Creating Professional Learning Networks Through Peer Observations
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Principles to Actions
Executive Summary

In 1989 the National Council of Teachers of Mathematics (NCTM) launched the standards-based education movement in North America with the release of *Curriculum and Evaluation Standards for School Mathematics*, an unprecedented initiative to promote systemic improvement in mathematics education. Now, twenty-five years later, the widespread adoption of college- and career-readiness standards, including adoption in the United States of the Common Core State Standards for Mathematics (CCSSM) by forty-five of the fifty states, provides an opportunity to reenergize and focus our commitment to significant improvement in mathematics education.

What is *different* and *promising* today, however, is the hope that the implementation of common standards, and the new generation of aligned and rigorous assessments, will help to address the continuing challenges and expand the progress already made. The need for coherent standards that promote college and career readiness has been endorsed across all states and provinces, whether or not they have adopted CCSSM. As NCTM publicly declared in the Position Statement *Supporting the Common Core State Standards for Mathematics*, released in 2013,

> The widespread adoption of the Common Core State Standards for Mathematics presents an unprecedented opportunity for systemic improvement in mathematics education in the United States. The Common Core State Standards offer a foundation for the development of more rigorous, focused, and coherent mathematics curricula, instruction, and assessments that promote conceptual understanding and reasoning as well as skill fluency. This foundation will help to ensure that all students are ready for college and the workplace when they graduate from high school and that they are prepared to take their place as productive, full participants in society.

What is the *same* today is the need to understand that standards do not teach; teachers teach. New standards provide guidance and direction, and help focus and clarify common outcomes. They motivate the development of new instructional resources and assessments. But these standards do not tell teachers, coaches, administrators, parents, or policymakers what to do at the classroom, school, or district level or how to begin making essential changes to implement the standards. Moreover, they do not describe or prescribe the essential conditions required to ensure mathematical success for all students. Thus, the primary purpose of *Principles to Actions* is to fill this gap between the development and adoption of CCSSM and other standards and the enactment of practices, policies, programs, and actions required for their widespread and successful implementation. Its overarching message is that effective teaching is the nonnegotiable core that ensures that all students learn mathematics at high levels and that such teaching requires a range of actions at the state or provincial, district, school, and classroom levels.

Looking back at mathematics education and student achievement in mathematics, we find much to celebrate. As a result of the gradual implementation of a growing body of research on teaching and learning mathematics and the dedicated efforts of nearly two million teachers of mathematics in North America, student achievement is at historic highs. For example, the percentage of fourth graders scoring "proficient" or above on the National Assessment of Educational Progress (NAEP) rose from 13 percent in 1990 to 42 percent in 2013, and the percentage of eighth graders scoring "proficient" or above on the NAEP rose from 15 percent in 1990 to 36 percent in 2013. Between 1990

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and 2013, mean SAT-Math scores increased from 501 in 1990 to 514 in 2013, mean ACT scores increased from 19.9 to 20.9, and the number of students taking Advanced Placement examinations in calculus and statistics increased substantially, from 77,634 in 1982 to 387,297 in 2013, and from 7,667 in 1997 to 169,508 in 2013, respectively.

These are impressive accomplishments. However, while we celebrate these record high NAEP scores and increases in SAT and ACT achievement—despite a significantly larger and more diverse range of test-takers—other recent data demonstrate that we are far from where we need to be and that much remains to be accomplished. For example, the average mathematics NAEP scores for 17-year-olds has been essentially flat since 1973; the difference in average NAEP mathematics scores between white and black and white and Hispanic 9- and 13-year-olds has narrowed somewhat between 1973 and 2012 but remains between 17 and 28 points; and among cohorts of 15-year-olds from the 34 countries participating in the 2012 Programme for International Student Assessment (PISA), the U.S. cohort ranked 26th in mathematics.

These more disturbing data point to the persistent challenges and the work that we still need to do to make mathematics achievement a reality for all students:

- Eliminate persistent racial, ethnic, and income achievement gaps so that all students have opportunities and supports to achieve high levels of mathematics learning
- Increase the level of mathematics learning of all students, so that they are college and career ready when they graduate from high school
- Increase the number of high school graduates, especially those from traditionally underrepresented groups, who are interested in, and prepared for, STEM careers

In short, we must move from "pockets of excellence" to "systemic excellence" by providing mathematics education that supports the learning of all students at the highest possible level.

