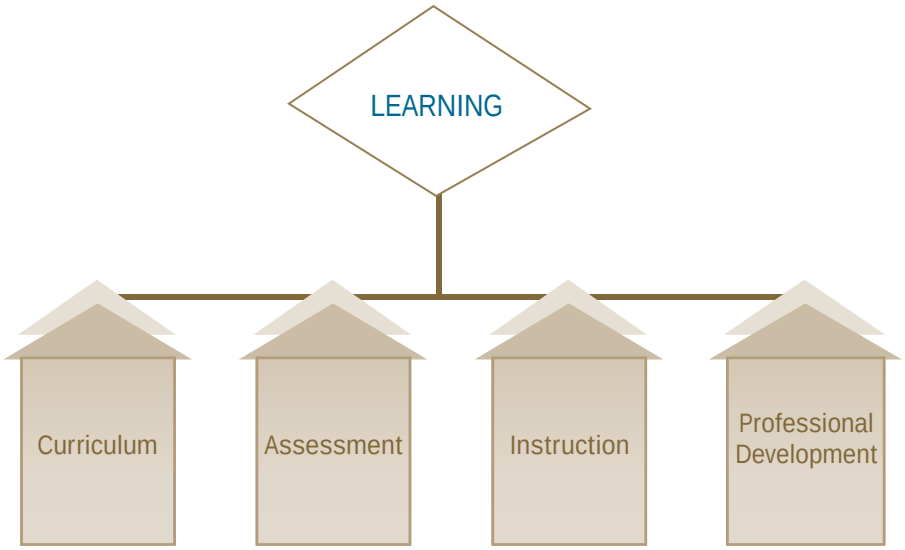
CHAPTER THREE
Learning–It's A Big World Out There

The mind is a magnificent thing. From the day a baby is born (actually, even before that day), sounds, images, scents, and sensations of touch flood into the brain. The mind makes meaning from it all by sorting impressions into categories and attaching interpretations and emotions to them. One cluster—a smiling face, soothing voice, warm touch—becomes Mommy. The years add a million subtle refinements to that first definition of this one Other. Another cluster—the one with the tummy in the middle that is sometimes full and sometimes aching to be filled, the one with the mouth that spreads into a grin when Mommy is near, the one with the wobbly legs that move it about—becomes Me. Doggy is that curious cluster with the cold nose, soft coat, too many legs, and strange voice. Learning is the process by which the mind makes meaning from a huge world by separating, clustering, and sometimes ignoring the infinite sensations that bombard us from the world and that also arise within us.

The curriculum is the result of someone deciding what children must understand and must know how to do, and the approximate order in which these things are learned.



The mind also organizes, regulates, notices, and makes meaning out of our actions. The child not only comes to "know" about the world, but also to "act" in the world. The child reaches with a hand, shakes her head to say "no," crawls, walks, speaks words, holds a spoon, pokes the doggy with a stick, runs away when the doggy yips, cries to get Mommy's attention. Before you know it, the child is scribbling with a crayon on the wall, then writing the first letter of her name, and counting the fingers on her hand, touching them one by one.

Because the world is huge and the sensations it evokes infinite, children go to school, where someone gives the child's mind some help by deciding what information can be ignored, what information must be known, how that information is organized, and in what order the child will most successfully acquire it and fit it into her scheme of things. Someone has decided that forming the shapes of letters, drawing arms and legs on the circle that becomes a man, and saying "thank you" are important ways to act. Poking your desk mate with a pencil is not.

The curriculum is the result of someone deciding what children must understand and must know how to do, and the approximate order in which these things are learned. The curriculum also includes larger chunks of knowing and doing that a child may also learn and approaches by which learning is accomplished most efficiently.

Because the mind is a marvelously complex instrument, children are intricately complicated. The curriculum might remain bound in a set of volumes, arranged in neat order on a long shelf, except for … teachers. The teacher is a marvelous and complex invention. The teacher knows the curriculum, and the teacher knows the child and the child's mind. In a miraculous process we call "instruction," the teacher brings together the curriculum and the child's mind. With her own innumerable skills, the teacher makes thousands of decisions to help the child master the curriculum and acquire the capacity and desire to go right on learning beyond the curriculum itself. Through instruction, the child masters the curriculum efficiently.

Making instructional decisions about a child's learning requires the teacher to know the curriculum, know the child's mind, and know the child's progress in mastering the curriculum. The teacher must also know a variety of ways to bring the child and the curriculum together, and which ways are most likely to be effective with which children. The instructional ways are what we call "teaching modes," which are closely associated with the materials teachers provide. "Assessment" is what we call the many methods teachers employ to obtain information about a child's progress in mastering the curriculum so that the teacher can make proper instructional decisions about teaching modes and materials.

All this may sound mechanical, and effective teachers do use organizational systems to efficiently transform curriculum into instructional modes and materials. They also assess students in precise and quantifiable ways to get the most accurate appraisal of their mastery and to make the best decisions about the correct instructional paths. But there is more to teaching than the application of organizational systems. Remember, the child's mind is a marvelous and complex thing, and its dimensions do not always comfortably fit our organizational frameworks. Motivation, the attitude that predisposes a child to pursue a learning task and persist with it, adds a psychological wildcard to the instructional equation that requires of the teacher a deftness of approach as well as a further understanding of the workings of a child's mind.

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In this chapter, we will examine how a curriculum is developed and how its mastery is assessed. We will also look at the instructional components of teaching modes, materials, and motivational considerations. In this way, we have chosen to categorize school learning into our own clusters of meaning—curriculum, assessment, instruction, and professional development. That's one way for a mind to organize this little slice of the world—school learning.

All the Moving Parts

When you open up a school and look inside, you find a lot of moving parts. If the school is a smoothly functioning system, the parts are moving in synch with one another, each with its own purpose but also contributing to the school's purpose. Clusters of these parts form subsystems within the big system of the school. Think of it as an intricate clock with wheels that spin and turn with specialized precision, some forming a subsystem to mark each advancing second, and others ticking forward on their axes to gather seconds into minutes. Some parts work together to turn the hands and others cooperate to set the pendulum in motion or sound the chime. When every part and every subsystem of parts does its job, the clock's hands will turn and point to the right numbers on the dial. Get a little sand in a gear, and the whole operation goes funky.

In Chapter 2 we looked at subsystems for decision-making. When they are well-oiled and wound to the correct tension, teams meet for sufficient amounts of time, looking at information (data and research) that is timely and appropriate, and making decisions that affect and enhance the performance of other systems in the school.

In Chapter 3, we are examining the subsystem of learning, the mainspring, the heart of the school, the subsystem for which all other subsystems labor. Just as a clock has its own vocabulary of parts—verges and pallets, pendulum bobs and gong wires, chime rods and hands—so also does the Mega System. Before we hold our jeweler's glass to our eye and peer into the moving parts of the subsystem of learning, let's label some of the parts that have a special meaning in the Mega System.

Curriculum Terms

Bloom's Taxonomy – a method for leveling student objectives that allows teachers to create learning strategies which address different cognitive skill levels. The levels in ascending order of difficulty are: knowledge, comprehension, application, analysis, synthesis, and evaluation.

Enhanced Objective—an objective that is related to the target objective but of a higher order, possibly from a higher grade level, but approachable by students who have shown mastery of the target objective.

Learning Plan Grid—a structure for a team of teachers to organize activities that are aligned to curricular objectives. The grid provides areas to identify differentiated activities (teacher/co-teacher centers, activity center, cooperative center, independent work, homework), and by levels of objectives (*prerequisite, target, enhanced*).

Prerequisite Objective—an objective level below that of the *target* (typically grade level) *objective*, but one that is a building block to the *target objective*.

Target Objective—an objective appropriate for most students in the class, typically an objective that is "on grade level."

Unit of Instruction—typically a three to six week block of instruction within a subject area, with objectives organized within a theme.

Unit Plan—a plan developed by the *Instructional Team* to define a *unit of instruction* and outline the standards and objectives addressed in the *unit of instruction*.

Assessment Terms

Class Progress Chart—a record of objectives for the *unit of instruction* and a running account of which students have met each objective.

Unit Test—a test or other assessment device, aligned with each objective covered in the unit, that is developed by the *Instructional Team* for each *unit of instruction* and is administered to all students served by that team before and after the *unit of instruction*.

Instruction Terms

Co-Teachers—teachers such as special education teachers and reading specialists, who assist the classroom teacher by working with individual students and small groups of students during *work time* and their activities are coordinated by the classroom teacher, who shares with them information about student progress.

Learning Centers (or Work Stations)—designated areas in the classroom where students can practice, remediate or enrich objective-based skills, facts, and concepts. *Learning centers* allow teachers to interact with students and provide feedback, while students learn to operate with self-direction. Standard *learning centers* in the classroom are:

- *Teacher center*, where the teacher works with individual students or small groups of students;
- *Co-teacher center*, where a co-teacher such as a special education teacher or reading specialist works with an individual student or group of students during work time;
- *Cooperative center*, where students share a common learning objective, engage in cooperative learning activities, and arrive at a common end product;
- *Activity center*, where each student completes activities individually, or peer-to-peer; and
- *Exploratory center*, a center with a range of high-interest activities related to objectives but selected by the student; the classroom library is located near the *exploratory center*.

Student Learning Plan—typically a one-week or two-week plan developed by the teacher for a student focused on that student's assessed prior learning and next appropriate objectives. Activities on the plan are selected from the *learning plan grids* developed by the *Instructional Team*. One SLP is developed for each subject area.

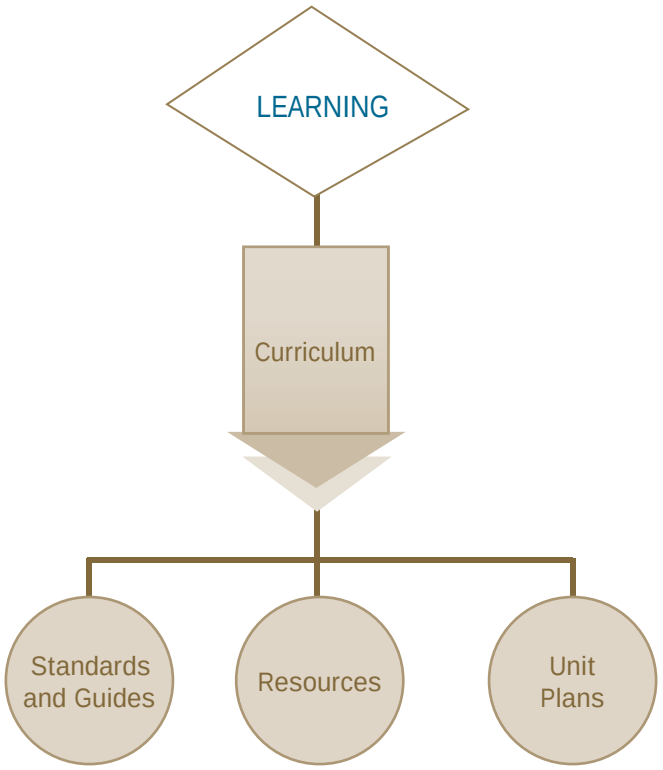
Targeted Learning—the teacher plans instruction to address each student's assessed prior learning, while students participate in the management of their plan, thereby becoming more responsible for what and how they learn. The *target* is where the student, teacher, and curricular objectives meet and learning takes place.

All the Moving Parts

Whole-Class Instruction—that part of instructional time during which the teacher is presenting new material, reviewing, questioning, and drilling with the entire class. The teacher works from the *teacher center*, moving about the room to achieve eye contact with each student.

Work Time—that part of instructional time during which each student follows his or her *Student Learning Plan*. The purposes of *work time* are to: 1) practice and master concepts and skills, 2) encourage self-directed learning, 3) individualize learning activities, 4) make best use of time, and 5) allow the teacher flexibility to work with individual students or small groups of students.

