GEORGIA DEPARTMENT OF EDUCATION

Kathy Cox, State Superintendent of Schools

Training for the New Georgia Performance Standards
Day 1: Standards-Based Education and the GPS

Participant's Guide Mathematics Grade 7

Use of This Guide

This training program was developed by the Georgia Department of Education as part of a series of professional opportunities to help teachers increase student achievement through the use of the Georgia Performance Standards.

The module materials, including a Content Facilitator's Guide, Participant's Guide, PowerPoint Presentation, and supplementary materials, are available to designated trainers throughout the state of Georgia who have successfully completed a Train-the-Trainer course offered through the Georgia Department of Education.

Materials (guides, presentations, etc.) will be available electronically on http://www.georgiastandards.org under the training tab after all trainings of Day 1 have occurred. Consult the trainer for other availability.

For more information on this or other GPS training modules, please contact Gerald Boyd at gboyd@doe.k12.ga.us

Table of Contents

Agenda

This is a one-day course, with approximately seven hours of instructional time.

Introduction

Overview of Standards

Standards-Based Teaching and Learning

Unpacking Content Standards

Putting It All Together

Summary and Field Assignments

Module Goal

Demonstrate a deep understanding of the new Georgia Performance Standards and the standards-based education approach, through thoughtful curriculum mapping, development of formative and summative assessments, and the design of instruction matched to the standards and research-based best practices for enrichment and extension through collaboration and teamwork.

Key words from the goal:

- Deep understanding
- Georgia Performance Standards (GPS)
- Curriculum Mapping
- Assessments
- Instruction
- Enrichment and extension
- Teamwork

Note that the goal will not be reached by day one of training alone. It will take preparation, follow up, and seven days of classroom instruction to master this goal. Various days of training will deal with different components of the goal, such as curriculum planning, assessment, and instruction.

Module Objectives

By the end of day one of training, participants will be able to:

1. Describe the benefits of the GPS.
2. Describe the various phases of the GPS rollout plan.
3. Define terms related to the GPS.
4. Identify four parts of each standard.
5. Describe the unit design process used in standards-based teaching and learning.
6. Identify key components of the applicable standards (for example, 7th grade math).

Seventh Grade Standards

Grade 7

By the end of grade seven, students will understand and use rational numbers, including signed numbers; solve linear equations in one variable; sketch and construct plane figures; demonstrate understanding of transformations; use and apply properties of similarity; examine properties of geometric shapes in space; describe and sketch solid figures, including their cross-sections; represent and describe relationships between variables in tables, graphs, and formulas; analyze the characteristics of linear relationships; and represent and analyze data using graphical displays, measures of central tendency, and measures of variation.

Instruction and assessment should include the appropriate use of manipulatives and technology. Topics should be represented in multiple ways, such as concrete/pictorial, verbal/written, numeric/data-based, graphical, and symbolic. Concepts should be introduced and used, where appropriate, in the context of realistic phenomena.

Concepts/Skills to Maintain

Operations with positive rational numbers, including mixed numbers
Line and rotational symmetry
Surface area and volume
Ratio as a representation of quantitative relationships

NUMBER AND OPERATIONS

Students will further develop their understanding of the concept of rational numbers and apply them to real world situations.

M7N1. Students will understand the meaning of positive and negative rational numbers and use them in computation.

a. Find the absolute value of a number and understand it as the distance from zero on a number line.
b. Compare and order rational numbers, including repeating decimals.
c. Add, subtract, multiply, and divide positive and negative rational numbers.
d. Solve problems using rational numbers.

GEOMETRY

Students will further develop and apply their understanding of plane and solid geometric figures through the use of constructions and transformations. Students will explore the properties of similarity and further develop their understanding of 3-dimensional figures.

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M7G1. Students will construct plane figures that meet given conditions.

a. Perform basic constructions using both compass and straight edge, and appropriate technology. Constructions should include copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

b. Recognize that many constructions are based on the creation of congruent triangles.

M7G2. Students will demonstrate understanding of transformations.

a. Demonstrate understanding of translations, dilations, rotations, reflections, and relate symmetry to appropriate transformations.

c. Given a figure in the coordinate plane, determine the coordinates resulting from a translation, dilation, rotation, or reflection.

M7G3. Students will use the properties of similarity and apply these concepts to geometric figures.

a. Understand the meaning of similarity, visually compare geometric figures for similarity, and describe similarities by listing corresponding parts.

b. Understand the relationships among scale factors, length ratios, and area ratios between similar figures. Use scale factors, length ratios, and area ratios to determine side lengths and areas of similar geometric figures.

c. Understand congruence of geometric figures as a special case of similarity: The figures have the same size and shape.

M7G4. Students will further develop their understanding of three-dimensional figures.

a. Describe three-dimensional figures formed by translations and rotations of plane figures through space.

b. Sketch, model, and describe cross-sections of cones, cylinders, pyramids, and prisms.

ALGEBRA

Students will demonstrate an understanding of linear relations and fundamental algebraic concepts.

M7A1. Students will represent and evaluate quantities using algebraic expressions.

a. Translate verbal phrases to algebraic expressions.

b. Simplify and evaluate algebraic expressions, using commutative, associative, and distributive properties as appropriate.

c. Add and subtract linear expressions.

