

Getting Ready to Teach Unit 5

Learning Path in the Common Core Standards

In this unit, children will read and show time to the 5 minutes, display data in bar graphs and picture graphs, and interpret the data in graphs to solve problems.

Visual models and real world situations are used throughout the unit to help children understand the concepts of time and graphing.

Help Children Avoid Common Errors

Math Expressions gives children opportunities to analyze and correct errors, explaining why the reasoning was flawed.

In this unit we use Puzzled Penguin to show typical errors that children make. Children enjoy teaching Puzzled Penguin the correct way, why this way is correct, and why Puzzled Penguin made the error. Common errors are presented in the Puzzled Penguin feature in the following lessons:

- ▶ **Lesson 2:** Choosing the incorrect hour when the hour hand is closer to the greater number
- ▶ **Lesson 4:** Reading the data in a picture graph incorrectly when the pictures are not aligned
- ▶ **Lesson 7:** Not realizing that a problem has more than one step
- ▶ **Lesson 8:** Not beginning the scale on a bar graph at 0.

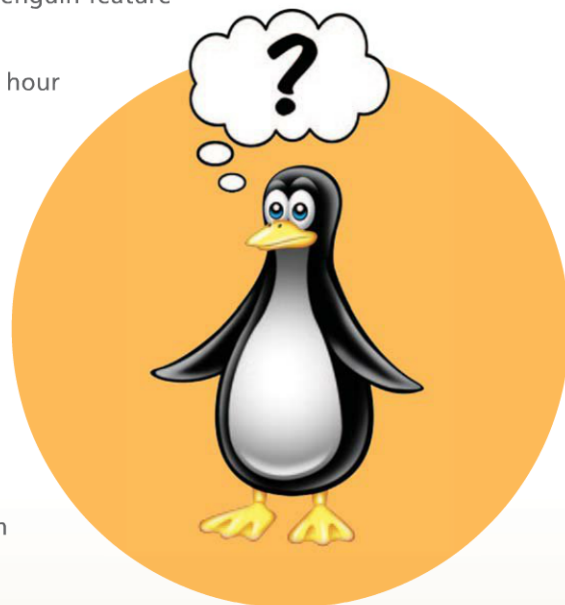
In addition to Puzzled Penguin, there are other suggestions listed in the Teacher Edition to help you watch for situations that may lead to common errors. As a part of the Unit Test Teacher Edition pages, you will find a common error and prescription listed for each test item.

Math Expressions VOCABULARY

As you teach this unit, emphasize understanding of these terms.

- 5-group circles
- comparison bars

See the *Teacher Glossary*.



Lessons

1

2

Working with Time

The Grade 2 Common Core State Standards for Measurement and Data require children to tell and write time from analog and digital clocks to the nearest five minutes, using A.M. and P.M.

Time and Clocks Children work with the two kinds of clocks that are most often used for telling time—analogue and digital. Knowing how to tell time with both kinds of clocks is an important real world skill as so much of what we do is driven by time—appointments, schedules, planning trips, and much else.

As they work with time in Grade 2, children build an analogue clock that they use to tell and show times. They also draw hands on analogue clock faces and write times in digital clock images.

Draw hands on each clock to show the time.

14.



10:35

15.



9:20

16.



2:25

17.



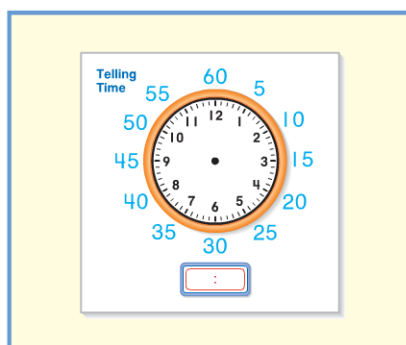
4:50

Understanding how analogue clocks work helps children to understand that a clock is a tool for measuring time with iterated units, just as a ruler is a tool for measuring length with iterated units. As in the customary length system a unit, the inch, is repeated to measure lengths and to form larger units, such as a foot or a yard or a mile, so in the system of time a unit, the minute, is repeated to measure time and to form larger units, such as an hour or a day or a year.

Guide children to observe that as the hour hand moves from one number to another, the minute hand moves all around the clock face. Some children may observe that to do this, the minute hand moves faster than the hour hand.

