



# My Vote is for Dorothy!

## Mathematics

Dorothy is loved by young and old alike. Is this true? What does the data reveal?

### National Standards: Mathematics > Data Analysis and Probability

**NM-DATA.3-5.1, NM-DATA.6-8.1 Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer (Grades 4 & 5) (Grade 6)**

- Design investigations to address a question and consider how data-collection methods affect the nature of the data set.
- Formulate questions, design studies, and collect data about a characteristic shared by two populations or different characteristics within one population.
- Collect data using observations, surveys, and experiments.
- Recognize the differences in representing categorical and numerical data.
- Represent data using tables and graphs such as line plots, bar graphs, and line graphs.
- Select, create, and use appropriate graphical representations of data, including histograms, box plots, and scatterplots.

**NM-DATA.3-5.2, NM-DATA.6-8.2 Select and use appropriate statistical methods to analyze data (Grades 4 & 5)**

- Describe the shape and important features of a set of data and compare related data sets, with an emphasis on how the data are distributed.
- Compare different representations of the same data and evaluate how well each representation shows important aspects of the data.
- Discuss and understand the correspondence between data sets and their graphical representations, especially histograms, stem-and-leaf plots, box plots, and scatterplots.

### Kentucky: Mathematics Standard

2. Students shall develop their abilities to apply core concepts and principles from mathematics, the sciences, the arts, the humanities, social studies, practical living studies, and vocational studies to what they will encounter throughout their lives.

#### **Probability and Statistics (2.8, 2.12, 2.13)**

2.8 Students understand various mathematical procedures and use them appropriately and accurately.

2.12 Students understand mathematical structure concepts including the properties and logic of various mathematical systems

2.13 Students understand and appropriately use statistics and probability.

#### **Skills**

##### **Grades 4 & 5**

**MA-E-3.2.1** Pose questions that can be answered by collecting data.

**MA-E-3.2.2** Collect, organize, and describe data (e.g., drawings, tables, charts).

**MA-E-3.2.3** Construct and interpret displays of data (e.g., line graph, bar graph, pictograph, line plot, simple Venn diagram, table).

The Wizard of Oz: Lessons for Grades 4-6

**MA-E-3.2.5** Make predictions and draw conclusions based on data.

**Grade 6**

**MA-M-3.2.1** Organize, represent, analyze, and interpret sets of data.

**MA-M-3.2.2** Construct and interpret displays of data (e.g., table, circle graph, line plot, stem-and-leaf plot, box-and-whiskers plot).

**MA-M-3.2.5** Make predictions and draw conclusions from statistical data and probability experiments.

**Relationships**

**Grades 4 & 5**

**MA-E-3.3.1** How data are used to draw conclusions.

**MA-E-3.3.3** How the type of display is related to data (appropriateness of graphs).

**Grade 6**

**MA-M-3.3.1** How different representations of data (e.g. tables, graphs, diagrams, plots) are related

**Ohio: Mathematics > Data Analysis and Probability**

- Pose questions and collect, organize, represent, interpret and analyze data to answer those questions.
- Develop and evaluate inferences, predictions, and arguments that are based on data.

**Benchmark(s) Grade 4**

- A. Gather and organize data from surveys and classroom experiments, including data collected over a period of time.
- C. Construct charts, tables and graphs to represent data, including picture graphs, bar graphs, line graphs, line plots and simple Venn diagrams.

**Benchmark(s) Grades 5 & 6**

- A. Read, create and use line graphs, histograms, circle graphs, box-and-whisker plots, stem-and leaf plots, and other representations when appropriate.
- B. Interpret data by looking for patterns and relationships, draw and justify conclusions, and answer related questions.
- D. Compare increasingly complex displays of data, such as multiple sets of data on the same graph.
- E. Collect, organize, display, and interpret data for a specific purpose or need.

**Ohio: Mathematics > Mathematical Processes Standard**

- Use mathematical processes and knowledge to solve problems.
- Apply problem-solving and decision-making techniques, and communicate mathematical ideas.

