Graphing begins with making observations of phenomena in the environment, such as counting how many students bring their lunch to school. After collecting the data, students should be involved in sorting and organizing the information into categories that represent and quantify the entire data set. Students can then make inferences, comparisons, and conclusions about the data. Ultimately, this inquiry becomes a springboard for future analysis and empowers students to become informed decision makers about data.

**Targeted Standards**

**GLE 0106.1.2** Apply and adapt a variety of appropriate strategies to problem solving, including estimation, and reasonableness of the solution.

**GLE 0106.5.1** Use various representations to display and compare data.

**Previous Grade**

In Kindergarten, students learned to:

- Identify and describe simple patterns, such as circles or triangles, by referring to their shapes, sizes, or colors.
- Sort objects by size and shape.
- Record results using objects, pictures, and picture graphs.

**This Grade**

During this chapter, students learn to:

- Sort objects and data by common attributes and describe the categories.
- Organize, represent, and compare data by category on simple graphs and charts.
- Represent and compare data by using pictures, bar graphs, tally charts, and picture graphs.

After this chapter, students learn to:

- Compare data using measurement with nonstandard units.

**Next Grade**

In second grade, students learn to:

- Collect data and record, organize and display the data on pictographs, bar graphs, and line plots.
- Analyze and interpret data displayed in pictographs, bar graphs, and line plots.

**Skills Trace**

**Vertical Alignment**

**Digital Videos**

The McGraw-Hill Professional Development Video Library provides short videos that support McGraw-Hill’s Math Connects. For support for this chapter, the following video is available.

**Print and Online**

Professional Development articles can be found in the Teacher Resource Handbook. These articles on current issues will allow you to implement new mathematical strategies and enhance your classroom performance.

**PD Collect and Sort Data**

Other videos, program walkthroughs, online courses, and video workshops are available at mhpdonline.com.

McGraw-Hill’s Math Connects program was conceived and developed with the final results in mind: student success in Algebra 1 and beyond. The authors developed this brand-new series by backmapping from Algebra 1 concepts, and vertically aligning the topics so that they build upon prior skills and concepts and serve as a foundation for future topics.
## Chapter at a Glance

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<td><strong>A</strong> Explore</td>
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<td>Lesson Animations</td>
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<tr>
<td></td>
<td></td>
<td>Daily Transparencies</td>
<td></td>
</tr>
</tbody>
</table>

### Get Connected
- Leveled Worksheets
- Explore Worksheets
- Visual Vocabulary Cards
- Lesson Animations
- Daily Transparencies
- Problem of the Day
- Virtual Manipulatives
- Graphic Novel Animations
- eGames
- Math Song Animations
- Real-World Problem Solving Readers
Math Vocabulary

**Glossary**

The following math vocabulary words are listed in the glossary of the *Student Edition*.

**Get ConnectED** Find interactive definitions in 13 languages in the e**Glossary** and review vocabulary e**Games** at connectED.mcgraw-hill.com.

**bar graph** A graph that uses bars to show data.

**sort** To group together like items.

**data** Numbers or symbols collected to show information.

**survey** To collect data by asking people the same question.

**tally chart** A way to show data collected using tally marks.

**graph** A way to present data collected. Also a type of chart.

**picture graph** A graph that has different pictures to show information collected.

**Visual Vocabulary Cards**

Use Visual Vocabulary Cards to reinforce the vocabulary in this chapter in English and Spanish. (The Define/Example/Ask routine is printed on the back of each card.)

<table>
<thead>
<tr>
<th>Name</th>
<th>Number of Pets</th>
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</thead>
<tbody>
<tr>
<td>Mary</td>
<td>3</td>
</tr>
<tr>
<td>James</td>
<td>1</td>
</tr>
<tr>
<td>Alonzo</td>
<td>4</td>
</tr>
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</table>

### How We Get To School

<table>
<thead>
<tr>
<th></th>
<th>Walk</th>
<th>Ride</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<tr>
<td>6</td>
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</table>

### Our Favorite Toys

<table>
<thead>
<tr>
<th>Favorite Foods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Apple</td>
</tr>
<tr>
<td>Lunch</td>
</tr>
<tr>
<td>Sushi</td>
</tr>
<tr>
<td>Pizza</td>
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</table>
ELL Support

Organize and Record Data

<table>
<thead>
<tr>
<th>Level</th>
<th>Activity</th>
<th>Modality</th>
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<tbody>
<tr>
<td>AL Beginning</td>
<td>Writing Forms</td>
<td>Kinesthetic, Interpersonal</td>
</tr>
<tr>
<td>OL Intermediate</td>
<td>Act It Out</td>
<td>Logical-Mathematical</td>
</tr>
<tr>
<td>BL Advanced</td>
<td>Scaffold</td>
<td>Linguistic, Spatial</td>
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<tr>
<td></td>
<td>Cooperative Learning</td>
<td>On Level</td>
</tr>
</tbody>
</table>

Read and Display Data

<table>
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<tr>
<th>Level</th>
<th>Activity</th>
<th>Modality</th>
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</thead>
<tbody>
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<td>AL Beginning</td>
<td>Word Recognition</td>
<td>Linguistic, Spatial</td>
</tr>
<tr>
<td>OL Intermediate</td>
<td>Activate Prior Knowledge</td>
<td>Linguistic, Spatial</td>
</tr>
<tr>
<td>BL Advanced</td>
<td>Activate Prior Knowledge</td>
<td>Spatial, Existential</td>
</tr>
<tr>
<td></td>
<td>Cooperative Learning</td>
<td>On Level</td>
</tr>
</tbody>
</table>

Get Connect ED

Find other English Language Learner strategies.

ELL Resources

The Professional Development articles listed below can be found in print and online in the Teacher Resource Handbook.

- “English Learners and Mathematics: Best Practices for Effective Instruction” by Kathryn Heinze (pp. TR32–TR33)
- “Engaging English Language Learners in Your Classroom” by Gladis Kersaint (pp. TR34–TR35)
- Multilingual eGlossary
- Visual Vocabulary Cards
- Language Alert (p. 162)
- ELL Guide (pp. 132–142)
**Reading**

**Button Graph**
- Read *The Button Box* by Margarette S. Reid or a similar book.
- Scoop some buttons from the jar.
- Graph them on grid paper.
- Put buttons that look the same in the same row.

*Teacher Note: After graphing their selection, students return their buttons to the jar, mix them with the others, and take a new scoop of buttons to graph.*

**Language Arts**

**Deck of Cards**
- Find ways to sort Alphabet Cards.
- For example, you may sort them by letters that are straight or curved.
- In your Math Journal, write three ways to sort the cards.

*Teacher Note: The cards can be sorted by shape of letter, type of animal, or color of letter.*

**Health**

**Food Pyramid**
- Cut pictures of 10 foods from magazines.
- Sort the pictures using the Food Pyramid as a guide.
- Glue the pictures in groups on a sheet of construction paper.
- Make a tally chart showing which food groups the 10 foods belong to.

*Teacher Note: After graphing their selection, students return their buttons to the jar, mix them with the others, and take a new scoop of buttons to graph.*

**Materials:**
- buttons in a jar
- grid paper
- crayons
- *The Button Box* by Margarette S. Reid

**Materials:**
- Alphabet Cards
- Math Journal
- pencil

**Materials:**
- magazines
- scissors
- glue
- pencils
- construction paper
- food pyramid
Science

Fruit Seeds
- Count the seeds in each piece of fruit.
- Make a bar graph to show how many seeds are in each piece of fruit.
- Write a title for your bar graph.

Teacher Note: Another option is to have students estimate the number of seeds in a watermelon. Slice the watermelon and have students count the seeds in their slice. Add all of the results together.

Materials:
- fruit (apple, peach, orange, cherry) sliced in half
- markers
- white paper
- pencils

Social Studies

Transportation
- Survey 10 students to find out how they get to school. Do they take a bus, ride in a car, walk, or ride a bike to school?
- Make a picture graph to show how students get to school.
- Write a title for your picture graph.
- How do most students get to school?

Materials:
- markers
- white paper
- pencils

Calendar Time

Tally the Days
- Write the name of the current month on the calendar. Fill in the numbers for the days of the month.
- Make a separate list for a tally chart of the days of the week.
- Model the use of tally marks to record a number by counting the number of Mondays in the current month. Record each count as a tally mark.
- Repeat with other days. Ask students to count the number of each day as you point to them. Record a tally mark for each count.
- Ask students how many of each day of the week are in the current month.

For additional calendar activities, see Math Routines on the Go cards.
Introduce the Chapter

Essential Question

- How do tally marks help you organize data? Sample answer: Tally marks help you count.
- What else can you use to help you count or keep track of data? Sample answer: You can use a number line or hundreds chart.

Key Vocabulary

Define: A picture graph is a graph that shows information with pictures.
Example: Sometimes the weather forecast is shown in a picture graph with suns, rain clouds, or thunderbolts for each day of the week.
Ask: Where else have you seen picture graphs?

- Student Glossary
- Graphic Organizer

Tally It Up!

