GEORGIA DEPARTMENT OF EDUCATION

Kathy Cox, State Superintendent of Schools

Training for Georgia Performance Standards

Day 3: Assessment FOR Learning

Participant's Guide Mathematics 6

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 modules, please contact Robin Gower at (404) 463-1933 or rogower@doe.k12.ga.us.

Use of This Guide

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

This is a one-day course, with approximately 5.5 hours of instructional time.

Introduction.....55 minutes

- Opening Activity (5 minutes)
- Hook Activity (25 minutes)
- Overview (5 minutes)
- Assessment and Backward Design (20 minutes)

Introduction to Assessment.....15 minutes

Balanced Assessment.....55 minutes

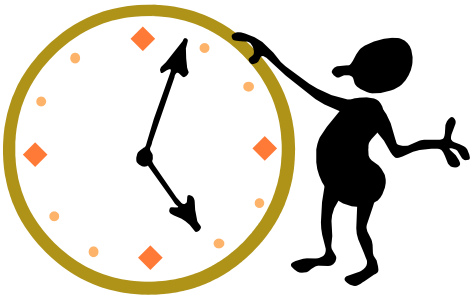
- Balanced Assessment Frameworks and Methods (25 minutes)
- Self Assessment (30 minutes)

Planning Assessments..... 3 hours

- Unit 1 (45 minutes)
- Unit 2 (1 hour)
- Unit 3 (1 hour 15 minutes)

Grading Student Work.....10 minutes

Summary, Evaluation, and Homework.....10 minutes



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 three of training, participants will be able to:

1. Explain why assessment is Stage 2 in the backward design process (standards-based education).

2. Identify the purpose of assessment in the classroom.

3. Given a standard(s) and a purpose for assessment, determine which assessment method(s) would be most appropriate at various times to increase student learning.

4. Given an assessment plan for a unit, identify whether it meets best practice standards for assessment.

5. Create a formative and summative assessment plan for a unit, including examples of performance tasks, rubrics, and constructed response.

Certificate of Participation from the International Clapping Institute

Participant

Date

Volume Score

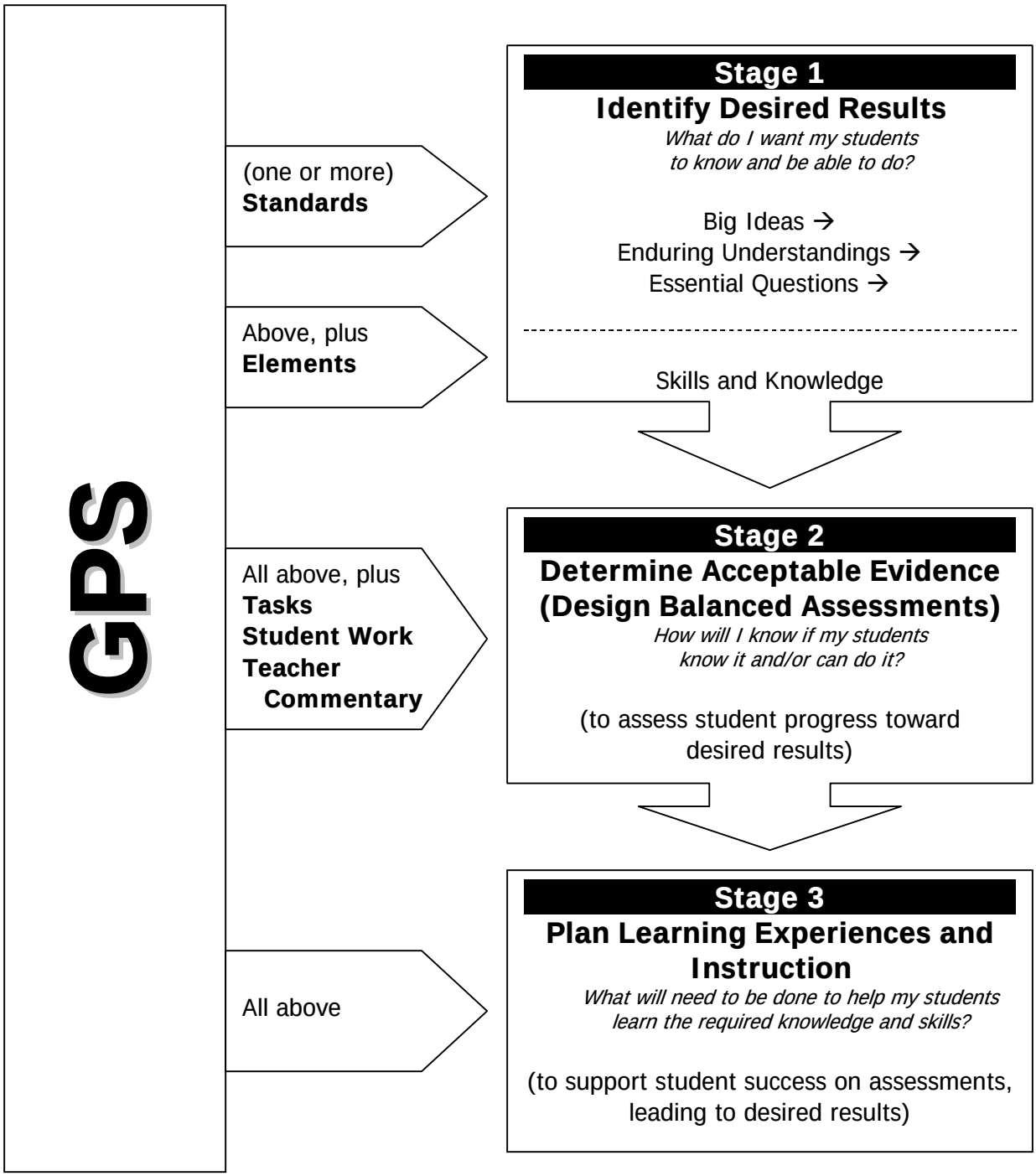
Appropriateness Score

Creativity Score

Rubric

Scale → / Criteria ↓	1	2	3	4
Accuracy	What's this?	Okay, it's a house, but it doesn't look like I imagined it would.	Better, I can tell it's a brick colonial.	Wow! This is just the way I imagined it would look.
Attention to Detail	Pretty plain.	Just the basics.	It's a nice house all right, but it doesn't look very lived in.	This has all those details that make a house a home.
Eye-Catching	Unmemorable.	Not unattractive, but I wouldn't drive around the block for a second look.	Not my ideal home, but I could live there.	My DREAM HOME.

GPS and the Backward Design Process



Summary of Backward Design for Mathematics

Stages of Unit Planning-

Stage 1: Desired Results; What students should know, understand, and be able to do at the end of the unit
Stage 2: Acceptable Evidence; Plan your formal and informal assessments; How we want the students to demonstrate the knowledge, understanding, or skill
Stage 3: Learning Experiences and Instruction; Plan your lessons; Lessons do not have to be just one day.

Stage 1
Established Goals: GPS Standards(s) and Element(s)

Big Ideas: Underline the big ideas in the GPS Standard(s) and Element(s). The big ideas connect discrete knowledge and skills.

