GEORGIA DEPARTMENT OF EDUCATION

Kathy Cox, State Superintendent of Schools

Training for the New Georgia Performance Standards

Days 6: Differentiation

Participant's Guide
Mathematics Grade 6

We will lead the nation in improving student achievement.

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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

The module materials, including a Leader'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.

Agenda

Introduction to Differentiation
- Fund Raising Ideas
- Four Corners
- Calvin's Day at School

What is Differentiation?
- What is it?
- Standards-Based Education Model
- Self-Assessment
- Fund Raising Ideas, Continued

How and Why Do We Differentiate?
- How do we differentiate?
- Why do we differentiate?
- Practice Analyzing a Differentiated Task
- Differentiation Stratego: A Reality Game

What Does a Differentiated Classroom Look Like?
- True/False Quiz: What Does Differentiation Look Like?
- Creative Demonstration
- Setting Personal Goals for Differentiating
- Task Time!

Summary and Field Assignment

Module Goal

Demonstrate a deep understanding of the new Georgia Performance Standards and the standards-based education approach, through thoughtful curriculum planning, development of formative and summative assessments, and the design of instruction matched to the standards and research-based best practices. This shall be measured by student performance on progress monitoring and standardized criterion-referenced tests.

Key words from the goal:

- Deep understanding
- Georgia Performance Standards (GPS)
- Standards-based education
- Research-based best practices

Note that the goal will not be reached by any single day of training. It will take preparation, follow up, and eight days of classroom instruction to master this goal.

Module Objectives

By the end of Day 6 of training, participants will be able to:

1. Define differentiation and explain the importance of differentiation in the standards-based education process.

2. Explain key elements in planning for differentiation.

3. Describe and develop procedures for differentiating instruction in a flexible classroom.

4. Describe and develop effective classroom management strategies in a differentiated classroom.

5. Describe the roles of the teacher in a differentiated classroom.

6. Set individual goals for differentiating instruction in each classroom.

Specialists' Contact Information

For a list of district coordinators visit the Georgia Learning Connection:

English Language Learners
http://www.glc.k12.ga.us/contact/contact.asp?groupname=ESOL+District+Coordinators

Gifted and Talented
http://www.glc.k12.ga.us/contact/contact.asp?groupname=Gifted+Education

For specialists at the Georgia Department of Education:

English Language Learners—Victoria Webbert	vwebbert@doe.k12.ga.us
Gifted and Talented—Dr. Sally Krisel	skrisel@doe.k12.ga.us
Exceptional Students (Special Education)—Deborah Keane	dkeane@doe.k12.ga.us

Georgia Mathematics Performance Standards
Grade 6

By the end of grade six, students will understand the four arithmetic operations as they relate to positive rational numbers; convert between and compute with different forms of rational numbers; understand the concept of ratio and solve problems using proportional reasoning; understand and use line and rotational symmetry; determine the surface area and volume of solid figures; use variables to represent unknown quantities in formulae, algebraic expressions and equations; utilize data to make predictions; and determine the probability of a given event.
Instruction and assessment should include the use of manipulatives and appropriate technology. Topics should be represented in multiple ways including concrete/pictorial, verbal/written, numeric/data-based, graphical, and symbolic. Concepts should be introduced and used in the context of real world phenomena.

Concepts/Skills to Maintain
Operations with decimal fractions
Addition and subtraction of common fractions and mixed numbers with unlike denominators such as 2, 3, 4, 5, 6, 8, 10 and 12.
Modeling multiplication of common fractions
Modeling percent
Graphing data
Multiples and factors
Perimeter, capacity and area of geometric figures
Evaluating algebraic expressions

NUMBER AND OPERATIONS
Students will understand the meaning of the four arithmetic operations as related to positive rational numbers and will apply these concepts and associated skills in real world situations.

M6N1. Students will understand the meaning of the four arithmetic operations as related to positive rational numbers and will use these concepts to solve problems.

a. Apply factors and multiples.
b. Decompose numbers into their prime factorization (Fundamental Theorem of Arithmetic).
c. Determine the greatest common factor (GCF) and the least common multiple (LCM) for a set of numbers.
d. Add and subtract fractions and mixed numbers with unlike denominators.
e. Multiply and divide fractions and mixed numbers.
f. Use fractions, decimals, and percents interchangeably.
g. Solve problems involving fractions, decimals, and percents.

MEASUREMENT
Students will understand how to determine the volume and surface area of solid figures.

They will understand and use the customary and metric systems of measurement to measure quantities efficiently and to represent volume and surface area appropriately.

M6M1. Students will convert from one unit to another within one system of measurement (customary or metric) by using proportional relationships.

M6M2. Students will use appropriate units of measure for finding length, perimeter, area and volume and will express each quantity using the appropriate unit.

a. Measure length to the nearest half, fourth, eighth and sixteenth of an inch.
b. Select and use units of appropriate size and type to measure length, perimeter, area and volume.
c. Compare and contrast units of measure for perimeter, area, and volume.

M6M3. Students will determine the volume of fundamental solid figures (right rectangular prisms, cylinders, pyramids and cones).

a. Determine the formula for finding the volume of fundamental solid figures.
b. Compute the volumes of fundamental solid figures**,** using appropriate units of measure.
c. Estimate the volumes of simple geometric solids.
d. Solve application problems involving the volume of fundamental solid figures.

M6M4. Students will determine the surface area of solid figures (right rectangular prisms and cylinders).

a. Find the surface area of right rectangular prisms and cylinders using manipulatives and constructing nets.
b. Compute the surface area of right rectangular prisms and cylinders using formulae.
c. Estimate the surface areas of simple geometric solids.
d. Solve application problems involving surface area of right rectangular prisms and cylinders.

GEOMETRY

Students will further develop their understanding of plane and solid geometric figures, incorporating the use of appropriate technology and using this knowledge to solve authentic problems.

M6G1. Students will further develop their understanding of plane figures.

a. Determine and use lines of symmetry.
b. Investigate rotational symmetry, including degree of rotation.
c. Use the concepts of ratio, proportion and scale factor to demonstrate the relationships between similar plane figures.
d. Interpret and sketch simple scale drawings.
e. Solve problems involving scale drawings.

M6G2. Students will further develop their understanding of solid figures.

a. Compare and contrast right prisms and pyramids.

b. Compare and contrast cylinders and cones.
c. Interpret and sketch front, back, top, bottom and side views of solid figures.
d. Construct nets for prisms, cylinders, pyramids, and cones.

ALGEBRA
Students will investigate relationships between two quantities. They will write and solve proportions and simple one-step equations that result from problem situations.

M6A1. Students will understand the concept of ratio and use it to represent quantitative relationships.

M6A2. Students will consider relationships between varying quantities.
a. Analyze and describe patterns arising from mathematical rules, tables, and graphs.
b. Use manipulatives or draw pictures to solve problems involving proportional relationships.
c. Use proportions (a/b=c/d) to describe relationships and solve problems, including percent problems.
d. Describe proportional relationships mathematically using y = kx, where k is the constant of proportionality.
e. Graph proportional relationships in the form y = kx and describe characteristics of the graphs.
f. In a proportional relationship expressed as y = kx, solve for one quantity given values of the other two. Given quantities may be whole numbers, decimals, or fractions. Solve problems using the relationship y = kx.
g. Use proportional reasoning (a/b=c/d and y = kx) to solve problems.

M6A3. Students will evaluate algebraic expressions, including those with exponents, and solve simple one-step equations using each of the four basic operations.

DATA ANALYSIS AND PROBABILITY
Students will demonstrate understanding of data analysis by posing questions to be answered by collecting data. They will represent, investigate, and use data to answer those questions. Students will understand experimental and theoretical probability.

M6D1. Students will pose questions, collect data, represent and analyze the data, and interpret results.
a. Formulate questions that can be answered by data. Students should collect data by using samples from a larger population (surveys), or by conducting experiments.
b. Using data, construct frequency distributions, frequency tables, and graphs.

c. Choose appropriate graphs to be consistent with the nature of the data (categorical or numerical). Graphs should include pictographs, histograms, bar graphs, line graphs, circle graphs, and line plots.
d. Use tables and graphs to examine variation that occurs within a group and variation that occurs between groups.
e. Relate the data analysis to the context of the questions posed.

M6D2. Students will use experimental and simple theoretical probability and understand the nature of sampling. They will also make predictions from investigations.

a. Predict the probability of a given event through trials/simulations (experimental probability), and represent the probability as a ratio.
b. Determine, and use a ratio to represent, the theoretical probability of a given event.
c. Discover that experimental probability approaches theoretical probability when the number of trials is large.

Terms/Symbols: positive rational numbers, factors, multiples, decompose, prime numbers, prime factorization, Fundamental Theorem of Arithmetic, GCF, LCM, evaluate, surface area, metric system of measurement, customary system of measurement, proportional relationships, right rectangular prism, cylinder, pyramid, cone, geometric solid, net, geometric figures, line symmetry, rotational symmetry, similar plane figures, scale factor, scale drawings, relations, varying quantities, ratio, direct proportion, proportions, proportional reasoning, frequency distributions, pictographs, histograms, bar graphs, line graphs, circle graphs, line plot, frequency table, experimental probability, theoretical probability, sampling, event, random sample, population, non-routine word problems

Process Standards

Each topic studied in this course should be developed with careful thought toward helping every student achieve the following process standards.

M6P1. 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.

M6P2. 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.

M6P3. 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.

M6P4. 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.

M6P5. 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

Unit Four Organizer: "ONE-STEP EQUATIONS" (2 weeks)

OVERVIEW:

In this unit, students will

- use letters to represent numbers;
- write and evaluate algebraic expressions, including those with exponents;
- generalize patterns by writing simple equations using two variables; and
- solve simple one step equations using each of the four basic operations.

To assure that this unit is taught with the appropriate emphasis, depth and rigor, it is important that the tasks listed under "Evidence of Learning" be reviewed early in the planning process. A variety of resources should be utilized to supplement, but not completely replace, the textbook. Textbooks not only provide much needed content information, but excellent learning activities as well. The tasks in these units illustrate the types of learning activities that should be utilized from a variety of sources.

ENDURING UNDERSTANDINGS:

- In mathematics, letters are used to represent numbers.
- There are conventions for using letters to represent numbers in mathematics.
- Algebraic expressions are used to represent relationships between numbers.
- Variables can be used to generalize patterns.
- Pictures and diagrams are helpful in recognizing relationships.
- Inverse operations are helpful in understanding and solving problems.

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ESSENTIAL QUESTIONS:

- Why do we use letters to represent numbers in mathematics?
- Why do we need conventions in mathematics?
- How do I evaluate an algebraic expression?
- How can variables be used to describe patterns?
- How do I solve a one step equation?

STANDARDS ADDRESSED IN THIS UNIT

Mathematical standards are interwoven and should be addressed throughout the year in as many different units and activities as possible in order to emphasize the natural connections that exist among mathematical topics.

KEY STANDARDS:

M6A3. Students will evaluate algebraic expressions, including those with exponents, and solve simple one-step equations using each of the four basic operations.
M6A2. Students will consider relationships between varying quantities.
a) Analyze and describe patterns arising from mathematical rules, tables, and graphs.

RELATED STANDARDS:

M6P1. 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.
M6P2. Students will reason and evaluate mathematical arguments.
a. Recognize reasoning and proof as fundamental aspects of mathematics.
b. Make and investigate mathematical conjectures.

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c. Develop and evaluate mathematical arguments and proofs.
d. Select and use various types of reasoning and methods of proof.

M6P3. 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.

M6P4. 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.

M6P5. 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.

CONCEPTS/SKILLS TO MAINTAIN:

It is expected that students will have prior knowledge/experience related to the concepts and skills identified below. It may be necessary to pre-assess in order to determine if time needs to be spent on conceptual activities that help students develop a deeper understanding of these ideas.

- Inverse operations

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SELECTED TERMS AND SYMBOLS:

You may visit www.intermath-uga.gatech.edu and click on dictionary to see definitions and specific examples of terms and symbols used in the sixth grade GPS.

EVIDENCE OF LEARNING:

By the conclusion of this unit, students should be able to demonstrate the following competencies:

- represent relationships between numbers by writing simple algebraic expressions;
- evaluate algebraic expressions, including those with exponents;
- generalize a pattern using variables; and
- solve problems by writing and solving simple one step equations.

The following task represents the level of depth, rigor, and complexity expected of all 6th grade students. This task or a task of similar depth and rigor should be used to demonstrate evidence of learning.

