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| Productive Beliefs  from *Principles to Action* | Math Teaching Practices  from *Principles to Action*  **TEACHER ROLE** | Standards for Mathematical Practice  from *Kentucky Academic Standards*  **STUDENT ROLE** |
| Mathematics learning should focus on developing understanding of concepts and procedures through problem solving, reasoning, and discourse.  All students need to have a range of strategies and approaches from which to choose in solving problems, including, but not limited to, general methods, standard algorithms, and procedures.  Students can learn mathematics through exploring and solving contextual and mathematical problems.  The role of the teacher is to engage students in tasks that promote reasoning and problem solving and facilitate discourse that moves students toward shared understanding of mathematics.  The role of the student is to be actively involved in making sense of mathematics tasks by using varied strategies and representations, justifying solutions, making connections to prior knowledge or familiar contexts and experiences, and considering the reasoning of others.  An effective teacher provides students with appropriate challenge, encourages perseverance in solving problems, and supports productive struggle in learning mathematics. | Establish mathematics goals to focus learning.  Implement tasks that promote reasoning and problem solving.  Use and connect mathematical representations.  Facilitate meaningful mathematical discourse.  Pose purposeful questions.  Build procedural fluency from conceptual understanding.  Support productive struggle in learning mathematics.  Elicit and use evidence of student thinking. | Make sense of problems and persevere in solving them.  Reason abstractly and quantitatively.  Construct viable arguments and critique the reasoning of others.  Model with mathematics.  Use appropriate tools strategically.  Attend to precision.  Look for and make use of structure.  Look for and express regularity in repeated reasoning. |