



WHAT WORKS CLEARINGHOUSE

WHAT WORKS for Practitioners

whatworks.ed.gov

Welcome to the What Works Clearinghouse



The What Works Clearinghouse (WWC) is designed to connect educators to research about the effectiveness of interventions and practices in education. Launched by the U.S. Department of Education's Institute of Education Sciences, the WWC's website (whatworks.ed.gov) is a place to learn about what makes a difference in the classroom.

To help teachers and school leaders, the WWC publishes practice guides with concrete recommendations about effective approaches to a range of the most talked-about topics in education today. The WWC also

regularly releases in-depth research reviews that compare and grade the interventions in critical areas, such as beginning reading instruction, dropout prevention, early childhood education, elementary and middle school math, English language learners, and character education. The WWC is posting new materials and gathering input from users about their needs through the WWC website, meetings, and focus groups.

At whatworks.ed.gov, you'll find easy access to the full range of the WWC's evidence-based products and services.



A What's New section helps visitors keep up to date with the latest findings about what works in education.

This search feature provides quick access to all information and materials on the WWC site.

The WWC offers user-friendly, classroom-specific practice guides on a variety of topics.

Topics summarize research on interventions for key areas of education.

What's in It for You?

To help educators identify and implement best practices, the What Works Clearinghouse offers timely, accessible materials focused on school practitioners' concerns. Publications and support services include:

- **Practice guides**, which contain explicit suggestions about effective approaches for topics such as organizing instruction and study to improve student learning, reducing behavior problems in the classroom, and improving adolescent literacy;

- **Research reviews**, which are comprehensive evaluations of research on the effects of a particular educational intervention (a product, program, practice, or policy). Topics include elementary and middle school math, early childhood education, character education, beginning reading, and dropout prevention; and

- **A Help Section** where you can learn answers to frequently asked questions, browse the glossary of terms, and contact a knowledgeable staff member to help you navigate the resources of the WWC.

A New and Improved WWC

Now under the management of Mathematica Policy Research, Inc., the WWC is releasing more reports and guides on a regular basis and improving the relevance of its products to respond to educators' increased demand

for scientifically based evidence about effective interventions. In 2008, the WWC unveiled a redesigned website that is more interactive and user-friendly.



TOOLS YOU CAN USE: WWC Practice Guides

Every What Works Clearinghouse practice guide focuses on a key topic, reviews research in that area, and gives concrete recommendations to guide practitioners' thinking. Practice guides can be used by teachers to improve instruction, by principals to inform instructional leadership and professional development, or by curriculum specialists to develop effective interventions. They also can help educators become better consumers of research by balancing the findings of different studies and laying out what questions are most important when examining a particular topic.

In the practice guide excerpted on the right, *Organizing Instruction and Study to Improve Student Learning*, the authors demonstrate how to translate decades of study about delayed learning, student time management, and instructional styles into a concrete checklist of recommendations.

Each guide includes straightforward guidance for educators about the topic at hand — in this case, how to organize time to improve student achievement. These guides give specific recommendations for instructional strategies that are supported by research, and explain why these approaches are most likely to improve student outcomes.

Practice guides are honest about how well research supports each recommendation, since part of the WWC's mission is to determine how strong the evidence is for different recommendations. Each guide uses the same set of ratings — strong, moderate, or low — to describe the research evidence supporting each recommendation.

A quick summary of relevant research helps educators understand the basis for the recommendations. These summaries are written in easy-to-follow language and focus on findings and conclusions, rather than methodology.



Recommendation 3: Combine graphics with verbal descriptions.



We recommend that teachers combine graphical presentations (e.g., graphs, figures) that illustrate key processes and concepts with verbal descriptions of those processes and concepts in order to facilitate student learning.

