

2 — You *sometimes* helped your group achieve its goals.

1 — You *did very little* to help your group achieve its goals.

Cooperative Group Work Rubric

Name: _____

4 — Exemplary — You *consistently* and *actively* helped your group achieve its goals by communicating well with group members, by encouraging the group to work together, and by *willingly* accepting and completing the necessary work of your daily role.

3 — Expected — You *usually* helped your group achieve its goals by communicating with other group members, by encouraging your group to work together, and by accepting and completing the necessary work of your daily role.

(If your evaluation is less than EXPECTED, try to use your cooperating skills more consistently.)

2 — You *sometimes* helped your group achieve its goals.

1 — You *did very little* to help your group achieve its goals.

Cooperative Group Work Rubric

Name: _____

4 — Exemplary — You *consistently* and *actively* helped your group achieve its goals by communicating well with group members, by encouraging the group to work together, and by *willingly* accepting and completing the necessary work of your daily role.

3 — Expected — You *usually* helped your group achieve its goals by communicating with other group members, by encouraging your group to work together, and by accepting and completing the necessary work of your daily role.

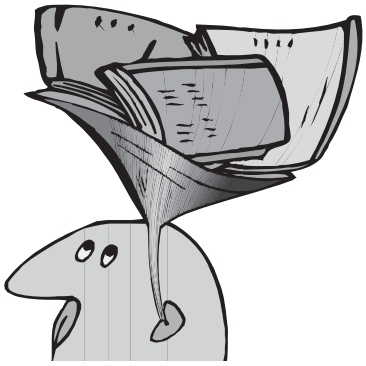
(If your evaluation is less than EXPECTED, try to use your cooperating skills more consistently.)

2 — You *sometimes* helped your group achieve its goals.

1 — You *did very little* to help your group achieve its goals.

HOW TO TEACH AND LEARN VOCABULARY

Learning vocabulary takes practice. Try to maximize your learning style to help you learn faster. Some teachers say the best way to learn something is to teach it. In POLLS you will have the opportunity to not only learn vocabulary but also to teach it to your peers.

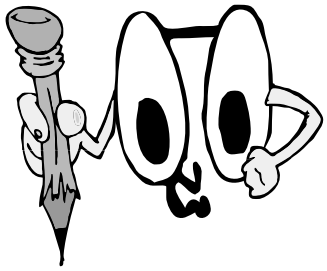


Auditory Learners

You need to "hear" the vocabulary. Reciting the word and its definition together helps to make an auditory memory. Remembering the sounds of letters sometimes helps. Remember that Protocol and Procedure begin with the sound of Pr. You might use PP and CC to help you remember that Protocol means Procedure of Correct Conduct.

Visual Learners

You need to "see" the vocabulary. This can be a fun activity as you turn the vocabulary word into a picture.
For example: ta~~llll~~y



Kinesthetic Learners

You are the "hands-on" learners. You need to make and handle flashcards—one set with definitions and one with words. You need to deal these out on a table and pick the matching pairs.

Mixed Learners

In actuality, we all can learn using methods like these, but we tend to prefer one over the other. A mixture of the activities is probably the best. Interestingly, competition also increases learning of vocabulary. Your Peer-teacher can flash cards or read definitions and ask team members to call out the answer. Finally, research has shown that testing also increases vocabulary learning. If your Peer-teacher gives a daily quiz, it will provide immediate feedback as to what you know and what you need to learn.

Peer-teacher Responsibilities

On your day as Peer-teacher, use the strategies above or others that you design to help your team learn the vocabulary. Always review the previous vocabulary as well as the new vocabulary.

FLASHCARDS (1)

Situations in polling that favor one outcome over others	A collection of the actual numbers recorded by a tally or counting
A guess, or prediction, of outcome	A situation where a pollster verbally asks questions and records the respondent's answers
The range of possible error in a poll	A person's viewpoint, belief, judgment or attitude
A part of a whole expressed in hundredths	A systematic questioning of people to find out opinions or information

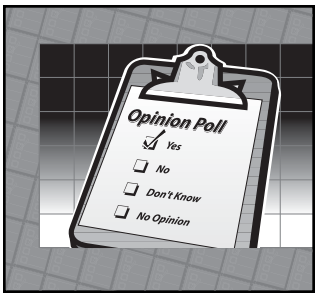
FLASHCARDS (2)

A person who conducts a poll or survey	A group of people who understand and may care about answering the polling questions
A procedure of correct conduct; a proper way of doing something	A list of carefully developed questions used in a poll
A method of accurately selecting people representing a population to take part in the poll	Another name for sample
A person who takes part in a poll by answering questions	The number of people who answer the poll questions expressed as a percentage

FLASHCARDS (3)

A group of people who are representative of a population, often selected randomly	A mathematician who specializes in statistics
The collection, organization, and analysis of data	An informal, unscientific poll
A synonym for poll	To count and record all the answer choices given in a poll
Results that are unfairly influenced by the pollster or poll itself	Sampling that requires choosing a minimum number of respondents from each subgroup of a population

CHOOSING A POLLING TOPIC (1)



Commercial pollsters choose polling topics to suit their purposes. They may want to learn about a certain age group or a population in a certain geographic area. For this they construct a *General Information Poll*. If the pollsters want to know whether it will be profitable to build an indoor hockey rink, they construct a *Topic-specific Poll* that asks specific questions. These questions might include: Do you like hockey? Will you pay admission to watch a hockey game?

General Information Poll

The pollster asks a population questions about several topics. Here are some sample questions from a General Information Poll. The population could be students in grades K–8 or even adults.

1. What is your favorite sport?

   Baseball Basketball Football Soccer Hockey None Other _____

2. How many minutes a day do you usually spend reading?

   Rarely read 5 to 30 min. 30 to 60 min. 1 hour or more

3. Which of the following candies do you like best?

   Chocolates Gum Fruit-flavored Mints Other None

4. What kind of birthday present(s) do you like best?

   Toys Clothes Music Money Books Other

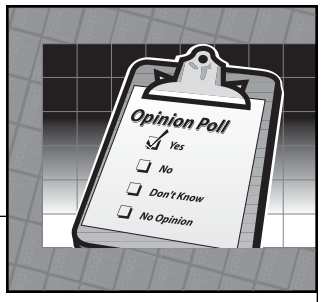
5. What grade are you in school?

   K–2 3–5 6–8 High school Adult

Although, there is no one apparent topic, answers to this poll reveal information about different age groups. A first grader will answer this poll differently from an eighth grader, and an adult differently from a student. A poll like this also reveals "favorites." If this same poll were given each year, the results would change over the years as one new fad or craze replaced another.

CHOOSING A POLLING TOPIC (2)

Topic-specific Poll
The questions are varied, but they all align to an overall polling topic. Here are some sample questions from a Topic-specific Poll. The pollster wants to learn how people spend their leisure time. The population is students in grades 1–8.



1. What is your favorite video game system?

   Computer None

   Other (name) _____

2. How often do you play a video game system each day?

   Rarely 5 to 30 min. 30 to 60 min. 1 hr. or more

3. How much TV do you watch each day?

   1/2 hr. or less 1 to 2 hrs. 3 to 4 hrs. over 4 hrs.

4. How many minutes a day do you usually read for fun?

   less than 5 min. 10 to 20 min. 25 to 45 min. 50 to 75 min. 80 min. or more

5. How often do you participate in organized after-school sports?

   Never once a week twice a week more than twice a week

The answers to this Topic-specific Poll will reveal not only how most students spend their free time, but also will reveal other information. It might help prove why the school needs a late bus, or even help explain why students are having difficulty finishing homework.

As a class, decide whether you will conduct a *General Information Poll* or a *Topic-specific Poll*. If you choose a General Information Poll, think about what you want to know about the population you will poll. If you choose a Topic-specific Poll, choose a subtopic that will provide the information you need about some part of the specific topic the whole group is investigating.

SAMPLE POLL
CAFETERIA LUNCH SURVEY

Below is a sample questionnaire complete with the results. This poll is about a school's lunch program and was given to students who eat in the cafeteria.

Cafeteria Lunch Survey
Please read each question carefully.
Mark your answer for each question.
Be honest.