Enduring Understandings:
1. Key understandings often violate common sense and conventional wisdom. (When you divide a given number by a decimal fraction that is less than one, the answer is larger than the given number.)
2. The understanding relates one skill to another skill. (Moving the decimal when dividing by decimal fractions is equivalent to inverting the divisor when dividing by common fractions.)
3. This is what you want the students to remember in 20 years. (There are formulas for calculating surface area and these formulas are derived from the areas of plane figures).
4. The understandings relate the math to another field of study. (Scale provides a mechanism by which we can study objects that are extremely large or small).

Unit Essential Questions: They have no simple right answer. They are meant to be discussed. You can turn enduring understandings statements into questions to develop unit essential questions. Using the enduring understandings above, we would have the following unit essential questions:
1. Why is the quotient larger than the dividend when you divide by a decimal fraction that is less than one?
2. Why do you move the decimal point in the divisor when you divide by decimal fractions?
3. How are the formulas for calculating the surface area of right prisms and cylinders derived from the areas of plane figures and how can nets be used to illustrate this?
4. To what extent do professionals use scale to analyze extremely large or small objects?

Skills and Knowledge: Knowledge is something you can say; a skill is something you can do. The knowledge part often comes from nouns and adjectives in the standards/elements; the skill part often comes from the verbs in the standards/elements.

Are the Best Curricular Designs "Backward?"

Why do we describe the most effective curricular designs as "backward"? We do so because many teachers begin with textbooks, favored lessons, and time-honored activities rather than deriving those tools from targeted goals or standards. We are advocating the reverse. One starts with the end-the desired results (goals or standards)-and then derives the curriculum from the evidence of learning (performances) called for by the standard and the teaching needed to equip students to perform. This view is hardly radical. Ralph Tyler (1949) described the logic of backward design clearly and succinctly about 50 years ago in the following quote:

Educational objectives become the criteria by which materials are selected, content is outlined, instructional procedures are developed, and tests and examinations are prepared. The purpose of a statement of objectives is to indicate the kinds of changes in the student to be brought about so that instructional activities can be planned and developed in a way likely to attain these objectives (pp.1, 45).

Backward design may be thought of as purposeful task analysis. Given a task to be accomplished, how do we get there? Or one might call it planned coaching. What kinds of lessons and practices are needed to master key performances? The approach to curricular design we are advocating is logically forward and commonsensical but backward in terms of conventional habits, whereby teachers typically think in terms of a series of activities.

This backward approach to curricular design also departs from another common practice: thinking about assessment as something we do at the end, once teaching is completed. Rather than creating assessments near the conclusion of a unit of study (or relying on the tests provided by textbook publishers, which may not completely or appropriately assess our standards), backward design calls for us to operationalize our goals or standards in terms of assessment evidence as we begin to plan a unit or course. It reminds us to begin with the question, What would we accept as evidence that students have attained the desired understandings and proficiencies-before proceeding to plan teaching and learning experiences? Many teachers who have adopted this design approach report that the process of "thinking like an assessor" about evidence of learning not only helps them to clarify their goals but also results in a more sharply defined teaching and leaning target, so that students perform better knowing their goal. Greater coherence among desired results, key performances, and teaching and leaning experiences leads to better student performance-the purpose of design.

From Wiggins, Grant and Jay McTighe. *Understanding by Design Professional Development Workbook.* Alexandria, VA: Association for Supervision and Curriculum Development. 2004.

Assessment Expectation

- There have been some questions regarding the assessment of and expectations for students with the most significant cognitive disabilities in relation to the GPS.
- NCLB and IDEA require the provision of access to a curriculum with challenging academic standards for *all* children, even the 1% with the most significant cognitive disabilities.
- Levels of achievement expectations on the GPS will be established for that 1%. The DOE will revise or redesign the Georgia Alternate Assessment for that 1%.
- To summarize, *all* teachers in our state must go through this training and learn these standards, because the GPS are the framework for *all* students; however, the tasks/measures used to assess the 1% of students who qualify under NCLB may be different.

Assessment Format Descriptions

1. Selected Response

Selected Response Items, which include multiple-choice questions, true/false items, and matching exercises, are the most common forms of assessments. Selected response items are best used in assessing breadth of content (McREL, 2000). Although selected response items often are used to assess students' recall and recognition of information, they also can be constructed to assess higher level thinking. For example, they might be used to assess students' understanding of concepts, their ability to apply knowledge, or their skill in predicting the consequences of an action.

Selected response formats are appropriate for use in a written form only when you are absolutely sure that students have a sufficiently high level of reading proficiency to be able to understand the test items. If you are administering a selected response assessment to students who are poor readers, nonreaders, or students who are still learning English, you must help them overcome their reading difficulty in order to determine their content mastery and obtain an accurate estimate of achievement.

It is possible, however, to use a selected response assessment in the primary grades or with students who are still learning English if the teacher reads the questions and provide pictorial response options.

Selected response formats are appropriate to use when you need efficiency, as you can administer them to large numbers of students at the same time, and you can score them quickly.

2. Constructed Response

Short Constructed-Response Items. Short constructed response items are questions that require students to prepare short written responses. For example, a science teacher might ask students to provide a brief explanation of how clouds affect weather and climate or a mathematics teacher might ask students to explain how they arrived at the answer to a mathematics problem. The value of this type of item is that it requires students to generate their own response, yet it is not as time intensive as are other assessment forms. In addition, this type of item can be effectively used to assess students' understanding of concepts

3. Performance Assessments

Performance Tasks. Performance tasks require students to apply learning to specific tasks and situations to demonstrate their knowledge. These tasks might include conducting interviews or creating physical products, oral presentations, videotapes, musical productions, or historical re-enactments. Research indicates that performance tasks can more deeply engage all students in their learning and can lead to a deeper understanding of content (Newmann, Secada, & Wehlage, 1995). Performance tasks can vary in terms of their complexity, time required for completion, and scope of content assessed. For example, students might be asked to do something as simple as read a poem or as complex as write and perform an original song. In any case, teachers should clearly describe the nature of the final product, resources students will need, and the criteria that will be used to judge the product. Teachers should embed performance tasks in meaningful contexts so students can see the relevance and usefulness of the knowledge and skills they are learning. This makes it easier for all students to demonstrate what they know. Minority students might find performance tasks particularly motivating and engaging because they present opportunities to bring their cultural backgrounds into classroom learning experiences (see Farr & Trumbull, 1997). Performance tasks also can be quite useful when it is necessary to provide adaptations and accommodations for special needs students. Accommodations in content, format, administration procedures, scoring, and interpretation are more viable with performance tasks than with forced-choice items (Farr & Trumbull, 1997).

4. Informal Assessments

Informal assessments are ongoing assessments used as part of the instructional process. Examples include teacher questioning, observations, examining student work, peer reviews, oral questioning, and student self-assessment. These assessments provide feedback to the teacher and the student. They are not typically scored or graded. According to Marzano (2000), one of the most straightforward ways to collect classroom assessment data is through informal observation of students. Researcher Audrey Kleinsasser (1991) explains that teacher observation involves the "informal conversations with students and observations of students that teachers make all day, every day." Teacher observation is highly effective for assessing process-oriented topics in mathematics. For example, noticing a student reading a graph while engaged in seat work, a teacher might ask the student to describe his or her thinking while reading the graph.

Guidelines for Performance Assessment

When constructing performance assessment tasks, it helps to use the acronym GRASPS.

