

Best Practices in K-12 Mathematics for Gifted Learners:

Examining and Incorporating National Guidance Documents



November 29th, 2021



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Today's Discussion

NCTM's Effective Mathematics
Teaching Practices

NAGC's Gifted Programming
Standards

Connections between guidance
and interactive examples

NCTM's Effective Mathematics Teaching Practices



[Click here for link](#)

- 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

NAGC's Gifted Programming Standards



[Click here for link](#)

Learning and Development

Assessment

Curriculum and Instruction

Learning Environments

Programming

Professional Learning

Organization of Programming Standards

STANDARD 1: LEARNING AND DEVELOPMENT

Description: Educators understand the variations in learning and development in cognitive, affective, and psychosocial areas between and among individuals with gifts and talents, creating learning environments that encourage awareness and understanding of interest, strengths, and needs; cognitive growth, social and emotional, and psychosocial skill development in school, home, and community settings.

Student Outcomes

1.1. Self-Understanding. Students with gifts and talents recognize their interests, strengths, and needs in cognitive, creative, social, emotional, and psychological areas.

Evidence-Based Practices

- 1.1.1. Educators engage students with gifts and talents in identifying interests, strengths, and needs.
- 1.1.2. Educators engage students with gifts and talents in identifying their intellectual, academic, creative, leadership, and/or artistic abilities.
- 1.1.3. Educators engage students in developmentally appropriate activities that help them discover their talents and develop noncognitive skills that support their talent areas.

Presentation Layout:

**Discussing
Connections
and Interactive
Practice**

**Connection between NAGC
and NCTM**

Interactive Task #1

**Connection between NAGC and
NCTM**

Interactive Task #2

**Connection between NAGC and
NCTM**

Interactive Task #3

Establish mathematics goals to focus learning.

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

3.5.1. Educators model and teach metacognitive models to meet the needs of students with gifts and talents such as *self-assessment, goal setting, and monitoring of learning*.

- Allowing students to be part of goal setting process
- Students engaged in progress monitoring

Support productive struggle in learning mathematics.

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**.

4.1.4. Educators provide feedback that promotes *perseverance* and *resilience* and focuses on *effort*, on evidence of *potential* to meet high standards, and on *mistakes as learning opportunities*.

- 4.1.5. Educators provide examples of *positive coping skills* and opportunities to apply them

Interactive Task #1



HOW ARE YOUR MATH GOALS DETERMINED CURRENTLY? FOR EACH LESSON? UNIT? TOPIC? HOW ARE THEY SHARED WITH STUDENTS?



HOW INVOLVED ARE STUDENTS IN THIS PROCESS? GOAL SETTING? PROGRESS MONITORING?



BRIANSTORM A LIST OF WAYS YOU COULD INCORPORATE MORE STUDENT INVOLVEMENT IN THIS PROCESS. HOW DOES THIS LOOK IN YOUR CLASSROOM?



WHAT IS CELEBRATED IN YOUR CLASSROOM? WHAT DOES SUCCESS LOOK LIKE IN YOUR EYES? IN THE EYES OF YOUR STUDENTS?



LIST ADDITIONAL WAYS TO PROMOTE AND CELEBRATE PRODUCTIVE STRUGGLE IN YOUR CLASSROOM. TYPE AN IDEA IN THE CHAT.

Example

More Student Involvement in Goal Setting

- “Set simple, clear, specific goals that move them toward getting something accomplished (approach goals) rather than avoiding something (avoidance goals)” –Janette Boazman, NAGC
- Practice of SMART goals
- Provide list of goal templates for students to self-select
- Individual and class incentives to meet goals
 - Focused on process rather than product

Celebrating Productive Struggle

- Celebrating Productive Struggle
 - Changing what we compliment and celebrate- “You worked so hard” vs. “You are so smart”
 - “Shout outs” for productive struggle from both teacher and classmates
 - Assigning tasks that promote not getting the answer the first time or that have more than one correct answer

Facilitate meaningful mathematical discourse.

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

4.2. Social Competence.

Students with gifts and talents develop *social competence* manifested in positive *peer relationships* and *social interactions*.

4.2.3. Educators *assess* and *provide instruction* on psychosocial and *social and emotional skills* needed for success in school, their community, and society.

Pose purposeful questions.

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

3.4.3. Educators use *models of inquiry* to engage students in *critical thinking, creative thinking, and problem-solving strategies*, particularly in their domain(s) of talent, both to *reveal and address* the needs of students with gifts and talents.

- Taking posing a question a step further...
- How can questions guide the whole learning process?

Four Forms of Inquiry

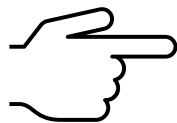
Confirmation Inquiry

Structured Inquiry

Guided Inquiry

Open Inquiry

Interactive Task #2



CHOOSE ONE OF THE FOUR FORMS OF INQUIRY.



DESIGN A WAY FOR THIS BE INCORPORATED INTO YOUR CLASSROOM.



HOW WILL MEANINGFUL MATHEMATICAL DISCOURSE BE PRACTICED IN THIS INCORPORATION?



WHAT WILL BE THE ROLE OF THE STUDENTS AND THE TEACHER IN THIS INCORPORATION?



JOIN BREAKOUT ROOM AND DISCUSS THESE IDEAS WITH YOUR GROUP.

