

DATA MANAGEMENT AND PROBABILITY

GRADE 1

ONTARIO EDITION

hands-on
mathematics

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Introduction

This module focuses on the collection and organization of information (data or statistics) (lessons 1 through 6) as well as on the concept of probability (lessons 7, 8, and 9). It is important for students to learn how to formulate suitable questions to help them find information or data, select the appropriate data and collect it efficiently, and organize and display it in a logical and mathematical way.

In this module, students will learn to collect and count various objects in their world. They will also learn that organization of information is a way of problem solving. Students will become skilled at sorting, comparing, counting, and classifying, in order to maintain data. As well, they will learn to develop an understanding for collecting surveys, formulating questions, and developing a visual record as a way of displaying their information.

You will have to guide younger students through the formulation of appropriate questions in order for them to access data. As they are exposed to the language of probability, they will become more efficient with data management.

Remember to continue with your classroom Math Word Wall, adding new terms to it as they arise in the module.

Background Information for Teachers

Students develop an understanding of data management by progressing through three stages:

Stage 1: Concrete graph

A *concrete graph* uses the actual object or person on the grid, rather than a picture or other representation of it. The base of the graph, or “graphing mat,” is often made from sturdy plastic, with squares (large enough for students to stand in) marked off with masking tape. Generally, a concrete graph is three squares wide and several squares long. The reverse side of the mat is divided into smaller squares (the size of common floor tiles), usually five or six squares wide and several squares long.

Commercial graphing mats are available through educational suppliers. You can also make your own from a large sheet of plastic or a plastic shower curtain, using permanent markers to draw the gridlines.

Stage 2: Pictograph

In a *pictograph*, a picture of the object or a pictorial representation of it (for example, a sticker) replaces the object.

Stage 3: Symbolic graph

In a *symbolic graph*, a written symbol, such as a checkmark or an X, is used to represent data collected.

Mathematics Vocabulary

Throughout this module, teachers should use, and encourage students to use, vocabulary such as: *data, information, sort, tally, survey, the same as, more than, fewer than, greater than, less than, pictograph, never, sometimes, always, possible, and probable/probably.*

2 Introducing Surveys

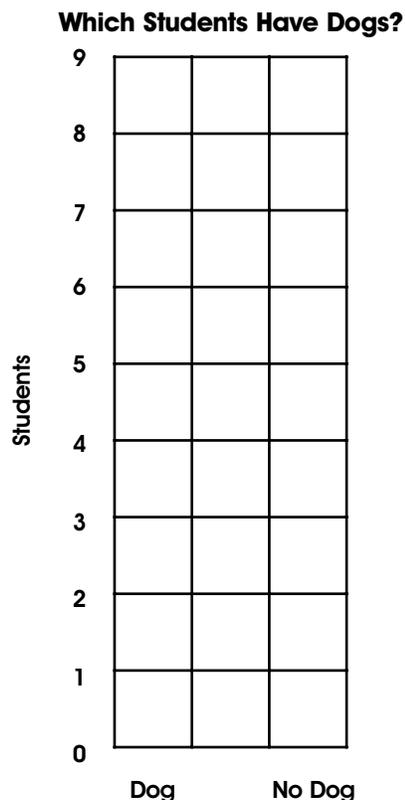
Background Information for Teachers

This lesson focuses on surveys and the language and questioning needed to conduct them. The purpose of these activities is for students to understand that data is the actual information gathered while a survey is a means of collecting the data or information.

Materials

- markers
- chart paper
- graphing mat large enough for students to stand on (refer to page 60 for instructions on making a graphing mat)
- index cards

Note: On index cards, write the title “Which Students Have Dogs?” and category labels “Dog” and “No Dog”. The graphing mat will eventually look like this:



Note: A bar graph always has a space between each item you are graphing. Be sure to model this on concrete graphs and pictographs to set the stage for instruction about bar graphs.

Activity: Part One: Survey Questions

Begin by asking students to recall the mathematical words they learned in the previous lesson. Encourage them to continue using words such as *sort*, *data*, *more*, and *less*.

Ask students what the word *data* means. Use *data* and *information* interchangeably until they understand the meaning of the term.

Ask students to talk about the data they learned, or collected, when they sorted the class. For example:

- How many boys are in the class?
- How many girls are in the class?
- How many more boys than girls are there?

The purpose of the following activity is to have students understand that an appropriate question is needed to discover certain information or data. Explain that when someone wants to find out certain information from a group of people, a specific question, called a *survey question*, is asked. Write the word *survey* on chart paper for students' reference. Then, write the following question:

- How many students in the class have a dog for a pet?

Ask:

- How many students in the class have a dog? (As students raise their hands, count, and record the number on chart paper.)
- Is there a different way to find this data, other than having you raise your hands?

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Guide students to think about how they discovered how many boys and how many girls are in the class, encouraging the response of sorting into groups. Next, have them sort themselves into groups: one for students who have dogs and one for students who do not have dogs.

Now, place the graphing mat on the floor and have each student stand on an appropriate square to show whether he/she has or does not have a dog. Count the number of students in each group. Ask:

- Can anyone tell me another way of showing this data?

Help students come up with other ideas, such as drawing a picture (example: six students with dogs; twelve students without dogs), making a list of names (checkmark, no checkmark), and so on.

On chart paper, write the names of students with dogs in one column and students without dogs in the second column. Explain that a *tally* is an easy way to group and count because things do not have to be counted one by one. Demonstrate a tally count.



Have students create another survey question (for example: How many students are wearing red today?) and demonstrate the collection of data using a tally, a class list (e.g., Mary: Yes; Jason: No; Eric: No, and so on), and a two-column table.

Brainstorm with students a list of possible survey questions that would sort the class into two groups. Record the suggestions on chart paper.

Activity: Part Two: Interviews

Students should work with partners for this activity. Have each pair select a survey question, interview twelve classmates, and display the data using Activity Sheet A (2.2.1). Have each pair present their findings to the class. Encourage students to explain how they collected their data.

Activity Sheet A

Directions to students:

Working with a partner, interview twelve classmates about one survey question. Show your data using a tally, a class list, or a table (2.2.1).

Problem Solving

Jeff surveyed his family to find out what their favourite kind of soup is. This is what Jeff found out:

His mom likes chicken noodle soup.

His dad likes chicken noodle soup.

His grandma likes mushroom soup.

His grandpa likes clam chowder.

His older brother likes chicken noodle soup.

His younger sister likes mushroom soup.

Jeff likes chicken noodle soup.

- How many people in Jeff's family like clam chowder?
- In his family, what is the least favourite kind of soup?
- In his family, what is the favourite kind of soup?

Note: A reproducible master for this problem can be found on page 71.

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Extension

Add the terms *tally*, *information*, *data*, and *survey* to the Math Word Wall.

Assessment Suggestion

Observe students to see if they can:

- select a survey question
- survey twelve students
- record data using a tally
- represent their data in a meaningful way

List these criteria on the Rubric, found on page 20, and record your observations.

Date: _____

Names: _____

Surveying Our Classmates

Our survey question is: _____

Our data:

What our data tells us: