

**Training for Georgia
Performance Standards**

Days 3 and 4: Classroom Implementation

*Participant's Guide
Grades 3 – 5 Mathematics*

We will lead the nation in improving student achievement.

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Acknowledgements

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

For more information on this or other GPS training, you may go to the math webpage through the Georgia Department of Education website under Curriculum and Instruction or use the direct link http://www.gadoe.org/ci_services.aspx?PageReq=CIServMath .



Use of This Guide

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 Days 3-4 have occurred. Consult the trainer for availability.

For more information on this or other GPS training, please contact Claire Pierce (404)657-7063 at cpierce@doe.k12.ga.us , Carmen Smith (404)463-1746 at csmith@doe.k12.ga.us , or Dr. Massie McAdoo (404) 463-6924 at mmcadoo@doe.k12.ga.us.

 **Agenda****Introduction**

- Review of Stages One and Two
- Overview of the Training

Describing the Standards-Based Classroom

- "Math Lab Raided" Activity
- Dog Wash Task
- Math Lab Lesson: Birthday Cookout
- What We Should See in a Lesson
- Strategies

Classroom Management

- Baseball Pizza Party
- Quote Activity
- Student Involvement and Cooperation

Designing Lessons

- Polygon Percent Pattern Task
- The Big Picture
- Putting it all together
- Designing lessons

Action Plan for Redelivery

 **Module Goal**

Demonstrate a deep understanding of the new Georgia Performance Standards and the standards-based education approach, through thoughtful determination of learning goals for specific units of instruction, development of a balanced assessment plan that includes formative and summative assessments, and the design of instruction that will provide students with the knowledge, skills, and understandings necessary to achieve the learning goals. This goal shall be measured by student performance on progress monitoring and on standardized criterion-referenced tests.

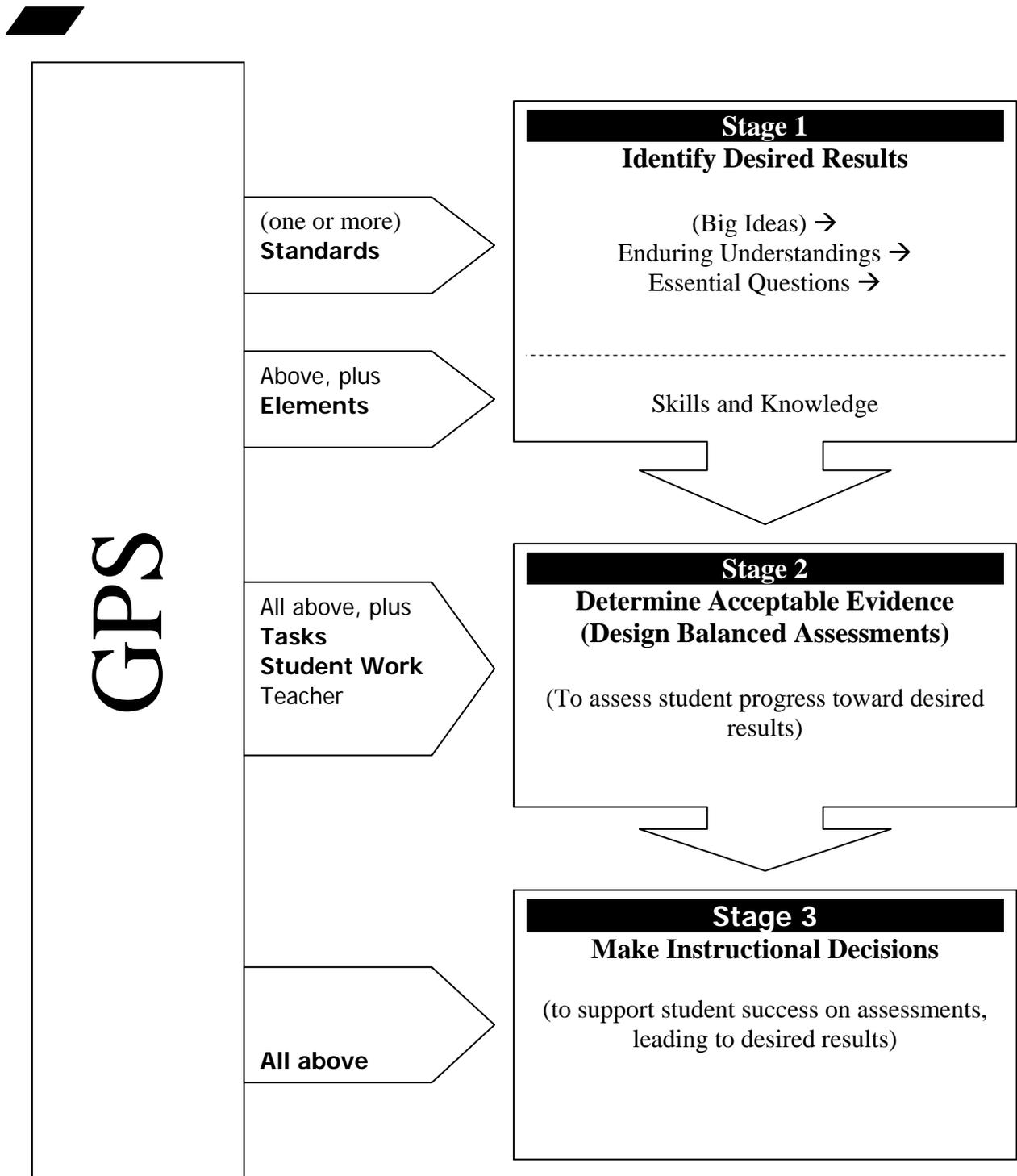
Note that the goal will not be reached by any single day of training. It will take preparation and follow up to master this goal.

 **Module Objectives**

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

1. Identify methods to create an environment that fosters student involvement and cooperation in all classroom activities.
2. Describe what a standards-based mathematics classroom looks like and how to choose appropriate instructional strategies.
3. Design lessons that will support the acquisition of content within the grades 3 – 5 frameworks and help students master the standards.

GPS and the Standards-Based Education Process

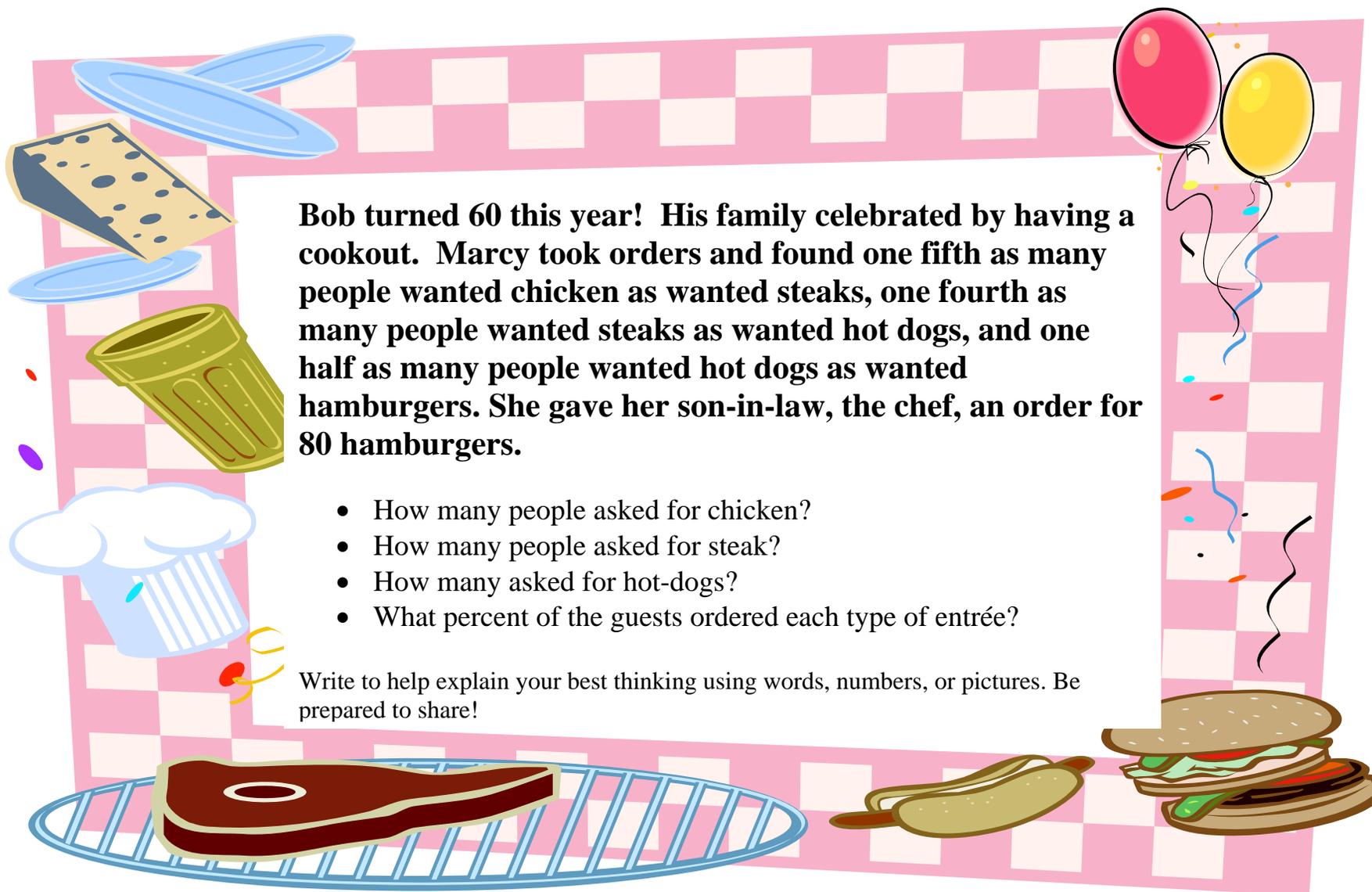


Dog Wash Task

Four girls offered to wash the neighbor's dog for \$5.00. They didn't know how to divide the money. The dog owner said: "I will pay $\frac{4}{5}$ of the total amount equally to the four of you. The first one to tell me how much money each child should receive will get $\frac{1}{2}$ of the other $\frac{1}{5}$ of the cost in addition to their portion of the original $\frac{4}{5}$."

