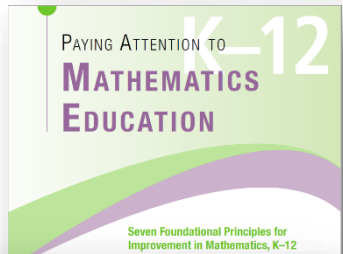
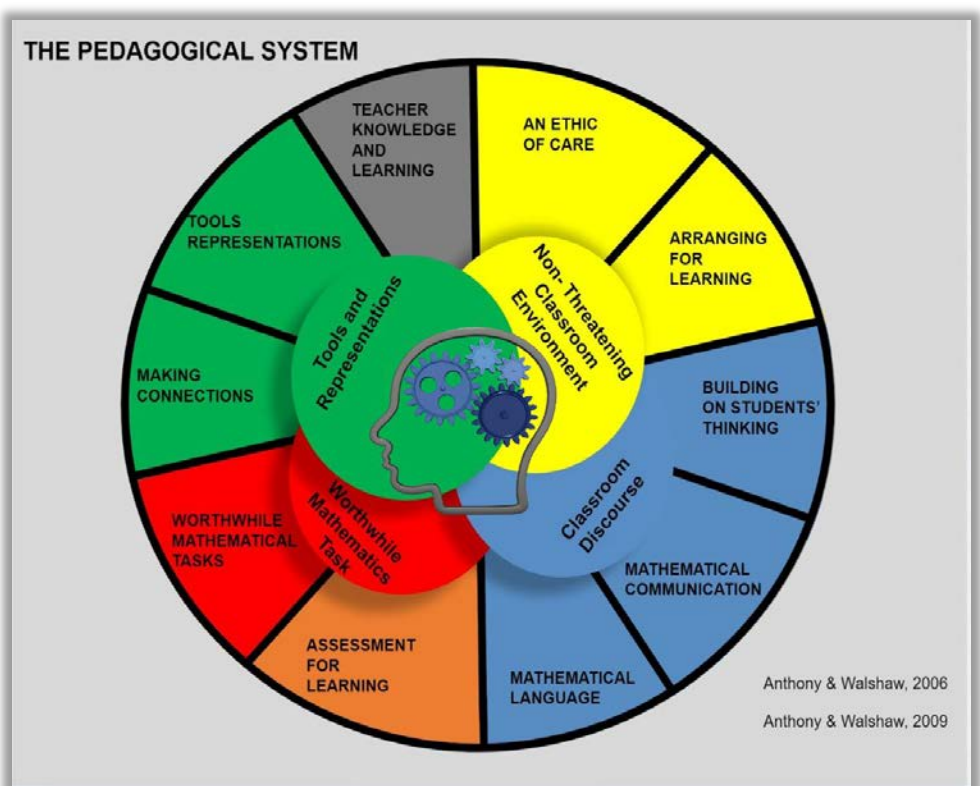


Eight Effective Teaching Practices	Purpose	What the Teacher Does	What the Student Does
1. Establish mathematics goals to focus learning. See Grade 6 examples of learning focus by lesson for Equality – Unknown Quantities	<ul style="list-style-type: none">Set the stage to guide instructional decisions.Expect students to understand the purpose of a lesson beyond simply repeating the expectation.	Considers broader goals, as well as the goals of the strand(s) and the actual lesson, including the following: <ul style="list-style-type: none">What is to be learned?Why is the goal important?Where are students coming from? Where do students need to go?How can learning be extended?	<ul style="list-style-type: none">Make sense of new concepts and skills, including connections to concepts/ big ideas learned in previous gradesExperience connections among the strands, overall and specific expectations.Deepen their understanding and expect mathematics to make sense.
2. Implement tasks that promote reasoning and problem solving. Example: (pages 13-30)	<ul style="list-style-type: none">Provide opportunities for students to engage in exploration and make sense of important mathematics.Encourage students to use procedures in ways that are connected to understanding.	Chooses tasks that <ul style="list-style-type: none">are built on current student understandings.have various entry points with multiple ways for the problems to be solved.are interesting to students (e.g. evolve from students’ thinking; connect to real world mathematics)	<ul style="list-style-type: none">Work to make sense out of the task and persevere in solving problems.Use a variety of models and materials to make sense of the mathematics in the task.Convince themselves and others the answer is reasonable.
3. Use and connect mathematical representations. Spatializing the Minds On – Primary Example	<ul style="list-style-type: none">Provide concrete representations that lead students to develop conceptual understanding and later connect that understanding to procedural skills.Provide a variety of representations that range from using physical models to using abstract models.	<ul style="list-style-type: none">Uses tasks that allow students to use a variety of representations.Encourages the use of different representations, including concrete models, pictures, words, and numbers, that support students in explaining their thinking and reasoning.	<ul style="list-style-type: none">Use materials to make sense out of problem situations.Connect representations to mathematical ideas and structures of big ideas, including operational sense with whole numbers, fractions and decimals.
4. Facilitate meaningful mathematical discourse. Math-Talk Learning Community Maximizing Student Mathematical Learning in the Early Years	<ul style="list-style-type: none">Provide students with opportunities to share ideas, clarify their understanding, and develop convincing arguments.Advance the mathematical thinking of the whole class by talking and sharing aloud.	<ul style="list-style-type: none">Engages students in explaining their mathematical reasoning in small groups and classroom situations.Facilitates discussions among students that support making sense of a variety of strategies and approaches.Scaffolds classroom discussions so that connections between representations and mathematical ideas take place.	<ul style="list-style-type: none">Explain the ideas and reasoning in small groups and with the entire class.Listen to the reasoning of others.Ask questions of others to make sense of their ideas.
5. Pose purposeful questions. Asking Effective Questions	<ul style="list-style-type: none">Reveal students’ current understanding of a concept.Encourage students to explain, elaborate and clarify their thinking.Make the learning of mathematics more visible and accessible for students.	<ul style="list-style-type: none">Asks questions that build on and extend student thinking.Is intentional about the kinds of questions asked to make the mathematics more visible to students.Uses wait time to provide students with time to thinking and examine their ideas.	<ul style="list-style-type: none">Think more deeply about the process of the mathematics rather than simply focusing on the answer.Listen to and comment on the explanations of others in the class.
6. Build procedural fluency from conceptual understanding.	<ul style="list-style-type: none">Provide experiences with concrete materials that allow students to make sense of important mathematics and flexibility choose from a variety of methods to solve problems.	<ul style="list-style-type: none">Provides opportunities for students to reason about mathematical ideas.Expects students to explain why their strategies work.Connects student methods to efficient procedures as appropriate.	<ul style="list-style-type: none">Understand and explain the procedures they are using an why they work.Use a variety of strategies to solve problems and make sense of the mathematical tasks.Do not rely on shortcuts or tricks to do mathematics.
7. Support productive struggle in learning mathematics. Dan Meyer, Thoughts About Inquiry	<ul style="list-style-type: none">Provide opportunities for productive struggle, which is significant and essential to learning mathematics with understanding.Allow students to grapple with ideas and relationships.Give students ample time to work with and make sense of new ideas, which is critical to their learning and understanding.	<ul style="list-style-type: none">Supports student struggle without showing and telling a procedure but rather focusing on the important mathematical ideas.Asks questions that scaffold and advance student thinkingBuilds questions and plans lessons based on important student misconceptions rather than focusing on the correct answer.Recognize the importance of effort as students work to make sense of new ideas.	<ul style="list-style-type: none">Stick to tasks and recognize that struggle is part of making sense.Ask questions that will help them to better understand the task.Support each other with ideas rather than telling others the answer or how to solve a problem.
8. Elicit and use evidence of student thinking. Communication in the Mathematics Classroom	<ul style="list-style-type: none">Elicit and use evidence of student thinking which helps teachers access learning progress and can be used to make instructional decisions during the lessons as well as help to prepare what will occur in the next lesson.Assess student thinking and understanding by using formative assessment through student written and oral ideas.	<ul style="list-style-type: none">Determines what to look for in gathering evidence of student learning.Poses questions and answers students questions that provide information about student understanding, strategies and reasoning.Uses evidence to determine next steps of instruction.	<ul style="list-style-type: none">Accept reasoning and understanding are as important as the answer to a problem.Use mistakes and misconceptions to rethink their understanding.Ask questions of the teach and peers to clarify confusion or misunderstanding.Assess progress toward developing mathematical understanding.