Culminating Activity: "Building with Toothpicks"
Students will determine the perimeter of a two-dimensional shape formed by a pattern of increasing squares.
By the conclusion of this unit, students should be able to demonstrate the following competencies:

STRATEGIES FOR TEACHING AND LEARNING:

- Students should be actively engaged by developing their own understanding.
- Mathematics should be represented in as many ways as possible by using graphs, tables, pictures, symbols and words.
- Appropriate manipulatives and technology should be used to enhance student learning.
- Students should be given opportunities to revise their work based on teacher feedback, peer feedback, and metacognition which includes self-assessment and reflection.

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TASKS:

The collection of the following tasks represents the level of depth, rigor and complexity expected of all sixth grade students to demonstrate evidence of learning.

- **Using Letters to Represent Numbers**

Using Letters to Represent Numbers

1. When Janice is 5 years old, her brother Clarence is 8 years old.
    a. How old will Clarence be when Janice is 15 years old?
    b. How old will Clarence be when Janice is 21 years old?
    c. Write the relationship between Janice's age and Clarence's age in words.
2. Suppose n stands for Janice's age.
    a. How could you represent Clarence's age "in terms" of Janice's age?
    b. Will this expression represent the relationship between Janice's age and Clarence's age no matter how old they are? Explain your thinking.
    c. Use your expression to find Clarence's age when Janice is 13. Show your work.
3. Look at the table below. It represents the relationship between Timothy's age and Carlos's age.

Timothy's Age (in years)	Carlos's Age (in years)
3	10
	13
11	
	N

a. Fill in the table.

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b. Write the relationship between Timothy's age and Carlos's age in words.
c. What expression represents the relationship between Timothy's age and Carlos's age?

4. Make up your own relationship similar to the ones described here.
   a. Write your situation in words.
   b. Draw a table for your relationship. Include at least 4 sets of values. Represent one quantity with a letter and write a rule that represents the relationship in your situation.

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Using Letters to Represent Numbers

Discussion, Suggestions, Possible Solutions

1. *a. When Janice is 15, Clarence will be 18.*
   b. When Janice is 21, Clarence will be 24.
   c. Students may correctly say that Clarence is three years older than Janice or that Janice is three years younger than Clarence. It is extremely important that students write numerical relationships in words.
2. *a. Clarence's age would be represented in terms of Janice's age by the expression n + 3.*
   b. This expression will always represent the relationship between Janice's age and Clarence's age because Clarence will always be three years older than Janice.
   c. Substituting 13 for n into n + 3, students should get n + 3 = 13 + 3 = 16.
3. *a.*

Timothy's Age (in years)	*Carlos's Age (in years)*
3	*10*
6	*13*
11	*18*
n – 7	*n*

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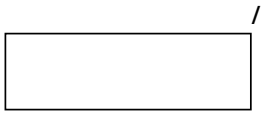
b. Timothy is 7 years younger than Carlos or Carlos is 7 years older than Timothy.
c. Timothy's age is equal to Carlos's age minus 7 or n-7.
4. Answers will vary.

- **Learning the Conventions for Multiplying and Dividing Letters and Numbers**

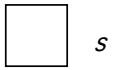
Learning the Conventions for Multiplying and Dividing Letters and Numbers

1. The formula for the perimeter of a rectangle can be written as $P = 2l + 2w$.



   a. What does $2l$ mean?
   b. What does $2w$ mean?
   c. What is the perimeter of a rectangle with a length of 5 inches and a width of 4 inches?

2. The square shown here has sides of length s.



   a. Write the formula for the perimeter of the square in two different ways. Explain your thinking.
   b. What is the perimeter of the square if s is 12 centimeters?

3. The formula for the area of the square above can be written as $A = s^2$.
   a. What does s^2 mean?
   b. What is the area of the square if $s = 12$ centimeters?

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4. Find the value of each of the following if $a = 9$ and $b = 4$.
   a. ab
   b. $a + b$
   c. $2a + 3b$
   d. b^3
   e. $a \mid b$
   f. $b \mid a$
   g. $a \div b$

****

Learning the Conventions for Multiplying and Dividing Letters and Numbers

Discussion, Suggestions, Possible Solutions

A mini-lesson for this task should involve the conventions for multiplying and dividing numbers and letters. Be sure that students know that 4n means 4 times n and can also be written as 4·n. Ask students why they think we might not want to write 4xn in algebra. Conventions that should be mentioned include:

- *4 times n is usually written as 4n rather than 4xn, 4·n, or n4*
- *1·n, 1xn, 1n are usually written as n. Ask students why they think this might be true.*
- *mn means m times n*
- *n/m means n divided by m and can also be written n÷m.*
- *n/n = 1. Ask students why they think this might be true.*

Possible Solutions

1. *The formula for the perimeter of a rectangle can be written as P = 2l + 2w.*
   a. *What does 2l mean? (2l means 2 times l)*
   b. *What does 2w mean?(2w means 2 times w)*
   c. *What is the perimeter of a rectangle with a length of 5 inches and a width of 4 inches?(P = 2·5 + 2·4 = 10 +8 = 18inches)*

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2. *The square shown here has sides of length s.*
   a. *Write the formula for the perimeter of the square in two different ways. Explain your thinking. (The formula for the perimeter of the square can be written P = 4s or P = s + s + s + s. The reason is that 4s is the same as s + s + s + s.)*
   b. *What is the perimeter of the square if s is 12 centimeters?(P = 4s = 4x12 = 48 centimeters.)*
3. *The formula for the area of the square above can be written as $A = s^2$.*
   a. *What does s^2 mean?(s^2 means s times s)*
   b. *What is the area of the square if s = 12 centimeters?(The area of the square is 12 x 12 = 144 square centimeters.)*
4. *Find the value of each of the following if a = 9 and b = 4.*
   a. *Ab = 9 x 4 = 36*
   b. *a + b = 9 + 4 = 13*
   c. *2a + 3b=2 x 9 + 3 x 4 = 18 + 12 = 30*
   d. *b^3= 4 x 4 x 4 =64*
   e. *a/b = 9/4=2.25 (or equivalent form)*
   f. *b/a = 4/9 (or equivalent form)*
   g. *a ÷ b = 2.25 (or equivalent form)*

- **Balancing Act**

Balancing Act

Two sides of a scale are balanced. One side of the scale has 3 balls. The other side has 1 ball and 1 cube. If the cube weighs 8 pounds, how much did each ball weigh? Explain your answer using pictures and words. Write and solve an equation that represents your solution.

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Balancing Act

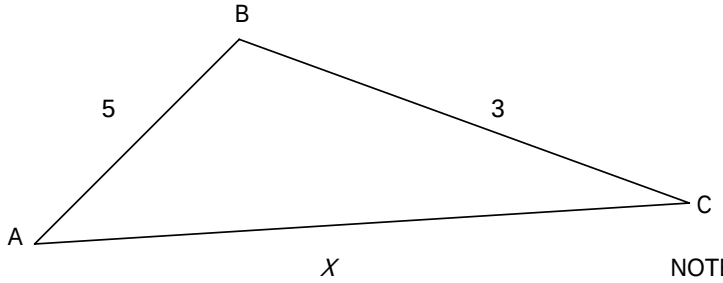
Discussion, Suggestions, Possible Solutions

Students should draw a picture and represent their solution with an equation showing the relationship of the weight of the balls to the weight of the cubes. For example, 3 balls weigh the same as 1 ball plus 1 cube, so if a ball is removed from both sides, the scale is still balanced. Therefore, 2n = 8, or 1/2 c = n where n = the weight of 1 ball and c = the weight of the cube. The equation 3n = n + 8 is also a representation of the original situation.

- **The Ant**

The Ant

An ant travels around a triangular picnic table in the following manner.
He begins at point A and travels to B. At B, he turns around and travels back to A. From A, he travels to C. If the perimeter of the picnic table is 17 feet, how far did the ant travel. Show how you know. Explain your thinking in words and by writing and solving equations.



NOTE: The drawing is not to scale.

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The Ant

Discussion, Suggestions, Possible Solutions

The missing side of the triangle can be found by using the fact that the perimeter of the triangle is 17 feet.
Students should include a written explanation of their work. They should also write and solve the equation, x + 3 + 5 = 17.
The length of the missing side of the triangle is 9 feet.

The ant travels a total of 2(5) + 9 or 19 feet.

- ## Building with Toothpicks

  This culminating task represents the level of depth and rigor and complexity expected of all 6th grade students to demonstrate evidence of learning.

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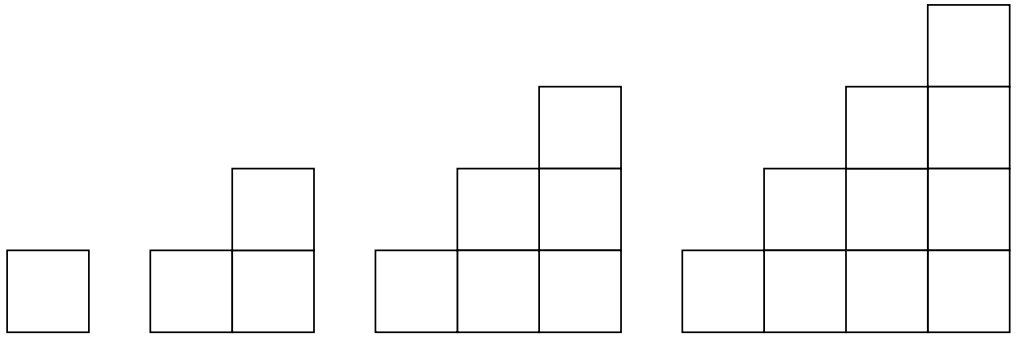
Georgia Performance Standards Framework for Needs Improvement Schools
Subject/Grade Level: Mathematics – Grade 6

UNIT FOUR TASK: "Building with Toothpicks"

The shapes shown below are made with toothpicks. Look for patterns in the number of toothpicks in the perimeter of each shape.



Shape 1 Shape 2 Shape 3 Shape 4

1. Use a pattern from the shapes above to determine the perimeter of the fifth shape in the sequence. Show or explain how you arrived at your answer.
2. Write a formula that you could use to find the perimeter of any shape *n*. Explain how you found your formula.
3. Which shape has a perimeter of 128?

DRAFT

Georgia Performance Standards Framework for Needs Improvement Schools
Subject/Grade Level: Mathematics – Grade 6

Standards Addressed in this Task

M6A2. Students will consider relationships between varying quantities.

a) Analyze and describe patterns arising from mathematical rules, tables, and graphs.

M6A3. Students will evaluate algebraic expressions, including those with exponents, and solve simple one-step equations using each of the four basic operations.

Concepts/Skills to Maintain

- Inverse operations

Suggestions for Classroom Use

While this task may serve as a summative assessment, it also may be used for teaching and learning. It is important that all elements of the task be addressed throughout the learning process so that students understand what is expected of them.

- Self-Assessment
- Peer Review
- Place in portfolio
- Bulletin Board display

Discussion, Suggestions and Possible Solutions

This activity is from the National Council of Teachers of Mathematics, Geometry Academy, Copyright 2001, and has been adapted from Burkhardt et al. (2000).

