Teacher Guide to Clarification

**2.MD.10**

**Represent and Interpret Data**

2.MD.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (see Table 1.)

**Draw picture and bar graphs and use the information in or to solve put-together, take-apart, and compare problems**

This standard requires a variety of skills working with categorical data by:

* Drawing a picture graph with up to 4 categories
* Drawing a bar graph with up to 4 categories (bars represented both vertically and horizontally)
* Solve simple put-together, take-apart, and compare problems

**2.MD.10 is a Supporting Standard. It supports students preforming operations with problems involving**

**put-together, take-apart, and compare** situations

**Types of Pets**

Be sure to expose students to bars shown horizontally

**Number of Students**

**Explanations and Examples:**

**2.MD.10** calls for students to work with categorical data by organizing, representing and interpreting data.

Students should have experiences posing a question with 4 possible responses and then work with the data that they collect.

**Example**:

Students pose a question and the 4 possible responses. Which is your favorite flavor of ice cream? Chocolate, vanilla, strawberry, or cherry?

Students collect their data by using tallies or another way of keeping track.

Students organize their data by totaling each category in a chart or table. Picture and bar graphs are introduced in Second Grade.

|  |  |
| --- | --- |
| **Flavor** | **Number of People** |
| Chocolate | 12 |
| Vanilla | 5 |
| Strawberry | 6 |
| Cherry | 9 |

Students display their data using a picture graph or bar graph using a single unit scale.

**To clarify: the single scale unit is referring to bar graph intervals and the picture used for a pictograph to only represent 1.**

In second grade, picture graphs (pictographs) include symbols that represent single units. Pictographs should include a title, categories, category label, key, and data.

|  |  |
| --- | --- |
| Title: Favorite Flavor | |
| Flavor | Number Of People |
| Chocolate | C:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmf |
| Vanilla | C:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmf |
| Strawberry | C:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmf |
| Cherry | C:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmfC:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmf |
| Key C:\Users\Owner\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6C2IYNXR\MC900013331[1].wmf = 1 person | |

Students answer simple problems related to addition and subtraction that ask them to put together, take apart, and compare numbers.

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Building the foundation for Grade 3…

In Grade 3, the most important development in data representation for categorical data is that students now draw picture graphs in which each picture represents more than one object, and they draw bar graphs in which the height of a given bar in tick marks must be multiplied by the scale factor in order to yield the number of objects in the given category. These developments connect with the emphasis on multiplication in this grade.

Common Core Standards Writing Team. (2013, September 19). *Progressions for the Common   
 Core State Standards in Mathematics(draft). K-5 Measurement and Data(Data Part).* Tucson, AZ: Institute for Mathematics and Educations, University of Arizona.

*Put-Together/ Total Unknown:*

*How many people like chocolate and vanilla ice-cream?*

*12 + 5 = 17*

*Take-Apart/ Addend Unknown:*

*Eleven people were surveyed, and 5 people liked Vanilla ice-cream. How many people liked Strawberry ice-cream?*

*Compare/ Difference Unknown:*

*How many more people liked Chocolate than Strawberry?*

*Compare/ Bigger Unknown:*

*Three more people liked cherry compared to those who liked strawberry. Six people liked strawberry. How many people liked cherry?*

*Compare/ Smaller Unknown:*

*Four more people liked cherry compared to those who liked vanilla. Nine people liked cherry ice-cream. How many people liked vanilla?*

Second graders should draw both horizontal and vertical bar graphs. Bar graphs include a title, scale, scale label, categories, category label, and data.

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When creating and interpreting bar graphs, it is important to ask the same kind of simple problems related to addition and subtraction that ask students problem situations involving put together, take apart, and compare numbers.

Grade 2

Students in Grade 2 draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. They solve simple put-together, take-apart, and compare problems using information presented in a bar graph.2.MD.10, 2.OA.1 The illustration shows an activity in which students make a bar graph to represent categorical data, then solve addition and subtraction problems based on the data.



Students might use scissors to cut out the pictures of each organism and then sort the organisms into piles by category. Category counts might be recorded efficiently in the form of a table.