Read and discuss the Graphic Novel. You may wish to use the blank Graphic Novels provided in Hands-On Activity Tools and Resources to help develop writing and speech skills.

- What is happening? Ella is taking the lunch count. She is counting tally marks to see how many people are eating different foods. When she finishes the lunch count Jaden and Mei walk in late.
- How many students are eating hot dogs for lunch? 5
- How many students are having pizza? 8
- How many students brought their own lunch to school? 6
- If Mei and Jaden both choose pizza how many students will be having pizza in all? 10
- How will Ella’s lunch count change if Jaden and Mei both brought their own lunch? Sample answer: It won’t change because she is only writing down how many people are eating pizza or hot dogs.

For additional reading and language arts activities, including support for reading a graphic novel, see Reading and Language Arts Support in the Grade 1 Math Connects Program Overview.

✔ 0106.1.9 Use age-appropriate books, stories, and videos to convey ideas of mathematics.
Chapter Connections

Real World: Which Flavor?
Share with students that they are going to learn about gathering, organizing, and using data.

- Take students to the playground and tell them they will be learning about fun ways to show information.
- Using yarn, make a large Venn diagram on the playground. Label one ring vanilla and the other chocolate.
- Which frozen yogurt flavor is your favorite—vanilla, chocolate, or swirl—a combination of vanilla and chocolate? Have students stand inside the ring labeled with their choice of frozen yogurt.
- Where should the students who chose swirl stand? In the center where the rings for vanilla and chocolate overlap.

WRITE MATH To introduce the idea of collecting and recording data, have students write their answers to the following questions.

- What could you do to find what time most students in the class go to bed each night? Sample answer: Ask everyone their bedtime.
- How could you share the information you find with the rest of the class? Sample answers: draw a picture; tell everyone

Have students draw pictures to illustrate their ideas. Provide time for students to share their ideas with the class.

Chapter Project

Take a Survey
- Have students work together in small groups to design a survey.
- Each group will work together to survey peers and record the data collected in a tally chart.
- Tell students to create a picture graph on construction paper or a bar graph on graph paper to illustrate and compare the data they collected.
- Have students present their survey, data, and graphs to the class. Provide time for students to ask questions about the different surveys and graphs and display them in the classroom or hallway.

Reading and Language Arts Support
For activities to connect reading and language arts to this chapter’s math concepts, see Reading and Language Arts Support in the Grade 1 Math Connects Program Overview.

Dinah Zike’s Foldables®
Guide students to create their own Top Pocket Foldable graphic organizer for organizing and using data.

1. Create a Shutterfold, crease and reopen. Apply glue along the valleys of the crease lines.
2. Fold the paper upwards along the horizontal axis and allow glue to adhere.
3. Fold the left and right sides of the fold inward so that they meet in the middle, using the creases from the Shutterfold as guides. Recreate and open.
4. Cut off the bottom edges of the left and right tabs stopping at the crease. Cut the resulting top tabs on each side into halves, thirds, or quarters depending on the lesson.
5. Worksheets and other student projects can be stored in the pocket. Students write key terms on the outer tabs and record information beneath the tabs.

When to Use It Lessons 1B, 1C, 2A, and 2B. (Additional instructions for using the Foldable with these lessons are found in the Mid-Chapter Check and Chapter Review/Test.)
You have two options for checking Prerequisite Skills for this chapter.

**Text Option**

“Are You Ready for the Chapter?”

**Online Option**

Take the Online Readiness Quiz.

---

**Name ____________________________**

Count. Write the number of objects you counted.

1. [Image of three leaves] 3

2. [Image of seven leaves] 7

Circle the correct answer.

3. [Image of two sets of objects] circle the correct option: is more than or is fewer than

4. [Image of two sets of objects] circle the correct option: is more than or is fewer than

Circle the answer.

5. 3 ducks are in the pond.
   2 ducks are in the barn.
   Which place has more ducks?
   - pond
   - barn
**2 DIAGNOSE AND PRESCRIBE**

**RtI (Response to Intervention)**
Based on the results of the Diagnostic Assessment, use the charts below to address individual needs before beginning the chapter.

**TIER 1**

**On Level (OL)**

**If**

- Students miss one in Exercises 1-5,

**Then**

- Choose a resource:
  - [ ] Learning Stations (pp. 145E-145F)
  - [ ] Are You Ready? Practice

**TIER 2**

**Strategic Intervention (AL)**

**If**

- Students miss two or three in Exercises 1-5,

**Then**

- Choose a resource:
  - [ ] Are You Ready? Review
  - [ ] Get ConnectEd Lesson Animations

**TIER 3**

**Intensive Intervention**

**If**

- Students miss four or more in Exercises 1-5,

**Then**

- Use Math Triumphs, an intensive math intervention program from McGraw-Hill
  - Chapter 4: Understand Whole Numbers

**Beyond Level**

**Beyond grade level**

**If**

- Students miss none in Exercises 1-5,

**Then**

- Choose a resource:
  - [ ] Chapter Project (p. 145G)
  - [ ] Are You Ready? Apply
  - [ ] Get ConnectEd eGames: Graphing with Clara Cat

---

**3 REASSESS**

Administer the Diagnostic Test.

- [ ] Diagnostic Test

---

Organize and Use Data 146A
Before you begin the Chapter:

• Read the Math at Home letter with the class and have each student sign it.

• Practice the activity so that students are familiar with it before trying it with their parents or guardians.

• Send home copies of the Math at Home letter with each student.

• Use the Spanish letter for Spanish-speaking parents or guardians who do not read English fluently.

For more information about parent involvement, read the article, “The Role of Parents and Guardians in Young Children Learning Mathematics” by Paul Giganti, Jr. See the Teacher Resource Handbook pp. TR44–TR45.

Dear Family,

Today my class started the chapter Organize and Use Data. In this chapter, I will learn to read and make picture graphs, tally charts, and bar graphs. Here are my vocabulary words, an activity we can do, and a list of books we can find in our local library.

Love,

Activity

Have your child create a picture graph of all of the doors, windows, bathrooms, and beds in your house. Now make it a tally chart and bar graph.

Books to Read

Lemonade for Sale
by Stuart J. Murphy
Harper Collins Publishers

Tally O’Malley
by Stuart J. Murphy
Harper Collins Publishers

Anno’s Flea Market
by Mitsumasa Anno
Putnam

Key Vocabulary

picture graph

<table>
<thead>
<tr>
<th>Favorite Zoo Animal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal</td>
</tr>
<tr>
<td>Penguin</td>
</tr>
<tr>
<td>Panda</td>
</tr>
<tr>
<td>Tiger</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

Online Option

See the multilingual eGlossary link at connect.mcgraw-hill.com to find out more about these words. There are 13 languages.
Estimada familia:
Hoy mi clase comenzó el capítulo Organice y utilice los datos. En este capítulo, aprenderé a leer y a hacer pictogramas, tablas de conteo y gráficas de barras. Aquí están mis palabras de vocabulario, una actividad que podemos hacer y una lista de libros que se encuentran en nuestra biblioteca local.

Caritos,

Vocabulario clave

<table>
<thead>
<tr>
<th>pictogramas</th>
<th>gráfica de barras</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Opción en línea
Visítan el eCímaria poliplota en connectED.mca.gov para aprender más acerca de estas palabras. Hay 13 idiomas.

Libros recomendados
Reunir datos: ¿Qué panqueca? de John Burstein
Weekly Reader Early Learning Library

A Pair of Socks
Stuart J. Murphy

Anno’s Flea Market
Mitsumasa Anno

Corduroy
Don Freeman

Real-World Problem Solving Library
Math and Social Studies: I Like That Too
Use these leveled books to reinforce and extend problem-solving skills and strategies.

Leveled for:
- AL Approaching Level
- OL On Level
- BL Beyond Level
- SP Spanish

For additional support, see the Real-World Problem Solving Readers Teacher Guide.

✔0106.1.9 Use age-appropriate books, stories, and videos to convey ideas of mathematics.

Multi-Part Lesson 1
A Pair of Socks
Stuart J. Murphy

Tally O’Malley
Stuart J. Murphy

Mouse Paint
Ellen Stoll Walsh

Multi-Part Lesson 2
Ten Toads and Eleven Lizards
Cass Hollander

Lemonade for Sale
Stuart J. Murphy

Additional Books
The Best Vacation Ever
Stuart J. Murphy

Collecting Data: Pick a Pancake
John Burnstein

The Button Box
Margarette S. Reid

Anno’s Flea Market
Mitsumasa Anno

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Organize and Record Data

PART A

Title / Objective
Sort and Classify Data
(pp. 149–150)

Sort and Classify (pp. 151–152)

Sort objects and describe how you sorted.

Use a Venn Diagram to sort and classify objects.