Curriculum: What Students Must Know and Do



The school's curriculum is what the school intends for students to learn. Of course, children learn a lot of things that are not included in the school's curriculum. Before they step foot in a school, the wiring in children's brains and the rapid cognitive integration in the early years prod children to learn by imitating, by experimenting, and by stubborn mastery of the next predictable skill. They wave bye-bye, scoot and crawl, walk, learn the meaning of words. They learn incidentally, informally, by virtue of living. Curiosity, a desire to please their parents, and the satisfaction of mastery drive early learning. These motivators are no less important in school learning, but the school's curriculum is of a different nature than either the infant and toddler's maturation-driven acquisition of predictable skills or the pre-schooler's random and incidental accumulation of information from the world around him. School learning is efficient learning, taking the child beyond the universal, cognitively-mapped sequence of psychomotor development, beyond the random absorption and integration of words, associations, and understandings.

Curriculum: What Students Must Know and Do

School learning is efficient because of the curriculum. Out of the infinite universe of "things to know and do," the school carves meaningful chunks, organizes them, sequences them, and makes them accessible to students. While the school may intentionally teach its students to master a set of skills and body of knowledge that the school calls its curriculum, a good school also provides opportunity, encouragement, and strategies by which the students acquire skills and knowledge ranging far beyond the stated curriculum. Teachers develop a taught and learned curriculum based on standards with open doors to wider learning. The school also teaches the child efficient ways to explore, organize, and understand what lies beyond its curriculum. The school teaches the child to learn intentionally and efficiently.

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In an effective system, teachers, working in teams, build curriculum from learning standards, curriculum guides, and a variety of resources, including textbooks, other commercial materials, and teacher-created activities and materials. Teachers organize the curriculum into unit plans that guide instruction for all students and for each student. The unit plans assure that students master standards-based objectives and also provide opportunities for enhanced learning.

Standards and Guides

We now live in a world of learning standards. Standards and benchmarks help us gauge the pace of student mastery of the curriculum; they establish a structure of "floors," levels of mastery to be met and exceeded at points in time. Standards were first created by associations of teachers and educationists with special interest and expertise in particular subject areas such as reading, mathematics, social studies, and science. Then, mostly during the 1990s, states took the standards created by the associations into consideration and designed their own standards. Typically, state departments of education collaborated with subject area associations and teachers in their states to develop learning standards. A common arrangement was to first organize the huge world into domains such as English/Language Arts, Mathematics, Social Studies, Science, Fine Arts, and Physical Education. Recently, Illinois added Social/Emotional Learning as a domain. Other states may follow suit. Within each domain, the standards-writers established a few goals, usually not more than four or five goals per domain. Under English/Language

Arts might be found goals like "Read with understanding and fluency" and "Write to communicate for a variety of purposes." Under Mathematics a goal would be to "Demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, division), patterns, ratios, and proportions" or "Use geometric methods to analyze, categorize, and draw conclusions about points, lines, planes, and space." Goals are the ultimate expectation for the student at the end of the schooling trail.

Because a goal is global, it is also general. For sake of specificity, standards are developed to further define what is subsumed within the goal. For each goal, three or four standards will usually do. A standard associated with the goal of "reading with understanding and fluency" would be to "apply word analysis and vocabulary skills to comprehend selections." A standard for the mathematics goal for "use of geometric methods" would be to "identify, describe, classify, and compare relationships using points, lines, planes, and space." If goals are global and general, standards are one step toward specificity, but a third-grade teacher would hardly know where to begin in preparing a student to someday apply geometric methods without a little more guidance.

Standards had to be made relevant to the grade level. That is not quite as simple as it sounds. When you consider all the students in a third-grade classroom, let alone all the third-graders in a state, the range of what might reasonably be expected is fairly wide. Standards cannot be so precise as to create a "ceiling" for student learning instead of a "floor." So standards-writers in each state invented "benchmarks," which are something like "objectives," but not quite so specific yet. The benchmarks are often provided for a group of grade levels (primary or intermediate, for example) rather than a specific grade level, to give some latitude for teachers as they plot the course of their students' mastery en route to the standard and the ultimate goal.

State learning standards provide a floor, a minimum but necessary set of knowledge and skills that all students should master. Standards, and their related benchmarks and grade-level expectations, give a curriculum a skeleton. Commonly, districts have aligned their curriculum guides to state standards and benchmarks. Textbooks are now aligned to standards. The gap that persists is between the aligned curriculum guide and the learning tasks provided each student.

Curriculum: What Students Must Know and Do

Alignment is a process of matching up the written curriculum (the one that appears in curriculum guides for a school or district) with the tested curriculum (the one that appears in the tests) and the supported curriculum (the one that appears in textbooks and other resources) to make the taught curriculum (the one the teacher actually delivers) more effective. The alignment process serves two related purposes: It serves as a check on guide/text/test congruence, and it provides teachers with an organizational structure for their own planning (Glatthorn, 1995).

The curriculum, materials, and learning activities are organized so that the teacher can target instruction to each student's level of mastery.

Even with the common set of learning objectives that is provided by state learning standards and assessments, a haphazardness in the classroom remains, created in part by the bewildering array of options teachers have for teaching. "Teachers pick and choose from among these options to teach an increasingly idiosyncratic versus common set of learning objectives and skills—even though common standards are essential to clear communication, coherence, and alignment among instructional effort, resources, and programs" (Rosenholtz, 1991, pp. 17-18). State standards and assessments, then, are one step toward solving the problem of "haphazardness." The next big step is for teachers to align their "taught curriculum" with standards. Finally, the taught curriculum is aligned, not for the class as a whole, but for each individual student.

Resources

Teachers construct the taught curriculum from a handful of sources—the state standards and benchmarks, the district curriculum guide, the school's curriculum syllabus, textbooks, other commercial material, and materials developed by the teachers. The teachers organize all of these sources of information into lesson plans that guide their instruction. The Mega System provides teachers with an orderly method for constructing their daily, weekly, and unit lesson plans, aligned to standards-based objectives. The curriculum, materials, and learning activities are organized so that the teacher can target instruction to each student's level of mastery. The system works with instructional units, usually three to six weeks in duration, developed by the Instructional Team for each subject. The unit plan also includes pre-tests and post-tests—quick assessments aligned to standards-based objectives that guide the teacher in individualizing instruction through Student Learning Plans. The system takes full advantage of the learning activities and materials developed by teachers and teams of teachers. The heart of the Mega System's instructional planning is described in detail in the next few sections.

Curriculum: What Students Must Know and Do

Unit Plans

A unit of instruction is typically three to six weeks of work within a subject area. In the Mega System, an Instructional Team develops a plan for each unit, and the plan is shared by all the teachers who teach that subject and grade level. The unit plan defines the topic or theme of the unit of instruction and then carefully aligns the following:

- State Standards and Benchmarks
- District Curriculum Guidelines
- School Curriculum Guidelines
- Standards/Benchmark-Based Objectives
- Criteria for Mastery
- Unit Pre-Test and Post-Test Items
- Leveled and Differentiated Learning Activities

A unit test is an assessment device, aligned with each objective covered in the unit, and administered to all students before and after the unit of instruction (or smaller parts of the unit). The pre-test and post-test are the same test, or parallel items for the same objectives, given at the beginning and end of a unit. In some cases, especially in the lower grades, the unit test is divided into a series of smaller tests, given before and after instruction in the objectives covered on the smaller test. Unit tests are constructed to give teachers a good idea of a student's current level of mastery of the objectives without taking a great amount of time to administer. A unit test need not be a pencil and paper test, especially in the lower grades, but is a way for the teacher to specifically check each student's mastery of each objective in a manner that is not time consuming.

The Unit Plan forms on the following page show how target objectives are aligned to grade-level or grade-cluster benchmarks, criteria for mastery, and items for the pre-/post-test.

Unit Plan Example

Page: 1

Grade Level: 3rd Subject: Reading Unit of Instruction Code: 3R01

Unit of Instruction Title: Effective Communication

Standard / Benchmark (Code)	Target Objectives (with Objective Code Prefix)	Objective Descriptor	Criteria for Mastery	Pre-Test / Post Test Items
A3	3R01-01T Construct proper sentences using correct grammar, punctuation, capitalization.	Sentence structure	When given a rubric that provides proper sentence structure, the student develops properly written sentences with 80% mastery.	1. Given a bank of vocabulary words, the student writes two proper sentences.
A3	3R01-02T Determine the appropriate use of imperative and exclamatory sentences.	Oral reading	The student marks the correct punctuation for imperative and exclamatory sentences with 80% mastery.	2. Given a variety of unmarked sentences, the student correctly marks and identifies sentence.

Unit Plan

Page: _____

Grade Level: _____ Subject: _____ Unit of Instruction Code: _____

Unit of Instruction Title: _____

Standard / Benchmark (Code)	Target Objectives (with Objective Code Prefix)	Objective Descriptor	Criteria for Mastery	Pre-Test / Post Test Items

Curriculum: What Students Must Know and Do

Leveled and Differentiated Learning Activities

Learning activities, the assignments given to each student targeted to that student's level of mastery, are carefully aligned with the objectives included in the unit plan to provide a variety of ways for a student to achieve mastery as evidenced in *both* the successful completion of the learning activities and correct responses on the unit post-test.

The learning plan grid provides a structure for a team of teachers to organize learning activities that are aligned to one curricular objective in the unit plan. The grid provides areas to identify differentiated activities (teacher/co-teacher centers, activity center, cooperative center, independent work, homework), and levels of objectives (prerequisite, target, enhanced).

An activity instructions form is created for each activity on the learning plan grid. For centers (or work stations), a copy of the activity instructions form may be laminated and placed at the center with the necessary materials.

The Learning Plan Grid forms on the following page show how a target objective is leveled to produce prerequisite and enhanced objectives and how each objective is aligned with learning activities in various settings.

Learning Plan Grid (Example)

Standard/Benchmark Code: A3

Target Objective Code: 3R01-01T Enhanced Objective Code: 3R01-01E Prerequisite code: 3R01-01P

Objective	Independent	Activity Center	Cooperative Center	Teacher Center/ Co-Teacher Center	Homework
Enhanced: *Construct in coherent narrative form a series of related sentences.*	*Enrichment p. 24, A & B*	*1. Develop a written conversation between two people (friends, parents, others) using declarative and interrogative sentences.*		*Discuss the inflections of speech in declarative & interrogative sentence usage*	*p. 28, 19-25, Add words to complete sentence*
Target: *Construct proper sentences using correct grammar, punctuation, capitalization.*	*Practice p. 20, C & D*	*2. Use proper sentence structure with activity*	*Create a short skit (3-5 minutes) on the computer using proper sentence structure, include int. and dec. sentences. Share oral and written work with class.*	*On-the-spot slate writing: look for correct punctuation, capitalization, etc.*	*p. 3, 16-20*
Prerequisite: *Assemble correct sentences when given words using manipulatives.*	*Review p. 17, 1-15*	*3. Build sentences with word tiles.*		*Write on chart paper student oral created sentences, discussing and highlighting, punctuation, capitalization, etc.*	*p. 3, 6-15, Label a sentence or not a sentence*

Exploratory Topics: Feature "Great Valley Train" as library selection. Use vocabulary discovery box.

Learning Plan Grid

Standard/Benchmark Code: _____

Target Objective Code: _____ Enhanced Objective Code: _____ Prerequisite code: _____

Objective	Independent	Activity Center	Cooperative Center	Teacher Center/ Co-Teacher Center	Homework
Enhanced					
Target					
Prerequisite					

Exploratory topics:

Collaborative Development of the Unit Plan

The unit plan is developed by the Instructional Team in the Mega System to define a unit of instruction and outline the standards/benchmarks and target objectives (typically grade level) addressed in the unit of instruction. A unit of instruction is typically three to six weeks of work within a subject area. The Instructional Team:

1. Determines the concepts, principles, and skills that will be covered within the unit.
2. Identifies the standards/benchmarks that apply to the grade level and unit topic.
3. Develops all objectives that clearly align to the selected standards/benchmarks.
4. Arranges the objectives in sequential order.
5. Determines the best objective descriptors.
6. Considers the most appropriate elements for mastery and constructs criteria for mastery.
7. Develops pre/post test items that are clear and specific and would provide evidence of mastery consistent with the criteria established.