A bar graph representing categorical data displays no additional information beyond the category counts. In such a graph, the bars are a way to make the category counts easy to interpret visually.

Thus, **the word problem in part 4 could be solved without drawing a bar graph**, just by using the category counts. The problem could even be cast entirely in words, without the accompanying picture: “There are 9 insects, 4 spiders, 13 vertebrates, and 2 organisms of other kinds. How many more spiders would there have to be in order for the number of spiders to equal the number of vertebrates?”

**Scales in bar graphs** Consider the two bar graphs shown to the right, in which the bars are oriented vertically. (Bars in a bar graph can also be oriented horizontally, in which case the following discussion would be modified in the obvious way.) Both of these bar graphs represent the same data set. These examples illustrate that the horizontal axis in a bar graph of categorical data is not a scale of any kind; position along the horizontal axis has no numerical meaning. Thus, the horizontal position and ordering of the bars are not determined by the data.*•*

However, the vertical axes in these graphs do have numerical meaning. In fact, the vertical axes in these graphs are segments of number line diagrams. We might think of the vertical axis as a “count scale” (a scale showing counts in whole numbers)—as opposed to a measurement scale, which can be subdivided into fractions of a measurement unit.



Common Core Standards Writing Team. (2013, September 19).

*Progressions for the Common Core State Standards in Mathematics(draft). K-5 Measurement and Data(Data Part)* Tucson, AZ: Institute for Mathematics and Educations, University of Arizona.

**Coherence and Connections: Need to Know**

|  |  |  |
| --- | --- | --- |
| Below Grade Level | At Grade Level | Above Grade Level |
| 1.MD.4 | **2.MD.10**  2.OA.1 |  |

**Examples of Linking Supporting Clusters to the Major Work of the Grade**

In cluster 2.MD.D, “Represent and interpret data,” standard **2.MD.D.10** particularly represents an opportunity to link to the major work of grade 2. Picture graphs and bar graphs can add variety as contexts for solving addition and subtraction problems. The language in **2.MD.D.10** mentions word problems (2.OA) explicitly. See the *Progression* document for K–5 Measurement and Data for more on the connections between data work and arithmetic in the early grades.21

*PARCC Draft Model Content Frameworks: Mathematics Grades K-2* (2013, December).  
 Retrieved May 10, 2014, from <http://parcconline.org/sites/parcc/files/PARCCMCFMathematicsNovember2012V3_FINAL_0.pdf>

Below is the Table from the Progression Document that the PARCC Content Model Framework K-2 refers to. Look at the build K-3 of the work students do with Categorical data and arithmetic work.



*PARCC Draft Model Content Frameworks: Mathematics Grades K-2* (2013, December).  
 Retrieved May 10, 2014, from <http://parcconline.org/sites/parcc/files/PARCCMCFMathematicsNovember2012V3_FINAL_0.pdf>

**Classroom Resources**

Have Daily Discussion and use the Power Point to represent and interpret categorical data

**HOT Questions**

**Class Pets**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Bird |  |  |  |  |  |  |
| Cat  Types of pets |  |  |  |  |  |  |
| Dog |  |  |  |  |  |  |
| Ferret |  |  |  |  |  |  |
|  | 1 | 2 | 3 | 4 | 5 | 6 |

Number of Students

1. Compare the number of students that have a ***ferret or a bird*** to the number of students that have a ***dog*** for a pet.

2. How many more pet dogs are there than pet cats?

3. What is the number of pets with four legs?

4. There are a total of 11 students surveyed. 2 students have ferrets, 1 student has a cat and 3 students have birds. How many students have a dog?

5. Create your own 2-step question using the Class Pets bar graph.

**Additional Resources**

2.MD.10 Tasks from North Carolina

<http://commoncoretasks.ncdpi.wikispaces.net/2.MD.9-2.MD.10+Tasks>

Inside Mathematics performance task

<http://www.insidemathematics.org/assets/common-core-math-tasks/our%20pets.pdf>

Class Pocket data collection

<http://www.insidemathematics.org/assets/problems-of-the-month/pick%20a%20pocket.pdf>

Engage NY – Grade 2 video

https://www.engageny.org/resource/grade-2-math-bar-graph-2md10