To achieve this goal, we must change a range of troubling and unproductive realities that exist in too many classrooms, schools, and districts. *Principles to Actions* addresses and documents these realities:

- Too much focus is on learning procedures without any connection to meaning, understanding, or the applications that require these procedures.
- Too many students are limited by the lower expectations and narrower curricula of remedial tracks from which few ever emerge.
- Too many teachers have limited access to the instructional materials, tools, and technology that they need.
- Too much weight is placed on results from assessments—particularly large-scale, high-stakes assessments—that emphasize skills and fact recall and fail to give sufficient attention to problem solving and reasoning.
- Too many teachers of mathematics remain professionally isolated, without the benefits of collaborative structures and coaching, and with inadequate opportunities for professional development related to mathematics teaching and learning.

As a result, too few students—especially those from traditionally underrepresented groups—are attaining high levels of mathematics learning.

In this exciting and challenging context, NCTM introduces *Principles to Actions: Ensuring Mathematical Success for All,* setting forth a set of strongly recommended, research-informed actions, based on the Council's core principles and intended for all educational leaders and policymakers, all school and district administrators, and all teachers, coaches, and specialists of mathematics. In *Principles and Standards for School Mathematics*, published by NCTM in 2000,

the Council first defined a set of Principles that "describe features of high-quality mathematics education." *Principles to Actions* now articulates and builds on an updated set of six Guiding Principles that reflect more than a decade of experience and new research evidence about excellent mathematics programs, as well as significant obstacles and unproductive beliefs that continue to compromise progress.

Three aspects of *Principles to Actions* are new, provocative, and important. First, *Principles to Actions* devotes the largest section to Teaching and Learning, the first Guiding Principle, and describes and illustrates eight Mathematics Teaching Practices (see fig. 1) that research indicates need to be consistent components of every mathematics lesson. Second, for each Guiding Principle, *Principles to Actions* offers commentary and a table that address productive and unproductive beliefs as part of a realistic appraisal of the obstacles that we face, as well as suggestions for overcoming these obstacles. Third, *Principles to Actions* issues a forceful call to action, asserting that all of us who are stakeholders have a role to play and important actions to take if we are finally to recognize our critical need for a world where the mathematics education of our students draws from research, is informed by common sense and good judgment, and is driven by a nonnegotiable belief that we must develop mathematical understanding and self-confidence in *all* students.

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.
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.

Fig. 1. Mathematics Teaching Practices

Guiding Principles for School Mathematics

Full statements of the Guiding Principles follow; *Principles to Actions* elaborates the unique importance of each, as summarized briefly below each statement. The first Guiding Principle, Teaching and Learning, has primacy among the Guiding Principles, with the others serving as the Essential Elements that support it.

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.*

The teaching of mathematics is complex. It requires teachers to have a deep understanding of the mathematical content that they are expected to teach and a clear view of how student learning of that mathematics develops and progresses across grades. It also calls for teachers to be skilled at using instructional practices that are effective in developing mathematics learning for all students. The eight Mathematics Teaching Practices (see fig. 1) describe the essential teaching skills derived from the research-based learning principles, as well as other knowledge of mathematics teaching that has emerged over the last two decades.

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.*

Equitable access means high expectations, adequate time, consistent opportunities to learn, and strong support that enable students to be mathematically successful. Instead of one-size-fits-all practices and the differential expectations for students who are placed in different academic tracks, equitable access means accommodating differences to meet a common goal of high levels of learning by all students.

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.*

A robust curriculum is more than a collection of activities; instead, it is a coherent sequencing of core mathematical ideas that are well articulated across the grades. Such an effective curriculum incorporates problems in contexts from everyday life and other subjects whenever possible. These tasks engage students and generate interest and curiosity in the topics under investigation.

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.*

Available tools and technology help teachers and students visualize and concretize mathematics abstractions, and when these resources are used appropriately, they support effective teaching and meaningful learning.

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.*

Effective assessment supports and enhances the learning of important mathematics by furnishing useful formative and summative information to both teachers and students. Productive mathematics assessment is a process that is

coherently aligned with learning goals and makes deliberate use of the data gathered as evidence of learning and provides guidance for next instructional steps and programmatic decision making. Students learn to assess and recognize high quality in their own work.

Professionalism. *In an excellent mathematics program, educators hold themselves and their colleagues accountable for the mathematical success of every student and for personal and collective professional growth toward effective teaching and learning of mathematics.*

Effective schools communicate a tangible sense of the professional imperative to grow personally and collectively and to hold one another accountable for this growth. Professionals who are responsible for students' mathematics learning are never satisfied with their accomplishments and are always working to increase the impact that they have on their students' mathematics learning. Moreover, they cultivate and support a culture of professional collaboration and continual improvement that is driven by an abiding sense of interdependence and collective responsibility.

