3rd

Topic 16: Data

Lessons 1-6

Math Intervention Resources

MDIS:

16-1 D85
16-2 D85
16-3 D83, D84
16-4 D83
16-5 D84
16-6 E29

Guided Practice

- As students work with graphs, provide opportunities for them to interpret data found on graphs by asking questions. Guide students in understanding the scales used on the bar graphs.
- Demonstrate the meaning of bar graphs by having students make a "human bar graph." Have students line up according to a visible characteristic, such as hair color. Draw a bar graph on the chalkboard to represent how the students line up.

Reinforce

Envision Math Games:

Topic Game: NA

envision Online Games
Make a bar graph
Make a line graph 1
Make a line graph 2
Make a picture graph 1
Make a picture graph 2
Make a tally chart

Symbaloo

Assessments

3rd

Topic 16: Data

Lesson 16-1

Line Plots

Quick and Easy **Lesson Overview**

Objective	Essential Understanding	Vocabulary	Materials
Students will use a line plot to organize the results of an experiment.	Line plots allow data to be compared more easily than in a list or a table.	**line plot**	Line Plots (Teaching Tool 48); Paper bag

PROFESSIONAL DEVELOPMENT

Math Background

In this lesson, students will learn to use line plots. First, they will learn to read line plots and then use the data to answer questions. When reading and interpreting data on a line plot, students will find that they are able to compare data more easily than if the data is in a list or table. They find that they can see which number occurs most frequently as well as the value of most of the data.

2 Guided Practice

MATHEMATICAL PRACTICES

Remind students that they should record one X for each result. Tell students to check their completed line plot against the data.

Exercise 2

Error Intervention

If students are having difficulty deciding how many Xs to draw,

then have them describe a line plot. *What do the Xs stand for in this line plot?* [The Xs represent one student.] *How many students jumped 33 inches?* [2 students.] *So, how many Xs should you draw above the number 33?* [2]

Reteaching For another example and more practice, assign **Reteaching** Set A on p. 406.

Common Core

Domain

Measurement and Data

Cluster

Represent and interpret data.

Standard

3.MD.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units–whole numbers, halves, or quarters.

Mathematical Practices

- ○ Make sense of problems and persevere in solving them.
- ○ Reason abstractly and quantitatively.
- ○ Construct viable arguments and critique the reasoning of others.
- ○ Model with mathematics.
- ✔ Use appropriate tools strategically.
- ✔ Attend to precision.
- ✔ Look for and make use of structure.
- ○ Look for and express regularity in repeated reasoning.

3rd

Topic 16: Data

Lesson 16-2

Line Plots

Quick and Easy **Lesson Overview**

Objective	Essential Understanding	Vocabulary	Materials
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PROFESSIONAL DEVELOPMENT

Math Background

In this lesson, students will learn to use line plots. First, they will learn to read line plots and then use the data to answer questions. When reading and interpreting data on a line plot, students will find that they are able to compare data more easily than if the data is in a list or table. They find that they can see which number occurs most frequently as well as the value of most of the data.

2 Guided Practice

MATHEMATICAL PRACTICES

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Mathematical Practices

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Topic 16: Data

Lesson 16-3

Reading Pictographs and Bar Graphs

Quick and Easy Lesson Overview

Objective	Essential Understanding	Vocabulary	Materials
Students will read and interpret data from a pictograph and a bar graph.	Each type of graph is most appropriate for certain kinds of data. Pictographs and bar graphs make it easy to compare data.	**pictograph** **key** **bar graph** **scale**	Reading Pictographs and Bar Graphs (Teaching Tool 49)

PROFESSIONAL DEVELOPMENT

Math Background

In this lesson, students read **pictographs** and **bar graphs,** extract information, and solve various addition, subtraction, and place-value problems.

Pictographs are used to show data, such as survey results. The **key** for a pictograph shows what symbols are used and how many items each symbol and partial symbol stand for.

Bar graphs are a common way to display data because the graphed data are easy to compare. Students should understand the basic relationship between the length of the bar and the relative number represented. Although the **scale** can be used to order the data, it is not necessary and is more time-consuming.

Students will learn to make pictographs and bar graphs and to draw conclusions from data and graphs later in this topic.

Common Core

Domain
Measurement and Data

Cluster
Represent and interpret data.

Standard
3.MD.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....

Mathematical Practices

- ✔ Make sense of problems and persevere in solving them.
- ✔ Reason abstractly and quantitatively.
- ✔ Construct viable arguments and critique the reasoning of others.
- ✔ Model with mathematics.
- ✔ Use appropriate tools strategically.
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2 Guided Practice

MATHEMATICAL PRACTICES

Remind students to look at the key in pictographs and the scale in bar graphs to find the number represented by each picture or line.

Exercise 4

Error Intervention

If students are having difficulty reading the pictograph,

then ask: *How can you find how many teams are in each league?* [Count by 2s for each pair of hockey sticks and by 1s for each single hockey stick to find the number of teams in each league.] *What operation will you use to find how many teams in all are in the two leagues?* [Addition]

Reteaching For another example and more practice, assign **Reteaching** Set C on p. 407.