The unit plan aligns the curriculum to standards and benchmarks. The next step is to align the curriculum to instruction. This is where the real fun begins—teachers sharing their most successful instructional strategies for meeting each objective in the unit of instruction. Learning plan grids level each objective into three tiers—target, enhanced, and prerequisite. The learning plan grid also differentiates learning activities among various settings—independent work, activity center, cooperative center, teacher center, co-teacher center, and homework. The learning plan grid records ideas for the exploratory center. An activity may appear on more than one grid. Once learning plan grids are prepared for all the objectives in the unit of instruction, activity instructions are prepared for each cell on the grid. The activity instructions provide the detail that enables any teacher to use the learning activity, and also become a means of explaining the activity to students.

Curriculum: What Students Must Know and Do

The Instructional Team's Preparation

To begin its work in developing units of instruction, the Instructional Team gathers all resources that support and guide instruction in the classroom:

- state academic standards,
- grade level benchmarks and performance indicators,
- district curriculum,
- scope and sequence of district curriculum,
- expectations of state assessment for relevant grades and subjects,
- district assessments,
- individual classroom lesson plans,
- textbook series resources, and
- other specific grade level/subject resources.

With this information at hand, the Instructional Team begins to knit together units of instruction, integrating curriculum, assessment, and instruction and aligning it all with standards.

Organizing Units and Aligning Benchmarks

In some districts, a curriculum map or scope-and-sequence has already defined unit topics and clustered benchmarks within them. The district curriculum guide may even organize grade-level performance indicators to provide the stepping stones to the benchmarks. Since benchmarks are provided by ranges of grade (such as K-3, 4-5, 6-8, and 9-11), other grades need to "design down"—planning the appropriate steps leading to the benchmark.

Depending upon the degree of specificity provided by the district curriculum, the Instructional Team will adopt or develop unit topics and benchmarks for each grade level and subject. Instructional Teams will then "articulate" the units from grade level to grade level, seeking appropriate sequence and fluency. In middle school and high school, course sequence may be more significant than grade/class level.

When developing unit topics and benchmarks clusters, the Instructional Team reviews ALL of the standards/benchmarks. The team considers the key concepts. The team examines the principles and skills suggested within each standard/benchmark. The team thinks about how the essential ideas can be clustered within a unit of instruction (i.e., How can reading and writing standards work together? or How do computation and problem-solving connect?).

Developing Target Objectives ("The student will be able to…")

Instructional Teams think about what the benchmarks are suggesting as the "target" for that grade level. They consider the verb that defines exactly what students should be able to do (i.e., identify, distinguish, write, use, present, demonstrate) at that grade level. They discuss and define what level of student action is expected toward the benchmark. The Instructional Team develops objectives to reflect the appropriate level of students' action. They discuss how students will show their mastery of that target objective.

A target objective is specific and:

- **aimed at the benchmark** and appropriate to the grade level
- sufficiently **specific** that it can be taught and **mastered within a week**
- specific to one student
- expressed as "The student will be able to…" **SWBAT** (this may be an "assumed" prefix of each objective when writing the objectives)
- expressed as **observable** or **measurable** student action
- descriptive of the student's **performance behavior**—what the student shows he/she knows or can do

Curriculum: What Students Must Know and Do

Criteria for Mastery (Conditions and Level of Accuracy)

The objective itself simply states what the student will be able to do: "The student will be able to identify nouns." The criteria for mastery give the *conditions* under which the objective will be met and the *level of accuracy* that is expected. The pre-test is for quick and convenient diagnostic purposes. The criteria for mastery is harder evidence of mastery, more likely to be exhibited by assignments completed during the week rather than on a pre-test or post-test. The exception to this rule is often found in middle school and high school, where the teacher may give a more thorough pre-test and post-test, serving the purpose of diagnosis as the pre-test and more thorough demonstration of mastery on the post-test.

Consider the target objective, "The student will be able to add a series of 4, single-digit numbers." The criteria for mastery might say: "Given 10 problems to solve, the student will answer 80% correctly." The "given 10 problems to solve" is the *condition* part of the statement. The 80% is the *level of accuracy*. Some objectives lend themselves to a level of accuracy that is less than 100%, and some do not. If the objective is to divide fractions, the teacher may decide that if a student gets 8 out of 10 problems correct, he or she has probably mastered the objective but made a couple calculation errors. However, if the objective is to print the student's first name, the teacher may expect 100% accuracy. "Asked to print name three times, the student spells it correctly and forms letters properly all three times."

Criteria for Mastery often use references to time ("within 10 minutes"), quantity ("list 5 nouns"), accuracy ("to the nearest 100"), and/or quality ("with 3 or fewer punctuation errors").

Pre-Test/Post-Test Items

The pre-test is used as a quick assessment, a way for the teacher to assess each student's readiness for an objective in order for the teacher to make appropriate assignments on the Student Learning Plan. Likewise, the post-test is a way to get a quick read on students' mastery after completion of the unit or after completion of the period of instruction allotted for the objective. The pre-test and the post-test are the same—a before and an after, or parallel items of the same level of difficulty. In other words, the post-test isn't "harder" than the pre-test. The "items" need not be pencil and paper test items. The teacher may give the pre-test for a unit all at one time or in chunks, prior to addressing each new set of objectives. If the items are taken from a chapter test or other material, the Instructional Team indicates the specific items that correspond with the objective. The chapter test may include more items than the pre-test/post-test, of course. Pre-tests should not be graded. Post-tests may be graded, or included as part of larger graded tests. Between the pre-test and the post-test, students complete a variety of learning activities, including independent work and homework. They may also take other graded tests. Teachers have several ways to determine mastery through the instructional process. The pre-test and post-test address only target objectives. The teacher assesses for mastery of prerequisite and enhanced objectives through learning activities.

When writing pre-test/post-test items, it is important to note the level of the objective within Bloom's Taxonomy: Knowledge, Comprehension, Application, Analysis, Synthesis, or Evaluation. The test items should match the taxonomy level of the objective.

Prerequisite Objectives

Sometimes the pre-test and/or subsequent work by the student demonstrates that the student is not ready to tackle the target objective. The teacher's goal is always to get every student to mastery of the target objective by the end of the unit, but students do not start in the same place. Bloom's Verbs are one way to "level" an objective by establishing a prerequisite step to the target objective. Another way is to look at the target objective for the next lower grade level (or course sequence) and adjust it up a little closer to the target objective. The prerequisite objective is a building block to the target objective.

Curriculum: What Students Must Know and Do

Enhanced Objectives

Some students demonstrate early mastery of an objective and are bored if kept with the rest of the class. The enhanced objective is based on the target objective but is more demanding of the student. Bloom's Verbs are one way to "level" an objective by establishing an enhanced step above the target objective. Another way is to look at the target objective for the next higher grade level (or course sequence) and adjust it down a little closer to the target objective.

Examples of Objectives

Target Objective: The student will be able to name the four primary directions on a navigational compass. (This is an objective at the level of general knowledge.)

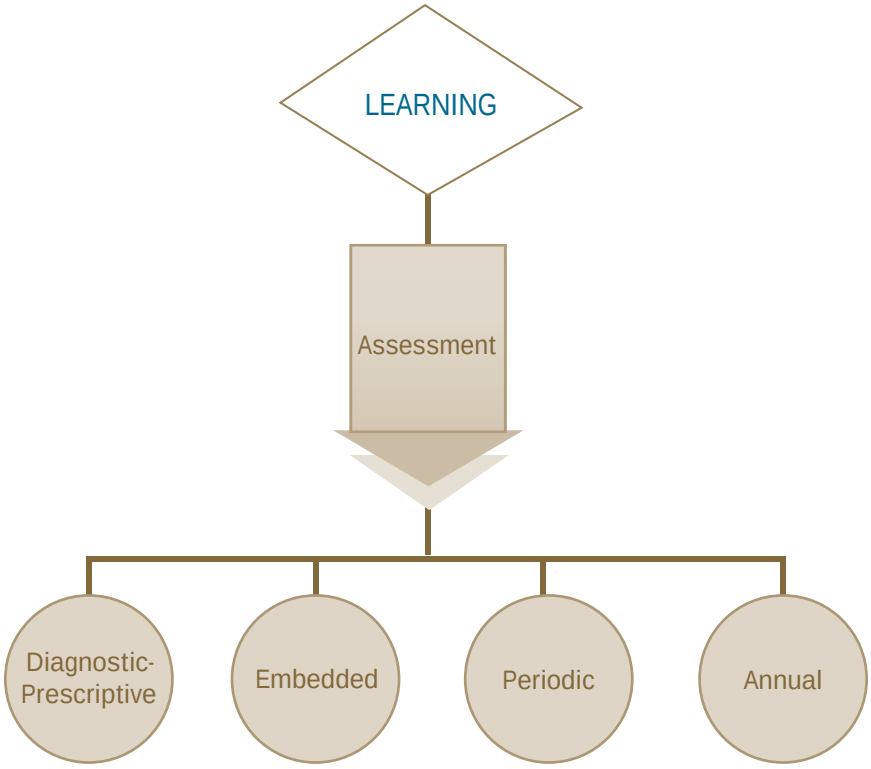
Criteria for mastery: Given a blank compass face, the student will write the name of the four primary directions in the correct locations.

Pre-test / Post-test item: Mark the four primary directions on the blank compass face.

Prerequisite Objective: The student will be able to identify the four primary directions on a navigational compass by matching the points to a list of North, South, East, West. (This is an objective at the level of general knowledge.)

Enhanced Objective: The student will be able to write a short paragraph explaining the positions of the four primary directions on a navigational compass. (This is an objective at the comprehension level.)

Assessment: Knowing What Each Student Knows and Can Do



Assessment is the process of testing (written, verbal, or by examination of work) to see: 1) what a student knows and can do, and 2) patterns of strength and weakness in what a group of students knows and can do. The value of an assessment is determined by what happens as a consequence of it. The National Academy of Science (1996) explains the evolution of assessment, as it has come to take a more prominent role in school improvement:

> Ideas about assessments have undergone important changes in recent years. In the new view, assessment and learning are two sides of the same coin. Assessments provide an operational definition of standards in that they define in measurable terms what teachers should teach and students should learn. When students engage in assessments, they should learn from those assessments. (pp. 15-16)

Assessment: Knowing What Each Student Knows and Can Do

It should be noted that teachers assess students informally in ways that we will not discuss here, but that are made obvious later when we discuss instruction. This informal assessment includes the teacher's scanning of the classroom during whole-class instruction, reading the faces of each child, questioning, and then changing course to re-teach or reiterate. The same skillful assessment occurs when teachers interact individually with students, taking the pulse of understanding, knowing what each child knows.

The Mega System helps teachers make practical use of four more formal types of assessment: diagnostic-prescriptive, embedded, periodic, and annual.

Diagnostic-Prescriptive Assessments

Diagnostic/prescriptive assessments are quick, diagnostic tests used to "prescribe" appropriate learning activities for a student or group of students to help them meet objectives. The Mega System includes unit pre-tests and post-tests for this purpose. The test may be a pencil and paper test, oral quizzes, or "show me" assessments that a teacher can quickly and conveniently administer to determine each student's level of mastery of the unit's objectives. The unit tests are created by the Instructional Teams.

Embedded Assessments

Embedded assessments are learning activities aligned to objectives with criteria for mastery which enable a teacher to check mastery within the context of instruction. By completing these assigned activities, the student demonstrates a level of mastery of the objectives the activities are designed to teach or to reinforce. The embedded assessments also serve the purpose of diagnosis, so that the teacher can modify the Student Learning Plan through the course of a unit of instruction.