Actions

Although principles provide guidance and structure, actions determine impact. *Principles to Actions* argues that ensuring mathematical success for all will take **teachers** who, among other actions—

- plan and implement effective instruction as described by the Mathematics Teaching Practices;
- develop socially, emotionally, and academically safe environments for mathematics teaching and learning—environments in which students feel secure and confident in engaging with one another and with teachers;
- evaluate curricular materials and resources to determine the extent to which these materials align with the standards, ensure coherent development of topics within and across grades, promote the mathematical practices, and support effective instruction that implements the Mathematics Teaching Practices;
- incorporate mathematical tools and technology as an everyday part of the mathematics classroom, recognizing that students should experience "mathematical action technologies" and physical or virtual manipulatives to explore important mathematics;
- provide students with descriptive, accurate, and timely feedback on assessments, including strengths, weaknesses, and next steps for progress toward the learning targets;
- work collaboratively with colleagues to plan instruction, solve common challenges, and provide mutual support as they take collective responsibility for student learning.

Principles to Actions argues that ensuring mathematical success for all will take **principals, coaches, specialists, and other school leaders** who, among other actions—

- make the eight Mathematics Teaching Practices a schoolwide focus that is expected for all teachers to strengthen learning and teaching for all students, and provide professional development, training, and coaching to make the implementation of these practices a priority;
- maintain a schoolwide culture with high expectations and a growth mindset;

- allocate time for teachers to collaborate in professional learning communities;
- support improvement with multifaceted assessments used to monitor progress and inform changes to instruction;
- make the mathematical success of every student a nonnegotiable priority.

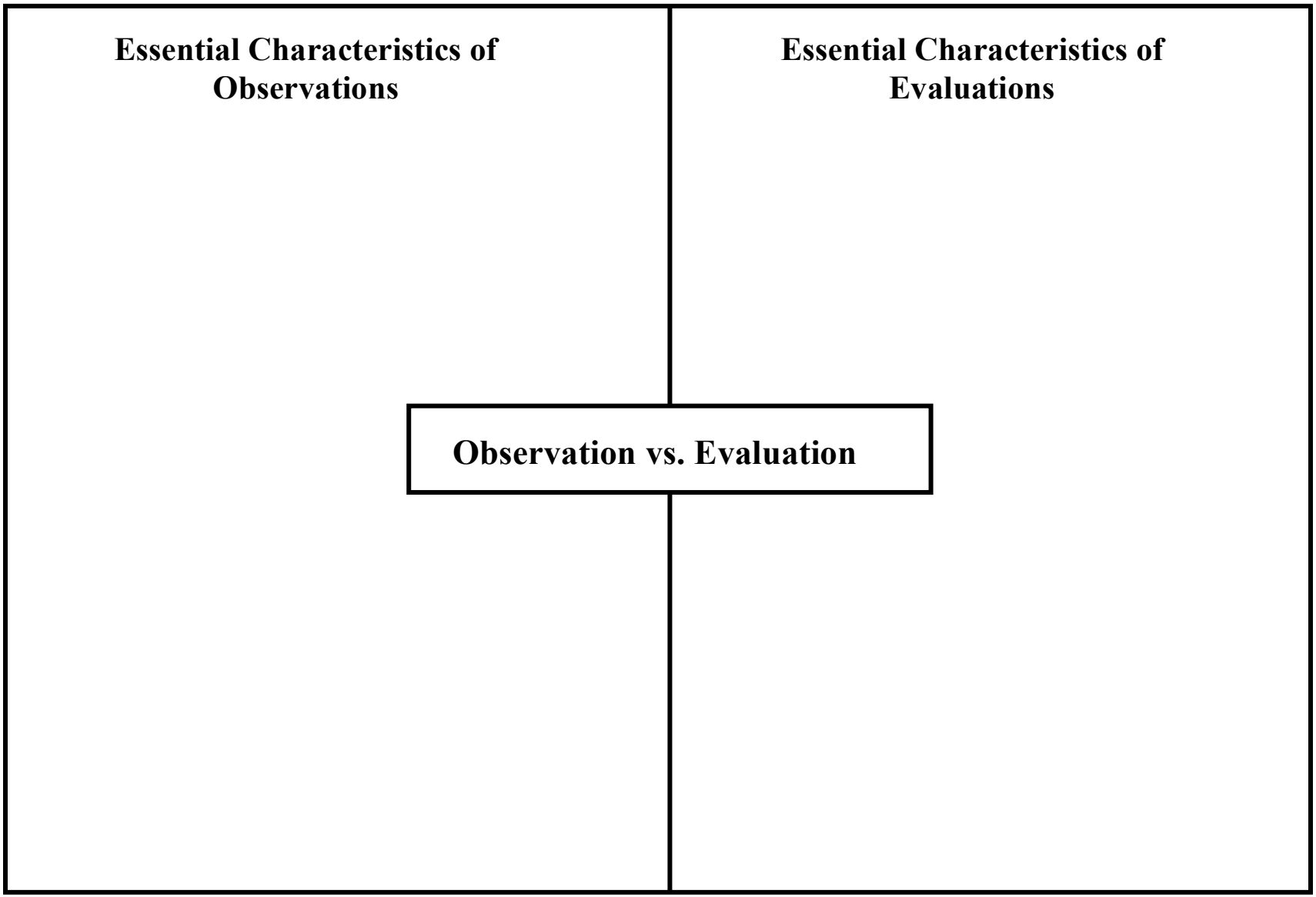
Principles to Actions argues that ensuring mathematical success for all will take **leaders and policymakers in districts, states or provinces, including commissioners, superintendents and other central office administrators**, who, among other actions—

