

Effective teaching of mathematics engages students in solving and discussing tasks that promote mathematical reasoning and problem solving and allow multiple points and varied solution strategies.

Effective teaching of mathematics uses purposeful questions to assess and advance students reasoning and sense-making about important mathematical ideas and relationships.

"It is important to note that not all tasks...have to...consume an entire class period or multiple days. What is critical is that a task provides students with the opportunity to engage actively in reasoning, sense-making, and problem-solving so that they develop a deep understanding of mathematics."
pp.20

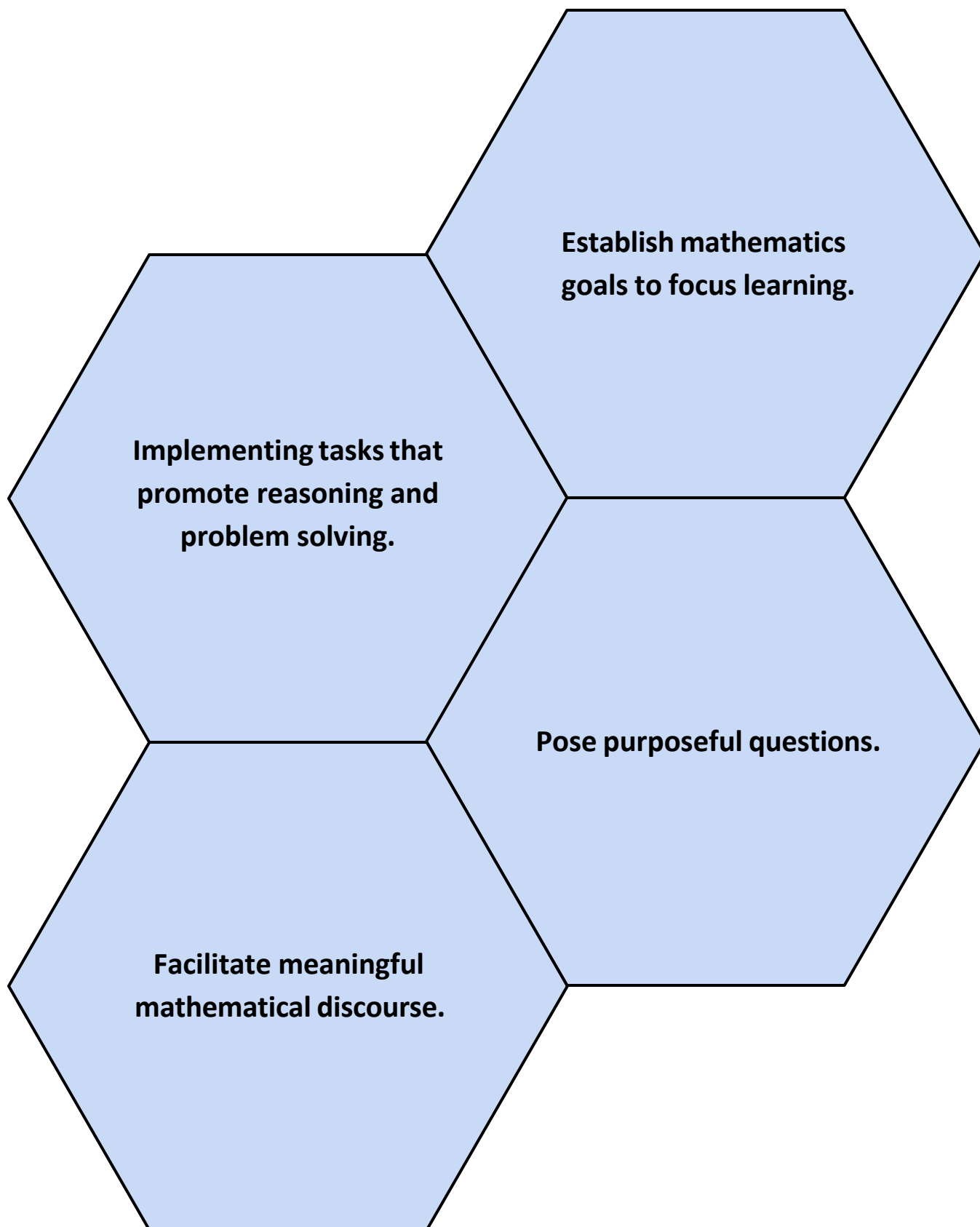
"Merely asking questions is not enough to ensure that students make sense of mathematics and advance their reasoning. Two critical issues must be considered - the type of questions that teachers ask and the pattern of questions that they use." pp.36

"Teachers carefully prepare and purposefully facilitate discourse... that build on student thinking and guide the learning of the class in a productive disciplinary direction. Students are active members of the discourse community as they explain their reasoning and consider the mathematical explanations and strategies of their classmates." pp.35

"Situating learning goals within the mathematics landscape supports opportunities to build explicit connections so that students see how ideas build on and relate to one another and come to view mathematics as a coherent and connected discipline." pp.13

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

Effective teaching of mathematics establishes clear goals for mathematics that students are learning, situates goals within learning progressions, and uses the goals to guide instructional decisions.



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

“When students learn to represent, discuss, and make connections among mathematical ideas in multiple forms, they demonstrate deeper mathematical understanding and enhanced problem-solving abilities.” pp.24

Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and adjust instruction continually in ways that support and extend learning.