1. How often do you buy lunch at our cafeteria?

Daily or almost every day	65%
About 2 or more times a week	25%
About once a week or less	7%
Hardly ever or not at all	3%

2. Is the cafeteria clean and tidy when you arrive for lunch?

Always or most of the time	88%
Sometimes clean and tidy	7%
Hardly ever clean and tidy	2%
No opinion	3%

3. Are you pleased with the selection of foods you can buy for lunch?

Very good variety	60%
Average or OK variety	22%
Poor variety	9%
No opinion	9%

4. What is your opinion about the serving portions?

Very good—large portions	90%
OK—average size portions	5%
Poor—small portions	2%
No opinion	3%

5. What do you think about the price of the lunches?

Very good—a bargain	70%
Fair price & reasonable	25%
Too high	2%
No opinion	3%

6. How do you rate the appearance of the food?

Looks fine all or most of the time	66%
Does not look appealing sometimes	22%
Does not look good most of the time	10%
No opinion	2%

7. What is your opinion regarding the taste of the food?

Tastes very good	57%
Tastes fine, but could be better at times	12%
Tastes lousy most of the time	28%
No opinion	3%

8. What is your opinion about the nutritional value of the food?

Very good—healthy and nutritious	75%
Good—usually healthy and nutritious	10%
Fair—could be more nutritious at times	7%
Poor—not very nutritious	1%
No opinion/don't know	7%

9. How would you describe the service you receive from the cafeteria workers?

Friendly and helpful all/most of the time	90%
Friendly and helpful some of the time	5%
Rarely friendly and helpful	3%
No opinion	2%

10. What is your opinion about the tables and seating arrangements in the cafeteria?

Very good	60%
Good	20%
Fair	8%
Poor	6%
No opinion	6%

11. Do you have enough time to eat your lunch in the cafeteria?

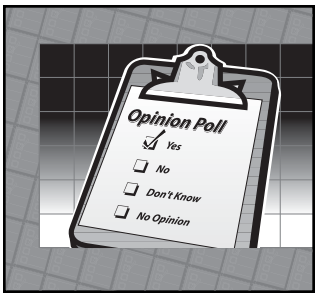
There is enough time all or most days	30%
Sometimes I feel rushed to eat and go	45%
Most of the time I feel rushed	20%
No opinion	5%

12. Overall, how would you rate our school's cafeteria lunch program?

Very good, I like dining here	80%
Good, but some things could be better	14%
Fair, many things need improvement	0%
Poor, I do not like eating here	2%
No opinion	4%

Thank you for answering our poll questions.
If you have any comments, please feel free to write them on the back of the questionnaire.

SAMPLING AND BIAS (1)



What is *bias* and how can it be avoided?
Bias is an unfair situation in polling that favors one outcome over others. Bias can occur in several ways, but it can be prevented. Pollsters need to construct fair polls. They must carefully follow procedures that minimize bias.

Bias and choosing people for a poll.
One place where bias can occur is in choosing the people to participate in the poll. Ideally it would be best to poll every individual of a population. However, this is not practical. Therefore, pollsters use a technique called *sampling.* For example, a poll about an upcoming election would be biased if it only surveyed one political party. A poll about a city's spending of money for more parks would be biased if it only polled families with children on sports teams that use the parks.

What is a *sample*?
A *sample* is a group of people who represent the whole population. The pollster needs to use a method of selecting these people that is unbiased.

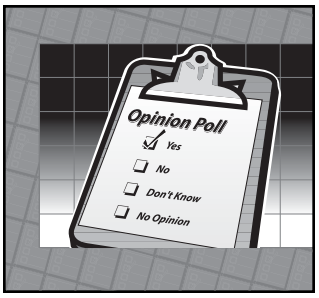
Why is choosing a sample so important?
The purpose of a poll is to draw conclusions about the population, not about the sample. If the sample does not represent the whole population, it is biased. If you conduct a poll about the importance of sports in schools, but *only* ask school athletes their opinions, your poll will be biased. Your results will only show the viewpoints of the athletes and not of the whole school or community population. It is crucial that the pollster fairly select a proper mix of people as poll respondents. The pollster does this by using random sampling.

How do you choose a random sample?
Random sampling can be done in several ways:

1. Lotto style—This is like "picking out of a hat." Select your list of respondents from a container that holds all the names of possible respondents. Most often this is the best way to choose your polling sample because every person of the population has a fair and equal chance of being selected.
2. Pick every 10th name from a list—This works well on an alphabetical list of students in a school. Some pollsters use the lists in a phone book. However, this may not be the best way because not everyone will be listed in a phone book.
3. Quota sample—Use one of the methods above, but make certain that participants reflect the population. For example, if the population is 50% men and 50% women, use two hats (one for men and another women) and choose an equal number from each.
4. Stratified random sampling—If you were to conduct a poll for grades 6–12 and you wanted to be sure that there were respondents from each grade, you might use this form of sampling. You would randomly choose a certain number of respondents from each grade.

One way to bias a poll is to not follow random sampling procedures. If random sampling is not done properly, your poll may have bias because of the way respondents were selected to be sampled.

SAMPLING AND BIAS (2)



Should every person be part of a randomly selected sample?
Not all groups should be selected for a poll. If your poll is about the local mayoral election, then it does not make sense to poll people in another state. Pollsters should always consider if a topic is of interest or relevant to someone before including that person in a population.

How many people need to be in a sample?
It depends. Commercial pollsters often conduct nationwide polls. They believe that the properly completed questionnaires of 1,000 people can accurately show the opinions of millions of people. They know that if the same survey is repeated within a reasonable period, the results should be about the same.

How accurate is a poll given to a random sample of people?
The *margin of error* is the measurement of uncertainty about the results of a poll. It is generally expressed as a percentage. Suppose a poll's results are that 60% of students preferred tuna to peanut butter, and the margin of error is ± 3%. This means that the poll's true result can be between 3% higher or 3% lower than 60%. (57% to 63% of students prefer tuna to peanut butter.) A good poll has a margin of error less than ± 5%.

BIAS ACTIVITY #1

Directions:

- The Leader should read the polling story below.
- Using the **Bias Barometer** decide as a team whether situation A *is* or *is not* biased.

Situation

The Mayor wants to know whether or not to spend money on a new skateboard park to be located on the south side of the town. She conducts a poll by asking PTA parents at the Northside Elementary School (grades K–5) for their opinions. With these polling results, she announces she is ready to make a decision.

The Leader will conduct the Team's discussion of the following questions:

1. Is this an unbiased poll?
2. Can the Mayor depend on these results?

On the chart below, the Recorder will record the problem(s) the team discovers and the ways they suggest to correct the poll.

Bias Barometer #1

Use the following rating scale when deciding if you detect *bias*.

Little or no bias	*Some bias*	*Very biased*

Problem(s) causing bias	*Possible corrections to the Problem*

OTHER SOURCES OF BIAS

Bias and the Questionnaire

Bias is an unfair situation in polling that favors one outcome over others. Bias can occur not only in sampling, but also in the questionnaire itself.

1. One way to cause a poll to be biased is to write questions that may influence, mislead, or change a respondent's reply. For example, consider these two questions:

   Example A. Do you think our governor, who already receives a generous paycheck, should be given an increase in salary? YES NO

   Example B. Do you think our governor should receive an increase in salary?
   YES NO No Opinion

   As you can see in Example A, the question includes an opinion that could easily change the respondents' viewpoint. Questions should not include any statement of opinion or false information. They should be written clearly and have adequate answer choices as well, including giving the respondent the opportunity to give no opinion. (See Example B)

2. The order of a poll's questions can also bias the outcome. For example, what if you asked questions about the environment in the first part of a poll? The respondent will start thinking about the environment. What if you asked about clearing woodlands for a new mall in the second half of the poll? The respondents might answer the mall questions differently than they would have if they hadn't thought about the environment first.

Bias and Timing

The timing of a poll may affect the outcome or poll results. What if you ask people their opinion regarding school funding shortly after a news story about school test scores? If the news story was favorable about schools, people may be more positive about school funding issues. If the test score news was weak, then the people may question more school funding and wonder if they are getting good services for their tax dollars.

