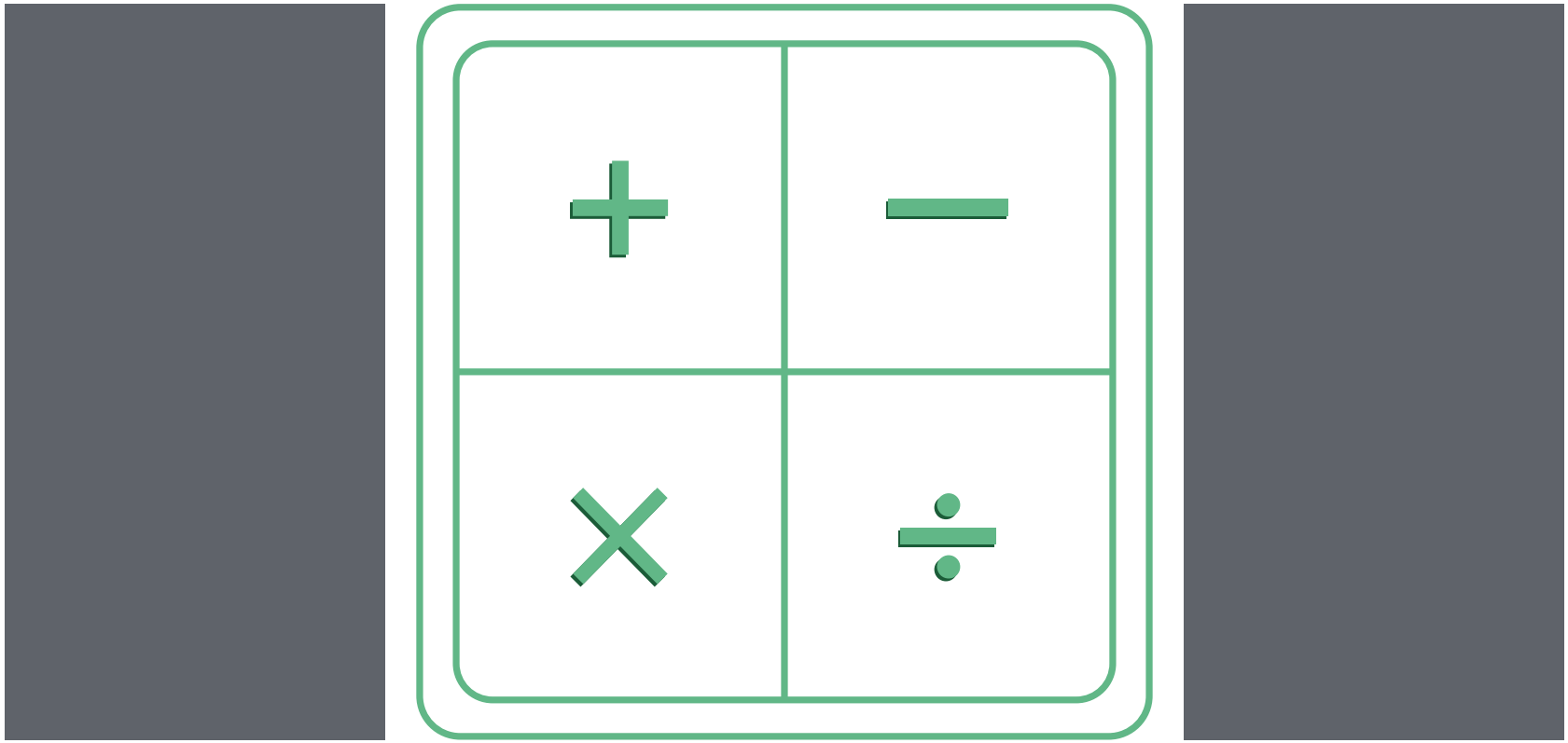
MIDDLE SCHOOL MATTERS INSTITUTE

GEORGE W. BUSH INSTITUTE

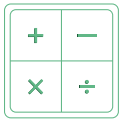
The Meadows Center FOR PREVENTING EDUCATIONAL RISK

Self-Assessment: Mathematics and Mathematics Interventions



Middle School Matters Institute
An initiative of the George W. Bush Institute in partnership with
The Meadows Center for Preventing Educational Risk

About The Self-Assessment



Before developing specific implementation goals, educators must take stock of which research-based practices are already in place and which practices are lacking or need improvement. This template guides users through a self-reflection process for **math** practices implemented throughout all content areas. Users should follow these steps for **each principle**.

