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…

|  |  |
| --- | --- |
|  NOTES |  |

Initial Thoughts

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

|  |  |
| --- | --- |
|  NOTES |  |

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

|  |  |
| --- | --- |
|  NOTES |  |

* 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]

|  |  |
| --- | --- |
|  NOTES |  |

* 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

|  |  |
| --- | --- |
|  NOTES |  |

* 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]

|  |  |
| --- | --- |
|  NOTES |  |

* 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

|  |  |
| --- | --- |
|  NOTES |  |

* 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…

|  |  |
| --- | --- |
|  NOTES |  |

* 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]

|  |  |
| --- | --- |
|  NOTES |  |

* 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

|  |  |
| --- | --- |
|  NOTES |  |

* 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]

|  |  |
| --- | --- |
|  NOTES |  |

* 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

|  |  |
| --- | --- |
|  NOTES |  |

Assessment

* Take some time now to answer the following questions.

|  |  |
| --- | --- |
|  NOTES |  |

You Have Completed This Module

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