- If someone gave the dog owner the right answer, how did the money get divided up between the children?
- Did the dog owner pay the full price that the children asked? Why or why not?
- Write to help explain your best thinking using words, numbers, or pictures.

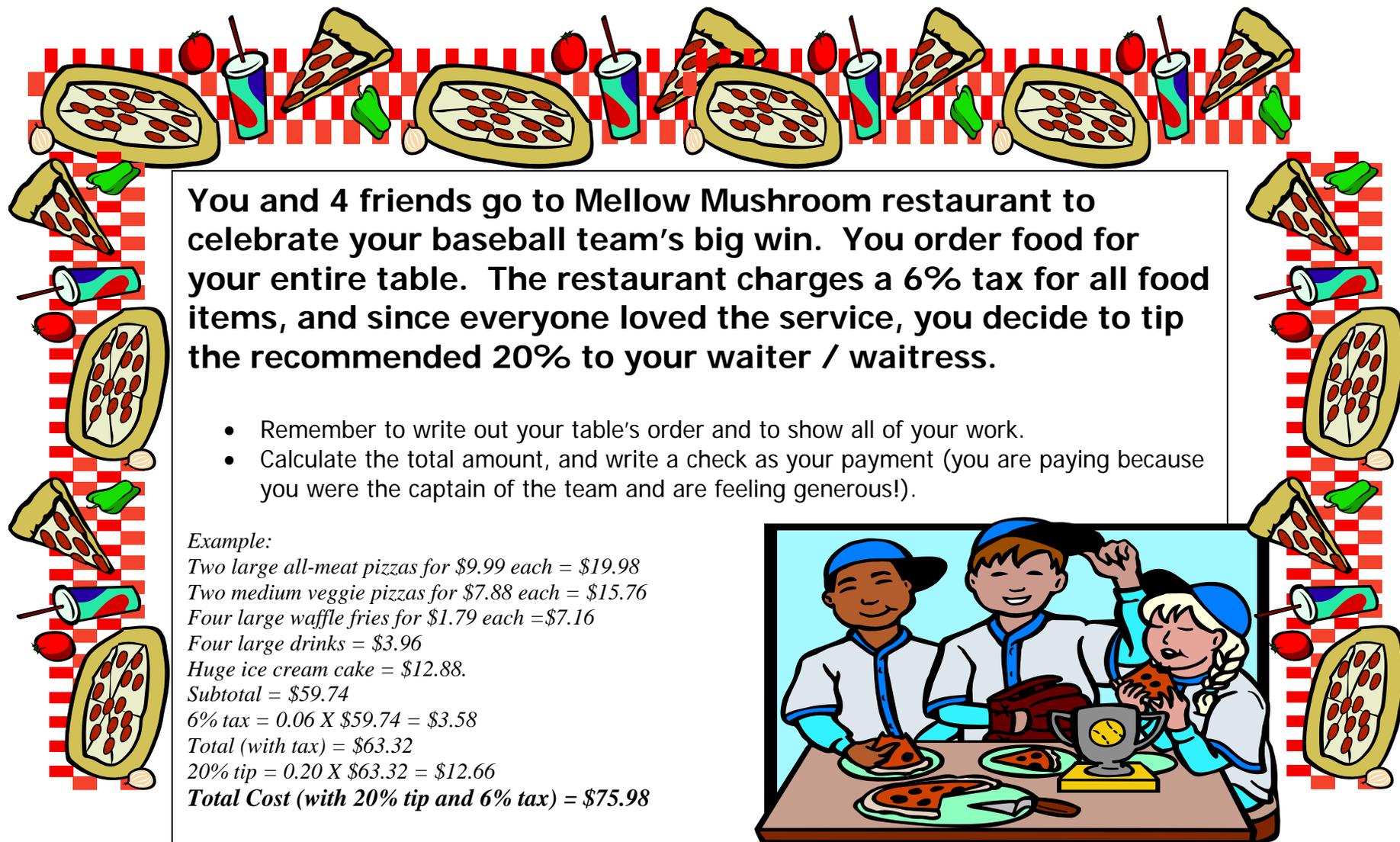




Bob turned 60 this year! His family celebrated by having a cookout. Marcy took orders and found one fifth as many people wanted chicken as wanted steaks, one fourth as many people wanted steaks as wanted hot dogs, and one half as many people wanted hot dogs as wanted hamburgers. She gave her son-in-law, the chef, an order for 80 hamburgers.

- How many people asked for chicken?
- How many people asked for steak?
- How many asked for hot-dogs?
- What percent of the guests ordered each type of entrée?

Write to help explain your best thinking using words, numbers, or pictures. Be prepared to share!



You and 4 friends go to Mellow Mushroom restaurant to celebrate your baseball team's big win. You order food for your entire table. The restaurant charges a 6% tax for all food items, and since everyone loved the service, you decide to tip the recommended 20% to your waiter / waitress.

- Remember to write out your table's order and to show all of your work.
- Calculate the total amount, and write a check as your payment (you are paying because you were the captain of the team and are feeling generous!).

Example:
 Two large all-meat pizzas for \$9.99 each = \$19.98
 Two medium veggie pizzas for \$7.88 each = \$15.76
 Four large waffle fries for \$1.79 each = \$7.16
 Four large drinks = \$3.96
 Huge ice cream cake = \$12.88.
 Subtotal = \$59.74
 6% tax = $0.06 \times \$59.74 = \3.58
 Total (with tax) = \$63.32
 20% tip = $0.20 \times \$63.32 = \12.66
Total Cost (with 20% tip and 6% tax) = \$75.98





I

↑ specialty pizzas

House Special - Originated when we first began, this Southern Classic features Pepperoni, Sausage, Ground Beef, Bacon, Mushrooms, Onions, Green Peppers, Black Olives, Tomatoes & Ham.

Small	Medium	Large
\$11.20	\$16.30	\$21.40

Mega-Veggie - Visit this tasty garden and munch on a pizza covered w/Broccoli, Mushrooms, Tofu, Black Olives, Artichoke Hearts, Sun-Dried Tomatoes, Feta, Onions, Green Peppers & Tomatoes. Great w/ or w/out Pesto Sauce!

Small	Medium	Large
\$11.20	\$16.30	\$21.40

House Pesto - Designed by our in-house engineers. This one's got Pesto Sauce, Mozzarella, Spinach, Mushrooms & Tomatoes.

Small	Medium	Large
\$9.25	\$14.25	\$18.40

Gourmet White - The Beatles had "The White Album" & we have the White Pizza. It's got garlic, Extra-Virgin Olive Oil Sauce, 4 Cheeses (Parmesan, Feta, Provolone, Mozzarella), Sun-Dried Tomatoes, Fresh Tomatoes & Onions. *Give Pizz-a Chance!*

Small	Medium	Large
\$10.75	\$16.10	\$21.40

Mighty Meaty - If meat is your treat, then this pizza is for you. It's got Pepperoni, Sausage, Ham, Bacon & Beef.

Small	Medium	Large
\$10.75	\$16.10	\$21.40

 **salads**

Greek	\$5.75
Lil'..Greek	\$3.75
Lettuce, Purple Cabbage, Green Peppers, Black Olives, Onions, Black Olives, Tomatoes, Mozzarella & Sprouts	
Chef	\$5.75
Lil'..Chef	\$3.75
Lettuce, Purple Cabbage, Onions, Green Peppers, Mushrooms, Black Olives, Tomatoes, Mozzarella & Sprouts	
Tossed	\$4.75
Lil'..Tossed	\$2.55
Lettuce, Purple Cabbage, Tomatoes & Mushrooms	
Caesar	\$5.75
Lil'..Caesar	\$3.75
Romaine, Lettuce, Croutons, Parmesan Cheese & Caesar dressing	
Field..Green	\$5.75
Lil'..Field..Green	\$3.75
Play the field with our field green salad. This healthy concoction has a mix of the best & freshest! Topped w. Mushrooms & Tomatoes.	

 **munchies**

Spring..Water..Basted..Pretzels.....Parmesan.or..Cinnamon
 Half (3) \$3.50 Whole (6) \$5.75

Garlic..Bread	
Whole	\$1.75
W/ Cheese	\$2.50

 **DRINKS**

Fountain & Fruitopia	\$1.35
Juices	\$1.75
Iced Tea	\$1.35



POLYGON PERCENT PATTERNS

Teaching Guidelines

<p>Subject: Mathematics</p> <p>Topics: Geometry, percents</p> <p>Grades: 4 - 7</p>
<p>Concepts:</p> <ul style="list-style-type: none"> • Polygon • Percent
<p>Knowledge and Skills:</p> <ul style="list-style-type: none"> • Can identify/describe common polygons • Can convert between percent notation and fraction notation
<p>Materials (for each team):</p> <ul style="list-style-type: none"> • three copies of the 60-triangle pattern handout • five sets of polygons, cut from construction paper, using the “Cutout Patterns” handout • one glue stick

Procedure:

This activity is best done with students working individually or in teams of two.

Distribute the handouts and polygons. (Instead of cutting out the shapes yourself, you may wish to give the students safety scissors and sheets of colored paper on which the shapes have been copied.)

Explain the assignment to the class. Show students an example that you prepare beforehand, of, say, a pattern which covers 30 of the triangles of the figure, or 50% of it.