Assessment: Knowing What Each Student Knows and Can Do

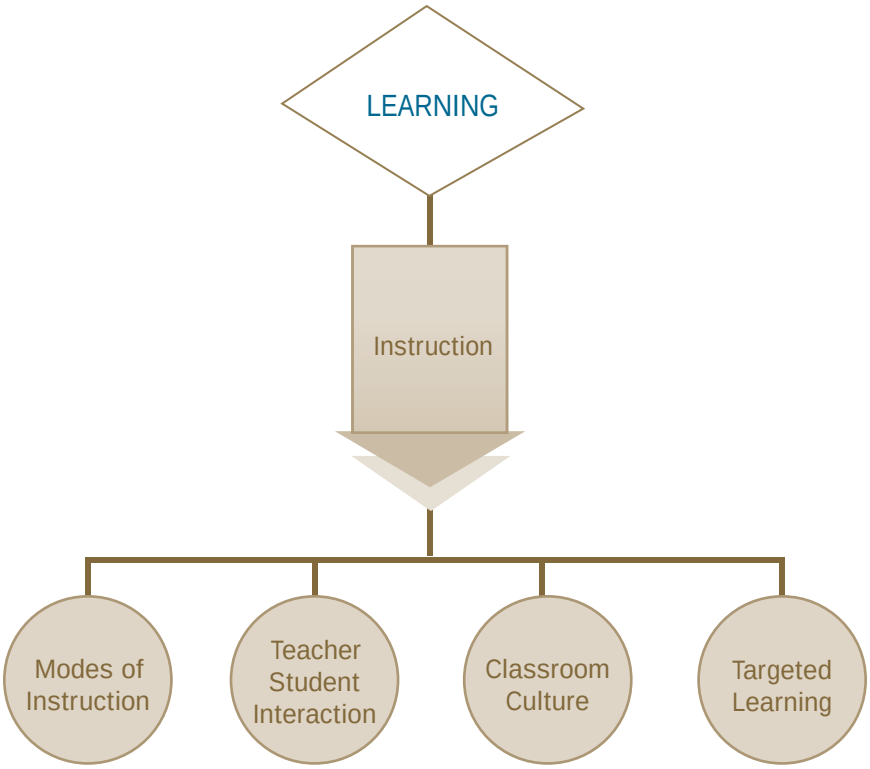
Periodic Assessments

Periodic assessments, administered for each grade level two to four times a year, enable the teachers and teams to see how students are progressing toward mastery of standards that will be included on state assessments. Periodic assessments may be teacher-made, part of a published curriculum, or created by psychometricians at testing firms. The periodic assessments help teachers modify their diagnostic/prescriptive assessments and their learning activities to bring a closer alignment between instruction and the annual standards-based assessments.

Annual Assessments

State standards assessments (criterion-referenced) and norm-referenced achievement tests provide an annual appraisal of each student's progress and the school's progress by grade levels and subject area. The timing and nature of these tests make them most useful to the Leadership Team in making program and placement decisions. The Instructional Teams use the annual assessments to improve their unit pre- and post-tests and their learning activities to address areas of general weakness on the annual assessment. Using the same achievement test in basic subject areas for all students in the school is important so that each student's year-to-year progress (value added) can be measured.

Instruction: Teacher and Student



School learning begins with a well-organized curriculum, including teacher presentations and student activities aligned to standards-based objectives. Assessment enables the teacher to know what each student knows and alter the instructional path accordingly. With this careful preparation by teams of teachers, the individual teacher now takes the curriculum to the student through a variety of instructional modes, with the artistry of both social and academic interactions with the student, in a classroom culture supportive of individual mastery. The most widely replicated findings concerning the characteristics of teachers who elicit strong achievement score gains are:

- **Teacher Expectation / Role Definition / Sense of Efficacy:** Teachers accept responsibility for teaching their students. They believe that students are capable of learning. They re-teach if necessary and alter materials as needed.
- **Student Opportunity to Learn:** Teachers allocate most of their available time to instruction, not non-academic activities, and learning activities are carefully aligned to standards.

- **Classroom Management and Organization:** Teachers organize their learning environments and use group management approaches effectively to maximize time students spend engaged in lessons.
- **Curriculum Pacing:** Teachers move through the curriculum rapidly but in small steps that minimize student frustration and allow continuous progress.
- **Active Teaching (sometimes called Direct Instruction):** Teachers actively instruct, demonstrating skills, explaining concepts, conducting participatory activities, reviewing when necessary. They teach their students rather than expecting them to learn mostly from curriculum materials. They do not just stress facts or skills, they also emphasize concepts and understanding.
- **Teaching to Mastery:** Following active instruction, teachers provide opportunities for students to practice and apply learning. They monitor each student's progress and provide feedback and remedial instruction as needed, making sure students achieve mastery.
- **A Supportive Learning Environment:** In addition to their strong academic focus, these teachers maintain pleasant, friendly classrooms and are perceived as enthusiastic, supportive instructors.

  (Brophy & Good, 1986; Good, 1996; Reynolds, 1992; Waxman & Walberg, 1991)

The Mega System defines the best practices within a variety of instructional modes and encourages teachers to select the mode appropriate to the student and the task. The Mega System also attends to the motivational factors in learning—the student's desire to learn and persistence in learning.

Mastery Learning and Student Support

The instructional subsystem described in this handbook includes the principles of mastery learning that require close attention to each child's demonstrated mastery of teacher-defined objectives. A basic premise of mastery learning is that nearly all students are capable of mastering objectives targeted to grade-level expectations aligned to benchmarks and standards. Individual students, however, require different instructional approaches and different amounts of time to achieve mastery.

Instruction: Teacher and Student

The Mega System's instructional subsystem carries forth the curricular leveling of objectives, with target objectives directed at the grade-level expectations, prerequisite objectives provided as building-blocks for students not ready for the target objective, and enhanced objectives for students demonstrating early mastery. Likewise, the Mega System, in its suggested process for curriculum development, encourages teams of teachers to plan a variety of learning activities for each level of objective. Instructionally, the teacher uses whole-class instruction, small-group instruction, independent work, homework, and computer-assisted instruction as means for further variation in mode of instructional delivery to account for student differences. Thus, the teacher's quiver is full of planned and prepared activities and materials to individualize instruction according to individual student differences in prior learning.

It is a tenet of mastery learning that time is the final variable to adjust to account for student differences in learning.

Even with these multiple methods for accounting for student differences, some students will lag behind. It is a tenet of mastery learning that time is the final variable to adjust to account for student differences in learning. Leveled objectives and learning tasks allow the teacher some fluidity in moving students forward at an individual pace. But again, this will not provide sufficient variation for all students. For lagging students, more instructional time is necessary, and this must be provided beyond regular class time. After-school and tutoring programs directly tied to classroom objectives are one way to provide more time for learning. Homework is another.

The Mega System's instructional methodology accounts for wide diversity of student learning and is effective even with most special education students included in the classroom. For a small group of students, maybe 1% or 2% of all students, variations in instructional methodology and time will not be sufficient to assure mastery of grade-level expectations. For these students, the same instructional methodology will be effective, but the objectives must be realistically adjusted. Special education staff, working with the Instructional Teams, will make these adaptations through their Individual Education Plans. A school may also find it useful to form a Support Team to examine periodic assessment data and devise interventions to support students who are not responding to the regular or special education programs. For some students, counseling, family support, summer programs, and other interventions beyond instructional interventions are necessary.

Modes of Instruction

Research gives us guidance for the most effective practices within each mode of instruction.

The traditional approach to schooling calls for whole class lessons followed by independent seatwork and homework for practice. Small-group learning, especially in the primary grades, is a popular variation to this approach. Small-group learning may follow the same principles as teacher-directed, whole-class instruction, where the teacher works with a group of students while other students are engaged in other activities. In another form of small-group learning, the students direct the activities, with instructions provided by the teacher. This student-directed, small-group learning allows for active learning with differentiated activities at various centers in the classroom at the same time. Student-directed, small-group learning is an ideal mode for cooperative learning strategies. Other modes of teaching are peer learning and computer-based learning. Research gives us guidance for the most effective practices within each mode of instruction.

In order to apply the most exact research evidence to the particular method of teaching, we break teaching/learning into categories. First, we distinguish between teacher-directed instruction and student-directed learning. Both, of course, are teacher planned. Teacher-directed instruction is otherwise known as direct instruction and occurs in a whole-class setting or in a teacher-directed small group. The third variation would be one-on-one, teacher-directed tutoring of an individual student. Student-directed learning may simply be independent work, or seatwork, the completion of assignments by individual students. Student-directed learning may also be in a small-group setting, including cooperative learning methods. Homework, which is student-directed but takes place at home rather than at school, receives its own category.

Teacher-Directed Instruction

An analysis of Quality of Instruction (Walberg, 1984; Wang, Haertel, & Walberg, 1993) finds evidence of the particular strength of the following approaches: instructional elements (cues, reinforcement, corrective feedback, engagement); mastery learning; computer-assisted instruction; comprehension teaching and direct instruction; graded homework with comments; explanatory graphics; adaptive speed-reading training; phonemic awareness; inquiry in writing; and acceleration of gifted students. Mastery learning methods require that students display mastery of one unit of instruction before moving on to the next; time becomes an important factor, as students require different amounts of time to master an objective. Direct instruction

Instruction: Teacher and Student

is teacher-directed instruction (whole-class or small-group) done well, including these phases: 1) review, homework check, and re-teaching if necessary; 2) rapid presentation of new content and skills in small steps; 3) guided student practice with close monitoring by the teacher; 4) corrective feedback and reinforcement; 5) independent practice in seat-time and homework with 90 percent success rates; 6) weekly and monthly reviews. Comprehension teaching is similar to direct instruction and consists of three phases: 1) modeling by the teacher, 2) guided practice—students perform with help from the teacher, and 3) application—students perform independently.

Particular techniques employed during teacher-directed instruction have demonstrated impressive power (effect sizes) in studies of student learning. Cues, for example, are especially effective in activating prior knowledge and alerting students to important information (Walberg & Lai, 1999). Connecting to prior knowledge is not only helpful in organizing new learning, but increases students' interest in the topic (Alexander, Kulikowich, & Schulze, 1994). Advance organizers, first popularized by psychologist David Ausubel (1968), provide scaffolding for the incorporation of new material to be introduced within the next 20 minutes or so. Advance organizers take such forms as visual graphics, lists, and statements abstracting the material. Simply describing the new content (expository advance organizer) is the most effective type of advance organizer, but other forms (narrative—brief presentation in story form, skimming—quick preview of text, and illustrated—use of visuals) are also effective (Stone, 1983). Internal summaries and the rule-example-rule approach have demonstrated their power in enhancing learning (Rosenshine, 1968). The agile teacher who is able to articulate clear goals and expectations for the lesson and make wise decisions in use of various instructional techniques is key to teacher-directed instruction (Good & Brophy, 2000).

Teacher-Directed Instruction (Whole Class)

The teacher plans whole class instruction at key points within the unit of instruction, typically devoting at least some time each day to whole-class instruction in each subject. The amount of time devoted to whole class instruction versus work time will vary from day to day. The teacher prepares a whole class instruction plan for each whole class instruction period. The plan includes notes to guide the teacher through: Review, Presentation, and Summary.

Review (20% of period)

The teacher begins a whole-class instructional segment by setting the climate for attentive learning, cueing the students to focus in, reinforcing attentive behaviors, reminding students to have their necessary materials at hand, checking postures and facial expressions, and generally encouraging pro-social behavior. This is called a "behavior check." Next the teacher quickly reviews the previous lesson, including homework assignments from it. The teacher uses rapid-fire questioning to review the previous lesson and build a bridge from it to the new lesson. The teacher notes the students' progress in mastering new learning and encourages their self-praise. The teacher checks for areas that need re-teaching.

Presentation (60% of period)

The presentation stage includes three phases: 1) The teacher introduces the new lesson, connecting it to the previous one and to prior learning; 2) The teacher develops interest in the new topic; and 3) The teacher directly teaches the new lesson. In introducing the new lesson, the teacher clearly delineates what the students will learn and what will be expected of them. In creating an interest in the topic, the teacher uses an interest stimulator (illustration, demonstration, model, anecdote), cues, advance organizers, and question sprinkling. In directly teaching the lesson, the teacher, with clarity and enthusiasm, proceeds in small steps, uses both verbal explanations and physical demonstrations, elicits student responses regularly but briefly, and "thinks out loud" throughout, verbalizing the thinking processes. In lengthy presentations, the teacher uses internal summaries at key points.

Summary/Confirmation of Mastery (20% of period)

The teacher chooses appropriate questioning strategies, drilling, recitation, and summative discussion or inquiry to ascertain what the students have learned and to help them rehearse it. The teacher balances the factual recall questions with the higher order thinking questions to evaluate the extent and quality of the student learning during this session. The teacher asks students to put new learning into their own words, to apply what they have learned to solve a problem, and/or to recite memorized facts or passages. The teacher equitably distributes questions among students. The teacher gives quick feedback to student responses. This phase should end with a definite closure statement to assist students in organizing the learning once again.

