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What are math routines, and how can you use them?

GRADE K–5

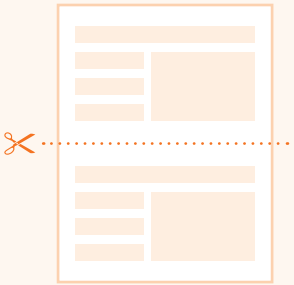
Instructional routines are a way for you and your students to maintain a sense of familiarity and structure throughout the school year. Over time, routines free up time you would otherwise spend giving directions and allow students to focus on math rather than how to engage in an activity. When everyone knows how a certain activity should run, and when instructions and expectations are internalized, everything goes more smoothly. Having a core set of shared routines can also create a powerful, practical force for establishing a classroom learning community.

In addition to instructional routines, you will find Math Language Routines (MLRs). These routines are designed to facilitate meaningful communication and understanding of mathematics, aiming to support students in both their math learning and language development simultaneously.

The included routines have been adapted from established teaching practices and, in most cases, research that offers direct evidence that these routines are effective for the diversity of students who use them.

Instructions

Starting on the next page, split tables by cutting along the dotted line at the center of each page.



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Collect and Display (MLR2)

Do you want to support students in developing new math language and concepts by creating a display of student language or strategies?

GOAL: Increase accessibility and make connections between formal and informal mathematical language

TIP
Consider adding translations of the new terms in other languages your students speak.

How to do it:

- As students share their thinking, listen for and collect information on how they are describing a strategy or making sense of a new mathematical term.
- Add student language, examples, diagrams, or strategies on a visual display for the class to reference. Revise and add to the display over the lesson, unit, or course.
- Invite students to create a class definition or description from the gathered student thinking to add to the display

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Compare and Connect (MLR7)

Do you want your students to make sense of multiple strategies for solving the same problem?

GOAL: Provide opportunities to identify, compare, and contrast multiple strategies

TIP
During partnered discussion, consider displaying sentence frames such as, " First they... Next they..." "Their strategy was to...," or "I see... in both strategies."

How to do it:

- Invite students to solve a problem that can be solved with multiple strategies. Then, display two hypothetical or anonymous examples of student work representing different strategies.
- Give students time to analyze the strategies on their own and then discuss with a partner.
- Facilitate a whole-class discussion to describe, compare, contrast, and connect the different strategies. Utilize open-ended questions like, "Why did different strategies lead to the same answer?" or "What was helpful about each strategy?"

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Notice and Wonder

Do you want to make certain mathematical tasks more accessible for all of your students?

GOAL: Make sense of a math representation, context, or task and promote curiosity

TIP
In a time crunch? Invite students to share with the whole class without first sharing as pairs.

How to do it:

- Display a mathematical representation, image, or other media. Then ask, "What do you notice? What do you wonder?"
- Give students a few minutes to think. Then invite them to share with a partner.
- During class discussion, ask several students to share what they noticed and wondered, and record responses for all to see.

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Number Talk

Do you want to encourage students to think about structure, patterns, and properties?

GOAL: Develop fluency and solve problems efficiently with various strategies

TIP
During class discussion, consider asking open-ended questions like, "Did anyone find the answer a different way?" or "How are the strategies we used the same? How are they different?"

How to do it:

- Display one math problem at a time.
- Say, "Take a few moments to quietly think about how you would solve this problem. Then, give me a signal when you are ready to share."
- During class discussion, ask several students to share how they solved the problem. Record explanations for all to see.

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Stronger and Clearer Each Time (MLR1)

Do you want to support students in explaining their thinking more precisely and clearly?

GOAL: Provide opportunities to refine ideas and written explanations

TIP
Encourage listeners to ask clarifying questions using sentence frames, such as, "How do you know that...?" and "What do you mean when you say...?"

How to do it:

- Give students time to think independently and create a first draft response to a problem.
- Say, "Share your response with a partner and listen to their response. Then offer feedback to help them clarify their thinking."
- Invite students to use the feedback they received to revise their response and write a second draft that is stronger and clearer.

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Think-Pair-Share

Do you want your students to have more time to think before solving and sharing thoughts about a problem?

GOAL: Support collaborative learning in a low stakes environment

TIP
Consider calling out actions different pairs are doing to help foster their discussion, such as asking clarifying questions.

How to do it:

- Give students time to think independently about a given prompt.
- Invite students to swap ideas with a neighbor, asking clarifying questions as needed.
- Invite several students to share their thoughts with the whole class.

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Three Reads (MLR6)

Do you want to support reading comprehension for mathematical questions and prompts?

GOAL: Develop a deeper understanding of a mathematical text before finding the solution

TIP
Give students a few minutes to think individually about each question, then encourage them to share with a partner before participating in a class discussion

How to do it:

- Read the problem aloud and ask students, "What is this problem about?"
- Read the problem a second time and ask students, "What numbers do you see in this problem? What can you count or measure? How are they related?"
- Read the problem a third time and ask students, "What strategies can you use to help solve this problem? What might be a good first step?"

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Which One Doesn't Belong?

Do you want to support students in noticing and precisely describing properties of mathematical objects as they compare and contrast them?

GOAL: Foster a need to define terms carefully and use words precisely

TIP
Consider labeling each corner of the room as a different object. Then, invite students to move to a corner of their choosing and explain how the object does not belong.

How to do it:

- Display four mathematical objects such as, figures, diagrams, graphs, or expressions. Then ask, "Which one doesn't belong? Why?"
- Give students time to think independently and encourage them to look for more than one possibility.
- Invite students to share ways that each choice is different from the rest with the whole class, and consider recording each students' name and their shares.