Level of evidence: Moderate

The panel judges the level of evidence supporting this recommendation to be *moderate*. Many laboratory experiments provide support for the benefits of combining graphical presentations and verbal descriptions of key processes and concepts.³² Some classroom experiments and quasi-experiments provide further evidence that the recommendation can be practically and effectively implemented in real courses at the K-12 and college levels.³³ Again, it is important to note that these experiments have explored these techniques in a variety of content domains, particularly in mathematics, science, and technology.

Brief summary of evidence to support the recommendation

Many studies have demonstrated that adding relevant graphical presentations to text descriptions can lead to better learning than text alone.³⁴ Most of these studies have focused on scientific processes, for example, how things work (e.g., lightning, disk brakes, bike pumps, volcanic eruptions). These studies emphasize that it is important that text descriptions appear near

the relevant elements in visual representations to best enhance learning.³⁵ In addition, students learn more when the verbal description is presented in audio form rather than in written text,³⁶ probably because a learner cannot read text and scrutinize an accompanying graphic at the same time. It should be noted that current evidence suggests that a well-chosen sequence of still pictures with accompanying prose can be just as effective in enhancing learning as narrated animations.³⁷

The benefits of interleaving graphics and verbal description have also been demonstrated for certain kinds of mathematics instruction. Researchers have found that adding a number-line visualization to mathematics instruction significantly improved learning.³⁸ Students required to use a number line while performing addition and subtraction of signed numbers showed better learning than students who solved equations without the number line. Classroom studies of this approach have demonstrated large student learning improvements in mathematics at the elementary, middle, and high school levels.³⁹

³² E.g., Clark and Mayer (2003); Mayer (2001); Mayer and Anderson (1991; 1992); Mayer and Moreno (1998); Moreno and Mayer (1999a); Mousavi, Low, and Sweller (1995).

³³ E.g., Griffin, Case, and Siegler (1994); Kalchman, Moss, and Case (2001); Kalchman and Koedinger (2005); Moss (2005).

³⁴ See Mayer (2001) and Sweller (1999) for reviews.

³⁵ For example, see Moreno and Mayer (1999a).

³⁶ Clark and Mayer (2003); Mayer (2001); Mayer and Anderson (1991; 1992); Mayer and Moreno (1998); Moreno and Mayer (1999a); Mousavi, Low, and Sweller (1995).

³⁷ Mayer, Hegarty, Mayer, et al. (2005); Pane, Corbett, and John (1996).

³⁸ Moreno and Mayer (1999b).

³⁹ For example, see Griffin, Case, and Siegler (1994); Kalchman, Moss, and Case (2001); Kalchman and Koedinger (2005); Moss (2005).

TOOLS YOU CAN USE: WWC Research Reviews

Create Your Own Summary Key:

Search for an Intervention

The Search for an Intervention feature allows users to easily search for an intervention of interest. This feature is available on all individual topic area pages on the main topic area page to enable searching across topics.

Create Your Own Table

The Create Your Own Table feature allows users to view lists of interventions customized to their interests.

Interventions

WWC rates the effectiveness of many interventions by examining rigorous studies on each. They use ratings to show the strengths and weaknesses of each intervention and the quality of the evidence supporting these findings.

Improvement Index

Every research review evaluates interventions along the outcomes most relevant to its success. Each review also gives an indication of how well the interventions improve student outcomes overall.

List all Interventions Reviewed in this Topic Area Search for an Intervention Go Print

Create Your Own Summary of Research Findings

Alphabetics Fluency

Comprehension General reading achievement

Create My Summary Print My Summary Help

Effectiveness Ratings For Beginning Reading: Alphabetics

Intervention	Improvement Index	Evidence Rating	Extent Of Evidence
Early Intervention in Reading (EIR)®	36	+	Small
Reading Recovery®	34	++	Small
Stepping Stones to Literacy	30	++	Small
Ladders to Literacy	25	+	Medium to Large
DaisyQuest	23	++	Small
Peer-Assisted Learning Strategies (PALS)®	19	+	Small
Waterford Early Reading Program	19	+	Small
Earobics	19	++	Small
Kaplan SpellRead	18	++	Small
Auditory Discrimination in Depth (ADD)® / Lindamood Phonemic Sequencing (LIPS)®	17	+	Small
Start Making a Reader Today® (SMART)®	16	+	Small
Success for All	13	+	Medium to Large
Wilson Reading	13	+	Small
Voyager Universal Literacy System®	11	+	Medium to Large
Corrective Reading	9	+	Small
Fast ForWord®	8	++	Small
Read, Write & Type!™	8	+	Small
Failure Free Reading	1	○	Small

