

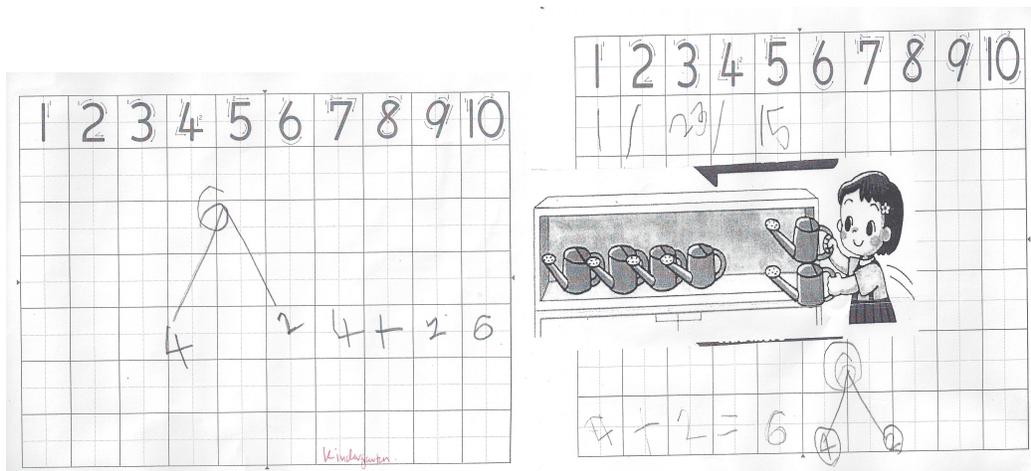
Getting Started with Reflective Mathematics Journals Grades K-1

Why use mathematics journals in kindergarten and 1st grade?

Journals in kindergarten can start lifelong habits of mathematical thinking, recording and reflecting. Kindergarten journals can help students share their thinking with the class, even if what they have “written” is just a picture or numerical expression.

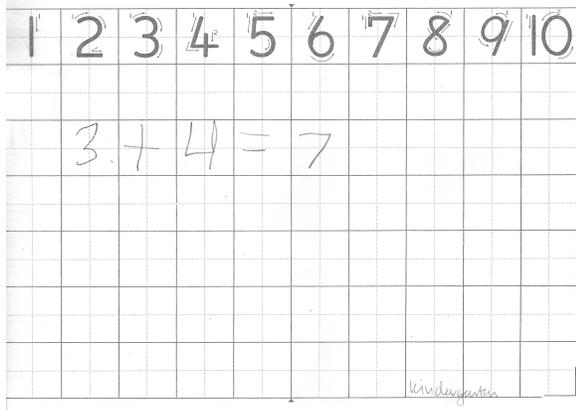
By 1st grade, students who have been introduced to journals in kindergarten are ready to do more writing, drawing, and recording of their ideas.

Journals are a powerful way to help all students build agency as mathematical thinkers. As students use their journals to try out ideas, re-think mistakes and ponder more than one solution method, they learn at a young age that mathematics is about thinking, exploring, representing and revising.



When and how should I introduce journals to students?

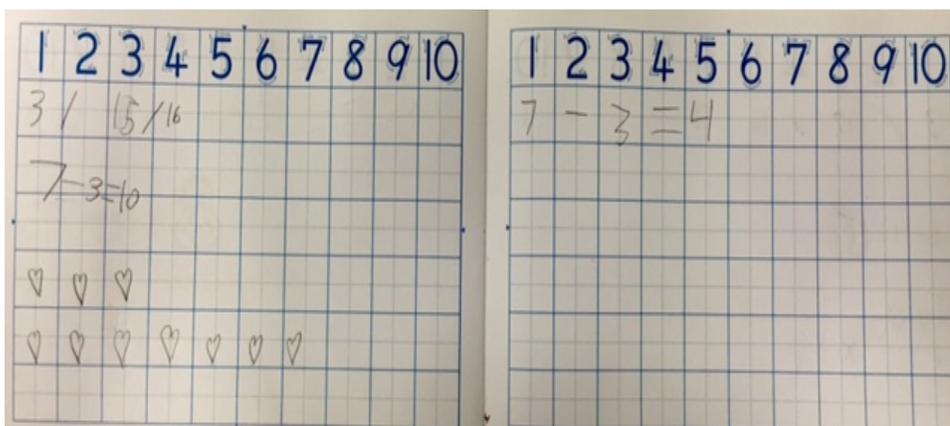
Most kindergarten teachers introduce journals partway through the year. A good time to start is when students learn to write numerals to 10 and begin to practice writing numerals; this should occur once students understand these numbers as quantities, so that there is meaning behind the numbers they practice writing in their journals. When ready, students can begin to record their ideas, by writing numbers or expressions to go with a picture, or by drawing a picture to go with a situation.