G Real-world **Goal**

R Real-world **Role**

A Real-world **Audience**

S Real-world **Situation**

P Real-world **Products** or **Performances**

S**tandards**

Example

Goal: The goal (within the scenario) is to minimize costs for shipping bulk quantities of M&Ms.

Role: You are an engineer in the packaging department of the M&Ms candy company.

Audience: The target audience is nonengineer company executives.

Situation: You need to convince penny-pinching company officers that your container design will provide cost-effective use of the given materials, maximize shipping volume of bulk quantities of M&Ms, and be safe to transport.

Product: You need to design a shipping container from given materials for the safe and cost-effective shipping of the M&Ms. Then you will prepare a written proposal in which you include a diagram and show mathematically how your container design provides effective use of the materials and maximizes the shipping volume of the M&Ms.

Standards: Your container proposal should: (a) provide cost-effective use of the given materials, (b) maximize shipping volume of bulk quantities of M&Ms, and (c) be safe to transport. Your models must make the mathematical case.

From Wiggins, Grant and Jay McTighe. *Understanding by Design Professional Development Workbook.* Alexandria, VA: Association for Supervision and Curriculum Development. 2004.

Stage 1-Desired Results

Established Goals:

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

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

Understandings: Students will understand that...	**Unit Essential Questions**
• Formulas for calculating surface area are derived from the areas of plane figures. • Using nets and creating mathematical models help us to derive and illustrate surface area formulas. • Solids have both surface area and volume. • The surface area of a solid is the total area (the sum) of the areas of all its faces of the solid. • The volume of a solid is the measure of the amount of space the solid occupies.	• How are the formulas for calculating the surface area of right prisms and cylinders derived from the areas of plane figures and how can nets be used to illustrate this? • How would you compare and contrast area and volume?
Knowledge: Students will know...	**Skills**: Students will be able to ...
• The definitions of right rectangular prism, right cylinder, volume, surface area, and net • Formulas for surface area of a cylinder and a right rectangular prism. (if you want students to memorize these)	• Find the surface area of a right prism and cylinder using manipulatives and constructing nets. • Derive formulas for the surface areas of right rectangular prisms and cylinders using areas of rectangles and circles. • Compute the surface area of right rectangular prisms and cylinders using formulae. • Estimate the surface area of a simple geometric solid. • Solve application problems involving surface area of right rectangular prisms and cylinders.

Performance Tasks

1. GRASPS

   Goal: Determine the most efficient package to use for shipping a single softball.

   Role: You are an industrial engineer for ABC Softball Company.

   Audience: The target audience is the shipping manager of ABC Softball Company.

   Situation: Your company ships out souvenir softballs one at a time. The shipping manager has told you to determine whether a tube or a box would be the most efficient way to send the individual softballs.

   Product Performance and Purpose: Manufacturers design efficient packages that are the right size for their products. The less wasted volume in a package, the more money a company saves. Packaging material is expensive, and it usually ends up in a landfill or a recycling plant. Therefore, reducing the amount of material required is good economics and good for the environment.

   You will need to construct two types of packaging for a softball. One package has the shape of a prism. The other has the shape of cylinder or a tube. You will construct the minimum size of each package for a softball. You will also determine which of the two types of packages uses less material.

   Calculate and record the surface areas of the box and tube. Put the ball in the box and then in the tube. Does the ball fit in both containers with little wasted space? Which container uses less material, the box or the tube? Why? If

Other Evidence

Academic Prompts:

- How can we use nets to derive the formula for surface area of any solid figure?
- What is the relationship between a plane figure and its surface area?
- How might the surface area be found given the volume of a solid figure?
- Explain how changing the dimensions of a solid figure affect the surface area.
- Suppose the radius and height of a cylinder are given in centimeters. What is the most convenient unit for the surface area of the cylinder?
- Make a conjecture about the ratio of the surface areas of two similar solids. Make a conjecture about the ratio of the volumes of two similar solids.
- Compare and contrast surface area and volume.

Quiz and Test Items:

1. Given that the volume of a cube is 54 cubic centimeters, find the surface area and construct the net and solid.
2. Provided some solid figures, find the surface area.
3. Develop four problems on surface area where one answer choice is correct, one answer choice is a common mistake/misunderstanding, and one answer choice is just wrong. Be sure to illustrate and support each answer choice.
4. Given a figure (pairs of students will have different solid figures), explain in writing how you would help a friend determine how much wrapping paper is needed to cover the entire figure without overlapping. Now, exchange papers with your pair partner and provide your classmate with feedback on the process. Refer to the standard and elements as you provide detailed feedback and utilize illustrations and detailed work to support your commentary.
5. Let l be the length, w the width, and h the

you use the container with the smallest surface area to package 100,000 softballs, how many square centimeters of packaging material will you save over the other container? If you ship X softballs, how much would you save?

Standards and Criteria for Success: Your presentation materials should include the tube and box that you constructed as well as the net that you used to construct them. Also, you should include a written report that addresses the following:

- type of container that you recommend;
- surface area of each of your containers including your calculations;
- information regarding how much your company would save by using your container if 100,000 individual softballs were sent;
- copy of Excel or other spreadsheet showing how much money your company would save by using your container for any given number of softballs shipped.

2. Given a right rectangular prism (box), use centimeter grid paper to make at least three nets to form the box. Test each paper net by cutting it out and wrapping it around the box. Then write descriptions for your nets.

3. Carly is a packaging designer for a cereal manufacturer. When she designs a new cereal box, she must report the amount of material that will be required to make the box. What amount should Carly report for the design shown? Show how you determined your amount and explain your process. Use illustrations to support your justifications.
4. Use tasks listed in the Grade 6 Mathematics GPS.

height of a rectangular prism. Show that the surface area of the prism can be found with this formula.
Surface Area = $2lw + 2lh + 2wh$.

Informal Checks for Understanding:

- Frequently throughout the unit, use the 3-2-1 summarizing strategy. For example, ask the students to answer the following three questions and turn them in as they leave the room.
  1. List 3 things that you have learned about determining the surface area of prisms and cylinders.
  2. If you were the teacher of this class next year, what two things would you do to ensure that the students truly understand surface area?
  3. Estimate the surface area of (some object in your classroom).
- Everyday as students work on their math assignments, monitor student progress by walking around the room and examining each individual's (or group's) work to identify misunderstandings.
- Monitor as students summarize while participating in inside-outside circle cooperative learning structure.
- Use student-generated Maps on the Wall created before the test and left up during the test.

Stage 1-Desired Results

Established Goals:

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

a. Analyze line and rotational symmetry.
b. Demonstrate the relationship between similar plane figures including the scale factor between them.

Understandings: Students will understand that…	**Unit Essential Questions**
• Real-world objects may or may not be symmetrical. • Scale provides a mechanism by which we can study objects that are extremely large or small. • Plane figures can be reduced or enlarged using scale factors	• Why is it important to understand symmetry? • To what extent do professionals use scale to analyze extremely large or small objects? • How do we use scale factors /symmetry in the real world?
Knowledge: Students will know… The definition of symmetry, line symmetry, rotational symmetry, order of rotational symmetry, degree of rotational symmetry	**Skills**: Students will be able to… • Determine line and rotational symmetry. • Determine if plane figures are similar and if they are determine the scale factor between them. • Determine the order and degree of rotational symmetry. • Create models that have line and/or rotational symmetry.

