Preparing a Lesson

1

The *Objective* sidebar clearly indicates the focus of each lesson.

2

Vocabulary words and definitions are listed in the *Vocabulary* sidebar in the order they appear in the lesson.

3

The *Preparation* sidebar identifies materials that need to be obtained and activities that should be performed in advance. Its handprint icon appears beside the components of the lesson that require preparation.

The *Safety* sidebar and *Alternative* sidebar (not shown) contain icons that appear beside headings as needed. These sidebars provide ways to expedite or simplify activities or add caution for the teacher when materials or activities could trigger student allergies or health conditions.

4

The *Extension* sidebar offers ideas to extend certain parts of the lesson.

5

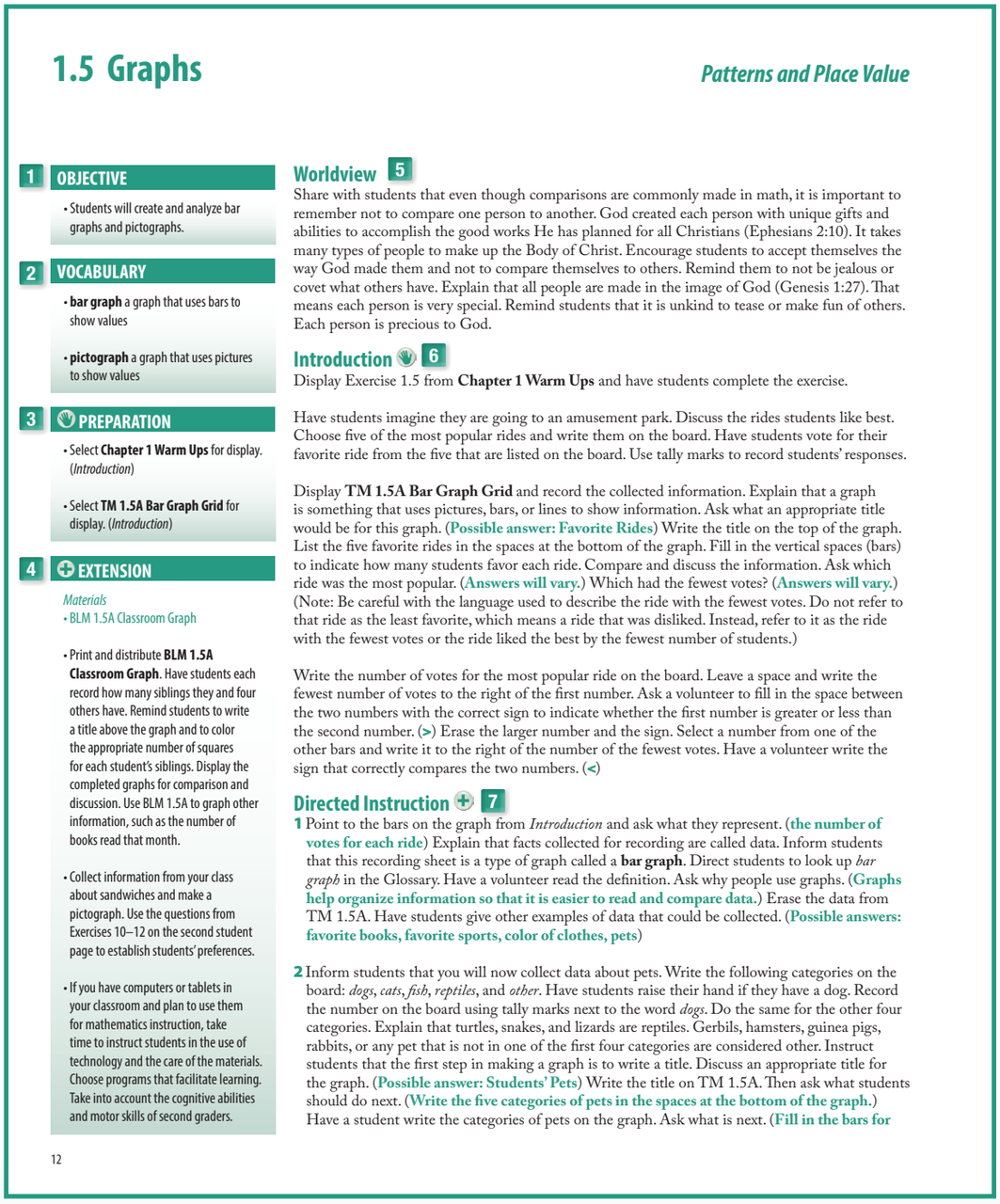
The *Worldview* section connects mathematical concepts to biblical teaching that the teacher can share with students.

