MATH UNIT

A graph that answers a question

Grade 1 | 7 lessons | 7 × 30 minutes | 5 source books | 210 minutes in all

THE QUESTION THIS UNIT FOLLOWS

What does this chart let you say, and what does it refuse to tell you?

ABOUT THIS UNIT

This unit runs the whole cycle rather than a piece of it. Children make tally marks by hand, one per thing, and build the crossed groups the book describes; then they read cards somebody else marked, turning each crossed group into five with a flat finger and counting the leftovers on by ones. From there they collect their own data — a census where every member of a named group gets exactly one column and one tick — and finish by reading a bar graph and answering the question it was drawn for.

Two ideas make this more than chart-making. First, a count is only worth having when every member is somewhere and nobody is in two places, which is why a placed card gets ticked and may not move. Second, and harder: marks give a count and nothing else. When three singers fall ill, a board of marks cannot say which three, and the book's own character says so — so the class rebuilds the board with a name on every note and recounts after each change. The unit ends by asking what a graph does not say, which children find genuinely surprising.

THE MATHEMATICAL ARC

Each lesson does one job the lesson before it made possible.

1. One mark for one thing, and the fifth goes across
2. Read a group as five and count the leftovers on
3. Everybody gets one column, and one tick so they cannot be counted twice

4 Marks give a count and nothing else

5 Say why the sentence is true, with a finger on the row

6 The tallest bar answers the question the graph was drawn for

7 A month of readings, sorted by a line and counted both ways

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SOURCE BOOKS

Every lesson in this unit is already published under Math lessons. Nothing here asks you to teach anything you cannot open today.

Tally Cat Keeps Track
1 lesson in this unit

Let's Make a Tally Chart
1 lesson in this unit

Who's Got Spots
3 lessons in this unit

Sorting Through Spring (Math in Nature)
1 lesson in this unit

Let's Go, Snow!
1 lesson in this unit

HOW TO USE THIS GUIDE

Open the source lesson before you teach.

Each day names one lesson that already exists under Math lessons, with its book, its number and its title. This guide says what that lesson is doing in the sequence and what to collect from it; the lesson itself carries the steps, the printables and the answers.

Thirty minutes a day.

Five minutes to connect to yesterday, the twenty-minute source lesson, five minutes to close on something you can see. A day that runs long should lose the close, never the core.

Teach a lesson on its own if you need to.

Every day carries a one-sentence opening for a teacher who is using that lesson outside the sequence.

Stop after a checkpoint.

The unit holds together if you stop after either checkpoint and come back to it. Stopping between a checkpoint and the next one leaves a lesson without the evidence it was built on.

WHERE THIS FITS IN YOUR YEAR

When to teach it

Any time after the class can count reliably to twenty. It pairs well with a science or class-routine topic that generates real data worth recording.

What students need first

Children can count to twenty with one touch to one number word, and can make a pencil mark where they intend to.

What this unit develops

Tally marks in crossed groups of five; reading a tally by fives and counting on; a census where every member gets one category and one tick; recounting after the data changes; choosing a display that survives a change; justifying a statement with a finger on the row that proves it; reading a bar graph for the most.

What it prepares them for

Grade 2 graphing, where a picture stands for more than one thing, and the Grade 3 work on a key that is not one to one.

CURRICULUM CONNECTIONS

> **None claimed.** The lessons in this unit carry their own standards classifications on their own pages, checked lesson by lesson. A unit-level expectation is a different claim, and none has been verified for this unit, so none is printed here. Use the placement guide above to site the unit in your year, and the individual lesson pages for the codes.

UNIT AT A GLANCE

#	MATHEMATICAL MOVE	SOURCE LESSON	COLLECT
1	One mark for one thing, and the fifth goes across	Tally Cat Keeps Track lesson 1, Four Marks and a Cross	A tally strip carrying the whole run to eighteen, checked against the cubes by a partner.
2	Read a group as five and count the leftovers on *Checkpoint after this lesson*	Let's Make a Tally Chart lesson 3, Reading the chart back: five, ten, and then the leftovers	Several cards read as numbers, each said again as a sentence with the food name in it, and the hamburger card checked against the number the book states.
3	Everybody gets one column, and one tick so they cannot be counted twice	Who's Got Spots lesson 1, Fifteen Singers, Three Columns, One Card Each	A three-column board holding every card once, with each column counted and the still-to-ask tray counted too.
4	Marks give a count and nothing else *Checkpoint after this lesson*	Who's Got Spots lesson 3, When Marks Will Not Do: Names You Can Move	A named board, recounted after three singers move each way, with the count of singers who can sing said aloud.
5	Say why the sentence is true, with a finger on the row	Who's Got Spots lesson 5, Ask Everyone, Then Say Why It Is True	A tally chart whose row counts match the survey list, and two defended sentences, one about a single row and one putting two rows side by side.
6	The tallest bar answers the question the graph was drawn for	Sorting Through Spring (Math in Nature) lesson 4, The Tallest Bar Answers the Question	Two three-tower graphs, the mosquito graph and the peeper vote, each with its question answered in a full sentence.
7	A month of readings, sorted by a line and counted both ways	Let's Go, Snow! lesson 2, A Month of Readings, Counted Two Ways	A filled month grid, the two colours separated into two lines, and both counts said as whole sentences.