Stage 2-Assessment Evidence

Performance Tasks

1. GRASPS

Goal: Teach students at the Parrar Art Institute the mathematics needed in order to use symmetry in various art forms.

Role: You are the low man on the totem pole at the Institute and have been put in charge of developing this workshop for art students.

Audience: The target audience is freshman art students.

Situation: You need to teach the mathematics to students who are "mathematically challenged."

Product Performance and Purpose: You must identify the mathematics that is needed for art majors to effectively use symmetry. You must discuss various art forms that do and do not have symmetry. Prepare the materials for a workshop including a power point presentation, handouts, digital photographs of physical examples, a bibliography of resources, and a transcript of the interview that you have conducted with one of the art teachers at Parrar Art Institute. (This person can be any art teacher). The purpose of your interview is to gain information from the teacher about the mathematics of symmetry that needs to be taught.

Standards and Criteria for Success:
Your presentation materials should include a PowerPoint presentation saved on a disk, hand-outs that you would give to the students, digital photographs of physical examples, a bibliography of resources, and a transcript of the interview with an art teacher.

2. Use performance tasks listed in the Grade 6 Mathematics GPS.

Other Evidence

1. **Tests and Quizzes**
   Multiple-choice and free response items.
2. **Informal Checks for Understanding**

Student-generated Maps on the Wall created before the test and left up during the test; ticket out of the door.

3. **Academic Prompts**
   - Do tasks with manipulatives, such as miras, patty paper, and tangrams.
   - Explain how a line of symmetry is related to a reflection.
   - Research biological organisms (plants, animals, micro-organisms) and group them into those that have line symmetry, those that have rotational symmetry, those that have both, and those that are asymmetrical.
   - Draw a figure that has rotational symmetry when it is turned 180 degrees only.
   - Draw a figure whose order of rotational symmetry is 5.
   - Draw a figure whose order of rotational symmetry is 8.
   - Draw a polygon that has line symmetry but not rotational symmetry. Then describe how you could change the figure so that it has rotational symmetry.

Design Template for Assessment for a Unit

What evidence will show that students understand _____?

Performance Tasks, Projects

Quizzes, Tests, Academic Prompts

Other Evidence (e.g., observations, work samples, dialogues)

Student Self-Assessment

From Wiggins, Grant and Jay McTighe. *Understanding by Design Professional Development Workbook.* Alexandria, VA: Association for Supervision and Curriculum Development. 2004.

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Stage 1-Desired Results

Established Goals

M5N3. Students will further develop their understanding of the meaning of multiplication and division with decimal fractions and use them.

a. Model multiplication and division of decimal fractions by another decimal fraction.
b. Explain the process of multiplication and division, including situations in which the multiplier and divisor are both whole numbers and decimal fractions.
c. Multiply and divide with decimal fractions including decimal fractions less than one and greater than one.
d. Understand the relationships and rules for multiplication and division of whole numbers also apply to decimal fractions.

M6P1. Using the appropriate technology, students will solve problems that arise in mathematics and in other contexts.

a. Solve non-routine word problems using the strategy of guess and check.

Understandings: Students will understand that…	**Unit Essential Questions**
• When you divide a given number by a decimal fraction that is less than one the quotient is larger than the given number. • Moving the decimal when dividing by decimal fractions is equivalent to inverting the divisor when dividing by common fractions.	• Why is the quotient larger than the dividend when you divide by a decimal fraction that is less than one? • Why do you move the decimal point in the divisor and the dividend when you divide by decimal fractions?
Knowledge: Students will know… The definition of decimal fraction and the strategy of guess and check.	**Skills**: Students will be able to … • Model multiplication and division of decimal fractions by another decimal fraction. • Explain the process of multiplication and division of decimal fractions. • Multiply and divide decimal fractions. • Understand the relationships and rules for multiplication and division of decimal fractions. • Solve non-routine word problems using the strategy of guess and check.

Stage 1-Desired Results

Established Goals: M6A2. Students will consider relations between varying quantities.

a. Analyze and describe patterns arising from function rules, tables, and graphs.
b. Understand the meaning of direct proportion. Investigate its features by using mathematical expressions. Graph simple functions in the form y = kx.
c. Apply methods for solving proportions.
d. Write and solve equations in the form y = kx where *x* and y are whole numbers, decimals, or fractions.
e. Use proportional reasoning including percents to solve problems.

Understandings: Students will understand that...

- Tables and graphs reveal patterns.
- Proportions and percents are used in authentic problem solving situations and are very relevant to everyday life.
- Proportional reasoning involves comparisons of relationships between ratios.
- Graphs provide visual representations of direct variations.
- Numerical relationships (number patterns) can be expressed in multiple ways.
- Some quantities vary directly.
- Direct proportions can be used to represent everyday relationships.
- Direct proportion is used to determine the rate of change in one variable in relation to another.
- Changing one of the quantities in an equation, table, graph or function affects the outcome - the other quantities.

Essential Questions

- Why do we study relationships in mathematics?
- Why do we need equations?
- Why are tables and graphs helpful in depicting data?
- Why is it important to analyze and describe patterns?
- What are the relationships between patterns, graphs and equations?
- How do you know when you have discovered a pattern?
- Why do we need different ways to represent patterns of numbers?
- How do equivalent representations of a relation clarify the relation?
- How are proportions used in solving authentic problems?
- How is direct proportion used in everyday life?
- How would the world look if things were not in proportion?
- How would you and your life be affected if proportional reasoning did not exist?
- How can using proportional reasoning (including percents) help you be a smart consumer?
- How does direct proportion impact choices that you make?
- What kinds of questions can be answered using proportional reasoning?

Knowledge: Students will know…	**Skills**: Students will be able to…
• The definition of pattern, proportion, direct proportion, equation, proportional reasoning, percent, constant of proportionality. • Relationship between percent and proportion. • If the quotient of two quantities is a constant, then the quantities vary directly.	• Identity patterns from data represented in tables and graphs. • Represent a number pattern in multiple ways, including a rule, a table, or a graph. • Analyze problem-solving situations and derive proportional equations. • Use manipulatives or draw pictures, and use proportions in the form a/b = c/d, to solve problems, including percent problems. • Graph proportional relationships in the form y = kx and describe characteristics of the graphs. • Write and solve equations involving proportions and percents, including those expressed as y = kx. • Create authentic problem-solving situations that can be solved using proportional reasoning. • Determine the reasonableness of an answer. • Determine when to estimate and when to calculate percents and proportions. • Describe proportional relationships using y=kx, where k is the constant of proportionality. • In a proportional relationship expressed as y=kx, solve for one quantity given values of the other.
Stage 2-Assessment Evidence	
Performance Tasks	**Other Evidence**
Stage 3-Learning Plan	
Learning Activities	

What Happens Between Assessments?

December 1996/January 1997 | Volume **54** | Number **4**
Teaching for Authentic Student Performance Pages 6-12

Not only assessment needs to change. Curriculums and instructional strategies, too, must reflect a performance orientation. Here are seven principles for performance-based instruction.
Jay McTighe

Growing concern over the inadequacy of conventional tests has spurred interest in performance assessments, such as performance tasks, projects, and exhibitions. To many supporters, these performance assessments are better suited than traditional tests to measure what really counts: whether students can apply their knowledge, skills, and understanding in important, real-world contexts. More teachers are using performance assessments in their classrooms, and such assessments are beginning to influence district- and state-level testing programs as well.