Bias, Pollsters, and Procedures

Polls should be done by neutral parties and in a scientific manner. When doing a poll, therefore, it is important to be careful to avoid doing something that could unfairly affect the results. Sometimes subtle things like the way a pollster speaks, or how he or she acts can taint a poll's findings. For example, if a pollster conducts a poll about animal rights and is seeking information about a proposed animal shelter, he or she may affect respondents' opinions if dressed like a hunter! Just as a scientist follows certain safeguards and procedures in a lab, good pollsters should take precautions to be sure their work is done properly and accurately.

QUESTION CORRECTION

How to Evaluate Questions

Developing good poll questions for your questionnaire can be a difficult task. When reviewing your possible poll questions, use this list to evaluate your work:

1. Is the question clear and understandable? Will any of the words be misinterpreted or difficult to understand?
2. Are there sufficient questions to provide you with the information you are seeking?
3. Will the question and response choices provide you with the information you are seeking? If it is not useful, do not use it.
4. Is the question free from bias? Do not word your question so that it leads respondents to a pre-determined reply.
5. Are the answer choices appropriate for the questions? Do they cover all the possible responses including "no opinion"?
6. What is the best order for the questions?

Directions

Below are some weak poll questions. List the fault(s) or problem(s) with the question and rewrite the question to correct the fault. There may be several ways of correcting these questions. Be prepared to give reasons to support your answers. Write the faults and corrections on separate paper.

Question A

In regard to a computer's display, is the symmetrical icon arrangements more or less superior to the archaic method of generalized listing?

Question B

Do you have culinary eccentricities in regard to your diet?

Yes **No**

Question C

Do you think our president, who has done a poor job, should be reelected?

Yes **No** **Not Sure**

Question D

Tell us how often you pack your own lunch for school.

Question E

As a definite championship team, do you think our team will win the play-off game?

Yes **No**

Question F

As a frequent shopper at this store, how do you view our product selection?

Great variety **Good variety**
So-so variety **Poor variety**

Question G

What is your favorite website?

Question H

How do you view your health?

Question I

What kind of animals do you have at home?

Question J

What do you like to eat?

Question K

Besides Silly Willy, who is the funniest character on the Blah-Blah-Blah television show?

Question L

Do you like to sleep?

Yes **No**

QUESTION CORRECTION:
ANSWER KEY (1)

Question A—Problems

Whew! Many problems here! The vocabulary is WAY too difficult to understand, and so is the question. The phrase "computer display" is ambiguous. Do they mean the screen display or the display set up as in a store? It assumes the respondent is familiar with computers. It presents bias by saying that "listing" is archaic (old fashioned). No answer choices given.

Question A—Possible Solution

1. Are you familiar with computers and able to use one? **Yes** **No**
   (If you answered yes, please go to the next question.)
2. For your computer desktop display, which seems best to you?
   ____ show picture symbols or icons of items
   ____ show words only to describe items
   ____ show both icons and words
   ____ no preference

Question B—Problems:

The vocabulary level here is too high—no need to use difficult words when simpler wording does the trick. Also the answer choices are limited.

Question B—Possible Solution:

Do you view yourself as a 'picky eater'?

Often **Sometimes** **Never** **Don't Know/No Opinion**

Question C—Problems:

Bias. Leads reader to agree with the statement about poor job. (Also, depending upon the poll, may need to clarify which president—class president? U. S. President? etc.)

Question C—Possible Solution:

Do you think the president of our country should be reelected? **Yes** **No** **Not Sure**

Question D—Problems:

No answer choices are given so this may be harder to tally later on. Also possible problem with the word "pack"— you may bring your own lunch for school, but not necessarily pack it.

Question D—Possible Solution:

How often do you bring you own lunch for school?

____ Never or hardly ever
____ About 3 to 6 times a month
____ About 7 to 12 times a month
____ Over 12 times a month

Question E—Problems:

Is the information accurate? If the team is not truly a valid "championship" team, then this question has bias. Also, no option provided for those who are not sure.

Question E—Possible Solution:

Do you think our team will win the play-off game? **Yes** **No** **Not Sure/No Opinion**

QUESTION CORRECTION:
ANSWER KEY (2)

Question F—Problems:

Assumes the respondent is a regular shopper, and it does not offer a way to compare.

Question F—Possible Solution:

In comparison with other similar stores you visit, how do you view our selection of products?

____ Great variety, much better than most stores
____ Good variety, better than other stores
____ Average variety, about the same as other stores
____ Poor variety, other stores offer more variety

Question G—Problems:

Respondent's use of computers may be limited or non existent. Lack of answer choices may be too wide to interpretation, and hard to tally accurately later on.

Question G —Possible Solution:

1. Do you use a computer to visit websites? **Yes** **No**
   (If you answered yes, please go to the next question)
2. What type of websites so you visit most often? (Choose up to 3)
   ____ Information, reference sites, to get info
   ____ Sports, news, weather
   ____ Non profit /organizational sites (church, charity, community group, etc.)
   ____ Stores and shopping sites
   ____ Specific work or job related sites
   ____ Email sites and/or chat rooms
   ____ Entertainment, games, music, etc., for pleasure

Question H—Problems:

Question seems too vague and the lack of answer choices adds to misunderstanding.

Question H—Possible Solution:

In your opinion, which set of words listed below best describes your current overall health and physical condition?

____ Excellent: I eat properly, exercise frequently, and feel great.
____ Very Good: I eat fairly well, exercise some, and feel good.
____ Good: I am sometimes not careful with what I eat, and/or not careful about how much exercise I get.
____ Fair: I am not careful with my eating habits and rarely exercise.
____ Poor: I do not watch my diet and I never exercise.
____ Other: I have a chronic health problem that restricts my ability for regular exercise and/or proper eating.
____ No opinion.

QUESTION CORRECTION:
ANSWER KEY (3)

Question I—Problems:

Possibly too broad a question and too difficult to tally and categorize later on.

Question I —Possible Solution:

1. How many pets do you have living in your home? **None 1 to 2 3 to 4 5 or more**
   (Plus include the following question)
2. What type of pet(s) do you own? (Circle all that apply)

   None Fish Cat Dog Reptile/amphibian

   Farm animal Exotic Other _____

Question J—Problem:

Again, possibly too broad

Question J —Possible Solution:

Please list your 3 favorite foods you like to eat most often.

Question K—Problems:

Possible bias with listing of Silly Willy in the question. Question also assumes the respondent watches the Blah-Blah-Blah show regularly. Plus no answer choices given to assist the respondent.

Question K —Possible Solution:

Who do you think is the funniest character on the Blah-Blah-Blah television show?
(Please choose only one.)

____ No opinion/do not watch the show
____ Doug Graves
____ Bill Due
____ Silly Willy
____ Sue Yu

Question L-— Problem:

This question will provide limited information of any value as most will obviously say yes.

Question L —Possible Solution:

How many hours a night do you usually sleep?

5 hrs. or less 6 to 7 hrs. 8 to 9 hrs. Over 9 hrs.

BIAS ACTIVITY #2

Directions:

- The Leader should read the polling story below.
- Using the **Bias Barometer** decide as a team whether situation B *is* or *is not* biased.

Situation

The school principal wants to know what new equipment to put in the new playground of his K–8 school. He decides to use the entire school's enrollment records that are arranged alphabetically by family name. To ensure a random sample he will choose to poll every 20th student from the list. There are 160 students in the school.

The Leader will conduct the Team's discussion of the following questions:

1. Is this an unbiased poll?
2. Can the Principal depend on these results?

On the chart below, the Recorder will record the problem(s) the team discovers and the ways they suggest to correct the poll.

Bias Barometer #2

Use the following rating scale when deciding if you detect *bias*.

Little or no bias	*Some bias*	*Very biased*

Problem(s) causing bias	*Possible corrections to the Problem*

BIAS ACTIVITY #3

Directions

- The Leader should read the polling story below.
- Using the **Bias Barometer** decide as a team whether situation C *is* or *is not* biased.

Situation

The Win-All party is doing a telephone poll to see how their candidate John Jones is doing. They ask only one question.

> *Will you vote for our all-American candidate John Jones, or will you vote for Tim Smith, whose grandmother wasn't even born here?*

The Leader will conduct the Team's discussion of the following questions:

1. Is this an unbiased poll?
2. Should the newspaper publish the results?

On the chart below, the Recorder will record the problem(s) the team discovers and the ways they suggest to correct the poll.