Students will need to work out how to determine the number of triangles their patterns should cover, given the percentage. Give individual help as necessary, but let them try to work this out on their own as much as possible. One good strategy is “guess and check”:

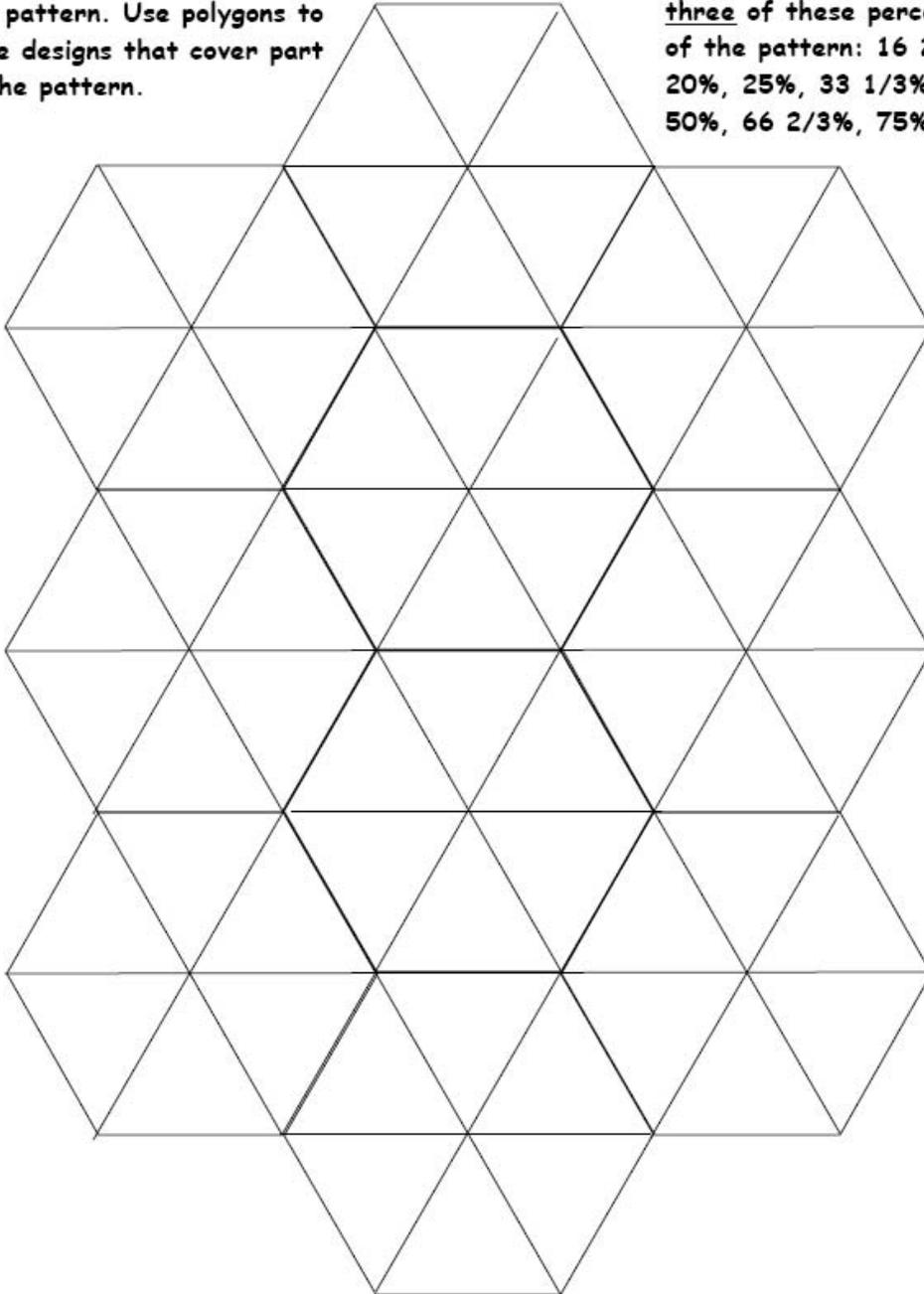
- a) choose a number of triangles (say, 15),
- b) write the fraction that shows the amount of the whole pattern that would be covered ($15/60$),
- c) reduce that fraction and convert it to a percent ($15/60 = \frac{1}{4} = 25\%$). If this is not the percent you wanted, try again, adjusting your guess up or down.

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There are 60 triangles in this pattern. Use polygons to make designs that cover part of the pattern.

Make designs that cover three of these percentages of the pattern: $16 \frac{2}{3}\%$, 20%, 25%, $33 \frac{1}{3}\%$, 40%, 50%, $66 \frac{2}{3}\%$, 75%, 80%.

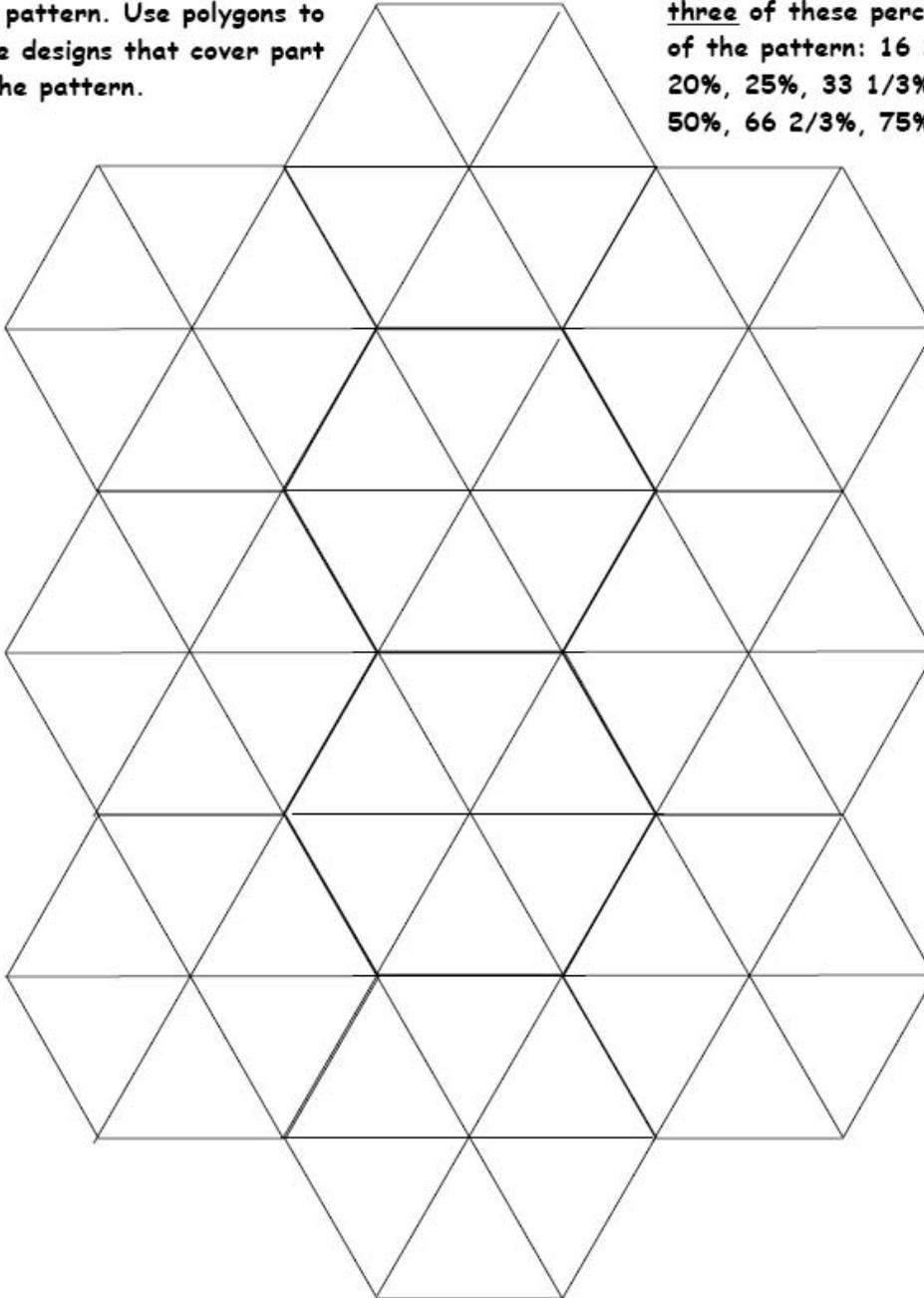


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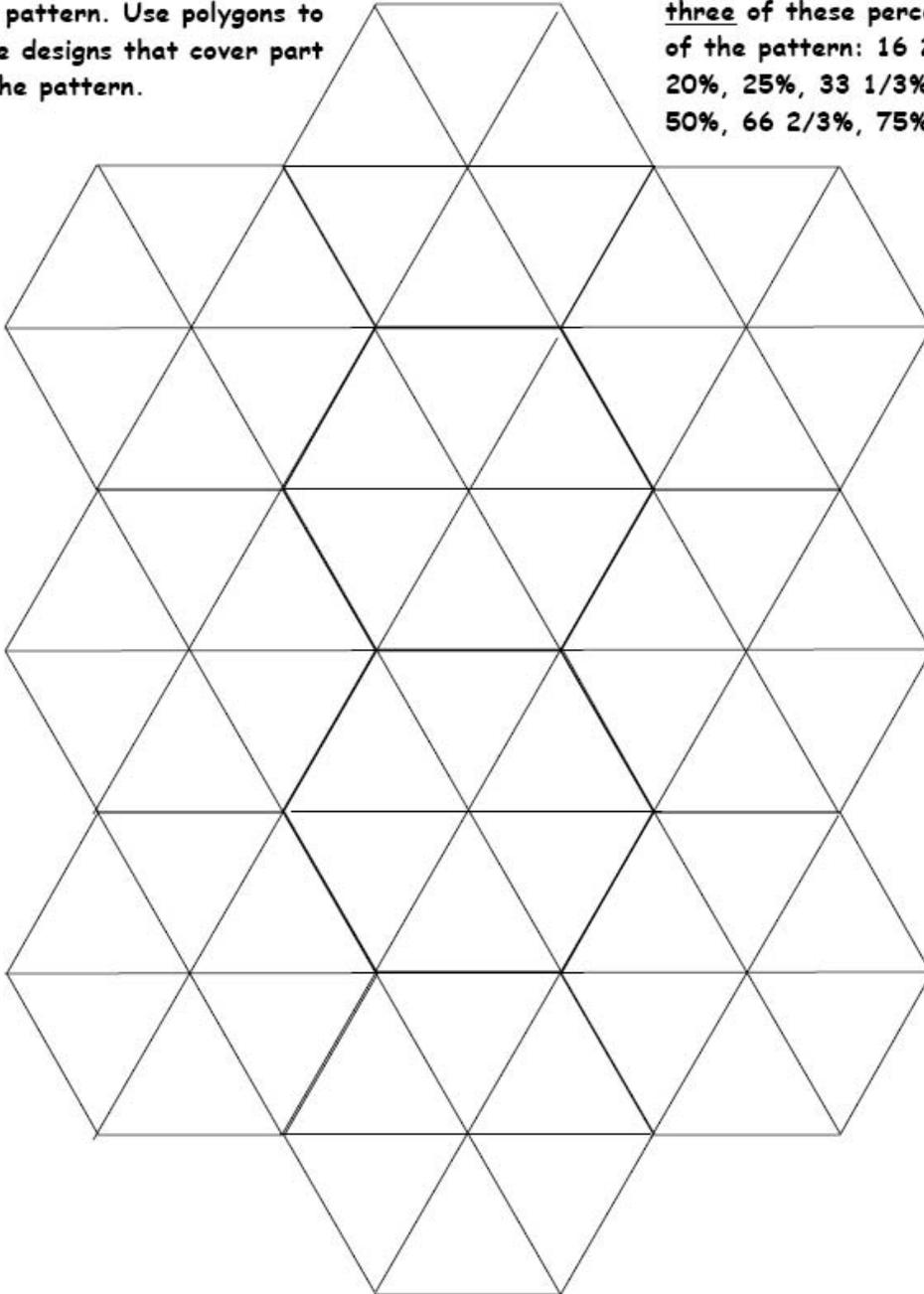