M7A2. Students will understand and apply linear equations in one variable.

a. Given a problem, define a variable, write an equation, solve the equation, and interpret the solution.

b. Use the addition and multiplication properties of equality to solve one- and two-step linear equations.

M7A3. Students will understand relationships between two variables.

a. Plot points on a coordinate plane.
b. Represent, describe, and analyze relations from tables, graphs, and formulas.
c. Describe how change in one variable affects the other variable.
d. Describe patterns in the graphs of proportional relationships, both direct ($y = kx$) and inverse ($y = k/x$).

DATA ANALYSIS AND PROBABILITY

Students will demonstrate understanding of data analysis by posing questions, collecting data, analyzing the data using measures of central tendency and variation, and using the data to answer the questions posed. Students will understand the role of probability in sampling.

M7D1. Students will pose questions, collect data, represent and analyze the data, and interpret results.

a. Formulate questions and collect data from a census of at least 30 objects and from samples of varying sizes.
b. Construct frequency distributions.
c. Analyze data using measures of central tendency (mean, median, and mode), including recognition of outliers.
d. Analyze data with respect to measures of variation (range, quartiles, interquartile range).
e. Compare measures of central tendency and variation from samples to those from a census. Observe that sample statistics are more likely to approximate the population parameters as sample size increases.
f. Analyze data using appropriate graphs, including pictographs, histograms, bar graphs, line graphs, circle graphs, and line plots introduced earlier, and using box and- whisker plots and scatter plots.
g. Analyze and draw conclusions about data, including describing the relationship between two variables.

Terms/Symbols: natural number, whole number, sign, integer, opposite, negative, positive, absolute value, term, variable, commutative property, associative property, distributive property, algebraic expression, linear equation, direct and indirect proportions, constant of proportionality ($y = kx$), variation, polyhedron, translation, rotation, reflection, dilation, symmetry, bisector, parallel lines, perpendicular lines, cross-section, similar, congruent, point, line, plane, line segment, endpoints, intersection, ray, parallel lines, perpendicular lines, similar, similarity, rate, scale drawings, corresponding sides, corresponding angles, congruent, diagonal, algebraic expression, commutative property, associative property, distributive property, direct variation, inverse variation, inversely proportional, mean, median, mode, range, quartile, interquartile range, outlier, histogram, scatter plot, line plot, box-and-whisker plot, $\cong$, $\sim$, $\approx$, $\|$, $\perp$, $\angle$.

Process Standards

The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.

M7P1. Students will solve problems (using appropriate technology).

a. Build new mathematical knowledge through problem solving.
b. Solve problems that arise in mathematics and in other contexts.
c. Apply and adapt a variety of appropriate strategies to solve problems.
d. Monitor and reflect on the process of mathematical problem solving.

M7P2. Students will reason and evaluate mathematical arguments.

a. Recognize reasoning and proof as fundamental aspects of mathematics.
b. Make and investigate mathematical conjectures.
c. Develop and evaluate mathematical arguments and proofs.
d. Select and use various types of reasoning and methods of proof.

M7P3. Students will communicate mathematically.

a. Organize and consolidate their mathematical thinking through communication.
b. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.
c. Analyze and evaluate the mathematical thinking and strategies of others.
d. Use the language of mathematics to express mathematical ideas precisely.

M7P4. Students will make connections among mathematical ideas and to other disciplines.

a. Recognize and use connections among mathematical ideas.
b. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
c. Recognize and apply mathematics in contexts outside of mathematics.

M7P5. Students will represent mathematics in multiple ways.

a. Create and use representations to organize, record, and communicate mathematical ideas.
b. Select, apply, and translate among mathematical representations to solve problems.
c. Use representations to model and interpret physical, social, and mathematical phenomena.

Reading Standard Comment

After the elementary years, students are seriously engaged in reading for learning. This process sweeps across all disciplinary domains, extending even to the area of personal learning. Students encounter a variety of informational as well as fictional texts, and they experience text in all genres and modes of discourse. In the study of various disciplines of learning (language arts, mathematics, science, social studies), students must learn through reading the communities of discourse of each of those disciplines. Each subject has its own specific vocabulary, and for students to excel in all subjects, they must learn the specific vocabulary of those subject areas *in context.*

Beginning with the middle grades years, students begin to self-select reading materials based on personal interests established through classroom learning. Students become curious about science, mathematics, history, and literature as they form contexts for those subjects related to their personal and classroom experiences. As students explore academic areas through reading, they develop favorite subjects and become confident in their verbal discourse about those subjects.

Reading across curriculum content develops both academic and personal interests in students. As students read, they develop both content and contextual vocabulary. They also build good habits for reading, researching, and learning. The Reading Across the Curriculum standard focuses on the academic and personal skills students acquire as they read in all areas of learning.

