

**MATH UNIT**

# Making a graph somebody else can read

Grade 2 | 7 lessons | 7 x 30 minutes | 3 source books | 210 minutes

**THE QUESTION THIS UNIT FOLLOWS**

What does this graph let you say?

**ABOUT THIS UNIT**

Children can colour squares long before they can build a graph somebody else can read. Categories and labels say what is being compared; equal units make visual comparisons fair; a numbered scale locates amounts; and a key, when used, states what one square or symbol represents. A graph answers the question its data were collected to answer, and no other.

**THE MATHEMATICAL ARC**

1. Sort by one attribute and label it for a reader.
2. Use two attributes at once, including both and neither.
3. Count four regions and check that they rebuild the whole set.
4. Make height represent number only with equal pieces and one baseline.
5. Use a numbered scale and stated key to give bars meaning.
6. Change the key and rebuild the same data.
7. Decide which survey question a graph can and cannot answer.

**SOURCE BOOKS**

|                           |           |
|---------------------------|-----------|
| The Great Graph Contest - | 2 lessons |
| Fishy Mystery -           | 2 lessons |
| Fair is Fair! -           | 3 lessons |

**HOW TO USE THIS GUIDE**

Open the exact source lesson named each day. Use about 5 minutes to connect, 20 minutes for the source core, and 5 minutes to close. Each lesson also includes a stand-alone entry point.

**WHERE THIS FITS IN YOUR YEAR**

Teach after: reliable sorting by one attribute and counting small collections.

Develops: categories, labels, two-attribute sorting, whole-set accounting, fair units, scale, key, and limits of interpretation.

Prepares for: later picture graphs and bar graphs, including scaled representations.

## STRONGEST CURRICULUM CONNECTIONS - OUR SUMMARY

None claimed. Add unit-level regional standards only after jurisdiction-by-jurisdiction verification.

| UNIT AT A GLANCE                |                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------|
| # Mathematical move             | Exact source lesson                                                                          |
| 1 Sort and label for a reader   | The Great Graph Contest L1 - Two Squares and the Words That Say What They Are                |
| 2 Two attributes; four regions  | Fishy Mystery L1 - Label First, Then Let the Cards Move                                      |
| 3 Four counts rebuild the whole | Fishy Mystery L5 - Four Numbers That Have To Add Back Up                                     |
| 4 Fair unit and common baseline | The Great Graph Contest L3 - The Taller Stack Only Wins If the Pieces Match                  |
| 5 Numbered scale and stated key | Fair is Fair! L1 - One Square, One Dollar: Building Marco's Graph the Way the Book Builds It |
| 6 Change key; same data         | Fair is Fair! L4 - What One Square Is Worth                                                  |
| 7 Question limits               | Fair is Fair! L3 - Two Surveys, Two Graphs: Which Question Did You Ask?                      |

## ASSESSMENT PLAN

### WHERE THIS FITS IN YOUR YEAR

# Making a graph somebody else can read — Nova Scotia

### Grade 2 mathematics

This unit fits naturally after students can sort objects by an observable attribute and count small collections reliably. Lessons 1–3 move from labelled sorting to two-attribute classification and then require students to account for the whole set by checking that four region counts rebuild the original collection.

Lessons 4–6 turn those counts into representations. Students establish why equal units and a common baseline matter, build bar graphs with a numbered scale and stated key, and then rebuild the same data under a changed key. Lesson 7 shifts from construction to interpretation: students decide which survey question a graph can answer and which claims the display cannot support.

The culminating task provides the strongest evidence. Students ask a three-response survey question, record one response per person, build a labelled graph from the record, and write both a supported statement and a statement about what the graph cannot tell.

### STRONGEST CURRICULUM CONNECTIONS - OUR SUMMARY

TEACHESSP01 - — Gather and record data about self and others to answer questions.

Student evidence: Students formulate a survey question, gather information from others, record each response, and answer questions using the collected data.

REINFORCESSP02 - — Construct and interpret concrete graphs and pictographs to solve problems.

Student evidence: Students construct and interpret categorical graph displays.

Limitation: The unit does not require both concrete graphs and pictographs.

### TEACHER MUST ADD

The unit does not require both concrete graphs and pictographs.

Checkpoint 1: four region counts must total the deck.

Checkpoint 2: plot 4, 6 and 9 under keys of 1 and 2; 9 deliberately requires a half-square under the second key.

Culminating task: collect real survey data, build a readable graph, state what it shows and what it cannot show.

Lesson 1 Sort by an attribute you choose, and label it so a stranger can read it SOURCE LESSON | The Great Graph Contest L1 - Two Squares and the Words That Say What They Are | Grade 2 | 20-minute core I CAN I can sort my collection and label what I did.

BIG IDEA A sort means nothing to another reader until its groups are named.

TAUGHT ON ITS OWN Gonk is handed a collection and must first decide what attribute to notice.

SOURCE CORE | 20 MIN Choose one attribute, sort every object into one of two groups, label both groups, and add a title.

WATCH FOR A rule that leaves objects out.

## **Lesson 2 Two attributes at once: every card answers two questions**

SOURCE LESSON | Fishy Mystery L1 - Label First, Then Let the Cards Move | Grade 2 | 20-minute core I CAN I can sort by two things at once.

BIG IDEA Two fixed rules give every card one of four possible regions.

TAUGHT ON ITS OWN The book explicitly allows some shapes to belong in neither circle.

SOURCE CORE | 20 MIN Draw overlapping circles inside a rectangle, label both attributes first, then place every card by answering both questions.

WATCH FOR Cards outside the rectangle.

## **Lesson 3 Four regions, four counts, and a total that rebuilds the whole set**

SOURCE LESSON | Fishy Mystery L5 - Four Numbers That Have To Add Back Up | Grade 2 | 20-minute core I CAN I can check that nothing is missing or counted twice.

