# 8 DATA

# Across-Grades Progression
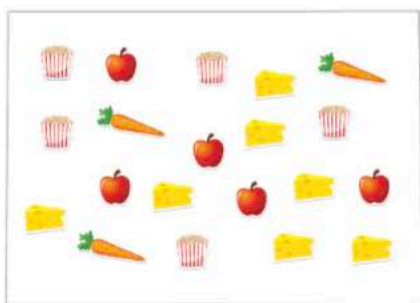
| Looking Back | Looking Here | Looking Ahead |
|---|---|---|
| **Grade 1 Chapter 10**<br><br>Section 10A Picture Graphs<br><br>Section 10B Tally Charts and Picture Graphs | **Grade 2 Chapter 8**<br><br>Section 8A Picture Graphs<br>• Picture Graphs and Draw Picture Graphs<br><br>**Section 8B Bar Graphs**<br>• Bar Graphs and Draw Bar Graphs<br><br>**Section 8C Line Plots**<br>• Line Plots<br>• Make Line Plots | **Grade 3 Chapter 9**<br><br>Section 9A Picture Graphs with Scales<br><br>Section 9B Bar Graphs with Scales<br><br>Section 9C Line Plots |

# Across-Chapters STEAM Project Work

This project spans **Chapters 8 and 9**. Students are given an opportunity to make connections between mathematics and art as they learn about potato art and collect data about their favorite potato dishes. This task requires students to apply their knowledge of using tally charts to collect data and then draw a picture graph to represent the data. Students will work in small groups to decide on their four favorite potato dishes, ask their classmates which of the four dishes they like best, and then create a picture graph using potato stamps. After completing their picture graph, students will use it to create another graph of their choice. Invite each group to share their graphs with the class at the end of **Chapter 9.**

# Chapter Progression

In **Section 8A**, students learn to read and interpret horizontal and vertical picture graphs. They also learn to draw a picture graph to show data. Students solve simple problems involving putting together, taking apart, and comparisons using the data from the picture graphs.
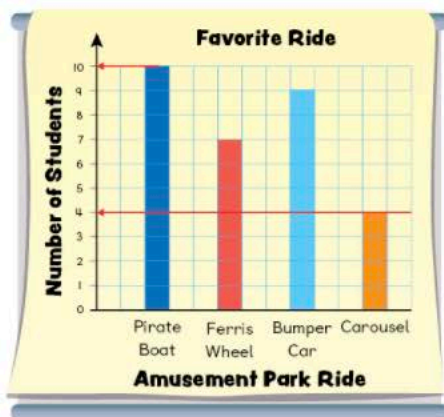
**Favorite Snack**

| | | |
|---|---|---|
| 🍿 | Popcorn | ⭐ ⭐ ⭐ ⭐ ⭐ |
| 🧀 | Cheese | ⭐ ⭐ ⭐ ⭐ ⭐ ⭐ ⭐ |
| 🥕 | Carrot | ⭐ ⭐ ⭐ |
| 🍎 | Apple | ⭐ ⭐ ⭐ ⭐ ⭐ |

**Key:** Each ⭐ stands for 1 student.

5 students like popcorn.

In **Section 8B**, students learn to read and interpret horizontal and vertical bar graphs. They will learn to draw bar graphs and use the information to solve simple problems involving putting together, taking apart, and comparisons.

The bar graph shows data from 30 students.

In **Section 8C**, students represent and interpret data on a line plot. They will measure objects to the nearest whole unit then show the measurements on a line plot. Finally, they will answer problems based on the data collected.

| | |
|---|---|
| | 10 cm |
| | 6 cm |
| | 9 cm |
| | 10 cm |
| | 6 cm |
| | 5 cm |
| | 8 cm |
| | 5 cm |
| | 10 cm |
| | 7 cm |
| | 5 cm |
| | 6 cm |
| | 5 cm |
| | 9 cm |

**Length of Ribbons**

Length (centimeters)
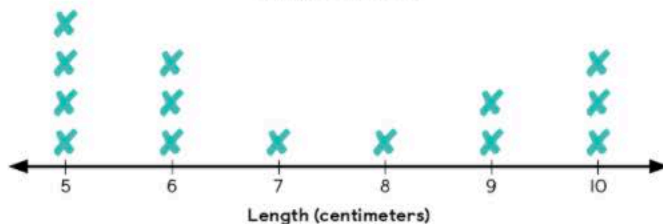
Key: Each ✖ stands for 1 ribbon.