Bias Barometer #3

Use the following rating scale when deciding if you detect *bias*.

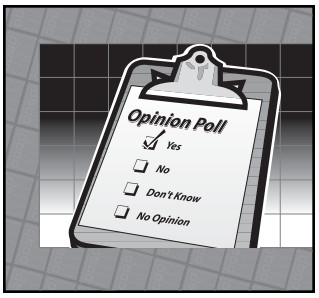
Little or no bias	*Some bias*	*Very biased*

Problem(s) causing bias	*Possible corrections to the Problem*

POLLING PROTOCOL

Directions

- Discuss each question.
- Make a list of your ideas below it.
- Go back to your lists and decide which is the most important idea and mark it *A*. Mark the second most important idea *B*, and so forth.
- Share your list with the whole class.



1. What must a pollster do to ensure that the poll results are fair and accurate?

2. What must a pollster never do?

POLLING SCRIPT
FOR POLLING IN SCHOOLS

Polling Date _____ Polling Time _____

Population _____

1. There are _____ in the class. Prepare a bag of number slips (one for each student) in order to do a random sampling.
2. Make sure you have all of your necessary supplies before leaving the room.
3. Go to the area(s) you are responsible for <u>at the proper time</u> and explain to all present what you are doing. Be professional and courteous.
4. So that you don't forget anything, use this script when introducing yourself and in explaining what you are about to do:

   "We are conducting a poll about (topic) _____. We are not polling the whole class, just _____ students. We will draw numbers to see who gets to answer the questionnaire. We will take those _____ students out of the class for about _____ minutes to complete the poll. Tomorrow, we will tally all the answers from polled students. We will share our survey results with you in the near future"

   (List any other special details here _____

   _____

   _____

   _____

   _____
5. Choose a random sample.
   a) Ask all the students in the classroom to count off by ones (1, 2, 3, 4, etc.) and remind them to remember their number.
   b) Ask a student to pick _____ slips from your bag of number slips. (This is how we will randomly select who will be the respondents.)
   c) Announce the winning numbers. These will be your respondents.
   d) Ask respondents to gather in the back of room, hallway, pod, or wherever you can do your polling. Your gathering spot should be private and quiet. Ask the respondents to bring a pencil.
6. Conduct the poll.
   a) Remind the respondents to be quiet and to pay attention to your instructions.
   b) Distribute the questionnaire form to the respondents.
   c) Give the respondents clear directions so they know what to do, such as marking only one answer response for each question, being honest in choosing their responses, putting no names on forms, etc.
   d) Answer any respondents' questions but be objective; you do not want to bias the results.
7. Collect all the completed forms. Remember to say ***thank you*** to the respondents, their teacher, and to the class for allowing you to conduct the poll.
8. Turn in your completed forms to _____.

BIAS ACTIVITY #4

Directions

- The Leader should read the polling story below.
- Using the **Bias Barometer** decide as a team whether situation D *is* or *is not* biased.

Situation

A group of activists wants the town to raise taxes to add more traffic lights. They decide to poll every adult who leaves the supermarket on Saturday between 8 a.m. and 4 p.m. From the data they collect, they are sure they can make a strong case before the Town Council. Ten pollsters stand in front of the market's two exits. To get the respondents' attention, they step in front of the grocery carts and stop the shoppers from going to their cars until they answer the questions. If anyone refuses to participate in the poll, the pollsters let them by, but call after them, *"I hope you have an accident!"*

The Leader will conduct the Team's discussion of the following questions:

1. Is this an unbiased poll?
2. Will the pollsters get the information they need?

On the chart below, the Recorder will record the problem(s) the team discovers and the ways they suggest to correct the poll.

Bias Barometer #4

Use the following rating scale when deciding if you detect *bias*.

Little or no bias	*Some bias*	*Very biased*

Problem(s) causing bias	*Possible corrections to the Problem*

STRAW POLLS, SCIENTIFIC POLLS, AND THE MARGIN OF ERROR

What is a *straw poll*?
Polls can be informal and unscientific. The questions are often very topical and concern a current event. Although the question or questions may be good, the population selection process is flawed. A common example is the "On-the-Street" interview: a pollster merely asks a person walking on the street what he or she thinks. Sometimes, a pollster just allows a respondent to choose to include him or herself in the poll. There is no scientific procedure to insure that the people polled are a representative sample of a population. This kind of poll is called a *straw poll.*

What is a *scientific poll*?
A *scientific poll* is more formal and follows procedures. The poll that you conduct should model a *scientific poll.* In a scientific poll, the population to be polled is selected because it knows and cares about the issue. The sampling technique is random and insures that the sample itself is representative of the whole population. The polling questions and technique are designed to be as bias-free as possible.

What is the *margin of error*?
Even when pollsters create a scientific poll and strive to avoid all bias, there is a "margin of error." That means that the poll is good, but the results need to be reported as a range rather than as discrete numbers.

A very good poll has a margin of error of ± 3%.
Look at an example of polling results and their margin of error.

Choice	Respondents	Margin of Error	Range of Accuracy
A	15%	± 3%	12% – 18%
B	36%	± 3%	33% – 39%
C	49%	± 3%	46% – 52%

The margin of error probably does not affect the outcome in this poll. Choice C earned the greatest percentage and Choice A the least.

However, look at the following results. What do you notice?

Choice	Respondents	Margin of Error	Range of Accuracy
A	27%	± 3%	24% – 30%
B	32%	± 3%	29% – 35%
C	35%	± 3%	32% – 38%
Undecided	6%	± 3%	3% – 9%

Some voters might change their vote at the last minute, some may not vote, and some of the undecided will vote for a candidate that they could not identify at the time of the poll.

The range of scores overlap on the different choices. Choice B is within the range of Choices A and C. If these were polling results from a pre-election poll, then the election would still be too close to call.

Practice
If the margin of error on a poll is ± 5%, what is the range of these results?

Choice	Respondents	Margin of Error	Range of Accuracy
A	11%	± 5%,	_____ to _____
B	25%	± 5%,	_____ to _____
C	38%	± 5%,	_____ to _____
D	26%	± 5%,	_____ to _____

GRAPH ASSIGNMENT AND RUBRIC

Directions
Create a graph that correctly displays the results of your poll.

_____ 1. Decide which kind of graph best displays your data. You may use bar graphs, pictographs, or pie graphs.

_____ 2. Write a title for your graph on the top or bottom of the page.
- For bar graphs, label both the x (horizontal) and y (vertical) axis.
- For pictographs, provide a key to explain your symbols.
- If you use color on your graphs, make a key to explain the colors.

_____ 3. For pie graphs (circle graphs), first convert your raw data into percentages. Then multiply the percent times 360° to compute the correct size of sections of the pie. Use a protractor to make the correct angles.

_____ 4. Make sure your work is neat and accurate. Choose styles, colors, sizes, etc., that clearly show your results. For example, do not use color combinations that may be hard to distinguish or sizes that may be too small to see easily.

_____ 5. Other requirements or information? See your teacher for details.

_____ 6. Submit this assignment on or before_____. Contact your teacher if you cannot meet this deadline.

Graph Rubric

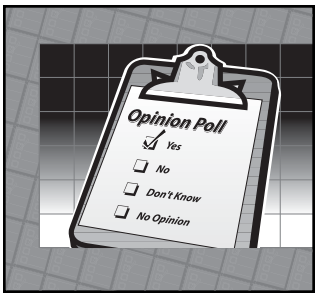
4 — Exceeds !!! I did a great job!!!
- I have followed directions stated above, but also have gone significantly beyond what was expected or asked.
- I have presented my assignment in an appealing and/or eye-catching way.
- I have no significant errors in spelling, grammar, or accuracy.

3 — Meets !! I did a very good job!!
- I have followed the directions stated above.
- I have presented my assignment neatly.
- I have few, if any, significant errors in spelling, grammar, or accuracy.

2 — Nearly There. Oops, I forgot something!
- I have followed all but one of the directions stated above, or my work may have errors.
- I need to correct my work and resubmit it as soon as possible.

1 — Incomplete. Back to the drawing board.
- I did not follow the directions stated above.
- I need to create a plan of action and share it with my teacher as soon as possible.