- make ongoing professional development that supports the implementation of the eight Mathematics Teaching Practices as a priority;
- allocate resources to ensure that all students are provided with an appropriate amount of instructional time to maximize their learning potential;
- eliminate the tracking of low-achieving students and instead structure interventions that provide high-quality instruction and other classroom support, such as math coaches and specialists;
- understand the devastating impact of professional isolation and create collaborative structures to maximize professional growth;
- Support risk taking and encourage new approaches that advance student learning.

Only when these words become actions and the actions lead to more productive beliefs, new norms of instructional practice, and implementation of the essential supporting elements will we overcome the obstacles that currently prevent school mathematics from ensuring success for all students.

The National Council of Teachers of Mathematics is the world's largest professional organization dedicated to improving mathematics education for all students. Growing out of its visionary *Agenda for Action* in 1980, the Council launched the education standards movement with its publication of *Curriculum and Evaluation Standards for School Mathematics* (1989), which presented a comprehensive vision for mathematics teaching and learning in K–12 mathematics. In 2000, NCTM's *Principles and Standards for School Mathematics* expanded on the 1989 Standards and added underlying Principles for excellence in school mathematics. Subsequent publications, *Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics: A Quest for Coherence* and *Focus in High School Mathematics: Reasoning and Sense Making*, extended this work by identifying the most significant mathematical concepts and skills at each level from prekindergarten through grade 8 and advocating practical changes to the high school mathematics curriculum to refocus learning on reasoning and sense making, respectively. These NCTM publications have significantly influenced the development of mathematics education standards worldwide. NCTM's recently published *Principles to Actions: Ensuring Mathematical Success for All* describes the principles and actions, including specific research-informed teaching practices, that are essential for a high-quality mathematics education for all students. The Council is committed to a constructive public dialogue to ensure a mathematics education of the highest quality for all students.

Creating Professional Learning Networks Through Peer Observations



Steps for Peer Observations

I. **Step One: Pre-Observation Information**
   a. Teacher Provides Context for Observer
      i. Possible Discussion Questions
         1. What specifically do you want me to look for?
         2. What are the objectives and expectations for the lesson?
         3. Is there a particular students or group you would like me to watch?
         4. How long would you like me to observe?
         5. How would you like me to give you feedback? (i.e. in person, video, email, etc.)

II. **Step Two: Observation**
   a. Focus not just on teachers actions but also on the student actions.
   b. Gather/document non-judgmental specific evidence from the observation.

III. **Step Three: Post-Observation Feedback and Reflection**
   a. Provide feedback to teacher.
      i. Possible Discussion Questions for Teacher
         1. How do you think the lesson went?
         2. How did the lesson compare to what you expected would happen?
         3. What could be some reasons this happened?
         4. Would you like me to share what I observed?
      ii. Provide non-judgmental specific evidence from the observation.
   b. Observer reflects on their practice and information gained from the observations.
      i. Possible Discussion/Reflection Questions for Observe
         1. See Facilitator Guiding Questions Handout

Data Sources for Peer Observations

- **Student Engagement/Standards for Mathematical Practice**
  - A record of the Standards of mathematical Practices seen with evidence.
- **Effective Teaching Practices**
  - A record of the Effecting Teaching Practices implemented with evidence.
- **Task Selection**
  - A record of the cognitive demand level of each task in which students engage (i.e. procedures without connections, procedures with connections, etc.)
- **Quality Questioning**
  - A record of what types of questions the teachers or students are asking (i.e. leading, funneling, clarifying, etc.)
- **Class Traffic**
  - A visual record of how the teacher moves throughout the classroom.
- **Even Count**
  - A record of the number of times something occurs (i.e. the number of times a learners interrupt one another)
- **Verbal Flow**
  - A written or visual description of who talks with whom or who is silent.