Connection to Geometry As children work with telling time to the half-hour, it may be helpful for them to relate two halves of an hour to two halves of a circle. When the minute hand is at 6 or 30 minutes, it is halfway through an hour and it has moved halfway around the clock face. Some children may also notice that the hour hand has moved halfway between the two hour numbers.

Skip Counting to Find Time Amounts To help children make the connection between the numbers on an analog clock and the number of minutes they represent, they use skip counting by 5s. They count by five-minute intervals as the clock numbers are pointed out on the Time Poster, which you have labeled with the numbers of minutes.



Daily Routine for Time Use this new daily routine every day as you teach this unit to provide practice with telling time to 5 minutes and understanding differences between A.M. and P.M. Five Student Leaders are needed to help with this routine.

The tasks are counting by fives around the clock with the Time Poster, telling digital time to 5 minutes, and showing clock face time to 5 minutes. Children use the clocks they made in Lesson 1 to show their responses.

**from THE PROGRESSIONS FOR
THE COMMON CORE STATE
STANDARDS ON NUMBER AND
OPERATIONS IN BASE TEN**

Understand Place Value Students begin to work towards multiplication when they skip count by 5s, by 10s, and by 100s. This skip counting is not yet true multiplication because students don't keep track of the number of groups they have counted.

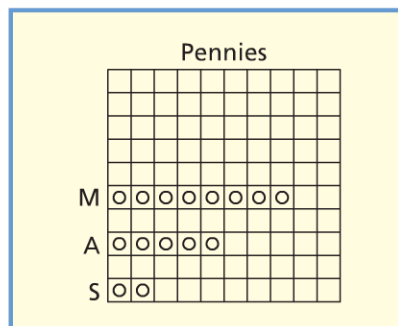
Lessons

3

4

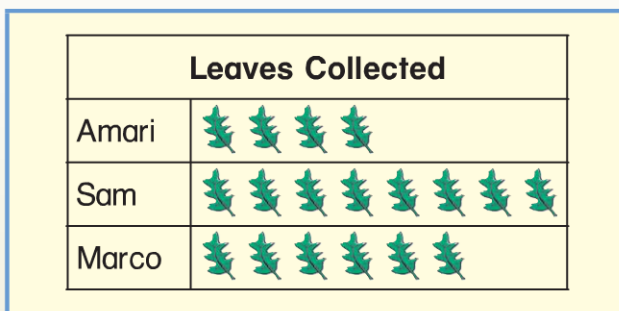
Picture Graphs

Make a Picture Graph Children construct their first picture graph by using the 10 × 10 Grid on their MathBoards to represent a situation in which you give each of three children a different numbers of pennies. After children work independently to record this information in a graph, they share and discuss their work. Then you guide them through a more formal process of making and labeling a picture graph. Point out that drawing circles to represent the pennies is easier and quicker than trying to draw pictures of the pennies.



Ask Questions Help children understand that collecting and representing data is only part of learning to work with data. Explain another important part of working with data using a graph is learning about the data by examining the graph. Guide children to ask and answer questions about the data in the graph.

Solve Problems Children use picture graphs shown in the Student Activity Book to solve problems and then make up their own questions about those graphs. Help them focus on asking comparative and equalizing questions about the data.



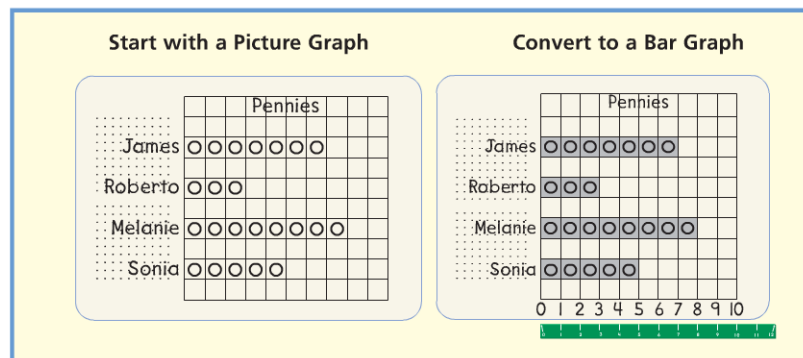
Asking questions and solving problems about picture graphs prepares children for similar work with bar graphs.

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STATE STANDARDS ON
MEASUREMENT AND DATA

Categorical Data 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.

Bar Graphs

Make a Bar Graph Converting a picture graph to a bar graph helps children understand what the bars in a bar graph represent. Children begin by making a picture graph on the 10×10 Grid on their MathBoards.