Instructions

Step 1: Convene a Middle School Matters Leadership team and set aside 1-2 hours for the self-assessment.

Step 2: Gather all available data (see page 4).

Step 3: Assess current instructional practices, using data gathered in step 2, and indicate which instructional traits are implemented: a) consistently, b) inconsistently, or c) not at all.

Consult the MSM Field Guide for more information:

https://greatmiddleschools.org/wp-content/uploads/2016/06/3c_FieldGuide_Math_July19.pdf

Step 4: Summarize assessment results and determine the level of implementation according to the rubric (adapted from Fixsen, Naoom, Blase, Friedman, & Wallace, 2005).

1. **No Implementation:** No evidence of implementation.
2. **Exploration:** Willingness to implement, but little to no evidence of actual implementation. May be in planning stage.
3. **Initial Implementation:** Evidence indicates that implementation has begun but is largely inconsistent.
4. **Full Implementation:** Strong evidence of implementation of all or most of the traits and practices.
5. **Sustainability:** Strong evidence of implementation with processes in place for continued implementation in the future.

Next Steps: Goal Setting and Action Planning

After conducting this self-assessment, select a few key principles to focus on for the upcoming school year. Using the MSMI Action Plan Template (https://greatmiddleschools.org/resources/action-plan-templates/), develop measurable goals with specific action steps and deadlines for each chosen principle.

Self-Assessment: Mathematics and Mathematics Interventions

Applicable Content Areas: Mathematics; science and social studies (predominantly Principle 1)

Date: _____ School _____ District _____

Participating team members: _____

Sources of Data:

State/District Curriculum

- ☐ Teacher Editions of math, science, and social studies curricula
- ☐ Scope and sequence of math, science, and social studies curricula
- ☐ State standards for math, science, and social studies

School/Teacher Instructional Delivery

- ☐ Range of lesson plans for math, science, and social studies classes
- ☐ Walk-through or classroom observations for math, science, and social studies classes
- ☐ Notes from department team meetings or grade level team meetings
- ☐ List of professional development sessions provided or attended over the past year
- ☐ Description of intervention groups/intervention classes, including schedule and curriculum

Student Demographic and Performance Data

- ☐ Demographics, including number of English learners and students in special education
- ☐ Course passing rates for math, science, and social studies
- ☐ Scores from state assessments and end-of-course assessments
- ☐ Scores from standardized achievement tests
- ☐ Scores from interim assessments and/or curriculum-based assessments
- ☐ List of students receiving intervention and their progress within those interventions

Principle 1: Establish school wide practices for enhancing mathematics understanding within relevant content area instruction.			
Consistently	Inconsistently	Not at All	**Practice 1: Encourage students to apply their understanding of mathematics concepts and procedures to draw conclusions and propose solutions about history, science, social studies, economics, and other content areas.**
☐	☐	☐	a) Content area teachers (e.g., science, social studies) assign student activities and assignments that require students to apply their understanding of mathematics concepts and procedures.
☐	☐	☐	b) Content area teachers require students to use mathematics to summarize, illustrate, explain or analyze information.
☐	☐	☐	c) Content area teachers require students to use mathematics to draw conclusions and propose solutions.
Consistently	**Inconsistently**	**Not at All**	**Practice 2: Ask students to analyze events and phenomena from a quantitative perspective and to use their analyses to develop arguments and provide justifications.**
☐	☐	☐	a) Content area teachers require students to use mathematics to analyze events and phenomena from a quantitative perspective.
☐	☐	☐	b) Content area teachers require students to use mathematical analyses to develop arguments and provide justifications.
Insert Total	**Insert Total**	**Insert Total**	**Current Level of Implementation**
_____	_____	_____	☐ Level 1: No Implementation ☐ Level 2: Exploration ☐ Level 3: Initial Implementation ☐ Level 4: Full Implementation ☐ Level 5: Sustainability