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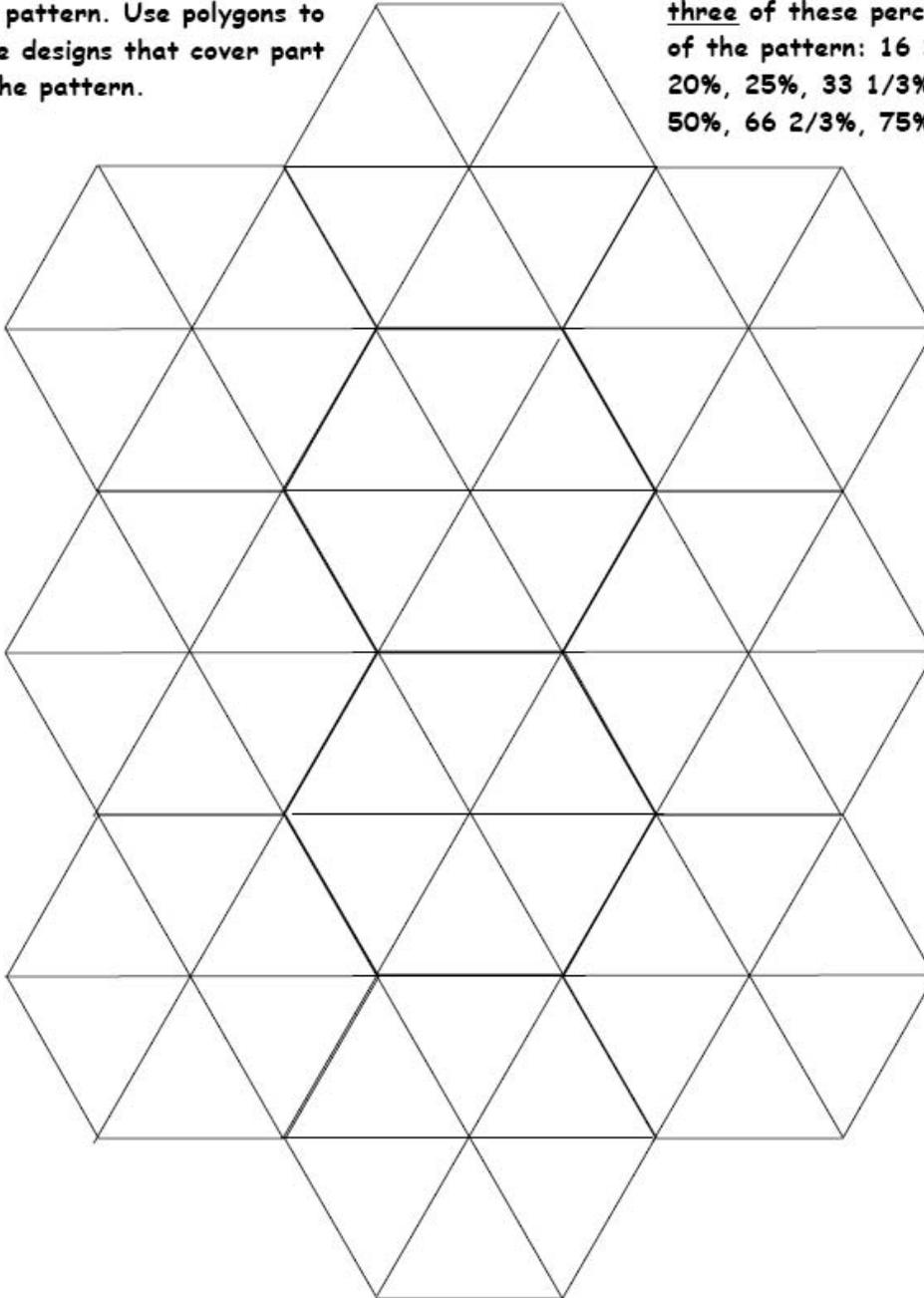


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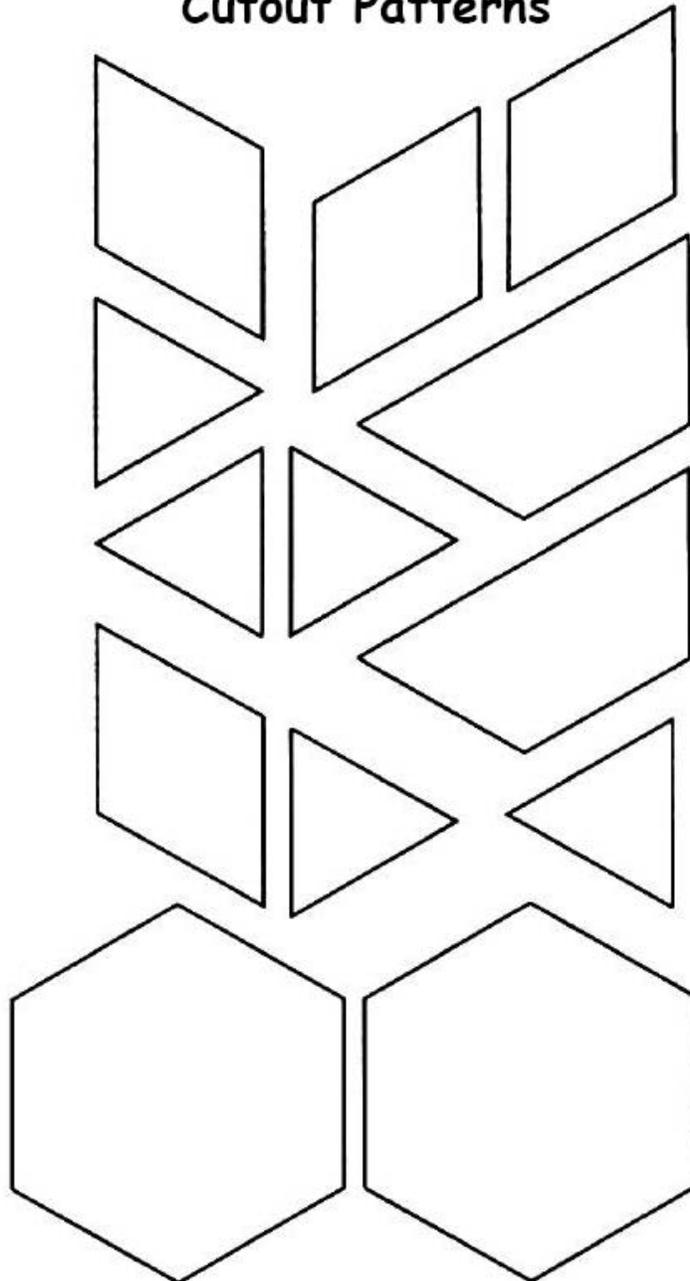


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Cutout Patterns

Cut out these hexagons, triangles, rhombuses, and trapezoids to make your designs.