The longest ribbon is 10 centimeters long.
There are 3 ribbons with this length.

**Lesson 2**

# 8A Picture Graphs

## Focus Question
How can you use a picture graph to show data?

## I CAN
- I can read and interpret picture graphs.
- I can use the information in the picture graphs to solve problems.
- I can draw a picture graph to show data.

## Mathematical Practice(s)
- 2 Reason
- 4 Model

## Vocabulary
- key

## Material(s)
- I set of sticky notes (4 colors) per pair or small group
- I set of counters per pair or small group
- I copy of Picture Graph Template (TR23) per student

### PICTURE GRAPHS AND DRAW PICTURE GRAPHS
(pages II7 to I24)

#### Lesson Opener
Task (page II7)                    10 minutes

- You may use the appropriate digital manipulative to support teaching and learning throughout the lesson(s) in Section 8A.
- Group students in pairs or small groups. Provide students with sticky notes in 4 colors.
- Encourage students to show the data using sticky notes by representing each snack with a different color sticky note. Have students work on the task. Observe student discussions.
- After students have attempted the task, use the following prompts to facilitate a class discussion. Pay attention to the language students use.
- 💬 **How is the data collected?** Each student put a sticker to show their favorite snack. **What data is collected?** The number of students who like each snack. **What does each sticker represent?** Each sticker shows one student who likes that snack. **How will you find the number of students who like a snack?** I will count the number of stickers with the picture of the snack. **What problems did you face while doing this?** I have to search for the stickers I want to count. **Do you think this is the best way to show data?** no **Why do you think so?** I cannot read and interpret the data easily; I cannot compare the data easily.

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Name: _____        Date: _____

## 8A Picture Graphs

A Second Grade class put stickers on a large piece of paper to show their favorite snack.

How many students are there in the class? How would you record the data to help you?

### Learn

**Favorite Snack**

| | | |
|---|---|---|
| 🍿 | Popcorn | ⭐⭐⭐⭐⭐ |
| 🧀 | Cheese | ⭐⭐⭐⭐⭐⭐ |
| 🥕 | Carrot | ⭐⭐⭐ |
| 🍎 | Apple | ⭐⭐⭐⭐⭐ |

**Key:** Each ⭐ stands for I student.

(a) There are ___20___ students in the class.

(b) ___5___ students like popcorn.

(c) ___Cheese___ is the most popular snack.

8A  Picture Graphs   II7
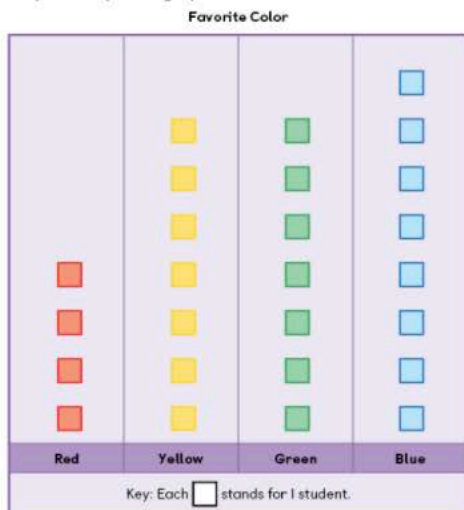
#### Lesson Development
**Learn** (page II7)                    10 minutes

- Display page II7.
- Group students in pairs or small groups.
- Encourage students to use the sticky notes from the Opener and group the sticky notes according to their colors.
- 💬 **Why do you need to organize data?** It is easier to read and compare data when it is organized. **What are different ways that you have learned to show data?** tally chart, picture graph
- Guide students to recall how they have used a picture graph to interpret data by counting the symbols in each row or column.
- 💬 **What does a key in a picture graph tell you?** It tells that each star in the picture graph shows I student. **How will you find the number of students who like each snack?** I will count the number of stars in that row. **How will you find the number of students in the class in all from the picture graph?** I can count all the stars; I can add the number of students who like each snack. **How will you use the picture graph to find the most popular snack?** The snack with the greatest number of stars is the most popular; the snack with the longest row of stars is the most popular.

## Learn Together

I. Mr. Martinez asked the students in his class to choose their favorite color to paint their classroom.
They made a picture graph to show the data.

**Favorite Color**

| Red | Yellow | Green | Blue |
|-----|--------|-------|------|

Key: Each ☐ stands for I student.

