

# 08\_Mathematical Practices

Content Area: **Math**  
Course(s):  
Time Period: **Full Year**  
Length: **Ongoing**  
Status: **Published**

## **General Overview, Course Description or Course Philosophy**

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The middle school Guided Study Program is a two-pronged program. It parallels the grade-level math curriculum to reinforce and/or preview concepts taught in the grade-level math class and prepares students for success on state-mandated assessments by targeting individual student mathematical deficiencies. Guided Study marking period grades are based upon participation/preparation, classwork, and summative assessments and are reported as: O (Outstanding), S (Satisfactory), or U (Unsatisfactory).

## **OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS**

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### **Objectives:**

- Develop proficiency in mathematical problem-solving strategies and critical thinking.
- Foster perseverance, resilience, and effective communication when tackling mathematical challenges.
- Cultivate an understanding of the importance of mathematical reasoning and justification.
- Enhance collaboration and discussion skills in exploring and solving mathematical problems.
- Apply mathematical practices to real-world contexts and interdisciplinary scenarios.

### **Essential Questions:**

- How can mathematical problem-solving strategies be applied to a wide range of mathematical problems?
- Why is it important to persevere, approach challenges from multiple angles, and reflect on problem-solving processes?
- What role does mathematical reasoning and justification play in communicating and validating solutions?
- How can effective collaboration and discussion enhance understanding and lead to more robust problem-solving outcomes?
- In what ways can mathematical practices be transferred and adapted to real-world situations and other academic disciplines?

### **Enduring Understandings:**

- Problem-solving strategies, such as breaking down complex problems and using patterns, are valuable tools in approaching various mathematical challenges.
- Perseverance and a growth mindset are crucial for overcoming obstacles and refining problem-solving skills.
- Justifying solutions through clear mathematical reasoning provides validity and deeper insight into the problem.
- Collaborative exploration and discussion promote diverse perspectives and lead to more comprehensive problem-solving approaches.
- Mathematical practices extend beyond the classroom and are applicable in real-world contexts and

other subject areas.

## CONTENT AREA STANDARDS

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MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.

## RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

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LA.K-12.NJSLSA.R7	Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
LA.RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
CS.K-12.2.d	Evaluate and select technological tools that can be used to collaborate on a project.
TECH.K-12.P.4	Demonstrate creativity and innovation.
TECH.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
TECH.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.

## STUDENT LEARNING TARGETS

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Refer to the 'Declarative Knowledge' and 'Procedural Knowledge' sections.

### Declarative Knowledge

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Students will understand that:

- Applying problem-solving steps and strategies based on the context can increase efficiency and accuracy while assisting with the development of conceptual understanding.
- Applying mathematical tools based on the context can increase efficiency and accuracy while assisting with the development of conceptual understanding.

- Mathematical modeling and varied representations of mathematical situations assist with the development of conceptual understanding.

## **Procedural Knowledge**

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Students will be able to:

- Apply mathematical content knowledge to develop or analyze solutions to everyday problems.
- Conceptualize and visualize problem-solving situations.
- Represent real-world situations using algebraic expressions and equations, diagrams, and models.
- Analyze mathematical situations and justify conclusions.
- Construct and communicate carefully formulated mathematical explanations both verbally and through writing.
- Recognize and make use of a pattern or structure to develop or analyze a solution.
- Evaluate mathematical situations to determine when a mathematical tool would be appropriate.

## **EVIDENCE OF LEARNING**

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Refer to the 'Formative Assessments' and 'Summative Assessments' sections.

## **Formative Assessments**

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- Warm-up tasks
- exit/closure tasks
- teacher observations
- student-student discussions
- conferencing

## **Summative Assessments**

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- Open-response tasks

## **RESOURCES (Instructional, Supplemental, Intervention Materials)**

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- Illustrative Math - [Open-response Tasks](#)
- [Inspirational Math](#)

## **INTERDISCIPLINARY CONNECTIONS**

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- Utilize critical thinking to make sense of problems and persevere in solving them.

## **ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS**

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See link to Accommodations & Modifications document in course folder.