UNIT VOCABULARY

Words students say, not words they are taught to define.

tally	One mark for one thing, from lesson 1. The fifth mark goes across the other four, not beside them.
group of five	Read as five with a flat finger in lesson 2, never recounted mark by mark.
leftover	The uncrossed marks at the end of a tally, counted on by ones.
column	Lesson 3's word. Every member of the group belongs in exactly one.
survey	Asking everybody once. Lesson 5 counts the list against the chart to prove nobody was asked twice.

MATERIALS

From the source lessons

Each day's materials are listed on that day's page below and on the source lesson itself. Nothing is duplicated here.

New for this unit

- Checkpoint 1 page, one per child
- Checkpoint 2 page, one per child
- Performance task set: twenty cubes, a blank tally strip, a prepared tally card nobody in the pair has marked, a three-column board with twelve name cards, a pencil, and interlocking cubes for towers, one set per pair
- Performance task page, one per child

ASSESSMENT PLAN

Daily evidence

Keep the tally strip from lesson 1 and the recount numbers from lesson 4. The strip shows whether the fifth mark went across; the recounts show whether a child says the number before checking it against the book, which is the habit this unit is trying to build.

Checkpoint 1, after lesson 2: Read a tally somebody else made

A card carrying three crossed groups and four leftover marks. The child reads it aloud — five, ten, fifteen, then counting the leftovers on — and says the total with the thing being counted named in it.

Book-free. A prepared tally card, no book.

Look for. A flat finger across each crossed group and no recounting of the marks inside one. A child who counts all nineteen marks has the answer and not the method.

Checkpoint 2, after lesson 4: Count again after it changes

A three-column board with twelve named cards. The teacher moves three cards from one column to another. The child recounts the affected columns and says both new numbers.

Book-free. A named board, no book.

Look for. Only the two changed columns are recounted, and the child can say what one move did to two columns at once. A child who recounts the whole board has not seen what the move did.

Culminating task: Make it, read it, collect it, answer with it

Each pair does four things. They tally a line of cubes to eighteen, making three crossed groups and a part group of three. They read a prepared card nobody in the pair marked, by fives and then leftovers. They deal twelve name cards onto a three-column board so every card has one column and one tick, and count each column. Then the teacher moves two cards and they recount the columns that changed, say the new numbers, and finish by saying one thing their board tells them and one thing it does not.

Collect. The tally strip, the number read off the prepared card, the dealt board with its column counts, the recount after the move, and the sentence about what the board does not say.

What it assesses. Making and reading a tally, a census with one column and one tick per member, a recount after a change, and a statement about the limits of the record — the whole cycle the unit built.

DAILY LESSON PAGES

Lesson 1 One mark for one thing, and the fifth goes across

SKILL LESSON **Tally Cat Keeps Track (/math-library/541.html)** · lesson 1, Four Marks and a Cross · Grade 1 · 20 minutes

Recording a count as tally marks in groups of five, to 18

I CAN	I can tally a count in crossed groups of five.
BIG IDEA	A tally is a record made while counting, not afterwards. The fifth mark goes across the other four so that a reader never has to count inside a group.
SUCCESS	The child's strip shows three crossed groups and a part group of three, and they say five, ten, fifteen at each close and eighteen at the end.
CONNECT | 5 MIN	First lesson. Count a line of eighteen cubes as a class and lose count on purpose halfway. Ask what could be written down to stop that happening.
TAUGHT ON ITS OWN	The back of the book teaches the tally completely: four single marks, a fifth laid across them, the same again to ten and to fifteen, and a last group that stops at three.
SOURCE CORE | 20 MIN	Children lay cubes in a line and draw one tally mark per cube, touching the cube as the mark is made, then put the fifth mark across the other four rather than beside them and cover the group with a finger to say how many without counting the marks.
COLLECT	A tally strip carrying the whole run to eighteen, checked against the cubes by a partner.
CLOSE | 5 MIN	Children put three more cubes down, make three more marks and leave that group uncrossed, say how many cubes they counted in all, and swap strips to check a partner's marks against their cubes.