Programs reviewed with no studies meeting WWC evidence screens

Evidence Rating Key	
++ Positive Effects: strong evidence of a positive effect with no overriding contrary evidence.	○ No Discernible Effects: no affirmative evidence of effects.
+ Potentially Positive Effects: evidence of a positive effect with no overriding contrary evidence.	- Potentially Negative Effects: evidence of a negative effect with no overriding contrary evidence.
+- Mixed Effects: evidence of inconsistent effects.	-- Negative Effects: strong evidence of a negative effect with no overriding contrary evidence.

Research reviews are comprehensive, in-depth reviews of research. They come in the form of Topic Reports, Intervention Reports, and Quick Reviews of single studies. WWC Topic Reports address areas from middle school math to character education curricula, identifying which evidence-based programs improve outcomes most. Intervention Reports are available for each intervention considered in WWC Topic Reports, providing an in-depth explanation of their ratings. These reviews meet educators' increased information needs in the No Child Left Behind era by identifying how interventions impact student outcomes — both generally and in specific

areas relevant to the topic at hand — and by assessing the strength of the evidence for these findings. Finally, to give educators timely guidance about whether education research in the news meets high standards, the WWC also releases Quick Reviews of recently released studies.

Taking the Next Step

To improve classroom practices and school policies, we have crafted our products with an eye to “the next step” — what a teacher, principal, or supervisor does after reviewing one of our practice guides or visiting our website.

While WWC products provide different levels of detail, every practice guide and research review includes a summary of findings and an extensive list of references. Here are some specific “next steps” you can take.



Classroom Teachers

- **Use practice guides to improve your teaching.** For instance, the Encouraging Girls in Math and Science practice guide suggests how to create classroom environments and design problems that motivate girls and sustain their interest in math and science.
- **Explore the WWC website for interventions** that might work in your school. WWC intervention and topic reports describe the research on the effectiveness of educational interventions in topics such as beginning reading and middle school math.
- **Organize meetings with colleagues** about WWC materials in your subject area or the grade level you teach.
- **Find answers to frequently asked questions,** browse the glossary of terms, and contact a knowledgeable staff member to help you navigate the resources of the WWC.
- **Suggest ways to implement effective practices and programs to colleagues and school and district leaders.** WWC products are an objective source of information that can support faculty recommendations about curriculum, teaching, purchasing, and policy decisions for meetings with school and district leaders.

Supervisors and School Leaders

- **Ensure that professional development helps staff use research** to improve practices, and encourage them to reevaluate their work based on the evidence.
- **Evaluate product developers' claims** about interventions using rigorous research.
- **Use WWC products to evaluate current programs and practices.** For instance, principals can use the Organizing Instruction and Study to Improve Student Learning practice guide to reconsider how the school day is structured.
- **Find answers to frequently asked questions,** browse the glossary of terms, and contact a knowledgeable staff member to help you navigate the resources of the WWC.
- **Recommend effective products, programs, practices, and policies to district staff and school boards.** WWC research reviews provide an in-depth look at what studies say and are an essential resource to consult before making purchasing decisions.

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The What Works Clearinghouse collects, reviews, and reports on studies of education programs, products, practices, and policies in selected topic areas, using a set of standards based on scientifically valid criteria. We welcome your feedback on the WWC in general and on the topics that the WWC could study in the future. Your comments can be sent through the WWC website by going to Contact.