Grade 1 students can be introduced to journals at the beginning of the year. Writing the date is a good element to learn first. As students are ready, you can model different ways to record thinking, such as pictures and number sentences. Many students will naturally copy approaches you model on the board, if your board writing is organized and appealing.

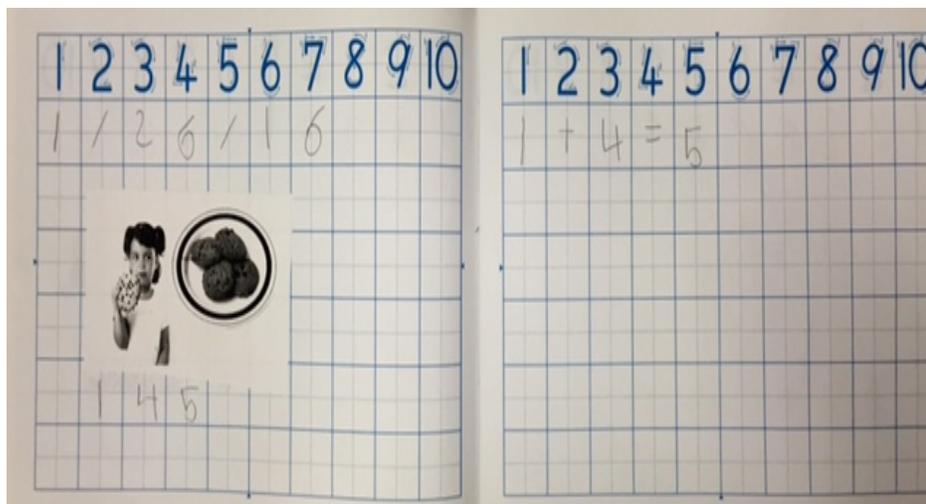
Many K and grade 1 teachers like to begin with an activity that builds excitement about the journaling process, such as decorating the cover page.

Especially at the outset, it's good to respond to each student's journal each day—even if it's simply a "smiley face" to show you could read their numerals. It's also good to begin each math lesson with several examples of student journals from the *prior* lesson. You can select these to show what is possible and to highlight values you are trying to build as a class—for example, lining out and correcting mistakes, representing a problem with a number sentence, persevering on a challenging problem, and so forth. A copy of your roster is a convenient place to track whose journals are shown at the beginning of class, so you can get around to all class members regularly.



How can I support students who aren't able to write yet?

Kindergarten students are not expected to write a great deal in their mathematics journals, even at the end of the school year. On the left side of the page spread, students glue in the picture or problem and they may write a number sentence, a number bond, a picture of a strategy used (such as blocks, fingers), and/or a drawing. They do this during independent problem solving, as they are working to make sense of the problem and solve it. On the right side of the page spread, kindergarten students might be asked to copy something from the board—often a number sentence that summarizes the problem.



1st grade students will vary considerably in their writing. Even a reluctant journal writer is likely to blossom over time, if their teacher notices and comments on tiny improvements, and if the thinking in their journal is shared with the class.

How much attention should I pay to neatness and correct writing of numerals?

Learning to write numerals correctly and legibly is important in kindergarten and 1st grade, so that students can easily revisit their own thinking and communicate it to classmates. Most students are still eager to learn to write numerals correctly at this age, so it's a good time to cement this skill, which will make mathematical reflection ever so much easier. Highlight the usefulness of legible, properly formed numbers. But don't be afraid to focus on the big mathematical ideas—and ignore the neatness of the numerals—if you think the situation calls for it.

How can I develop student skills in writing numerals?