Example: Open Inquiry

- Genius Hour
 - [Video Explanation](#)
 - Role of teacher and student
 - Setting up guidelines ahead of time
 - Planning check-ins
 - Mathematical Discourse
 - Group settings
 - Meetings with teacher
 - Culminating presentation

Implement tasks that promote reasoning and problem solving.

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

3.1.5. Educators regularly use pre-assessments, formative assessments, and summative assessments to identify students' strengths and needs, *develop differentiated content*, and *adjust instructional plans* based on progress monitoring.

- Using student needs to set up productive struggle
- Reasoning and problem solving won't look the same for all

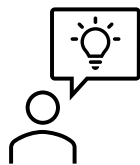
Elicit and use evidence of student thinking.

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

2.4.4. Educators use and interpret qualitative and quantitative assessment information to *develop a profile* of the *interests*, *strengths* and *needs* of each student with gifts and talents to plan appropriate interventions.

- Can be quick notes:
- Think checklists, symbols to represent levels of understanding

Interactive Task #3



THINK ABOUT YOUR CURRENT ASSESSMENT PROCESS- (PRE-ASSESSMENT, FORMATIVE AND SUMMATIVE)



START SMALL- HOW CAN YOU STREAMLINE ONE OF YOUR ASSESSMENTS?



HOW WILL YOU USE THESE ASSESSMENTS TO ADJUST CONTENT FOR STUDENTS AND "DEVELOP TASKS THAT PROMOTE REASONING AND PROBLEM SOLVING"?



JOIN BREAKOUT ROOMS TO DISCUSS ANSWERS TO THESE QUESTIONS.

Example

BEFORE: Using daily worksheets as lesson post assessment to plan for groups the next day

- Ended up with fire kindling by the end of the week and no idea what my students could or couldn't do...
- Switched to exit tickets on notecards that I could easily check and place into groups

BEFORE: Looking at preassessment data by standard before every lesson in order to make small groups for that lesson

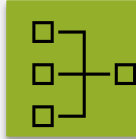
- Switched to a clipboard with student names and checked whiteboards during active student response time:
 - +, check, -
 - Used these to make partnerships for discussions as well as small groups

Toolbox Takeaways

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Set up easy access to important guidance documents



Set up a system of including students in goal setting and progress monitoring



Choose one form of inquiry to add to an upcoming lesson or topic



Try a new efficient assessment strategy



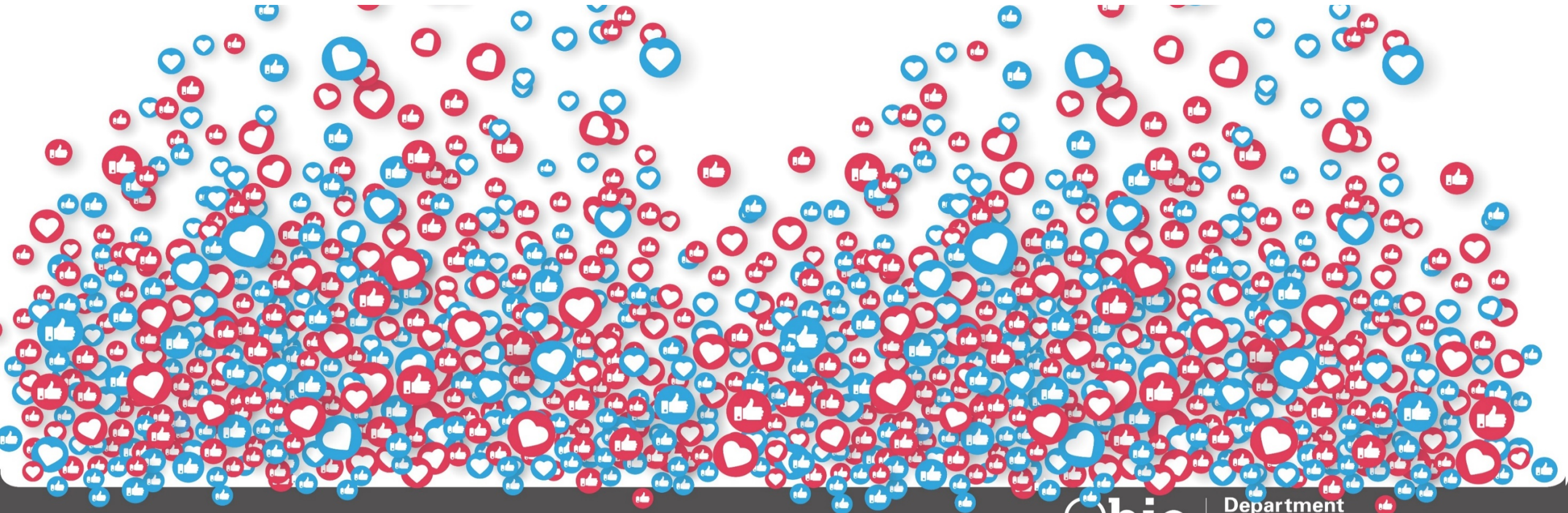
Choose one best practice from national guidance documents to try out in an upcoming lesson



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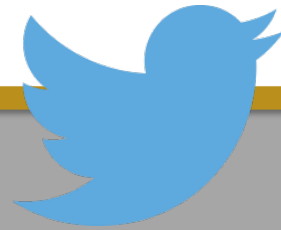


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