Standards
GLE 0106.5.1

GLE 0106.5.1

Vocabulary

Materials / Manipulatives
connecting cubes

crayons, chalk, pencils, markers, two-
color counters, connecting cubes, rubber bands, pattern blocks

Resources

Explore Worksheet

Leveled Worksheets

Lesson Animation

Visual Vocabulary Cards

eGames: Sorting with Clara Cat

Daily Transparencies

Math Song Animation: Organizing Data

eGames: Making a Graph with Clara Cat

Visual Vocabulary Cards

Math Song Animation: Organizing Data

Essential Question

If you ask several friends the same question, how could you show all of their answers at one time? Sample answer: I could draw a picture that shows their answers.

Focus on Math Background

Sorting and classifying are prerequisite skills for creating and adhering to categories represented on graphs. A Venn diagram can help first graders do this. The section where the circles intersect provides an area where students can show common attributes. The outer sections provide a place for differences. This layout helps students see how objects can adhere to different rules. Students will begin to see that using tally marks to represent data takes less time and space than using pictures. At first, most students will count tally marks one by one. With time, they will learn to count more efficiently.

Focus on Blended Lesson

Refer to the Blending Math Connects and IMPACT Mathematics guide for detailed lesson plans.

Blended Approach

Refer to the Blending Math Connects and IMPACT Mathematics guide for detailed lesson plans.

Suggested Pacing (10 Days)

<table>
<thead>
<tr>
<th>Multi-Part Lessons</th>
<th>1</th>
<th>2</th>
<th>Assess</th>
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<tbody>
<tr>
<td><strong>PART</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>A</strong></td>
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<td><strong>B</strong></td>
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<td><strong>C</strong></td>
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<tr>
<td><strong>D</strong></td>
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</tr>
</tbody>
</table>

Days

1 1 1 1 1 2 1 2

Math Their Way, pp. 61–63

All digital assets are Interactive Whiteboard ready.

IMPACT Mathematics

Students will begin to see that using tally marks to represent data takes less time and space than using pictures. At first, most students will count tally marks one by one. With time, they will learn to count more efficiently.

Focus on Blended Lesson

Refer to the Blending Math Connects and IMPACT Mathematics guide for detailed lesson plans.

Blended Approach

Refer to the Blending Math Connects and IMPACT Mathematics guide for detailed lesson plans.
Organize and Use Data

**Title / Objective**

Make and read a tally chart. Use the *Make a Table* strategy to solve problems.

**Standards**

Tally chart, survey

GLE 0106.5.1

GLE 0106.1.2

- **tally chart, survey**

- **Visual Vocabulary Card 71**

- **pencils, paper, overhead projector, coins, craft sticks**

- **paper, pencils**

**Resources**

- Leveled Worksheets
- Visual Vocabulary Cards
- Daily Transparencies
- Problem of the Day
- Virtual Manipulatives
- Graphic Novel Animation
- Math Song Animation: *Organizing Data*
- I Like That Too

**Blended Approach**

IMPACT Mathematics: Units E-1 and E-2

**PART C**

**Tally Charts** (pp. 153–154)

Make and read a tally chart.

**PART D**

**Problem-Solving Strategy:** *Make a Table* (pp. 155–156)

Use the *Make a Table* strategy to solve problems.

Mid-Chapter Check (p. 157)

Spiral Review (p. 158)
Differentiated Instruction

**Approaching Level (AL)**

**Option 1** Use with 1C

**Hands-On Activity**

**Materials:** food advertisements or magazines, scissors

- Have students find and cut out pictures of assorted canned goods.
- Have them sort the pictures by type of food (vegetable, fruit, meat, soup, and so on.).
- Guide them in making a tally chart to record the data.

![Image of scissors and canned goods]

**Option 2** Use after 1D

**Hands-On Activity**

**Materials:** connecting cubes

- Give students each a handful of red, purple, and yellow cubes.
- Have students sort their cubes by color.
- Create a large table with rows for each color cube.
- Have students count how many of each color they have in all.
- Record results on the table. Discuss, as a group, which color had the most and which had the least.

![Image of cubes]

**Other Options**

- TE Learning Station Card 17
- Get Connected Virtual Manipulatives, Math Song

**On Level (OL)**

**Option 1** Use after 1B

**Hands-On Activity**

**Materials:** Venn diagram labeled *two*, *both*, and *red*; connecting cubes

- Have students point to the Venn diagram labels as you read them aloud.
- Give students a handful of connecting cubes. Some of the connecting cubes should be stacked into groups of two.
- Have students use the Venn diagram to sort the connecting cubes.

**Option 2** Use after 1D

**Hands-On Activity**

**Materials:** dry erase boards or white boards, markers, and erasers; paper; pencils

- Display the following example for students to read: *Four children ran a race. Brian was in front of Kevin. Kevin was behind Cindy. Ann was in 2nd place. Who won the race? Brian*
- Have students make a table to solve the problem. Then have them create their own logical-reasoning problem about a race.
- Ask students to make an answer sheet that shows their problem-solving table and the answer to the problem.
- Invite students to exchange problems with a partner and solve. Have them compare their answer to their partner’s answer sheet.

**Other Options**

- TE Learning Station Card 18
- Get Connected Lesson Animations, Virtual Manipulatives, Math Song Animation: Organizing Data, eGames: Starfish Theatre: Bar Graphs
This strategy helps English Learners learn vocabulary associated with sorting, conducting surveys, and recording results.

Find Core Vocabulary, and Common Use Verbs in the online ELL strategies to help students grasp the math skills; use Language Alerts at point of use in the Teacher Edition.

**Beginning**

**Writing Forms** Learn how to tally and record data.
- Draw a tally chart. Use Girls and Boys as column labels. Say, tally chart, and have students repeat.
- Say, Girls, please stand up. Draw a tally mark for each girl. Say, I am making a tally mark for each girl.
- Say, tally mark, and have students repeat.
- Demonstrate how to make the fifth tally mark. Repeat for boys. Practice counting tally groups by five.

**Intermediate**

**Act It Out** Learn about sorting by characteristics.
- Show a pattern block. Say, Tell me about this. Students should give information about shape, size, or color: It is red. It is round. It is a circle.
- Model sorting pattern blocks by color. Then have students sort on their own. Make sure they use language to discuss the characteristics by which they are sorting. This block is red. This one is not red. Say, We are sorting by color. Have students repeat.
- As students sort, make a tally chart on the board, and introduce the words tally and tally chart.

**Advanced**

**Scaffold** Conduct a survey to gather and sort information.
- Do a quick survey of the students’ favorite pets and record their answers in a tally chart. Say, tally chart, and have students repeat.
- Have students conduct a survey about sports. Monitor students as they survey the class. Have students answer the questions in complete sentences.
- Have students create tally charts and report their information.

**Extend**

Teach polite language that students might use as they conduct their surveys. For example, Excuse me, what is your favorite color? You might also teach an indirect question, which is often used as a more polite version of a direct question. Could you tell me what your favorite color is?
PART A

Sort and Classify Data

Objective
Sort objects and describe how you sorted.

Resources
Manipulatives: connecting cubes

Explore Worksheet

Get Connected

GLE 0106.5.1 Use various representations to display and compare data.
Checks for Understanding ✓ 0106.5.4

Concept Development
Students will use connecting cubes to sort objects by different attributes.

STEP 1
Identify Objects
Discuss the scene on the student page with students. Have them identify the different types of shoes shown. Have them place a cube on each shoe that matches the color of the shoe.

STEP 2
Sort Objects
Have students sort the cubes (shoes) by color. Discuss the sorted groups. Have students identify how many shoes there are of each color.

STEP 3
Sort Again
Ask students to identify another way to sort the shoes. Have students identify the different types of shoes shown. Have students place a cube on each shoe, have them use like colors to identify the same type of shoe. For example, all flip flops will have a yellow cube on them. All shoes with laces will have a green cube on them. Have students sort the cubes (shoes) and discuss the way in which they sorted. Tell students that items can be sorted in many different ways, for example: flip flops could also be sorted by the thickness of the bottom of the flip flop.
Reflect and Clarify

- **How did you sort the shoes the second time?** Sample answer: Into a group of shoes with laces and a group of shoes without.
- **How else could you have sorted them?** Sample answer: Shoes with wheels and shoes without wheels.

**WRITE MATH** Have students draw a picture of other items you might find at a party. Have students draw a circle around objects that could belong in one group and an X on objects that could belong in a second group. Have students explain how they sorted the objects they drew.

**Use the Student Page**

- Have students identify all of the ways to sort the shoes on the Explore workmat. Have them discuss other types of shoes that could be added to the groups. Have students draw the shoes they are wearing on the workmat and include their shoes in the sort.
- Use the next page as practice. Have students look at each set of objects and describe a way that they could sort the objects. Have students write how they sorted the objects on the lines provided.
Sort and Classify

Objective
Use a Venn diagram to sort and classify objects.

Vocabulary
sort, Venn diagram

Resources
Materials: crayons, chalk, pencils, markers, rubber bands
Manipulatives: two-color counters, connecting cubes, pattern blocks

Leveled Worksheets

Check
Use pattern blocks. Sort the blocks. See students’ drawings.

1. Draw one way you sorted.

Activity Choice 1: Hands-On
Give each small group a red crayon, a piece of chalk, a blue crayon, a yellow pencil, a red pencil, a marker, a red counter, a red block or cube, and two large rubber bands or circles of yarn.