From the source lesson: Counting cubes, twenty per child; Tally strip, a blank paper strip ruled into rows; Word cards: cross, each, group, leftover

Watch for: A fifth mark laid beside the other four. Ask them to cover the group and say how many; the answer will be slow, which is the reason for the crossing.

Lesson 2 Read a group as five and count the leftovers on

SKILL LESSON **Let's Make a Tally Chart (/math-library/518.html)** · lesson 3, Reading the chart back: five, ten, and then the leftovers · Grade 1 · 20 minutes

Reading a tally record by counting crossed groups and counting on

I CAN	I can read a tally somebody else made.
BIG IDEA	Reading a tally is two different hand movements: a flat finger for each five, a single touch for each leftover. Recounting inside a crossed group throws away the reason it was crossed.
SUCCESS	The child reads a card by fives and then counts on by ones, and says the finished number with the thing being counted named in it.
CONNECT | 5 MIN	Yesterday the marks were yours and you knew what they meant. Today the cards arrive already marked by somebody else.
TAUGHT ON ITS OWN	The book states the crossing rule and then prints the numbers its own chart is supposed to give.
SOURCE CORE | 20 MIN	Children lay a finger flat across each crossed group saying five, ten, fifteen and moving group to group without touching a single mark inside them, then from the number they stopped on touch each leftover mark and count on by ones.
COLLECT	Several cards read as numbers, each said again as a sentence with the food name in it, and the hamburger card checked against the number the book states.
CLOSE | 5 MIN	Children point at a crossed group and say what those five marks are — five people who each said the same food — then point at one single mark and say what that one is, and say why crossing helps a reader with a long row.

From the source lesson: Cards of finished tally marks, crossed groups and leftovers, one per pair; The book's data sentence, displayed; Word cards: group, across

Watch for: Marks counted one by one inside a group. Put a flat finger over the group yourself and ask for the number from there.

Checkpoint after this lesson: Read a tally somebody else made. The page is at the end of this guide.

Lesson 3 Everybody gets one column, and one tick so they cannot be counted twice

SKILL LESSON **Who's Got Spots (/math-library/410.html)** · lesson 1, Fifteen Singers, Three Columns, One Card Each · Grade 1 · 20 minutes

Sorting a named group into three data categories, one member to one category

I CAN	I can sort a whole group so every person is in exactly one column.
BIG IDEA	A count is only worth having when every member is somewhere and nobody is in two places. The tick is what makes that checkable.
SUCCESS	No card is left in the pile and no card carries two ticks, and the child counts each column and the tray at the end.
CONNECT | 5 MIN	Reading somebody else's record is one thing. Today the class makes the record, and it has to be a record of everybody.
TAUGHT ON ITS OWN	Kip's chart is a census of a group he can name: fifteen singers, three columns, and every singer belongs in exactly one of them.
SOURCE CORE | 20 MIN	Children deal fifteen name cards face up and count them, place the four the book decides for them, then take the pile one card at a time as a partner reads each singer's answer, putting the card in its column and ticking it once so it cannot move.
COLLECT	A three-column board holding every card once, with each column counted and the still-to-ask tray counted too.
CLOSE | 5 MIN	Children put every card they have no answer for in the tray, count them, say how many singers are still to be asked, then say it again after two more answers arrive and check both numbers against the ones Kip says.

From the source lesson: A set of fifteen name cards, one for each singer in the chorus; A board with three columns headed Had it, Has it now and Never had it; A pencil, for the single tick a card gets once it is placed; A tray labelled Still to ask; Word cards: chorus, column, neither, survey

Watch for: A card moved to a second column after it has been ticked. The tick is the rule; ask

them what the tick was for.

Lesson 4 Marks give a count and nothing else

SKILL LESSON **Who's Got Spots (/math-library/410.html)** · lesson 3, When Marks Will Not Do: Names You Can Move · Grade 1 · 20 minutes

Choosing a data display that survives a change, and recounting after each change

I CAN	I can say what a board of marks cannot tell me, and fix it.
BIG IDEA	The display has to survive the data changing. Marks cannot say which three singers are absent; a name on a note can be picked up and moved.
SUCCESS	The child works both of the book's changes in order, recounts after each, and says each number before checking it against the book.
CONNECT | 5 MIN	Yesterday's board was right on the day it was made. Today three singers fall ill and the board has to be asked a question it cannot answer.
TAUGHT ON ITS OWN	Kip's chart works until the data moves — marks in a column give a count and nothing else, and he says so. Alice's answer is a name on every note.
SOURCE CORE | 20 MIN	Children try to answer which three singers are absent from a board of marks with no names, say what the marks can and cannot tell them, then write one singer's name on each of fifteen notes and stick them where the marks were, checking that no count has changed.
COLLECT	A named board, recounted after three singers move each way, with the count of singers who can sing said aloud.
CLOSE | 5 MIN	Children move Kelly and Jackson, count again, say the new number before the book says it, and say what each move did to two columns at once.