ANALYSIS ASSIGNMENT AND RUBRIC (1)



Pollsters analyze the data from their surveys. They write *True Statements* to describe what they have learned. For example, a population of students was asked about their favorite available lunch items. The results (data) were: 55% chose pizza, 25% chose hamburgers, 15% chose sandwiches, 5% chose other items. From their data these pollsters can make the following True Statements:

- More than half of those surveyed chose pizza.
- Hamburgers were the second most popular item.
- 45% (25 + 15 + 5) chose lunch items other than pizza.
- More than twice as many people chose pizza over hamburgers.
- Sandwiches and other items were chosen least often.
- 10% more people chose hamburgers than chose sandwiches.

Pollsters use the true statements to draw conclusions.
This is a good *Summary Statement* for the data above:

In this lunch survey, pizza appears to be the favorite choice.

This is a good *Summary Paragraph* for the data above:

We asked a representative sample of sixth, seventh, and eighth grade students at the Wickford Middle School the following question: What is your favorite available lunch item? *More than **half** of the students polled chose pizza. Hamburgers were the second most popular item, but more than twice as many people chose pizza over hamburgers. Sandwiches and other items were chosen least often. In this lunch survey, pizza appears to be the favorite choice.*

Directions

Analyze your polling data and write an organized summary paragraph.

1. Carefully examine the question data you collected in the poll and the graph(s) you made.
2. Write several *True Statements* that can be made from your polling data.

_____

_____

_____

_____

_____

_____

3. You will not use all these statements. Choose three or four true statements that <u>best</u> describe what the data means and can provide the most useful information.

_____

_____

_____

_____

ANALYSIS ASSIGNMENT AND RUBRIC (2)

4. From these true statements, try to draw a conclusion and make one *Summary Statement*.

   _____

   _____

   _____

   _____

   _____

5. Write a paragraph that explains your poll results.
   - Begin with *"We asked* _____*the following question."*
     (Identify the population.)

     _____

     _____
     (Write the question.)
   - Write 3 or 4 of your *True Statements.*
   - End the paragraph with your *Summary Statement.*

6. Submit this assignment on or before _____. Contact your teacher if you cannot meet this deadline.

Analysis Rubric

4 — Exceeds !!! I did a great job!!!

- I have followed directions stated above, but also have gone significantly beyond what was expected or asked.
- I have written a well-organized summary paragraph that clearly describes the results of my poll.
- I have no significant errors in spelling, grammar, or accuracy.

3 — Meets !! I did a very good job!!

- I have followed the directions stated above.
- I have written an organized summary paragraph that describes the results of my poll.
- I have few, if any, significant errors in spelling, grammar, or accuracy.

2 — Nearly There. Oops, I forgot something!

- I have followed all but one of the directions stated above, or my work may have errors.
- I need to correct my work and resubmit it as soon as possible.

1 — Incomplete. Back to the drawing board.

- I did not follow the directions stated above.
- I need to create a plan of action and share it with my teacher as soon as possible.

POSTTEST (1)

Vocabulary Directions

Match the vocabulary to the definition. Write the correct LETTER in front of each definition.

A Bias	G. Opinion	M. Questionnaire	S. Stratified random sample
B. Biased results	H. Percentage	N. Random sampling	
C. Data	I. Poll	O. Respondent	T. Straw poll
D. Hypothesis	J. Pollster	P. Response rate	U. Tally
E. Interview	K. Population	Q. Sample	
F. Margin of error	L. Protocol	R. Statistician	

____ 1. A part of a whole expressed in hundredths

____ 2. A group of people who understand and may care about answering the polling questions

____ 3. A polling situation where a pollster verbally asks questions and records the respondent's answers

____ 4. A person who takes part in a poll by answering questions

____ 5. A list of carefully developed questions used in a poll

____ 6. A mathematician who specializes in statistics—the collection, organization, and analysis of data

____ 7. The range of possible error in a poll

____ 8. A systematic questioning of people to find out opinions or information

____ 9. A method of accurately selecting people representing a population to take part in the poll

____ 10. A person who conducts a poll or survey (May work alone or with others.)

____ 11. The number of people who answer the poll questions expressed as a percentage

____ 12. A group of people who are representative of a population, often selected randomly

____ 13. An informal, unscientific poll

____ 14. Sampling that requires choosing a minimum number of respondents from each subgroup of a population

____ 15. A collection of the actual numbers recorded by a tally or counting

____ 16. Situations in polling that favor one outcome over others

____ 17. To count and record all the answer choices given in a poll

____ 18. A procedure of correct conduct

____ 19. Outcomes that are unfairly influenced by the pollster or the poll itself

____ 20. A guess, or prediction, of outcome

____ 21. A person's viewpoint, belief, judgment or attitude

POSTTEST (2)

Synonyms Directions
Match the synonyms to the vocabulary. Write the correct LETTER in front of each synonym.

____ 22. Survey

____ 23. Raw count

____ 24. Representative sample

Multiple Choice and Short Answer Directions
Circle the correct answer or fill in the blanks. Write short answers in complete sentences.

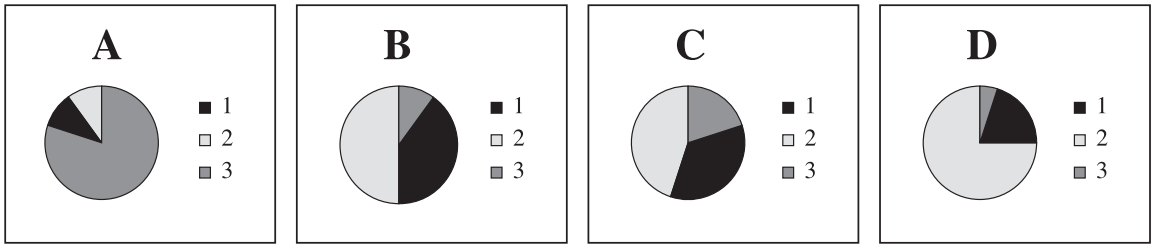
1. Which of these questions cannot be answered by doing a scientific poll?
   A Finding out how people spend their weekend time
   B Determining who may win the next election
   C Finding out your family tree
   D Deciding what new choices to add to a school lunch menu

2. A poll asked high school students about their reading habits in the last two weeks. The results were:
   60% read sports titles most often 5% read magazines most often
   30% read mysteries most often 5% had no opinion or chose not to participate
   Based only on these poll results, CHECK all the statements that are supported by this poll.
   ____A High school students should read more often.
   ____B Sports titles are read twice as often as mysteries.
   ____C Most students are athletes.
   ____D Most boys read sports titles.
   ____E The school should offer low-cost magazine subscriptions to students.
   ____F Mostly girls read mysteries.
   ____G 5% of the respondents did not read.
   ____H Six times as many students choose to read mysteries rather than magazines.

3. The margin of error for a pre-election poll was ± 5%. The results were:
   37% plan to vote for Candidate Bill 28% plan to vote for Candidate Don
   33% plan to vote for Candidate Carl 2% were undecided
   Evaluate these statements. CHECK all the true statements that are supported by this poll
   ____A Candidate Bill will definitely win.
   ____B 2% of the people will not vote.
   ____C The election is too close to call.
   ____D Candidate Bill actually could have the support of over 40% of the voters.
   ____E Candidate Carl actually could have the support of less than 30% of the voters.
   ____F Candidate Bill actually could have the support of less than 27% of the voters.
   ____G Candidate Don's result could be anywhere between 23% and 33% of the voters.

POSTTEST (3)

4. Which of these pie graphs describes this data?
   40% yes 50% no 10% no comment



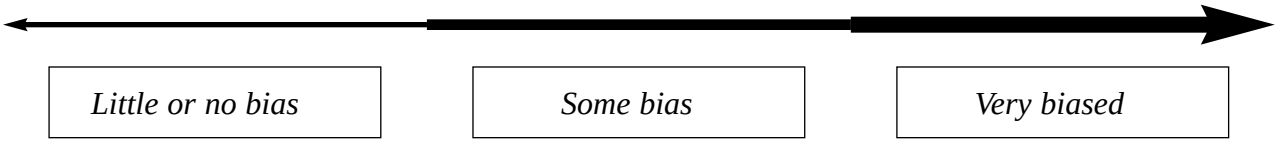
5. How can you tell there is an error in these results?
   53% chose red
   33% chose blue
   19% had no opinion

_____

_____

_____

6. Read the description of the poll and use the following rating scale if you detect *bias*.



A town has four neighborhood schools that they like. The new superintendent decides they should reorganize and build new buildings. He says he wants input from the community so he creates a poll and sends it to the parents.
Which of these two options should we pursue?
____ *A one big school*
____ *B two smaller schools*
If there is bias, describe why this poll is biased.