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Fill in the blanks.

**(a)** How many more students liked blue than red?

4

How many students liked green?
How many students liked blue?

**(b)** How many students liked green or blue?

I5

**(c)** How many students did **not** want to paint the classroom red?   22

**(d)** Which color was the most popular? _____ blue _____

**(e)** An equal number of students liked two colors. Which are the two colors?

_____ yellow _____ and _____ green _____

**(f)** How many students are there in Mr. Martinez's class?

26

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**continued**

### Extension

*Encourage students to make their own questions based on the picture graph. Have students exchange the questions with a classmate. Invite students to share the questions and their answers.*

## Learn Together (pages II8 to I2I)          I5 minutes

- Group students in pairs or small groups to answer Questions I to 3. Provide a set of counters.
- **QUESTION I** requires students to interpret data from a vertical picture graph.
- Encourage students to use counters to show the information in the picture graph.

💬 **What does this picture graph show?** The picture graph shows the number of students who like each color. **How is this picture graph different from the picture graph in LEARN?** In this picture graph, the symbols are lined up vertically; small squares are used in this picture graph. **How will you find the number of students who like each color?** I will count the squares for each color. **How will you use the picture graph to compare the number of students who like blue to the number that like red?** I will count how many more squares there are in the blue column than in the red column; I will find the number of students who like blue and the number of students who like red, and then subtract. **What information will you need to find the number of students who like green or blue?** I need to find the number of students who like green and the number of students who like blue. **Why?** I will find the number of students who like each color and add. **How will you find the number of students who do not want the classroom to be painted red?** I will find the number of students who like colors other than red. **How will you find this?** count the number of squares of all colors other than red; add the number of students who like each color other than red; subtract the number of students who like red from the total number of students.

💬 **How will you use the picture graph to find the most popular color?** The color with the greatest number of squares; the color with the tallest tower. **How will you find two colors which have the same number of votes?** I will find the 2 colors that have the same number of squares; towers of the same height. **What are the different ways you can use to find the total number of students?** I can count the total number of squares; I can add the number of students who chose each color.
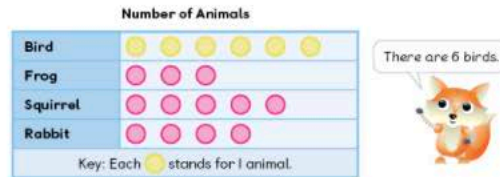
## Best Practice

Provide students with connecting cubes to show the data in the picture graph. Encourage students to stack the connecting cubes for each color to make four towers. Invite students to show sum and difference using the towers to compare data.

## Extension

Invite students to interpret the graph by considering that each square stands for 2 students. Encourage students to explain how they can use this to find the number of students who like each color.

- **QUESTION 2** requires students to complete a horizontal picture graph. Provide students with a set of counters or sticky notes.
- Invite students to use counters to represent the animals. Have students arrange the counters for each type of animal in one row or column.
- Point out the key for the picture graph and highlight that the circle represents one animal.

2. Count each type of animal to complete the picture graph.

**Number of Animals**

| | | | | | | |
|---|---|---|---|---|---|---|
| Bird | 🟡 | 🟡 | 🟡 | 🟡 | 🟡 | 🟡 |
| Frog | 🔴 | 🔴 | 🔴 | | | |
| Squirrel | 🔴 | 🔴 | 🔴 | 🔴 | | |
| Rabbit | 🔴 | 🔴 | 🔴 | 🔴 | | |

Key: Each 🟡 stands for 1 animal.

There are 6 birds.

How would you compare the number of different animals?

120  Chapter 8  Data

💬 **How do you use a picture graph to represent data?** I show the number of animals of each type in the picture graph. **Why are 6 circles drawn in the row showing birds?** Because there are 6 birds in the picture. **How would you complete the picture graph?** I draw a circle in the correct row for each animal counted. **What information can you find from the picture graph?** I can compare the number of animals of different types; I can find the animal with the greatest number; I can find the animal with the smallest number.

- Point out that the circles in the picture graph are placed at the same distance away from each other so that it is easier to compare visually.
- Remind students to record the data for each type of animal in the appropriate row.

😊 Encourage students to talk about how they can compare the number of different animals in the picture.

💬 **Why is it easier to compare the number of animals from the picture graph than from the picture?** It is easier to visualize information from the picture graph.