

Math Strategies for Grades 7-12

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Instructional Strategies

Used Solved Problems to Engage Students in Analyzing Algebraic Reasoning & Strategies

Have students discuss solved problem structures and solutions to make connections among strategies and reasoning. Select solved problems that reflect the lesson's instructional aim, including problems that illustrate common errors. Use whole-class discussions, small-group work, and independent practice activities to introduce, elaborate on, and practice working with solved problems.

Utilize the Structure of Algebraic Representation

Promote the use of language that reflects mathematical structure. Encourage students to use reflective questioning to notice structure as they solve problems. Teach students that different algebraic representations can convey different information about an algebra problem.

Assessment Strategies

Open-Ended Questions

Using open-ended questions allows you to determine the depth and breadth of student learning. Ask students questions that cannot be answered with "yes" or "no" or another one-word answer. Open-ended questions require students to think about their answers and use their knowledge and understanding about a topic in their responses. Questions that involve the word "why" often encourage deeper thinking.

Teach A Friend

A good strategy for determining if students understand a concept or process is to have them teach it to a friend. Students need to think about the knowledge and skills needed for understanding and include that information in their teaching. Pair students up and have them "teach" their partner about the concept or process.



Standards of Mathematical Practices

Reason Abstractly & Quantitatively

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to de-contextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities; and knowing and flexibly using different properties of operations and objects.

Classroom / Time Management Strategies

Clear Expectations

No matter what systems or structures you create for your classroom, it is critical that you are clear about what you expect from students. It is important to be specific instead of making generic statements. This helps clarify expectations and makes them more concrete. When students know exactly what you expect of them, it gives them the freedom to explore your classroom in a more productive way within set parameters. Using modeling, practice, and repetition can help familiarize students with your classroom rules so that they know what is and isn't allowed. Getting this step right will allow students to open up and not fear negative consequences.

The resources listed are provided as options and examples.

Pennsylvania does not require, recommend, or endorse any specific program or product. All curricular and instructional decisions are made at the local level.