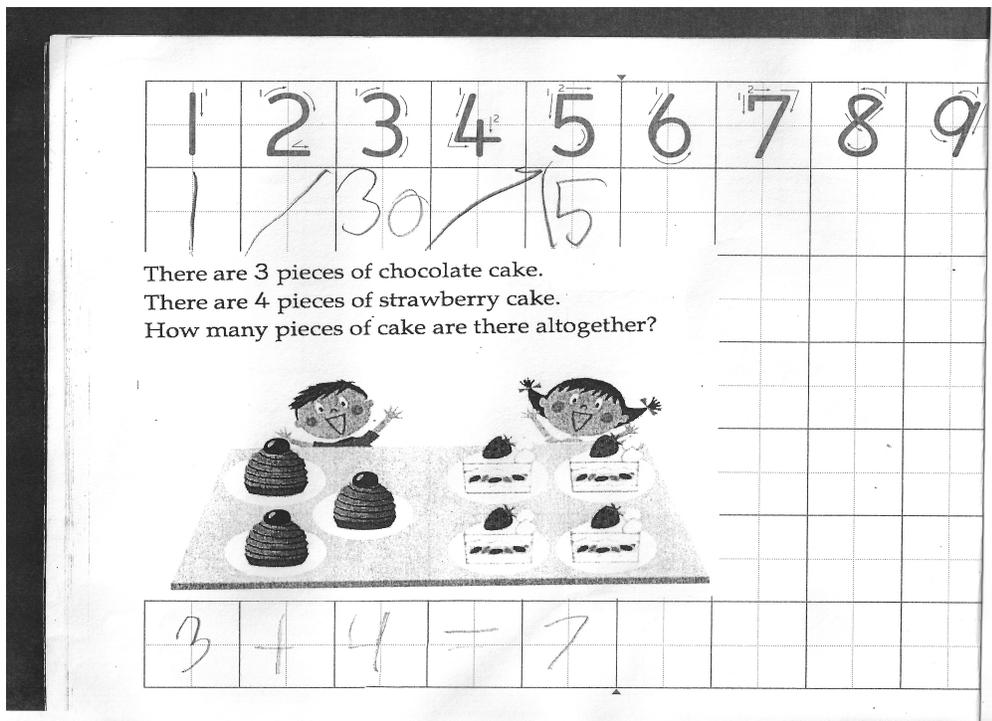
Even though many students enter kindergarten knowing how to write numerals, their numerals may be reversed or formed incorrectly. You may want to enlarge a square of the journal and put that on the board to demonstrate the proper strokes and the order of those strokes needed to make each numeral. Have students put each numeral or symbol in a separate big square in

the journal, using the smaller squares to guide size and proportion. Students can practice in their journals for a few minutes each day while you circulate to provide feedback. Some teachers use short poems or songs to go with proper formation of the numbers (e.g., “Number 1 is like a stick—a straight down line, it’s really quick!”).

How can I help students learn to record their thinking?

When kindergarteners first start using their journals, it can take them a very long time to do the basics: to copy the date from the board, to use their glue sticks to glue in the math picture or problem, to take out their manipulatives and use them to think through the task at hand, and to record something about their thinking. Taking pride in their journal, and coming to see it as a useful tool for thinking, are key goals.

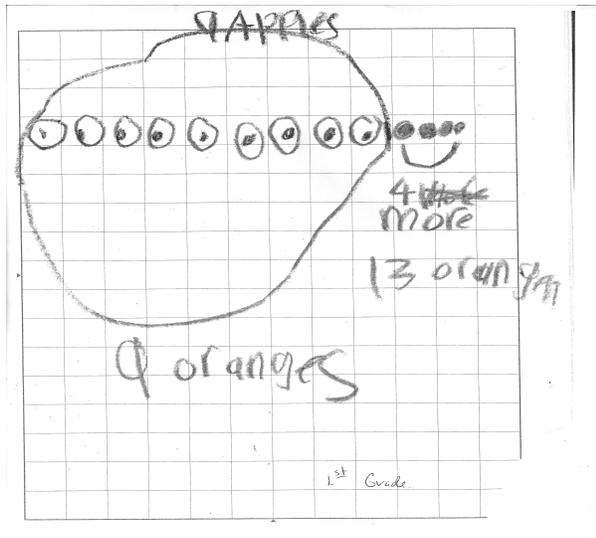
Over time, students will realize that their journal writing helps the teacher and classmates see their mathematical ideas. Most students will be eager to have their ideas shared at the board, and will learn from models presented by the teacher and by other students’ journals, highlighted at the beginning of class or during board work.



In 1st grade, students usually glue a copy of the problem into their journal and try to solve it in the space below. Students might be asked to record their process and answer, and a class discussion might produce a sentence students can write down summarizing what they learned. Over time, students can benefit from writing prompts such as “I learned . . .” or “My work shows . . .”

What kinds of issues or challenges do students typically have when writing in journals?

Spacing: Some students take up a great deal of space with their writing and go through journal pages quickly. Using a large-grid journal and encouraging one character per square may be helpful.