BIG IDEA The four disjoint region counts must add back to the original set.

TAUGHT ON ITS OWN A finished diagram carries four counts: first only, both, second only, neither.

SOURCE CORE | 20 MIN Count each region once, add the four counts, then count the deck and compare.

WATCH FOR Changing a count merely to force the total.

CHECKPOINT: Complete the corresponding student page before moving on.

## **Lesson 4 Height stands for number only when the pieces match**

SOURCE LESSON | The Great Graph Contest L3 - The Taller Stack Only Wins If the Pieces Match | Grade 2 | 20-minute core I CAN I can build a graph with a fair unit.

BIG IDEA Height represents number only with equal units and a common baseline.

TAUGHT ON ITS OWN Beezy's stacks make height stand for number only under a fair-unit condition.

SOURCE CORE | 20 MIN Build equal-counter stacks from one baseline; read height, then verify by counting. Test with thicker blocks.

WATCH FOR Unequal pieces or different baselines.

## **Lesson 5 A numbered side and a stated key turn squares into a graph**

SOURCE LESSON | Fair is Fair! L1 - One Square, One Dollar: Building Marco's Graph the Way the Book Builds It | Grade 2 | 20-minute core I CAN I can number the side and say what one square is worth.

BIG IDEA The scale locates a bar's value; the key states what a square represents.

TAUGHT ON ITS OWN The book narrates Marco's graph-building moves in order.

SOURCE CORE | 20 MIN Number the scale, state the key, label categories, then build bars.

WATCH FOR Colouring before scale, labels, and key.

## **Lesson 6 Change the key and rebuild**

SOURCE LESSON | Fair is Fair! L4 - What One Square Is Worth | Grade 2 | 20-minute core I CAN I can explain what changes when the key changes.

BIG IDEA Changing the key changes the representation, not the data.

TAUGHT ON ITS OWN The book explicitly states what one square stood for.

SOURCE CORE | 20 MIN Build 4, 6 and 9 first with key 1, then key 2. Represent 9 as four-and-a-half squares under key 2.

WATCH FOR Copying old bar heights instead of applying the new key.

CHECKPOINT: Complete the corresponding student page before moving on.

## **Lesson 7 A graph answers the question its survey asked, and no other**

SOURCE LESSON | Fair is Fair! L3 - Two Surveys, Two Graphs: Which Question Did You Ask? | Grade 2 | 20-minute core I CAN I can say which question a graph can answer.

BIG IDEA A display supports claims only about the variable actually measured.

TAUGHT ON ITS OWN Marco's two graphs concern the same classmates but different questions.

SOURCE CORE | 20 MIN Match graphs to survey questions, then judge new questions as answerable or not from the available categories.

WATCH FOR Treating 'not obvious' as 'not answerable.'

## CULMINATING PERFORMANCE TASK

Ask, record, build, and say what it shows Write one question with three allowed answers. Ask at least twelve people and record exactly one response per person. Build a graph from the record using equal units, label every category, write the survey question as the title, and check every bar against the marks. Then write one statement the graph supports and one thing it cannot tell.

| TEACHER RUBRIC                                              |                              |                                   |
|-------------------------------------------------------------|------------------------------|-----------------------------------|
| Strand Secure                                               | Developing                   | Not yet                           |
| Representation Equal units; labels; title/question.         | One element needs prompting. | Display cannot be read reliably.  |
| Accuracy Bars match response record.                        | Accurate after checking.     | Record and graph disagree.        |
| Meaning Uses scale and states key correctly.                | Does so with prompting.      | Treats marks as self-explanatory. |
| Interpretation Supported claim + valid cannot-answer claim. | One needs prompting.         | Claims unrepresented information. |

## CHECKPOINT 1 | GRADE 2

Account for all of them Count each of the four regions. Write the four numbers. Add them. Count the whole deck. If the totals disagree, find the card that was missed or counted twice.

First only: \_\_\_\_\_ Both: \_\_\_\_\_ Second only: \_\_\_\_\_ Neither: \_\_\_\_\_ Four-region total: \_\_\_\_\_  
Deck total: \_\_\_\_\_

What did you find if the totals did not agree? \_\_\_\_\_

## CHECKPOINT 2 | GRADE 2

What is one square worth?

Plot 4, 6 and 9. Say the key before you colour. On Graph B, 9 will need part of a square.

GRAPH A - 1 square = 1 10 9 8 7 6 5 4 3 2 1

|   |   |   |
|---|---|---|
| 4 | 6 | 9 |
|---|---|---|

|                           |                         |   |   |   |
|---------------------------|-------------------------|---|---|---|
| GRAPH B - 1<br>square = 2 |                         |   |   |   |
|                           | 10 9 8 7 6 5 4 3 2<br>1 | 4 | 6 | 9 |

## CULMINATING TASK | GRADE 2

Ask, record, build, and say what it shows My survey question:

\_\_\_\_\_ Allowed answer

1: \_\_\_\_\_ Answer

2: \_\_\_\_\_ Answer

3: \_\_\_\_\_

### RECORD ONE MARK PER PERSON

Answer

Marks

1

2

3

### BUILD YOUR GRAPH

Answer 1

Answer 2

Answer 3 One thing my graph shows: \_\_\_\_\_

One thing my graph cannot tell: \_\_\_\_\_

## TEACHER PLANNING AND HANDOFF

Students who cannot state the key before plotting need another one-unit graph before scaled representations. A zero-count category is not guaranteed by the seven source lessons, so include one deliberately in a checkpoint or teacher-created example if it has not appeared naturally. Leave a full session for the culminating survey task.