• Ask the students to make a group of things to write with and a group of things that are red. Students who are familiar with Venn diagrams might overlap their circles and put the red writing tools in the overlap. If a group does, ask them to explain what they did and why.

• If no group overlaps the circles, ask how they might use the circles to show that something belongs in both groups.

Activity Choice 2: Snack Time
Provide students with a snack of fruits and vegetables.

• Have students sort their snacks by color, then by shape.

• Ask students to identify another way they could sort.

2. Talk Math How did you sort the blocks? See students’ response.

Scaffolding Questions
Draw a Venn diagram. Label the circles Wood, Metal, and Both.

• Have students gather classroom items that have wood, metal, or both. What is this object called? See students response. Write the name in the proper circle.

• If an item has both wood and metal, remind students of the overlap, if necessary.
Alternate Teaching Strategy

If students have trouble understanding how objects can adhere to two rules . . .

Then use one of these reteach options:

1. **AL** Reteach Worksheet

2. **Button Sort** Hold up buttons and have students describe them. Then have pairs of students use a Venn diagram to sort buttons. **What do the buttons in the center have in common?** See students’ work. You may choose to read aloud the book *Corduroy* by Don Freeman. Ask students to describe Corduroy’s missing button. **It is white and round.**

**3. PRACTICE**

Differentiate practice using these suggestions.

<table>
<thead>
<tr>
<th>Level</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AL</strong> Approaching Level</td>
<td>Guide students through the exercises using sticky notes as manipulatives.</td>
</tr>
<tr>
<td><strong>OL</strong> On Level</td>
<td>Complete the exercises with a partner.</td>
</tr>
<tr>
<td><strong>BL</strong> Beyond Level</td>
<td>Complete the exercises independently.</td>
</tr>
</tbody>
</table>

**ES** Homework Practice Worksheet

**ES** Problem-Solving Practice Worksheet

**4. ASSESS**

**Formative Assessment**

What do you put in the center section of a Venn diagram? **the objects that match both rules**

What do you put in the other two sections of the diagram? **the objects that match only one rule**

**WRITE MATH** Have students write about one way that they used a Venn diagram.

**Quick Check**

Are students continuing to struggle with using a Venn diagram to sort items?

During **Small Group Instruction**

If Yes → **AL** Strategic Intervention Guide (pp. 118–127)

**AL** Daily Transparencies

If No → **OL** Skills Practice Worksheet

**OL** Differentiated Instruction: Option 1 (p. 149c)

**BL** Enrich Worksheet

**BL** Differentiated Instruction: Option 1 (p. 149d)

**Building Math Vocabulary**

Write **sort** on the board. Ask students to stand up. Ask boys to line up on one side of the classroom and girls on the other.

- **How did we sort students in this class?** boys and girls
- Ask students with birthdays in June to sit in their seats.
- **How are students sorted now?** birth month
- **How else could we sort students in this class?** Sample answers: hair color, height, clothing, hobbies

**Visual Vocabulary Cards**

Use the Visual Vocabulary Card to reinforce the vocabulary in this lesson in English and Spanish. (The Define/Example/Ask routine is printed on the back of each card.)
Objective
Make and read a tally chart.

Vocabulary
tally chart, survey

Resources
Materials: pencils, paper, overhead projector, coins, craft sticks
Leveled Worksheets

1. INTRODUCE

Activity Choice 1: Hands-On
- Ask students to listen as you say the tongue twister Peter Piper Picked a Peck of Pickled Peppers, and make a mark on their paper each time you make the sound of P.
- Display a student’s tally chart on the overhead, and ask someone to tell you how many marks there are. Then show them how to make the same number of marks with the diagonal 5th mark and count by 5s.

Activity Choice 2: Graphic Novel
- Play the Graphic Novel Animation “Tally It Up!” Point out the parts that you have learned so far in this chapter. Have students solve the problem in the graphic novel.

2. TEACH

Scaffolding Questions
Make a two-column table on the board. Label one row Fruits and the other Vegetables.
- Ask one student to tally Fruits, using the 5-tally system, and another to tally Vegetables, using single tallies. Ask each student, whether he or she likes apples or corn better. Repeat with other combinations of fruits and vegetables.
- How many tally marks are there for fruits? How many for vegetables? See students’ response. Which system is quicker and easier to read? Sample answer: 5 tally system
- Use plastic fruits and vegetables to create a real (object) graph to display the data.

GLE 0106.5.1 Use various representations to display and compare data.

Checks for Understanding ✔ 0106.5.2, ✔ 0106.5.3, ✔ 0106.5.4

Tally Charts

A tally chart shows a mark for each vote in a survey. A survey asks what people like best.

<table>
<thead>
<tr>
<th>Favorite Vegetables</th>
<th>Tally</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carrot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corn</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I took a survey. Corn is the favorite vegetable.

| stands for 1. ||| stands for 5.

Ask 10 friends to choose their favorite school subject. Make a tally chart. Write the totals.

<table>
<thead>
<tr>
<th>Favorite Subject</th>
<th>Tally</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Use the tally chart. How many chose each? See students’ work.

1. _____ 2. _____ 3. _____

4. E Talk Math How are tally marks used to take surveys? Sample answer: Tally marks keep track of data.

Organize and Use Data

Get Ready
Use the Get Ready section at the top of the page to teach the lesson concept. Guide students through the example, and help them understand that tallying is another way to sort information.

Check
Observe students as you work the Check Exercises as a class.

Talk Math Use the Talk Math Exercise to assess student comprehension before assigning the practice exercises.

Line Up
Start a tally chart on the board. Have each student add a tally mark as he or she lines up.

Common Error!
When tallying data, students may omit data or count an item twice. Suggest that each time students make a tally on their chart, they place a counter over the item they counted.
Write each total. Use the tally chart to answer the questions.

<table>
<thead>
<tr>
<th>Color</th>
<th>Tally</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>H H H</td>
<td>8</td>
</tr>
<tr>
<td>Blue</td>
<td>I I</td>
<td>3</td>
</tr>
<tr>
<td>Purple</td>
<td>H H H</td>
<td>5</td>
</tr>
<tr>
<td>Green</td>
<td>I</td>
<td>2</td>
</tr>
</tbody>
</table>

5. Which color is liked the most? ______red______
6. Which color is liked the least? ______green______
7. How many students chose red? _____8_____
8. Do more students like purple or blue? ______purple______

4. Write Math What would happen if you added more color choices to your survey?
Sample answer: Some of the choices would have fewer votes because the students liked another color more.

Alternate Teaching Strategy

If students have difficulty counting and representing the fifth slash in a set of five tally marks . . .

Then use one of these reteach options:
1. **AL** Reteach Worksheet
2. **IWB** Virtual Manipulatives Use the virtual two-color counters to reteach the concept.
3. **Tally Mark Finger Play** Teach a finger play to relate the 5-mark that crosses four tally marks to students folding a thumb over the other four fingers on their hand:
   - One, two, three, four, (Raise one finger as you say each number)
   - Now there are five! (Lift thumb.)
   - Shut the door. (Fold thumb over the four fingers.)

Practice Differentiate practice using these suggestions.

<table>
<thead>
<tr>
<th>Level</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AL</strong></td>
<td>Approaching Level Guide students through the exercises, using craft sticks as manipulatives.</td>
</tr>
<tr>
<td><strong>OL</strong></td>
<td>On Level Complete the exercises independently, using manipulatives as needed.</td>
</tr>
<tr>
<td><strong>BL</strong></td>
<td>Beyond Level Complete the exercises without manipulatives.</td>
</tr>
</tbody>
</table>

Math at Home Activity: Ask your child to make a tally chart to show which sport your family likes best: football or baseball.

Assess Formative Assessment
Give students a handful of coins and ask them to create a tally chart to show the number of coins.

Write Math Have students write about how grouping tally marks in bundles of five makes it faster to read a tally chart.

Building Math Vocabulary
Write on the board the terms **tally chart** and **survey**. Explain to students that a survey is a way to get data by asking different people the same question. Point out that writing tally marks on a chart is one way to record people’s answers. A tally chart can show the number of votes for something. Have students vote for their favorite book. Discuss the survey results.

Visual Vocabulary Cards
Use the Visual Vocabulary Card to reinforce the vocabulary in this lesson in English and Spanish. (The Define/Example/Ask routine is printed on the back of each card.)

Quick Check Are students continuing to struggle with using a hundred chart?

During **Small Group Instruction**

If Yes
- **AL** Daily Transparencies
- **AL** Differentiated Instruction: Option 1 (p. 149c)

If No
- **OL** Skills Practice Worksheet
- **BL** Enrich Worksheet
PART D  Problem-Solving Strategy: Make a Table

Objective
Use the make a table strategy to solve problems.

Resources

Materials: pencils, paper
Leveled Worksheets

Get Connected

Alternate Teaching Strategy
If students have trouble creating a table to solve problems . . .