1) Shape 1 $\Rightarrow$ 4
   Shape 2 $\Rightarrow$ 8

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Georgia Performance Standards Framework for Needs Improvement Schools
Subject/Grade Level: Mathematics – Grade 6

Shape 3 ⇒ 12
Shape 4 ⇒ 16
Shape 5 ⇒ 20

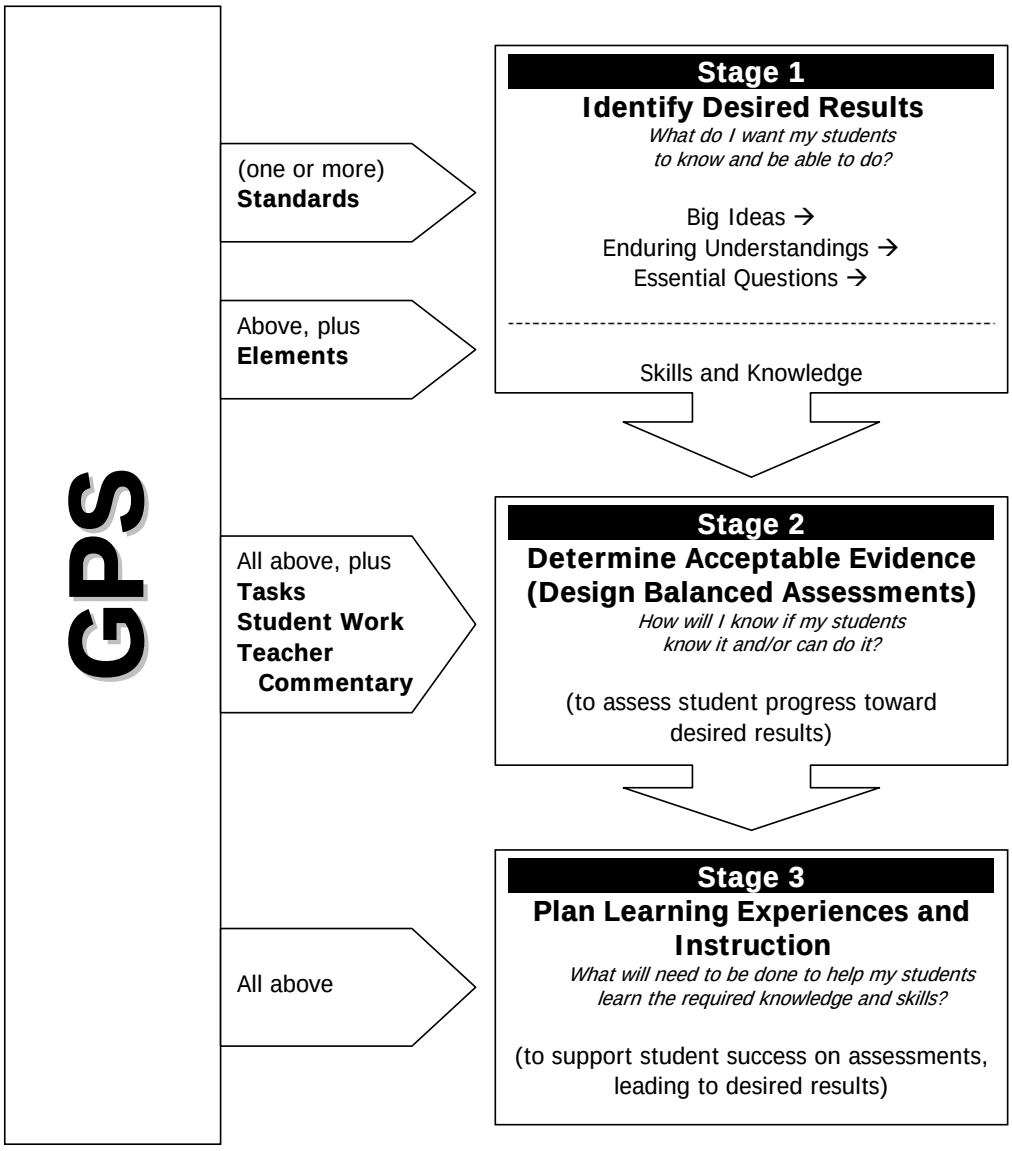
Students may determine the perimeter of the 5th shape by recognizing that the perimeter is four times the shape number or by noticing that 4 is being added to the perimeter of the previous shape to obtain the perimeter of the next shape.

2) So, perimeter = 4s when s = the shape number.

3) Using the formula P = 4s and substituting P = 128 you now have the one-step equation 128 = 4s.
Dividing both sides by 4 you find ÷4 ÷4
32 = s

Therefore, the shape with a perimeter of 128 toothpicks would be shape number 32.

GPS and the Unit Design Process



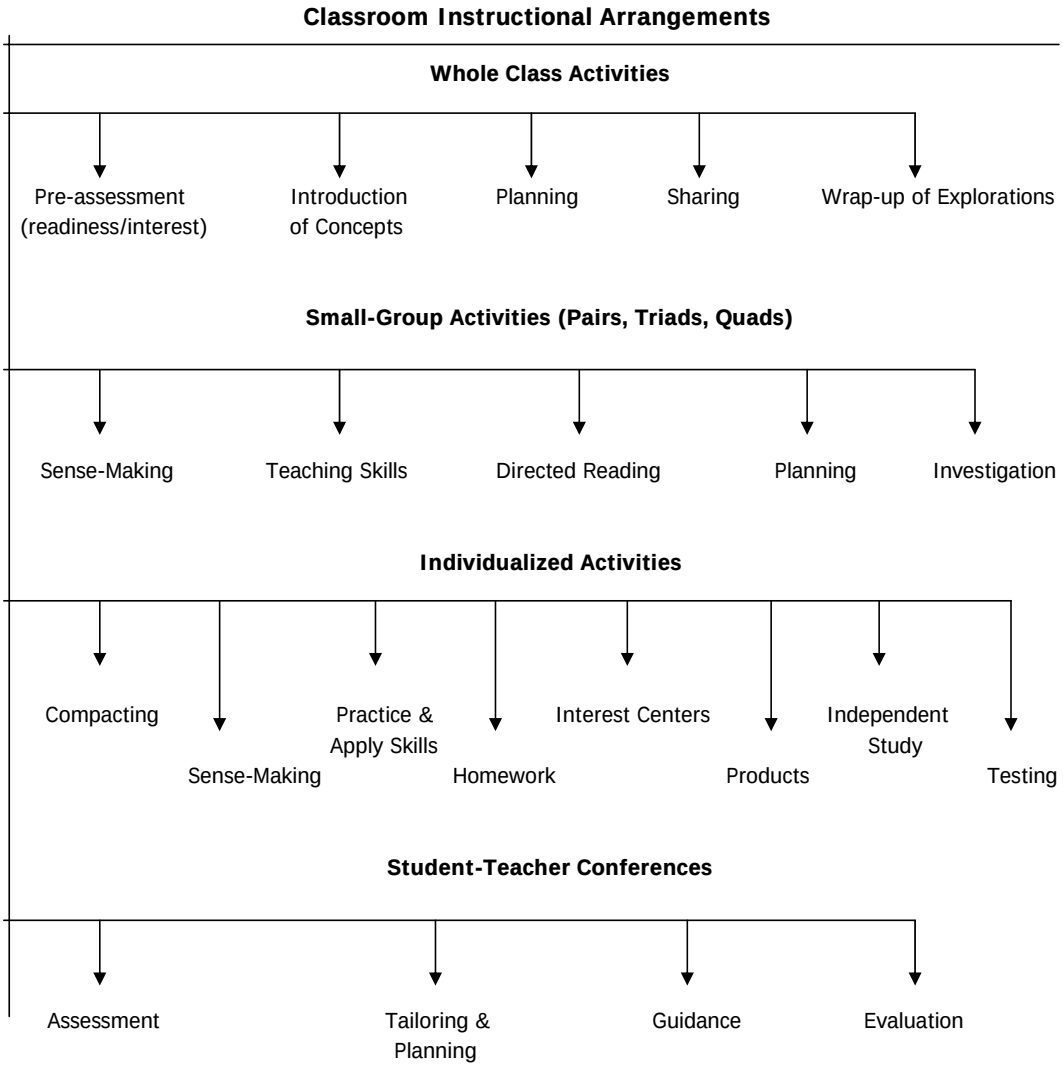
Some Underlying Assumptions of Differentiated Instruction

Read each assumption and assess your own "way of thinking about teaching" by marking the star if this assumption is implicit in your practice throughout the unit, the smiley face if you've taken this assumption into consideration in some way for this unit, and the question mark if you need to think about your practice in terms of this assumption.

The Underlying Assumption	☆	☺	**?**
1. I have planned this unit to accommodate multiple and varied learning needs (social as well as cognitive), rather than attempting to accommodate them after student frustration or failure.			
2. I work to create and maintain a classroom community where students feel safe and valued as they are; at the same time I support each student in order to maximizing his or her potential.			
3. I interact with each student with positive regard and positive expectations.			
4. I recognize every student has both talents and areas of need, and I emphasize the student's strengths rather than accentuating labels, deficits, or differences. At the same time, I do not call attention to the differentiation, but rather I help students appreciate varied ways in which all of them can find personal success with important goals.			
5. I use multiple and alternative forms of assessment at all stages of student learning in this unit in order to uncover and address a full range of learning needs and strengths.			
6. I gather and employ knowledge and information about my students in order to identify and address their varied readiness levels, interests, and learning profiles during this unit.			
7. I find ways to provide access for all students to meaningful and powerful ideas, information, and skills in this unit rather than reducing the standards, watering down the curriculum, or assigning busy work.			
8. I use multiple methods in this unit to engage students in active learning. Although I may employ whole-class instruction, I know that differentiation does not take place during whole class instruction.			
9. I work to develop classroom management skills that allow 1) multiple tasks to proceed smoothly in the classroom, 2) students to take increasing responsibility for their learning, and 3) the time to monitor student activity and coach for student growth and quality work.			

Based on the work of Stephanie Corrigan, Utah Valley State College. Adapted from "The Facilitator's Guide," *At Work in the Differentiated Classroom*, Alexandria: ASCD, 2001, 57-58.

Range of Activities in a Differentiated Classroom



Carol Ann Tomlinson, *How to Differentiate in Mixed-Ability Classrooms*, 2nd ed., Alexandria: ASCD, 2001, 25.

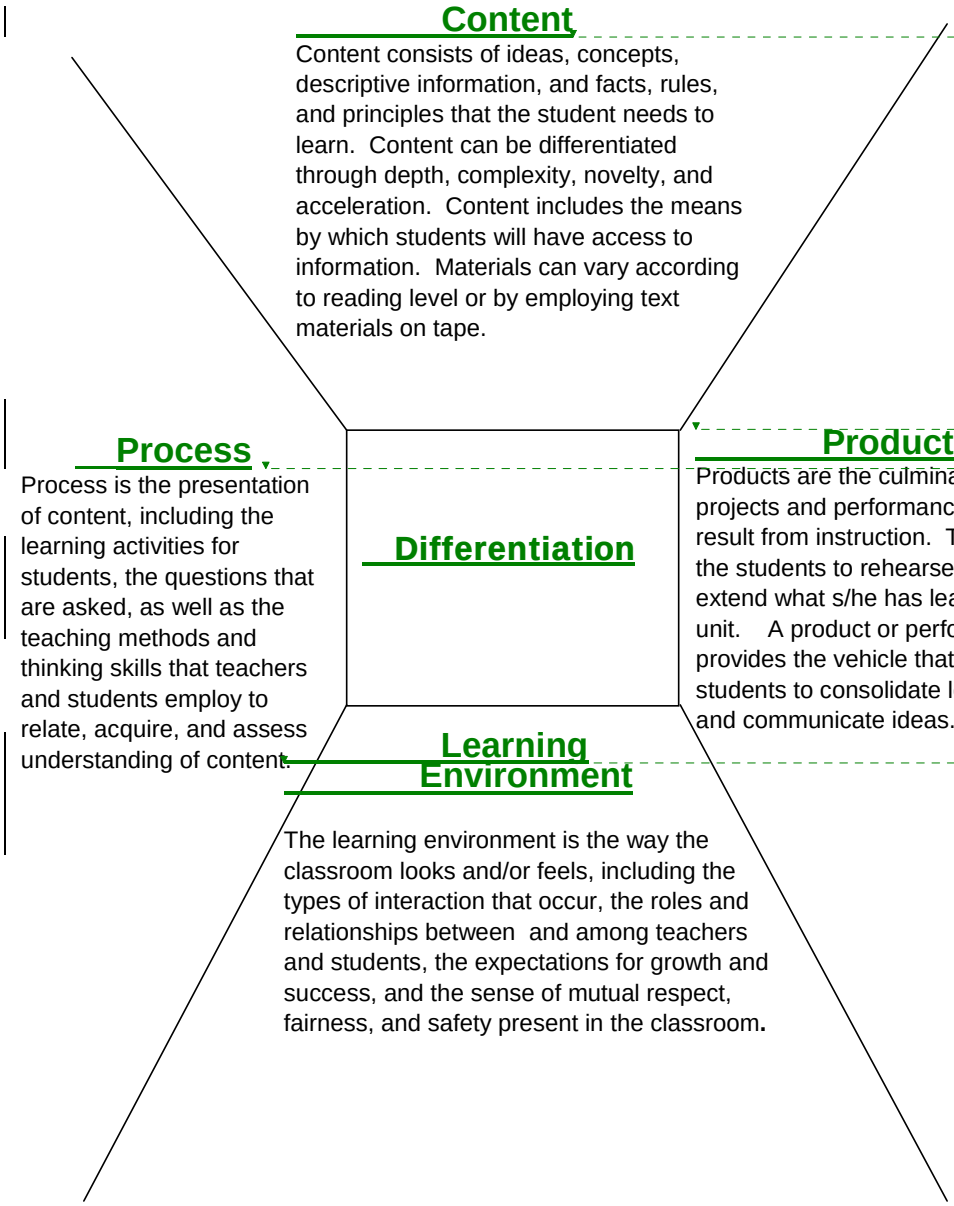
Pre-Assessment Strategies

- ✓ **teacher prepared pretest**
- ✓ **KWL charts and other graphic organizers**
- ✓ **writing prompts/samples**
- ✓ **questioning**
- ✓ **guess box**
- ✓ **picture interpretation**
- ✓ **prediction**
- ✓ **teacher observation/checklists**
- ✓ **student demonstrations and discussions**
- ✓ **initiating activities**
- ✓ **informational surveys/questionnaires/inventories**
- ✓ **student interviews**
- ✓ **student products and work samples**
- ✓ **self-evaluations**
- ✓ **portfolio analysis**
- ✓ **game activities**
- ✓ **show of hands to determine understanding: every pupil response**
- ✓ **drawing related to topic or content**
- ✓ **standardized test information**
- ✓ **reader response survey**
- ✓ **anticipation journals**