MRC. Students will enhance reading in all curriculum areas by:

a. Reading in all curriculum areas
- Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas.
- Read both informational and fictional texts in a variety of genres and modes of discourse
- Read technical texts related to various subject areas

b. Discussing books
- Discuss messages and themes from books in all subject areas.
- Respond to a variety of texts in multiple modes of discourse.
- Relate messages and themes from one subject area to messages and themes in another area.
- Evaluate the merit of texts in every subject discipline.
- Examine author's purpose in writing.
- Recognize the features of disciplinary texts.

c. Building vocabulary knowledge
- Demonstrate an understanding of contextual vocabulary in various subjects.
- Use content vocabulary in writing and speaking.
- Explore understanding of new words found in subject area texts.

d. Establishing context
- Explore life experiences related to subject area content.
- Discuss in both writing and speaking how certain words are subject area related.
- Determine strategies for finding content and contextual meaning for unknown words.

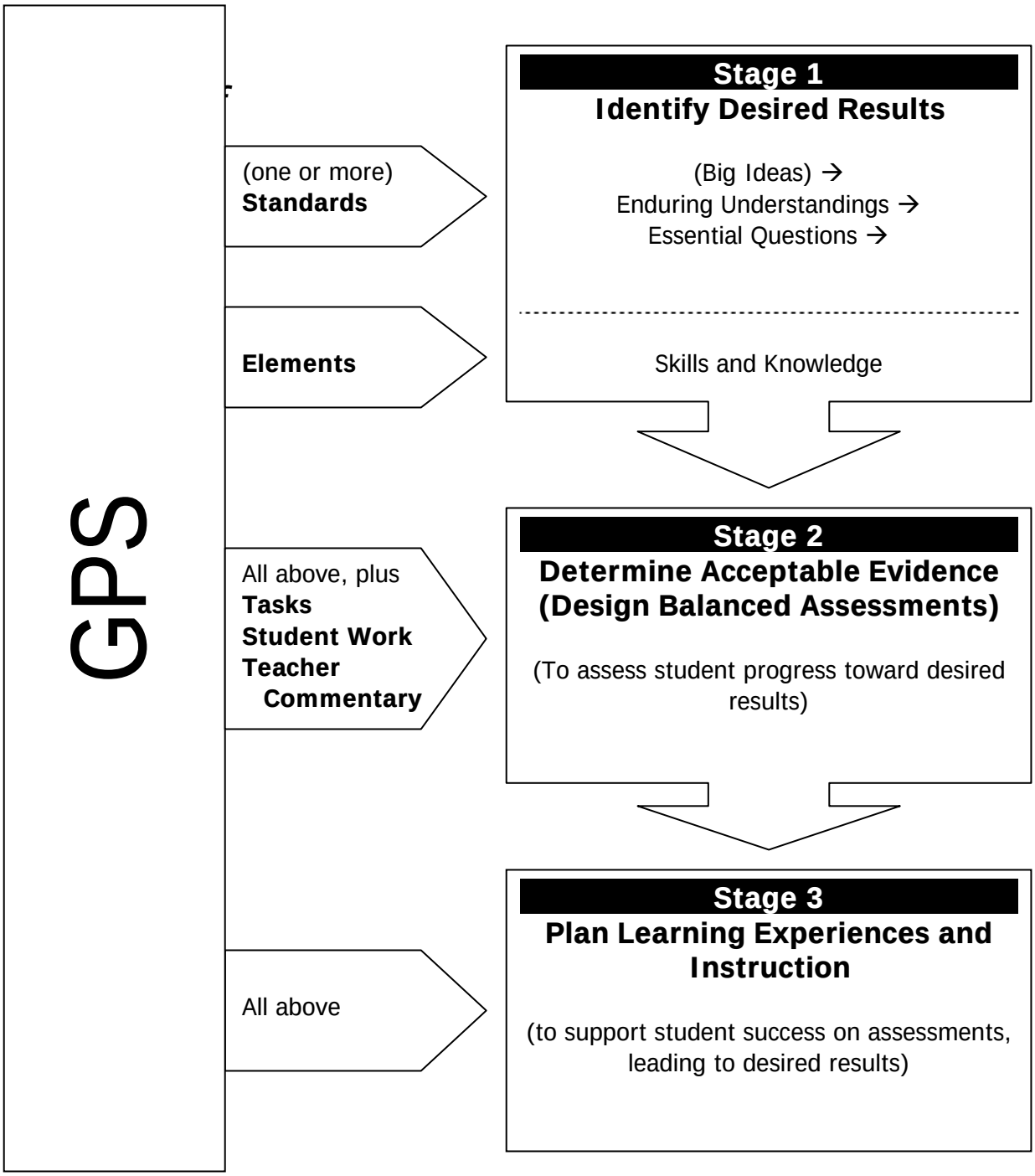
Middle School Mathematics

	6th Grade	7th Grade	8th Grade
Numbers and Operations	• Factors and multiples • Fundamental Theorem of Arithmetic • GCF and LCM • Compute with fractions and mixed numbers (unlike denominators) • Equivalent fractions, decimals, and percents	• Absolute value • Compare & order rational numbers • Compute & solve problems with positive and negative rational numbers	• Square roots of perfect squares • Rational vs Irrational numbers • Simplify expressions with integer exponents • Scientific Notation
Measurement	• Convert units using proportions • Volume of right rectangular prisms, right circular cylinders, pyramids and cones • Surface area of right rectangular prisms, right circular cylinders		
Geometry	• Line & rotational symmetry • Ratio, proportion and scale factor with similar plane figures • Scale drawings • Compare/contrast right prisms/pyramids and cylinders/cones • Views of solid figures • Nets (prisms, cylinders, pyramids, and cones)	• Basic constructions • Transformations • Properties of similarity • 3-D figures formed by translations & rotations in space • Cross sections of cones, cylinders, pyramids and prisms	• Properties of parallel and perpendicular lines • Meaning of congruence • Pythagorean Theorem
Algebra	• Ratio for quantitative relationship • Write & solve proportions • Write & solve simple one-step equations	• Algebraic expressions • Linear equations in one variable • Relationships between two variables	• Represent, analyze, and solve problems • Inequalities in one variable • Relations and Linear functions
Data Analysis and Probability	• Question, Collect Data, Make Graphs • Experimental/ Theoretical Probability • Predictions from investigations	• Question, Collect Data, Make Graphs, Interpret results	• Set theory • Tree Diagrams/ Counting Principles • Basic laws of probability • Organize, interpret, make inferences form data
Process Skills	Problem Solving, Arguments, Communicate, Connections, Multiple Representations	Problem Solving, Arguments, Communicate, Connections, Multiple Representations	Problem Solving, Arguments, Communicate, Connections, Multiple Representations

Phase In Plan

Grade	Math Training	Math Teaching
K	**05-06**	**06-07**
1	**05-06**	**06-07**
2	**05-06**	**06-07**
3	06-07	07-08
4	06-07	07-08
5	06-07	07-08
6	**04-05**	**05-06**
7	**05-06**	**06-07**
8	06-07	07-08

GPS and the Unit Design Process



Identifying Desired Results of a Standard

Standard / Element	
Big Idea	
Enduring Understandings	
Essential Questions	
Skills and Knowledge	

A Big Idea…

…Provides a "conceptual lens" for organizing content. A Big Idea refers to core concepts, principles, theories, and processes that should serve as the focal point of the curricula, instruction, and assessment. Big Ideas reflect expert understanding and anchor the discourse, inquiries, discoveries, and arguments in a field of study. They provide a basis for setting curriculum priorities to focus on the most meaningful content.