Then use one of these reteach options:
1. Reteach Worksheet
2. Completing a Table
   Ask students to fill in tables one row at a time as you guide them with questions.
   - Does it have a picture?
   - How many words are on it?
   - Does it have a stripe on the sleeve?

---

Organize and Use Data

GLE 0106.1.2 Apply and adapt a variety of appropriate strategies to problem solving, including estimation, and reasonableness of the solution. Also addresses GLE 0106.5.1.

Checks for Understanding ✔ 0106.5.2, ✔ 0106.5.3, ✔ 0106.5.4

---

Main Idea
I will make a table to solve problems.

Kimi wants to buy a T-shirt. She wants a picture of a bicycle on it. She wants 4 words on it. She wants a stripe on each sleeve.

Which shirt should she buy?

---

Understand
What do I need to find? Circle the question.

Plan
How will I solve the problem?

Solve
Make a table. Circle the answer.

<table>
<thead>
<tr>
<th>Shirt</th>
<th>Picture</th>
<th>Number of Words</th>
<th>Stripe</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>No</td>
<td>2</td>
<td>Yes</td>
</tr>
<tr>
<td>Second</td>
<td>Yes</td>
<td>4</td>
<td>Yes</td>
</tr>
<tr>
<td>Third</td>
<td>Yes</td>
<td>3</td>
<td>No</td>
</tr>
<tr>
<td>Fourth</td>
<td>Yes</td>
<td>0</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Check
Is my answer reasonable?
How do I know? Check students’ explanations.

---

Activity Choice 1: Review
Write and read aloud the following: There are 3 cars in the driveway. The first car is blue. The last car is behind the red car. Which car is white?

- What do we know? There are 3 cars: blue, red, and white.
- What do we want to find? Which car is white.
- Demonstrate how to make a table to solve the problem. Have students copy the table and use Xs to show the position of each car.
- Which car is white? the third, or last car

<table>
<thead>
<tr>
<th>blue</th>
<th>red</th>
<th>white</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>2nd</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>3rd (last)</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Activity Choice 2: RWPS Reader
- Read the story I Like That Too with students.
- Go back to page 6 and discuss the tally chart with students.
- Have students take a survey in their own class to find out who likes to play bingo.
- Have students identify whether more boys or more girls like to play bingo.

---

Name ____________________

Problem-Solving Strategy

Make a Table

Kimi should buy the second shirt.

---

Alternate Teaching Strategy

If students have trouble creating a table to solve problems . . .

Then use one of these reteach options:
1. Reteach Worksheet
2. Completing a Table
   Ask students to fill in tables one row at a time as you guide them with questions.
   - Does it have a picture?
   - How many words are on it?
   - Does it have a stripe on the sleeve?
1. Make a table.

<table>
<thead>
<tr>
<th>Animal</th>
<th>How Many?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken</td>
<td>8</td>
</tr>
<tr>
<td>Dog</td>
<td>1</td>
</tr>
<tr>
<td>Cow</td>
<td>4</td>
</tr>
<tr>
<td>Sheep</td>
<td>2</td>
</tr>
</tbody>
</table>

Use the table to answer the questions.

2. How many more cows than dogs are there? 3
3. How many cows and sheep are there? 6
4. What animal do you see the most? chicken

COMMON ERROR!

Students may have difficulty correctly recalling the information provided in the problem. Have them go through the problem, sentence by sentence, and add the information to a picture or table.

STOP and REFLECT

Multi-Part Lesson 1 How do tally charts help you organize data? Sample answer: Tally charts make it easier to count when you are comparing data.

2 TEACH

Have students read the problem at the top of the student page. Guide them through the problem-solving steps.

Understand Using the questions, review what students know and what they need to find.

Plan Have them discuss their strategy.

Solve Guide students in using the make a table strategy to solve the problem. Discuss each choice and fill in the table.

Check Have students look back at the problem to make sure that the answer fits the facts given.

- Why is the third T-shirt the wrong shirt for Kimi? It has three words instead of four words.
- Which T-shirt will Kimi buy? the second T-shirt

As a class, complete the Try It Exercises.

3 PRACTICE

Your Turn

Have students complete the Your Turn Exercise. Be sure students can read and understand the problems. Remind students to record what they know and decide what they are supposed to find.

Homework Practice Worksheet

4 ASSESS

Formative Assessment

Provide students with a picture that has objects that can be put into a table. Have students create a new table and fill in the data on their own.

WRITE MATH Have students write a story or draw a picture that includes data. Have students make a table to show the data.
Mid-Chapter Check

Formative Assessment

Use the Mid-Chapter Check to assess students’ progress in the first half of the chapter.

ExamView

Customize and create multiple versions of your Mid-Chapter Check and the test answer keys.

**Dinah Zike’s Foldables**

Use these lesson suggestions to incorporate the Foldable during the chapter.

**Lesson 1B** Have students sort a group of objects. Have them draw the groups on the flaps of the foldable. Behind each flap have students describe how they sorted.

**Lesson 1C** Have students draw a group of objects on each flap. Have them draw tally marks to represent the group behind each flap. Have students draw tally marks in the center to represent all of the objects.

---

Data-Driven Decision Making

Based on the results of the Mid-Chapter Check, use the following resources to review concepts that continue to give students problems.

<table>
<thead>
<tr>
<th>Exercises</th>
<th>Tennessee Standards</th>
<th>What’s the Math?</th>
<th>Error Analysis</th>
<th>Resources for Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GLE 0106.5.1</td>
<td>Sort objects and data by common attributes.</td>
<td>Does not sort objects appropriately.</td>
<td>Chapter Resource Masters</td>
</tr>
<tr>
<td>2–4</td>
<td>GLE 0106.5.1</td>
<td>Represent and compare data. Represent data by using tally charts.</td>
<td>Does not fill in numbers in chart. Does not understand word “least.” Switches words “baseball” and “basketball.”</td>
<td>Lesson Animations</td>
</tr>
<tr>
<td>5</td>
<td>GLE 0106.1.2</td>
<td>Compare data.</td>
<td>Does not understand word “survey.” Does not understand word “least.” Does not record choices correctly.</td>
<td></td>
</tr>
</tbody>
</table>

**Exercises**

1. Draw a line from each dog to where it belongs.

2. Which sport is liked the least?

3. How many people chose soccer? __8__ people

4. How many more like basketball than baseball? __2__ people

5. I took a survey of favorite colors.
   - The choices were green, purple, and blue.
   - Most people liked blue.
   - More people liked purple than green.
   - Which was the least favorite color? __green__

---

**Tennessee Standards**

Data-Driven Decision Making

Based on the results of the Mid-Chapter Check, use the following resources to review concepts that continue to give students problems.
Add.

6. Part Part  
   \[ \frac{5}{5} \]  
   Whole  
   \[ 10 \]  

7. Part Part  
   \[ \frac{6}{3} \]  
   Whole  
   \[ 9 \]  

Write the addition number sentence.

8. \[ 3 + 2 = 5 \]  

9. \[ 5 + 4 = 9 \]  

Subtract.

10. \[ 4 - 3 = 1 \]  

11. \[ 6 - 4 = 2 \]  

Write the numbers. Add.

12. \[ 6 + 3 = 9 \]  

13. \[ 3 + 5 = 8 \]  

14. 7 ants were at the picnic. 3 more ants joined them. How many ants are at the picnic now?

\[ 10 \] ants
**PART A**

**Title / Objective**

**Picture Graphs** (pp. 159–160)

Make and read a picture graph.

**Standards**

GLE 0106.5.1

**Vocabulary**

graph, data, picture graph

Visual Vocabulary Cards 20, 56

**Materials/Manipulatives**

index cards, stickers or coins, tape

**Resources**

- Leveled Worksheets
- Visual Vocabulary Cards
- Lesson Animations
- Daily Transparencies
- Problem of the Day
- eGames: Starfish Theatre: Interpreting Graphs
- Math Song Animation: Organizing Data

---

**PART B**

**Title / Objective**

**Bar Graphs** (pp. 161–164)

Make and read a bar graph.

**Standards**

GLE 0106.5.1

**Vocabulary**

bar graph, data

Visual Vocabulary Card 10 and 20

**Materials/Manipulatives**

overhead projector, colored beads, pencils, crayons, 1-inch grid paper, red number cubes, connecting cubes

---

**Extra Practice** (p. 165)

Game Time

Animal Race (p. 166)

---

**Blended Approach**

Refer to the Blending Math Connects and IMPACT Mathematics guide for detailed lesson plans.

---

**Suggested Pacing** (10 Days)

<table>
<thead>
<tr>
<th>Multi-Part Lessons</th>
<th>1</th>
<th>2</th>
<th>Assess</th>
</tr>
</thead>
<tbody>
<tr>
<td>PART A</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>PART B</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Days</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

---

**Focus on Math Background**

A picture graph is a useful way to show data at the primary level using pictures. Seeing a picture of each item in the data set helps students quickly understand and interpret information. A pictograph is another way students can use pictures to represent their data. Instead of using a different picture to represent each set of data, a pictograph uses a symbol. Bar graphs are used to quantify and compare sets of data. The lengths of the bars show how many more or fewer data are in different categories. This makes it easy for students to see a size-to-quantity relationship.