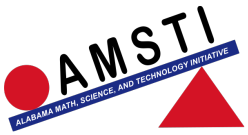
Note: Not all questions need to be asked after each peer observation. These questions are a guide to begin discussion.

Mathematics Teaching Practices

1	Establish mathematics goals to focus learning.
2	Implement tasks that promote reasoning and problem solving
3	Use and connect mathematical representations.
4	Facilitate meaningful mathematical discourse.
5	Pose purposeful questions.
6	Build procedural fluency from conceptual understanding.
7	Support productive struggle in learning mathematics.
8	Elicit and use evidence of student thinking.

Standards for Mathematical Practice

1	Make sense of problems and persevere in solving them.
2	Reason abstractly and quantitatively.
3	Construct viable arguments and critique the reasoning of others.
4	Model with mathematics.
5	Use appropriate tools strategically.
6	Attend to precision.
7	Look for and make use of structure.
8	Look for and express regularity in repeated reasoning.



Peer Observations

Teacher: _____ Observer: _____

Class: _____ Date: _____

Things I saw that I can't wait to use in my class:	Main actions I saw by the teacher or students:

Peer Observations

Teacher: _____ Observer: _____

Class: _____ Date: _____

Things I saw that I can't wait to use in my class:	Main actions I saw by the teacher or students:

Facilitator Guiding Questions

1. What were three strengths of the lesson?
    a. How did the strengths help the learning of all students?
2. What was the learning target for the lesson?
    a. Why was this learning important?
3. Do you feel students successfully achieved the lesson objective(s)?
    a. What data supports your answer?
4. What resources/materials were used for instruction?
5. What prior knowledge was needed for the lesson?
    a. How did the teacher connect prior knowledge to the new learning?
6. How did this lesson connect to student's real-life experiences and/or possible careers?
7. Did you see any of the Standards for Mathematical Practices?
    a. If so, which ones? What evidence?
8. Did you see any of the 8 Effective Math Teaching Standards?
    a. If no, which ones? What evidence?
9. What strategies were used to meet the needs of individual students?
10. What questioning techniques did you observe that were used to support student learning?
11. If you had to estimate, what was the teacher to student ratio for talking and discourse?
12. How was technology integrated into the lesson?
13. How did students take ownership of their learning?
14. How did the learning environment support all students?
15. How were different grouping strategies used?
16. How was respect for all modeled?
17. How did the teacher check for students understanding?
18. What insights have you discovered about your teaching practices from participating in today's peer observations?

Note: Not all questions need to be asked after each peer observation. These questions are a guide to begin discussion.

Math Classroom Observation Checklist

Taken from the Common Core Institute at www.commoncoreinstitute.org.

Mathematical Practices	*Observations*
MP.1 Make sense of problems and persevere in solving them	***Students are expected to_____*** ☐ Engage in solving problems. ☐ Explain the meaning of a problem and restate it their own words. ☐ Analyze given information to develop possible strategies for solving the problem. ☐ Identify and execute appropriate strategies to solve the problem. ☐ Check their answers using a different method and continually ask, "Does this make sense?"
	Teachers are expected to_____ ☐ Provide time for students to discuss problem solving.
MP.2 Reason abstractly and quantitatively	***Students are expected to_____*** ☐ Connect quantity to numbers and symbols (decontextualize the problem) and create a logical representation of the problem at hand. ☐ Recognize that a number represents a specific quantity (contextualize the problem). ☐ Contextualize and decontextualize within the process of solving a problem.
	Teachers are expected to_____ ☐ Provide appropriate representations of problems.
MP.3 Construct viable arguments and critique the reasoning of others	***Students are expected to_____*** ☐ Explain their thinking to others and respond to others' thinking. ☐ Participate in mathematical discussions involving questions such as, "How did you get that?" and "Why is that true?" ☐ Construct arguments that utilize prior learning. ☐ Question and problem pose. ☐ Practice questioning strategies used to generate information. ☐ Analyze alternative approaches suggested by others and select better approaches. ☐ Justify conclusions, communicate them to others, and respond to the arguments of others. ☐ Compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and if there is a flaw in an argument, explain what it is.
	Teachers are expected to_____ ☐ Provide opportunities for students to listen to or read the conclusions and arguments of others.