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DATE	OBJECTIVE (S)	PROCEDURES/DIFFERENTIATED STRATEGIES	MATERIALS	EVALUATION
MON.	Students should be able to: GPS:	<input type="checkbox"/> Teacher directed <input type="checkbox"/> Student-centered <input type="checkbox"/> Review & Discussion <input type="checkbox"/> Student (one-on-one as needed) <input type="checkbox"/> Small Group <input type="checkbox"/> Whole Group <input type="checkbox"/> Task <input type="checkbox"/> Homework	<input type="checkbox"/> GPS Unit <input type="checkbox"/> Textbook <input type="checkbox"/> Multimedia (internet) <input type="checkbox"/> Literature	<input type="checkbox"/> Performance task <input type="checkbox"/> Daily Class Part. <input type="checkbox"/> Oral Responses <input type="checkbox"/> Rubric <input type="checkbox"/> Groupwork <input type="checkbox"/> Teacher Observ. <input type="checkbox"/> Assessment
TUE.	Students should be able to: GPS:	<input type="checkbox"/> Teacher directed <input type="checkbox"/> Student-centered <input type="checkbox"/> Review & Discussion <input type="checkbox"/> Student (one-on-one as needed) <input type="checkbox"/> Small Group <input type="checkbox"/> Whole Group <input type="checkbox"/> Task <input type="checkbox"/> Homework	<input type="checkbox"/> GPS Unit <input type="checkbox"/> Textbook <input type="checkbox"/> Multimedia (internet) <input type="checkbox"/> Literature	<input type="checkbox"/> Performance task <input type="checkbox"/> Daily Class Part. <input type="checkbox"/> Oral Responses <input type="checkbox"/> Rubric <input type="checkbox"/> Groupwork <input type="checkbox"/> Teacher Observ. <input type="checkbox"/> Assessment
WED.	Students should be able to: GPS:	<input type="checkbox"/> Teacher directed <input type="checkbox"/> Student-centered <input type="checkbox"/> Review & Discussion <input type="checkbox"/> Student (one-on-one as needed) <input type="checkbox"/> Small Group <input type="checkbox"/> Whole Group <input type="checkbox"/> Task <input type="checkbox"/> Homework	<input type="checkbox"/> GPS Unit <input type="checkbox"/> Textbook <input type="checkbox"/> Multimedia (internet) <input type="checkbox"/> Literature	<input type="checkbox"/> Performance task <input type="checkbox"/> Daily Class Part. <input type="checkbox"/> Oral Responses <input type="checkbox"/> Rubric <input type="checkbox"/> Groupwork <input type="checkbox"/> Teacher Observ. <input type="checkbox"/> Assessment
THU.	Students should be able to: GPS:	<input type="checkbox"/> Teacher directed <input type="checkbox"/> Student-centered <input type="checkbox"/> Review & Discussion <input type="checkbox"/> Student (one-on-one as needed) <input type="checkbox"/> Small Group <input type="checkbox"/> Whole Group <input type="checkbox"/> Task <input type="checkbox"/> Homework	<input type="checkbox"/> GPS Unit <input type="checkbox"/> Textbook <input type="checkbox"/> Multimedia (internet) <input type="checkbox"/> Literature	<input type="checkbox"/> Performance task <input type="checkbox"/> Daily Class Part. <input type="checkbox"/> Oral Responses <input type="checkbox"/> Rubric <input type="checkbox"/> Groupwork <input type="checkbox"/> Teacher Observ. <input type="checkbox"/> Assessment
FRI.	Students should be able to: GPS:	<input type="checkbox"/> Teacher directed <input type="checkbox"/> Student-centered <input type="checkbox"/> Review & Discussion <input type="checkbox"/> Student (one-on-one as needed) <input type="checkbox"/> Small Group <input type="checkbox"/> Whole Group <input type="checkbox"/> Task <input type="checkbox"/> Homework	<input type="checkbox"/> GPS Unit <input type="checkbox"/> Textbook <input type="checkbox"/> Multimedia (internet) <input type="checkbox"/> Literature	<input type="checkbox"/> Performance task <input type="checkbox"/> Daily Class Part. <input type="checkbox"/> Oral Responses <input type="checkbox"/> Rubric <input type="checkbox"/> Groupwork <input type="checkbox"/> Teacher Observ. <input type="checkbox"/> Assessment

Teacher: _____ Grade: _____ Subject: _____ Content: _____ Week ---, 2007

Unit Lesson Plan

Stage 1: Desired Results	
Teacher:	Grade:
Time Frame: 3 weeks	Class: Math
Big Ideas:	
Established Goals:	
Enduring Understandings:	
Essential Questions:	
Knowledge: <i>The student will know:</i>	
Skills: <i>GPS: The student will be able to:</i>	
Stage 2: Assessment Evidence	

Performance Tasks, Projects:

Quizzes, Tests, Academic Prompts:

Other Evidence:

Stage 3: Learning Plan

Activities:

Positive Expectations

People that expect to achieve success are constantly prepared for opportunities to become successful.

“All students can learn and mine will achieve to their fullest potential!”

“I am a good teacher, and know that I can motivate every one of my students to do their very best.”

“I love to learn new things that I can try out in my classroom.”

Negative Expectations

People that expect to be unsuccessful are constantly looking for reasons, evidence, and explanations of why they fail.

“These eighth graders can't even add, much less divide!”

“My students don't want to learn. They just come to school to see their friends.”

“Going to those GPS trainings are so boring. I have better things to do with my time.”

Some Suggested Classroom Procedures

Remember to *explain* them clearly, *practice* them until they become routines, and *reinforce* them as needed.

Entering the classroom	Coming to attention	Exchanging papers
Getting to work immediately	When absent	Returning student work
What to do if tardy	Working cooperatively	Passing in papers
End-of-class dismissal	Changing groups	Moving about the room
Indicating whether understand	Keeping notebook	Going to the library
Participating in discussions	Going to the office	Headings on papers
When need paper or pencil	Need help or conferencing	When finish early
Keeping desk orderly	Knowing the day's schedule	After an interruption
Checking out materials	Finding assignment directions	Asking a question
Listening/responding to questions	Walking in the hall during class time	When a school-wide announcement is made
Fire drill	When get sick	Saying “thank you”
When visitors are in the room	When teacher is out of room	Re-arranging desks/furniture

Adapted from *How to be an Effective Teacher: The First Days of School* by Harry K. Wong & Rosemary T. Wong, page 193

Albertville, AL Math Lab Raided

Albertville Police, responding to an anonymous tip, found an active math lab inside a school on Tuesday morning.

The police chief said one of his officers "...received information that there was an active hands-on math class being taught at the school. With that information, the K-9 officer, two other officers, and another official went to that address and located the math lab."

In the classroom at the school at the time officers arrived, were two fulltime teachers. Upon questioning, both admitted to attending unauthorized out-of-district teacher training from northeastern and midwestern publishers' consultants on hands-on math.

The chief added that containers of Unifix blocks and Cuisenaire rods were found, along with several boxes of controlled TI graphing calculators, were also discovered. The chief said, "We are also investigating some data analysis software found at the location, which was reportedly stolen in Georgia from a GPS math workshop. No one has been officially charged in that matter yet, but it is under investigation," the chief said.

Officer Matt Fitzgerald, who recently completed a specialized manipulatives-handling and other cognitively-hazardous materials training course, was called in to assist in reducing a hazardous situation and clearing the crime scene. Students were given circa-1975 Laidlaw Spectrum drill-and-practice workbooks to begin their de-programming and break their dependency on counters and other visual aids.

The Marshall County Educational Enforcement Unit (MCDEU) was also called to the scene. The director said, "It was a fairly large setup."

Portions of the illicit lab were, according to Phillips, in several rooms of the school, including a stock room and the library.

While there were no children involved with the incident, there were apparently several other teachers, including two new teachers, who were apparently being encouraged to participate in the illicit activities.

All four suspects were placed in the Marshall County Correctional Facility on various bond amounts, all of which were large hard-to-factor 5-digit prime numbers. One of the suspects was given a no-bond for failure to appear on an unrelated charge of encouraging student questions.

The chief expressed his gratitude at the fine police work of his officers and the MCDEU that led to the arrests of the four individuals and dismantling of the illegal lab.

What should we see in a standards-based mathematics classroom?

- **Warm-up**
 - connected to the lesson
 - starts students thinking in right direction

- **Mini lesson, opening, setting the stage**
 - checks for prior knowledge
 - reviews needed skills
 - left in view for quick access during work period

- **Work period, Activity period**
 - rigorous mathematics
 - use of previously learned concepts in service of new ideas
 - collaboration and verbalization
 - process skills
 - individual accountability

- **Summary, Closing**
 - presentation and comparison of different approaches
 - students commenting on and questioning the approaches of other students
 - teacher guiding the discussion, if necessary, to solidify concepts, skills and procedures to be learned
 - clarifying of misconceptions

Role of the Teacher in a Standards-based Classroom

- Plan authentic learning experiences.
- Provide solid foundations in math to promote application of skills and knowledge
- Talk less, listen more.
- Circulate through the classroom, facilitating math discussions.
- Provide clarification when necessary.
- Ask questions that encourage reasoning and making connections.
- Provide clarification when necessary.
- Ask questions that encourage reasoning and making connections.
- Establish classroom procedures to promote effective management of small groups of differentiated learners.
- Participate in ongoing assessments of all learners.

Role of the Student in a Standards-based Classroom

- Work individually, in pairs, or small groups to complete a task.
- Gather data, share ideas, look for patterns, make conjectures, and utilize problem-solving strategies.
- Explore mathematical relationships and make connections to real life experiences.
- Ask questions and look for solutions.
- Explore mathematical relationships and make connections to real life experiences.
- Ask questions and look for solutions.

Glossary of Instructional Strategies

Assigned Questions - Assigned questions are those prepared by the teacher to be answered by individuals or small groups of students. Students discuss their responses with one another or with the teacher. Particular positions or points-of-view should be supported by evidence. In some instances, it may be desirable for students to generate their own set of questions.

Brainstorming- Brainstorming is a large or small group activity which encourages children to focus on a topic and contribute to the free flow of ideas. The teacher may begin by posing a question or a problem, or by introducing a topic. Students then express possible answers, relevant words and ideas. Contributions are accepted without criticism or judgment.

Case Study - Case studies are stories or scenarios, often in narrative form, created and used as a tool for analysis and discussion. Cases are often based on actual events which add a sense of urgency or reality. Case studies have elements of simulations but the students are observers rather than participants. A good case has sufficient detail to necessitate research and to stimulate analysis from a variety of viewpoints or perspectives. They place the learner in the position of problem solver. Students become actively engaged in the materials discovering underlying issues, dilemmas and conflict issues.

Circle of Knowledge - A circle of knowledge is a strategy that acts as a framework for effective discussions. The teacher poses a question to the whole class, and the students move into small groups to examine the issue before returning to the large group for further discussion.

Cloze Procedures - Cloze procedure is a technique in which words are deleted from a passage according to a word-count formula or various other criteria. The passage is presented to students, who insert words as they read to complete and construct meaning from the text. This procedure can be used as a diagnostic reading assessment technique.

Computer Assisted Instruction - Computer-assisted instruction (CAI) refers to any instructional program in which the computer performs, manages, or supports some or all of the teacher/provider functions.

Concept Attainment - Concept Attainment is an indirect instructional strategy that uses a structured inquiry process. It is based on the work of Jerome Bruner. In concept attainment, students figure out the attributes of a group or category that has already been formed by the teacher. To do so, students compare and contrast examples that contain the attributes of the concept with examples that do not contain those attributes. They then separate them into two groups. Concept attainment, then, is the search for and identification of attributes that can be used to distinguish examples of a given group or category from non-examples.