---

**Essential Question**

How can charts or graphs make displaying data easier? Sample answer: If you show information in a graph then you can answer questions just by looking at it and you don’t have to count every piece of data.
**Problem-Solving Investigation:** Choose a Strategy  
(pp. 167–168)

Choose the best strategy to solve a problem.

- **Title / Objective**
  - Choose the best strategy to solve a problem.

- **Standards**
  - [ ] GLE 0106.1.2

- **Vocabulary**
  - pencils, paper

- **Materials/Manipulatives**

- **Resources**
  - Leveled Worksheets
  - Daily Transparencies
  - Problem of the Day
  - Math Song Animation: Organizing Data

- **Blended Approach**

---

**Problem Solving in Health**  
(pp. 169–170)

**Chapter Review/Test**  
(pp. 171–172)

**Test Practice**  
(p. 173–174)
**Option 1**  Use with 2B

**Hands-On Activity**

**Materials:** completed bar graph, counters

- Show small groups a completed bar graph.
- Ask students questions about the data in the graph. Have students use counters to model the answers.
- Guide students in using their counters to compare numbers in the bar graph.
- Have students talk about how their counters model the facts found in the bar graph.

**Option 2**  Use after 2C

**Hands-On Activity**

**Materials:** paper, pencil

- Display examples of problems and solutions for each of the following problem-solving strategies: *use logical reasoning, draw a picture, and write a number sentence.*
- Invite students to write three problems of their own and use a different strategy to solve each one.

**Other Options**

- **Learning Station Card 20**
- Math Song Animation: *Organizing Data*

**Option 1**  Use with 2A

**Hands-On Activity**

**Materials:** connecting cubes, 1-inch grid paper, colored pencils

- Have students make a pattern with at least fifteen cubes. Ask them to use more than one color of cube.
- Instruct students to make a bar graph on 1-inch grid paper to show how many of each color they used in their pattern.
- Make sure that students record their cube pattern on the paper to show how the graph corresponds to their data.

**Option 2**  Use after 2B

**Hands-On Activity**

**Materials:** connecting cubes

- Invite students to use connecting cubes to model story problems.
- *Melissa has 6 purple toy cars. She has 3 fewer yellow toy cars than purple. She has 2 more green toy cars than yellow.*
- Direct students to model the 6 purple cars with their cubes. Then have them model the yellow and green cars.
- Have students tell you the color they are modeling and how many are in that group. 3 yellow; 5 green  **How many purple and yellow cars in all?** 9 cars  Have students make a bar graph to show their answer.
- Tell students another story problem and have them create a bar graph to show the data without using cubes to model the story.

**Other Options**

- Learning Station Card 16
- Lesson Animation, Math Song Animation: *Organizing Data*
Beyond Level  

Option 1  

Use with 2A  

**Hands-On Activity**  

**Materials:** 1-inch grid paper, crayons, pencil  

- Invite students to make a picture graph showing classmates’ favorite ball games. Have each student choose four types of ball games and then survey ten people to find out which game is their favorite.  
- Ask students to interpret the data in their graphs. **Which game got the most votes? Which game got the fewest votes?**  
- Extend the activity. Ask students to show the data in a pictograph.  

**Our Favorite Ball Games**  

<table>
<thead>
<tr>
<th>Football</th>
<th>Baseball</th>
<th>Basketball</th>
<th>Soccer</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="football.png" alt="" /></td>
<td><img src="baseball.png" alt="" /></td>
<td><img src="basketball.png" alt="" /></td>
<td><img src="soccer.png" alt="" /></td>
</tr>
</tbody>
</table>

Option 2  

Use after 2C  

**Hands-On Activity**  

**Materials:** paper, pencil  

- Have students survey classmates to find how many students like cats best and how many like dogs the best.  
- After the student collects the information, the student should write a number sentence describing the information.  
- The students will need to write the number sentence of how many more like one animal than the other animal and then write the answer to that number sentence.

Other Options  

- **Learning Station Card 19**  
- **Get Connected** Lesson Animation, Math Song Animation: Organizing Data

---

**English Language Learners**  

This strategy helps English Learners learn graphing vocabulary.  

Find **Core Vocabulary** and **Common Use Verbs** in the online EL strategies to help students grasp the math skills; use **Language Alerts** at point of use in the Teacher Edition.

**AL** Beginning  

**Word Recognition**  Introduce **picture graph** and associated vocabulary.  

- Conduct a survey of favorite fruits. Record data in a tally chart.  
- Point to the tally chart and ask, **What is this?**  
- Circle the tally marks and say, **This is data.** Have students repeat the term. Write it on the board.  
- Use the data in the tally charts to create a picture graph.  
- Say, **picture graph.** Have students repeat. Write the word.

**OL** Intermediate  

**Activate Prior Knowledge**  Apply background knowledge to graphing.  

- Write **Home** on the left side of the board and **School** on the right. Draw a line connecting each word to a pocket chart titled **Ways to get to school.**  
- Draw a simple picture of a car, bus, bicycle, or feet.  
- Move a picture along the line as you say, **I get to school by [car].** Have students practice the sentence.  
- Then have students draw their own picture of how they get to school, say the sentence, and place it in the pocket chart.  
- Use the data to create a bar graph and introduce the term.

**BL** Advanced  

**Activate Prior Knowledge**  Convert a picture graph or pictograph to a bar graph.  

- Say, **bar graph,** and have students repeat. Write **bar graph** on the board. Ask, **Can you make a bar graph?** Post a picture graph, and have students create a bar graph using the same data.  
- Ask students which type of graph is easier to create and read.

**Extend**  

Have students use a picture graph or bar graph and describe the information in the graph. For example, **Nine students have blue eyes.**
Picture Graphs

Objective
Make and read a picture graph.

Vocabulary
graph, data, picture graph

Resources
Materials: index cards, stickers or coins, tape
Leveled Worksheets

Get Ready

Main Idea
I will read and make a picture graph.

Vocabulary
graph data picture graph

A graph shows information or data.
A picture graph uses pictures to show data.

Check

4. Sample answer: 10 different people might not have the same favorites.

1. Ask 10 classmates to vote for their favorite drink.
Make a picture graph.

Use the graph to answer the questions.

1. Which drink is the favorite? ______________________
2. Which drink is the least favorite? ______________________
3. Which month of the year has the most birthdays?
   See students’ work.

4. Talk Math Would the graph change if you asked
   10 different people? Explain.

Organize and Use Data

Get Ready

Use the Get Ready section to teach the lesson concept.

Check

Observe students as you work the Check Exercises as a class.

Talk Math
Use the Talk Math Exercise to assess student comprehension before assigning the practice exercises.

Building Math Vocabulary

Explain that graphs are charts that show collected information called data. Draw a picture graph. Ask students to vote for their favorite activity. Complete the graph. Discuss the results.

Visual Vocabulary Cards

Use the Visual Vocabulary Card to reinforce the vocabulary introduced in this lesson in English and Spanish. (The Define/Example/Ask routine is printed on the back of each card.)
**Alternate Teaching Strategy**

If students have difficulty making or reading picture graphs . . .

Then use one of these reteach options:

1. **AL Reteach Worksheet**
2. **Quick Picture Graphs**

To help students record results more quickly and accurately, provide stickers or coins and pattern block stamps to be used in place of drawing pictures. Have students tell you what each stamp or sticker on their graph represents.

---

**Practice**

Use the graph to answer the questions.

**Favorite Fruits**

- Grapes
- Strawberries
- Oranges
- Apples

5. How many chose ? __6__
6. Did more choose or ? __oranges__
7. Did fewer choose or ? __apples__
8. How many more chose than ? __3__
9. Which fruit has one more than ? __oranges__

**Problem Solving**

10. Finish the graph. 3 people chose fish. 2 fewer people chose cats. 4 people chose dogs.

**Favorite Pet**

- Dog
- Cat
- Fish

Students should draw 4 dogs, 1 cat, and 3 fish.

**Line Up**

Have students line up when you name the type of pet they have. Ask students who do not have pets to line up based on the type of pet they would like.

---

**COMMON ERROR!**

When graphing data, students may fail to count or record each piece of data. Have students draw a picture to show a vote before asking the next classmate to choose a favorite drink.

---

**Formative Assessment**

What is a picture graph? a chart that uses pictures to show information

How do you read a picture graph? by counting and comparing the number of pictures next to each type of data

**Write Math** Write about something you could make a picture graph about. Then make the graph.

---

**Quick Check**

Are students continuing to struggle with creating picture graphs?

During **Small Group Instruction**

If Yes → **AL Daily Transparencies**

If No → **OL Skills Practice Worksheet**

**OL Differentiated Instruction: Option 1** (p. 159c)

**BL Enrich Worksheet**

**BL Differentiated Instruction: Option 1** (p. 159d)
Bar Graphs

Objective
Make and read a bar graph.

