

Core Content

Cluster Title: Represent and interpret data.

Standard 3: Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent five pets.

MASTERY Patterns of Reasoning:**Conceptual:**

Students will understand how to present data on a scaled picture graph and a scaled bar graph with several categories.

Students will understand that each picture on a picture graph represents a set number of items.

Students will understand that the lines on a bar graph represent a specified increment, and can identify the amount represented.

Students will understand that categories on a bar graph can be compared to each other to determine how many more or less.

Procedural:

Students can accurately solve two step problems (how many more, how many less) relating to a picture or bar graph.

Students can compute, with repeated addition or multiplication of given symbols, the totals shown in each category on a picture graph.

Students can compute, with repeated addition or multiplication, the totals shown in given categories on a bar graph.

Students can convert data, such as tally marks, to numbers to show totals in each category.

Students can use the scale given to accurately show data on the graph.

Students can collect data through a survey in order to create a graph.

Representational:

Students can create a picture graph and a bar graph showing a data set, using varied scales appropriate to the data set, and verbally defend the graph created.

Students can model information shown on a graph with manipulatives.

Students can explain strategies for solving one- and two-step “how many more” and “how many less” problems, both verbally and in writing.

Supports for Teachers

Critical Background Knowledge
<p>Conceptual:</p> <ul style="list-style-type: none"> Students will understand that bar graphs and picture graphs are pictures that show data. Students will understand data when presented in single units, with up to four categories. Students will skip count by twos, fives, and tens. Students will understand the concept of compare and contrast, and how to verbalize differences. Students will know the difference between a bar graph and a picture graph. Students will know that graphs have a key and what the key is used for. Students will know that picture graphs and bar graphs are used to count objects. <p>Procedural:</p> <ul style="list-style-type: none"> Students can answer simple put-together (addition), take-apart (subtraction), and comparison problems using information presented on a picture graph or bar graph. <p>Representational:</p> <ul style="list-style-type: none"> Using given data, students can create picture graphs and bar graphs when key and scale are in single units (whole numbers) and the graph has no more than four categories.
Academic Vocabulary and Notation
<p>data, picture graph, pictograph, symbol, key, scale, category, title labels, compare, how many more/less, tally marks, chart, survey</p>

Instructional Strategies Used	Resources Used
<p>Use literature to introduce and pique interest in graphs. For example, have students use <i>The Great Graph Contest</i> by Loreen Leedy, or find graphs in newspapers or magazines, or survey the class to collect data of personal interest.</p> <p>Present clear data sets for students to create bar and picture graphs. Make available multiple art media for creating eye catching graphs. Explain these graphs verbally with a partner/group.</p>	<p>Nagda, Ann Whitehead. <i>Tiger Math: Learning to Graph from a Baby Tiger</i>. Henry Holt, 2002.</p> <p>Ochiltree, Diane. <i>Bart's Amazing Charts</i>. Demco Media, 2000.</p> <p>Smith, David J. <i>If the World Were a Village</i>. Kids Can Press, 2011.</p> <p>Murphy, Stuart J. <i>Lemonade for Sale (MathStart 3)</i>. HarperCollins, 1997.</p> <p>Leedy, Loreen. <i>The Great Graph Contest</i>. Holiday House, 2005.</p> <p>http://nces.ed.gov/nceskids/createagraph/</p>

Assessment Tasks Used

Skill-Based Task:

Given a piece of graph paper, students create picture and bar graphs for a given set of data with several categories, and with a scale or key of 2, 5, or 10.

Problem Task:

Josey wanted to know how many picture books certain authors have written. She found the information online and then created the scaled picture graph below. Each picture represents five books. What does the graph tell you? Justify your answers.

Number of Books by Children’s Authors