…Serves as an organizer for connecting important facts, skills, and actions. Big Ideas function as the "conceptual Velcro" for a topic of study. They connect discrete knowledge and skills to a larger intellectual frame and provide a bridge for linking specific facts and skills. A focus on these larger ideas helps students to see the purpose and relevance on content.

…Transfers to other contexts. Discrete facts do not transfer. Big Ideas are powerful because they embody transferable ideas, applicable to other topics, inquiries, context, issues, and problems. Because we can never cover all the knowledge on a given topic, a focus on the Big Ideas helps to manage information overload. Big Ideas provide the conceptual through lines that anchor a coherent curriculum.

…Manifests itself in various ways within disciplines. Big Ideas are typically revealed through one or more of the following forums: a core concept (e.g., adaptation), a focusing theme (e.g., man's inhumanity to man), an ongoing issue or debate (e.g., liberal vs. conservative), a puzzling paradox (e.g., poverty amidst plenty), an important process (e.g., writing process), an authentic problem or persistent challenge (e.g., illiteracy, voter apathy), an illuminating theory (e.g., Manifest Destiny), an underlying assumption (e.g., the markets are rationale), or differing perspectives (e.g., terrorist vs. freedom fighter).

…Requires uncoverage because it is an abstraction. A Big Idea is inherently abstract. Its meaning is not always obvious to students, and simply covering it (i.e., the teacher or textbook defining it) will not ensure student understanding. "Coverage" is unlikely to cause genuine insight; understanding must be earned. Thus, the idea must be uncovered—its meaning discovered, constructed or inferred by the learners, with the aid of the teacher and well-designed learning experiences.

How to identify big ideas: Read the standard thoroughly. Underline the big ideas in the standard. Make additional notes as needed. Note that this is just a stepping stone in the process; once you have turned your Big Ideas into enduring understandings, you do not need to write them down.

An Enduring Understanding…

…Involves the big ideas that give meaning and importance to facts. Enduring understandings are made up of the concepts, principles, and theories that weave many facts into revealing and useful patterns. They involve the (few) organizing priority ideas that enable us to make sense of past lessons, conduct current inquiry, and create new knowledge.

…Can transfer to other topics, fields, and adult life. Such understandings endure in that they enable us to make vital and informative connections in our learning—as students and as adults. For example, the idea that "might does not make right" applies to both playground disputes and international diplomacy.

…Is usually not obvious, often counter-intuitive, and easily misunderstood. An understanding is an inference, not a fact. It is an insight derived from inquiry. Key understandings in intellectual fields (e.g., in physics: *Objects remain in motion at a constant velocity if no force acts on them*) often violate common sense and conventional wisdom. They are thus often prone to misunderstanding by students. These understandings therefore cannot be covered; they must be uncovered.

…May provide a conceptual foundation for basic skills. The skill-based teaching in mathematics, foreign language, and physical education does not seem to deal with "understanding." In most units, all skills derive their value from the strategic principles that help us know when and how to use the skill. The understandings also justify the use of skills (e.g., the student who can explain why you should use a bent-arm pull in swimming free style) and enable the student to extend the use of the skill to new situations (e.g., the use of bent-arm pull in back stroke).