Instruction: Teacher and Student

The Whole-Class Instruction Plan shown on the next page helps the teacher organize and outline the key components of whole class instruction and tie them to the standards-based objectives addressed during the week. Combined with individual learning activities, developed on the learning plan grids and assigned with Student Learning Plans (described later), the Whole-Class Instruction Plan is the teacher's basic preparation for each week's instruction. Together, the Whole-Class Instruction Plan and Student Learning Plan provide targeted learning in a variety of instructional modes.

Whole-Class Instruction Plan

Week of: _____ Teacher: _____ Subject: _____

Target Objective Code(s): _____

	Monday	Tuesday	Wednesday	Thursday	Friday
Central Purpose of Lesson					
Behavior Check					
Review					
Think					
Know					
Show					

Instruction: Teacher and Student

Whole-Class Instruction Guidelines

The teacher plans whole class instruction at key points within the unit of instruction, typically devoting at least some time each day to whole-class instruction in each subject. The amount of time devoted to whole class instruction versus work time will vary from day to day. The teacher prepares a whole class instruction plan for each whole class instruction segment. The plan includes notes to guide the teacher through: Behavior Check, Review and Homework Check, Think, Know, and Show.

Behavior Check

Time: Approximately 1 to 2 minutes

Purpose: To set the psychological climate in the classroom; cue students to focus in; reinforce attentive behaviors

Method: Teacher in his/her station, students have learning materials on desks and in order, students in learning posture, smiles on faces. Pro-social behavioral expectations reinforced by teacher.

Review (and Homework Check)

Time: 5 to 8 minutes

Purposes: To provide students with clear evaluations of their progress in attaining learning goals (Marzano, 2003); To detect areas that need further teaching or practice; To connect prior learning with new learning

Method: May include homework check. To review: Teacher asks fairly rapid-fire questions from previous lesson to build a bridge to today's new learning. Teacher calls on students in rotation, using various methods. Teacher sprinkles in verbal reinforcement about the progress and understanding students are demonstrating. This is followed with a "rope" (anything to lasso or draw in the students' attention).The "rope" signals the transition to the *Think* segment, where the new lesson is introduced.

Think

Time: Approximately 20% of the *Think/Know/Show* sequence time

Purpose: To introduce new lesson; continue activating prior knowledge; stimulate student cognition relative to the topic

Methods: Cues, Advance Organizers, Sprinkling of Questions

- **Cues** are one of the top 4 selected teacher effectiveness strategies in the Walberg research (Walberg, 1999). Cueing students on what is to be learned and how to learn it activates prior knowledge; students look for what they expect to see as the lesson unfolds, based on where teacher has told them to focus.
  - Cues involve "hints" about what students are about to experience.
  - Cues should focus on what is important as opposed to what is unusual.
  - Research indicates that the more students know about a topic, the more they tend to be interested in it (Alexander, Kulikowich, & Schulze, 1994).
- **Questions** are effective learning tools even when asked *before* a learning experience, so sprinkle them in as part of the learning "set."
- **Advance Organizers** were first popularized by psychologist David Ausubel (1968) who defined them as: "appropriately relevant and inclusive introductory materials…introduced in advance of learning…and presented at a higher level of abstraction, generality, and inclusiveness than the information presented after it. The organizer serves to provide ideational scaffolding for the stable incorporation and retention of the more detailed and differentiated materials that follow. Thus, advance organizers are not the same as summaries or overviews….but rather are designed to bridge the gap between what the learner already knows and what he needs to know before he can successfully learn the task at hand" (p. 148).

Instruction: Teacher and Student

An **Advance Organizer** can be:

- A graphic, a visual
- A list
- A statement
- Anything that helps students focus on the main idea
- Anything that helps students order their thoughts
- Anything that helps students relate to material that might otherwise seem fragmented
- Anything that helps students know what they're expected to learn in the next 20 minutes and why it is important

Advance Organizers can produce different results:

- Four general types: expository, narrative, skimming, illustrated
- All produce fairly powerful results, but **expository** has the largest effect size (Stone, 1983).

  Expository: simply describe the new content to which students are going to be exposed

  Narrative: present information to students in a story format

  Skimming: used with text that is going to be presented. Teacher asks students to skim, or briefly look at, certain pages, pictures, etc.

  Illustrated: non-linguistic, visual representation of the material to be covered; a graphic organizer is another term for this. Usually shows the main topic in the center, with subtopics on "arms"

Summing Up *Think*: The *Think* segment of *whole-class instruction* is signaled by a "rope"—an interest stimulator—to focus student attention on the introduction of the new lesson for the day. The teacher chooses cues, questions, and/or advance organizers to preview the day's lesson in a fast-paced presentation of 5 minutes or so. These strategies assist students in activating their prior knowledge and provide them a framework for organizing what is coming next.

Know

Time: Approximately 60% of the *Think/Know/Show* sequence time

Purpose: To directly teach the new skills or concepts

Methods: Lecture, Demonstration, Modeling

- With clarity and enthusiasm, teacher directly communicates what the students need to know
- Teacher proceeds in small steps
- Teacher uses both verbal explanations and physical demonstrations
- Teacher elicits student responses regularly, occasionally questions (engagement)
- Teacher "thinks out loud" throughout, verbalizing the thinking processes
- If presentation is lengthier, teacher gives internal summaries at key points (Rosenshine, 1968)
- "Rule-example-rule" approach

Summing Up *Know*: There will be a variety of strategies employed during this direct teaching segment. This is where "teacher decision-making, guided by clear goals, is the key to effective instruction" (Good & Brophy, 2000, p. 375).

Show

Time: Approximately 20% of the *Think/Know/Show* sequence time

Purpose: To find out what students have learned and rehearse their learning

Methods: Conducting Verbal Drills, Recitations; Discussions; Quiz Games

Instruction: Teacher and Student

- Teacher asks students to put new learning into their own words
- Teacher asks students to apply what they have just learned in solving a problem
- Teacher may ask class to recite memorized facts or passages
- Teacher utilizes the 6 Characteristics of Good Questions (Grossier, 1964) when conducting recitations. Questions are: Clear, Purposeful, Brief, Natural, Sequenced, Thought Provoking
- Teacher equitably distributes questions among students
- Teacher gives quick feedback about student responses

The End of Show

The end of the *Show* segment includes lesson closure. This is where the "ribbon" comes in. It signifies a wrap up to the learning and prompts students where to store the information for later retrieval.

- Teacher finishes the *Show* segment with a quick review of the lesson's main points
- Teacher may return to the advance organizer, visual, or "rope" object
- This may only take 2 or 3 minutes, but it is necessary to help students know where and how to store the information they just learned; the teacher is organizing it for the students once more
- Teacher analyzes whether or not re-teaching of the day's concept is necessary
- Teacher does a quick introduction to the Work Time activities, if this has not already been previewed earlier in the day

Summing Up *Show*: The teacher again is the decision-maker, choosing appropriate questioning strategies, discussion, or inquiry to ascertain what the students have learned. The teacher is a master at questioning, balancing the factual recall questions with the higher order thinking questions to evaluate the extent and quality of the student learning during this session. The *Show* segment should end with a definite closure statement (a "ribbon" to tie up the package) to assist students in organizing the learning in their brains once again.

Teacher-Directed Instruction (Small Group)

Teacher-directed, small-group instruction is an effective follow-up to the whole-class presentation, enabling the teacher to focus instructional attention on the particular requirements of homogeneous groups of students. The groupings should be fluid, rearranged frequently in response to particular learning needs. Students should not be clustered in other ways—such as seating arrangements—that appear to solidify group membership and "label" members. Because groups are formed to address particular learning needs, they will vary from time to time in number of members and in the time devoted to them (Good & Brophy, 2000).

Situational grouping is based on short-term grouping of students that enables the teacher to re-teach, review, and enhance to a specific subset of knowledge and skill needs of students who are in the process of mastering material that has already been presented.

Mason and Good (1993) tested two small-group models on 1,700 fourth, fifth, and sixth grade students in 81 mathematics classrooms. In one model, which they called the *structural approach*, students were divided into two homogeneous groups (based on prior proficiency in mathematics) before separately receiving whole-class instruction from a teacher. In the second model, called the *situational approach*, all students received the same whole-class instruction and were then provided follow-up instruction in small groups based on their demonstrated need for review or enrichment. The *situational approach* proved most effective.

A word of caution is in order here. The *situational approach* was effective because it allowed the teacher flexibility in grouping and re-grouping students for specific instructional purposes following introduction of the new material. This is different from traditional ability grouping (such as reading groups) where the group membership tends to remain highly stable once groups are formed, creating a *de facto* "tracking" system with negative consequences (Eder & Felmlee, 1984; Haller, 1985; Hallinan & Sorensen, 1985; Rowan & Miracle, 1983; Weinstein, 1976).

Situational grouping is based on short-term grouping of students that enables the teacher to re-teach, review, and enhance to a specific subset of knowledge and skill needs of students who are in the process of mastering material that has already been presented. Groups should be organized and taught in ways that provide low achievers with the extra instruction they need. Teachers can assign more students to high groups and fewer students to low groups, thus arranging for more intensive instruction of low achievers within the group setting. Or, teachers can spend more of their time providing direct instruction and supervision to low groups while high groups spend more time working cooperatively or independently (Anderson & Pigford, 1988).

Instruction: Teacher and Student

Student-Directed Instruction

Student-directed instruction serves several purposes: Students develop personal responsibility for their learning; they hone their learning skills and meta-cognitive skills; they learn from other students in group settings and in peer teaching arrangements; and the teacher is able to target different learning activities to meet the needs of specific students while also being free to assist some students directly. The most common form of student-directed instruction is independent work, when students complete their assignments individually. This does not mean that they are all completing the same assignment. Once again, the teacher is able, through a Student Learning Plan, to differentiate instruction by giving students assignments consistent with their demonstrated prior learning. With peer teaching, or peer learning, the teacher pairs students to help each other. The act of teaching and assisting another student strengthens the learning of the peer teacher. Instructional time is increased and made specific to the student in this arrangement, as opposed to a teacher instructing all students at the same time. The third type of student-directed instruction is found in small groups of students who complete assignments provided by the teacher for the group. This format provides the opportunity for cooperative learning techniques.

Homework and Communication with Parents

Research has long established the strong influence of a student's home environment on that student's success in school. Less clear has been what schools can do to engage parents in their children's learning. We now have significant, new research that shows that schools can improve their students' learning by engaging parents in ways that directly relate to their children's academic progress, maintaining a consistent message of what is expected of parents, and reaching parents directly, personally, and with a trusting approach (Epstein, 1995; Henderson & Mapp, 2002; Patrikakou, Weissberg, & Rubenstein, 1999; Redding, 2000). Homework is a primary point of interface between the school and the home, and parents are best able to support the school's purposes for homework when they understand what is expected of students and their role in monitoring their children's homework. Consistency from teacher to teacher and across grade levels and subjects contributes to teachers', parents', and students' understanding of the school's purposes for homework and also reinforces students' formation of independent study habits.

Guidelines for Homework

Homework is most effective when it is used in ways proven to contribute most to student learning and student acquisition of independent study habits. Guidelines for effective homework are:

- Homework must be monitored and followed up.
- Teacher comments on homework are vital; graded homework that counts is most effective. Prompt return of homework by teacher is essential.
- Practice and preparation assignments are primarily the responsibility of the students to complete themselves.
- It is unrealistic to expect parents to play significant instructional roles with homework, especially at the upper grades (Grolnick et al., 1997).
- In the elementary grades, brief forms of parental involvement are desirable (especially those assignments that call for students to show or explain their work to parents and get their reactions).
- Assigning homework for punishment is inappropriate.

Computer-Based and Technology-Assisted Instruction

More and more, technology is used to individualize instruction, provide a well-organized presentation of material, offer feedback, and allow students to progress at their own rate. Computer-based instruction is successful when the program is carefully aligned with the same standards and objectives that the teacher is addressing within the designated unit of instruction. This requires the teacher to know the content of the computer program and to use it in concert with other modes of instruction. It also requires that the teacher check for mastery of objectives independent of the program's validation of mastery. When a computer program is successful, students are engaged, on task, and comfortable with the program and its navigation. The teacher travels about the room to assist students and monitor their work. When a student is in need of assistance from the teacher, the teacher provides curriculum-related activities to avoid "down time." In terms of classroom management, the students are taught to make orderly transitions to and from their computer stations.

