

**Title:** Survey of Favorites

**Grade Ranges:**

    K-4  
  X  5-8  
    9-12

**Subject Tag:**

Math: Statistics

**Synopsis:**

Students are familiar with TV, music, movie and book ratings. As the culmination of a unit on statistics, students will conduct a survey and devise their own ratings about one of these types of media. For their chosen topic, the students will collect 100 random samples, using charts to track the gender of the participants, time per week spent on the activity, and the favorite type within this topic. Each student must come up with five types (example: music might include classical, rock, alternative, rap, and country). Each student will figure the mean, median and mode and range for the response “time per week.” Each student will calculate the percent of the whole for each of the five “favorite types.” And finally each student will calculate the percent of males versus females who chose each of the five favorites. Students will determine the appropriate type of graph (bar, line, pie ) to depict each section of data.

**Keywords:**

survey, statistics, range, mean, median, mode, measure of central tendency, arithmetic average, graphs, random sampling

**Body:**

1. Generate a classroom discussion about favorite TV programs, types of music, books, and movies. How do we get the ratings we hear about? Who conducts them? Who are the participants? Has anyone ever been a participant in a survey on the phone? In a mall? What do you think the surveyor did with the data?
2. After a lesson on mean, median, mode, range, and random sampling, students will choose one of the following topics to survey: favorite music, favorite movies, favorite books, favorite TV programs. Discuss what a random sample is and how they may go about obtaining it. Brainstorm possible subtypes within each of the four topics (example: music might include classical, rock, alternative, rap, and country). Students will choose five subtypes to include in their survey.
3. Review line, bar, and pie or circle graphs and the type of information each best depicts.
4. Review how to calculate percents on a calculator.
5. Students will conduct the survey out of class over a period of several days. They will use charts and frequency tables to keep track of the data. They will need to determine the gender of each participant, how many hours per week each participates in the given activity, and which of the five subtypes is the participant’s favorite. They may also include “no particular favorite” and “other” as answer choices.
6. When they have completed the random sampling of 100 participants, they will calculate the mean, median, mode, and range for the amount of time spent by participants per week. They

will calculate the percent of males versus females who chose a subtype as their favorite. And they will calculate what percent of the whole sampling each subtype represents.

7. Students will determine which type of graph will best depict their data, and graph the data from each chart. Students may use computers to graph if they are available.
8. Students will share their data with the whole class. After all have shared, discuss how the outcomes could be affected by different questions, restricting the age of the participants, time of day the survey was conducted, who asked the questions, where the questions were asked, etc. Students will determine individually and as a whole class if any patterns emerge between genders and within subgroups. Discuss possible explanations for any patterns.

### **Related Links:**

Review of Tables, Bar Graphs, and Circle Graphs

<http://cstl.syr.edu/fipse/TabBar/Contents.htm>

This site offers Self-Instructional Mathematics Tutorials from Syracuse University's Center for Support of Teaching and Learning. This site has two excellent tutorials pertinent to this lesson: Comparing Circle Graphs, Bar Graphs, and Tables and Summary of Tables, Bar Graphs, and Circle Graphs.

Using Computers to Produce Spreadsheets and Bar Graphs

<http://score.kings.k12.ca.us/lessons/spread.bar.html#standards>

This web activity teaches middle grade and older students how computers can help to create and display graphs.

### **Features:**

- Contains special education tips
- Quick Activity (less than 30 minutes; story starter)
- Requires Internet access for students to complete

### **Objectives:**

By the end of the lesson students will be able to conduct a survey using a random sampling of 100 participants. They will chart their findings, calculate the mean, median, mode, range and percent of various parts of the sampling. Finally, they will choose the appropriate type of graphs with which to present their data.

### **Standards:**

**NY: MST Math Standard 1.3:** Critical thinking skills are used in the solution of mathematical problems. **3.2:** Students use number sense and numeration to develop an understanding of the multiple uses of numbers in the real world, the use of numbers to communicate mathematically, and the use of numbers in the development of mathematical ideas. **3.5:** Students use measurement in both metric and English measure to provide a major link between the abstractions of mathematics and the real world in order to describe and compare objects and data.

**NYC: A2a:** Make an oral presentation of project plans or findings to an appropriate audience.

**A3a:** Gather information to assist in completing project work. **A4b:** Keep records of work activities in an orderly manner. **M1e:** Describes and compares quantities by using whole numbers up to 10,000. **M4a:** Collects data, organizes data, and displays data with tables, charts,

and graphs that are appropriate, i.e., consistent with the nature of the data. **M4b:** Analyzes data with respect to characteristics of frequency and distribution, including mode and range. **M4c:** Analyzes appropriately central tendencies of data by considering mean and median. **M4d:** Makes conclusions and recommendations based on data analysis. **M8a.** Data study based on civic, economic, or social issues.

**CT: Math Standard 4. Ratios, Proportions and Percents:** Students will use ratios, proportions and percents to represent relationships between quantities and measures and solve problems involving ratios, proportions and percents. **7. Probability and Statistics:** Students will use basic concepts of probability and statistics to collect, organize, display and analyze data, simulate events and test hypotheses. **8. Patterns:** Students will discover, analyze, describe, extend and create patterns, and use patterns to describe mathematical and other real-world phenomena.

**NJ: Math Standard 4.1:** All students will develop the ability to pose and solve mathematical problems in mathematics, other disciplines, and everyday experiences. **4.11:** All students will develop an understanding of patterns, relationships, and functions and will use them to represent and explain real-world phenomena. **4.12:** All students will develop an understanding of statistics and probability and will use them to describe sets of data, model situations, and support appropriate inferences and arguments.

**Prerequisite Skills:**

1. Students need to have a working knowledge of mean, median, mode, and range and be able to calculate percents.
2. Students need to have been introduced to the different types of graphs and the kind of information each best depicts.

**Time Required:**

Two to three 45-minute sessions

**Technology and Materials Needed:**

1. calculator
2. graph paper and/or notebook paper and ruler
3. computers (optional)

**Assessment Criteria:**

1. Check for follow through on procedures and instructions.
2. Check for evidence of assigned number of samples and completion of assigned charts.
3. Check for appropriate use of graphs.

**Review Date:**

**Review Comments:**