…Is deliberately framed as a generalization—the "moral of the story." An understanding is a generalization derived from inquiry. It is the specific insight that should be inferred from study of the topic (not just the stating of the topic)—what we want the student leaving the study to realize. Note: The enduring understanding of a unit might be that there is no single agreed-upon understanding, or that people disagree about how the issues, facts, or text should be understood.

How to identify enduring understandings: Frame them as full-sentence generalizations starting with "The student will understand that…" Avoid statements that are vague or trite. It may help to think about common mis<u>mis</u>understandings about the topic. Enduring understandings may be overarching (beyond the specifics of the unit) or topical.

Essential Questions…

…Have no simple "right" answer; they are meant to be argued. Essential questions yield inquiry and argument—a variety of plausible responses, not straightforward facts that end the matter. They should *uncover* rather than cover the subject's puzzles and perspectives. They should result in conclusions drawn by the learner, not recited facts. Like enduring understandings, they may be topical or overarching.

Examples: Does art reflect culture or help shape it? What makes a great story?

…Are designed to provoke and sustain student inquiry, while focusing learning and final performances. Essential questions work best when they are designed and edited to be thought provoking to students, engaging them in sustained, focused inquiries that culminate in important performance. They involve the counterintuitive, the visceral, the whimsical, the controversial.

Examples: Does food that is good for you have to taste bad? Are censorship and democracy compatible?

…Often address the conceptual or philosophical foundations of a discipline. They reflect the most historically important issues, problems, and debates in a field of study.

Examples: What is a proof? Nature or nurture? Can fiction reveal truth?

…Raise other important questions. Essential questions lead to other important questions within, and sometimes across, subject boundaries.

Example: In nature, do only the strong survive? (Leads to questions such as, "What is strength? Are insects strong, since they are survivors?)

…Naturally and appropriately recur. The same important questions are asked and asked again throughout one's learning.

Example: What makes a book "great?"

…Stimulate vital, ongoing rethinking of big ideas, assumptions, and prior lessons. They force us to ask deep questions about the nature, origin, and extent of our understanding.

Example: (In light of fractions, place value, irrationals, and negative square roots) what is a number?

How to develop essential questions: Two to five per unit is reasonable. Put them in language appropriate to students. Use them as organizers for the unit, making the "content" answer the questions. Sequence questions so they lead naturally from one to another. Share essential questions with other teachers to ensure curricular coherence.

Skills and Knowledge

Knowledge. Getting students to construct meaning, organize information, and (selectively) store information. This includes

- Vocabulary
- Terminology
- Definitions
- Key factual information
- Formulas
- Critical details
- Important events, people
- Sequence and timelines
- Rules
- Laws
- Principles
- Concepts

Skills. Getting students to demonstrate the ability to do something. These may be very simple, discrete operations, or more complex creative ones. This includes

- Actions, procedures, and processes
- Basic skills—decoding, arithmetic computation
- Psychomotor skills—running, swimming a back stroke, playing an instrument
- Study skills
- Communication skills—listening, speaking, writing
- Thinking skills—comparing, inferring, analyzing, interpreting
- Research, inquiry, investigation skills
- Interpersonal/group skills

Verbs to use when stating skills and knowledge. These are samples only:

- Demonstrate
- Derive
- State
- Describe
- List
- Design
- Express
- Induce
- Instruct
- Create
- Critique
- Compare/contrast
- Evaluate
- Illustrate
- Judge
- Make meaning of
- Make sense of
- Use
- Model
- Predict
- Prove
- Show
- Synthesize
- Justify
- Choose
- Imagine
- Assess
- Write
- Draw
- Translate
- Adapt
- Build
- Determine
- Perform
- Solve
- Test

How to develop skills and knowledge statements: Look at the enduring understandings, essential questions, and elements. Ask yourself, "What skills and knowledge do students need in order to reach this goal?" Start each skill/knowledge statement with a verb.

Find the Hidden Treasure Chest!

You and your friends have found instructions describing how to reconstruct a secret map telling how to find a hidden treasure chest that has been buried in the town park.

The instructions say that the water fountain is at (-12, 4), the trashcan is at (-7, -6) and the slide's ladder is at (4, -6). Also, the big oak tree is at (11, 6) and the flag pole is at (5, 0). An angle is formed by the water fountain, trashcan and ladder with the trashcan as the vertex. A segment is formed by the oak tree and the flag pole.