Mathematical Practices	*Observations*
MP.4 Model with mathematics	***Students are expected to_____*** ☐ Apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. ☐ Make assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. ☐ Experiment with representing problem situations in multiple ways, including numbers, words (mathematical language), drawing pictures, using objects, acting out, making a chart or list, creating equations, etc. ☐ Identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts, and formulas. ☐ Evaluate their results in the context of the situation and reflect on whether their results make sense. ☐ Analyze mathematical relationships to draw conclusions.
	Teachers are expected to_____ ☐ Provide contexts for students to apply the mathematics learned.
MP.5 Use appropriate tools strategically	***Students are expected to_____*** ☐ Use tools when solving a mathematical problem and deepen their understanding of concepts (*e.g., pencil and paper, physical models, geometric construction and measurement devices, graph paper, calculators, computer-based algebra or geometry systems*). ☐ Consider available tools when solving a mathematical problem and decide when certain tools might be helpful, recognizing both the insight to be gained and their limitations. ☐ Detect possible errors by strategically using estimation and other mathematical knowledge.
	Teachers are expected to_____ ☐ Model the use of appropriate tools (*e.g. manipulatives*) instructionally.
MP.6 Attend to precision	***Students are expected to_____*** ☐ Use clear and precise language in their discussions with others and in their own reasoning. ☐ Use clear definitions and state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. ☐ Specify units of measure and label parts of graphs and charts. ☐ Calculate with accuracy and efficiency based on a problem's expectation.
	Teachers are expected to_____ ☐ Emphasize the importance of precise communication.

Mathematical Practices	*Observations*
MP.7 Look for and make use of structure	***Students are expected to_____*** ☐ Describe a pattern or structure. ☐ Look for, develop, generalize, and describe a pattern orally, symbolically, graphically and in written form. ☐ Relate numerical patterns to a rule or graphical representation. ☐ Apply and discuss properties.
	Teachers are expected to_____ ☐ Provide time for applying and discussing properties.
MP.8 Look for and express regularity in repeated reasoning	***Students are expected to_____*** ☐ Describe repetitive actions in computation. ☐ Look for mathematically sound shortcuts. ☐ Use repeated applications to generalize properties. ☐ Use models to explain calculations and describe how algorithms work. ☐ Use models to examine patterns and generate their own algorithms. ☐ Check the reasonableness of their results.
	Teachers are expected to_____ ☐ Encourage students to look for and discuss regularity in reasoning.

Advanced Practices / Teachers:

- ☐ **Standards Routine**: Begins with the Standard(s), identifies the skill(s) to be taught.
- ☐ **Cognitive Demand**: Is aware of and can articulate the level of cognitive demand associated with the skills taught within the lesson.
- ☐ **Vocabulary**: Uses appropriate mathematical vocabulary, including vocabulary from more advanced grades. Is aware of the importance of vocabulary usage.
- ☐ **Assessment**: Selects assessment methods in the classroom appropriate for the level of cognitive demand.
- ☐ **Priority Overlays**: Is aware of the priority standards overlays associated with their assessment consortia and reiterates / reinforces those content areas within the lesson.
- ☐ **Problem Choice**: Selects complex problems for whole classroom work from the middle and end of units or chapters.
- ☐ Utilizes **questioning techniques** to elicit discussion, brainstorming, and investigation of multiple methods of problem solving.
- ☐ Uses methods such as paraphrasing and translation of word problems into mathematical symbols.
- ☐ **Problem Translation**: Leads the classroom from word-based problems, to symbolic representation of the problem, back to word-based problems.
- ☐ **Fluency**: Can articulate the Fluency Standards within their grade and teaches them early and often, including repetitive problems in different forms throughout the Scope & Sequence.
- ☐ **Multiple representations**: Uses multiple representations including graphs, number lines, pictures, and manipulatives to represent problems.
- ☐ Utilizes **cooperative learning in a safe environment**, such as paired answer discussion, as compared to calling on students in front of the entire classroom.
- ☐ Utilizes **close reading techniques** for problem deconstruction and deep understanding.
- ☐ Utilizes exemplar questions and assessment items. Displays the ability to extend an operation from an exemplar to other parts of the curriculum.
- ☐ Utilizes real-world content and problems, including problems drawn from Science, Technology, and Social Studies.
- ☐ Utilizes content that stimulates student interest in, and understanding of, STEM careers.
- ☐ Presents the negative case and inappropriate or insufficient methods of problem solving, along with accurate and adequate reasoning.

1. What about this Standard for Mathematical Practice (SMP) make you think differently?
2. What connections can you make about this Standard for Mathematical Practice (SMP) to your instruction?