Increasing the use of performance assessments in and of itself will not significantly improve student performance, however. To borrow the old farm adage: "You don't fatten the cattle by weighing them." If we expect students to improve their performance on these new, more authentic measures, we need to engage in "performance-based instruction" on a regular basis.

But what does it really mean to teach for performance? Working the past six years with hundreds of teachers using performance assessments, I've seen how the development of assessment tasks and performance targets can influence instruction. Based on this experience, I offer seven principles of performance-based instruction, illustrated by vignettes from classrooms in which these principles are being applied.

Establish Clear Performance Targets

As part of a unit on nutrition, a middle school health teacher presents her students with the following performance task.

You are having six of your friends over for your birthday party. You are preparing the food for the party, but your mother has just read a book on nutrition and tells you that you can't serve anything containing artificial sweeteners or lots of salt, sugar, or saturated fats. Plan a menu that will make your friends happy and still meet your mother's expectations. Explain why your menu is both tasty and healthy. Use the USDA Food Pyramid guidelines and the Nutrition Facts on food labels to support your menu selection.[1]

To teach effectively, we need to be clear about what we expect students to know, understand, and be able to do as a result of our instruction. But performance-based instruction calls for more. We also need to determine *how* students will demonstrate the intended knowledge,

understanding, and proficiency. When establishing performance targets, consider Gardner's (1991) contention that developing students' *understanding* is a primary goal of teaching. He defines understanding as the ability to apply facts, concepts, and skills appropriately in new situations.

The principle of *establishing clear performance targets* and the goal of *teaching for understanding* fit together as a powerful means of linking curriculum, instruction, and assessment. A performance-based orientation requires that we think about curriculum not simply as content to be covered, but in terms of desired *performances of understanding*. Thus, performance-oriented teachers consider assessment up front by conceptualizing their learning goals and objectives as performance applications calling for students to demonstrate their understanding. Performance assessments, then, become targets for teaching and learning, as well as serving as a source of evidence that students understand, and are able to apply, what we've taught.
Establishing clear performance targets is important for several reasons. Teachers who establish and communicate clear performance targets to their students reflect the research on effective teaching, which supports the importance of instructional clarity. These teachers also recognize that students' attitudes and perceptions toward learning are influenced by the degree to which they understand what is expected of them and what the rationale is for various instructional activities. Finally, the process of establishing performance targets helps identify curriculum priorities, enabling us to focus on the essential and enduring knowledge in a crowded field.

Strive for Authenticity in Products and Performances

Fifth graders conduct a survey to gather data about community attitudes toward a proposal that public school students wear uniforms. The students organize the data and then choose an appropriate graphic display for communicating their findings. Finally, students write letters to the editor of the local paper to present their data and their personal views on the proposal. A direct link to the larger world is established when two student letters are published in the newspaper.

Leading reformers recommend that schools involve their students in authentic work. Performance tasks should call upon students to demonstrate their knowledge and skills in a manner that reflects the world outside the classroom. Although diagramming sentences may help students understand sentence structures and parts of speech, this is not really an authentic activity, because few people outside of school diagram sentences. When students engage in purposeful writing (for example, to persuade an identified audience), however, they are using their knowledge and skills in ways much more congruent with the demands of real life.

As in the larger world, authentic work in schools calls for students to apply their knowledge and skills, with the result typically being a tangible product (written, visual, or 3-dimensional) or a performance. These products and performances have an explicit *purpose* (for example, to explain, to entertain, or to solve a problem) and are directed toward an identified *audience*. Because real-world issues and problems are rarely limited to a single content area, authentic work often provides opportunities for making interdisciplinary connections.

Emphasizing authentic work does not lessen the importance of helping students develop basic skills. On the contrary, basic knowledge and skills provide an essential foundation for meaningful application. The "basics" are not ends in themselves, however; they serve a larger goal: to enable students to thoughtfully apply knowledge and skills within a meaningful, authentic context.

Research and experience confirm that when learners perceive classroom activities as meaningful and relevant, they are more likely to have a positive attitude toward them (McCombs 1984, Schunk 1990)). In addition, many teachers have observed that when given the opportunity to produce a tangible product or demonstrate something to a real audience (for example, peers, parents, younger or older students, community members), students often seem more willing to put forth the effort required to do quality work.
Remember that what we assess sends a strong signal to students about what is important for them to learn. When authentic performance tasks play a key role in teaching and assessing, students will know that we expect them to apply knowledge in ways valued in the world beyond the classroom.

Publicize Criteria and Performance Standards

Before beginning a laboratory experiment, a high school science teacher reviews the Science Department's performance list for a lab report with her students. The list, containing the criteria for a thorough report, clearly conveys the teacher's expectations while serving as a guide to the students as they prepare their reports. Before she collects the reports, the teacher allows students to exchange papers with their lab partners, give feedback to one another based on the performance list criteria, and make needed revisions.

Like the problems and issues we confront in the real world, authentic classroom performance tasks rarely have a single, correct answer. Therefore, our evaluation of student products and performances must be based upon judgment and guided by criteria. The criteria are typically incorporated into one of several types of scoring tools: a rubric, a rating scale, or a performance list. With all of these tools, the criteria help to spell out the qualities that we consider to be most significant or important in student work.

Teachers at elementary schools in Anne Arundel County, Maryland, use a "Writing to Persuade" rubric to help students learn the qualities of effective persuasive writing. A large poster of the rubric, containing the criteria in the form of questions, is prominently displayed in the front of the classroom to provide an easy reference for teachers and students. For example, "Did I clearly identify my position?" "Did I fully support my position with facts or personal experiences?" "Did I effectively use persuasive language to convince my audience?"

Evaluative criteria clearly are essential for summative evaluations, but teachers also are recognizing their role in *improving* performance. By sharing the criteria with students, we begin to remove the mystery of how work will be evaluated, while highlighting the elements of quality

and standards of performance toward which students should strive. Teachers also can help students internalize these elements of quality by having them use scoring tools themselves to evaluate their own work or that of their peers. When students have opportunities to examine their work in light of known criteria and performance standards, they begin to shift their orientation from "What did I get?" to "Now I know what I need to do to improve."

Provide Models of Excellence

A middle school art teacher displays five examples of well-constructed papier-mâché sculptures of "figures in action." The examples illustrate the criteria by which the sculptures will be evaluated: composition (figure showing action), strength and stability of armature (underlying structure), surface construction (application of papier-mâché), finishing techniques (texture, color, details), and overall effect. The teacher notes that the quality of her students' sculptures has markedly improved since she began sharing and discussing actual models of excellence.

Providing students with lists of criteria or scoring rubrics is a necessary piece of performance-based instruction but it isn't always sufficient. Not every student will immediately understand the criteria or how to apply them to their own work ("What do you mean by well organized?"). Wiggins (1993) suggests that if we expect students to do excellent work, they need to know what excellent work looks like. Following his idea, performance-based instruction calls for providing students with models and demonstrations that illustrate excellence in products or performances.

This approach, of course, is not unknown in schools. Effective coaches and sponsors of extracurricular activities often involve their club or team members in analyzing award-winning school newspapers or yearbooks, or reviewing videotapes of excellent athletic or dramatic performances. But providing models of quality work is also an essential piece of performance-based instruction in classrooms.