Vocabulary
bar graph, data

Resources
Materials: overhead projector, colored beads, pencils, crayons, 1-inch grid paper
Manipulatives: red number cubes, connecting cube

Activities

1. INTRODUCE

Activity Choice 1: Hands-On
Display on an overhead projector a bar graph for graphing the colors of colored beads in a package. Have volunteers sort the beads by color. Record the data on the bar graph.

- Which color were most beads? Which color were the fewest number of beads? Did any colors appear the same number of times? See students' work.

- How many more/fewer yellow beads were there than red ones? See students' work.

Activity Choice 2: Active Math
Take students outside and have them do three activities, such as: jumping rope, hopping on one foot, and doing sit-ups. Help students create a bar graph to show which activity each student liked best. Discuss the results.

2. TEACH

Scaffolding Questions
Have students suggest five activities they enjoy. Use the activities as category labels on a large bar graph. Have students vote for their favorite activity. Record the data and discuss the results.

- Which activity received the most votes? Which activity received the least votes? See students' response.

- How many more votes did it get than the least favorite activity? See students' response.

- How is a bar graph like a tally chart? Both compare data.
**Alternate Teaching Strategy**

If students have trouble reading a bar graph . . .

Then use one of these reteach options:

1. **Reteach Worksheet**

2. **Handprint Graph**

   Have students sort themselves based on right-handedness and left-handedness. Have them make handprints on square pieces of paper, using red paint for right-handed and blue paint for left-handed. Have students arrange squares in horizontal columns by color. Create a two-column graph to display data.

---

**Building Math Vocabulary**

Write the term **bar graph** on the board. Explain that a bar graph uses bars to show data. Display three sets of cubes—9 red, 8 blue, and 10 yellow. Spread the blue set apart to make it appear larger. Ask students to predict which set has the most cubes. Have volunteers count the cubes to check the predictions. Next, connect the cubes in each set. Place the bars next to each other.

- **Which set has the most cubes?** yellow
- **How can I make the red bar equal to the yellow bar?** Add 1 red cube or remove 1 yellow cube.

**Visual Vocabulary Cards**

Use the Visual Vocabulary Card to reinforce the vocabulary introduced in this lesson in English and Spanish. (The Define/Example/Ask routine is printed on the back of each card.)

---

**Practice**

Tyler asked his friends what kind of sandwich they like best. Fill in the totals. Color the graph. Then answer the questions.

<table>
<thead>
<tr>
<th>Favorite Sandwich</th>
<th>Tally</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peanut Butter</td>
<td>III</td>
<td>8</td>
</tr>
<tr>
<td>Turkey</td>
<td>III</td>
<td>3</td>
</tr>
<tr>
<td>Ham</td>
<td>III</td>
<td>5</td>
</tr>
<tr>
<td>Cheese</td>
<td>III</td>
<td>3</td>
</tr>
</tbody>
</table>

6. How many chose turkey? ____ friends
7. How many more chose peanut butter than ham? ____ friends
8. Did more choose cheese or turkey? turkey
9. Which kind of sandwich do Tyler’s friends like best? peanut butter
**Practice**

Differentiate practice using these suggestions.

<table>
<thead>
<tr>
<th>Level</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL</td>
<td>Approaching Level&lt;br&gt;Guide students through the exercises.</td>
</tr>
<tr>
<td>OL</td>
<td>On Level&lt;br&gt;Complete the exercises with a partner.</td>
</tr>
<tr>
<td>BL</td>
<td>Beyond Level&lt;br&gt;Complete the exercises independently.</td>
</tr>
</tbody>
</table>

**Homework Practice Worksheet**

**Problem-Solving Practice Worksheet**

---

Name ______________________

10. Ask 10 friends what their favorite playground activity is. Make a tally chart to show your data.

<table>
<thead>
<tr>
<th>Playground Activity</th>
<th>Activity</th>
<th>Votes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jump Rope</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basketball</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See students’ work.

11. Use the tally chart to make a bar graph. Then answer the questions.

See students’ work.

12. How many voted for basketball? _____ students

13. Did more students vote for jump rope or slide? 

12–14. See students’ work.

14. What playground activity has the most votes? ________________

---

**Line Up**

Give each student one of three different colors of cubes. Have students line up in three lines by color. Which line has the most students? the least?

---

**Common Error!**

Students may count the zero line of a graph as one. Show them a picture of a ladder and explain that the zero line is like the ground under the ladder. The line above or after the first box is the line to count as one, like the first step above the ground.

---

Organize and Use Data

one hundred sixty-three 163
Problem Solving

Solve.

15. There are 10 pencils in a box. 4 pencils are yellow. The rest are green. How many pencils are green?

6 pencils

16. Rex made 7 bubbles. Molly made 2 more bubbles than Rex. How many bubbles did they make in all?

9 bubbles

In Your World

If you visit Arizona, you may see a cactus in the desert. There are many kinds of cacti. Use the graph to tell how many of each.

17. How many saguaro cacti? 5

18. How many more hedgehog than prickly pear cacti? 1

Fun Facts

- The saguaro cactus produces its first flower when it is about 50 years old. It blooms at night and only lasts 24 hours.
- The spines on cacti keep animals from eating them.
- Cacti have thick stems to store water.

4 ASSESS

Formative Assessment

Display a bar graph that shows students’ favorite animals. Which animal is most popular? Which animal is least popular? See students’ work.

WRITE MATH

Ask students to write about why bar graphs make it easier to compare data.

Quick Check

Are students continuing to struggle with making and reading bar graphs?

During Small Group Instruction

If Yes ➔ AL Daily Transparencies
AL Differentiated Instruction: Option 1 (p. 159c)

If No ➔ OL Differentiated Instruction: Option 2 (p. 159c)
OL Skills Practice Worksheet
BL Enrich Worksheet
Review Lessons 2A to 2B

Objective: Review and assess mastery of previous lessons’ skills and concepts.

- Review with students how to read a bar graph.
- Explain that this bar graph shows the favorite color choices of students.
- Students may wish to use counters to help them analyze data from the bar graph.

Practice with Technology

Get ConnectED Find additional practice with online activities, games, and quizzes.

Use the graph. Answer the questions.

1. How many students chose \( \square \)?
2. Did more choose \( \square \) or \( \square \)?
3. Did fewer choose \( \square \) or \( \square \)?
4. How many more chose \( \square \) than \( \square \)?
5. Which color has one fewer than \( \square \)?
6. Which two colors do the same number of people like? Circle two colors.
7. Color one balloon to show each student’s favorite color.
**Animal Race Using Data**

**Manipulatives** connecting cubes, four-color spinner

Introduce the game to students to play as a class, in small groups, or at a learning station to review concepts introduced in this chapter. You may wish to use the available Game Board to play the game.

**Instructions**

- Note: This game can be played individually or in a group of 4. If 4 students play, each chooses an animal as his or hers.
- Assign a color on the spinner to each animal. (Example: turtle – red, rabbit – blue, crab – green, frog – yellow)
- Players take turns spinning the spinner.
- The player whose animal matches the color to which the spinner points moves his or her connecting cube forward one space and shades in the space with their color.
- The first player to reach Finish wins the race!

**Extend the Game**

- Have students create a new game board using different animals and more spaces.
- Before players move their connecting cube forward they must add the number in the new space to the previous number. For example, if a connecting cube is on number 2 and is about to move to number 3, the player must add 2 + 3 and give the sum before moving his or her connecting cube forward.
- For another game focusing on the same mathematical concept, see Game Time.

**Differentiated Practice**

Use these leveled suggestions to differentiate the game for all learners.

<table>
<thead>
<tr>
<th>Level</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL</td>
<td>To make it easier for students to identify which animal matches each color on the spinner, allow them to draw a circle around each animal, using a crayon of the color assigned to it.</td>
</tr>
<tr>
<td>OL</td>
<td>Have students play the game with the rules as written.</td>
</tr>
</tbody>
</table>
Objective
Choose the best strategy to solve a problem.

Resources
Materials: paper, pencils
Leveled Worksheets

1. INTRODUCE
Activity: Review
Write and read aloud the following:
A horse has 4 hooves, or feet. Each hoof needs a horseshoe.
How many horseshoes are needed for 3 horses?
- What do we know? A horse has 4 hooves. Each hoof needs a horseshoe.
- What do we want to find? We need to find how many horseshoes are needed for 3 horses.
- Discuss which problem-solving strategy would be appropriate: guess and check, draw a picture, or write a number sentence.
- Guide students to draw a picture. Have students draw three horses with four legs each and then count to find the answer.
- How many horseshoes are needed? 12 horseshoes

2. TEACH
Have students read the problem at the top of the student page. Guide them through the problem-solving steps.

Understand Using the questions, review what students know and what they need to find.

Plan Have them discuss their strategy.

Solve Guide students to write a number sentence to solve.
- Are you using addition or subtraction to solve? subtraction

Check Have students look back at the problem to make sure that the answer fits the facts given.
- Have students use addition to check their answer.
Mixed Problem Solving

Choose a strategy. Solve.