Principle 2: Use a universal screener to identify students at risk for mathematics difficulties and to determine interventions to provide these at-risk students. Monitor the development of mathematics knowledge and skills of identified students.			
Consistently	Inconsistently	Not at All	**Practice 1: Identify a system for screening and progress monitoring that prioritizes content and skills that are necessary for subsequent mathematics development.**
☐	☐	☐	a) The school has a process for monitoring student progress and determining which students need intervention in mathematics.
☐	☐	☐	b) The school consistently administers a universal screener that reflects mathematics knowledge and skills that are essential for grade-level proficiency and relates to the domain in which potential risk is being evaluated.
Consistently	Inconsistently	Not at All	**Practice 2: Select a cut score for screening that balances the need to help the most at-risk students with the resources available.**
☐	☐	☐	a) In the universal screening system, cut scores are used to identify students at risk of failure along a spectrum of scores (significant risk, moderate risk, and minimal risk).
☐	☐	☐	b) The appropriate cut score is determined in a manner that ensures children who are in need of additional support are matched with the resources available.
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Principle 3: Help students recognize number systems and expand their understanding beyond whole numbers to integers and rational numbers. Use number lines as a central representational tool in teaching this and other rational number concepts.			
Consistently	Inconsistently	Not at All	**Practice 1: Use measurement activities and number lines to help students understand that fractions and decimals are numbers and share number properties.**
☐	☐	☐	a) Teachers use measurement and number lines to illustrate that fractions and decimals have magnitude similar to whole numbers.
☐	☐	☐	b) Teachers assign students tasks that require them to measure objects by using number lines with fractions and decimals.
Consistently	Inconsistently	Not at All	**Practice 2: Provide opportunities for students to locate and compare fractions and decimals on number lines.**
☐	☐	☐	a) Teachers provide activities for students to accurately locate fractions and decimals on a number line.
☐	☐	☐	b) Teachers provide activities for students to use number lines to compare the magnitude of fractions and/or decimals.
☐	☐	☐	c) Teachers model how to measure objects with precision by using fractions and decimals on a number line.
☐	☐	☐	d) Teachers instruct students how to justify the reasonableness of an answer related to measurement in fractions and decimals.
Consistently	Inconsistently	Not at All	**Practice 3: Use number lines to improve students' understanding of fraction equivalence, fraction density (the concept that there is an infinite number of fractions between any two fractions), and negative fractions.**
☐	☐	☐	a) Teachers instruct students how to compare equivalent fractions using number lines.
☐	☐	☐	b) Teachers demonstrate fraction density by having students place increasingly smaller fractions on a number line.
☐	☐	☐	c) Teachers help students understand that these smaller fractions represent more precise values between whole numbers.
☐	☐	☐	d) Teachers have students identify negative fractions on number lines.

Principle 3: Help students recognize number systems and expand their understanding beyond whole numbers to integers and rational numbers. Use number lines as a central representational tool in teaching this and other rational number concepts.			
Consistently	Inconsistently	Not at All	**Practice 4: Explain that fractions can be represented as common fractions, decimals, and percentages, and develop students' ability to translate among these forms.**
☐	☐	☐	a) Teachers demonstrate how numbers can be represented in different forms (fractions, decimals, percentages).
☐	☐	☐	b) Teachers develop students' understanding of how to translate among fractions, decimals, and percentages.
☐	☐	☐	c) Teachers use number lines to demonstrate equivalence between representations of rational numbers.
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Principle 4: Develop students' conceptual understanding of mathematics and provide ample opportunities to improve procedural fluency.			
Consistently	Inconsistently	Not at All	**Practice 1: Use area models, number lines, and other visual representations to improve students' understanding of formal computational procedures.**
☐	☐	☐	a) Teachers use models, number lines, and other visual representations to improve student understanding of formal computational problems.
Consistently	Inconsistently	Not at All	**Practice 2: Use meaningful fact practice activities for students lacking a strong foundation in math facts.**
☐	☐	☐	a) Teachers assess the fluency of students.
☐	☐	☐	b) For students who experience difficulty with fluency, teachers explicitly teach early numeracy and operations concepts.
☐	☐	☐	c) Students who experience difficulty with fluency engage in daily practice activities for a short amount of time.
Consistently	Inconsistently	Not at All	**Practice 3: Address common misconceptions regarding computational procedures.**
☐	☐	☐	a) Teachers analyze students' errors to identify students who have a misconception regarding computational procedures.
☐	☐	☐	b) Teachers identify the specific type of misconception a student has for a computational procedure (wrong operation, computational error, or defective algorithm).
☐	☐	☐	c) Teachers provide targeted instruction to address specific misconceptions to prevent chronic errors.
Consistently	Inconsistently	Not at All	**Practice 4: Present real-world contexts with plausible numbers for problems.**
☐	☐	☐	a) Teachers present mathematical problems in real-world contexts that maintain the intended mathematical ideas.
☐	☐	☐	b) Teachers use real-world contexts that are meaningful to students and relevant to their experience.