From the source lesson: A board of tally marks only, three headed columns and no names; Fifteen sticky notes and a pen, one note for each singer; A row of ten squares, laid under the board as the line the count must not fall below; Word cards: chart, graph, absent

Watch for: A recount of the whole board after a move. Ask which columns changed, and let the answer shorten the work.

Checkpoint after this lesson: Count again after it changes. The page is at the end of this guide.

Lesson 5 Say why the sentence is true, with a finger on the row

SKILL LESSON **Who's Got Spots (/math-library/410.html)** · lesson 5, Ask Everyone, Then Say Why It Is True · Grade 1 · 20 minutes

Taking a survey with three answers and justifying statements from the chart

I CAN	I can ask everybody, tally the answers and say why my sentence is true.
BIG IDEA	A statement about data is defended by pointing at the part of the record that proves it. A sentence the chart cannot settle is not an answer, and saying so is the right answer.
SUCCESS	The child says two sentences about their chart and defends each with a finger on the row that proves it, and can say which of the book's five sentences need names rather than numbers.
CONNECT | 5 MIN	The last two lessons used somebody else's data. Today the class collects its own, from everybody in the room.
TAUGHT ON ITS OWN	The back of the book hands a class a question and a job: Amy and Fred asked some friends whether they would sing a solo, and the reader is told to say why five sentences about the answers are true.
SOURCE CORE | 20 MIN	Children ask every person in the room the book's question exactly as printed, writing each answer as yes, no or maybe and asking nobody twice, then build a three-row tally chart, crossing each answer off the list as it is marked, and check the total marks against the number of people asked.
COLLECT	A tally chart whose row counts match the survey list, and two defended sentences, one about a single row and one putting two rows side by side.
CLOSE | 5 MIN	Children hear the book's five sentences one at a time and say for each whether their chart can settle it, saying what the chart would need where it cannot, and name the two of the five that need names rather than numbers.

From the source lesson: A survey list with a line for every person in the room; A three-row chart headed yes, no and maybe; The book's five back-page sentences, one to a card; Word cards: survey, tally, true, maybe

Watch for: A total that does not match the list. Find the person asked twice before anything is said about the chart.

Lesson 6 The tallest bar answers the question the graph was drawn for

SKILL LESSON **Sorting Through Spring (Math in Nature) (/math-library/2614.html)** · lesson 4, The Tallest Bar Answers the Question · Grade 1 · 20 minutes

Reading a bar graph to find which category has the most, and answering a question from it

I CAN	I can read a bar graph to find the most, and answer the question with it.
BIG IDEA	A bar is tall because a number is large, so the answer is read off the picture rather than computed. The category is the answer, not the number.
SUCCESS	The child finds the tallest tower by looking along the tops and answers in a full sentence naming the category.
CONNECT | 5 MIN	Tallies have been marks in rows. Today the same counts stand up as towers, and the answer can be seen from across the table.
TAUGHT ON ITS OWN	The mosquito spread prints a graph with three labelled categories and asks a question the graph alone answers: where the mosquitoes should lay their eggs.
SOURCE CORE | 20 MIN	Children build three cube towers on a labelled base with their bottoms level, say each label aloud with a hand on its tower, then find the tallest by looking along the tops and answer the book's question in a sentence naming the category, counting only if a partner disagrees.
COLLECT	Two three-tower graphs, the mosquito graph and the peeper vote, each with its question answered in a full sentence.
CLOSE | 5 MIN	Children look at the mosquito towers again and say one thing the graph does tell them and one thing it does not, beginning the second with the graph does not say, and a partner says whether that thing could be found by looking at the towers.

From the source lesson: Interlocking cubes, thirty per pair; Labelled base strip with three category names; Second labelled base strip; Word cards: graph, tallest, most, votes

Watch for: Towers with uneven bases. Level them before anything is compared, or the tallest is decided by the table.