Differentiation

	What is it?	How to differentiate?	Strategies to use?
Content			
Process			
Product			
Learning Environment			

What to Differentiate



Deleted: Content¶

Deleted: Product¶

Deleted: Process

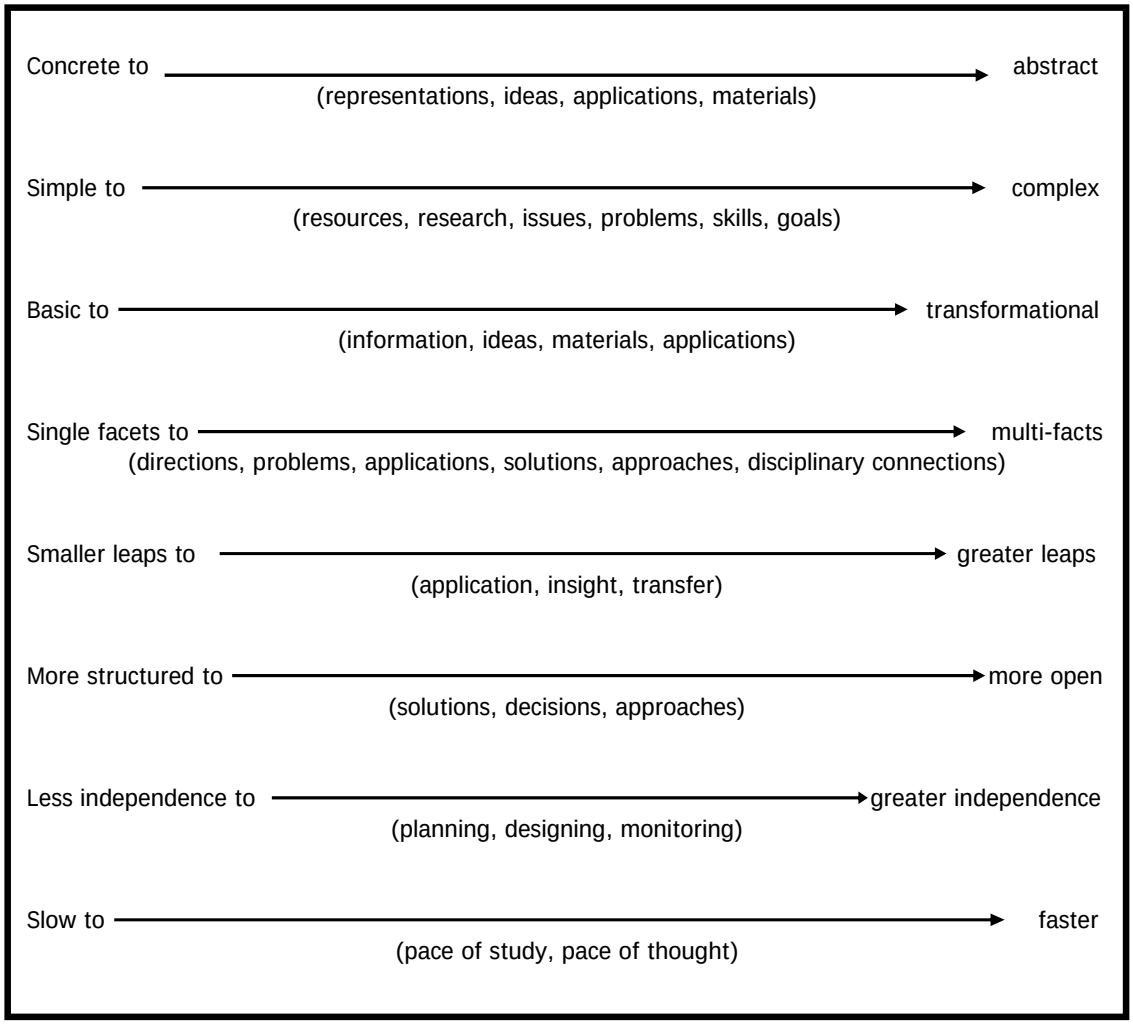
Deleted: Learning¶ Environment¶

Strategies for Managing a Differentiated Classroom

Carol Ann Tomlinson

1. Have a strong rationale for differentiation instruction based on student readiness, interest, and learning profile.
2. Begin differentiating at a pace that is comfortable for you.
3. Time differentiated activities to support student success.
4. Use an "anchor activity" to free you up to focus your attention on your students.
5. Create and deliver instructions carefully
6. Assign students into groups or seating areas smoothly.
7. Have a "home base" for students.
8. Be sure students have a plan for getting help when you're busy with another student or group.
9. Minimize noise.
10. Make a plan for students to turn in work.
11. Teach students to rearrange furniture.
12. Minimize "stray movement".
13. Promote on-task behavior.
14. Have a plan for "quick finishers".
15. Make a plan for "calling a halt".
16. Give your students as much responsibility for their learning as possible.
17. Engage your students in talking about classroom procedures and group process

The Equalizer



Tomlinson

Practice: Differentiating Mathematics Tasks

M6M4. Students will determine the surface area of solid figures (right rectangular prisms and cylinders).

a. Find the surface area of right rectangular prisms and cylinders using manipulatives and constructing nets.
b. Compute the surface area of right rectangular prisms and cylinders using formulae.
c. Estimate the surface areas of simple geometric solids.

Sample Task: Cylinder Task, Parts A-D

a) Explain what is meant by surface area. What steps would you take to find the surface area of a cylinder?
b) One of the major expenses in manufacturing a can is the amount of metal that goes into it. How many square centimeters of metal would be required to manufacture a can that has a diameter of 8 cm and a height of 20 cm? Estimate and then solve.
c) Draw a net (pattern) for the manufacturer to use to make the can.
d) Use your work in parts a – c to write a rule *in words* for finding the surface area of a cylinder. Now write your rule using letters, numbers and mathematical symbols (a formula).

Differentiated Tasks:

1. Independently research the meaning of surface area of a cylinder and nets of cylinders, and prepare an explanation of surface area that involves words. Then write your explanation as a formula. Prepare a presentation, skit or role-play for other students that demonstrates your understanding of surface area and nets of cylinders.
2. A company wants to build individual cylindrical storage buildings. Because of cost, the management would like to limit the amount of paint needed, thus minimizing surface area, while the customers want the most square footage for storage (volume). Explore the relationship between cylindrical surface area and cylindrical volume to determine the best ratio between r and h so that volume is maximized while surface area is minimized. In a format of your choice, present your conclusions about the relationship between r and h, when maximizing volume and minimizing surface area of cylinders.
3. Students, in pairs or small groups, are given several cylinders made of cardboard or paper, scissors, and a ruler. The students are instructed to use the scissors to cut the cylinders in shapes that will allow them to estimate and then measure its size. They use a student-generated graphic organizer to record their findings, and then determine the surface area of their cylinders. Finally, they write an explanation of how to find surface area of a cylinder and its net that they then present to the class or another group.
4. Students, in pairs or small groups, are given a cylinder made of cardboard or paper, scissors, a ruler, and manipulatives such as connecting cubes or tiles. Using a teacher-prepared graphic organizerand , they use manipulatives to estimate the surface area of the cylinder. Then they use the scissors to cut the cylinder in shapes that will allow them to measure its dimensions and determine its net. They write an explanation of surface area that involves words and/or pictures, a diagram, or a flow chart, and use their explanation to write the formula for the surface area of a cylinder.

What Does Differentiation Look Like: A True/False Quiz

Directions: Mark the item T if it is TRUE for a differentiated classroom or F if it is FALSE for a differentiated classroom. After you have responded individually, compare your answers to the others in your table group. When you disagree, discuss your various points and attempt to reach consensus.

_____ 1. Allowing all students in the class to complete the same work for a unit/chapter.

_____ 2. Assessing students before a unit of instruction to determine what they already know.

_____ 3. Adjusting the **core** curriculum by content (below to above grade level),

_____ 4. Limiting how and what is taught by teaching to the average student.

_____ 5. Providing assignments tailored for students of different levels of achievement.

_____ 6. Having high expectations for **ALL** students.

_____ 7. Providing educational experiences which extend, replace, or supplement standard curriculum.

_____ 8. Assigning more work at the same level to high achieving students.

_____ 9. Focusing on student weaknesses and ignoring student strengths.

_____ 10. Using activities that **all** students will be able to do.

_____ 11. Structuring class assignments so they require high levels of critical thinking and allow for a range of responses.

_____ 12. Giving the same kind of problems or questions and expecting more.

_____ 13. Creating more work-extra credit, to do when done.

_____ 14. Having students participating in respectful work.

_____ 15. Putting students in situations where they don't know the answer often.

_____ 16. Ensuring that students and teachers collaborating in learning.

_____ 17. Providing free-time challenge activities.

_____ 18. Differing the pace of instruction.

_____ 19. Using capable students as tutors.

_____ 20. Using higher standards when grading.

_____ 21. Blending of whole class, group, and independent learning.

_____ 22. Using individualized instruction.

What Does Differentiated Instruction Look Like?

Differentiated Instruction is...	**Differentiated Instruction is not...**
1.Assessing students before a unit of instruction to determine what they already know	1.All students in the class completing the same work for a unit/chapter
2.Adjustment of the **core** curriculum by content (below to above grade level), process (concrete to abstract), and product (simple to complex)	2 Limiting how and what is taught by teaching to the average student
3.Providing assignments tailored for students of different levels of achievement	3. Assigning more work at the same level to high achieving students
4. Having high expectations for **ALL** students	4. Focusing on student weaknesses and ignoring student strengths
5. Educational experiences which extend, replace, or supplement standard curriculum	5. Activities that **all** students will be able to do
6. Structuring class assignments so they require high levels of critical thinking and allow for a range of responses	6. Giving the same kind of problems or questions and expecting more
7. Students participating in respectful work	7. Creating more work-extra credit, do when done
8. Students and teachers collaborating in learning	8. Using higher standards when grading
9. Putting students in situations where they don't know the answer- often	9. Providing free-time challenge activities
10. Differing the pace of instruction	10.Using capable students as tutors
11. A blend of whole class, group, and independent learning	11. Using individualized instruction

A Traditional Classroom Compared to a Differentiated One

Traditional Classroom	Differentiated Classroom
1. Student differences are masked or acted upon when problematic.	1. Student differences are studied as a basis for planning.
2. Assessment is most common at the end of learning to see "who got it."	2. Assessment is ongoing and diagnostic to understand how to make instruction more responsive to learner need.
3. A relatively narrow sense of intelligence prevails.	3. Focus on multiple forms of intelligence is evident.
4. A single definition of excellence exists.	4. Excellence is defined by individual growth from a starting point.
5. Student interest is infrequently tapped.	5. Students are frequently guided in making interest-based learning choices.
6. Relatively few learning profile options are	6. Many learning profile options are provided. taken into account.
7. Whole class instruction dominates.	7. Many instructional arrangements are used.
8. Coverage of texts and/or curriculum guides drives instruction.	8. Student readiness, interest, and learning profile shape instruction.
9. Mastery of facts and skills out-of-context focus of learning.	9. Use of essential skills to make sense of the key concepts and principles is the focus of learning.
10. Single-option assignments are the norm.	10. Multi-option assignments are frequently used.
11. Time is relatively inflexible.	11. Time is used flexibly in accordance with student need.
12. A single text prevails.	12. Multiple materials are provided.