Principle 4: Develop students' conceptual understanding of mathematics and provide ample opportunities to improve procedural fluency.			
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Principle 5: Provide explicit and systematic instruction during instruction and intervention.			
Consistently	Inconsistently	Not at All	**Practice 1: Include explicit teacher or peer modeling and demonstrate key concepts and skills.**
☐	☐	☐	a) Teachers explicitly model and demonstrate key mathematical concepts and procedures using strategies like teacher "think-alouds".
☐	☐	☐	b) Teachers use precise language and examples to present clear models.
☐	☐	☐	c) Students clearly communicate appropriate mathematical steps during peer-tutoring situations.
☐	☐	☐	d) Students use the language of the teacher (or a peer) when working on a similar problem.
Consistently	Inconsistently	Not at All	**Practice 2: Include worked examples of key concepts and skills.**
☐	☐	☐	a) Modeling includes worked examples that the teacher or peer analyzes and discusses in the context of the step-by-step algorithm or process used to work the problem.
Consistently	Inconsistently	Not at All	**Practice 3: Gradually transition from teacher-modeled problem solving to student-directed problem solving.**
☐	☐	☐	a) Teachers provide students with a framework for problem solving such as a step-by-step checklist or mnemonic.
☐	☐	☐	b) Teacher coaching and prompting fades as students become more proficient.
Consistently	Inconsistently	Not at All	**Practice 4: Include opportunities for students to talk aloud about the skills, knowledge, or problem-solving procedures they are learning.**
☐	☐	☐	a) Teachers model thinking aloud while solving a problem, explaining the rationale for each step.
☐	☐	☐	b) Students are encouraged to verbalize their thinking and rationale for each step while solving a problem.