Concept Mapping - A concept map is a special form of a web diagram for exploring knowledge and gathering and sharing information. Concept mapping is the strategy employed

to develop a concept map. A concept map consists of cells that contain a concept, item or question and links. The links are labeled and denote direction with an arrow symbol. The labeled links explain the relationship between the nodes. The arrow describes the direction of the relationship and reads like a sentence.

Concept Formation - Concept formation provides students with an opportunity to explore ideas by making connections and seeing relationships between items of information. This method can help students develop and refine their ability to recall and discriminate among key ideas, to see commonalities and identify relationships, to formulate concepts and generalizations, to explain how they have organized data, and to present evidence to support their organization of the data involved.

Cooperative Learning - Cooperative learning is an instructional strategy that simultaneously addresses academic and social skill learning by students. It is a well-researched instructional strategy and has been reported to be highly successful in the classroom.

Correspondence Lessons - Correspondence education has a long history. Before the advent of the computer age, correspondence schooling meant print correspondence. Today, however, correspondence education is delivered through a variety of technologies: audio, video and computer.

Debates - Debating is a structured contest of argumentation in which two opposing individuals or teams defend and attack a given proposition. The procedure is bound by rules that vary based on location and participants. The process is adjudicated and a winner is declared. Debating is a foundational aspect of a democratic society.

Demonstrations - A demonstration refers to a teacher activity and talk that shows students "how"; [demonstrations] apply primarily to skills and processes and are useful for helping students acquire procedural knowledge.

Didactic Questions - tend to be convergent, factual, and often begin with "what," "where," "when," and "how." They can be effectively used to diagnose recall and comprehension skills, to draw on prior learning experiences, to determine the extent to which lesson objectives were achieved, to provide practice, and to aid retention of information or processes. Teachers should remember that didactic questions can be simplistic, can encourage guessing, and can discourage insightful answers or creativity. However, effectiveness of this method can be increased by the appropriate addition of "why" questions, and the occasional use of "what if" questions.

Direct Instruction - a highly structured instructional approach.

Drill and Practice - promotes the acquisition of knowledge or skill through repetitive practice. It refers to small tasks such as the memorization of spelling or vocabulary words, or the practicing of arithmetic facts and may also be found in more supplicated learning tasks or physical education games and sports. Drill-and-practice, like memorization, involves repetition of specific skills, such as addition and subtraction, or spelling. To be meaningful to learners, the

skills built through drill-and-practice should become the building blocks for more meaningful learning.

Essays - Essays are research-backed statements of opinion on arguable topics.

Experiments - Experiments involve creating a test of a hypothesis where variables have been identified and then specifically identifying one or more of those variables that causes the effect.

Experiential Learning - Experiential learning is inductive, learner centered, and activity oriented. Personalized reflection about an experience and the formulation of plans to apply learning to other contexts are critical factors in effective experiential learning. The emphasis in experiential learning is on the process of learning and not on the product.

Explicit Teaching - Explicit teaching involves "six teaching functions: daily review, presenting new material, conducting guided practice, provide feedback and correctives, conduct independent practice, weekly and monthly review.

Field Observations - Field observations refer to observations made of naturally occurring phenomena by students outside the classroom.

Games - Games are structured learning activities that include conflict, control, and rules for winning and terminating the activities.

Guides for Reading, Listening, Viewing - Guides for reading, listening, and viewing refer to providing leading questions, diagrams, or statements to assist students in focusing on the important ideas within text, lecture, media, or other presentations.

Independent Learning - Independent study refers to the range of instructional methods which are purposefully provided to foster the development of individual student initiative, self-reliance, and self-improvement. In addition, independent study can include learning in partnership with another individual or as part of a small group.

Indirect Instruction - indirect instruction is mainly student-centered. Indirect instruction seeks a high level of student involvement in observing, investigating, drawing inferences from data, or forming hypotheses. It takes advantage of students' interest and curiosity, often encouraging them to generate alternatives or solve problems. In indirect instruction, the role of the teacher shifts from lecturer/director to that of facilitator, supporter, and resource person. The teacher arranges the learning environment, provides opportunity for student involvement, and, when appropriate, provides feedback to students while they conduct the inquiry (Martin, 1983).

Interviewing - Interviewing, a meeting during which information is obtained by one person from another, is an excellent means for students to gain an insight into another's worldview. Effective interviewing begins with the development of basic skills and thorough preparation. Students may be the interviewer or the interviewee, depending upon the skill set being developed and the information sought.

Graphic Organizers - A graphic organizer is a visual communication tool that uses visual symbols to express ideas and concepts, to convey meaning. A graphic organizer often depicts the relationships between facts, terms, and or ideas within a learning task. It is often referred to as a "map" because it can help teachers and students "map out" their ideas in a visual manner. There are many similar names for graphic organizers including: knowledge maps, concept maps, story maps, cognitive organizers, advance organizers, or concept diagrams.

Inquiry - Inquiry learning provides opportunities for students to experience and acquire processes through which they can gather information about the world. This requires a high level of interaction among the learner, the teacher, the area of study, available resources, and the learning environment.

Interactive Instruction - Interactive instruction relies heavily on discussion and sharing among participants. Students can learn from peers and teachers to develop social skills and abilities, to organize their thoughts, and to develop rational arguments. The interactive instruction strategy allows for a range of groupings and interactive methods. It is important for the teacher to outline the topic, the amount of discussion time, the composition and size of the groups, and reporting or sharing techniques. Interactive instruction requires the refinement of observation, listening, interpersonal, and intervention skills and abilities by both teacher and students.

Lab Groups - Lab groups are cooperative learning groups in an experimental setting.

Learning Activity Pack - A learning activity package (LAP) refers to a planned series of activities that involve the student in exploring a topic, skill, or concept.

Learning Centers - A classroom with learning centers offers various stations at which individuals or groups of students may complete selected tasks or activities. The activities are designed to accommodate a variety of learning styles and challenge the multiple intelligences.

Learning Contracts - Learning contracts provide a method of individualizing instruction and developing student responsibility. They permit individual pacing so that students may learn at the rate at which they are able to master the material. Learning contracts can be designed so that students function at the academic levels most suitable to them and work with resource materials containing concepts and knowledge that are appropriate to their abilities and experiences. Although this method focuses on the individual, learning contracts also provide an opportunity for students to work in small groups. The teacher may select this approach for some students to support them as they learn to work independently.

Mastery Lecture - Mastery lecture is a type of direct instruction. A significant amount of information can be communicated in a relatively short period of time. The quality of a lecture improves when audio and visual aids are incorporated and if interaction between the teacher and the students is facilitated.

Model Building - Model building involves the students in the design and construction of a theory, concept, or object.

Nonlinguistic Representation – an imagery mode of representation that is expressed as mental pictures and physical sensations such as smell, taste, touch, kinesthetic association, and sound, or in graphic, kinesthetic, or musical forms or products.

Panel - Several experts sit around a table and discuss a topic; they may field questions from an audience. Learners may prepare questions in advance for panelists.

Peer Practice - Peer practice involves each student rehearsing skills or conceptual information with a peer.

Problem-Solving - Learners start a topic by solving a problem that incorporates the concepts of the module. Have participants work in teams to solve a scenario. Begin the presentation with the problem-solving exercise and then debrief the exercise by highlighting important points in the presentation.

Reading for Meaning - To read for meaning, students must simultaneously utilize clues from all cueing systems. Readers bring knowledge and past experiences to the reading task to construct interpretations and to determine if the print makes sense to them. It is easier for readers to understand print when the content is relevant to their personal experiences. Familiar content and topics convey meaning or clues through the semantic cueing system. When students are comfortable and familiar with the content of a passage, they can predict upcoming text and take greater risks in reading. Research has repeatedly shown that fluent readers risk more guesses when interacting with unfamiliar print than poorer readers. They derive more meaning from passages than readers who frequently stop to sound or decode words by individual phonemes or letters.

Reciprocal Teaching - Reciprocal teaching refers to an instructional activity that takes place in the form of a dialogue between teachers and students regarding segments of text. The dialogue is structured by the use of four strategies: summarizing, question generating, clarifying, and predicting. The teacher and students take turns assuming the role of teacher in leading this dialogue.

Reflective Discussion - Reflective discussions encourage students to think and talk about what they have observed, heard or read. The teacher or student initiates the discussion by asking a question that requires students to reflect upon and interpret films, experiences, read or recorded stories, or illustrations. As students question and recreate information and events in a film or story, they clarify their thoughts and feelings. The questions posed should encourage students to relate story content to life experiences and to other stories. These questions will elicit personal interpretations and feelings. Interpretations will vary, but such variances demonstrate that differences of opinion are valuable.

Research Projects - Research projects are very effective for developing and extending language arts skills as students learn in all subject areas. While doing research, students practice reading for specific purposes, recording information, sequencing and organizing ideas, and using language to inform others.

Role Playing - Taking on roles and interacting in groups actively involves students in learning opportunities. By taking on a perspective other than their own, students begin to appreciate the beliefs, wants and needs, and motivations of others while trying to find creative and effective solutions to challenges.

Simulation - Simulations are instructional scenarios where the learner is placed in a "world" defined by the teacher. They represent a reality within which students interact. The teacher sets the parameters of this "world" in which students interact to acquire knowledge and understanding. Debriefing is an essential component of simulation. Simulations are in a way a lab experiment where the students themselves are the test subjects. They experience the reality of the scenario and gather meaning from it.

Socratic Seminar – A Socratic seminar allows students to reach deeper understanding of complex texts or issues through rigorously thoughtful dialogue. Unlike debate, the purpose here is not to win or lose but to arrive at understanding.

Structured Overview - A structured overview refers to organizing and arranging topics or concepts to make them meaningful to students.

Surveys - A survey is a research instrument which involves the asking of questions of a group of individuals. Creating and administering a survey, as well as analyzing the data collected, are all excellent opportunities for students to be active learners.

Synectics - The term Synectics from the Greek word *synectikos* which means "bringing forth together" or "bringing different things into unified connection." Since creativity involves the coordination of things into new structures, every creative thought or action draws on synectic thinking. Synectic thinking is the process of discovering the links that unite seemingly disconnected elements. It is a way of mentally taking things apart and putting them together to furnish new insight for all types of problems. It is a creative problem solving technique which uses analogies.