13. Single interpretations of ideas and events	13. Multiple perspectives on ideas and events are routinely sought.
14. The teacher directs student behavior.	14. The teacher facilitates students' skills at becoming more self-reliant learners.
15. The teacher solves problems.	15. Students help one another and the teacher solve problems.
16. A single form of assessment is often used.	16. Students are assessed in multiple ways.

Carol Tomlinson, 1998

Low-Prep and High-Prep Differentiation

Low-Prep Differentiation

- Choice of books
- Homework options
- Use of reading buddies
- Varied journal prompts
- Orbitals
- Varied pacing with anchor options
- Student-teacher goal setting
- Work alone/work together
- Whole-to-part and part to whole explanations
- Flexible seating
- Varied computer programs
- Design-A-Day
- Varied supplementary materials
- Options for varied modes of expression
- Varying scaffolding on same organizer
- Let's Make a Deal projects
- Computer mentors
- Think-Pair-Share by readiness, interest, learning profile
- Use of collaboration, independence, and cooperation
- Open-ended activities
- Miniworkshops to reteach or extend skills
- Jigsaw
- Negotiated Criteria
- Explorations by interest
- Games to practice mastery of information and skill
- Multiple levels of questions

High Prep-Differentiation

- Tiered activities and labs
- Tiered products
- Independent studies
- Multiple texts
- Alternative assessments
- Learning contracts
- 4-MAT
- Multiple intelligence options
- Compacting
- Spelling by readiness
- Entry Points
- Varying organizers
- Lectures coupled with graphic organizers
- Interest groups
- Tiered centers
- Interest centers
- Personal agendas
- Literature Circles
- Stations
- Complex instruction
- Group investigation
- Tape-recorded materials
- Teams, Games, and Tournaments
- Think-Tac-Toe
- Simulations
- Problem-Based Learning
- Graduated rubrics
- Flexible reading formats
- Student-centered writing Formats

Tomlinson, *How to Differentiate in Mixed-Ability Classrooms*, 34.

Redelivery Action Plan

Directions: Complete the following chart to create your individual plan for building a differentiated classroom. Consider the following:

- What am I already doing to differentiate?
- How can I assess and use student readiness, interests, and learning profiles to maximize learning growth for every student?
- How can I differentiate content, process, products, or the learning environment?
- How can I employ Tomlinson's Equalizer to create tiered assignments, activities, tasks, and products?

Step/Activity	Who	By When	How	Resources and Ideas

Glossary

Ability Grouping—Grouping students according to similar readiness levels or learning profiles.

Alternate Assignment—Assignments given to particular students or groups of students in lieu of the assignment given to the other members of the class. These assignments are designed to capitalize on student readiness levels, interests, or learning profiles.

Anchor Activity—A task or activity that a student automatically moves to upon completion of other assigned work.

Cluster Grouping—Flexible grouping and regrouping of students within a classroom to accommodate different instructional needs at different times and/or for different subject or content, different readiness levels, interests, or learning profiles.

Compacting—Modifying or streamlining content, process, or product in order to eliminate repetition of previously mastered material.

Contracting—Students contract for grades and/or choose from a variety of available project/product options.

Cooperative Learning—Students work with other students in groups to achieve a specific goal or purpose. Each group member has a particular, predetermined role in helping the group reach its goal.

Exit Cards—Teacher distributes index cards to students a few minutes before the end of class. Students respond quickly to a specific prompt such as "What's the most important thing you learned today?" Exit cards provide a quick and easy method of assessing understanding.

Flexible Grouping—Purposeful reordering of students into a variety of different groups in a short amount of time in order to ensure that all students work with a number of different students on a regular basis. Criteria for grouping—readiness, interest, learning profile, activity or task, content—will vary regularly as well.

Interest Centers/Groups—Interest centers (often used with younger learners) and groups (often used with older learners) allow students choice in an area or areas of study.

Independent Study Projects—A student or small group of students pursues an area of interest related to a specific topic, curricular area, or individual area of interest.

Literature Circles—Small groups of students read and/or study different books with varying degrees of difficulty and/or focusing on a variety of topics of interest.

Product/Project Options—Students chose from a variety of options the way that they will provide evidence of learning. These options allow students to utilize their individual strengths and interests.

Pyramid Activities—Any activity that begins with students working individually, progresses through pairs, groups of four, etc., until ending with the whole-class group. A good way to review material or to practice test-taking strategies. Students may begin by individually recording what they know and then add to or change their responses as they collaborate with other students.

Questioning Strategies—Different types of questions are employed before, during, and after an activity, a lesson, or a unit of instruction to engage and challenge students to demonstrate their understanding from the knowledge level to the evaluation level. These questions allow students to clarify their thinking, increase their knowledge, and deepen their understanding.

RAFT Activities—Students select a Role, Audience, Format, and Topic for a particular task. The task vary but may include writing, oral presentations, skits, review activities, etc.

Reader's Workshop—This student-centered, instructional model for "real reading" uses authentic literature and allows students to self-select books. Students read at their own pace, reflect on what they read, and talk about their reading with others.

Reading Buddies—One name for peer reading partners, pairs of students who assist each other in reading for comprehension. They may take turns: one reading aloud and the other summarizing OR one reading aloud while the other formulates questions about that reading, etc.

Scaffolding—This refers to any support system that enables students to succeed with tasks they find genuinely challenging.

Subject/Content Acceleration—A student or group of students moves to a higher level of at an earlier time or age than the other students.

Thinking Maps—Visual representations of ideas that allow students to "unpack" their thinking and organize ideas in a visual format rather than solely in sentences or paragraphs.

Tiered Assignments—Teachers adjust the degree of difficulty for a particular assignment or task in order to meet the needs of students with varying levels of readiness, varying interests, and/or varying learner profiles.

Writer's Workshop—This student-centered, instructional model for "real writing" uses authentic assignments that allow students to participate in differentiated activities while participating in all stages of the writing process. Students spend time on self-selected writing activities.

Recommended Readings/Viewings/Websites: Differentiation

Note: A more general list of resources for the standards-based education process is contained in the materials for Day 1 of training.

At Work in the Differentiated Classroom. Alexandria, VA: ASCD, 2001.

This excellent resource includes three VHS tapes and a Facilitator's Guide. The videos provide clips of real differentiated classrooms and include commentary by Carol Ann Tomlinson. One set of these materials is being sent to each local system.

Berger, Sandra L. "Differentiating Curriculum for Gifted Students." 1991. Information Center on Disabilities and Gifted Children. Council on Exceptional Children, 1996. http://ericec.org/digests/e510.html.

Berger provides an overview of four areas of differentiation: content, process, product, and learning environment. In addition, she lists seven guiding principles for curriculum differentiation developed by the curriculum committee of the Leadership Training Institute.

Hall, Tracey, Nicole Strangman, and Anne Meyer. "Differentiated Instruction and Implications for UDL Implementation: Effective Classroom Practices Report." *Ideas that Work*. National Center on Accessing the General Curriculum. U.S. Office of Special Education Programs. CAST, Inc. 1999-2005. http://www.cast.org/publications/ncac/ncac_diffinstructudl.html.

This report examines information on the theory and research behind differentiated instruction and the intersection with Universal Design for Learning (UDL), a curriculum designed approach to increase flexibility in teaching and decrease the barriers that frequently limit student access to materials and learning in classrooms. The report includes a number of links to sites with more information about differentiated instruction.

"Interact Graphic Organizers." *Write Design Online*. zNet. http://www.writedesignonline.com/organizers/interact.html#interaction.

Using varying types/levels of graphic organizers provides one means of differentiating content or process. This website includes a number of different types of graphic organizers along with explanations and suggestions for their use. Links to other resources may also be valuable.

"The I-Search Curriculum Unit." *Literacy Matters*. Education Development Center, Inc., 2003-04. http://www.literacymatters.org/content/isearch/intro.htm.

Individual and group investigations, valuable strategies for differentiation, may be organized as I-Searches. An I-Search can actively engage students in the research process as they

pursue questions of importance that they care about. This site explains one version of the I-Search process.

Laturnau, Joseph. "Standards-Based Instruction for English Language Learners." Honolulu: **Pacific Resources for Education and Learning**. http://www.prel.org/products/pc_/standards-based.htm.

This article examines the potential benefits of standards-based instruction for English Language Learners (ELLs), presents a standards-based process for designing standards-based instructional units, and reviews the design of two standards-based units for ELLs. The benefits of performance standards for ELLs are clearly represented in a chart included in the article.

Teaching Styles Inventory. Texas Collaborative for Teaching Excellence. CORD, 2005. http://www.texascollaborative.org/tools/TSI.pdf.

Use this twelve item teaching style inventory to self-assess and self-score your teaching style in the areas of concept representation, learning, interaction, and cognitive processing.

Tomlinson, Carol Ann. *How to Differentiate in Mixed-Ability Classrooms*. 2nd ed. Alexandria, ASCD, 2001.

This valuable resource explains both the theory behind and the means to achieve differentiation in mixed-ability classrooms. Each school received one copy of this resource along with other materials in the fall of 2004.

-----. "Mapping a Route Toward Differentiated Instruction." *Educational Leadership* 57.1 (Sept. 1999): 12-16. http://pdonline.ascd.org/pd_online/diffinstr/ el199909_tomlinson.html.

Tomlinson provides a view into three separate classrooms to illustrate what a differentiated classroom does and does not look like.

-----. *The Differentiated Classroom: Responding to the Needs of All Learners*. Alexandria, ASCD, 1999.

In this book, Tomlinson discusses the what, how, and why of differentiation, and provides examples from a number of differentiated classrooms.

Tomlinson, Carol Ann, and Caroline Cunningham Eidson. *Differentiation in Practice: A Resource Guide for Differentiating Curriculum, Grades K-5*. Alexandria, VA: ASCD, 2003.

This resource provides a brief primer on differentiation, as well as six differentiated units of instruction for grades K-5: two language arts units, two mathematics units, one science unit, and one social studies unit.

-----. *Differentiation in Practice: A Resource Guide for Differentiating Curriculum, Grades 5-9*. Alexandria, VA: ASCD, 2003.

This resource provides a brief primer on differentiation, as well as six differentiated units of instruction for grades 5-9: one language arts unit, one mathematics unit, one science unit, two social studies units, and one French unit.

-----. *Differentiation in Practice: A Resource Guide for Differentiating Curriculum, Grades 9-12*. Alexandria, VA: ASCD, 2005.

This resource is scheduled to be published in August of 2005.

Mathematics

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

Illuminations. http:illuminations.nctm.org/index.asp

Intermath. http://www.intermath.uga.gatech.edu

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

Northey, Sheryn Spencer. *Handbook on Differentiated Instruction for 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 A. and LouAnn Lovin. *Teaching Student-Centered Mathematics: Grades 5-8.* Boston, MA: Pearson Allyn & Bacon, 2006.

Appendix

An Announcement: SAT Prep Online Course

The Georgia Department of Education (GDOE) is pleased to announce the availability of the College Board's **Official SAT Prep Online Course™ for all students in grades 9-12.** The Online SAT Prep Course is another component of our continuing efforts to assist local systems in improving the quality of education for students in Georgia. Available twenty-four hours a day, seven days a week, this program can be integrated into classroom instruction or may be used as a self-paced independent study for students.

The College Board will send specific information regarding the registration of students and educators to each high school principal. The online course is very user-friendly and does not require special training. However, in order to encourage all high schools to fully utilize the course, educators may attend a training session. There will be at least 10 training sessions available throughout the state, and at least one Web cast. The training will include an online demonstration of the course and instruction on maximizing usage of this valuable resource.

By August 1, 2005, the College Board, the facilitators of the Online SAT Program, will provide information for each high school in your district about the following items:

1. Personal access codes for each student in grades 9-12 in each high school
2. 18 interactive lessons that focus on critical reading, math, and writing
3. 600+ practice questions in critical reading, mathematics, writing
4. Explanations of answers to practice test items
5. Three full-length timed practice tests for the SAT
6. Personalized score reports on tests and quizzes for each student
7. Test Reports for the following categories:
   (A). practice test score by student
   (B). practice test question and answer by student and by class
   (C). practice test item type by student
   (D). practice college success skills by student
   (E). practice test summary by student and by class
   (F). practice test current performance by school and by district
   (G). practice test progress by class, by school, and by district
   (H). practice test roster by class
8. Online essay scoring service
9. Twelve-month subscription service for all students and educators.