Instruction: Teacher and Student

With technology-assisted instruction, the teacher uses computers and other technology tools as a seamless part of the learning activity. Students use word processing programs to write and edit their written work. They develop projects with presentation software. They use the internet as a source of information. All this requires clear direction to gather, organize, and present information. To make technology-assisted instruction fruitful, teachers must be trained in the use of the software and must be supported in integrating the technology into the routine of instruction. Technology can also be a great asset to teachers in their recordkeeping.

Teacher-Student Interaction

Teacher-student interactions include teacher praise for and reinforcement of positive student behavior and demonstration of learning as well as questioning techniques and discussion methods. Teacher-student interactions are social, instructional, and managerial. Social interaction has been found to be a particularly strong correlate of academic learning (Wang, Haertel, &Walberg, 1993), as it facilitates a bond of connection between the teacher and the students and increases each student's sense of belonging to the classroom group.

Grossier (1964) suggested six characteristics of good questions that teachers use in instructional interaction with students. The question should be: 1) clear, specific, to the point, delivered one at a time, with a cue to channel the student's response; 2) purposeful, aligned with the lesson's intent, often written in advance by the teacher; 3) brief; 4) natural, in simple language, conversational, appropriate to the level of the class, and with clarification of any new words; 5) sequenced, starting with questions of fact, integrated with previously-discussed material, then prompting students to refine or apply their understanding, using a variety of types from Bloom's taxonomy, moving toward connection of lesson elements; and 6) thought provoking, sufficiently strong to arouse interest, and designed to help students understand and analyze.

Rowe (1974; 1986) demonstrated the effectiveness of sufficient pausing by the teacher after asking a question before calling on a student. When the pause was extended from the typical one second or less to three to five seconds, the quality of responses improved dramatically. These effects were most dramatic with less-able students. Other studies have verified these conclusions (DeTure, 1979; Swift, Gooding, & Swift, 1988; Tobin, 1983).

Drill and recitation occur frequently in classrooms and are important instructional tools, but true group discussion is rare. Activities that teachers call "discussion" tend to be recitations in which teachers ask questions and students respond by reciting what they already know or are now learning. A true discussion involves teachers and students sharing ideas in order to clarify issues, relate new knowledge to their prior experience, or attempt to answer a question or solve a problem (Alvermann, O'Brien, & Dillon, 1990; Tharp & Gallimore, 1988).

The pace of a discussion is noticeably slower than a recitation; longer periods of silence are sustained between speakers. Sometimes questions can actually impede discussions. To avoid this, Dillon (1979) lists six alternatives to questioning that teachers can use to sustain discussions: 1) declarative statements; 2) declarative restatements that summarize a student's point; 3) indirect questions to avoid the sound of rejection and prompt more careful consideration; 4) imperatives, such as "tell us more about that" or "perhaps you could give us an example"; 5) student questions—asking for students to ask questions of other students; 6) deliberate silence to allow students to absorb content.

Classroom Culture

A meta-analysis of 28 factors that affect school learning (Wang, Haertel, & Walberg, 1993) found that the single most powerful factor is classroom management—the way the teacher organizes and manages the complex variables of curriculum, time, space, and interaction with students. Classroom management is evidenced in the teacher's "withitness," the learner's accountability for learning, the clear procedures in the classroom, and the way the teacher mixes whole-class instruction, small-group instruction, and individual instruction.

Consistent reinforcement of classroom rules and procedures is key to classroom management (Emmer et al., 1984; Evertson et al., 1984). Rules and procedures are posted in the classroom, and students are reminded of them and learn to operate according to them. The effective teacher "teaches" classroom procedures in a positive way rather than relying solely on correction of violations. Frequently resorting to correction and punishment is a sign of inadequate classroom management methods, but consistent enforcement of rules and procedures is a necessity (Stage & Quiroz, 1997).

Instruction: Teacher and Student

Teacher "withitness" is described by Brophy (1996) as the teacher being "aware of what is happening in all parts of the classroom at all times … by continuously scanning the classroom, even when working with small groups or individuals. Also [the teacher demonstrates] … this withitness by intervening promptly and accurately when inappropriate behavior threatens to become disruptive" (p. 11). The way a teacher plans, organizes, manages, and watches over the classroom determines the prevailing "culture." Students adopt the ethos of the classroom culture, responding to what the teacher has created and to the way the teacher behaves.

Whole-class instruction has been described in detail above, and the teacher exercises immediate control over the classroom culture during whole-class instruction, operating as the central character while interacting with the rest of the cast. The Whole-Class Instruction Plan guides the teacher in teaching in the whole-class mode. The Mega System distinguishes between two primary groupings within the classroom—Whole-Class Instruction and Work Time. Work Time is the classroom time when the teacher is not teaching the whole class, but students are learning in either an independent (individual) mode or in various small-group configurations. During Work Time, the teacher has an opportunity to individualize instruction by drawing from the learning plan grids for the unit to create Student Learning Plans to guide each student's activities. A Student Learning Plan is typically a one-week plan developed by the teacher for the class, with a variety of learning activities that enable the teacher to adapt the plan for individual students. One Student Learning Plan is developed for each subject area. The Student Learning Plan guides the student's activity during work time, is reviewed by parents when completed, and is then returned to the teacher to be maintained in the student's file. Learning activities are leveled (see objective levels in Learning Plan Grid) according to the student's evidence of prior learning, particularly on the unit pre-test and subsequent work within the unit of instruction.

The following pages show examples of Student Learning Plans for students who are able to read and follow directions. Simpler forms using symbols and colors work well with kindergarten and first-grade students. The Student Learning Plan is the teacher's vehicle for individualizing instruction and establishing a classroom culture that encourages student-directed work and accountability.

Student Learning Plan

Student's Name: _____ Teacher's Name: _____

Pre-Test Date: _____ Post-Test Date: _____ Subject: _____

Standards/Benchmarks Codes: _____ Objective Codes: _____ Week(s) of: _____

Sequence	Independent Activities (Check)	Centers	Homework (Circle)	Teacher Check
	Activity Number and Title	(Check) (Number AC)	Activity Number and Title	Initial/Date
1	___ 1) ___ 2) ___ 3) ___ 4)	AC ____ CC ____ EC ____	___ 1) ___ 2) ___ 3) ___ 4)	
2	___ 1) ___ 2) ___ 3) ___ 4)	AC ____ CC ____ EC ____	___ 1) ___ 2) ___ 3) ___ 4)	
3	___ 1) ___ 2) ___ 3) ___ 4)	AC ____ CC ____ EC ____	___ 1) ___ 2) ___ 3) ___ 4)	
4	___ 1) ___ 2) ___ 3) ___ 4)	AC ____ CC ____ EC ____	___ 1) ___ 2) ___ 3) ___ 4)	
5	___ 1) ___ 2) ___ 3) ___ 4)	AC ____ CC ____ EC ____	___ 1) ___ 2) ___ 3) ___ 4)	

Centers: AC = Activity Center and number of activity to complete; CC = Cooperative Center, EC = Exploratory Center
Activity Number and Title correspond with Activity Instructions.
Student: Draw line through completed activity. Teacher Check indicates that sequence was completed by student.

Teacher Comments: _____

Parent Comments: _____

Parent Signature: _____ Date: _____

Student Learning Plan (Class Example for Most Students)

Student's Name: _____ Teacher's Name: Mrs. Hanger

Pre-Test Date: 9-3-04 Post-Test Date: 10-2-04 Subject: *Reading*

Standards/Benchmarks Codes: *A3* Objective Codes: 3R1-1 to 3R1-4 Week(s) of: Sept. 11, 2004

Sequence	Independent Activities (Check)	Centers	Homework (Circle)	Teacher Check
	Activity Number and Title	(Check) (Number AC)	Activity Number and Title	Initial/Date
1	__ 1) *What is a sentence p. 17* X 2) *Sentence structure p. 20, C&D* __ 3) *Declarative and Inter. Sentences p. 24, A&B* __ 4)	AC 2 CC ____ EC ____	__ 1) *p. 3, 6-15* X 2) *p. 3, 16-20* __ 3) *p. 28, 19-25 Add Label words to make a sentence* __ 4)	
2	__ 1) *Sentence punctuation p. 18, B* X 2) *Imperative and Excl. p. 19, 2-10* __ 3) *Letter writing p. 25, C&D* __ 4) *Booktime*	AC 2 CC X EC ____	__ 1) *p. 5, 13-20 Punctuation* X 2) *p. 7, 8-15 Label sentences* __ 3) *Finish letter* __ 4) *Read for 20 minutes*	
3	__ 1) *Vocabulary building worksheet* X 2) *Context clues worksheet* __ 3) *Combining sentences worksheet* __ 4)	AC 2 CC ____ EC ____	__ 1) *p. 39, 1-6 Create sentences* X 2) *p. 39, 7-11* __ 3) *p. 23, 6-12 Context clues/ combining* __ 4) *Main Idea*	
4	__ 1) *Combining words p. 21 A* X 2) *Vocabulary list of the week* __ 3) *Parts of a story worksheet* __ 4)	AC 2 CC ____ EC ____	__ 1) *Where you would like to visit* __ 2) __ 3) *p. 55, 1-2* __ 4)	
5	__ 1) *Time-order words worksheet* X 2) *Detail sentences p. 21 B* __ 3) *Main idea worksheet* __ 4) *Booktime*	AC 2 CC ____ EC X	__ 1) *Paragraph using time-order words* X 2) *p. 50, Write 4 detail* __ 3) *p. 72, 1-6 Main Idea and details* __ 4) *Read for 20 minutes*	

Centers: AC = Activity Center and number of activity to complete; CC = Cooperative Center, EC = Exploratory Center
Activity Number and Title correspond with Activity Instructions.
Student: Draw line through completed activity. Teacher Check indicates that sequence was completed by student.

Teacher Comments: _____

Parent Comments: _____

Parent Signature: _____ Date: _____

Student Learning Plan (Example for a Student Not Initially Ready for Target Objectives)

Student's Name: _____ Teacher's Name: Mrs. Hanger

Pre-Test Date: 9-3-04 Post-Test Date: 10-2-04 Subject: *Reading*

Standards/Benchmarks Codes: *A3* Objective Codes: 3R1-1 to 3R1-4 Week(s) of: Sept. 11, 2004

Sequence	Independent Activities (Check)	Centers	Homework (Circle)	Teacher Check
	Activity Number and Title	(Check) (Number AC)	Activity Number and Title	Initial/Date
1	X 1) *What is a sentence p. 17* __ 2) *Sentence structure p. 20, C&D C & D* __ 3) *Declarative and Inter. Sentences p. 24, A&B* __ 4)	AC 1 CC ____ EC ____	X 1) *p. 3, 6-15* __ 2) *p. 3, 16-20* __ 3) *p. 28, 19-25 Add Label words to make a sentence* __ 4)	
2	X 1) *Sentence punctuation p. 18, B* __ 2) *Imperative and Excl. p. 19, 2-10* __ 3) *Letter writing p. 25, C&D* __ 4) *Booktime*	AC 1 CC X EC ____	__ 1) *p. 5, 13-20 Punctuation* X 2) *p. 7, 8-15 Label sentences* __ 3) *Finish letter* __ 4) *Read for 20 minutes*	
3	X 1) *Vocabulary building worksheet* X 2) *Context clues worksheet* __ 3) *Combining sentences worksheet* __ 4)	AC 1 CC ____ EC ____	__ 1) *p. 39, 1-6 Create sentences* X 2) *p. 39, 7-11* __ 3) *p. 23, 6-12 Context clues/ combining* __ 4) *Main Idea*	
4	__ 1) *Combining words p. 21 A* X 2) *Vocabulary list of the week* __ 3) *Parts of a story worksheet* __ 4)	AC 2 CC ____ EC ____	X 1) *Where you would like to visit* __ 2) __ 3) *p. 55, 1-2* __ 4)	
5	__ 1) *Time-order words worksheet* X 2) *Detail sentences p. 21 B* __ 3) *Main idea worksheet* __ 4) *Booktime*	AC 2 CC ____ EC ____	__ 1) *Paragraph using time-order words* X 2) *p. 50, Write 4 detail* __ 3) *p. 72, 1-6 Main Idea and details* __ 4) *Read for 20 minutes*	

Centers: AC = Activity Center and number of activity to complete; CC = Cooperative Center, EC = Exploratory Center
Activity Number and Title correspond with Activity Instructions.
Student: Draw line through completed activity. Teacher Check indicates that sequence was completed by student.

