

MA.3.DP.1.2

Overarching Standard: *MA.3.DP.1 Collect, represent, and interpret numerical and categorical data.*

Benchmark of Focus

MA.3.DP.1.2: Interpret data with whole-number values represented with tables, scaled pictographs, circle graphs, scaled bar graphs or line plots by solving one- and two-step problems.

Benchmark Clarifications

Clarification 1: Problems include the use of data in informal comparisons between two data sets in the same units.

Clarification 2: Data displays can be represented both horizontally and vertically.

Clarification 3: Circle graphs are limited to showing the total values in each category.

Related Benchmark/Horizontal Alignment

- MA.3.NSO.2.2/2.4

Vertical Alignment

Previous Benchmarks

MA.2.DP.1.2

Next Benchmarks

MA.4.DP.1.3

Terms from the K-12 Glossary

- Bar Graph
- Categorical Data
- Circle Graph
- Whole Number

Purpose and Instructional Strategies

The purpose of this benchmark is for students to interpret data displayed in scaled pictographs, circle graphs, scaled bar graphs and line plots. Like MA.3.DP.1.1, the purpose of this benchmark builds on data interpretation skills from Grades 1 and 2. In Grade 1, students interpreted data represented with tally marks and pictographs, and in Grade 2, students also interpreted data represented in pictographs and bar graphs. Additionally, students solved addition and subtraction problems using the data representations.

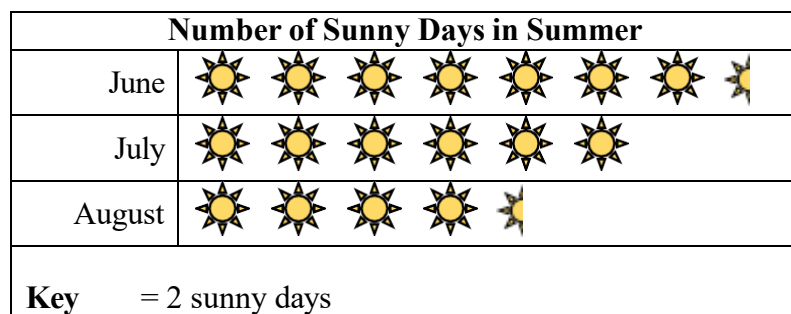
- In grade 3, students will interpret categorical data represented in scaled pictographs and bar graphs, whole-number numerical data represented in line plots, and whole-number category totals in circle graphs (e.g., instead of percentages). To interpret the represented data, they will solve one- and two-step problems from a given data set or compare two data sets in the same units (MTR.5.1).
- Instruction should include opportunities for students to interpret their own numerical and categorical data (MTR.7.1).
- Students could use addition, subtraction, multiplication, or division to solve the problems. This benchmark should be taught with 3.DP.1.1 (collecting and representing data) (MTR.2.1, MTR.4.1, MTR.5.1).

Common Misconceptions or Errors

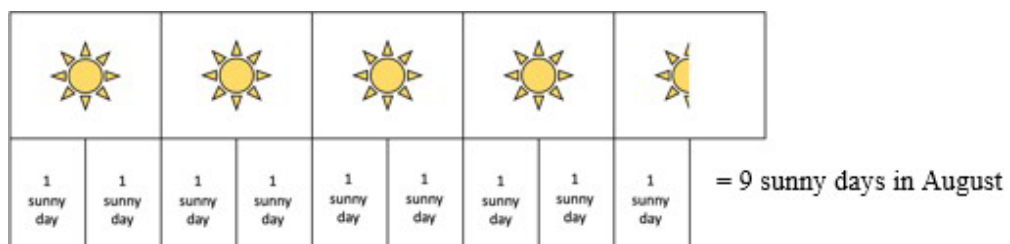
- Students may confuse the values in scaled pictographs and bar graphs. They should always utilize the given key when determining frequency of each category.