You will receive information soon from representatives of the GDOE and/or College Board about professional learning classes for facilitators of the SAT Prep Online course in your high schools. We urge each of you to take advantage of this opportunity to improve student achievement on the SAT at no cost to local systems. Thank you for continuing to work toward our goal of leading the nation in improving student achievement. If you have any questions, please contact:

Charlotte Robinson
404-656-6854
crobinso@doe.k12.ga.us

MEMORANDUM

DATE: September 1, 2005

TO: System Superintendents

FROM: Kathy Cox

SUBJECT: Mathematics Manipulatives Shipment

The implementation of the mathematics Georgia Performance Standards (GPS) begins with 6th grade mathematics during the 2005-06 school year. Teaching in a performance-based classroom requires teaching for conceptual understanding. Doing mathematics using "hands-on" manipulatives enables students to move from concrete to pictorial representation to abstract learning of mathematics.

Over the next few weeks, each school containing one or more 6th grade classroom will receive one classroom set of the materials and manipulatives listed below to be shared between classrooms. Because of the size of the shipments, you should expect to receive several different deliveries.

The following materials are currently being packed and shipped:

Item/Description

Algeblocks Middle School Comprehensive Kit
Folding Geometric Shapes (Set of 8)
Overhead Folding Geometric Shapes (Set of 16)
Power Solids
Pattern Blocks, Manipulite, 1 cm (Set of 250)
Overhead Pattern Blocks (Set of 49)
Exploring with Pattern Blocks
Angle Ruler Class Set (Set of 30)
Centimeter Cubes (Set of 1000)
Shatter-Resistant Transparent Ruler (Set of 10)
Classroom set (30) TI-83+ Calculators
TI View Screen Overhead Calculator
Book – Elementary and Middle School Mathematics - Teaching Developmentally

The GPS trainers from each system attending the Phase I, Days 6 & 7 training will receive information and training on the effective use of these materials. Again, redelivery of this training, as well as the entire GPS training, by your system-level trainers to every classroom teacher responsible for implementing the GPS is critical.

Please share this information with your principals so that they will be expecting these shipments during September and possibly into October.

Kathy Cox
State Superintendent of Schools
Georgia Department of Education
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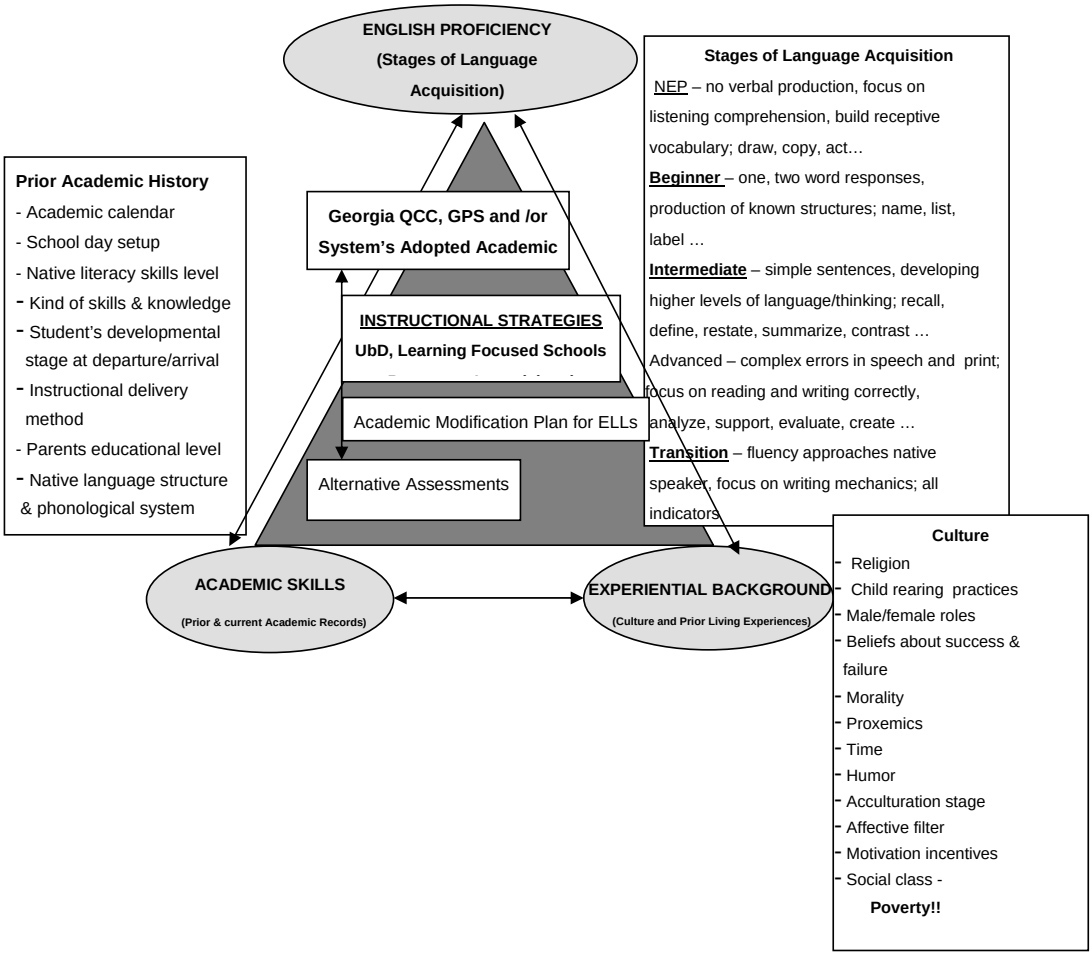
Pre-Assessing the English Language Learner

Framework for Understanding the Learning of PHLOTE & ELL Students: Who Am I Teaching?



Instructional Accommodations for ELLs

Accommodations for ELLS are appropriate and effective only to the level that these match the English language learners proficiency in English, prior academic knowledge and cultural learning patterns.

- **give tests orally rather than in written form**
- **give more time to complete**
- **assignments**
- **allow same-language buddy to assist**
- **require fewer responses to demonstrate mastery**
- **permit incomplete sentences in responses**
- **permit ungrammatically correct sentences in responses**
- **provide lower level text on content material**
- **provide video on content material**
- **provide text on tape**
- **highlight key points**
- **reduce number of key points that student is responsible for knowing**
- **give advanced organizers/study guides**
- **permit open book tests**
- **use graphic organizers**
- **give written instructions as well as oral**
- **make a written record of instruction and display it on chart paper**
- **take time to develop students' prior knowledge of new topics**
- **increase % of student talk about topic (more discussions)**
- **break students into small groups for discussion**
- **plan for group work**
- **use demonstrations when possible**
- **present model of work done well at the beginning of the assignment**
- **use hands-on activities when possible**
- **give sufficient wait time after asking questions**
- **adapt homework requirements to reflect stage of language development**
- **use performance based assessment when possible**
- **adapt project/assignment requirements so students can participate**
- **provide learning centers (language masters, books on tape, magazines for classifying and developing picture dictionaries, language based games)**
- **provide computer time (phonics software, *Kidspiration* graphic organizer software, internet)**
- **seat student near teacher or positive role models**
- **relate content to real life**
- **present tasks from easy to hard**
- **reduce details needed to learn main concepts**

- **use simpler vocabulary or paraphrase**
- **provide additional examples**
- **pair verbal directions with visual clues**
- **look at students when talking**
- **use audio-visual aids frequently**
- **provide student with outline of lesson notes**
- **use peer assisted note taking**
- **use role-playing**
- **use games**
- **provide self-checking materials**
- **use different colors for worksheets**
- **use enlarged type on worksheets**
- **reduce the length or amount of work**
- **mark only correct answers**
- **do NOT write the name of a Korean student in red...it means death**
- **give short quizzes/avoid long tests**
- **allow the use of a dictionary during tests**
- **allow student to take tests until passes/emphasize mastery**

Suggestions for Differentiating the Cylinder Task

Task:

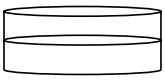
e) Explain what is meant by surface area. What steps would you take to find the surface area of a cylinder?

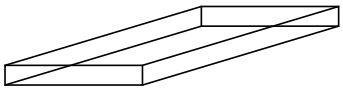
f) One of the major expenses in manufacturing a can is the amount of metal that goes into it. How many square centimeters of metal would be required to manufacture a can that has a diameter of 8 cm and a height of 20 cm? Estimate and then solve.

g) Draw a net (pattern) for the manufacturer to use to make the can.

h) Use your work in parts a – c to write a rule *in words* for finding the surface area of a cylinder. Now write your rule using letters, numbers and mathematical symbols (a formula).

i) Michael bakes a round two-layer birthday cake that is to be covered with frosting on the top, sides, and in between the layers. Each layer has a height of 4 cm and diameter of 24 cm. The label on the can of frosting he bought claims that the contents will cover the top and sides of a one-layer rectangular sheet cake that is 32 cm by 22 cm by 4 cm. Will Michael have enough frosting? Show how you know.





Suggestions for Differentiating Task:

Special Education

a) Students can develop a flow chart to illustrate the steps in finding the surface area of a cylinder. They can write, draw, or attach picture symbols to illustrate the steps.
b) Provide manipulatives for students to use prior to estimating the amount of metal.
c) Students may use a net provided by the teacher and color the area that the manufacturer would use to make the can.
d) Use picture symbols to develop a flow chart for finding the surface area of a cylinder. Use a word processor or voice activated software to write a rule in words for finding the surface area of a cylinder.
e) Use manipulatives that represent the cake. Students can use connecting cubes to determine whether or not Michael will have enough icing.

Gifted Education

Some students in your mathematics class will learn more rapidly, with fewer repetitions and less explanation, than most of their age peers. These students are easily bored with routine tasks, and, in the absence of more challenging tasks, they are at risk for loss of intellectual enthusiasm and motivation for learning. Gifted/advanced students, in comparison to their age peers, more easily grasp complex and abstract concepts, and they can more easily see connections within and across

disciplines. Exploration of advanced concepts within and across disciplines allows advanced mathematics students to see and create patterns of meaning. They use critical thinking skills and logical approaches to figuring out solutions, often drawing inferences and making generalizations that age peers do not yet recognize.

These suggested differentiated tasks respond to these student differences by allowing advanced students an opportunity to study in greater breadth and depth the sixth-grade math standards related to surface area and volume of geometric solids. Once students have demonstrated understanding of surface area and applications of this mathematical concept, the intellectual demand of the tasks could be increased by asking them to build new mathematical knowledge by exploring the relationship between surface area and volume. This acknowledges the advanced students' quick mastery of content/concepts and eliminates lethargy and poor work habits resulting from unecessary practice. The differentiated tasks draw on students' advanced thinking skills and focuses on problem solving.

Suggested Differentiated Tasks: Relating Surface Area to Volume

- A company wants to build individual storage units that are unattached from other units. One of the costs related to the task is painting the units. The management would like to limit the amount of paint needed, thus minimizing surface area, while the customers want the most square footage for storage (volume). Explore different three-dimensional shapes to find the best relation between higher volume for customers and lower surface area for management.
- Using the skills and knowledge gained from the previous exercise, explore the relationship between cylindrical surface area and cylindrical volume to determine the best ratio between r and h so that you maximize volume while minimizing surface area.
- Make a chart of cylindrical formations defined by $r + h = 30$. (For example, start with $r = 1$ and $h = 29$, and the do $r = 2$ and $h = 28$ until you get to $r = 29$ and $h = 1$.) Calculate the surface area and volume for each cylinder, and then calculate the quotient of the volume and the surface area. What configuration has the highest quotient value? What does this mean? What patterns do you see in the quotient? Why does this pattern exist?
- Place the algebraic equation for cylindrical volume over the algebraic equation for cylindrical surface area. Factor out common factors and simplify the equation. What does the simplified polynomial fraction tell you about your results from part c? Can you draw any conclusions from the new equation?

The differentiated tasks, while related to all the standards required for the basic tasks, emphasize the standards involving surface area and volume and their application, and the process standards.

English Language Learner (ELL)

The teacher needs to determine differentiation strategies based on specific student learning characteristics taking in consideration the student's English language proficiency stage, the student's prior knowledge and the student's culture. Some specific suggested strategies, tailored for students at different levels of English acquisition, follow these parts of the task. (For the information about English language learners at other proficiency stages, please see p. 26-28 in the Participant's Guide.)