Teacher Comments: _____

Parent Comments: _____

Parent Signature: _____ Date: _____

Student Learning Plan (Example for a Student Demonstrating Early Mastery)

Student's Name: _____ Teacher's Name: Mrs. Hanger

Pre-Test Date: 9-3-04 Post-Test Date: 10-2-04 Subject: *Reading*

Standards/Benchmarks Codes: *A3* Objective Codes: 3R1-1 to 3R1-4 Week(s) of: Sept. 11, 2004

Sequence	Independent Activities (Check)	Centers	Homework (Circle)	Teacher Check
	Activity Number and Title	(Check) (Number AC)	Activity Number and Title	Initial/Date
1	__ 1) *What is a sentence p. 17* X 2) *Sentence structure p. 20, C&D* X 3) *Declarative and Inter. Sentences p. 24, A&B* __ 4)	AC 2 CC ____ EC ____	__ 1) *p. 3, 6-15* X 2) *p. 3, 16-20* __ 3) *p. 28, 19-25 Add Label words to make a sentence* __ 4)	
2	__ 1) *Sentence punctuation p. 18, B* __ 2) *Imperative and Excl. p. 19, 2-10* X 3) *Letter writing p. 25, C&D* __ 4) *Booktime*	AC 3 CC X EC ____	__ 1) *p. 5, 13-20 Punctuation* __ 2) *p. 7, 8-15 Label sentences* X 3) *Finish letter* __ 4) *Read for 20 minutes*	
3	__ 1) *Vocabulary building worksheet* X 2) *Context clues worksheet* __ 3) *Combining sentences worksheet* __ 4)	AC 3 CC ____ EC ____	__ 1) *p. 39, 1-6 Create sentences* X 2) *p. 39, 7-11* __ 3) *p. 23, 6-12 Context clues/ combining* __ 4) *Main Idea*	
4	__ 1) *Combining words p. 21 A* __ 2) *Vocabulary list of the week* X 3) *Parts of a story worksheet* __ 4)	AC 3 CC ____ EC ____	__ 1) *Where you would like to visit* __ 2) X 3) *p. 55, 1-2* __ 4)	
5	__ 1) *Time-order words worksheet* __ 2) *Detail sentences p. 21 B* X 3) *Main idea worksheet* X 4) *Booktime*	AC 3 CC ____ EC ____	__ 1) *Paragraph using time-order words* __ 2) *p. 50, Write 4 detail* X 3) *p. 72, 1-6 Main Idea and details* __ 4) *Read for 20 minutes*	

Centers: AC = Activity Center and number of activity to complete; CC = Cooperative Center, EC = Exploratory Center
Activity Number and Title correspond with Activity Instructions.
Student: Draw line through completed activity. Teacher Check indicates that sequence was completed by student.

Teacher Comments: _____

Parent Comments: _____

Parent Signature: _____ Date: _____

Targeted Learning

"Targeted learning" is a term applied to instruction that is ideal for the individual student, taking into account that student's prior mastery. Targeted learning contributes to the student's motivation to learn because the student perceives learning tasks as challenging but not forbidding. Targeted learning models and encourages personal responsibility for learning and the application of a variety of strategies to reach successful ends. As previously described, the teacher assesses students routinely and periodically to make the most appropriate assignment of new learning tasks. The teacher selects from a variety of instructional modes to build the student's ability to apply various learning strategies, thus enhancing metacognitive skills, and to maintain a high level of interest. From a strong presentational base in well-executed, whole-class instruction, targeted learning proceeds to reach each student individually, bringing that student to mastery of standards-based objectives. While targeted learning provides prerequisite steps to mastery for some students, it also enhances learning beyond the level of the standard for other students, thus making the standards-based objective a floor and not a ceiling. Because each student is assessed for each objective, no student is consigned to a "group" or "track," but is able to reach and exceed each objective based on the student's demonstrated readiness for and mastery of that particular objective.

Student Motivation to Learn

Student motivation to learn depends upon the student's perceived self-efficacy in the face of a learning challenge, and the teacher's interaction with students affects perceived self-efficacy over time. Albert Bandura (1997, p. 3) defines self-efficacy perception as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments." When a student approaches a new learning task, the student's perception of his or her ability to successfully complete the task bears on the motivation to persist with the task. Self-efficacy influences academic motivation, learning, and achievement (Pajares, 1996; Schunk, 1995; Schunk & Pajares, 2002). A student's self-efficacy perception, the anticipation of success, is derived from the student's assessment of his or her own level of skill and the relative challenge of the task at hand (Csikszentmihalyi, 1990; 1993). When perceived skill is high and the challenge low, the student is bored. When perceived skill is low and the challenge high, the student becomes anxious and prone to avoid the task. The job of the teacher is to set learning tasks that are suf-

Instruction: Teacher and Student

ficiently challenging for the student while within the proximate reach of the student's abilities. The skillful teacher heightens the student's interest and perception of likely success. This is the essence of targeted learning—planning learning tasks for each student that are appropriate to that student's demonstrated prior knowledge and provided in an instructional mode that heightens the student's interest, value for the result, and perception of likely success.

A teacher can increase a student's perception of self-efficacy, thus elevating the student's effort, persistence, and ultimate level of performance by: 1) encouraging students to set goals that are specific, challenging, but attainable, 2) modeling effective responses to tasks, 3) providing feedback that encourages students to stay on course until achieving mastery, and 4) making attributional statements that help students understand and appreciate that they are improving their own abilities by accepting challenges and maintaining effort (Bandura, 1997; Schunk & Ertmer, 2000).

Motivation is something we can only detect indirectly; we assume from a student's willingness to tackle a new task and persist with it that the student is "motivated" toward it. Motivation is a theoretical construct that we employ in order to explain goal-directed behavior (Maehr & Meyer, 1997). In fact, all behavior is motivated to some extent. Teachers want students to be motivated to learn. In the classroom context, the concept of student motivation is used to explain the degree to which students invest attention and effort in various pursuits, which may or may not be the ones desired by teachers. Thus, it is not fair to say that a student lacks motivation when, in fact, the student is motivated by something other than what the teacher desires. The trick is to encourage student motivation toward learning objectives.

It is unrealistic to expect teachers to teach and students to learn motivated purely by intrinsic factors. Interest leading to play or casual exploration is not the same as motivated and focused learning. If students think of an activity as play rather than as learning, they will not use the processes needed to get the most out of the experience and file it away for future application. Students may be motivated to learn from an activity whether or not they find its content interesting or its process enjoyable. They may not get to choose the activity, but they can choose to get the most out of it (Brophy, 2004, p. 250).

Kieran Egan (2002) makes a similar point when he distinguishes between learning "in nature," the incidental learning that occurs naturally as part of a child's playing and interacting with the world around him, and the formal learning in school which requires focus, discipline, and concerted effort. Even the acquisition of language, which Egan explains occurs with miraculous ease because of the brain's innate cognitive structures for it, is something apart from school learning.

Even if the student does not find the topic of high interest, the student will persist with the learning task if the topic (or the acquisition of the skill or knowledge) is perceived as valuable.

When the topic is of high interest to a student, that level of interest may provide intrinsic motivation for the student to pursue the subject. But some topics are not of high interest to every student, and yet it is essential that the student learn about them. The process of learning—careful listening and reading, studying to master and memorize, practicing—can, in fact, be quite tedious. Depending upon the teacher's enthusiasm and the topic's interest, it is not always enough to "motivate" students to learn. Students must be encouraged to be motivated by learning itself (Brophy, 2004). In other words, the student finds reward in the acquisition of new skills and knowledge. Anticipating the satisfaction of accomplishment, the student is motivated to persist, even if the topic is not of great initial interest and the task of mastery is arduous.

The value a student places on learning contributes to the student's mental calculus in approaching a new task. Even if the student does not find the topic of high interest, the student will persist with the learning task if the topic (or the acquisition of the skill or knowledge) is perceived as valuable. The classic example of perceived value is found in the attention high school sophomores give to mastering the material necessary to acquire a driver's license. Learning the rules of the road may not be a topic of high interest, but success in learning them is of great value to the student who wants to drive.

The teacher contributes to a student's desire to learn by modeling an enthusiasm for learning and for the specific topic; presenting material clearly, interactively, and directly; interacting socially and academically with students; and allowing students a degree of self-direction or self-management of their learning toward clear objectives. Students respond to the right blend of caring and expectation, the knowledge that the teacher "knows me and thinks there is something special about me," recognition for accomplishment derived from evidence of effort and mastery, the opportunity to manage work tasks and to be responsible for them, and content that is challenging and interestingly presented.

Instruction: Teacher and Student

The effective teacher scaffolds each students' learning with clear goals, advance organizers, skillful questioning, and targeted learning activities. Reluctant and apathetic students must be resocialized to alter their attitudes and behaviors by developing a close working relationship with them, building upon their existing knowledge and interests, and intentionally expecting their positive attitude toward schoolwork.

While the teacher models enthusiasm for learning and the topic at hand, enthusiasm does not mean pep talks and phony theatrics. It means genuine personal delight in learning, identifying good reasons to view a topic as interesting, meaningful, and important. The purpose is not to amuse or entertain, but to induce students to value the topic or activity. All students, but especially at-risk students, do best with teachers who:

> share warm, personal interactions with them but also hold high expectations for their academic progress, require them to perform up to their capabilities, and see that they progress as far and as fast as they are able. These teachers break through social-class differences, cultural differences, language differences, and other potential barriers to communication in order to form close relationships with at-risk students, but they use these relationships to maximize the students' academic progress, not merely to provide friendship or sympathy to them (Brophy, 2004, p. 360).

At-risk students are especially successful when they feel a bond with their teacher and classmates, and such bonding is achieved by establishing a warm and inviting social climate. Respect for each student's background of language and tradition is essential in creating a trusting classroom environment. The teacher who visits homes, knows students' familial milieu, and shows respect for what the student brings to the classroom will contribute greatly to each student's desire to learn.

Helping students articulate their own aspirations also reinforces the attitudes conducive to learning, placing a healthy emphasis on what the student wants to become. Knowledge itself equips the mind to learn in new and different ways. Categorizing students by suspected learning styles is a form of pigeonholing. It limits what a child learns, which in turn limits what a child is capable of learning. A child is best served by encouraging the exercise of a variety of learning strategies.

Metacognition

Metacognition is thinking about thinking, the learner's ability to know what he or she knows and to adapt learning strategies in order to reach desired ends. Teachers help students build their metacognitive awareness and skills by showing the roadmap of learning, enabling them to see learning objectives as their personal goals. Teachers talk the language of metacognition by thinking out loud, helping students see the possible routes to mastery of new concepts and skills, and encouraging self-direction and responsibility for mastery. The mix of instructional modes and variety of learning activities acquaints students with the repertoire of strategies that might be applied to any learning situation. In addition, the teacher directly teaches students efficient methods for approaching, comprehending, mastering, and sometimes memorizing material within the context of the objectives at hand. Teaching metacognitive and critical thinking skills apart from subject matter is ineffective, and teachers are most successful when they embed this important component of learning within the curriculum.

THE LANGUAGE OF METACOGNITION

Teachers talk the language of metacognition by thinking out loud, helping students see the possible routes to mastery of new concepts and skills, and encouraging self-direction and responsibility for mastery.

It is important to reiterate that learning strategies should not be confused with learning styles. Most learning style research has been done in limited areas of the curriculum and with very mixed, negative, and unconvincing results. Advocates of learning styles tend also to overlook the advice of creditable researchers for teachers to "help students to 'stretch' to function in the learning modes they use infrequently" (Brophy, 2004, p. 342).

Learning style schemes and over-differentiation of instruction according to "cognitive styles" lack research validation. While it is wise to offer more than one route to mastery and to teach different subjects in different ways, teachers should avoid round-about means to achieve learning ends, labeling and stereotyping students, and overemphasis of perceived student strengths without sufficient attention to weaknesses (Krechevsky & Seidel, 2001). The central purpose of schooling is for children to learn what they don't already know, grow in areas where they lack development, and expand their areas of interest and knowledge.