6

Introduction contains activities or discussions that will elicit students' interest in the topic.

7

Directed Instruction gives sequential instructions to teach the concepts of the lesson and a guide for how students should complete their pages. This section also provides optional activities to reinforce the objective.



1.5 Graphs

Patterns and Place Value

1 OBJECTIVE

- Students will create and analyze bar graphs and pictographs.

2 VOCABULARY

- **bar graph** a graph that uses bars to show values
- **pictograph** a graph that uses pictures to show values

3 PREPARATION

- Select **Chapter 1 Warm Ups** for display. (*Introduction*)
- Select **TM 1.5A Bar Graph Grid** for display. (*Introduction*)

4 EXTENSION

Materials
- BLM 1.5A Classroom Graph

- Print and distribute **BLM 1.5A Classroom Graph**. Have students each record how many siblings they and four others have. Remind students to write a title above the graph and to color the appropriate number of squares for each student's siblings. Display the completed graphs for comparison and discussion. Use BLM 1.5A to graph other information, such as the number of books read that month.
- Collect information from your class about sandwiches and make a pictograph. Use the questions from Exercises 10–12 on the second student page to establish students' preferences.
- If you have computers or tablets in your classroom and plan to use them for mathematics instruction, take time to instruct students in the use of technology and the care of the materials. Choose programs that facilitate learning. Take into account the cognitive abilities and motor skills of second graders.

12

Worldview 5

Share with students that even though comparisons are commonly made in math, it is important to remember not to compare one person to another. God created each person with unique gifts and abilities to accomplish the good works He has planned for all Christians (Ephesians 2:10). It takes many types of people to make up the Body of Christ. Encourage students to accept themselves the way God made them and not to compare themselves to others. Remind them to not be jealous or covet what others have. Explain that all people are made in the image of God (Genesis 1:27). That means each person is very special. Remind students that it is unkind to tease or make fun of others. Each person is precious to God.

Introduction 6

Display Exercise 1.5 from **Chapter 1 Warm Ups** and have students complete the exercise.

Have students imagine they are going to an amusement park. Discuss the rides students like best. Choose five of the most popular rides and write them on the board. Have students vote for their favorite ride from the five that are listed on the board. Use tally marks to record students' responses.

Display **TM 1.5A Bar Graph Grid** and record the collected information. Explain that a graph is something that uses pictures, bars, or lines to show information. Ask what an appropriate title would be for this graph. (**Possible answer: Favorite Rides**) Write the title on the top of the graph. List the five favorite rides in the spaces at the bottom of the graph. Fill in the vertical spaces (bars) to indicate how many students favor each ride. Compare and discuss the information. Ask which ride was the most popular. (**Answers will vary.**) Which had the fewest votes? (**Answers will vary.**) (Note: Be careful with the language used to describe the ride with the fewest votes. Do not refer to that ride as the least favorite, which means a ride that was disliked. Instead, refer to it as the ride with the fewest votes or the ride liked the best by the fewest number of students.)

Write the number of votes for the most popular ride on the board. Leave a space and write the fewest number of votes to the right of the first number. Ask a volunteer to fill in the space between the two numbers with the correct sign to indicate whether the first number is greater or less than the second number. (**>**) Erase the larger number and the sign. Select a number from one of the other bars and write it to the right of the number of the fewest votes. Have a volunteer write the sign that correctly compares the two numbers. (**<**)

Directed Instruction 7

1 Point to the bars on the graph from *Introduction* and ask what they represent. (**the number of votes for each ride**) Explain that facts collected for recording are called data. Inform students that this recording sheet is a type of graph called a **bar graph**. Direct students to look up *bar graph* in the Glossary. Have a volunteer read the definition. Ask why people use graphs. (**Graphs help organize information so that it is easier to read and compare data.**) Erase the data from TM 1.5A. Have students give other examples of data that could be collected. (**Possible answers: favorite books, favorite sports, color of clothes, pets**)