Lesson 7 A month of readings, sorted by a line and counted both ways

SKILL LESSON **Let's Go, Snow! (/math-library/388.html)** · lesson 2, A Month of Readings, Counted Two Ways · Grade 1 · 20 minutes

Recording daily readings on a chart and counting how many fall in each of two groups

I CAN	I can record a reading every day and count the two groups at the end.
BIG IDEA	The counting has somewhere to go. Two counts answer a question somebody actually asked, which is what makes the month of recording worth doing.
SUCCESS	The child fills every box, separates the two colours, counts both lines aloud with one touch per cube, and says which group has more with both counts inside the answer.
CONNECT | 5 MIN	Every record so far has been made in one sitting. Today the record is made a day at a time and only means something at the end of the month.
TAUGHT ON ITS OWN	The book's closing pages set the class a job in its own words: read a thermometer each day, record it, and at the end of the month count how many days were above freezing and how many below.
SOURCE CORE | 20 MIN	Children take the day cards in order and place a cube in each day box — light if the reading is above the blue line at 32, dark if below — saying the number and the colour aloud so a partner can check, and working straight through without going back.
COLLECT	A filled month grid, the two colours separated into two lines, and both counts said as whole sentences.
CLOSE | 5 MIN	Children look at their two lines and say which group has more days in it, then say whether this was a month when snow could be expected, pointing at the lines as the reason and saying both counts inside the answer.

From the source lesson: A month grid of thirty day boxes per pair, one box per day, with a blue line drawn across it at 32; Thirty snap cubes per pair in two colours; A set of twelve day cards per pair, each printed with one whole-number reading between 10 and 80; Word cards: record, month, count, more

Watch for: Empty boxes counted into a group. Count the cubes, not the boxes.

CULMINATING PERFORMANCE TASK

Make it, read it, collect it, answer with it

Each pair does four things. They tally a line of cubes to eighteen, making three crossed groups and a part group of three. They read a prepared card nobody in the pair marked, by fives and then leftovers. They deal twelve name cards onto a three-column board so every card has one column and one tick, and count each column. Then the teacher moves two cards and they recount the columns that changed, say the new numbers, and finish by saying one thing their board tells them and one thing it does not.

Collect. The tally strip, the number read off the prepared card, the dealt board with its column counts, the recount after the move, and the sentence about what the board does not say.

What it assesses. Making and reading a tally, a census with one column and one tick per member, a recount after a change, and a statement about the limits of the record — the whole cycle the unit built.

TEACHER KEY AND RUBRIC

Key

- Checkpoint 1: nineteen. The method is what is being checked, so ask how each group was read even when the number is right.
- Checkpoint 2: the two changed columns only, with both new numbers. Move the three cards between two columns rather than three, or the answer stops being about what a single move does.
- Task: prepare the tally card yourself with an awkward number of leftovers — four, not one — so that counting on is really needed. Check your own total before the lesson.

Rubric

STRAND	SECURE LOOKS LIKE	DEVELOPING	NOT YET
Representation	One mark for one thing, with the fifth mark across the other four, and a bar built with its bottom level with the others.	Does it with the arrangement in front of them.	Produces an answer without the arrangement or the reason.
Calculation	A crossed group is read as five without being recounted, and the leftovers are counted on from that number.	Does it with the arrangement in front of them.	Produces an answer without the arrangement or the reason.
Meaning	Every member of the group is in exactly one column, ticked once, and a total is said with the thing counted named in it.	Does it with the arrangement in front of them.	Produces an answer without the arrangement or the reason.
Explanation	A statement about the chart is defended with a finger on the row that proves it, and the child can name something the chart does not say.	Does it with the arrangement in front of them.	Produces an answer without the arrangement or the reason.

PRINT-READY STUDENT PAGES

CHECKPOINT 1 · GRADE 1

Read a tally somebody else made

Name Date

Read this card out loud and tell me the number. Show me how you read each group.

CHECKPOINT 2 · GRADE 1

Count again after it changes

Name Date

Here is the board. I am moving these three. Which columns changed? Count them again and tell me both numbers.

CULMINATING TASK · GRADE 1

Make it, read it, collect it, answer with it

Name Date

Tally these cubes and stop at eighteen. Now read this card — tell me the number and how you read each group. Deal the twelve names so everybody has one column and one tick, and count each column. I am going to move two cards. Which columns changed? Last, tell me one thing your board says and one thing it does not.

TEACHER PLANNING AND HANDOFF

- A child who recounts a crossed group mark by mark will be slow through all of Grade 2's graphing. Give them the flat-finger reading again before that unit.
- Lesson 4 is the one to keep if time is short. Choosing a display because it survives a change is the only place on this shelf where a child chooses a representation rather than being handed one.
- Tally Cat Keeps Track's two closing lessons, on the word each and on a tally that counts honestly and still misleads, were left out as a fourth and fifth from one book; the honest-count idea is carried by lesson 3's one card, one column, one tick.

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