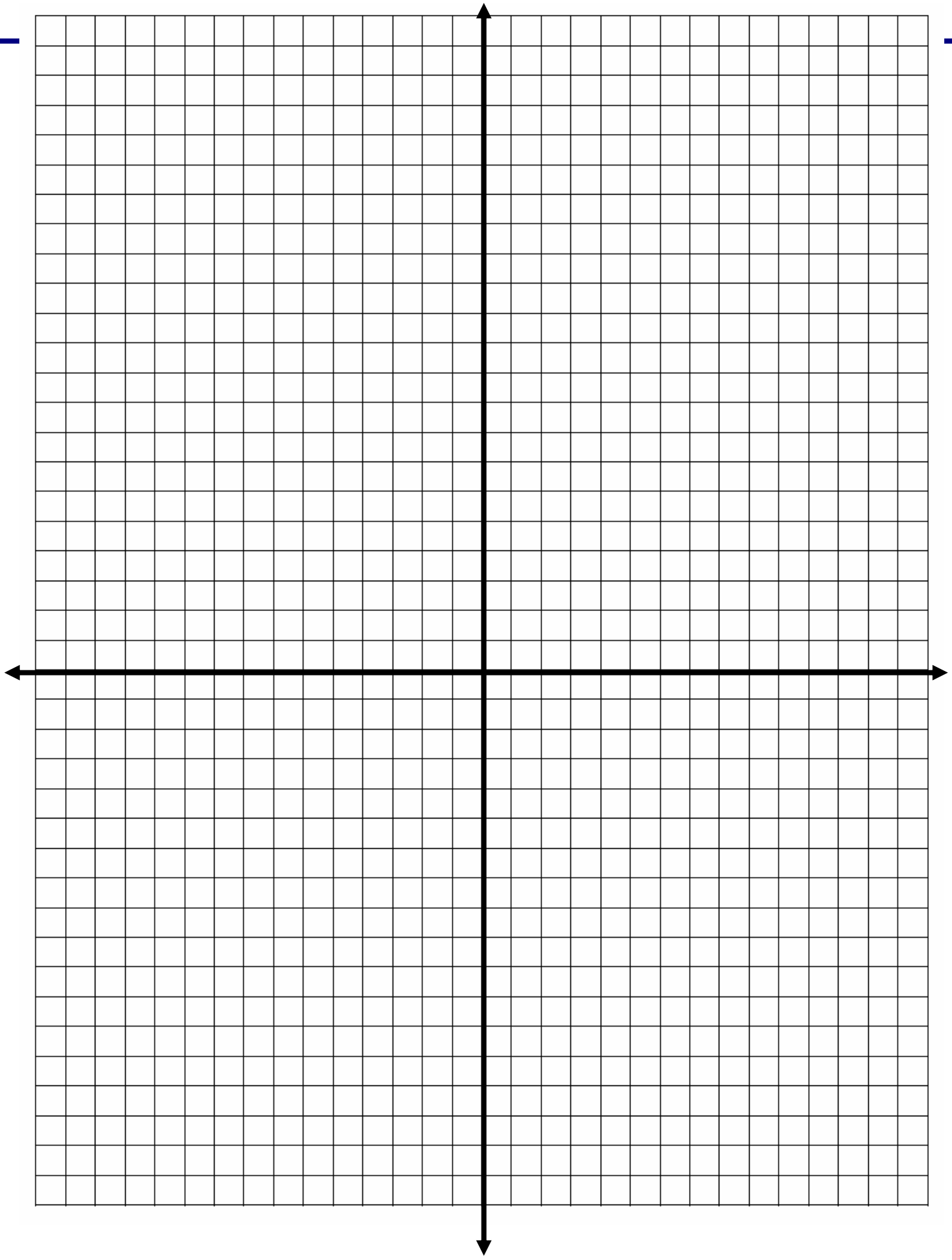
To locate the spot where the treasure was buried, you need to find the intersection of the angle's bisector and the segment's perpendicular bisector.

1) Find the location of the treasure chest.

2) Give different directions to find the treasure using the same landmarks (with the same points). Explain why your directions also work.

3) Swap directions with your neighbor and see if you can find the treasure using the new instructions.

4) Make up a similar problem to share with a different friend. (NOTE: Your new problem may include additional seventh grade standards. Be creative!)



Field Assignment

- **Redeliver Day 1: How to Identify Desired Results of a Standard**
- **Day 2 will focus on determining acceptable evidence.**
- **Review the Seventh Grade Mathematics Georgia Performance Standards.**
- **Think about what evidence is necessary to access them? How good is good enough?**
- **Bring your *Understanding by Design* Workbook with you to the Day 2 Training.**

Redelivery Action Plan

Directions: Complete the following chart to help shape your team's work before day two of training. You should analyze at least one standard in each strand, including big ideas, understandings, essential questions, skills and knowledge, and evidence. Here are some questions to consider:

- What do we need?
- What do we have?
- Haw can we obtain needed information or resources?
- What can we develop as a team?
- What is our plan for completing the work and learning together?

Step/Activity	Who	By When	How	Resources and Ideas

Provided Texts

Mathematics Resources:

Danielson, Charlotte. *A Collection of Performance Tasks and Rubrics: Middle School Mathematics.* Larchmont, NY: Eye on Education, 1997.

Northey, Sheryn Spencer. *Handbook on Differentiated Instruction of Middle and High Schools*. Larchmont, NY: Eye on Education, 2005.

Van de Walle, John A. *Elementary and Middle School Mathematics: Teaching Developmentally, Fifth Edition*. New York, NY: Longman Press, 2004.

Van de Walle, John I. And LouAnn Lovin. *Teaching Student-Centered mathematics: Grades 5-8*. Boston, MA: Pearson Allyn & Bacon, 2006.

Each school received one copy of each book listed below at the beginning of the previous school year. This box of books was addressed to the principal of the school.