Tutorial Groups - Tutorial groups are set up to help students who need remediation or additional practice, or for students who can benefit from enrichment. Tutorial groups provide for greater attention to individual needs and allow students to participate more actively. Peer tutoring occurs when a student (the tutor) is assigned to help other students (the learners). The roles played by teacher, tutor, and learner must be explained and expectations for behavior must be outlined.

General Categories of Instructional Strategies

Direct Instruction: Instructional strategies that involve a high degree of teacher control.

Compare & Contrast	Explicit Teaching	Reinforcing Effort & Providing Recognition*
Cues, Questions, & Advance Organizers*	Graphic Organizers	Setting Objectives & Providing Feedback*
Demonstrations	Guides for Reading, Listening, Viewing	Summarizing & Note Taking*
Didactic Questions	Identifying Similarities and Differences*	Structured Overview
Drill and Practice	Mastery Lecture	

Experiential Learning: Instructional strategies where students learn by doing or experiencing authentic or simulated situations.

Conducting Experiments	Model Building	Role Playing
Field Observations	Surveys	Games
Field Trips	Modeling	Simulations
	Nonlinguistic Representations*	Synectics

Independent Learning: Instructional strategies during which students work independently, sometimes at their own rate on self-selected assignments or topics.

Assigned Questions	Graphic Organizers	Learning Contracts
Computer Assisted Instruction	Homework and Practice*	Reports
Correspondence Lessons	Learning Activity Package	Research Projects
Essays	Learning Centers	Summarizing and Note Taking*

Indirect Instruction: Instructional strategies where the teacher establishes the learning situation or task, but the students determine the direction and/or solution.

Case Studies	Close Procedures	Problem Solving
Concept Attainment	Generating & Testing Hypotheses*	Reading for Meaning
Concept Formation	Graphic Organizers	Reciprocal Teaching
Concept Mapping	Inquiry	Reflective Discussion

Interactive Instruction: Instructional strategies that involve students working with other students and/or the teacher to move toward the learning goals.

Brainstorming	Interviewing	Problem Solving
Circle of Knowledge	Laboratory Groups	Role Playing
Cooperative Learning*	Panels	Socratic Seminars
Debates	Peer Practice	Tutorial Groups

* Marzano, Pickering, and Pollock note that incorporating these nine strategies into instruction can improve student achievement across all content areas and grade levels. <http://www.learn-line.nrw.de/angebote/greenline/lernen/downloads/nine.pdf>

Matching Instructional Formats to Achievement Targets

	Direct Instruction	Experiential Learning	Independent Learning	Indirect Instruction	Interactive Instruction
Knowledge/ Information	Strategies such as direct instruction, graphic organizers, structured overview, etc., can convey facts or information to students.	Experiential strategies may be structured to allow students to arrive, inductively or deductively, at rules or principles.	Strategies such as assigned questions, learning activity packages or centers, reports, or research projects allow students to obtain facts, etc.	Strategies such as concept attainment or concept formation, reading for meaning, reciprocal teaching, and inquiry allow students to arrive at rules or principles.	Strategies such as discussion, interviewing, or tutorial groups can provide students with information or help them to review rules, etc.
Skills/ Processes	Modeling can introduce or demonstrate skills or processes, but other, more student-directed strategies are needed as well.	Modeling, games, conducting experiments, etc., can introduce skills/processes or provide practice.	Essays, learning activity packages or centers, or research projects, etc., can provide opportunities for application or practice.	Instructional strategies that involve problem solving often provide the opportunity to acquire skills or practice processes.	Cooperative learning groups, debates, role playing, or laboratory groups, etc., work well.
Thinking & Reasoning	Modeling can introduce or demonstrate thinking and reasoning processes, but other, more student-directed strategies are needed as well.	Most experiential strategies work well here, especially roll playing, games, experiments, and simulations.	Some, such as certain essay topics, learning activity packages or centers, or research projects, work better than others.	Strategies such as working with case studies, concept map-ping, inquiry, problem solving, etc., work well with thinking and reasoning targets.	Most interactive instructional strategies work with these targets, but especially problem solving and Socratic Seminars.
Communication	Not the best strategies for providing students with opportunities to acquire or practice communication skills.	Good when oral, written, or other forms of expression are included, such as reporting field observations, role playing, or simulations.	Again, essays or other strategies that involve oral, written, or other forms of expression can provide the opportunity to learn communication skills.	Reciprocal teaching, reflective discussion, or other strategies that involve oral, written, or other forms or expression work well.	By definition, interactive instructional strategies include opportunities to learn or practice communication skills.

Teaching for Breadth and Depth

For Depth	Breadth
<p><i>Unearth it</i></p> <ul style="list-style-type: none"> ➤ Make assumptions explicit ➤ Clarify points of view ➤ Bring light to the subtle, the misunderstood, the not obvious, the controversial, the obscure, the problematic, the missing, and the lost <p>➤</p> <p><i>Analyze it</i></p> <ul style="list-style-type: none"> ➤ Separate into parts ➤ Inspect and examine ➤ Dissect, refine, and qualify ➤ Question ➤ Test ➤ Challenge ➤ Doubt ➤ Critique <p><i>Prove it</i></p> <ul style="list-style-type: none"> ➤ Argue ➤ Support ➤ Verify ➤ Justify <p><i>Generalize it</i></p> <ul style="list-style-type: none"> ➤ Subsume specifics under a more encompassing idea ➤ Compare and contrast 	<p><i>Connect it</i></p> <ul style="list-style-type: none"> ➤ Link discrete and diverse ideas, facts, and experiences <p><i>Picture it</i></p> <ul style="list-style-type: none"> ➤ Make concrete and simple ➤ Represent or model in different ways <p><i>Extend it</i></p> <ul style="list-style-type: none"> ➤ Go beyond the given to implications ➤ Imagine “what if?”

Adapted from Grant Wiggins and Jay McTighe. *Understanding by Design*. ASCD. 1998.

WHERE TO: Making Instructional Decisions

Stage 3—Learning Plan Teaching and Learning Activities:

In Stage 3 we consider the instructional strategies and learning experiences needed to achieve the desired results (Stage 1) as reflected in the assessment evidence to be gathered (Stage 2). The activities are planned to develop the targeted understandings and the knowledge and skills identified in Stage 1 *and* to equip students for the performances of learning specified in Stage 2. The acronym WHERE TO summarizes key elements to consider when designing an effective and engaging learning plan.

To what extent is the learning plan effective and engaging? Consider:

Will the students...

- W** **O** Know *where* they're going (the learning goals), *why* (reason for learning the content), and *what* is required of them (unit goal, performance requirements, and evaluative criteria)?
- H** **O** Be *hooked*—engaged in digging into the Big Ideas (e.g., through inquiry, research, problem-solving, experimentation)?
- E** **O** Have adequate opportunities to *explore* and *experience* Big Ideas and receive instruction to *equip* them for the required performances?
- R** **O** Have sufficient opportunities to *rethink*, *rehearse*, *revise*, and *refine* their work based upon timely feedback?
- E** **O** Have an opportunity to *evaluate* their work and set future goals?

Consider the extent to which the learning plan is

- T** **O** *Tailored* and flexible to address the interests and learning styles of all students.
- O** **O** *Organized* and sequenced to maximize engagement and effectiveness.

(Understanding by Design Professional Development Workbook, ASCD, 2004, p. 212)

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”

“GDOE”

Signature:

Georgia Department of Education

By: _____

Print Name:

Title: _____

Guardian’s Relationship to Minor:

Date: _____

Print Minor’s Name:



Recommended Readings/Viewings: Instruction

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

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

Using a meta-analysis of thousands of research studies, Marzano, et al., clearly answer the question, “Which instructional techniques are *proven* to work?” They provide 13 proven strategies that all teachers can use, and they explain the research in a clear, practical manner.

Marzano, R., et al. *A Handbook for Classroom Instruction That Works*. Alexandria, VA: ASCD, 2001.

A perfect resource for self-help or school study groups, this handbook makes it much easier to apply the teaching practices outlined in *Classroom Instruction That Works*. The authors guide the reader through the nine categories of instructional strategies that are most likely to maximize student achievement and provide everything needed to use the strategies quickly in classrooms. The book includes the following: exercises to check understanding; brief questionnaires to reflect on current beliefs and practices; tips and recommendations to implement the strategies; samples, worksheets, and other tools to help plan classroom activities; and rubrics to assess the effectiveness of the strategies with students.

Marzano, Robert J. *Classroom Management That Works: Research-Based Strategies for Every Teacher*. Alexandria, VA: ASCD, 2003.

The authors analyze research from more than 100 studies on classroom management to answer the questions, “How does classroom management affect student achievement?” and “What techniques do teachers find most effective?” The authors provide action steps, along with real stories of teachers and students, to guide teachers in implementing the research findings.

Schifter, D., & Fosnot, C.T. (1993). *Reconstructing mathematics education: stories of teachers meeting the challenge of reform*. New York: Teachers College Press. (ISBN: 0807732052)

The authors describe teachers who confront their own concept of mathematics by doing real mathematics themselves. There are also many insights into the classrooms to which these teachers return. If you feel a bit threatened by the call for change, this is a book that can give you some company.

Strong, R., H. Silver, and M. Perini. *Teaching What Matters Most: Standards and Strategies for Raising Student Achievement*. Alexandria, VA: ASCD, 2001.

This practical book about the responsibility educators have to teach what matters most includes many examples of educators throughout the nation who have been successful in increasing student performance on state and national assessments. The authors also explore three changes that must take place to achieve this goal: responsible standards, responsible strategies, and responsible assessment practices.

Van de Walle, John. *Elementary and Middle School Mathematics: Teaching Developmentally*. Boston, MA: Pearson Education, Inc. 2004.

A resource for those who are investigating the teaching of mathematics at the elementary and middle school levels. The emphasis is on student-centered problem solving.

Wiggins, Grant, and Jay McTighe. *Understanding by Design*. Alexandria, VA: ASCD, 1998.

This book explains the “backward design” process that is the backbone of standards-based education. The book explains both the underlying principles and the process teachers can use to put them into practice.

