Module Home



**Outline­**

**High-Quality Mathematics Instruction**:

What Teachers Should Know

* Module Description: This module describes the components of high-quality mathematics instruction: a standards-based curriculum and evidence-based practices. It also highlights a number of evidence-based practices as well as other classroom practices that teachers can use to teach mathematics (est. completion time: 1.5 hours).
* Link: Challenge Cycle for RTI (Part 1): An Overview [IRIS Module]

Challenge

* Video: Over the last five years, the principals and teachers in the…

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Initial Thoughts

* What is high-quality mathematics instruction and why is it important?
* What evidence-based mathematics instructional practices can teachers employ?

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Perspectives & Resources

* Module Objectives
* Understand the importance of providing high-quality mathematics instruction
* Identify the components of high-quality mathematics instruction
* Recognize the need for implementing a standards-based mathematics curriculum
* Describe some evidence-based practices for teaching mathematics
* Recognize effective classroom practices that promote and support the implementation of high-quality mathematics instruction

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* Page 1: The Importance of High-Quality Mathematics Instruction
* One of the core academic subjects in the United States and…
* Research Shows
* What Do These Data Indicate?
  + Consider This?
* Why Do Some Students Struggle More with Math?
  + Students with Learning Disabilities
    - Link: mathematics learning disability (MLD) [definition]
    - Although every learner is unique, students… [bullet points]
    - Audio: Diane Bryant, who conducts research on…
  + English Language Learners
    - Link: academic language [link]
* What Can Teachers Do?
  + This instruction involves the implementation of… [bullet points]
  + Research Shows
  + Activity
    - Link: Click to discover your own… [drop-down menu]

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* Page 2: A Standards-Based Mathematics Curriculum
* Among experts, the debate over the most effective method of…
* More specifically, the CCSSM… [bullet points]
* For Your Information
  + Audio: Diane Pedrotty Bryant discusses the purpose of…
* Standards for Mathematical Practice
  + Link: National Council of Teachers of Mathematics [definition]
  + Link: National Research Council (NRC) [definition]
  + CCSSM Standards for Mathematical Practice [table]
* Standards for Mathematical Content
  + Kindergarten – 8thgrade
    - K–8 [table]
    - Link: Common Core State Standards Initiative [web page]
  + High School
    - Unlike the K–8 standards that are organized… [bullet points]
    - For Your Information
      * Link: CCSSM [website]
      * Link: Standards for Mathematical Practice [web page]
      * Link: Standards for Mathematical Content [web page]
      * Link: Standards in Your State [web page]
  + Curricular Materials
    - Did You Know?
      * Link: Click link to learn more about them [web page]
    - Link: Click to view a list of these… [drop-down table]
    - Link: Guidelines for Design of Mathematics… [PDF]
    - Audio: Listen as Kim Paulsen provides more information…
    - For Your Information

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* Page 3: Evidence-Based Mathematics Practices
* Once they have adopted a standards-based curriculum…
* For Your Information
* Why Should Teachers Use EBPs?
  + Link: Every Student Succeeds Act (ESSA) [definition]
  + Link: Individuals with Disabilities Education Act [definition]
  + Link: scientifically-based research [definition]
  + Among the benefits of using EBPs… [bullet points]
* Identifying and Selecting EBPs
  + Click for a list of web-based resources… [drop-down menu]
    - Link: Best Evidence Encyclopedia [website]
    - Link: Center on Instruction [website]
    - Link: Evidence-Based Intervention Network [website]
    - Link: National Center on Intensive Intervention [website]
    - Link: Promising Practices Network [website]
    - Link: What Works Clearinghouse [website]
* Implementing EBPs with Fidelity
  + Generally, to implement an EBP with fidelity… [bullet points]
  + Audio: Sarah Powell, a researcher in the area of mathematics…
  + For Your Information
    - Link: Evidence-Based Practices (Part 1): Identifying and Selecting a Practice or Program [IRIS Module]
    - Link: Evidence-Based Practices (Part 2): Implementing a Practice or Program with Fidelity [IRIS Module]
    - Link: Evidence-Based Practices (Part 3): Evaluating Learner Outcomes and Fidelity [IRIS Module]
* EBPs for Mathematics
  + Link: strong evidence [definition]
  + Link: moderate evidence [definition]
  + This module will highlight four practices that show… [bullet points]
  + HLP and CCSSM Standards Alignment
    - Link: High-Leverage Practices in Special… [web page]
    - Link: CCSSM Standards for Mathematical… [web page]

