## Factor 1: Classroom Culture

*The classroom culture is very student-centered.*

Below are some specific characteristics of a student-centered classroom that would be evident to an outside observer:

- Students will be engaged in mathematical discourse with the teacher and with fellow students.
- Students will be explaining their mathematical thinking.
- Students will be justifying their reasoning mathematically.
- Students will critique the thinking of others.
- Mathematical reasoning will be the ultimate authority to determine the validity of a claim, and students will need to convince their own classmates through sound and logical reasoning.
- Students will be engaged in problem solving.
- Students will be communicating mathematical thinking, verbally and in writing, coherently and using precise mathematical language.
- Students will be sharing alternative solution pathways.
- Students will embrace mistakes and remain persistent when problem solving.
- Students will routinely seek, examine, and verify patterns, structures, or repeated reasoning to make connections to problem solve.

## Factor 2: Student Learning Experiences

*Teachers explicitly create learning experiences that promote the development of students' network/web of deep, well-connected conceptual understandings, including content knowledge and procedural fluency.*

This factor describes what teachers do to create a healthy, student-centered environment focused on developing procedural fluency from conceptual understanding. The questioning style of the teachers is a key factor. Teachers will ask questions of students rather than automatically providing the answer or explanation. Teachers will no longer be the final authority regarding the validity of a claim—the mathematics is the final authority. It will be evident that teachers are following an explicit process that involves the following:

- Selecting meaningful tasks that promote deep mathematical thinking.
- Initial engagement and orientation to the problem that involves identifying the givens and the goals of the problem.
- Pattern recognition and heuristics application.
- Justification.
- Generalization.
- Defining multiple algorithms and solution pathways.

## Factor 3: Socio-Mathematical Norms

*It will be evident that students adhere to well-defined socio-mathematical norms.*

Socio-mathematical norms include the following:

- Each student is expected to share their thinking publicly.
- If collaborative work occurs, there is individual accountability.
- Students feel safe to express their thinking—there is respectful communication among students.
- Teachers have high expectations for the quality/rigor of the thinking of their students.
- Students develop a strong mathematical mindset and embrace mistakes as a learning opportunity.