Teachers can use examples of excellent work during instruction to help students understand the desired elements of quality. Some teachers also present students with examples of mediocre and excellent work, asking them to analyze the differences and identify the characteristics that distinguish the excellent examples from the rest. In this way, students learn the criteria through tangible models and concrete examples. In some classrooms, students actually help to construct the scoring tools (rubric, rating scale, or performance list), based on their growing knowledge of the topic and the criteria they have identified in the examples. (The potential benefits of providing students with tangible examples underscore the value of saving examples of student work from performance tasks for use as models in future years!)

Some teachers are wary of providing models of quality, fearing that students may simply copy or imitate the examples. This is a real danger with activities for which there is a single correct answer (or one "best" way of accomplishing the task). With more open-ended performance tasks and projects, however, we can minimize this problem by presenting students with multiple

models. In this way, students are shown several different ways to satisfy the desired criteria, thus discouraging a cookie-cutter approach.
By providing students with criteria *and* models of excellence, teachers are often rewarded with higher quality products and performances. In addition, they are helping students become more self-directed students, able to distinguish between poor- and high-quality performance are more likely to be able to evaluate and improve their own work, guided by a clear conception of excellence.[2]

Teach Strategies Explicitly

An elementary teacher introduces his students to two strategies—summarizing and predicting to enhance their comprehension of text materials. He describes each strategy and models its use by thinking aloud while applying it to a challenging text. During the lesson, the teacher refers to large posters spelling out a written procedure and visual symbol for each strategy. Following the lesson, he distributes bookmark versions of the posters. Over the next two weeks, students work with a reading buddy to practice using the strategies with both fiction and non-fiction texts while the teacher monitors their progress and provides guidance.

In every field of endeavor, effective performers use specific techniques and strategies to boost their performance. Olympic athletes visualize flawless performances, writers seek feedback from "critical friends," law students form study groups, coaches share tips at coaching clinics, busy executives practice time-management techniques.

Students also benefit from specific strategies that can improve their performance on academic tasks. For example, webbing and mapping techniques help students see connections, cognitive reading strategies boost comprehension (Palinscar and Brown 1984; Haller, Child, and Walberg 1988), brainstorming techniques enhance idea generation, and mnemonics assist retention and recall.

Few students spontaneously generate and use strategies on their own, however, so we need to explicitly teach these thinking and learning strategies. One straightforward approach is to use a direct instruction model, in which teachers

- introduce and explain the purpose of the strategy;
- demonstrate and model its use;
- provide guided practice for students to apply the strategy with feedback;
- allow students to apply the strategy independently and in teams; and
- regularly reflect on the appropriate uses of the strategy and its effectiveness.

In addition to direct instruction, many teachers have found it helpful to incorporate thinking and learning strategies into tangible products, such as posters, bookmarks, visual symbols, or cue cards (McTighe and Lyman 1988). For example, students in a middle school mathematics class I'm familiar with have constructed desktop spinners depicting six problem-solving strategies they've been taught. When working on open-ended problems, the students use the spinners to

indicate the strategy they are using. Their teacher circulates around the room, asking students to think aloud by explaining their reasoning and problem-solving strategies. Later, she leads a class discussion of solutions and the effectiveness of the strategies used. The spinners provide students with a tangible reminder of the value of using strategies during problem solving. These and other cognitive tools offer students practical and concrete support as they acquire and internalize performance-enhancing strategies.

Use Ongoing Assessments for Feedback and Adjustment

A middle school social studies teacher notes that the quality of her students' research reports has markedly improved since he began using the writing process approach of brainstorming, drafting, reviewing feedback, and revising. Through the use of teacher and peer reviews of draft reports, students are given specific feedback on strengths, as well as on aspects of their reports that may be unclear, inaccurate, or incomplete. They appreciate the opportunity to make necessary revisions before turning in their final copy.

The Japanese concept of *Kaizen* suggests that quality is achieved through constant, incremental improvement. According to J. Edwards Deming, guru of the TQM movement, quality in manufacturing is not achieved through end-of-line inspections; by then, it is too late. Rather, quality is the result of regular inspections (assessments) *along the way*, followed by needed adjustments based on the information gleaned from the inspections.

How do these ideas apply in an academic setting? We know that students will rarely perform at high levels on challenging learning tasks on the first attempt. Deep understanding or high levels of proficiency are achieved only as a result of trial, practice, adjustments based on feedback, and more practice. Performance-based instruction underscores the importance of using assessments to provide information to guide improvement throughout the learning process, instead of waiting to give feedback at the end of instruction

Once again, effective coaches and sponsors of clubs often use this principle as they involve their students in scrimmages, dress rehearsals, and reviews of bluelines. Such activities serve to identify problems and weaknesses, followed by more coaching and opportunities to practice or revise.
The ongoing interplay between assessment and instruction so common in the arts and athletics is also evident in classrooms using practices such as non-graded quizzes and practice tests, the writing process, formative performance tasks, review of drafts, and peer response groups. The teachers in such classrooms recognize that ongoing assessments provide feedback that enhances their instruction and guides student revision. *Kaizen*, in the context of schools, means ensuring that assessment enhances performance, not simply measures it.

Document and Celebrate Progress

Early in the school year, a middle school physical education teacher has her students analyze their current fitness levels based on a series of measures of strength, endurance, and flexibility. The initial results are charted and used to establish personal fitness goals. The teacher then

guides students in preparing an individualized fitness plan to achieve their goals. Subsequent fitness tests at the middle and end of the year enable the teacher and her students to document their progress and, if necessary, establish new goals. The teacher believes that the focus on improvement based on a personal benchmark allows every student to achieve a measure of success while cultivating the habits necessary for lifelong fitness.

Perhaps one of the greatest challenges in this current era of school reform is the gap between our goal of higher standards of performance for all and the realization that some students are functioning well below these lofty standards. Many educators struggle daily with this tension: How do we preserve students' self-esteem without lowering our standards? How do we encourage their efforts without conveying a false sense of accomplishment? Perceptive teachers also recognize that students' own beliefs about their ability to be successful in new learning situations are a critical variable. Confronted with rigorous performance standards, some students may well believe that the target is beyond their grasp and may not, as a result, put forth needed effort.

There are no easy solutions to this dilemma. But reflect for a moment on the natural inclination displayed by parents and grandparents of toddlers and pre-schoolers. They regularly support novice performance by encouraging small steps ("C'mon, you can do it!"), celebrating incremental achievements ("Listen everyone, she said, dada'!") and documenting growth (witness the refrigerator displays ranging from scribbles of color to identifiable pictures). These celebrations encourage children to keep trying and to strive for greater competence. They focus on what youngsters *can do* and how they have *improved* as a means of spurring continued growth.

Performance-based instruction demands a similar tack. Acknowledging the limitations of one-shot assessments, such as tests and quizzes, as the primary measures of important learning goals, some educators are moving toward creating collections of student work over time. One manifestation of this is the growing interest in and use of portfolios. Consider an analogy with photography. If a test or quiz represents a snapshot (a picture of learning at a specific moment), then a portfolio is more like a photo album - a collection of pictures showing growth and change over time.