Standard 1: Make sense of problems and persevere in solving them.	**Standard 2: Reason abstractly and quantitatively.**
Standard 3: Construct viable arguments and critique the reasoning of others.	**Standard 4: Model with mathematics.**
Standard 5: Use appropriate tools strategically.	**Standard 6: Attend to precision.**
Standard 7: Look for and make use of structure.	**Standard 8: Look for and express regularity in repeated reasoning.**

Math Classroom Observation Checklist

Name: _____ Date: _____

School: _____ Grade: Class/time: _____

Worthwhile Mathematical Tasks	Comments
Students are engaged.	
Students use a variety of mathematical tools.	
Conjectures, generalizations, and what if questions abound.	
Misconceptions, limited understandings, and/or flawed reasoning surface.	
Students communicate about the math tasks at hand.	
Students' Role in Discourse	**Comments**
Students present solutions.	
Students question one another.	
Students pay attention while another student is speaking.	
Students use a variety of tools to reason, make connections, solve problems and communicate their thinking.	
Students make conjectures.	
Tools for Discourse	**Comments**
Students are using "tools" to enhance discourse.	
Four kinds of tools are: written symbols, oral language, physical materials, previously acquired skills.	
Students are using the tools to: record, communicate, and think.	
Students are presenting and modeling their work.	
Students reflect on their learning.	
Students select tools that are appropriate.	
Culture in the Classroom	**Comments**
Students look at problems and ideas in different ways.	
Students celebrate their AHA's.	
Wrong answers are viewed as worthwhile.	
Students are equitable in their spoken and unspoken messages about all students' mathematical potential.	
Students respect each other student's thinking.	

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Teachers Helping Teachers: Peer Observations

Teachers can collaboratively observe each other for professional development purposes. These peer observations are confidential and non-evaluative in nature.

Peer observations benefit both the observer and the observed teacher:

- Observers see new techniques in action, get new ideas for their teaching toolkits, and can reflect on their own assumptions, beliefs, and teaching practices based on what they witness.
- Observed teachers benefit from analyzing the descriptive data the observer collects about classroom interactions and the class environment; they can also grow though discussions that result from observer questions and suggestions to improve learning outcomes.
- Based on their discussions and reflections, participants can develop action plans or action research projects to improve their teaching practice.
- Peer observations can also improve camaraderie, deepen collaboration, and increase self-awareness among participating teachers.

Peer observation stages:

- **Pre-observation meeting:** The observer meets with the teacher before the class to learn about the lesson's focus and objectives. The teacher should define a focus area, perhaps related to something s/he would like to improve upon or a problem that s/he is trying to solve. Make sure you are both in agreement about how the observation will be conducted (duration, seating, etc.) and when the post-observation meeting will occur.

- **Observation:** The observed teacher should inform students about the observation before the lesson. The observer should arrive a few minutes early and be as discreet as possible: sit in the back of the room; focus solely on the observation and observe the entire lesson (or agreed upon segment); be open-minded and make detailed descriptive records in preparation for the post-observation meeting.

- **Post-observation meeting:** This is the most important part of the observation process. Reflection before this meeting and the discussion about what happened in the classroom is when real learning for both the teacher and the observer occurs. Teachers should treat each other with respect and offer opinions in a kind and constructive way. Participants should set action plans/goals based on what they learn. Both teachers should walk away feeling like they have learned something new and will be better teachers because of it.

Sample Peer Observation Schedule

Teacher Being Observed	Observer	Pre-Meeting Time & Date	Observation Time & Date	Post Meeting Time & Date	Completed (Signature of both teachers)

Observer Considerations

- **Things to look for while you observe:**
  - What are the major lesson stages and the associated timing and interaction patterns?
- **Things to consider as you review your records and prepare for the post-observation meeting:**
  - What has the teacher done especially well?
  - Were the students engaged? How did you know?
  - Were there a variety of activities?
  - Was there a lot of STT (student talk time)?
  - What activities do you enjoy the most / find the most interesting?
  - What questions do you need to ask about unobservable information?
  - Do you have suggestions for improvement or alternative?
  - What have you learned about your own teaching practices, beliefs, and assumptions based on this observation?

Observer: Observation Form

Teacher: _____

Observer: _____

Date_____Time_____Class/Level_____

Lesson focus / objectives _____

Observation focus areas _____

Time	**Stage / Activity**	**What I saw – interactions, classroom environment**	**Questions, comments, reflections, suggestions**

Overall Comments:

Reflection notes:

Observed Teacher: Reflection Form

After your lesson, use the prompts below to make notes about the positive aspects and areas for improvement or desired changes. Complete this form before the post-observation meeting with your colleague. Be sure to bring these notes to the meeting.

Lesson Plan and Activities:

- Did your lesson go as planned?
- Did you meet the lesson's objectives?
- Were your activities effective and appropriate for this learner group?
- How was your time-management?

Personal Qualities and Communication

- Did you enjoy teaching and did you convey this to your students?
- How was your classroom management?
- Did the lesson include STT opportunities and varied interaction patterns?
- Where did you position yourself in the classroom?
- How did you react to students' responses, non-responses, and errors?

