



219 North Main Street, Suite 402  
Barre, VT 05641 (p) 802-479-1030 | (f) 802-479-1835

## **Equitable Mathematics Teaching Practices Proficiency Scale**

**Based on NCTM's Catalyzing Change in High School Mathematics (2018) and Principles to Actions (2014)**

Developed by Heidi E. Whipple, M.A., M.S.T  
Vermont Agency of Education

### **Purpose of document:**

**Support Teachers and Coaches to be able to collaborate on improving teaching practices.**

1. This tool is meant to be used by teachers and coaches to guide and support continuous improvement.
2. This tool is meant to be a self-assessment for teachers to determine their proficiency with NCTM's eight math teaching practices (2014)
3. This tool is **NOT** meant to be an evaluative tool.
4. Like students, teachers need to try new learning, make mistakes, make adjustments, and try again.
5. Teachers are **NOT** meant to work on all eight practices at the same time. Teachers recognize that the practices are interconnected and that by working on one of the practices deeply, this can affect other practices. Selecting one practice at a time and working to improve that practice can effectively support continuous improvement.
6. The Proficient level is the equity practices published in NCTM's Catalyzing Change for High School Mathematics and is appropriate for grade K-12.
7. The Expanding level is focused on how students can take ownership of the teaching practices and learn to advocate for their learning.

**Teaching Practice: #1** Establish mathematics goals to focus learning. (NCTM 2014)

**Performance Indicator:** 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.

Beginning	Developing	Proficient (NCTM 2018)	Expanding
I establish goals for mathematical understanding.	I establish learning progressions that build students' mathematical understanding.	<b>I establish learning progressions that build students' mathematical understanding, increase their confidence, and support their mathematical identities as doers of mathematics.</b>	Students see themselves as doers of mathematics and refer to learning progressions to advance their progress.
I establish goals for mathematical understanding.	I establish expectations so students can meet the mathematical goals.	<b>I establish high expectations to ensure that each and every student has the opportunity to meet the mathematical goals.</b>	Students understand the mathematical goals and how to achieve them and advocate for themselves when needed.
I establish goals for mathematical understanding.	I establish classroom norms for participation.	<b>I establish classroom norms for participation that position each and every student as a competent mathematics thinker.</b>	Students see themselves as competent mathematics thinkers and share ideas based on classroom norms.
I establish goals for mathematical understanding.	I establish classroom environments that promote learning mathematics.	<b>I establish classroom environments that promote learning mathematics as just, equitable, and inclusive.</b>	Students promote a mathematics classroom environment that is just, equitable, and inclusive.

**Observation/Reflection:**

**Teaching Practice: #2** Implement tasks that promote reasoning and problem solving. (NCTM 2014)

**Performance Indicator:** 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.

Beginning	Developing	Proficient (NCTM 2018)	Expanding
I engage students in tasks.	I engage students in tasks that provide that require reasoning, problem solving, and modeling.	<b>I engage students in tasks that provide multiple pathways for success and that require reasoning, problem solving, and modeling, thus enhancing each student's mathematical identity and sense of agency.</b>	Students collaboratively engage in tasks that provide multiple pathways for success and that require reasoning, problem solving, and modeling, and support the mathematical identity and sense of agency of others.
I engage students in tasks.	I engage students in tasks that are relevant.	<b>I engage students in tasks that are culturally relevant.</b>	Students connect understanding to the cultural relevance of the tasks in class.
I engage students in tasks.	I engage students in tasks that allow them to draw on their knowledge.	<b>I engage students in tasks that allow them to draw on their funds of knowledge (i.e., the resources that students bring to the classroom, including their home, cultural, and language experiences).</b>	Students support each other in tasks that allow them to draw on their funds of knowledge (i.e., the resources that students bring to the classroom, including their home, cultural, and language experiences).

**Observation/Reflection:**

**Teaching Practice: #3** Use and connect mathematical representations. (NCTM 2014)

**Performance Indicator:** Effective teaching of mathematics engages students in making connections among mathematical representations to deepen understanding of mathematics concepts and procedures and to use as tools for problem solving.

Beginning	Developing	Proficient (NCTM 2018)	Expanding
I use representations in mathematics instruction.	I use representations so that students draw on resources of knowledge.	<b>I use multiple representations so that students draw on multiple resources of knowledge to position them as competent.</b>	Students use multiple representations to explain their thinking to their peers and demonstrate competency.
I use representations in mathematics instruction.	I use multiple representations to draw on knowledge and experiences related to mathematics.	<b>I use multiple representations to draw on knowledge and experiences related to the resources that students bring to mathematics (culture, contexts, and experiences).</b>	Students use multiple representations that are culturally relevant to students' experience to deepen conceptual understanding and to solve problems.
I use representations in mathematics instruction.	I use multiple representations to promote the creation and discussion of unique mathematical representations.	<b>I use multiple representations to promote the creation and discussion of unique mathematical representations to position students as mathematically competent.</b>	Students use multiple representations to explain unique solutions to their peers and demonstrate competency.

**Observation/Reflection:**

**Teaching Practice: #4** Facilitate meaningful mathematical discourse. (NCTM 2014)

**Performance Indicator:** Effective teaching of mathematics facilitates discourse among students to build shared understanding of mathematical ideas by analyzing and comparing student approaches and arguments.