Wiggins, Grant, and Jay McTighe. *Understanding by Design Study Guide*. Alexandria, VA: ASCD, 2000.

This companion book to *Understanding by Design* provides discussion questions, graphic organizers, and summaries to support faculty study groups that are exploring *Understanding by Design*.

Wiggins, Grant, and Jay McTighe. *Understanding by Design Professional Development Workbook*. Alexandria, VA: ASCD, 2004.

This companion book to *Understanding by Design* is chock-full of templates and examples to help teachers put the process into place.

Suggested Web Sites for Instruction

<http://ims.ode.state.oh.us/ODE/IMS/Lessons/Default.asp>

This web site, created by the Ohio Department of Education, provides guidelines for planning standards-based instruction and for designing standards-based units and lessons.

<http://pareonline.net>

Practical Assessment, Research and Evaluation (PARE) is an on-line journal supported, in part, by the Department of Measurement, Statistics, and Evaluation at the University of Maryland. Its purpose is to provide education professionals access to refereed articles that can have a positive impact on assessment, research, evaluation, and teaching practice.

http://users.edte.utwente.nl/lanzing/cm_home.htm

This web site provides an overview of concept mapping that might be useful for determining those concepts and processes that fit together for units of instruction.

<http://www.greece.k12.ny.us/instruction/ela/6-12/BackwardDesign/Overview.htm>

This page on the Greece Central School District of New York web site offers multiple resources related to instructional planning using the standards-based education process.

<http://www.greece.k12.ny.us/instruction/ela/6-12/Curriculum%20Mapping/Index.htm>

This page on the Greece Central School District of New York web site offers multiple templates that can be modified and used to assist in mapping concepts into units of instruction.

http://www.lkwash.wednet.edu/lwsd/html/programs/curriculum/modelunits_t.asp

This web site published by the Lake Washington School District includes a sample planning guide, a unit planning template, and several sample unit plans. GPS need to be unpacked through stages 1 and 2 before employing these templates.

<http://www.learn-line.nrw.de/angebote/greenline/lernen/downloads/nine.pdf>

This article lists, explains, and provides examples of nine instructional strategies, identified by Marzano, Pickering, and Pollock, that improve student achievement across all content areas and grade levels.

<http://www.pbs.org/pbsyou/about.html>

This PBS web site provides information about free, televised, adult education courses in everything from dramatic literature to cooking. Anyone teaching a new course or just wanting to revisit particular content topics might find this site useful.

<http://www.rmcdenver.com/useguide/lessons/examples.htm?>

This site provides sample lessons/units based on the Texas state standards.

<http://www.sasked.gov.sk.ca/docs/policy/approach/instrapp05.html>

This excellent article from Curriculum and Instruction Branch, Saskatchewan Education, 2220 College Avenue, Regina, Saskatchewan, provides information teachers may find helpful about matching instructional strategies to desired learning goals.

<http://64.233.179.104/search?q=cache:FWPY3QS1C6wJ:www.pls.uni.edu/tws/rubricsamples/IDM2.pdf+Making+Instructional+Decisions&hl=en>

This web site provides two anecdotal examples of teachers using assessment of student learning to make instructional decisions.

<http://www.techtrekers.com/>

This site provides information about simulations, web quests, and other strategies and activities that can provide students with opportunities to learn.

www.pals.sri.com

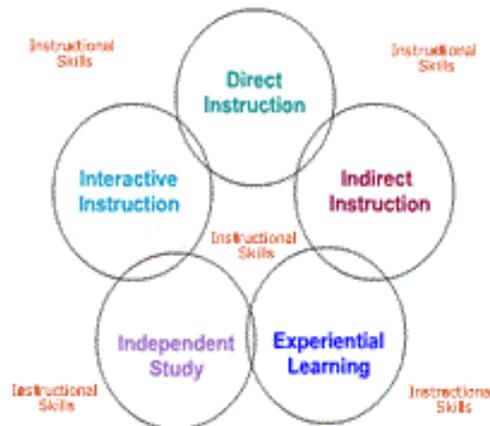
PALS is an on-line, standards-based, continually updated resource bank of science performance tasks indexed via the National Science Education Standards (NSES) and various other standards frameworks.

www.teachersbridge.org

This excellent site, created by a consortium of Georgia educators and other professionals in education, provides teaching resources, online learning communities, and much more.

<http://www.sasked.gov.sk.ca/docs/policy/approach/instrapp02.html>

This article provides an overview of four foundations for instructional decision-making, as well as information on appropriate teacher reflection about the practice of instructional decision-making in the classroom.



<http://olc.spsd.sk.ca/DE/PD/instr/index.html>

http://www.saskschools.ca/curr_content/onlineteach/op/home/index.htm

Mathematics Resources

Teacher Resources:

Brooks, J. G. & Brooks, M. G. (1993). *In search of understanding: The case for the constructivist classroom*. Alexandria, VA: Association for Supervision and curriculum Development. (ISBN: 0130606626)

Though not a book about teaching mathematics, this is a readable and informative book on teaching in a constructivist manner. Examples span all curricular areas and all grades.

Fosnot, C. T. (Ed.). (1996). *Constructivism: Theory, perspectives, and practice*. New York: Teachers College Press. (ISBN: 0807745707)

The first section of this book develops the theory of constructivism through three readable chapters. The next five chapters examine the application of constructivist theory in different disciplines. Deborah Schifter provides the perspective on teaching mathematics. The final section includes four chapters on classroom practice. You will not find this book overly theoretical or hard to read. At the same time, Fosnot's book is not exactly a light read. You will be challenged and rewarded.

Lester, R. K. & Charles, R. I. (Eds.) (2004). *Teaching mathematics through problem solving: Grades 6-12*. Reston, VA: National Council of Teachers of Mathematics.

This is an important and valuable publication from the council. Topics include "Mathematics as Sense Making," "Designing and Selecting Tasks," "How to Problematicize the Curriculum," "Listening to Children," "Problem solving with Technology," and "Problem Posing." The 17 chapters, all written by top authors in the field, provide an in-depth examination of using a problem-based approach to teaching for understanding. The voices of teachers are also included in short reflections by those who have worked to make teaching through problem solving a success in their classrooms.

A Collection of Math Lessons. Marilyn Burns and Bonnie Tank. Math Solutions Publications: Sausalito, CA. 1999.

The Big Book of Books and Activities -- An Illustrated Guide for Teachers, Parents and Anyone Who Works with Kids! Dinah Zike. Dinah-Might Adventures, LP: San Antonio, TX.

Big Book of Math Graphics Every Teacher Needs! Dinah Zike. Dinah-Might Adventures, LP: San Antonio, TX.

http://www.gadoe.org/ci_services.aspx?PageReq=CIServMath

The Georgia Department of Education Mathematics webpage has links to the standards, the frameworks, and many other valuable websites.

www.gradebook.org/Mathematics.htm

Mathematics Department World Wide Web Resources for Mathematics Education. *
New Directions and Issues in Pedagogy ... Links to lesson plans, materials, videos,
manipulatives, discussion groups

<http://www.mathsolutions.com>

DRAFT

**Georgia Performance Standards Framework for Needs Improvement Schools
Subject / Grade Level: Mathematics Grade 3**

Unit 1		Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Part I	Part II					
		9 Weeks	6 Weeks	4 Weeks	5 Weeks	3 Weeks
4 Weeks	5 Weeks	Geometry & Measurement	Fractions & Decimals	Data Analysis	Algebra: Study of Patterns	Putting It All Together
Whole Numbers						
Algebra Standards will be integrated throughout the year and students will focus on Algebra the last nine weeks.						
<u>Key Standards</u> M3N1 a, b. M3N2 a, b, c	<u>Key Standards</u> M3N1 a, b M3N3 a, b, c, d, e, f, g M3N4 a, b, c, d, e, f	<u>Key Standards</u> M3G1 a, b, c, d M3M1 M3M2 a, b, c, d M3M3 a, b, c M3M4 a, b, c	<u>Key Standards</u> M3N5 a, b, c, d, e, f, g	<u>Key Standards</u> M3D1 a, b	<u>Key Standards</u> M3A1 a, b, c	All Standards
<u>Related Standards</u> M3A1 a, b M3M3 b	<u>Related Standards</u> M3A1 a, b M3M3 b	<u>Related Standards</u> M3A1 a, c M3M3 c M3M4 c	<u>Related Standards</u> M3A1 a, c M3N1 a M3M2 b	<u>Related Standards</u>	<u>Related Standards</u>	

DRAFT							
Georgia Performance Standards: Curriculum Map							
Grade Level/ Subject : 4 th Grade Mathematics							
1st 9 weeks		2nd 9 weeks		3rd 9 weeks		4th 9 weeks	
Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8
6 weeks	3 weeks	4 weeks	4 weeks	4 weeks	5 weeks	6 weeks	4-5 weeks
Radical Rounding: Place Value, Numeration, Rounding, and Estimation	The Graphs of Math: Venn diagrams, bar graphs and picture graphs	Operation Multiplication	Devine Division	Weighty Figures: Measurement	Plane Coordinates and Geometric Figures	Dizzy Fractions and Decimals	Review and Preview
All units will include skills to maintain and the Process Standards.							
Routine topics such as estimation, computational drill and practice, number patterns and rules, graphing, and problem solving should be addressed on an ongoing basis.							

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

DRAFT					
Georgia Performance Standards: Curriculum Map					
Subject/ Grade Level: Mathematics Grade 5					
1st 9 Weeks		2nd 9 Weeks		3rd 9 Weeks	
4th 9 Weeks					
Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
4 weeks	7 weeks	7 weeks	6 weeks	5 weeks	7 weeks
Groovy Graphing	Divine Decimals	Funky Fractions	Positively Perfect Plane Figures (2-D)	Super Solid Figures (3-D)	Putting It All Together
All units will include skills to maintain and the Process Standards.					
Routine topics such as add/subtract decimals and fractions with like denominators, whole number computation, angle measurement, length/area/weight, number sense, data usage and representations, characteristics of 2D and 3D shapes and order of operations should be addressed on an ongoing basis.					

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