Principle 5: Provide explicit and systematic instruction during instruction and intervention.			
Consistently	Inconsistently	Not at All	**Practice 5: Provide immediate and corrective feedback with opportunities for students to correct errors.**
☐	☐	☐	a) Teachers provide immediate and corrective feedback to students.
☐	☐	☐	b) Students correct errors after receiving immediate and corrective feedback.
Consistently	**Inconsistently**	**Not at All**	**Practice 6: Include sufficient, distributed, and cumulative practice and review.**
☐	☐	☐	a) Teachers provide practice and review sufficient for students to develop mastery.
☐	☐	☐	b) Teachers provide practice that is distributed over time to improve retention (delayed review).
☐	☐	☐	c) Teachers provide practice that is cumulative by distributing types of problems across assignments.
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Principle 6: Instruction should include strategies for solving word and algebra problems that are based on common underlying structures.			
Consistently	Inconsistently	Not at All	**Practice 1: Include systematic instruction on the structural connections between known, familiar, and novel word problems.**
☐	☐	☐	a) Teachers provide an organizational strategy for setting up and solving problems (e.g., an attack strategy).
☐	☐	☐	b) Teachers help students identify underlying structures of problems across a range of examples to ensure generalization.
☐	☐	☐	c) Teachers help students understand meaningful features of a problem that are similar to other problems with the same underlying structure, rather than focusing on only key words or other superficial features of the context.
☐	☐	☐	d) Teachers provide instruction and practice with known, familiar, and novel word problems.
Consistently	Inconsistently	Not at All	**Practice 2: Teach common problem types and their structures, as well as how to categorize and select appropriate solution methods for each problem type.**
☐	☐	☐	a) Students are able to see common problem types and connect them to viable solutions.
☐	☐	☐	b) Struggling students receive explicit instruction on organizing information presented in word problems, on common problem types, and appropriate solutions.
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Principle 7: For students who struggle in mathematics, instruction and intervention materials should include opportunities to work with representations of mathematical ideas. Teachers should be proficient in the use of these representations.			
Consistently	Inconsistently	Not at All	**Practice 1: Employ visual representations to model mathematical concepts.**
☐	☐	☐	a) Intervention incorporates concrete and visual representations of mathematical concepts to develop foundational knowledge.
☐	☐	☐	b) Instruction uses representations as a support for mathematics learning, rather than a focus of the lesson.
Consistently	Inconsistently	Not at All	**Practice 2: Explicitly link a visual representation or model with the abstract mathematical symbol or concept.**
☐	☐	☐	a) Teachers help students see and understand how a visual representation can be translated into abstract numbers and number sentences.
Consistently	Inconsistently	Not at All	**Practice 3: Use consistent language across similar representations.**
☐	☐	☐	a) Teachers communicate with consistent and precise language across representations of the same mathematical concept.
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Principle 8: Establish a school wide plan to identify and improve teachers' mathematical and pedagogical content knowledge.			
Consistently	Inconsistently	Not at All	**Practice 1: Assess teachers' needs in relation to mathematics content knowledge and mathematics pedagogical content knowledge across content areas.**
☐	☐	☐	a) A needs assessment is conducted that includes mathematics teachers' self-reflection of their strengths and limitations and/or an objective test of their knowledge and skills.
☐	☐	☐	b) Because mathematical reasoning should be integrated across relevant content areas, a needs assessment is conducted for teachers responsible for such content.
Consistently	Inconsistently	Not at All	**Practice 2: Select and implement high-quality professional development that acknowledges different teachers' needs.**
☐	☐	☐	a) Professional development is targeted to support individual teachers' needs.
☐	☐	☐	b) Professional development is delivered over time allowing for knowledge growth.
☐	☐	☐	c) Professional development is situated within a collaborative environment such as a learning community or by encouraging discourse among colleagues.
☐	☐	☐	d) Professional development opportunities are evaluated for alignment with these expectations prior to implementation.
Consistently	Inconsistently	Not at All	**Practice 3: Improve teachers' knowledge and understanding of making practice decisions based on research evidence and student data.**
☐	☐	☐	a) Leadership provides guidance and establishes an expectation that instructional decisions are based on a review of student data.
☐	☐	☐	b) Student performance data is systematically gathered before, during, and after instruction to guide instructional and programmatic decisions.
☐	☐	☐	c) Teachers and administrators understand the types of data needed, how to collect and analyze the data, and how to make decisions and communicate regarding the results.
☐	☐	☐	d) Teachers and administrators regularly read research literature on math instruction and intervention and consider how these practices can be implemented within the local context.

Principle 8: Establish a school wide plan to identify and improve teachers' mathematical and pedagogical content knowledge.			
Consistently	Inconsistently	Not at All	Practice 3: Improve teachers' knowledge and understanding of making practice decisions based on research evidence and student data.
☐	☐	☐	e) Leadership cultivates a school climate that allows for experimentation and implementation of evidence-based practices in a supportive environment.
☐	☐	☐	f) Leadership works with teachers to support fidelity of implementation.
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Principle 9: Discontinue using practices that are NOT associated with improved outcomes for students and teachers.			
Consistently	Inconsistently	Not at All	**Practice 1: Examine the evidentiary bases of practices currently used in teaching mathematics and identify and eliminate practices that are contraindicated by existing evidence.**
☐	☐	☐	a) Teachers and school administrators review research summaries and other resources for evidence regarding effective practices for teaching mathematics in the middle grades.
☐	☐	☐	b) Teachers and school administrators examine the evidence base of practices currently used in teaching mathematics.
☐	☐	☐	c) Practices not supported by research evidence or local student performance evidence are discontinued.
Consistently	Inconsistently	Not at All	**Practice 2: Monitor student learning formally and informally and use trend data to determine whether and how to adjust current practices.**
☐	☐	☐	a) Teachers monitor student learning formally (e.g., using summative assessments) and informally (e.g., using observation, formative assessment) and adjust practices accordingly.
☐	☐	☐	b) Teachers use progress monitoring to identify students who need instructional adjustments to improve learning.
☐	☐	☐	c) School administrators use data at the student, classroom, and teacher levels to make programmatic changes, eliminating programs that are not working for their students.
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