_____

_____

_____

7. Rewrite the poll question in #6 so that it corrects any bias that you found.

_____

_____

_____

_____

_____

MODE, MEDIAN, AND MEAN

Sometimes pollsters ask the respondents to tell a little about themselves. They may ask a respondent's age, income, job, or level of education. With this additional information and the answers to the poll, the pollsters can analyze the results more fully. At other times, the results of one or more poll questions may be expressed as a mode, median, or mean. There are advantages and disadvantages to using each.

Pollsters use the *mode*, *median*, and *mean* to organize information. Let's look at a group of data. There were 17 respondents to a poll. Here are their ages in order:

15	30
16, 16	31
18, 18	33, 33, 33
19	35
24	42
26, 26	50

The number of respondents is 17.
The range of ages if 15 to 50.
The mode (most frequent number) is 33.
The median (middle number) is 26.
The mean (average) is 27.35.

Mode — The mode will tell you the most common age in this poll. In a different poll, where there was a fill-in-the-blank answer, it would tell you the most common answer. The disadvantage to a mode is that it may not represent the whole group. Three people are older than the mode in this example; eleven are younger.

Median — The middle number can be very valuable when organizing data. It is not affected by the range. When there is a very young age or a very old age, the middle age on the list is not affected. If, however, the numbers were 11, 11, 12, 12, 13, 38, 39, 41, 56, the median of 13 would not be very helpful. However, real estate people often use a median to describe housing. If the median family house in a town costs $180,000 that means half the houses in town cost more and half cost less.

Mean — A mean is an average. To compute it, you add all the values and divide them by the number of values. You may be familiar with a mean because your teacher may "average" your grades. The mean in the example above is 27.35. Not one person was 27, and if there were someone age 90 added to the list, the average would rise to over 30. Baseball statistics are actually *means*, so a *batting average* could actually be called a *batting mean*.

Directions
Read the questions below and decide which would you use (mode, median, or mean) to organize the answers. There are no wrong answers. However, you must give a justifiable reason for your choice.

1. About how many points does your team score per game in one season? _____
   _____
2. What is your favorite fruit? _____
3. If you asked what price the respondents paid for their cars, what method would give you the most useful price to report? _____
   _____
4. What grade should you earn in math? _____

Exemplary Polling

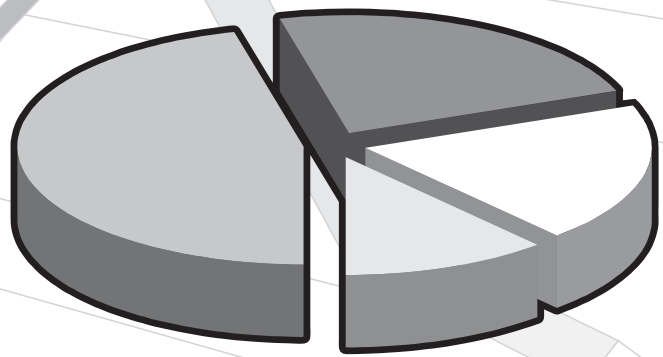
Presented to

_____

_____ _____

Awarded by On this date

EXEMPLARY GRAPHING



PRESENTED TO

_____

_____ _____

AWARDED BY ON THIS DATE

EXEMPLARY

COOPERATIVE WORK

PRESENTED TO

_____

_____ _____

AWARDED BY ON THIS DATE

Teacher Feedback Form

At Interact, we constantly strive to make our units the best they can be. We always appreciate feedback from you—our customer—to facilitate this process. With your input, we can continue to provide high-quality, interactive, and meaningful instructional materials to enhance your curriculum and engage your students. Please take a few moments to complete this feedback form and drop it in the mail. Address it to:

Interact • Attn: Editorial
10200 Jefferson Blvd. • P.O. Box 802
Culver City, CA 90232-0802

or fax it to us at **(800) 944-5432**

or e-mail it to us at **access@teachinteract.com**

We enjoy receiving photos or videotapes of our units in action! Please use the release form on the following page.

Your Name: _____

Address: _____

_____

E-mail: _____

Interact Unit: _____

Comments: _____

_____

_____

_____

_____

_____

_____

_____

_____

Release Form for Photographic Images

To Teachers:

To help illustrate to others the experiential activities involved and to promote the use of simulations, we like to get photographs and videos of classes participating in the simulation. Please send photos of students actively engaged so we can publish them in our promotional material. Be aware that we can only use images of students for whom a release form has been submitted.

To Parents:

I give permission for photographs or videos of my child to appear in catalogs of educational materials published by Interact.

Name of Student: _____(print)

Age of Student: _____(print)

Parent or Guardian: _____(print)

Signature: _____ Date: _____

Address:

_____

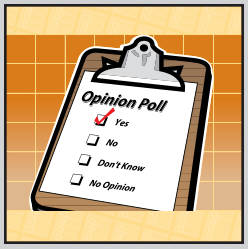
_____

_____

_____

Phone: _____

Interact
10200 Jefferson Blvd.
Culver City, CA 90232-0802
310-839-2436



STUDENT GUIDE

Student Name: _____

POLLS

Welcome to POLLS

Did you know that opinion polls affect all aspects of your daily life?. Some polls are conducted as market research. They help determine what snack foods you will be able to buy, or what the hot new styles will be, or what programs you will see on television. Some polls seek out political opinions. They help lawmakers decide what to do. You are about to learn valuable information about polls and pollsters. POLLS will help you to be a more informed consumer and citizen. You will learn how to recognize when polling is biased and when polling results are dishonest. You will also function as a real life researcher. POLLS is organized into three phases.

Phase One — Learning about Polls

You will learn what polls are, how they are designed, how they are conducted, and how they are used.

Phase Two — Designing and Conducting a Poll

Your team will determine the poll topic and devise the questions, then poll your selected population.

Phase Three — Analyzing and Presenting Poll Results

Your team will analyze your poll results to make sense of the information you gathered and present your poll results to your class.

Roles and Responsibilities

You will work in small teams and report back to your whole class. All team members must help one another to get the jobs done successfully and on time. Good cooperation is an essential life skill and a key component of POLLS. Researchers, like everyone else, must work together to complete tasks and meet deadlines.

Leader

- Organizes the team for the day's tasks
- Runs the team discussions to solve problems or make decisions
- Collects materials and stores them for the next class
- Rotates to become the Recorder

Recorder

- Records the team's written work (completing worksheets, writing questions, writing summary statements)
- Rotates to become the Peer-teacher

Peer-teacher

- Peer-teaches the daily vocabulary and reviews vocabulary already presented
- Rotates to become team Member

Every Team Member

- Takes turns filling named roles
- Assists other team members when asked or needed
- Participates in discussions and decision making
- Follows polling procedures carefully to ensure valid conclusions
- Acts as a statistician (tallying answers, analyzing results, and making graphs)

978-1-56004-391-1

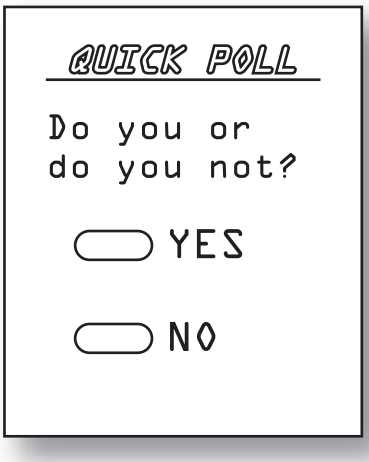
9 781560 043911

INT108SG

interact
Learn Through Experience

What is a poll and how is it used?
A *poll* is a form of research that is used to find out people's *opinions*. It reveals people's preferences, habits, and tastes. Polls can also be used to collect information or to determine how often something occurs. A poll is a valuable tool used to gather information on almost any subject.