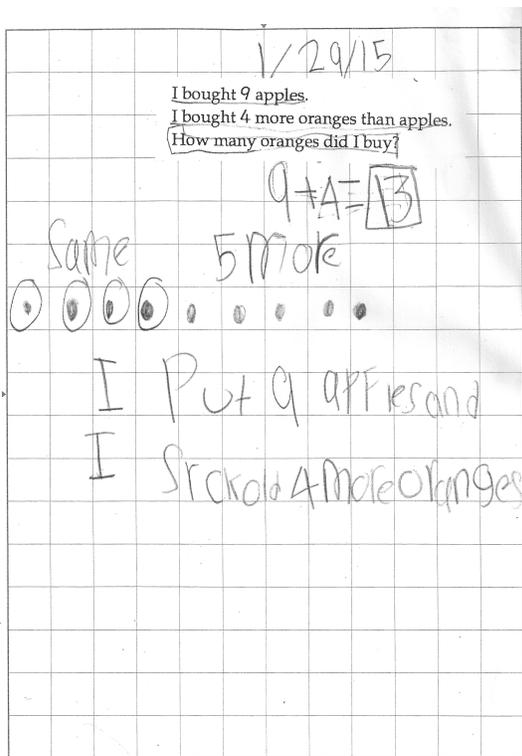
Recording: Some students struggle to record their mathematical ideas. Often they just don't know where to start. Or they may write what their neighbor has recorded without actually understanding it. Copying what is on the board or in other students' work may be a starting point for writing one's own ideas. Questions like "Tell me what you know about this problem" may help students get started.

Frustration: Young students can get frustrated quickly and give up. Over time, the teacher's noticing of tiny bits of progress can support persistence.

Erasing: The first journal experiences are the perfect time to establish the habit of crossing out, not erasing. Let them know how much you want to see the changes in their thinking. As students develop new ideas and understanding over the lesson, remind them to cross out (not erase) what they initially wrote.

How should I use the journal prompts (e.g., date, problem, my idea, my friend's idea, summary, reflection)?

Journal prompts need to be kept very simple in kindergarten. You may simply want to start with just the date. Likewise, keep things simple for 1st graders, introducing new prompts as students master them: date, gluing in the problem or math task, writing a few words or a picture to show their thinking. Some teachers later introduce "My Idea" and prompt the students to start with "I ..." or "I think ..."



What aspects of the journals do students enjoy the most?

At the beginning of the year, students are likely to be excited to have a special math journal. They are likely to be happy to practice number writing in it, and delighted with feedback (verbal or in the form of a written comment or star next to their neatest numeral). When children learn that all older kids in the school, including their older siblings, also have math journals, they feel very important and mature.

Students love seeing their journal page(s) projected under the document camera and many enjoy coming to the board to share their thinking. They know that in order to do that, their teachers must see the student's thinking in the journal. If they haven't written something, they won't be able to share their ideas with their friends.

Teacher feedback is very powerful, too. Quick teacher notes or messages in a student's journal, such as "You're thinking!" or "Wow" or "Interesting!" or "You wrote so neatly (or so much)" go a long way.

What advice do teachers have for other teachers about starting journals in their classrooms?

"For kindergarten, the main goal is to have students leave in June understanding the purpose of a math journal and being confident and proud of the work that they produce in it. For 1st grade, the goal is to get students expressing ideas with words and pictures as a way to understand and enjoy math more fully."

“Be sure to utilize the journal tool consistently. Teachers report that the more regularly they ask the children to work in their journals, the more comfortable and fluent the students become.”

“Share many examples of what the students have written in their journals. This is a great way for the students who might be struggling to build a greater understanding and base for what they could do to express their ideas.”

What is teaching through problem-solving?

Japanese lessons are called “teaching through problem-solving.” Students grapple with a mathematical task they have not previously learned to solve, and that embodies the new mathematical ideas or procedures to be learned. Teaching through problem-solving is very similar to the *5 Practices for Orchestrating Mathematical Discussions* by Margaret Smith and Mary Kay Stein that is widely used in the U.S.

The teacher starts the class by presenting a mathematics problem and making sure students understand what is being asked. Students write or glue a copy of the problem into their journals and begin solving. As students solve, the teacher walks around to see the student thinking reflected in the journals. Having thought through in advance the “line-up” of work at the board that will build the major mathematical ideas of the lesson, the teacher selects several students to present their work and share their thinking at the board, in a sequence designed to build the key mathematical ideas. As each student shares their work and the class discusses it, the teacher makes sure the student strategy and important discussion points are recorded on the board. From comparing and synthesizing the various strategies, the lesson’s new mathematical ideas emerge, and they are summarized on the board. So by the end of the lesson, the board provides a coherent story of the mathematics developed during the lesson.

What is the connection between journals, board work and discussion?

Journals, board work and discussion provide important support for each other. Even for kindergarteners, the board tells a coherent story of the mathematics learned that day. Students can consult it when they are trying to say what they learned that day, to compare different representations or solution strategies, or remember some idea discussed during the lesson.

