High Yield Instructional Practices for Mathematics

Effective mathematics teaching begins with the belief that every student can learn. All students bring valuable knowledge, experiences, and ways of knowing. Learning deepens when teachers honour students' identities, relationships, and communities. Inclusive, culturally and linguistically responsive practices create safe, welcoming spaces where students' strengths and lived experiences are woven into mathematics in authentic ways.

High yield instructional practices allow students to explore, communicate, and make sense of mathematics conceptually, procedurally, and contextually. There is no single "best" practice; instead, teachers make intentional, responsive choices grounded in knowledge of their students, the curriculum, and the progression of mathematical concepts. Balanced mathematics instruction involves designing learning experiences that support curiosity, understanding, problem solving, and reasoning for all students.

Assessment is an important part of effective instruction. Its purpose is to improve student learning and achievement by gathering ongoing evidence of progress, informing instructional decisions, and encouraging students to reflect on their own growth. A balanced approach to assessment helps teachers understand where students are in their learning and where they need to go.

This document, grounded in the principles of the National Council of Teachers of Mathematics (NCTM)[1], guides educators and leaders in using high yield instructional practices to strengthen mathematics teaching, learning, and assessment across classrooms and schools.

The chart highlights high yield instructional practices with descriptions and examples of what it looks like in action for both teachers and students.

Practice	Description	Teacher Action	Student Action
1. Establish Mathematics Goals to Focus Learning	Clear goals are used to guide instructional decisions and help students focus on what they are learning.	• Align the learning goal to the verbs in the curriculum. • Clearly share what students are learning and why it matters. • Connect the goal to past and future learning. • Refer to the goal during the lesson to keep learning focused. • Use the goal to plan, adjust, and reflect on instruction.	• Know what action they are expected to do. • Understand what they are learning and why it matters. • Use the goal to stay focused and guide their thinking. • Reflect on their progress toward the learning goal. • Connect new learning to what they already know.

[1] National Council of Teachers of Mathematics. (2014). *Principles to Actions*. National Council of Teachers of Mathematics.

Practice	Description	Teacher Action	Student Action
2. Implement Tasks that Promote Reasoning and Problem Solving	Regularly engage students in tasks that require thinking, reasoning, and problem solving with multiple entry points.	• Use open-ended, authentic tasks that build on students' thinking and reflect their cultural contexts. • Choose problems that allow multiple strategies and representations. • Give time for deep thinking and exploration without jumping in too quickly. • Honour diverse ways of knowing by supporting varied approaches and encourage reasoning with tools and models.	• Use what they know to make sense of new problems. • Choose tools and strategies that make sense to them. • Stick with challenges and explore new ideas. • Show and explain their thinking in different ways.
3. Use and Connect Mathematical Representations	Engage students in exploring and connecting the relationships among different representations to deepen understanding.	• Provide tasks that allow choice in how students represent their thinking. • Give time to explore and connect concrete, visual, and symbolic forms. • Introduce useful representations and link them to prior learning. • Guide students in making sense of representations through discussion and reasoning.	• Choose from various forms of representations that help them solve problems and explain thinking. • Show their thinking with pictures, tools, or numbers, and explain how these are connected. • Compare and reflect on different ways of showing their thinking. • Talk about their ideas to understand why a certain representation makes sense.
4. Facilitate Meaningful Mathematical Discourse	Promote student discussion to nurture shared understanding of mathematical ideas.	• Create space for students to share thinking using visuals/models. • Highlight student work to deepen class discussions. • Promote student-to-student talk with supports like sentence stems and visuals. • Connect ideas back to the math goal to move learning forward. • Teach and use math vocabulary to support clear and precise communication.	• Explain their thinking using math language and visuals/models. • Listen to others, ask questions, and compare strategies. • Use sentence starters and visuals to talk about math understanding. • Think about how their ideas and those of others connect to the math goal. • Use precise math vocabulary when talking about math.

Practice	Description	Teacher Action	Student Action
5. Pose Purposeful Questions	Ask open questions that uncover student reasoning and deepen student thinking about important mathematical concepts.	• Ask questions that align with curriculum goals and extend students' thinking based on their ideas. • Ask open-ended "why" and "how" questions to uncover and deepen thinking. • Avoid leading students—build on their responses instead. • Vary question types and give time for all students to think and respond. • Incorporate questions that include lived experiences.	• Answer and ask questions that help them deepen understanding and build on classmates' thinking. • Expect to explain and justify their reasoning, not just give answers. • Reflect on their thinking and explain why it makes sense. • Take time to answer questions, share ideas, explain their thinking, and learn from others. • Ask questions that connect math to their lived experiences.
6. Build Procedural Fluency from Conceptual Understanding	Ensure students develop accurate and flexible procedures through meaningful practice rooted in conceptual understanding.	• Let students use their own strategies before teaching formal procedures. • Ask students to explain why their method works. • Connect student thinking to efficient procedures over time. • Reinforce fluency through intentional games and purposeful practice. • Link skill-building to reasoning, not just speed. • Incorporate culturally relevant contexts for practice.	• Use strategies they understand and can explain clearly. • Choose and reflect on approaches that work for them. • Explain why procedures work and how they connect to the math. • Try different strategies, recognize patterns and adapt their thinking as needed. • Focus on understanding and explaining their thinking—not just doing it quickly. • Students see their identities, cultures, and/or communities reflected in math tasks.

Practice	Description	Teacher Action	Student Action
7. Support Productive Struggle in Learning Mathematics	Provide opportunities for students to work through challenges and build perseverance.	• Anticipate struggles and support thinking without giving answers. • Allow time for students to work through challenges. • Use mistakes as learning opportunities. • Encourage reflection, persistence, and confidence. • Provide the opportunity for collaboration. • Give feedback that guides next steps. • Recognize student resilience, creativity, brilliance, and perseverance as a strength	• Stay with challenges and see struggle as a normal and valuable part of learning. • Ask questions that help them move forward when they feel stuck. • Try different strategies and think aloud to work through problems. • Think about their learning, keep trying when challenges arise, and build confidence in their ability to solve problems. • Support peers by collaborating or asking thoughtful questions. • Use feedback to understand next steps and continue learning. • Recognize and celebrate their perseverance as a strength.
8. Elicit and Use Evidence of Student Thinking	Use formative assessment and student work to guide instructional decisions and support learning.	• Plan how to gather evidence of learning during lessons. • Use observations, conversations, and work samples to check understanding. • Respond with prompts that deepen thinking. • Give timely feedback that guides learning. • Adjust instruction based on what students show and speak. • Design assessments with voice and choice, incorporating lived experiences.	• Show what they are learning in different ways so that the teacher can see how they are thinking. • Represent their thinking using pictures, numbers, words, or oral explanations. • Use teacher prompts to think more deeply about math. • Apply feedback to improve their understanding and refine their thinking. • Share their thinking so that the teacher can support them in a way that fits their needs. • Demonstrate their learning in a way that works for them.