How can polls and poll information help us?
- Determining popular opinions or trends
- Making predictions
- Making decisions
- Creating changes or assisting in plan development
- Learning something new
- Selling products or ideas
- Advocating a cause



Who are some people or groups that use polls?
- Researchers and scientists
- Governments, public agencies, and politicians
- News and media groups such as TV, magazines, newspapers, etc.
- Small groups seeking information about an item of local interest
- Businesses, manufacturers, industries, and commercial firms

How are polls conducted?
Pollsters follow specific steps when designing and conducting polls. Proper procedures insure that the poll is fair, accurate, and worthwhile. Pollsters determine what they want to know, whom to ask, which questions to ask, and the procedures to follow. When the results are in, pollsters *tally* the answers and analyze the results. Finally they share the poll results and use the information they learned.

What other information can polls provide?
Some polls ask more than opinions. They also ask *respondents* to mark their age, gender, income range, and so on. Pollsters use this additional *data* along with the respondents' answers to make more specific conclusions. For example, a poll asked 100 people, "Do you own a pet?" 80 of the respondents said "yes" and 20 said "no." Of the 80 who said yes, 60 were females. The answers together with the personal information reveal that most of the pet owners in this *population* are female. Advertisers could use this valuable information to develop new commercials that will appeal to women.

When did polling get started?

There have probably always been informal polls. However, newspapers seem to have started the trend for commercial polls to *survey* large populations. Back around 1824, two newspapers, the Harrisburg Pennsylvanian and the Raleigh Star, conducted an election poll. In 1883, the Boston Globe sent reporters out to poll people at voting places. When other papers and magazines saw readers' increased interest, they also started using polls. First polls covered elections and political topics. Later *questionnaire*s included social and economic questions. The US government began using polls before World War II. Soon the use of polls began to spread to other countries around the world. Today many organizations and companies develop and use polls in a variety of ways.

Who is George Gallup?

One of the most famous polls is known as the "Gallup Poll." Pollster George Gallup developed the idea of *sampling* in the 1930s. He realized that to get the most accurate information, he would need to ask every single individual in a population. Needless to say, this would be too difficult. However, if he properly chose representatives from the population (called *random sampling*) he could get nearly the same results.

What is wrong with some polls?

Most polls are conducted fairly, and the conclusions that pollsters make are accurate and accepted. However, some circumstances result in polls that are not accurate:

- Asking the wrong population
- Asking the wrong questions
- Too frequent polls that burden the public (telemarketers)
- A poor format that is confusing or difficult to read
- A bandwagon effect following a favorable news story or other polling result
- A catastrophic news story

Some circumstances result in polls that are not fair. For various reasons, some polls favor one outcome over another. This is called *bias*. The conclusions based on biased polls are inaccurate and may mislead the public. Bias can be found in questions, sampling, polling procedures, and analysis of results.

Directions

- Read **Choosing A Polling Topic**.
- Follow these steps to design and conduct a successful poll.
  - — Your team will work together on some of the steps.
  - — Your entire class will work with your team on some of the steps.
- Check off each step as you complete it.

1. **Brainstorm ideas for a poll topic**. (Team activity)
   List your ideas for a poll and consider doing webbing to get other ideas. After brainstorming, look through your lists, and as a team choose one poll topic.

   __ Be prepared to report your topics for class consideration.

   __ Choose either a General Information Poll or a Topic-specific Poll. (Whole class activity)

2. **Determine the population**. (Whole class activity)
   Who can best answer your questions? (All students or just some students in grades 4 through 11? Teachers? Parents? Community members? etc.)

   If necessary, notify teachers affected by your upcoming survey and seek their permission to poll the students.

   If conducting a telephone survey or going out into the community, check with your teacher and school authorities as to what safeguards or procedures you must follow.

   __ Select the population to be polled.

   __ Determine your sample size—the number of people you will poll.

   __ Determine your random sampling technique—how to select respondents for your poll.

   __ Establish the date(s) the poll will be conducted.

3. **Create a questionnaire**. (Team activity)

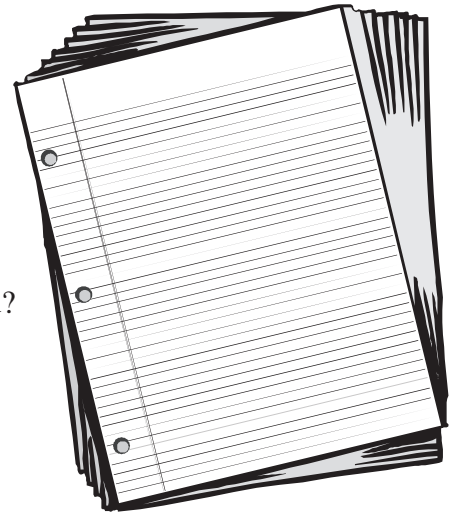
   __ Using a brainstorming technique, think of all the words related to your poll topic(s) and create a master word list. This list will assist your team with possible polling questions.

   __ Write a list of the questions to create a bank of possible polling questions. For each question, decide on an answer format (true–false, yes–no, agree–disagree, multiple choice, fill-in-the-blank, etc.)

   __ From your bank of questions, make a final selection of questions to include in the class poll.

   __ Evaluate each question to make sure that it provides information you need.

4. **Polish the questions**. (Whole class activity)
   Rewrite and revise the questions as necessary.



   __ Are the questions clear and understandable?

   __ Are the spelling and grammar correct?

   __ Are the answer choice methods suitable?

   __ Are there any provisions for "no opinion" or "no response"?

   __ Will these questions yield the data or information that you need?

5. **Finalize the questionnaire**. (Whole class activity)

   __ After polishing the selected questions put them in order.

   __ Make sure your questionnaire format is free of bias.

   __ Ask your teacher to review and approve your questionnaire format.

6. **Make final preparations**. (Whole class activity)

   __ Confirm the date(s) the poll will be conducted.

   __ Prepare questionnaire forms or response sheets.
   Make sure that you have prepared enough materials to complete your poll.

   __ Organize your materials before conducting your poll.

7. **Stage a rehearsal**. (Whole class activity)
   If more than one person is conducting the poll, it is important to have a standardized procedure set for all to follow. Establish and review proper guidelines on what you are to say and do when conducting your interviews, and what procedure you will follow to insure random sampling. Check with your teacher for any specific details.

   __ Prior to conducting the poll, review proper pollster protocol—how you should conduct yourself. You are expected to act as a professional and to be courteous.

   __ Discuss possible problems or questions that may come up and know how to respond to them.

8. **Conduct the poll**. (Team activity)
   Complete your role as pollster with responsibility.

   __ Collect completed questionnaires or record responses honestly after each interview.

   __ After the polling is finished, give your completed questionnaires to your team Leader who will then store them in a secure place.

   __ Be prepared to discuss with the class any observations and thoughts you had while conducting the survey.

Directions

- Study the **Graph Assignment** and **Rubric** and the **Analysis Assignment** and **Rubric**.
- Follow these steps to successfully analyze and present the results of your poll.
  - — Your team will work together on some of the steps.
  - — Your entire class will work with your team on some of the steps.
- Check off each step as you complete it.

1. **Tally the questionnaire results**. (Team and Whole class activity)
   Work carefully to insure accuracy in the counting and tallying of all the results.
   - __ Use a blank tally paper to do the counts. Tally with marks in groups of five (𝍸).
   - __ Share your results so that the class may prepare a grand tally (a raw count) of the results for each question.

2. **Convert the raw scores into percentages**. (Team activity)
   - __ Divide the raw count of each answer by the total of responses to the question, multiply by 100, and round to the nearest whole percent.

3. **Prepare charts or graphs question-by-question**. (Team activity)
   - __ Choose the most effective type of graph to present your findings (circle, bar, or pictograph).
   - __ Prepare an accurate graph or graphs of the results of your question(s).
   - __ Label carefully and/or use color to make the results clearer to interpret.

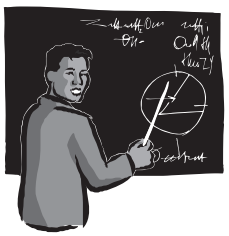
4. **Analyze the findings question-by-question**. (Team activity)
   - __ Write your results as sentences (e.g., 40% of the respondents chose grapes).
   - __ Reread your results sentences and see if there are some conclusions that you can make from them (e.g., More people preferred fruits to vegetables as snacks).