2 Inform students that you will now collect data about pets. Write the following categories on the board: *dogs*, *cats*, *fish*, *reptiles*, and *other*. Have students raise their hand if they have a dog. Record the number on the board using tally marks next to the word *dogs*. Do the same for the other four categories. Explain that turtles, snakes, and lizards are reptiles. Gerbils, hamsters, guinea pigs, rabbits, or any pet that is not in one of the first four categories are considered other. Instruct students that the first step in making a graph is to write a title. Discuss an appropriate title for the graph. (**Possible answer: Students' Pets**) Write the title on TM 1.5A. Then ask what students should do next. (**Write the five categories of pets in the spaces at the bottom of the graph.**) Have a student write the categories of pets on the graph. Ask what is next. (**Fill in the bars for**

each category.) Guide volunteers to fill in the bars for each category using the data that was collected and written on the board. Direct other volunteers to check the bars for correct amounts. Ask which kind of pet is most popular with the class. (**Answers will vary.**) Which kind of pet do the least number of students own? (**Answers will vary.**)

3 Direct students' attention to the first student page. Read the directions. Have students observe the pictures of the three students' blocks. Have students look ahead and try to mentally complete Exercises 4–8 before they count the blocks. Ask whether they can complete Exercises 4–8 accurately without counting the blocks. (**No.**) Then direct students to count the blocks, to use crayons to record the number of blocks for each child, and to complete Exercises 1–3. Ask whether the completed graph will now help them complete Exercises 4–8. (**Yes.**) Explain that some of the exercises have multiple correct answers. Conduct a class discussion to discover all the possible correct answers. Have students complete the remaining exercises.

4 Direct students to turn to their second student page. Have them look up the word **pictograph** in the Glossary. Have students observe the pictograph on the student page. Explain that each sandwich represents one student. Have students complete Exercises 9–22 independently.

Lesson Review 8

If you wanted to use pictures to represent values, what type of graph would you use? (**pictograph**) What is a bar graph? (**a graph that uses bars to show values**) What information do you need to fill in on a bar graph? (**the title, the categories, and the individual bars**)

Notes

RECOVERY 10

- Print and distribute **BLM 1.5B Home Graph**. Have students take it home to record the number of cans of different food items in their kitchen cabinets or pantry. Display the completed graphs for comparisons.

ENRICHMENT 11

- As a challenge activity, have one or more students visit a local sandwich shop with one of their parents to find out if the results of the sandwich survey on their student page match the real-life experience in the shop. Have them present the following question: *If 20 people come to the shop, how many would be likely to order cheese, ham, tuna, or veggie sandwiches?* Then have students create their own bar graph and pictograph with the data they have collected.

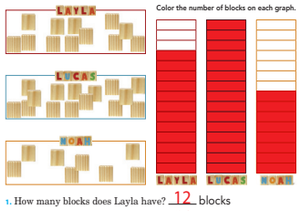
9

Name _____

Graphs 1.5

Bar graphs use bars to show values.

Color the number of blocks on each graph.



1. How many blocks does Layla have? 12 blocks
2. How many blocks does Lucas have? 18 blocks
3. How many blocks does Noah have? 8 blocks
4. Lucas has more blocks than Layla or Noah
5.
6. Answers will vary.
7.
8. Lucas has the most blocks of all.

© Mathematics Grade 2 eleven 11

Pictographs use pictures to show values.

Read the pictograph. Write the answers.

Favorite Sandwiches

ham	
cheese	
tuna	
veggie	

9. In Mrs. Hill's class, how many students like cheese? 5 ham? 9 veggie? 3 tuna? 4
10. What is the favorite sandwich of the class? ham
11. Which sandwich is chosen the least? veggie
12. What is your favorite sandwich? Answers will vary.

Review

Add.

13. 6 + 2 = 8	15. 2 + 3 = 5	17. 5 + 5 = 10	19. 4 + 2 = 6	21. 3 + 4 = 7
14. 3 + 3 = 6	16. 7 + 2 = 9	18. 5 + 3 = 8	20. 4 + 4 = 8	22. 6 + 3 = 9

12 twelve

8

Lesson Review offers specific questions or activities to assess students' understanding of lesson content.

9

Readable reductions of each student textbook page are large enough for the teacher to read the text and the answers to the exercises.

10

The activities in the *Recovery* sidebar can be used for differentiated learning instruction or to supply extra practice for students who would benefit from more opportunity to learn the concepts taught.

11

The *Enrichment* sidebar lists activities that will challenge those students who have clearly understood the concepts presented and are ready to learn more.