Vision for the Mathematics Learner



- ### Seven Foundational Principles for Improvement in Mathematics, K-12
- ❖ Focus on mathematics.
 - ❖ Coordinate and strengthen mathematics leadership.
 - ❖ Build understanding of effective mathematics instruction.
 - ❖ Support collaborative professional learning in mathematics.
 - ❖ Design a responsive mathematics learning environment.
 - ❖ Provide assessment and evaluation in mathematics that supports student learning.
 - ❖ Facilitate access to mathematics learning resources.



Guiding Principles for School Mathematics	
Teaching and Learning. An excellent mathematics program requires effective teaching that engages students in meaningful learning through individual and collaborative experiences that promote their ability to make sense of mathematical ideas and reason mathematically.	ESSENTIAL ELEMENTS
Access and Equity. An excellent mathematics program requires that all students have access to a high-quality mathematics curriculum, effective teaching and learning, high expectations, and the support and resources needed to maximize their learning potential.	
Curriculum. An excellent mathematics program includes a curriculum that develops important mathematics along coherent learning progressions and develops connections among areas of mathematical study and between mathematics and the real world.	
Tools and Technology. An excellent mathematics program integrates the use of mathematical tools and technology as essential resources to help students learn and make sense of mathematical ideas, reason mathematically, and communicate their mathematical thinking.	
Assessment. An excellent mathematics program ensures that assessment is an integral part of instruction, provides evidence of proficiency with important mathematics content and practices, includes a variety of strategies and data sources, and informs feedback to students, instructional decisions, and program improvement.	
Professionalism. In an excellent mathematics program, educators hold themselves and their colleagues accountable for the mathematical success of every student and for their personal and collective professional growth toward effective teaching and learning of mathematics.	

Mathematics Teaching Practices	
Establish mathematics goals to focus learning. Effective teaching of mathematics establishes clear goals for the mathematics that students are learning, situates goals within learning progressions, and uses the goals to guide instructional decisions.	ESSENTIAL ELEMENTS
Implement tasks that promote reasoning and problem solving. Effective teaching of mathematics engages students in solving and discussing tasks that promote mathematical reasoning and problem solving and allow multiple entry points and varied solution strategies.	
Use and connect mathematical representations. Effective teaching of mathematics engages students in making connections among mathematical representations to deepen understanding of mathematics concepts and procedures and as tools for problem solving.	
Facilitate meaningful mathematical discourse. Effective teaching of mathematics facilitates discourse among students to build shared understanding of mathematical ideas by analyzing and comparing student approaches and arguments.	
Pose purposeful questions. Effective teaching of mathematics uses purposeful questions to assess and advance students' reasoning and sense making about important mathematical ideas and relationships.	
Build procedural fluency from conceptual understanding. Effective teaching of mathematics builds fluency with procedures on a foundation of conceptual understanding so that students, over time, become skillful in using procedures flexibly as they solve contextual and mathematical problems.	
Support productive struggle in learning mathematics. Effective teaching of mathematics consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships.	
Elicit and use evidence of student thinking. Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning.	