5. **Write an analysis of results for the whole poll**. (Individual activity)
   - __ The opening sentence explains who was polled and what was asked.
   - __ The three middle sentences use 3–4 of the true statements that you can make from the data.
   - __ The concluding sentence is based on the results and is supported by the true statements.

6. **Analyze the findings of the whole poll**. (Whole class activity)
   - __ Share analysis of individual questions.
   - __ Generate a list of summary statements.

7. **Discuss how to further share your polling project**. (Team and Whole class activity)
   - __ Consider one or some combination of the following:

     Handout or mini-report, brochure, bulletin board display or poster, classroom presentation, newspaper article or other media outlet, announcements or factual quips, presentations to interested or affected groups, or internet bulletin board or web site posting.



8. **Evaluate what you have learned**. (Team and Whole class activity)
   Be prepared to discuss your ideas with your classmates and your teacher.
   - __ Do any of your poll question responses stimulate ideas for further action?
   - __ Can the results be used for some other project or learning activity?

GRAPHING

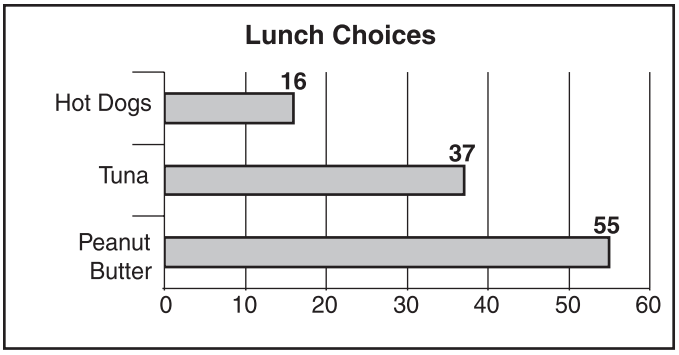
Putting your poll data into a graph can be very valuable to your analysis. It often reveals information that is not apparent in just the numbers. Look at these examples:

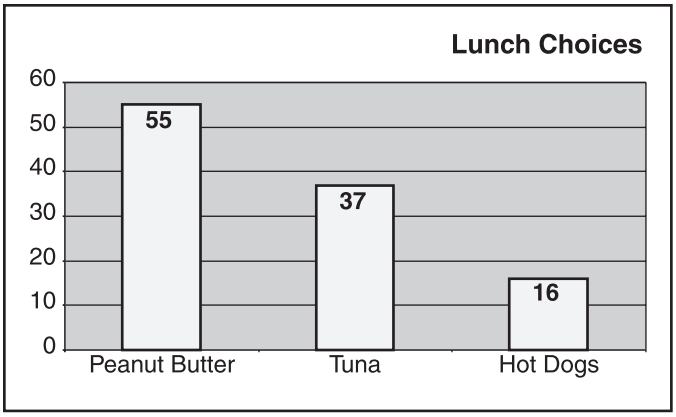
Student pollsters asked 108 of their other students what they preferred for lunch. The chart shows the results.

Lunch Choices

Hot Dogs	16
Tuna	37
Peanut Butter	55

These bar graphs are even more telling.



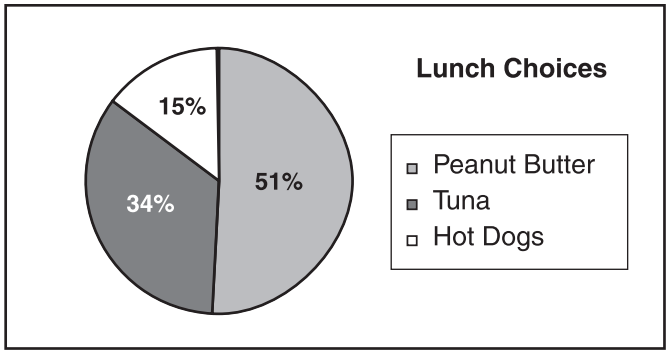


More than twice as many people preferred tuna to hot dogs. Peanut butter was the favorite by far.

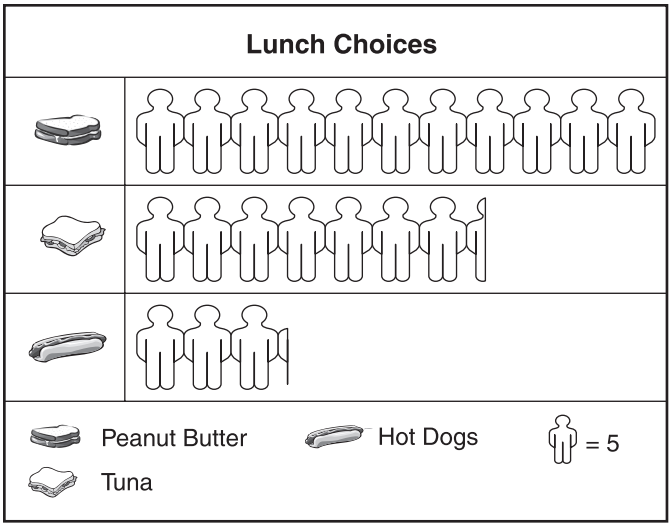
Note that all graphs have titles and keys or labels.

Circle graphs are effective tools used to present data. Circle graphs require that you first convert your raw data into percentages. To do that you divide the number of answers by the total number of respondents and multiply by 100. For example, 16 of the 108 students preferred hot dogs. Divide 16 by 108 and multiply by 100. This is equal to about 15%.

There are 360° in a circle. 15% of 360° = 54°. (360° x .15 = 54°) The light area of the circle graph shows 54° — the number of students who like hot dogs. The circle graph also reveals that a little more than half the students like peanut butter.



A pictograph uses pictures or images to tell about the poll results. It can be fun to make and to read. It is an excellent graph to use for young children.



VOCABULARY

Bias — Situations in polling that favor one outcome over others

Biased results — Outcomes that are unfairly influenced by the pollster or by the poll itself

Data — A collection of the actual numbers recorded by a tally or counting

Hypothesis — A guess, or prediction, of outcome

Interview — A situation where a pollster verbally asks questions and records the respondent's answers

Margin of error — The range of possible error in a poll (generally ± 5% in a properly completed poll)

Opinion — A person's viewpoint, belief, judgment, or attitude

Percentage — A part of a whole expressed in hundredths (For example 50% means 50 per 100 or 1/2.)

Poll — A systematic questioning of people to find out opinions or information (Poll can be used as a noun *[Conduct your* **poll** *honestly]* or as a verb *[***Poll** *your classmates].)*

Pollster — A person who conducts a poll or survey (may work alone or with others)

Population — A group of people who understand and may care about answering the polling questions

Protocol — A procedure of correct conduct, a proper way of doing something

Questionnaire — A list of carefully developed questions used in a poll

Random sampling — A method of accurately selecting people representing a population to take part in the poll

Representative sample — Another name for sample

Respondent — A person who takes part in a poll by answering questions

Response rate — The number of people who answer the poll questions expressed as a percentage

Sample — A group of people who are representative of a population, often selected randomly (also called a representative sample)

Statistician — A mathematician who specializes in statistics

Statistics — The collection, organization, and analysis of data

Stratified random sample — Sampling that requires choosing a minimum number of respondents from each subgroup of a population (For example, if a population includes students from kindergarten through grade 8, a *stratified random sample* could consist of four persons from each grade.)

Straw poll — An informal, unscientific poll

Survey — A synonym for poll

Tally — To count and record all the answer choices given in a poll (when used as a noun, the actual number recorded; sometimes called a raw count)

Cooperative Group Work Rubric

Your teacher will use the Cooperative Group Work Rubric to evaluate your cooperative group work.

4 — EXEMPLARY — You *consistently* and *actively* help your group achieve its goals by communicating well with other group members, by encouraging the group to work together, and by *willingly* accepting and completing the necessary work of your daily role.

3 — EXPECTED — You *usually* help your group achieve its goals by communicating with other group members, by encouraging your group to work together, and by accepting and completing the necessary work of your daily role.

(If your evaluation is less than EXPECTED, try to use your cooperating skills more consistently.)

2 — You *sometimes* help your group achieve its goals.

1 — You *do very little* to help your group achieve its goals.