Hayes Jacobs, Heidi. *Mapping the Big Pictures: Integrating Curriculum and Assessment K-12.* Alexandria, VA: Association for Supervision and Curriculum Development. 1997.

Marzano, Robert J. *What Works in Schools: Translating Research into Action.* Alexandria, VA: Association for Supervision and Curriculum Development. 2003.

Robert J. Marzano, Debra Pickering, and Jay McTighe. *Assessing Student Outcomes: Performance Assessment Using the Dimensions of Learning Model.* Alexandria, VA: Association for Supervision and Curriculum Development. 1993.

Marzano, Robert J, Debra J. Pickering, and Jane E. Pollock. *Classroom Instruction That Works: Research-Based Strategies for Increasing Student Achievement.* Alexandria, VA: Association for Supervision and Curriculum Development. 2001.

Marzano, Robert J, Jana Marzano, & Debra Pickering. *Classroom Management That Works: Research-Based Strategies for Every Teacher.* Alexandria, VA: Association for Supervision and Curriculum Development. 2003.

Strong, Richard W., Harvey F. Silver, and Matthew J. Perini. *Teaching What Matters Most: Standards and Strategies for Raising Student Achievement.* Alexandria, VA: Association for Supervision and Curriculum Development. 2001.

Tomlinson, Carol Ann. *How to Differentiate Instruction in Mixed-Ability Classrooms, 2nd edition.* Alexandria, VA: Association for Supervision and Curriculum Development. 2001.

Wiggins, Grant and Jay McTighe. *Understanding by Design.* Alexandria, VA: Association for Supervision and Curriculum Development. 1998.

Wiggins, Grant and Jay McTighe. *Understanding by Design Study Guide.* Alexandria, VA: Association for Supervision and Curriculum Development. 2000.

Professional Organizations

National Science Teachers Association—NSTA—http://www.nsta.org
Georgia Science Teachers Association—GSTA—http://www.georgiascienceteacher.org
National Council of Teachers of Mathematics—NCTM—http://www.nctm.org
Georgia Council of Teachers of Mathematics—GCTM—http://www.gctm.org

Web Sites

Units (incorporating Learning Focused components). Connected Learning. http://www.title3.org/.

BOCES is a cooperative service organization that helps school districts save money by pooling resources and sharing costs.

www.intermath-uga.gatech.edu/

http://illuminations.nctm.org/

National Library of Virtual Manipulatives http://nlvm.usu.edu/en/nav/vlibrary.html

Special Education Resources

Access, Participation, & Progress in the General K-12 Curriculum. National Center on Accessing the General Curriculum (ncaog.org).

Approximately 70 general and special educators and parents attended the National Capacity Building Institute on Access, Participation, and Progress in the General Curriculum, held on July 10, in Arlington, VA. The article includes the proceedings from the Institute.

Aligning Special Education with NCLB. www.ldonline.org.

The No Child Left Behind Act (NCLB) is a standards-based reform movement. This movement emphasizes standards and the alignment of curriculum and assessment to those standards. States established what is to be taught. The goal of standards is to increase academic achievement levels. A related goal is to close the achievement gap

for students who have traditionally been at-risk for academic failure or lack of success. This group includes students with disabilities.

Thompson, S., Thurlow, M., Quenemoen, R.F., & Esler, A. (2001). *Addressing Standards And Assessments On State IEP Forms*, National Center on Educational Outcomes (NCEO Synthesis Report 38)

This article summarizes data on each State's use of standards in developing Individualized Education Programs (IEP) for students with disabilities. All fifty states were asked to send their IEP forms and to indicate whether the forms were required, recommended, or simply sample forms. Out of the 41 states with IEP forms, only 5 states specifically addressed the general curriculum on their forms. Recommendations for IEP forms that provide decision-making guidance involving access to the general curriculum are summarized.

Writing Standards-based IEPs. Colorado Department of Education. www.cde.org.

The Colorado Department of Education provides information for teachers on developing standards-driven IEPs. The summary includes a definition of standards-driven IEPs, characteristics of standards-driven IEPs, and a rationale for standards-driven IEPs.

Resources for Differentiation

Association for Supervision and Curriculum Development. *At work in the differentiated classroom.* Alexandria, VA. Author. (video staff development set). 2001.

Chapman C. & Gregory, G. *Differentiated instruction strategies for writing in the content areas.* Thousand Oaks, CA: Corwin Press. 2003.

Coil, C. *Standards-based activities and assessments for the differentiated classroom*. Marion, IL: Pieces of Learning. 2004.

Tomlinson, C. *Fulfilling the promise of the differentiated classroom: Strategies and tools for responsive teaching*. Alexandria, VA: Association for Supervision and Curriculum Development. 2003.

Winebrenner, S. *Teaching gifted kids in the regular classroom*. Minneapolis, MN: Free Spirit. 1992.

