

# Toolkit to Support Evidence-Based Algebra Instruction in Middle and High School

Regional Educational Laboratory Central






National Center for Education Evaluation and Regional Assistance at IES

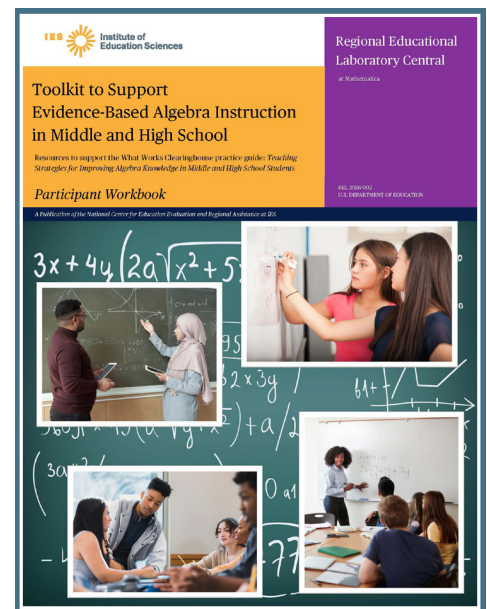
Algebra is a gateway to advanced math, but many students struggle with the shift from arithmetic to symbolic reasoning, leading teachers to ask, “How can I help my students develop deeper algebraic thinking?” *The Toolkit to Support Evidence-Based Algebra Instruction in Middle and High School* answers that question with practical, research-backed strategies that improve student understanding and engagement.



## What's in the toolkit

Developed by REL Central in partnership with educators, the toolkit guides educators through:

-  Four learning modules aligned to the [Teaching Strategies for Improving Algebra Knowledge in Middle and High School Students](#) What Works Clearinghouse practice guide
-  14 one-hour professional learning community sessions (adaptable to local needs)
-  Instructional strategies and solutions for common roadblocks
-  Data tools to monitor implementation and student impact and visualize results
-  Resources for school leaders to support instructional change



## Three evidence-based recommendations

The toolkit focuses on the following three evidence-based recommendations—with supporting instructional strategies—from the practice guide.

-  Use solved problems to engage students in analyzing algebraic reasoning and strategies

- Have students discuss solved problem structures and solutions to make connections among strategies and reasoning.
- Select solved problems aligned with instructional goals, including those that illustrate common errors.
- Use a variety of instructional formats—whole-class discussions, small-group work, and independent practice—to engage students with solved problems throughout the learning cycle.

“My students were more confident and engaged during whole group discussion when presented with a solved problem. It resulted in students being more independent on independent work.”

Teacher piloting the toolkit



## Teach students to utilize the structure of algebraic representations

- Promote the use of language that reflects mathematical structure.
- Encourage students to use reflective questioning to notice structure as they solve problems.
- Teach students that different algebraic representations (for example, equations, graphs, word problems) can convey different information about the same problem.







## Teach students to intentionally choose from alternative algebraic strategies

- Teach students to recognize and generate multiple strategies for solving problems.
- Encourage students to articulate the reasoning behind their choice of strategy and its mathematical validity.
- Have students evaluate and compare different strategies for solving problems.

### How the toolkit works

Each learning module guides educators through a Plan-Do-Study-Act (PDSA) cycle

Plan	Do	Study	Act
Identify and prepare instructional strategies	Implement strategies in the classroom	Collect and analyze data	Reflect and refine practice
			

### The learning modules include tools to guide reflection and measurement

- Educator self-reflection tool
- Classroom visitation tool
- Student survey
- Student knowledge assessment
- Excel-based visualization templates

“The student response to the survey was representative [of] successful implementation regarding what they learned and how well they retained the precise language. Students also showed a growth mindset as well as higher overall test scores compared to previous years.”

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For more information, contact us at [RELCentral@mathematica-mpr.com](mailto:RELCentral@mathematica-mpr.com).

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