Materials:

- How well did your materials work in the lesson?
- Did you encounter any problems?
- How could you have improved the materials themselves or the way you used them?

Observation Focus Areas

- Make notes about your performance in relation to the areas you asked your colleague to observe

Summary:

- How will you apply what you learned today to improve your planning and teaching of future lessons?

Name: _____

Peer Visit Form

Step 1: Contact teacher and confirm focus of the visit.

Colleague	Focus of my visit

Step 2: Plan (When will I visit?)

Date	Period	Time	Room #

Step 3: Observations from the Visit

I See/ I Hear (What is happening during your visit?)	Ideas I Would Like to Try

After the Visit: Submit the completed peer visit form with your name on it to Nancy Sommer.

Name: _____

Step 4: Reflect

What questions might I ask the teacher after my visit?

Step 5: Apply

What might I try in my classroom as a result of my visit?

Step 6: Evaluate

1. The peer visit was a useful professional development opportunity.
   Strongly Agree Agree Disagree Strongly Disagree

If Disagree, please explain. (on back of sheet)

2. Suggested upgrades for peer visit process? (on back of sheet)

After the Visit: Submit the completed peer visit form with your name on it to Nancy Sommer.

Source: http://www.wayne.k12.ms.us/userfiles/384/PeertoPeerClassroomObservationForm.pdf

Peer to Peer Classroom Observation Form

Observer: _____ **Teacher Observed:** _____

Date: _____ **Time:** _____ **Subject:** _____

1. Focus on Curriculum

1a. What is the learning objective?

Objective:

1b. Learning objective is evident to the students:

___ Evident ___ Not Evident ___ Unable to determine

1c. Learning objective on target for grade-level standards

___ Yes ___ No

2. Focus on Instruction

2a. Identify instruction practices

___ Coaching ___ Modeling ___ Teacher-direct Q and A
___ Discussion ___ Presentation ___ Testing
___ Hands-on Exp. ___ Providing Directions ___ Lecture
___ Learning Centers ___ Providing Practice Opportunities ___ _____

2b. Identify grouping format

___ Whole group ___ Small Group ___ Paired ____ Individual

2c. Identify research-based instructional strategies

___ Identify similarities and differences ___ Cooperative Learning
___ summarizing/note taking ___ Setting objectives/feedback
___ Reinforcing effort/recognition ___ Generating/testing hypotheses
___ homework/practice ___ Cues/questions/advanced org.
___ nonlinguistic representations

3. Focus on the Learner

3a. Identify student actions

___ Listening ___ working with hands-on ___ Speaking
___ Reading ___ Writing ___ _____

3b. Identify instructional materials

___ Computer Software ___ Overhead/board/flip chart ___ Video
___ Manipulatives ___ Published print materials ___ Web sites
___ Hand held tech ___ Real-world objects ___ Worksheets
___ Lab/activity sheet ___ Student created material ___ _____
___ Oral ___ Textbook

3c. Determine level of student work

___ Recalling Information (knowledge) ___ Breaking down info into parts (analysis)
___ Understanding info (comprehension) ___ Putting information together in new ways (Synthesis)
___ Using information in a new way (apply) ___ Making judgments and justifying positions (Evaluate)

3d. Determine levels of class engagement

___ Highly engaged – Most students are authentically engaged
___ Well managed _ Students are willingly compliant, ritually engaged
___ Dysfunctional – Many students actively reject the assigned task or substitute another activity

4. Focus on Classroom Environment

___ Materials are available in the classroom ___ Students interact with classroom environment
___ Models/exemplars of quality work posted ___ Student work displayed
___ Routines and procedures are evident ___ Scoring rubrics are displayed/provided

5. Do you see evidence that the teacher is responding to the different learning needs in the classroom?

___ A Lot ___ Some ___ None ___ Unable to determine

<u>Observer Reflection:</u> In what ways has the lesson you've observed impacted your thinking and/or future classroom practices?

*** * Give the completed form to the Teacher Observed the day of the observation**

<u>Teacher Observed Reflection</u>: What went well throughout the lesson? What would you do differently next time:

**** Teacher observed should give the completed form to the Principal within two days of the observation**

Peer to Peer Observation Request for Coverage

Name: _____ Date: _____

Please provide coverage on _____ (date) at _____ (time) so that I may observe _____'s class.

- Submit your request no later than two days prior to the intended observation time if you are needing coverage
- Do not leave your classroom until your coverage arrives. If there are any problems, contact the Assistant Principal (ext. 107)

Date: _____

_____,

Please provide coverage for the above mentioned teacher at the requested time.

Thank you for your assistance,