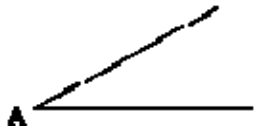
Glossary

CONTENT STANDARDS:	Content standards state the purpose and direction the content is to take, and are generally followed by elements. Content standards define what students are expected to know, understand, and be able to do.
CURRICULUM DOCUMENT:	The Georgia Performance Standards document is the curriculum document that contains all standards that should be learned by all students.
ELEMENTS:	Elements are part of the content standards that identify specific learning goals associated with the standard.
PERFORMANCE STANDARDS:	Performance standards define specific expectations of what students should know and be able to do and how well students must perform to achieve or exceed the standard. Georgia's performance standards are composed of four components: content standards, tasks, student work, and teacher commentary.
PROCESS STANDARDS:	Process standards define the means used to develop patterns of thought and behavior that lead to conceptual understanding.
STANDARD:	Something set up and established by authority as a rule for the measure of quantity, weight, extent, value, or quality.
STANDARDS-BASED EDUCATION:	In standards-based classrooms, standards are the starting point for classroom instruction that ensures high expectations for all students.
STRAND:	A strand is an organizing tool used to group standards by content. For example, the English language arts curriculum contains strands of reading, writing, listening, speaking, and viewing. K-5 science curriculum contains a life science strand, physical science strand, and an earth science strand.
STUDENT WORK:	Examples of successful student work are included to specify what it takes to meet the standard and to enable both teachers and students to see what meeting the standard "looks like."

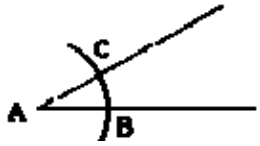
TASKS:	Keyed to the relevant standards, tasks provide a sample performance that demonstrates to teachers what students should know and be able to do during or by the end of the course. Some tasks can serve as activities that will help students achieve the learning goals of the standard, while others can be used to assess student learning; many serve both purposes. Although the Georgia Performance Standards include tasks, teachers may develop their own tasks.
TEACHER COMMENTARY:	Teacher commentary is meant to open the pathways of communication between students and the classroom teacher as well as within faculty in order to ensure consistency within assessment and expectations. Commentary shows students why they did or did not meet a standard and enables them to take ownership of their own learning.

To Reproduce an angle

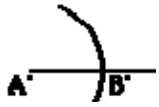
Given an angle with vertex at A



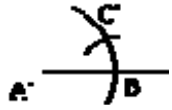
Step 1. Scribe an arc centered at A and intersecting the arms of the angle at B and C.



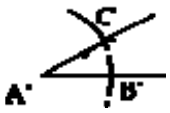
Step 2. On the other line, scribe and arc of the same radius centered at A' intersecting the line at B'



Step 3. Use the compass to measure the distance from B to C, and with the compass centered at B' scribe an arc whose radius is the distance from B to C intersecting the arc from Step 2 at C'.



Step 4. Draw the line from A' through C'.

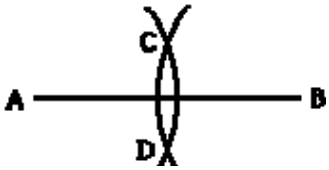


http://www.sonoma.edu/users/w/wilsonst/Courses/Math_100/C-S/Copy-Angle.html

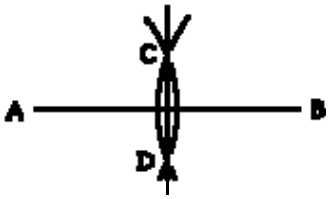
The perpendicular bisector of a line segment

Given a line segment AB

open the compass more than half of the distance between A and B, and scribe arcs of the same radius centered at A and B.



Call the two points where these two arcs meet C and D. Draw the line between C and D.

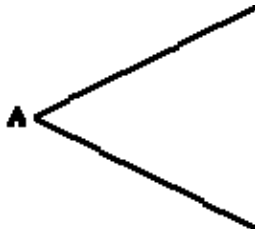


CD is the perpendicular bisector of the line segment AB. Call the point where CD intersects AB E.

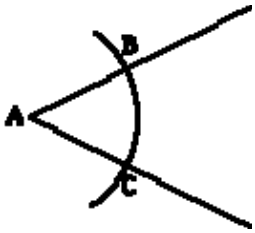
http://www.sonoma.edu/users/w/wilsonst/Courses/Math_100/C-S/Perp-Bisect.html

To bisect an angle

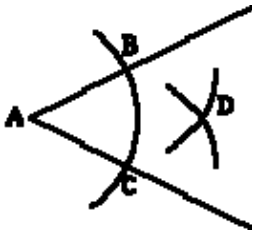
Given an angle



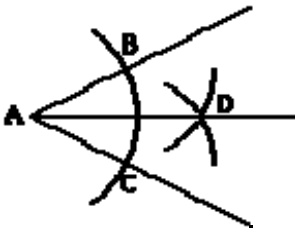
scribe an arc centered at the vertex.



Let the points where this arc meets the arms of the angle be B and C. Scribe an arc centered at B and an arc centered at C with the same radii.



Let the point where these arcs meet be D. Draw AD.



AD is the bisector of the angle at A.

http://www.sonoma.edu/users/w/wilsonst/Courses/Math_100/C-S/Angle_bisector.html

Reflections on the Day

Please take a few minutes and share your thoughts on the following four areas.

Important things I've learned or had reaffirmed. . .	Today's experiences have left me feeling. . .
Questions I want answered now. . .	What I will do when I return to my workplace. . .