1. A chicken has 2 legs. How many legs would 4 chickens have?
   - 8 legs

2. A cat has 4 legs. How many legs would 3 cats have?
   - 12 legs

3. There are 3 plates on the table. Each plate has 2 rolls. How many rolls are there in all?
   - 6 rolls

4. There are 3 maple trees. There are 5 oak trees. There are 8 redwood trees. How many oak and maple trees are there altogether?
   - 8 trees

Common Error!

Students may have difficulty choosing the most efficient strategy to solve a problem. Use various strategies to solve the same problem and discuss why one strategy works better than the others.

Line Up

Have students line up by favorite season. Which season do most students like best? Which season do the fewest students like best?

Alternate Teaching Strategy

If students have trouble choosing the most appropriate problem-solving strategy . . .

Then use one of these reteach options:

1. Reteach Worksheet

2. Choose a Strategy. Ask students to try different strategies for solving the same problem.
   - Which strategy worked best for you? See students’ response.

Practice

Mixed Problem Solving

Exercises 1–4 Be sure students can read and understand the problems. Remind students to think about what they know and what they need to find out. Have them think about which strategy will best help them find out what they need to know.

Homework Practice Worksheet

Assess

Formative Assessment

To check for understanding, ask students to explain their thought process.

- Which strategy did you choose for Exercise 4? See students’ work.
- Why did you choose this strategy? See students’ work.

Quick Check

Are students continuing to struggle with choosing problem-solving strategies?

During Small Group Instruction

If Yes

- Daily Transparencies
- Differentiated Instruction: Option 2 (p. 159c)

If No

- Skills Practice Worksheet
- Enrich Worksheet
- Differentiated Instruction: Option 2 (p. 159d)

Multi Part Lesson 2

How are bar graphs and picture graphs the same? Sample answer: Bar graphs and picture graphs both show data in an organized way. How are they different? Sample answer: whereas picture graphs use pictures to show the data, bar graphs show bars of different length to show data.
Activate Prior Knowledge

Before you turn students’ attention to the pages, discuss activities that keep us healthy.

- What activities can we do to keep our bodies healthy? Sample answers: exercise, eat healthy food, drink water
- What can we do to keep our teeth healthy? Sample answers: brush, floss, use mouth wash

Objective

Use graphs to display data about healthy activities.

- GLE 0106.1.2 Apply and adapt a variety of appropriate strategies to problem solving, including estimation, and reasonableness of the solution.
- ✔ 0106.1.9 Use age-appropriate books, stories, and videos to convey ideas of mathematics.

Healthy Choices

Exercise is a healthy choice for your body. There are healthy choices you can make every day.

This book belongs to

Use soap and water to wash your hands.

When should you wash your hands?
Sample answer: Before eating and after using the restroom.

Use graphs to display data about healthy activities.
Use the Student Pages

Have students work individually or in pairs to solve the word problems on pages C–D.

Page C Have students draw a picture that shows Morgan brushing her teeth in the morning and at night for three days. Help students count how many times Morgan brushed her teeth in three days.

Page D Use the picture graphs to find out how many more stickers Mason has for exercising than Morgan.

Write Math Have students write a question about comparing the data in the bar graph on page D.

Fun Facts

- Children exercise less as they get older.
- You should change your tooth brush every three months.
- What is your favorite way to exercise? See students’ response.

Brush your teeth in the morning and before you go to bed.

Morgan brushes her teeth 2 times a day. How many times does she brush her teeth in 3 days? 6 times

How many more stickers does Mason have for exercising than Morgan? 2 stickers
**Chapter Review/Test**

**The BIG Idea**

As a class, revisit this chapter’s Big Idea.

How can I read and make picture graphs, tally charts, and bar graphs?

Sample answer: I can collect data from my friends by asking them a question. I can make tally marks to show each answer given. Then I can use the tally charts to color in a bar graph or draw pictures on a picture graph to show the results.

**Dinah Zike’s Foldables®**

Use the lesson suggestions to incorporate the Foldable during the chapter. Students can then use their Foldable to review for the test.

**Lesson 2A** Have students draw a picture graph with four rows in the center of the chart. Have students write each of the four categories, one on each flap. Have students poll their classmates and keep tally charts of the data behind each flap. Have students use the tallies to complete the picture graph in the center.

**Lesson 2B** Have students draw a bar graph with four rows in the center of the chart. Have students write each of the four categories, one on each flap. Have students poll their classmates and keep tally charts of the data behind each flap. Have students use the tallies to complete the bar graph in the center.

**Vocabulary Review**

Review chapter vocabulary using one of the following options.

- Visual Vocabulary Cards (10, 20, 56, 64, 71)
- eGlossary
- Reflecting on the Chapter

---

**Name**

**Vocabulary**

Draw lines to match.

1. tally chart  2. picture graph  3. bar graph

**Concepts**

Use the graph to answer the questions.

<table>
<thead>
<tr>
<th>Piano</th>
<th>Guitar</th>
<th>Trumpet</th>
<th>Drum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Color</th>
<th>Tall</th>
<th>Fav</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Blue</td>
<td>56</td>
<td>47</td>
</tr>
<tr>
<td>Purple</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Green</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

4. How many students chose ? __4__ students
5. Which instrument has four more than ?
6. How many more students chose than ? ___1___

---

**Chapter Project**

**Take a Survey** Alone, in pairs, or in small groups, have students discuss the results of their completed chapter project with the class. Assess their work using the Chapter Project rubric found in the Chapter Resource Masters.
Alicia asked her classmates what their favorite sea animal was.
2 chose whales.
6 chose dolphins.
9 chose sharks.

7. Make a tally chart of the data.

<table>
<thead>
<tr>
<th>Favorite Sea Animal</th>
<th>Tally</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dolphins</td>
<td>IIII</td>
<td>6</td>
</tr>
<tr>
<td>Sharks</td>
<td>I I I I</td>
<td>9</td>
</tr>
</tbody>
</table>

8. Use the tally chart to make a bar graph of the data.

9. Did more students choose whales or dolphins? **dolphins**

10. Adam asked his friends to vote for their favorite subject. 6 voted for math, 4 voted for science, and 3 voted for reading. Do more friends like math or science? Explain.
**Math. See students’ explanations.**

---

**Data-Driven Decision Making**

Based on the results of the Chapter Review/Test, use the following to review concepts that continue to present students with problems.

<table>
<thead>
<tr>
<th>Exercises</th>
<th>Tennessee Standards</th>
<th>What’s the Math?</th>
<th>Error Analysis</th>
<th>Resources for Review</th>
</tr>
</thead>
</table>
| 1–6       | GLE 0106.5.1        | Identify a tally chart, picture graph, and bar graph. Represent and compare data using graphs and charts. | Draws lines to wrong chart or graph. Does not recognize tally chart, picture graph, bar graph. Does not understand “four more than,” “how many more students chose.” | ⭐️ Chapter Resource Masters  
[Get ConnectED](#)  
Lesson Animations |
| 7         | GLE 0106.5.1        | Organize and represent data in a tally chart. | Does not understand how to make “tally chart.” | |
| 8–10      | GLE 0106.5.1        | Sort and represent data by using a bar graph. Use a bar graph to answer questions. | Does not know how to make a bar graph. Misreads numbers from bar graph. | |
1 INTRODUCE

For the Teacher
• It may be helpful to remind students to double check that they put their first and last names on the test.
• Read oral test questions at a moderate, steady pace.

For the Student
• Make sure to check that you have filled in a circle for each test question.
• Tell students that if they cannot answer a question, to cross out the answer choices they know are wrong, then choose an answer from the choices that remain.

2 TEACH

Before beginning the practice test, give students an opportunity to solve the Additional Example.

ADDITIONAL EXAMPLE

What is \( 5 + 3?\)

\[
\begin{array}{c}
5 + 3 \\
\hline
2 \\
7 \\
8 \\
9 \\
\end{array}
\]

IWB INTERACTIVE WHITEBOARD READY

3 ASSESS

Formative Assessment
• Use these pages as practice and cumulative review. The questions are written in the same style as those found on standardized tests.
• You can use these pages to benchmark student progress.

Additional Practice
• Standardized Test Practice
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Test Directions for Teachers

Read the following directions to students before they begin. Then read each question followed by a pause to allow students time to work and choose an answer. The first two test items can be worked as class examples.

- Write your name at the top of the page.
- I am going to read each question to you. Listen carefully to the entire question before you choose an answer.

A. Which addition sentence shows a way to make 6?
B. Look at the tally chart. It shows favorite snacks. Find the snack that has two votes. Mark the picture that shows two votes.
1. Look at the graph. It shows the activities that children like to do. Find and mark the activity that got the most votes.
2. Look at the picture. Which number sentence goes with the picture?
- Turn the page over.
3. Which group has three ladybugs?
4. Look at the connecting cubes. How many are left?
5. Look at the part-part whole mat. Which number shows the whole?
6. What is the difference?
7. Katie had 3 balloons. All 3 float away. How many balloons does Katie have left?
8. What is the sum?

Short Response

9. There are 7 cats. 2 cats are brown. How many cats are not brown?
10. Keith has 5 toy cars. He takes away 1 car. How many cars are left?