In the early grades, student journals have three main components: the problem, the child’s own thinking, and the number sentence or mathematics the teacher wants students to take away from the day’s lesson. By working in journals, students formulate their ideas so they can express them more easily at the board. Discussion adds ideas, and the board tells the story. Someone who walks into a classroom can look at the board, see the task, and figure out what students were thinking and what they learned in math that day.

What visual aids help establish teaching through problem-solving in a kindergarten classroom?

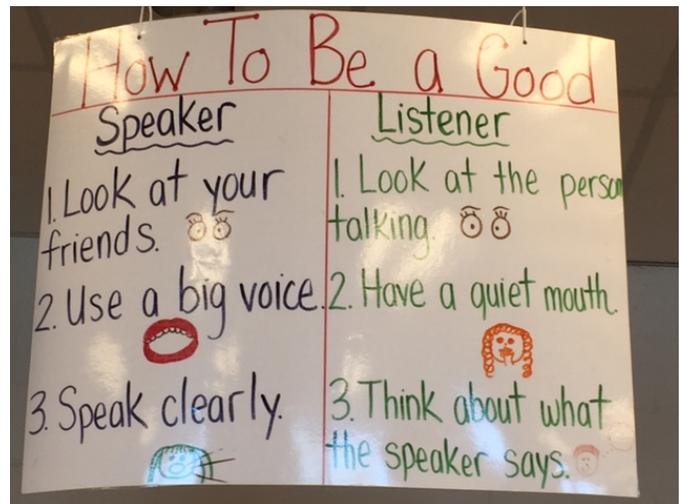
The pictures below show anchor charts used by kindergarten teachers working to establish journaling. The descriptions are written by the teachers.

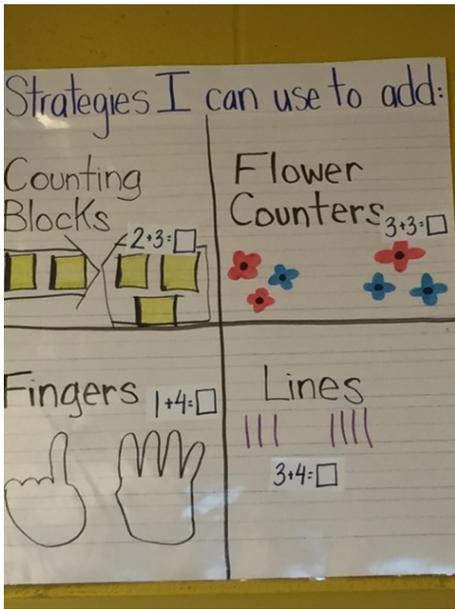


We add to this anchor chart as students are introduced to new math tools at the beginning of the year. We discuss that toys are for playing and tools are for helping us learn. After a new tool is introduced, students have an opportunity to choose from several pictures (at least one toy and one tool) and determine what side of our chart they go on.

This chart stays up all year as a reference guide for students, but most of them don't actually need it for very long. Sometimes when one student sees another student playing with one of the math tools, he or she will say, "Is that a toy or a tool?" and point up the chart.

We introduce this anchor chart once we really begin having comparison and discussions in math. Students practice these behaviors during math class (and obviously at other points throughout the day). This hangs directly above our math board as a visual reminder of the appropriate behaviors of a speaker and of a listener.



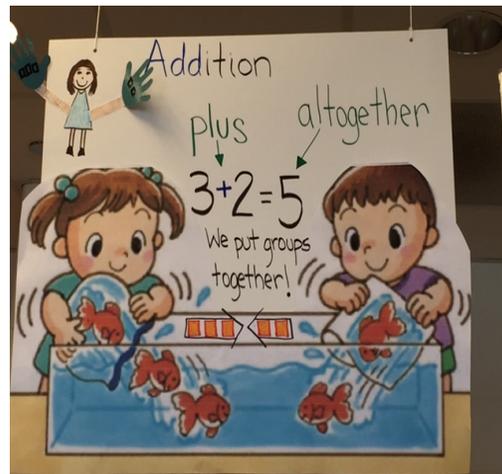


We create this poster with our students in the middle of our addition unit, once several strategies for solving addition problems have emerged and have been discussed and explained during the comparison and discussion portion of lessons. It looks different each year, depending on how your students are choosing to solve that particular year.

Students really reference this during this unit and for the remainder of the year when they are deciding how they will solve a problem, or when they want to try a different strategy.

We create this poster with our students at the end of our addition unit. Students help to add the different labels and make suggestions about what we should put on the chart so they'll remember what it means to add.

This poster hangs above our math board and serves as a reference for the remainder of the year.



This is the same as the addition poster, except for subtraction.