*Note: The following benchmarks are embedded within the grade level indicators.*

**Benchmark(s) Grade 3**

A, B, C, D, G, H, I and K

**Benchmark(s) Grades 5 and 6**

A, B, C, D, E, F, G, H, I, J and K (see all)

**Objective**

Student will:

- Conduct a classroom survey to gather data that is both numerical and of opinion.
- Collect and analyze data and present the results in both numerical and graphic formats.

### **Assessment**

Students will be able to:

- Craft survey questions and interview classmates, schoolmates and the general public regarding preference and opinion of the story, The Wizard of Oz.
- Gather relevant data regarding students' favorite characters, scenes, songs, events, etc.
- Classify data by demographics of survey participants, and represent findings in both a numerical and visual formats.

Sample items to gauge student understanding:

1. Explain what is data? (*factual information; information that is true*)
2. Explain the function of demographics. (*provides information on social quantitative data*)
3. Describe ways to collect information. (*asking questions; talking to people, through reading, by observing, etc.*)

### **Vocabulary**

- Data
- Demographics

### **Materials**

- Pencils and colored pencils
- Handout A: Sample survey template for questions regarding the story/play, The Wizard of Oz.

### **Activity 1**

#### **Our Favorites!**

**Teacher will:**

1. Share with students a brief history of the story of The Wizard of Oz, and how it has been depicted in book form, as well as movie formats and theatrical performances.
  - a. The original story title was, The Wonderful Wizard of Oz.
  - b. Written by the author L. Frank Baum in 1899.
  - c. The story was first published in the year 1900, 105years ago.
  - d. Baum wrote the story solely to "please children of today." (His desire to just tell a good story.)
  - e. The film version was made in 1939; 66 years ago.
  - f. First shown on television in 1956, and 49+ times since.
2. Ask students to think about their favorite character and event from the story and from the Children's Theatre stage production of The Wizard of Oz.
3. Record the students' favorite characters and events on chart paper (or on the board) with a number count to reflect how many students chose the same one.
4. Classify with students the tallied answers into categories (e.g., songs, scenes, characters, events, etc.).

5. Model for students how to interpret the information just gathered into multiple graphic formats--line graphs, histograms, circle graphs, box-and-whisker plots, stem-and-leaf plots, etc.
6. Ask the question prompt: Is there additional information one could gather to further clarify the data results?
7. Introduce/review the concept of demographics and its use in data collection.
8. Have students to reorder the previous data results according to their ages and gender. Question prompt: How does display of the data results change?
9. Explain to students their task to survey schoolmates, family and community members to gather data on The Wizard of Oz favorites. Have students to decide upon necessary demographics to include in the survey.
10. Instruct students to create multiple charts or graphs based on the data they collect for comparison of demographic groups.
11. Have students observe, analyze and write summary statements to reflect the data collected.
12. Facilitate class discussion to address the use of such data collecting methods (surveys, graphs and charts) by theatrical companies to gain insight into the success of their productions, including audiences' character favorites.

**Students will:**

1. Share with the class their favorite character and event from The Wizard of Oz story/production.
2. Classify resulting data into categories.
3. Interview and survey others to collect and record data on "favorites" from The Wizard of Oz.
4. Create multiple graphs to reflect numerical, categorical data, and data demographics.
5. Observe, analyze and compare data, and write conclusive summary statements.



**Handout: Math (4-6)  
Sample Survey Questions**

<b>Name</b>		
<b>Grade</b>		
<b>Age</b>		
<b>Sex</b> (etc.) <i>Students will generate additional criteria for demographics.</i>		
<b>Question:</b>	<b>Tally:</b>	<b>Student Statements:</b>
<b>Who was your favorite character?</b>		
1. Glinda the Good Witch		
2. Dorothy		
3. The Wicked Witch of the West		
4. Scarecrow		
5. Tin Man		
6. Lion		
7. Wizard		
8. Toto		
9. Other		
<b>What was your favorite event in the story?</b>		
1. Dorothy singing "Somewhere Over the Rainbow?"		
2. Tornado		
3. Dorothy meeting the Munchkins		
4. Journey through the enchanted forest.		
5. Dorothy captured by the Flying Monkeys		
6. Melting of the Wicked Witch		
<i>Other question to be decided by teacher and/or students</i>		