Children see that the length of each bar represents the total number of things (in that category). Point out that in a bar graph the length of each bar shows the total number of that item, but in a picture graph, each item is shown separately so that the total number has to be counted.

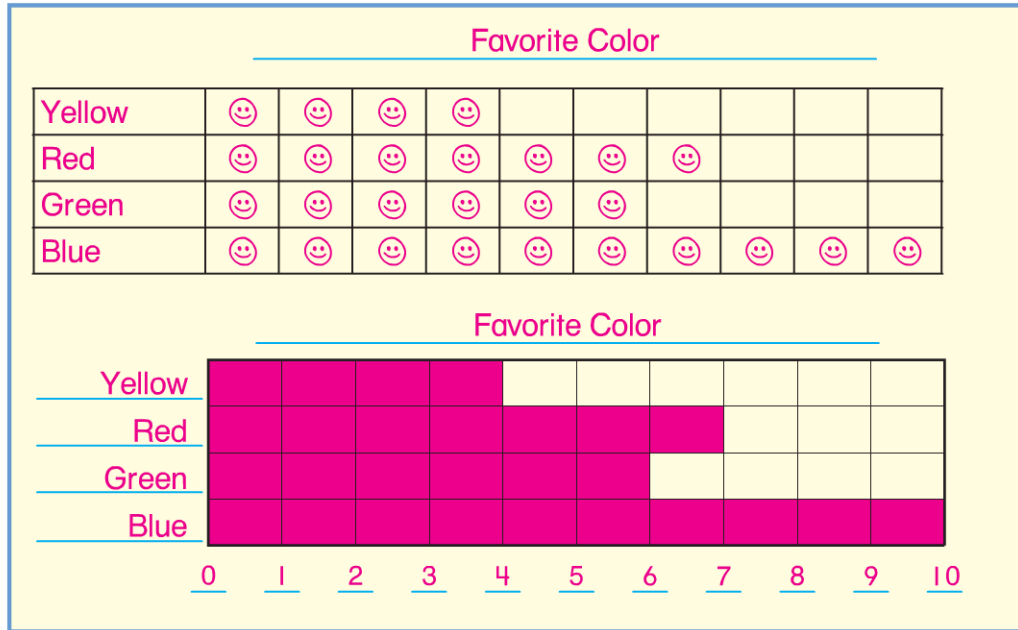
To support the idea that a bar graph is a length model, children use an inch ruler to label the bottom axis with the count scale. Be sure that children place the numbers under the vertical lines on the grid rather than centering them in the spaces of the grid and align the 0 on the ruler with the left edge of the grid.

Horizontal and Vertical Bars In this unit, children will work with bar graphs that have both horizontal bars and vertical bars. To help them understand the differences between the two kinds of bar graphs, they will convert a horizontal bar graph to a vertical bar graph in Lesson 6. As they do this, they discuss how and why the scale moves from the horizontal axis to the vertical axis. Children should also note that they do not change the scale and that in the vertical bar graph, each vertical bar representing a quantity corresponds to a horizontal bar representing that quantity in the horizontal bar graph.

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STATE STANDARDS ON
MEASUREMENT AND DATA

Categorical Data When drawing bar graphs on grid paper, the tick marks on the count scale should be drawn at intersections of the gridlines. The tops of the bars should reach the respective gridlines of the appropriate tick marks. When drawing picture graphs on grid paper, the pictures representing the objects should be drawn in the squares of the grid paper.

Collect and Organize Data Children learn to use a table to organize data before making a graph. They later use a simple survey to collect data about a topic of their choice, such as favorite color, food, or game. They organize the data they collect in a table and then make both a picture graph and a bar graph.



Solve Problems Children solve *Put Together/Take Apart* and *Compare* story problems using information presented in bar graphs shown in the Student Activity Book. They also make up their own questions about graphs in the Student Activity Book and their own graphs. Guide them especially to ask comparative questions about the data. When children make a comparison, ask them to present it from both points of view.

Three more children liked red better than yellow.

Three fewer children liked yellow better than red.

As children gain experience with using bar graphs to solve problems, they will notice that they can simply look at the bars in a graph to make a quick comparison and then find the length of the bars to make a more precise comparison.

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STATE STANDARDS ON
MEASUREMENT AND DATA**

Categorical Data Students in Grade 2 ... solve simple put-together, take-apart, and compare problems using information presented in a bar graph.