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* Page 4: Explicit, Systematic Instruction
* *Explicit, systematic instruction*, sometimes simply referred to as…
* Explicit Components/Systematic Components [table]
  + Link: scaffolded instruction [definition]
  + Link: maintenance [definition]
  + Link: Click to view a sample task analysis… [drop-down menu]
* Research Shows
* How does this practice align?
* Link: Click for a step-by-step description of a lesson… [drop-down menu]
  + Link: corrective feedback [definition]
* Video: Elementary School Example
* Video: High School Example
* For Your Information

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* Page 5: Visual Representations
* Yet another evidence-based strategy to help students learn abstract…
* Research Shows
* How does this practice align?
* Number Lines [drop-down menu]
* Strip Diagrams [drop-down menu]
* Pictures [drop-down menu]
* Graphs/Charts [drop-down menu]
* Graphic Organizers [drop-down menu]
* Elementary Example
* High School Example
* Manipulatives
  + Link: If you would like to learn more about this… [drop-down menu]
    - For Your Information
  + Audio: Kim Paulsen discusses the benefits of manipulatives…

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* Page 6: Schema Instruction
* Another effective strategy for helping students improve their…
* How does this practice align?
* Difficulty with Word Problems
  + This is in large part because of word problems… [bullet points]
* Research Shows
* Word Problem Structures
  + Additive Schemas
    - Total [drop-down menu]
    - Difference [drop-down menu]
    - Change [drop-down menu]
  + Multiplicative Schemas
    - Equal Groups [drop-down menu]
    - Comparison [drop-down menu]
    - Ratios/Proportions [drop-down menu]
  + Combined Schemas
    - Audio: Sarah Powell, who has conducted extensive…
* Teaching Word Problem Structures
  + Steps for how to teach the combine schema [table]

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* Page 7: Metacognitive Strategies
* As you have now learned, students who struggle with mathematics…
* More specifically, metacognitive strategies help students… [bullet points]
* How does this practice align?
* Research Shows
* Types of Metacognitive Strategies
  + Metacognitive Strategy/Definition/Examples [table]
* Teaching Metacognitive Strategies
  + To do this, teachers can… [bullet points]
* Examples of Students Using Metacognitive Strategies
  + Video: Elementary School Example
  + Video: High School Example
  + Audio: Diane Bryant discusses the importance of teaching…
  + For Your Information

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* Page 8: Effective Classroom Practices
* A number of other classroom practices are supported by…
* Among these effective classroom practices is… [bullet points]
* Research Shows
* For Your Information
* Encouraging Student Discussion
  + To implement this practice, teachers should… [bullet points]
  + How does this practice align?
  + Video: The video depicts a teacher encouraging his students…
* Presenting and Comparing Multiple Solution Strategies
  + To do this, teachers should… [bullet points]
  + How does this practice align?
  + Video: Watch the video for an example of how a teacher can…
* Assessing Student Understanding
  + How does this practice align?
  + Formative Assessment
    - Link: exit ticket [definition]
    - Link: progress monitoring [definition]
    - Link: Progress Monitoring: Mathematics [IRIS Module]
  + Error Analysis
    - Audio: Diane Bryant discusses the instructional…
    - Link: Mathematics: Identifying and Addressing Student Errors [IRIS Module]

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* Page 9: References & Additional Resources
* Suggested module citation
* References
* Additional Resources
* Page 10: Credits
* Content Expert
* Expert Reviewers
* Module Developers
* Module Production Team
* Media

Wrap Up

* Summary of the module
* Evidence-Based Practice/Definition [table]
* Audio: Listen as Lois Coles discusses the positive effects of using a…
* Revisit your Initial Thoughts responses

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Assessment

* Take some time now to answer the following questions.

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You Have Completed This Module

* Give Us Your Feedback
  + Link: Module Feedback Form
* Professional Development Hours
  + Link: IRIS PD Options
* Related Resources [link]