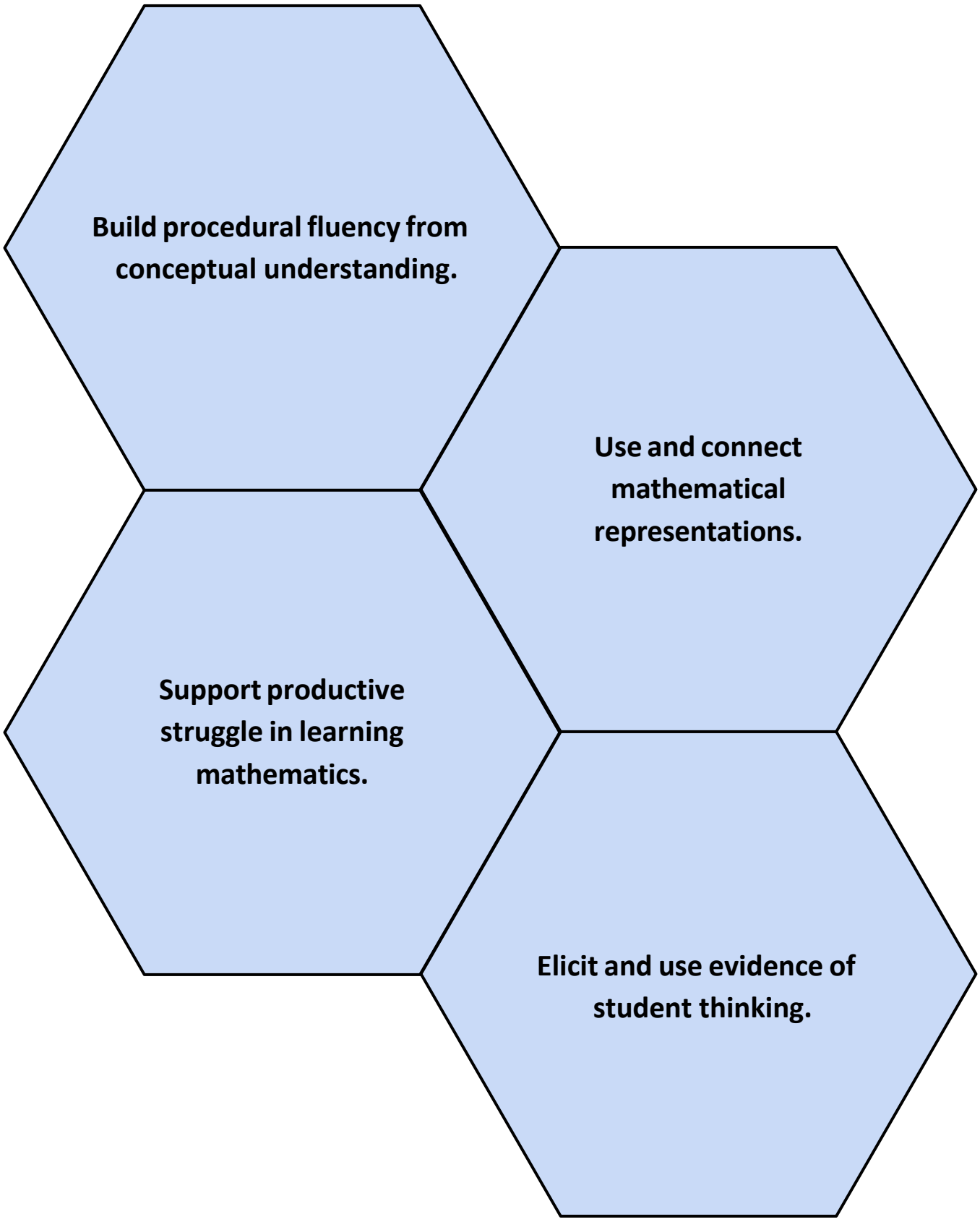
“Waiting until the quiz on Friday or the unit test to find out whether students are making adequate progress is too late. Rather, it is important to identify and address potential learning gaps and misconceptions when it matters most to students, which is during instruction.” pp.53

"Mathematics classrooms that embrace struggle necessitate rethinking on the part of both students and teachers. Students must rethink what it means to be a successful learner of mathematics, and teachers must rethink what it means to be an effective teacher of mathematics." pp.49

"To use mathematics effectively, students must be able to do much more than carry out mathematical procedures. They must know which procedure is appropriate and most productive in a given situation, what a procedure accomplishes, and what kind of results to expect." pp.42

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.

Effective teaching of mathematics builds fluency with procedures on foundation of conceptual understanding so that students, over time, become skillful in using procedures as they solve contextual and mathematical problems.



**Build procedural fluency from
conceptual understanding.**

**Use and connect
mathematical
representations.**

**Support productive
struggle in learning
mathematics.**

**Elicit and use evidence of
student thinking.**

Inquiry-Based Learning

Learning deepens knowledge through a guided process, including meaningful questions, research, analysis, and productive discourse.

Student-Centered Learning

Learning is active rather than passive and provides students with choice about their learning.

Construction of Knowledge

Learning calls for the use of higher order thinking to convert information into organized knowledge.

Real-World Connections

Learning holds relevance beyond the classroom.