

NUMBER SENSE AND NUMERATION
GRADE 1
ONTARIO EDITION

hands-on
mathematics

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Introduction

The activities in this module are designed to help students develop an understanding of number concepts and the operations of addition and subtraction. Particular emphasis is placed on extending students' knowledge of cardinal and ordinal numbers, counting, and number relationships.

The operations are introduced through the use of story problems. These problems provide reasons for adding and subtracting, as well as contexts that will help students understand the meaning of the operations, and when they are used.

Several lessons in this module include a section called "Next Steps." In this section, teachers are guided through a subsequent sequence of activities to do with students, following developmentally from the main activity. For example, in the main activities of lesson 2, students are introduced to rote counting to 10. As students master this, the next step is to move to rote counting to 20, then, to 30, and so on, progressively working toward the goal of rote counting to 100.

Background Information for Teachers

The addition story problems in this module include two different situations: *active* and *inactive*.

- *Active* situations involve the joining of separate parts to form a whole. For example:
 - Marnie has 3 dolls. She bought 2 more. How many dolls does she have now?
 - *Inactive* situations involve separate parts that are not actually joined to form a whole. For example:
 - There are 3 cars parked on one side of the road and 2 cars parked on the other side of the road. Altogether, how many cars are parked on the road?
- The subtraction story problems in this module include three distinct situations: *set-subset*, *comparison*, and *adding on*.
- *Set-subset*: There are two types of set-subset situations. The first involves taking away or removing a subset from a set. For example:
 - Mark has 6 cookies. He eats 4 of them. How many are left?

The second type involves the partitioning of a set into subsets. For example:

 - Mark has 6 cookies. Four cookies are chocolate chip and the rest are oatmeal. How many oatmeal cookies does he have?
 - *Comparison* situations involve finding the difference in size between two sets. For example:
 - There are 8 boys and 6 girls in Mr. Smith's class. How many more boys are there than girls?
 - *Adding on* situations are really addition problems with a missing addend. They answer the question, "How many more is/are needed?" in order to reach a specified goal. For example:
 - Sarah needs to sell 12 books. She has sold 3. How many more books does she need to sell?

Mathematics Vocabulary

Continue to use the Math Word Wall as a means of displaying new vocabulary. As terms are introduced or reviewed, print them on index cards, and display them alphabetically on the Math Word Wall.

Throughout this module, teachers should use, and encourage students to use, vocabulary such as: *number, count, set, sequence, forward, backward, estimate, record, pattern, number words to ten, tens, ones, more than, less than, smaller, larger, smallest, largest, ordinal numbers to ten, one half, and, plus, equals, take away, minus, penny, nickel, dime, quarter, one-dollar coin (loonie), two-dollar coin (toonie), cents.*

3 Estimating

Background Information for Teachers

Estimation is the process of making judgments about the approximate size of quantities. In this lesson, students estimate, then count, the number of objects in a set (0 to 25), beginning first with sets to 10, then to 15, 20, and, finally, to 25.

Materials

- a variety of small items to be used as counters (for example: bingo chips, buttons, bread tags, dried beans)
- overhead projector
- chart paper
- markers

Activity

Randomly place 5 or 6 objects on the overhead projector, before turning it on. Have students focus on the dark screen. Turn on the projector long enough for students to see the objects without being able to count them. Turn it off and ask:

- About how many objects did you see?

Record students' responses (estimates) on chart paper. Now, turn on the projector again, and count the objects together. Under the students' estimates, record the actual number of objects counted, and circle this number. Explain that what you just counted is the *actual* number of objects. An *about* number is a guess about the actual number: it can be more or less than the actual number, but it should be close to it. The proper term for an "about" number is an *estimate*.

Now, ask students:

- If 5 is our actual number of objects, is 1 a good estimate? Why, or why not?
- Is 100 a good estimate? What about 20? 4? Why or why not?
- What makes a good estimate?

Repeat the activity several times, varying how you place the objects on the overhead. For example, place 6 objects in groups of 2, or place 3 objects in a triangular shape. Use both regular and irregular patterns to encourage students to look for strategies to estimate and identify the actual number of objects. Each time, have students estimate the number of objects, record their estimates on chart paper, count the objects, and record the actual number of objects.

Vary the activity by using different objects. Keep the number of objects to 10 or less.

Next Steps

Repeat this activity on a regular basis throughout the year. As students gain estimating and counting skills, increase the number of objects to 15, then, to 20, then, to 25. Also, vary the size and type of objects used.

Problem Solving

Have students review the recorded estimates from the previous activity. Ask them to compare each one to the circled actual number and determine whether the estimate is too large, too small or about right. Then, have them calculate the difference between the actual number and each estimate. Support the use of a variety of strategies such as counting up or back.

3

Extensions

- Continue with your classroom Math Word Wall, adding the terms *estimate* and *record*.
- Have a daily estimation task ready when students enter the classroom in the morning or after lunch. Place several objects in a jar, and have students record their names and estimates on a sheet of paper beside the jar. At the end of each day, empty the jar, count the objects, and compare the actual number to the students' estimates. As an alternative, students can keep an estimation journal to record this daily task.

Activity Centre

Fill a container with counters (e.g., beans, buttons, or bread tags). Fill a second container with cards displaying the numerals 1 to 25 (0-50 numeral templates are included with lesson 8) (5.8.1). Have students select a numeral card from the container, then gently pour/shake out counters from the other container until they think they have the same number of counters as the number on the card. Then, have them check their estimates by counting. Have them use the Activity Centre Sheet called "Estimation Recording Sheet" (5.3.1) to record their work.

Note: A second Estimation Recording Sheet (5.3.2) is included for students who have developed their estimation skills and are ready to calculate the difference between their estimates and the actual numbers.

Date: _____

Name: _____

Estimation Recording Sheet

Number	Estimate	My Estimate Was (circle one)
		too small about right too large
		too small about right too large
		too small about right too large
		too small about right too large
		too small about right too large
		too small about right too large

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Date: _____

Name: _____

Estimation Recording Sheet

Number	Estimate	Difference	My Estimate Was (circle one)
			too small about right too large
			too small about right too large
			too small about right too large
			too small about right too large
			too small about right too large
			too small about right too large

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