Strategies to Support Tiered Instruction

- Instruction includes opportunities to determine the values in a scaled pictograph, pointing out the importance of paying close attention to the key of the pictograph. The key outlines how much each of the pictures on the graph will represent. Students connect multiplication strategies to this concept. Instruction includes opportunities to practice counting by 2s, 5s, and 10s, to be successful with this benchmark. To help students see the connection between the key and what each picture represents, a bar diagram may be helpful.
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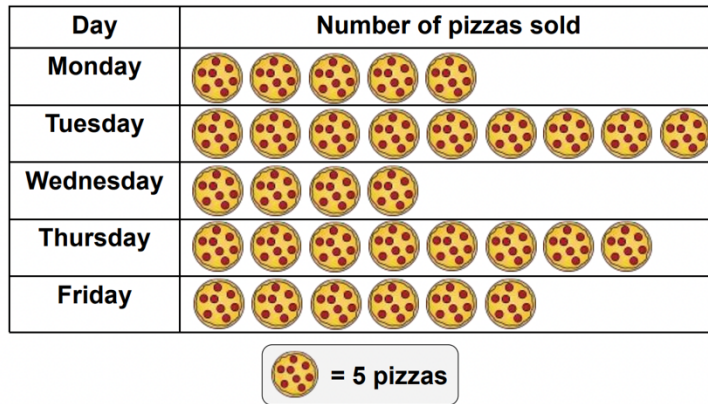


- For example, students use the key for the pictograph and a bar model to determine the number of sunny days in August.



Questions to ask students:

- **Show the pictograph with a scaled key below to the student. Ask: What equation can help you find the total number of pizzas sold on Friday?**

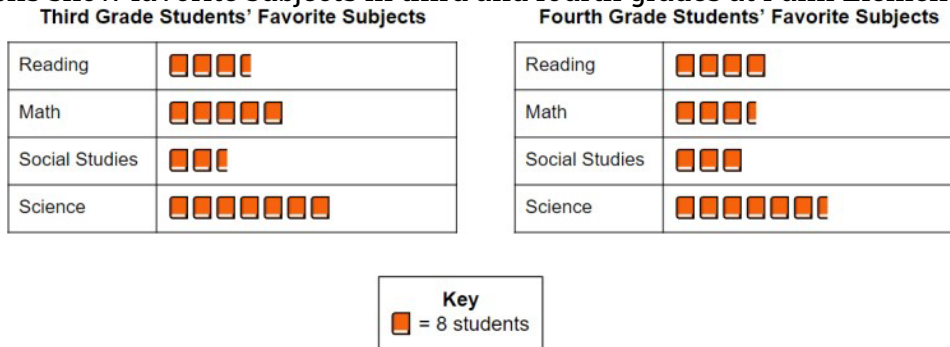


- Sample answer that indicates understanding: *The key tells me that each picture of a pizza counts as 5 pizzas. Since there are 6 pizzas next to Friday, then I can think 6 groups of 5 is 30 or $6 \times 5 = 30$. So, there were 30 pizzas sold on Friday.*
- **What is this bar graph/pictograph/circle graph/line plot about? What information can you learn from the graph?**
 - Sample answer that indicates understanding: *I can read the title and look at the labels to help me understand what the graph is about. The student correctly shares some information about the data represented in the graph (example: "most people like pizza" or "the least favorite color was yellow")*
- **Have students look at a scaled bar graph or pictograph to compare two categories. Ask how many more or how many less is in one category than the other.**
 - Sample answer that indicates understanding: *The student correctly counts the number in each category then adds or subtracts them to find how many more or how many less.*

Instructional Tasks

Instructional Task 1

The pictographs show favorite subjects in third and fourth grades at Palm Elementary School.



Part A: Write an equation that shows how many fourth graders chose reading as their favorite subject.

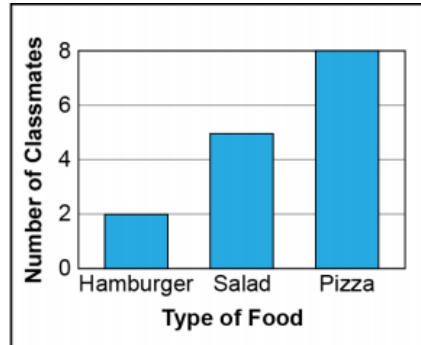
Part B: How many third graders chose social studies as their favorite subject?

Part C: How many more students prefer math in third grade than fourth grade?

Instructional Items

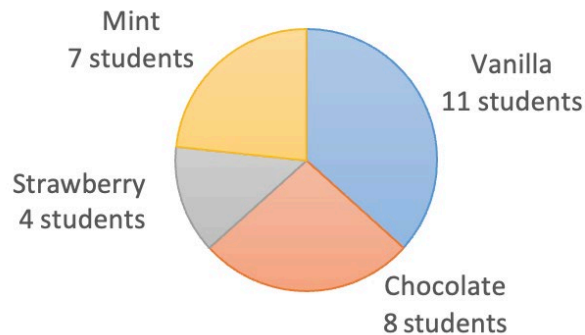
Instructional Item 1

John surveys his classmates about their favorite foods, as shown in the bar graph. How many more classmates chose pizza as their favorite food than classmates who chose salad?



Instructional Item 2

Molly surveys her class about their favorite ice cream flavors, as shown in the circle graph. How many students picked a favorite ice cream flavor other than vanilla?



Achievement Level Descriptors

Benchmark	Context	Assessment Limits
<p>MA.3.DP.1.2 Interpret data with whole-number values represented with tables, scaled pictographs, circle graphs, scaled bar graphs or line plots by solving one- and two-step problems.</p> <p>Clarification 1: Problems include the use of data in informal comparisons between two data sets in the same units.</p> <p>Clarification 2: Data displays can be represented horizontally or vertically.</p> <p>Clarification 3: Circle graphs are limited to showing the total values in each category.</p> <p>Also Assesses</p> <p>MA.3.DP.1.1 Collect and represent numerical and categorical data with wholenumber values using</p>	<p>Real-world for MA.3.DP.1.2</p> <p>Both for MA.3.DP.1.1</p>	<p>Data are limited to no more than six categories.</p> <p>Items assessing MA.3.DP.1.1 and including numerical data sets will not be presented as sets using braces.</p>

<p>tables, scaled pictographs, scaled bar graphs or line plots. Use appropriate titles, labels, and units.</p> <p>Clarification 1: Within this benchmark, the expectation for representation is to complete a representation or construct a representation from a data set.</p> <p>Clarification 2: Instruction includes the connection between multiplication and the number of data points represented by a bar in scaled bar graph or a scaled column in a pictograph.</p> <p>Clarification 3: Data displays are represented both horizontally and vertically.</p>			
ALD 2	ALD 3	ALD 4	ALD 5
<p>given the data, creates a table, scaled pictograph, or scaled bar graph with appropriate titles, labels, and units.</p> <p>solves one-step problems using a given scaled pictograph or scaled bar graph.</p>	<p>represents numerical and categorical data with whole number values using tables, scaled pictographs, or scaled bar graphs with appropriate titles, labels, and units.</p> <p>interprets data with whole number values presented in tables, scaled pictographs, circle graphs, or scaled bar graphs by solving one-step problems.</p>	<p>collects and represents numerical and categorical data with whole number values using tables, scaled pictographs, scaled bar graphs, or line plots; uses appropriate titles, labels, and units.</p> <p>interprets data with whole number values represented with tables, scaled pictographs, circle graphs, scaled bar graphs, or line plots by solving one- and two-step problems.</p>	<p>collects and represents numerical and categorical data with whole number values using tables, scaled pictographs, scaled bar graphs, or line plots; uses appropriate titles, labels, and units; explains how different scale factors affect representation of data.</p> <p>interprets and compares multiple data sets with whole number and/or missing values represented with tables, scaled pictographs, circle graphs, scaled bar graphs, or line plots by solving one- and two-step problems.</p>

Additional Resources:

[CPALMS Resources](#)

Khan Academy Practice: [Reading Bar Graphs](#) – provides multiple *one-step* questions to practice analyzing and solving about scaled bar graphs.

Khan Academy Video: [Interpreting Bar Graphs](#) – provides support with solving a *multi-step* problem about a scaled bar graph.

Kahn Academy Practice: [Reading Picture Graphs](#) – provides support with analyzing and solving problems involving scaled pictographs

Resources/Tasks to Support Your Child at Home:

Khan Academy Video: [Reading Bar Graphs](#) – watch the video with your child and pause as each new graph appears. Take a moment to have your child make sense of the data in the graph, including the scale. Have your child try and answer the questions before listening to the rest of the answer in the video.

Khan Academy Practice: [Reading Bar Graphs](#) – practice analyzing and answering *one-step* questions about scaled bar graphs.

Kahn Academy: [Reading Picture Graphs \(Multi-Step\)](#) – practice analyzing and answering *multi-step* questions about scaled and non-scaled pictographs.