Part a):

- In the case of English Language Learner (ELL), always provide the illustration for the word problem and include the placement of the measurements with the illustration. Explain key words and numbers that tell them what to do with the problem, i.e. words like *explain, surface area, cylinder.* The word *can* may be problematic due to multiple meanings; *can* should be recognized by the student as the cylinder and not the verb for ability. For the content area of mathematics, key words would be *square centimeters, diameter, height, estimate* and any other words the teacher finds problematic during pre-assessment. This task hits all facets - the mathematics concept, computation, the algorithm and the formula, direct reference to the concrete and real world basis. Teachers need to make sure these connections are thoroughly addressed. More suggestions follow.

- **Language characteristics of Non English Proficiency (NEP) students:**
  - **minimal comprehension**
  - **no verbal production**
  - **communicates with actions and gestures**

- When an English language learner is at the pre-production stage (NEP), after the teacher introduces the concept in class using rich contextual realia (making input comprehensible by the use of concrete resources, i.e., manipulatives, advanced organizers, illustrations, etc.), the student may show evidence of learning through the kind of behaviors described in the following performance indicators, which are silent verbs.
  - **listen / draw**
  - **point / act**
  - **move / copy**
  - **mime / circle**
  - **match / choose**

- Depending on the information gathered, the task may look similar to this:

  - Explain task in native language and accept response in native language for NEPs if at all possible.
    In your native language explain what is meant by surface area. What steps would you take to find the surface area of a cylinder?
  - Student may be allowed to choose the right answers by circling an answer from a multiple-choice exercise. Instructions in native language may be needed.
    Circle the correct answer for the surface area of the cylinders below.
  - Student may draw other figures and calculate their surface area to indicate understanding of concept.
  - Student may be allowed to measure surface area of other physical figures in the classroom.

- The teacher may need to accept units of measurement for surface area in the metric system due to its prevalence across the world.

- Student may not have had the opportunity to learn this concept or may have gone beyond such concepts in native academic setting. Mathematics diagnostic measures that utilize computation measures, instead of application, may provide the teacher a general idea of the student's mathematics prior knowledge. Mathematics is a developmentally sequenced subject; teachers need to know the student's mathematics level to determine the differentiation strategies that may apply.

Part b):

- For an intermediate ELL the following performance indicators apply:
  - **recall / summarize**
  - **retell / describe**
  - **define / role-play**
  - **explain / restate**
  - **compare / contrast**

- For an intermediate ELL the following language characteristics apply:
  - **increased comprehension**
  - **simple sentences**
  - **some errors in speech**

- The student may be able to engage with this task if exposed to this concept in native language school setting. Students from some parts of the world may have difficulties showing evidence of their work since in many countries students are encouraged to solve mathematical problems in their heads.

- Teacher may need to accept units of measurement in the metric system due to its prevalence across the world.

Parts c) and d):

- Buddy assistance may be provided to explain the task.
- Task c may be appropriate for ELLs once initial understanding of task is achieved.

Part e):

- In addition to suggestions provided above, teacher may need to explain or illustrate potentially difficult vocabulary for ELLs i.e. two-layer cake, frosting, label and/or sheet cake.

If the student is advanced in English proficiency and gifted in mathematics, then gifted differentiation strategies may apply.

Georgia Department of Education, GPS Differentiation Menu

For students who have difficulty with ***writing/composing written material***:**

- cooperative learning groups
- word processing application
- dictation to a scribe or onto a tape
- demonstrate/role play
- oral responses, presentation, and assessments
- multi-media presentation
- graphic organizer
- extended time on timed tasks
- word prediction software
- *Co-Writer, Write Out Loud, Dragon Naturally Speaking,* or other software
- voice output computer programs
- spell check/grammar check (not allowed on standardized tests)
- task item rubrics
- teacher prepared format
- bread work into manageable parts
- individual or small group test taking
- story starters
- sentence starters
- outlines
- tape recorded essays and oral presentations
- voice activated software
- portable word processor
- prewriting conference/prewriting activities
- illustrations
- K-W-L chart
- provide sample work
- debates
- proofreading checklist
- word bank/word wall
- matrix usage
- note taking assistance
- provide student with key words on essay tests
- abbreviate assignments
- adapted writing tools or other assistive technology, as appropriate

For students who have difficulty with ***reading/accessing written material***:**

- cooperative learning groups/group discussion
- extended time on timed tasks
- voice output computer programs
- talking dictionaries

- break work into manageable parts/presentation of small chunks of a passage
- individual or small group test taking
- testing with reader or scanable text readers
- books on tape/listening to recording/viewing film version of story
- text read to the student by adult or peer
- reading guides (highlighted text, summaries, etc.)
- Language Master
- tracking light or other tracking device
- colored overlays
- computer generated books
- answer "yes/no" questions for comprehension checks
- choral reading
- pre-reading summary
- electronic text (text reader)
- oral (or audio) presentation to student
- teacher introduction of vocabulary words
- paired reading
- picture cues
- illustrations to show comprehension
- *CoWriter, Write Out Loud*, other software
- K-W-L chart
- previewing topics to introduce vocabulary and key concepts
- listening guide to facilitate note taking
- links to prior knowledge/personal experience
- debates
- word bank/word wall
- other assistive technology, as appropriate

For students who have difficulty ***speaking*:

- sign language interpreter/transliterator
- augmentative communication devices
- communication boards
- cooperative learning groups
- usage of other preferred means of communication
- demonstrate/play act tasks
- picture symbol program
- object symbols
- voice output computer programs
- object symbols
- voice output computer programs
- break work into manageable parts
- provide time to respond
- ask "yes/no" questions
- indicating correct answer by pointing
- assign written rather than oral reports

- avoid situations that create pressure
- other assistive technology, as appropriate

For students who have difficulty ***listening***:**

- cooperative learning groups
- visual presentation using computer software, such as *PowerPoint* or *Inspiration*
- break work into manageable parts
- repeat, rephrase, simplify statements and instructions
- provide time to respond
- use of literal, concrete speech
- visual aids
- preferential seating
- note taking assistance (copy or notes/note-taking guides/note taker)
- have student repeat instructions
- reinforce oral instructions with written instructions
- assistive technology, as appropriate

For students who have difficulty with mobility:

- cooperative learning groups
- switch use
- touch screen
- modified keyboards
- extended time on timed tasks (or waive timed tasks)
- modified handwriting and/or grid paper
- weighted pencils and other motoric devices
- slant board or wedge
- magnets, tape, or other paper stabilizers
- stabilized materials
- break work into manageable parts
- individual or small group test taking
- provide time to respond
- page turner
- flexible schedule/scheduled rest breaks
- provide assistance in manipulating classroom and personal materials
- note taking assistance
- adaptive or special furniture
- dictation to a scribe or onto a tape
- other assistive technology, as appropriate

For students who have difficulty attending to *task*:

- cooperative learning groups with specific tasks assigned
- rubrics
- graphic organizers
- extended time on timed tasks
- break work into manageable parts

- individual or small group test taking
- task analysis
- task analysis graphically displayed
- proximity control
- visual, verbal, and tactile cues
- gain student's attention before delivery of information
- flexible schedule/scheduled rest breaks
- preferential seating
- note taking assistance
- provide study guides for tests
- have student repeat instructions
- regular notebook/agenda checks
- give abbreviated assignments
- set time allotments for tasks
- organizer/daily planner/homework notebook/folders
- fewer items on each page
- allow students to mark answers in workbooks and test booklets
- select optimal time of day for assessments
- provide study carrel or other quiet work space with minimal distractions
- assistive technology, as appropriate

For students who have difficulty with ***organizations/study skills***:**

- cooperative learning groups
- graphic organizers
- extended time on timed tasks
- break work into manageable parts
- individual or small group test taking
- task analysis
- task analysis graphically displayed
- organizer/daily planner/homework notebook/folders
- provide time to respond
- preferential seating
- provide sample work
- task item rubrics
- provide study guides for tests
- have student repeat instructions
- regular notebook/agenda checks
- set time allotments for task
- fewer items on each page
- provide study carrel or other quiet work space with minimal distractions
- provide books to remain at home
- establish and post daily routines
- allow students to mark answers in workbooks and test booklets
- assistive technology, as appropriate

For students who are ***Deaf/Hard of Hearing***:**

- sign language interpreter/transliterator
- amplification equipment
- sound-treated classrooms/special acoustics
- visual presentation using computer software, such as *PowerPoint* or *Inspiration*
- highlighted vocabulary
- closed captioning for viewing movies and other video presentations
- cooperative learning groups
- demonstrate/play act tasks
- voice output computer programs
- individual or small group test taking
- give short, specific verbal instructions
- story webs
- story starters
- *Write Out Loud, CoWriter,* or other software
- peer scribe
- note taking assistance
- provision of class notes with critical information, test questions, and highlighted vocabulary
- preferential seating
- refrain from speaking with back turned to students
- provide a work space with minimal noise
- other communication aids (assistive technology), as appropriate

For students who are ***Visually Impaired***:**

- Braille text/Braille writer
- enlarged print
- print with optical devices
- tactile symbols
- calendar system
- auditory and electronic formats
- dark or raised line paper
- cooperative learning groups
- slant board
- individual or small group test taking
- low vision devices/magnifying equipment
- screen readers/text scanners
- audiotaped directions and text (Talking Books for the Blind)
- word processing program with voice output
- electronic Braille note takers
- positioning in class away from glare
- black print handouts
- primary typewriter
- preferential seating
- usage of grid paper

- special or adapted lighting
- other alternate formats, communication aids, or assistive technology, as appropriate

Student-Created Products

Verbal	riddle	filmstrip	transparency	improvisation
anecdote	role-play	flag	travel ad	instrument
audio recording	song	flashcard	travel log	invention
ballad	speech	flip chart	tree chart	jigsaw puzzle
book report	story telling	flowchart	video tape	kite
campaign speech	survey	game	wall hanging	laboratory
characterrization		graphic	weather map	learning center
choral reading	**Visual**	greeting card	weaving	macramé
cinquain	advertisement	hieroglyphic	web	mime
comedy act	CD cover	icon	web page	mobile
comparison	anagram	id chart	window shade	model
conference	animation	illustration	word game	origami
couplet	annotated biblio.	layout	word search	parallel play
debate	area graph	map		paper mache
description	artifact collection	mask	**Kinesthetic**	play
dialog	award	mobile	apparatus	prototype
discussion	banner	mosaic	aquarium	puppet
documentary	bar graph	movie	artifacts	finger puppet
dramatization	blueprint	newscast	card game	marionette
explanation	book jacket	outline	cardboard relief	hand puppet
fairy tale/tall tale	booklet	painting	ceramics	puppet show
free verse	bookmark	pattern	charade	puzzle
interview	brochure	pennant	circuit boards	quilt
jingle	bulletin board	photo essay	clothing	relief rubbing
joke	calendar	photograph	collage	role play
lecture	cardboard relief	picture dictionary	collection	sand casting
lesson	cartoon	picture story	dance	scavenger hunt
limerick	chart	pie chart	demonstration	service
mock interview	checklist	playing card	discovery center	sewing cards
monologue	collage	print	display	shadow box
myth	collection	puzzle	dramatization	simulation
newscast	comic book	scatter graph	equipment	skit
nursery rhyme	costume	scenario	etching	soap sculpture
oral report	cross-section	scrap book	experiment	stage set
panel discussion	crossword puzzle	scroll	fair	stitchery
quatrain	design	sign	food	terrarium
radio show	diagram	silk screen	furniture	tie-dye
radio commercial	diorama	slide show	gadget	tool
rap	display	stencil	game	toy
recorded dialogue	drawing	TV commercial	hat	uniform
rhyme	film	timeline	imaginary play	vehicle
weaving	dialog	letter to editor	patent	riddle
wire sculpture	dictionary	limerick	pen pal	satire
	editorial	list	petition	science fiction

Written	essay	log	plan	scroll
advertisement	fairy tale/tall tale	lyrics	play	short story
autobiography	field manual	magazine	poem	skit
book report	free verse	magazine article	prediction	slogan
booklet	friendly letter	manual	profile	speech
brochure	glossary	metaphor	puppet show	story
business letter	guidebook	myth	questionnaire	story problems
characterization	handbook	new story ending	questions	survey
classified ad	handout	newsletter	radio script	telegram
comic book	interview script	newspaper	rating scale	TV script
comparison	job description	newspaper article	rationale	term paper
computer prog.	joke book	notes	recipe	test
couplet	jot list	novel	reference	travel log
creative writing	journal article	oath	report	vocabulary list
critique	label	outline	research paper	yearbook
database	law	pamphlet	review	
description	lesson plan	parody	rewritten ending	

from GA Dept. of Education *Curriculum Guide for the Education of Gifted Students*, by Jim Curry and John Samara

Product Possibilities

Design a web page	Design political cartoons	Compile a newspaper
Develop a solution to a community problem	Formulate & defend a theory	Develop an exhibit
Create a public service announcement	Conduct a training session	Conduct an ethnography
Write a book	Design & teach a class	Write a biography
Design a game	Do a demonstration	Present a photo-essay
Generate & circulate a petition	Present a news report	Hold a press conference
Write a series of letters	Write a new law & plan for its passage	Develop & use a questionnaire
Present a mime	Make learning centers	Conduct a debate
Design & create a needlework	Create authentic recipes	Make a video documentary
Lead a symposium	Choreograph dances	Create a series of illustrations
Build a planetarium	Present a mock trial	Write poems
Conduct a series of interviews	Make a plan	Develop tools
Develop a collection	Compile & annotate a set of Internet resources	Design or create musical instruments
Submit writings to a journal, magazine, or newspaper	Design a new product	Compile a booklet or brochure
Interpret through multimedia	Write a series of songs	Draw a set of blueprints
Design a structure	Create a subject dictionary	Present a radio program
Design & conduct an experiment	Make and carry out a plan	Do a puppet show
Collect & analyze samples	Design a simulation	Create a series of wall hangings
Plan a journey or an odyssey	Write a musical	Go on an archeological dig
Make an etching or a woodcut	Develop a museum exhibit	Design & make costumes
Writer letters to the editor	Be a mentor	Present an interior monologue
	Write or produce a play	Generate charts or diagrams to explain ideas

Carol Ann Tomlinson, How to Differentiate in a Mixed-Ability Classroom, 2nd ed., Alexandria, ASCD, 2001, 89.