Just as portfolios can be extremely useful as a means of documenting student progress, they also provide a tangible way to display and celebrate student work. Grade-level teams at North Frederick Elementary School in Frederick, Maryland, for example, sponsor a "portfolio party" each fall and spring. Parents, grandparents, school board members, central office staff, business partners, and others are invited to review student work collected in portfolios. Before the party, teachers guide students in selecting examples from their portfolios that illustrate progress in key learning areas. During the party, students present their portfolios to the guests, describe their work during the year, highlight the progress they have made, and identify related goals for future improvement.

Principal Carolyn Strum says the school's portfolio program has had at least four benefits: (1) the systematic collection of student work throughout the year helps document student progress and achievement; student work serves as a lens through which the faculty can reflect on their successes and adjust their instructional strategies; (3) school-to-home communication is enhanced as students present and explain their work to their parents and other adults; and (4) students assume greater ownership of their learning and display obvious pride when involved in selecting and showing off their accomplishments and growth.

Developing content standards, creating more authentic performance assessments, and establishing rigorous student performance standards will not—in and of themselves—substantially boost student achievement. But the seven principles above reflect promising ways that teachers and schools are beginning to rethink their curriculum and instructional strategies to ensure that *performance* is more than something measured at the end of a unit.

Endnotes

[1] This performance task was developed in 1994 by Marzano, R., and Pickering, D., Mid-Continent Regional Educational Laboratory Institute, Aurora, Colorado.

[2] For a detailed discussion and examples of classroom performance lists, see M. Hibbard and colleagues, (1996), *Performance-Based Learning and Assessment*, (Alexandria, VA.: Association for Supervision and Curriculum Development).

References

Haller, E., Child, D. and Walberg, H. (1988). "Can Comprehension Be Taught: A Qualitative Synthesis." *Educational Researcher* 17, 9: 5-8.

Gardner, H. (1991). *The Unschooled Mind*. Basic Books: CITY, STATE.

McCombs, B. (1984). "Processes and Skills Underlying Intrinsic Motivation to Learn: Toward a Definition of Motivational Skills Training Intervention." *Educational Psychologist* 19: 197-218.

McTighe, J., and Lyman, F. (1988). "Cueing Thinking in the Classroom: The Promise of Theory-Embedded Tools." *Educational Leadership* 45, 7: 18-24.

Palinscar, A., and Brown, A. (1984). "Reciprocal Teaching of Comprehension Fostering and Comprehension Monitoring Activities." *Cognition and Instruction* 1: 117-176.

Schunk, D. (1990). "Goal Setting and Self-Efficacy During Self-Regulated Learning." *Educational Psychologist* 25, 1: 71-86.

Wiggins, G. (1993). *Assessing Student Performance: Exploring the Limits and Purposes of Testing*. Jossey-Bass: San Francisco, California.

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Recommended Readings: Assessment

Note: A more general list of resources for Standards-Based Education is contained in the materials for Day One of training.

Andrade, H. (2000, February). Using Rubrics to Promote Thinking and Learning. *Educational Leadership*, 56 (5), 13-19.

An excellent resource on using rubrics to support student learning. In this article, Andrade outlines the importance of rubrics by providing insight into their purpose, various uses and effective designs. She makes the point that rubrics can help educators assess student work quickly and efficiently, and help support student grades. When properly designed and used correctly, rubrics can support both the learning and assessment process.

Arter, J., & Busick, K. (2001). *Practice With Student-Involved Classroom Assessment*. Upper Saddle River, NJ: Prentice Hall.

This workbook has been developed as the companion to the third edition textbook. The connections between the concepts in the text and the workbook exercises are well-planned and finely tuned to work together chapter-by-chapter. Each exercise provides direct assistance to teachers on concepts from evaluating grading practices to developing scoring criteria.

Carr, J., & Harris, D. (2001). *Succeeding With Standards: Linking Curriculum, Assessment and Action Planning*. Alexandria, VA: Association for Supervision and Curriculum Development.

A practical, school-tested solution to the challenge of incorporating standards at all levels. The authors describe a comprehensive process by which schools and districts can create a coherent plan to become standards-based. Improved student performance is the centerpiece of all standards-linking processes.

Coladarci, T. (2002, June). Is it a House...or a Pile of Bricks? *Phi Delta Kappa*, 83(10), 772-774.

An examination of assessment. By addressing six features, school leaders will be working more deliberately toward a true local assessment system, rather than on a mere collection of assessments.

Davies, A. (2000). *Making Classroom Assessment Work*. Merville, British Columbia: Connections Publishing.

This provides a thoughtful framework for how teachers and administrators can reconsider how assessment is working in classrooms. From building the foundation for student involvement through ways to report, the author provides a bridge between what the research shows and what teachers can do in their classrooms. This book is a quick read that is written in teacher-friendly language.

Gregory, K., Cameron, C. & Davies, A. (1997). *Knowing What Counts*. Merville, British Columbia: Connections Publishing.

This series of three books for use in middle grades and high school classrooms outlines incredibly practical ways for teachers to involve students in their own assessment. *Setting and Using Criteria* outlines a four-part process for setting criteria, and then shows how to use it to provide descriptive feedback to support learning. *Self-Assessment and Goal-Setting* provides 10 practical self-assessment ideas and five goal-setting ideas to use with students. *Conferencing and Reporting* focuses on practical ways to involve students in their own communication with others about learning. Additional information about her work in assessment can be found on Anne Davies' organization's web site: www.connect2learning.com.

Guskey, T. (2002, June). *Computerized Gradebooks and the Myth of Objectivity*. Phi Delta Kappa, 83(10), 775-780.

A look at the need for teachers to decide the most accurate and fair description of each student's achievement and level of performance utilizing computerized grading programs and electronic grade books.

Lewin, L., & Shoemaker, B. (1998) *Great Performances: Creating Classroom-Based Assessment Tasks*. Alexandria, VA: Association for Supervision and Curriculum Development.

An inspiring book filled with personal examples on how to increase student achievement by helping students understand the assessment process. The authors provide a four-step approach to assist students in learning content and how to understand it for the assessment. They maintain that helping students to understand teacher expectations, performance levels and strategies for reaching course goals will increase student achievement. This resource includes examples of students' projects and assessment tools.

Lockwood, R., & McLean, J. (1996). *Why We Assess Students – And How*. Thousand Oaks, CA: Corwin Press, Inc.

This book is an easy-to-read and powerful resource book that describes the types of assessments, the strengths and weaknesses of each type, use of kinds of assessment data and the caution to be observed while interpreting assessment results. The book includes discussions on criterion-referenced testing and alternative or authentic testing methodologies. The last chapter demonstrates how to develop an ideal assessment program for your staff. It's a keeper, just like the authors say.

Marzano, Robert J. *Transforming Classroom Grading*. Alexandria, VA: Association for Supervision and Curriculum Development. 2000.

Grading has the *potential* for being a valuable learning tool that helps both students and teachers clearly see how they can improve; however, this potential is seldom realized. In this book, Marzano presents viable alternatives to traditional assessment that are grounded in research and practical at the same time.

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

Marzano et. al. make the case that performance tasks should be developed to help students achieve deep learning and promote active construction of knowledge. This book contains numerous examples of such performance tasks and also includes several chapters on the construction of rubrics to score performance and offer useful feedback to students.

Nichols, B., & Singer, K. (2000). Developing Data Mentors. *Educational Leadership*, 57(5), 34-37.