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Topic 16: Data

Lesson 16-4

Making Pictographs

Quick and Easy **Lesson Overview**

Objective	Essential Understanding	Vocabulary	Materials
Students will make a pictograph from a table or tally chart.	Each type of graph is most appropriate for certain kinds of data. The key for a pictograph determines the number of pictures needed to represent each number in a set of data.		Making Pictographs (Teaching Tool 50)

PROFESSIONAL DEVELOPMENT

Math Background

Research says ... making graphs provides children with an opportunity to count, compare, add, subtract, sequence, and classify data. Representing amounts using tactile and visual representations helps to facilitate children's understanding of comparative values (Choate and Okey, 1981). This lesson and the next involve students in making and interpreting pictographs and bar graphs.

2 Guided Practice

MATHEMATICAL PRACTICES

Remind students to identify the value of whole symbols and any partial symbols in the key.

Exercise 4

Error Intervention

If students are having difficulty determining how many symbols to draw,

then ask: ***How can skip counting by 10s and 5s help you draw the correct symbols?*** [You can count by 10s and then 5s until you reach 25. Each time you count by 10, draw a whole triangle. Each time you count by 5, draw a half triangle.]

Reteaching For another example and more practice, assign **Reteaching** Set C on p. 407.

Common Core

Domain

Measurement and Data

Cluster

Represent and interpret data.

Standard

3.MD.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....

Mathematical Practices

- ✔ Make sense of problems and persevere in solving them.
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Topic 16: Data

Lesson 16-5

Making Bar Graphs

Quick and Easy Lesson Overview

Objective	Essential Understanding	Vocabulary	Materials
Students will make a bar graph to represent the data in a table or tally chart.	Each type of graph is most appropriate for certain kinds of data. In a bar graph, the scale determines how long the bar needs to be to represent each number in a set of data.		Centimeter Grid Paper (Teaching Tool 11)

PROFESSIONAL DEVELOPMENT

Math Background

Bar graphs are a good way to display data to make comparisons. Students have read and interpreted data from graphs. They can use their familiarity with graphs to help them make bar graphs.

Although a vertical bar graph is shown in the Visual Learning Bridge, students are also asked to make graphs with horizontal bars. Let students know that regardless of whether bars go up and down or across, each method shows the same information.

Emphasize to students that they should make sure their bars are labeled correctly and that the length of each bar matches the data correctly.

Students may need a more in-depth discussion of scale, including how all numbered scales begin with zero and how to decide on the size of the intervals on the scale. You might point out that students can skip count to find the values for any scale.

2 Guided Practice

MATHEMATICAL PRACTICES

Remind students that the bars on their bar graphs should start at 0 and stop at the appropriate value on the scale.

Exercise 1

Error Intervention

If students are having difficulty making bar graphs with proper intervals,

then ask: ***Between which grid lines would the bars for chess, painting, and writing end?*** [All three bars would end between 5 and 10.] ***How could you change the scale so that the values for each bar are clearer?*** [Choose a scale with fewer numbers between grid lines.]

Reteaching Provide grid paper to students. Have them copy the graph in the example. Discuss the steps for making a bar graph. Be sure students understand that the scale starts at zero and goes to a number greater than the greatest number being graphed. Have students use a straightedge to check that each of their bars aligns with the correct number on the scale. For another example and more practice, assign **Reteaching** Set D on p. 407.

Common Core

Domain

Measurement and Data

Cluster

Represent and interpret data.

Standard

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Mathematical Practices

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Topic 16: Data

Lesson 16-6

Problem Solving: Use Tables and Graphs to Draw Conclusions

Quick and Easy **Lesson Overview**

Objective	Essential Understanding	Vocabulary	Materials
Students will solve problems by using tables and graphs to draw conclusions.	Some problems can be solved by making, reading, and analyzing a graph.		Sandwich Survey (Teaching Tool 30)

PROFESSIONAL DEVELOPMENT

Math Background

In reading textbooks, students sometimes find tables and graphs accompanying a selection. Tables and graphs are generally used to show comparisons among various categories of information. In mathematics, students can use the information in tables and graphs to help them solve problems.

When information is presented in one format, displaying the information differently sometimes makes it easier to compare data and draw conclusions. Exercise 14 on page 405 is an example of when it might be helpful to make a table to solve the problem. Exercises 11 and 12 on page 405 are examples of when it might be helpful to make a pictograph or bar graph to compare data.

2 Guided Practice

MATHEMATICAL PRACTICES

The problem-solving strategy ***Make a Table*** can be helpful in trying to draw conclusions from data. To review this strategy, refer students to the Problem-Solving Handbook.

Exercise 5

Error Intervention

If students are having difficulty writing a comparison problem,

then ask: ***Which operation can you use to compare the values in two categories in the same graph?*** [Subtraction] ***How could you write a comparison statement and use it to write a comparison problem?*** [Make the statement the answer to the problem. Then write a problem to match the answer.]

Reteaching Have students make a pictograph and a bar graph of the information in the Bicycle Club table. ***Write 2 comparison statements about the data.*** Discuss which way of showing the information made it easiest to compare data. For more reteaching and examples, see **Reteaching** Set D on p. 407.

Common Core

Domain

Measurement and Data

Cluster

Represent and interpret data.

Standard

3.MD.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....

Mathematical Practices

- ○ Make sense of problems and persevere in solving them.
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