Fund Raising Ideas

The entire sixth grade class at Daysix Middle School is planning a huge party to celebrate the fact that they have led the nation in student achievement. To assure that the party is absolutely awesome, they need to hold a walk-a-thon fund raiser. The students will earn money based on the number of kilometers walked.

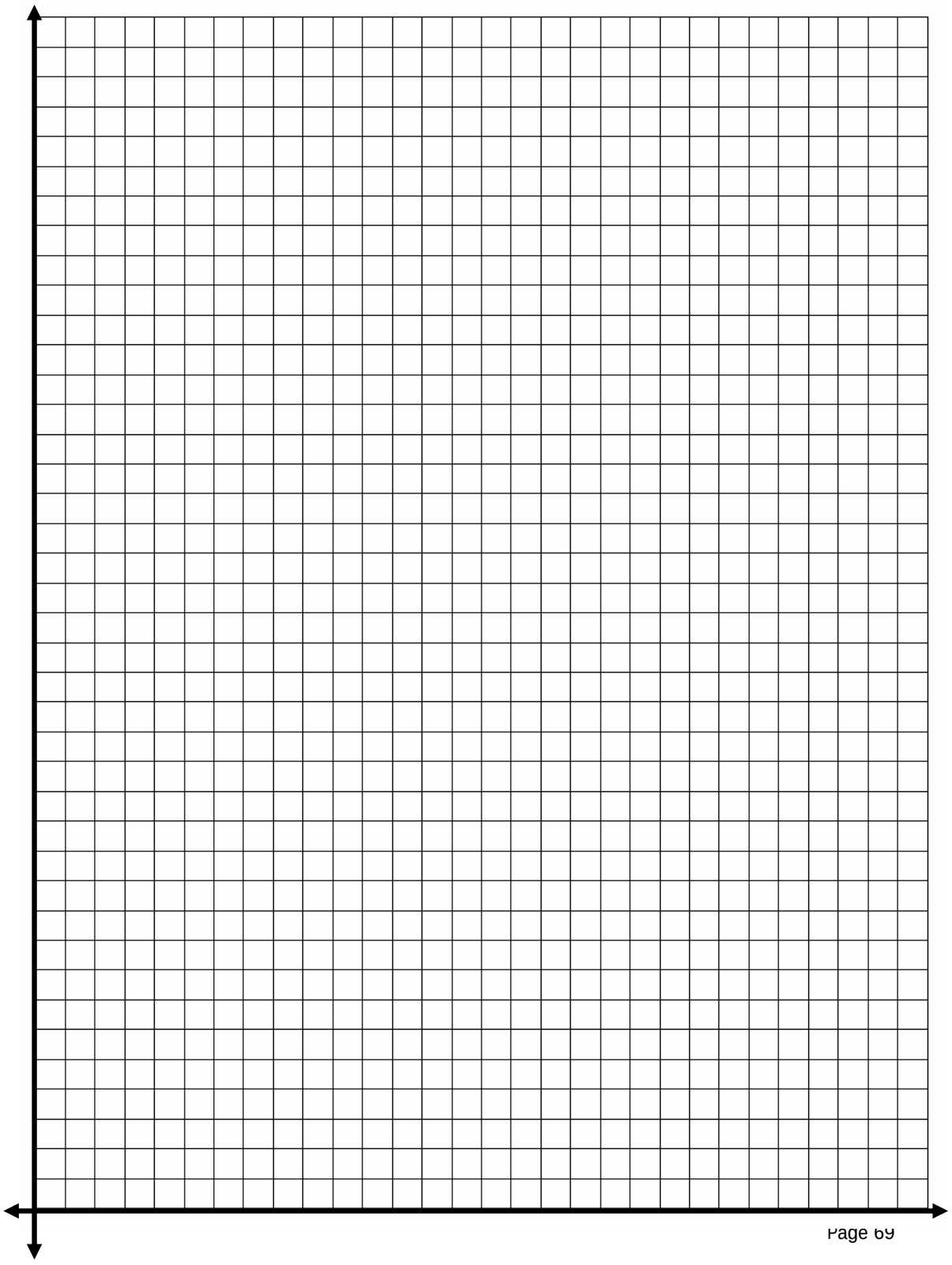
1. You are not limited to the types of sponsorship agreements. With your partner, invent as many different sponsorship scenarios as you can for walking in this fundraiser. Be creative!
2. Choose one of these scenarios and construct a table of values representing the money earned after having walked 0, 1, 2, 3, ... kilometers.
3. Plot the pairs of values found (the distance waked and the money earned) on a large graph. Remember to label your x and y axis.
4. Make a prediction concerning what you think the graph will look like when it is complete. Will it be a straight or curved line and why?
5. When you have completed the table and graph, find a way to represent this information as an equation, using d to represent the distance walked and $ to represent the amount of money earned.
6. Write the symbolic representation for this information in different ways.
7. Repeat steps 2-6 for your choice of at least three other scenarios.
8. Compare and contrast the graphs of the various sponsorship agreements. What do you think might affect the changes from one graph to another and why?
9. Explore ways of increasing the amount of money raised for the walk-a-thon.
10. Prepare a presentation to the sixth grade class that would help them to see and understand what kinds of sponsorship agreements you think would yield the most money.

Fundraiser Tic-Tac-Toe

I will sponsor you by starting with a $10 donation, then adding $2 more for every kilometer that you walk.	**I will sponsor your by donating $5 for each kilometer that you walk.**	**I will sponsor you by starting with 10 cents, and doubling my donation for each kilometer that you walk.**
I will sponsor you by donating the number of dollars equal to the sum of the number of kilometers that you walk.	**I will sponsor you with $3 per kilometer and if you complete the walk, I will give you $50 more.**	**I will pay you $4.75 for every kilometer that you complete.**
I will sponsor you by giving you $5 for each two kilometers that you walk.	**My donation will be the square of the number of kilometers that you walk.**	**I will give you 2 ¼ times the number of kilometers that you complete in the walk-a-thon.**

Fundraiser Tic-Tac-Toe

I will sponsor you by starting with a $10 donation, then adding $2 more for every kilometer that you walk.	**I will sponsor your by donating $5 for each kilometer that you walk.**	**I will sponsor you by starting with 10 cents, and doubling my donation for each kilometer that you walk.**
I will sponsor you by donating the number of dollars equal to the sum of the number of kilometers that you walk.	**I will sponsor you with $3 per kilometer and if you complete the walk, I will give you $50 more.**	**I will pay you $4.75 for every kilometer that you complete.**
I will sponsor you by giving you $5 for each two kilometers that you walk.	**My donation will be the square of the number of kilometers that you walk.**	**I will give you 2 ¼ times the number of kilometers that you complete in the walk-a-thon.**



Assignments for Days 7 and 8 of GPS Training

For Day 7 for all grade levels and all content areas:

Each participant should bring a student work sample to Day 7 of training. This sample should include 4 copies of the student work, 1 copy of the assignment that generated the work including the standard(s) being assessed via this student work, and 1 copy of each of the two permission forms (teacher permission form and student/parent permission form). These forms are in the Participant's Guide for Day 6 of the training.

For Day 8 for all grade levels and all content areas:

As you work to implement the GPS standards this first year, please record your experiences in a notebook, journal, or other calendar format. Note any tasks, strategies, assessments, etc., that worked especially well; critical comments about particular standards (e.g., gaps that need filling, elements that are problematic, terms that need defining, etc.); suggestions for teachers/instructional leaders in Phase II who will be implementing the following year; thoughts or ideas about the second year of your implementation; etc. Please bring this record with you to Day 8 of training. The State Board of Education will be reviewing the GPS each year, and your comments will provide information for this review, as well as topics for discussion in training.

Permission Forms for Student Work

CONSENT AND ASSIGNMENT

This Consent and Assignment (the "Assignment") is effective when signed by the undersigned Georgia educator ("Educator") and is between Educator and the Georgia Department of Education (the "GDOE"). For good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree:

1. GDOE gratefully acknowledges the contribution Educator is hereby making to GDOE of the original work product (the "Work Product") created, developed, worked on or revised by Educator in connection with GDOE's Georgia Performance Standards Project (the "Project"). So that GDOE may fully use the Work Product in any manner it sees fit, including making copies, modifications and derivative works, Educator hereby fully and unconditionally transfers, assigns and conveys to GDOE all of Educator's copyright, ownership interests and other intellectual property rights in the Work Product (collectively, the "Intellectual Property Rights"). Educator further agrees that GDOE may publicly recognize and acknowledge Educator's contribution to, and involvement in, the Project.

2. This Assignment is governed by Georgia law, can only be amended if both parties do so in writing, is assignable solely by GDOE and supersedes any contrary oral or written agreement or understanding. Educator grants to GDOE the power and authority to execute any documentation deemed necessary by GDOE to register or protect the Work Product or Intellectual Property Rights therein or complete the full transfer of the Work Product and Intellectual Property Rights to GDOE which is the purpose of this Assignment.

"Educator"
Name:

Signature:

_____

Print:

_____

"GDOE"

Georgia Department of Education

By:

_____

Title:

_____

Date:

_____

CONSENT AND ASSIGNMENT

This Consent and Assignment (the "Assignment") is effective when signed by the undersigned legal guardian ("Guardian") on behalf of the Guardian and minor Georgia student named below ("Student"), and is among Guardian, Student and the Georgia Department of Education (the "GDOE"). For good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree:

1. GDOE gratefully acknowledges the contribution Student and Guardian are hereby making to GDOE of the original work product (the "Work Product") created, developed, worked on or revised by Student. So that GDOE may fully use the Work Product in any manner it sees fit in connection with GDOE's Georgia Performance Standards Project (the "Project"), including making copies, modifications and derivative works, Guardian on behalf of Guardian and Student (and their heirs and successors) hereby fully and unconditionally transfer, assign and convey to GDOE all of Student's and Guardian's copyright, ownership interests and other intellectual property rights in the Work Product (collectively, the "Intellectual Property Rights"). Guardian further agrees that GDOE may publicly recognize and acknowledge Student's contribution to, and involvement in, the Project.

2. This Assignment is governed by Georgia law, can only be amended if both parties do so in writing, is assignable solely by GDOE and supersedes any contrary oral or written agreement or understanding. Student grants to GDOE the power and authority to execute any documentation deemed necessary by GDOE to register or protect the Work Product or Intellectual Property Rights therein or complete the full transfer of the Work Product and Intellectual Property Rights to GDOE which is the purpose of this Assignment.

"Guardian"

Signature:
_____

Print Name:
_____

Guardian's Relationship to Minor:
_____

Print Minor's Name:
_____

"GDOE"

Georgia Department of Education

By:
_____

Title:
_____

Date:
_____