A good resource with a focus on applying assessment data to improve student achievement. The authors share the pitfalls of gathering and sharing student assessment data. They offer two major strategies to assist classroom teachers and principals in data analysis: use of data notebooks and implementation of a data-mentoring program. These strategies improve data analysis and skills for both parties.

O' Connor, K. (2002) *How to Grade for Learning, 2nd Edition*. Arlington, Illinois: Skylight Publishers. www.skylightedu.com

The second edition of this book offers eight practical guidelines that encourage effective learning, support student success and make grades meaningful. Each guideline defines the purpose, illustrates an example, discusses and analyzes key issues, and summarizes the bottom line. Additional topics include overviews of various grading programs, calculation strategies, the use of report cards and other reporting forms, and insights on future trends in student assessment.

Reeves, D. (2001). *101 Questions & Answers About Standards, Assessment and Accountability.* Denver, CO: Advanced Learning Press.

An easy-to-use reference book that gives clear answers to some of the most commonly asked questions about some of today's most pressing educational issues. Teachers, parents and school administrators can use this book to help formulate effective solutions and improve communication within the entire school community.

Reeves, D. (1997). *Making Standards Work: How to Implement Standards-Based Assessments in the Classroom, School and District*. Denver, CO: Advanced Learning Press.

An examination of the undeniable evidence of the importance of using performance assessment as part of an educator's daily life. This book leads the reader through the steps of creating and using performance assessments to determine students' achievement throughout the school year. The author advocates using performance assessments that contain real-world scenarios, multiple tasks, and clear, consistent scoring guides.

Research You Can Use to Improve Results. (1999). Alexandria, VA: Association for Supervision and Curriculum Development.

A useful tool for school improvement. This book describes research-based practices that have been associated with improvements in the following areas: leadership, planning and learning goals; management and organization; instruction and instructional improvement; interactions; equity; special programs; assessment and parent and community involvement.

Schmoker, M. (1999). *Results: The Key to Continuous School Improvement*. Alexandria, VA: Association for Supervision and Curriculum Development.

A guideline for continuous improvement. How do educational leaders know their schools are improving? Do they know the strategies that really work in reading, mathematics, writing or science programs? How do they measure what works? How do they sustain school reform? Schmoker answers these and other questions by focusing on student learning. He outlines a school improvement planning process around teams of teachers and administrators who meet regularly to analyze data, develop measurable goals and research-based action steps, and monitor progress toward goals using formative and summative data.

Schmoker, M. (2001). *The Results Fieldbook*. Alexandria, VA: Association for Supervision and Curriculum Development.

In this book, the reader gets a close, detailed look at how entire school systems cultivate and capture teacher expertise to increase student achievement. The schools focused on the concepts of collaboration and data collection from Mike Schmoker's book titled *The Key to Continuous School Improvement.* Goal-oriented, data-driven collaboration, plus ongoing assessment in these five school systems led to an array of effective innovation and teaching strategies. Short vignettes, written in the first-person, give practitioner accounts of successful schools obtaining measurable improvement. Schools shared how they overcame obstacles and achieved exceptional results for all their students. Actual data results from the systems are presented.

Stiggins, R. (2001). *Student-Involved Classroom Assessment*, Third Edition. Upper Saddle River, NJ: Prentice Hall.

An important resource for leaders in helping teachers create quality classroom assessments. Stiggins shows how classroom assessment can be used to build student confidence and to increase student performance. He also presents ways to use different assessment methods to reach achievement goals. This is the third edition of Rick Stiggins' acclaimed textbook, and it continues to build on his practical guidelines for developing quality classroom assessment practices. It offers a wealth of ideas for improving learning through effective assessment and demonstrates how vital and powerful student involvement is in the process. Additional assessment resources produced by Rick Stiggins' organization, the Assessment Learning Institute (Portland, Oregon), are available and downloadable at no cost on the organization's web site: www.assessmentinst.com.

Stiggins, R. (2002, June). *Assessment Crisis: The Absence of Assessment FOR Learning*. Phi Delta Kappa, 83(10), 758-765.

A must reading for anyone who needs to know more about the impact assessment has on student achievement. This article sums up the research on classroom assessment with a connection to school improvement. Rick Stiggins, president of Assessment Training Institute, Inc. in Portland, Oregon, and considered by many the country's most renowned researcher and speaker on assessment, writes in a manner in which school leaders and teachers can learn and use the information. The latter part of this article helps school leaders focus their work on improving classroom assessment FOR learning.

Thompson, M., & Thompson, J. (2000). *Leadership, Achievement and Accountability*. Learning Products and Assessment, Inc.

An easy-to-follow handbook that uses Essential Questions to explore exemplary practices in each of the following areas: assessment, curriculum, instruction, organization and accountability. This resource provides research-based, practical solutions to common problems within educational organizations.

Trevisan, M. (2002, June). The State's Role in Ensuring Assessment Competence. *Phi Delta Kappa*, 83(10), 766-771.

A look at educators' licensure competencies in adopting well-thought-out, rigorously developed assessment standards to support student success.

Wilson, L. (2002) *Better Instruction Through Assessment: What Your Students Are Trying to Tell You*. Larchmont, NY: Eye on Education, Inc.

This book provides teachers with the knowledge to interpret and use data well to make better instructional decisions. It is a practical book for administrators and teachers on understanding measurement concepts. It covers the blending of instruction with assessment, test item formats, essential measurement concepts, ways teachers can evaluate their own assessments to make them most effective, and issues such as "teaching to the test." The book provides authentic examples of measurement concepts at work in classrooms and suggestions about how to use what one learns in assessment to improve student learning. There are useful "Putting into Practice" sections throughout the book on interpreting and planning needed instruction.

Suggested Web Sites for Assessment

http://cresst96.cse.ucla.edu/resources/justforteachers_set.htm
This Los Angeles Public Schools site includes a PDF file with sample performance tasks.

http://intranet.cps.k12.il.us/Assessments/Ideas_and_Rubrics/ideas_and_rubrics.html
This excellent site by the Chicago Public Schools provides information about rubrics for performance assessments, performance assessment tasks, and assessment resources, as well as a rubric bank.

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://www.rmcdenver.com/useguide/assessme/online.htm
This site provides links to a variety of websites dealing with creating assessments, assessment strategies and definitions, rubrics, etc.

http://school.discovery.com/schrockguide/assess.html
This site provides an extensive bank of rubrics, rubric builders, graphic organizers, etc.

http://www.techtrekers.com/rubrics.html
This site provides links to a variety of websites for creating rubrics.

www.eduplace.com/graphicorganizer/
This site contains approximately 35 different graphic organizers.

www.ieq.org/Portal/Stud_assess.html
The student assessment section of the IEQ Teacher Resource Portal provides education program planners and teacher development specialists with access to web-based resources such as case studies, descriptions of alternative approaches to primary school assessment, sample test instruments, and classroom strategies that can be used to link assessment and instructional practice.

www.nwrel.org/assessment
This excellent site provides a wealth of materials, including *Toolkit98*, which contains tutorials "designed to assist classroom teachers to become better assessors of student learning. The primary users of Toolkit98 are intended to be those who have the

responsibility to coordinate and facilitate professional development in assessment for teachers."

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

www.prenhall.com/stiggins
This site provides additional information for users of *Student-Involved Assessment FOR Learning, 4th ed.*, by Richard J. Stiggins.