Beginning	Developing	Proficient (NCTM 2018)	Expanding
I encourage students to engage in discourse.	I use discourse to elicit students' ideas and strategies.	<b>I use discourse to elicit students' ideas and strategies and create space for students to interact with peers to value multiple contributions and diminish hierarchical status among students (i.e., perceptions of differences in smartness and ability to participate).</b>	Students use discourse to promote ideas and strategies with peers to value multiple contributions and diminish hierarchical status among each other. Students recognize that every student can participate and have thoughtful ideas.
I encourage students to engage in discourse.	I use discourse to position students as capable of doing mathematics.	<b>I use discourse to attend to ways in which students position one another as capable or not capable of doing mathematics.</b>	Students use discourse to position each other as being capable of doing mathematics.
I encourage students to engage in discourse.	I make discourse a part of mathematical thinking and reasoning.	<b>I make discourse an expected and natural part of mathematical thinking and reasoning, providing students with the space and confidence to ask questions that enhance their own mathematical learning.</b>	Students use discourse to uphold a climate where providing students with the space and confidence to ask questions that enhance their own mathematical learning is the norm.
I encourage students to engage in discourse.	I use discourse as a means to uncover student misconceptions.	<b>I use discourse as a means to disrupt structures and language that marginalize students.</b>	Students recognize structures and language that marginalize students and correct or address that through discourse.

**Observation/Reflection:**

**Teaching Practice:** #5 Pose purposeful questions. (NCTM 2014)

**Performance Indicator:** Effective teaching of mathematics uses purposeful questions to assess and advance students' reasoning and sense making about important mathematical ideas and relationships.

Beginning	Developing	Proficient (NCTM 2018)	Expanding
I pose questions in the mathematics class.	I pose purposeful questions and then listen to and understand students' thinking.	<b>I pose purposeful questions and then listen to and understand students' thinking to signal to students that their thinking is valued and makes sense.</b>	Students pose purposeful questions and then listen to and understand students' thinking to signal to students that their thinking is valued and makes sense.
I pose questions in the mathematics class.	I pose purposeful questions to assign competence to students.	<b>I pose purposeful questions to assign competence to students, verbally mark students' ideas as interesting or identify an important aspect of students' strategies to position them as competent.</b>	Students pose purposeful questions to assign competence to students, verbally mark students' ideas as interesting or identify an important aspect of students' strategies to position them as competent.
I pose questions in the mathematics class.	I am mindful of the questions I ask a student and how I follow up on the student's response.	<b>I am mindful of the fact that the questions that a teacher asks a student and how the teacher follows up on the student's response can support the student's development of a positive mathematical identity and sense of agency as a thinker and doer of mathematics.</b>	Students are mindful of the fact that the questions that students ask each other and how the students follow up on the response can support the student's development of a positive mathematical identity and sense of agency as a thinker and doer of mathematics.

**Observation/Reflection:**

**Teaching Practice: #6** Build procedural fluency from conceptual understanding. (NCTM 2014)

**Performance Indicator:** 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.

Beginning	Developing	Proficient (NCTM 2018)	Expanding
I build mathematical fluency with students.	I connect conceptual understanding with procedural fluency to help students make sense of the mathematics.	<b>I connect conceptual understanding with procedural fluency to help students make sense of the mathematics and develop a positive disposition toward mathematics.</b>	Students refer to conceptual understandings to practice procedural fluency and encourage and support the success of their peers.
I build mathematical fluency with students.	I connect conceptual understanding with procedural fluency to reduce mathematical anxiety.	<b>I connect conceptual understanding with procedural fluency to reduce mathematical anxiety and position students as mathematical knowers and doers.</b>	Students use positive self-talk and encourage peers about procedural fluency based on conceptual understandings.
I build mathematical fluency with students.	I connect conceptual understanding with procedural fluency to provide students with a wider range of options for entering a task.	<b>I connect conceptual understanding with procedural fluency to provide students with a wider range of options for entering a task and building mathematical meaning.</b>	Students use conceptual understanding with procedural fluency as they collaboratively engage in tasks and build meaning.

**Observation/Reflection:**

**Teaching Practice:** #7 Support productive struggle in learning mathematics. (NCTM 2014)

**Performance Indicator:** 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.

Beginning	Developing	Proficient (NCTM 2018)	Expanding
I allow students to productively struggle with mathematics.	I allow time for students to struggle with mathematical ideas to support perseverance.	<b>I allow time for students to engage with mathematical ideas to support perseverance and identity development.</b>	Students encourage and support each other's learning by allowing think time by their peers and encouraging perseverance.
I allow students to productively struggle with mathematics.	I offer support to students who are struggling with the mathematics.	<b>I hold high expectations, while offering just enough support and scaffolding to facilitate student progress on challenging work, to communicate caring and confidence in students.</b>	Students support each other's learning by offering just enough support to move learning forward without removing the productive struggle while conveying confidence in the learning of others.

**Observation/Reflection:**



**Teaching Practice: #8 Elicit and use evidence of student thinking. (NCTM 2014)**

**Performance Indicator:** 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.

Beginning	Developing	Proficient (NCTM 2018)	Expanding
I elicit student thinking.	I elicit student thinking and make use of it during a lesson.	<b>I elicit student thinking and make use of it during a lesson to send positive messages about students' mathematical identities.</b>	Students make use of each other's thinking to extend their learning and have strong mathematical identities.
I elicit student thinking.	I make student thinking public.	<b>I make student thinking public, and then choose to elevate a student to a more prominent position in the discussion by identifying his or her idea as worth exploring, to cultivate a positive mathematical identity.</b>	Students refer to each other's public thinking and exhibit positive mathematical identity.
I elicit student thinking.	I promote a classroom culture in which mistakes and errors are acceptable.	<b>I promote a classroom culture in which mistakes and errors are viewed as important reasoning opportunities, to encourage a wider range of students to engage in mathematical discussions with their peers and the teacher.</b>	Students support and value each other's mistakes and see them as opportunities to learn and deepen their mathematical discussions.

**Observation/Reflection:**