Instruction: Teacher and Student

Brophy (2004) cautions against capitulation to perceived student preferences as opposed to balanced development of a menu of learning strategies and modes:

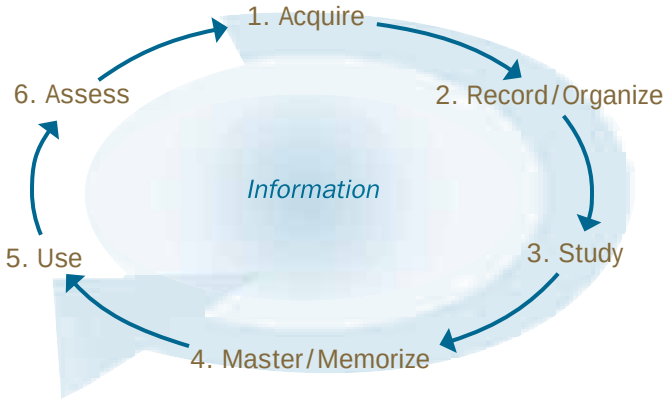
> In order to attain certain learning goals students must engage in processes that they might prefer to avoid (presentations to the class, debates, cooperative work on a group project). Or you might have to limit certain students' opportunities to pursue favorite topics or learn in their preferred mode, because if the students spent too much time indulging these preferences they would fail to develop knowledge or skills needed in school or in life generally. (p. 345)

Teaching and modeling a metacognitive approach to learning benefits students. The teacher shows students how to address a learning task by:

- Defining the task: What am I expected to learn and what do I already know?
- Goal-setting: How will I know when I have completed the task? What strategies will I apply?
- Applying learning strategies: Research, practice, ask questions, memorize, outline, other strategies.
- Monitoring: What new information do I need? Is this a simple or difficult task? How do I approach it? How am I doing? Should I try a different strategy?

Learning strategies are applied at each point within a *learning cycle*, as diagramed below:

Learning Cycle



Teachers help students build metacognitive skills by:

- Connecting new learning to prior learning.
- Helping students focus on what is expected and HOW to meet those expectations.
- Articulating expectations clearly.
- Modeling and demonstrating strategies for mastery.
- Showing students how to "check" their own mastery.
- Breaking complicated processes into simpler steps.
- Helping students focus on mastery rather than fear of failing.
- Helping students find their own errors and self-correct.
- Emphasizing learning, task mastery, and effort rather than ability, performance, and competition.

Attribution

To what does a student attribute his/her learning success or difficulty? The answer affects both motivation and metacognition. Constructive attributions include effort, strategies applied, and available information: "I need to try harder, try a different approach, ask questions." Lack of ability is a destructive attribution: "I'm just not smart enough." Equally non-productive are deflective attributions which externalize the source of difficulty: "It's not about me. The teacher doesn't like me. The test isn't fair." Even when students are successful, they may express counterproductive attributions: "The test was easy." "The teacher likes me." "I was just lucky." Through their interactions with students, teachers give signals that reinforce attributions. Asking key questions and shaping the acceptable responses helps students view learning as a process over which they exercise considerable control: "What do you think you need to do to reach this objective?" "Why do you think you did so well?" By targeting instruction for each student, the teacher paves a path of possibility that encourages constructive attribution. By modeling metacognitive skills, the teacher emphasizes the learner's active role in learning, discouraging external attribution for success and failure.

Professional Development

Professional development in the Mega System parallels the school improvement plan and evidence of research-based practices in the classroom. When the school improvement plan calls for new expertise to enable the school to move in a new direction or to address a particular problem, professional development is a means for elevating the skill and knowledge of administrators, teachers, and staff. When classroom observations by the principal or other teachers (as in peer observation and collegial learning) indicate a general need for improvement across the faculty, well-planned professional development is a way to improve. When classroom observations by the principal or another teacher show an individual teacher's areas that need improvement, that teacher's personal development plan can include training or coaching to assist the teacher in the area of need.

The list of indicators of research-based instructional practices at the end of this chapter provides the basis for a rubric for classroom observations. The principal or another teacher would meet with the observed teacher before the observation to review the indicators and again after the observation to discuss the observer's impressions. The teacher and the observer then create or update a professional development plan for the teacher, listing: a) observed strengths and ways the teacher might share his/her expertise with other teachers, and b) areas that need improvement and steps toward improvement. The observer assists the teacher in carrying out these next steps.

Continuous improvement of each teacher's skills is achieved through a variety of means including whole-faculty workshops, consultations with Instructional Teams, the principal's work with individual teachers and with teams, and through collegial learning—teacher to teacher (including peer observations, study groups, coaching, and mentoring). While teacher evaluation is something apart from professional development, evaluation should include examination of the teacher's proficiency with the same indicators used to plan professional development for each individual teacher and for the faculty as whole.

Professional Development

The Professional Development Plan for Teachers on the next page provides a post-observation agenda for a meeting between the observer and the teacher as well as an action plan and record of the meeting's conclusions. This plan is premised upon one or more observations of the teacher using a checklist of research-based indicators such as those provided later in this chapter. Analysis of the plans for all teachers provides guidance in providing professional development targeted to areas in need of improvement across the faculty. The areas of strength outlined in the plan create an inventory of expertise within the faculty, useful in pairing teachers for coaching and in selecting teachers to lead workshop sessions and study groups.

Professional Development Plan for Teachers

Teacher's Name: _____

You will need a copy of the completed Classroom Observation Instrument.

Identified below are the three top areas of strengths and three areas that most indicate a need for improvement based on the Classroom Observation Instrument.

Indicators	Strengths Ways to Share Expertise	Timeline to Completion
1.		
2.		
3.		

Indicators	Areas to be Improved Strategies To Be Used	Timeline to Completion
1.		
2.		
3.		

Teacher's Signature: _____ **Date:** _____

Observer's Signature: _____ **Date:** _____

Chapter Summary

Chapter 2 outlined decision-making structures through which learning data are analyzed. Chapter 3 has covered the bases of learning—curriculum, assessment, instruction, and professional development—providing a review of evidence on effective approaches to each. We have established a framework within which a school can guide and monitor its progress and the progress of each of its students. We have offered a distillation of research on curriculum, assessment, and instruction, generalized to apply across grade levels and subject areas. Within each subject area, and for each grade or age level, more specific research will guide the teacher. A framework for school improvement, however, seeks general application of sound practices and monitors both these practices and their outcomes, adjusting course in response to the data. The Mega System includes both decision-making structures to guide and monitor progress and sound instructional practices most likely to achieve the desired results. While a model would measure progress against implementation standards, a system measures progress by accomplishment of results in student learning.

Putting Learning Components in Place

The forms on the following pages may be used to assess the current status of key elements of a learning system and to plan for the development of the missing pieces. A Leadership Team can work through these forms, develop a plan of action, and monitor the progress. For items checked "No" on the assessment of the current situation, primary responsibility is assigned to a person or team, with an expected date for completion of the task. Many of the items are worded to apply to "the teacher." This makes these items useful for classroom observations by the principal, peer observations between teachers, and self-assessment by individual teachers. For the purpose of determining the current status of these indicators within the school, the Leadership Team should consider the extent to which each indicator could be awarded a "yes" for *all* teachers. Periodically, a compilation of observations of or self-assessments by all teachers can be produced, without reference to individual teachers' names, to show the strength of the indicator in the school. This information is especially useful in planning professional development.

Learning Indicators

Assessing the Current Situation		Adding the Missing Pieces	
Yes	No	Primary Responsibility	Target Date for Completion
A. Curriculum			
B. Assessment			
C. Instruction			
D. Professional Development			
1. Professional development for teachers includes observations by the principal related to indicators of effective teaching.			
2. Professional development for teachers includes observations by peers related to indicators of effective teaching.			

Learning Indicators

A. Curriculum	
1. Instructional Teams develop standards-aligned units of instruction for each subject and grade level.	
2. Teachers are guided by a document that aligns standards, curriculum, instruction, and assessment.	
3. Teachers submit weekly lesson plans based on aligned units of instruction.	
4. Units of instruction include standards-based objectives and criteria for mastery.	
5. Units of instruction include pre/post tests to assess student mastery.	
6. Units of instruction include specific learning activities aligned to objectives.	
7. Instructional Teams develop materials for their standards-aligned learning activities and share the materials among themselves.	
8. Materials for standards-aligned learning activities are well-organized, labeled, and stored for convenient use by teachers.	

B. Assessment	
The teacher:	
1. Uses objectives-based pre-tests.	
2. Uses objectives-based post-tests.	
3. Maintains a record of each student's mastery of specific learning objectives.	
4. Tests frequently using a variety of evaluation methods and maintains a record of the results.	
5. Differentiates assignments in response to individual student performance on pre-tests and other methods of assessment.	

	Assessing the Current Situation		Adding the Missing Pieces	
	Yes	No	Primary Responsibility	Target Date for Completion

	Assessing the Current Situation		Adding the Missing Pieces	
	Yes	No	Primary Responsibility	Target Date for Completion

Learning Indicators

C. Instruction	
Classroom Culture	
1. When waiting for assistance from the teacher, students are occupied with curriculum-related activities provided by the teacher.	
2. Transitions between instructional modes are brief and orderly.	
3. Students maintain eye contact and are attentive.	
4. Students raise hands or otherwise signal before speaking.	
The teacher:	
5. Uses a variety of instructional modes—whole-class, small-group, independent, computer-assisted, computer-based.	
6. Maintains well-organized student learning materials in the classroom.	
7. Displays completed student work in the classroom.	
8. Posts classroom rules and procedures in the classroom.	
9. Corrects students who do not follow classroom rules and procedures.	
10. Reinforces classroom rules and procedures by positively teaching them.	
11. Conducts an occasional “behavior check.”	
12. Engages all students, e.g., encourages silent students to participate.	
13. Is active in the classroom regardless of the instructional mode.	
14. Interacts with students socially, instructionally, and managerial as appropriate.	

	Assessing the Current Situation		Adding the Missing Pieces	
	Yes	No	Primary Responsibility	Target Date for Completion

Learning Indicators

C. Instruction *(continued)*	
Teacher-Directed Whole-Class or Small Group: Introduction	
The teacher:	
1. Reviews the previous lesson.	
2. Clearly states the lesson's topic, theme, objectives.	
3. Stimulates interest in the topics.	
4. Uses modeling, demonstration, graphics.	
Teacher-Directed Whole-Class or Small Group: Presentation	
The teacher:	
1. Proceeds in small steps at rapid pace.	
2. Explains directly and thoroughly.	
3. Maintains eye contact.	
4. Speaks with expression and uses a variety of vocal tones.	
5. Uses prompting/cueing.	
Teacher-Directed Whole-Class or Small-Group: Summarize/Confirm Mastery	
The teacher:	
1. Re-teaches when necessary.	
2. Reviews with drilling/class recitation.	
3. Reviews with questioning.	
4. Summarizes key concepts.	

	Assessing the Current Situation		Adding the Missing Pieces	
	Yes	No	Primary Responsibility	Target Date for Completion

Learning Indicators

C. Instruction *(continued)*	
Teacher-Directed Whole-Class or Small Group: Teacher-Student Interaction	
The teacher:	
1. Re-teaches following questioning.	
2. Uses open-ended questioning and encourages elaboration.	
3. Re-directs student questions.	
4. Encourages peer interaction.	
5. Encourages students to paraphrase, summarize, relate.	
6. Encourages students to check their own comprehension.	
7. Verbally praises students.	
Student-Directed Small-Group or Independent	
The teacher:	
1. Travels to all areas in which students are working.	
2. Meets with students to facilitate mastery of objectives.	
3. Encourages students to help each other with their work.	
4. Interacts instructionally with students (explaining, checking, giving feedback).	
5. Interacts managerially with students (reinforcing rules, procedures).	
6. Interacts socially with students (noticing and attending to an ill student, asking about the weekend, inquiring about the family).	
7. Verbally praises students.	

	Assessing the Current Situation		Adding the Missing Pieces	
	Yes	No	Primary Responsibility	Target Date for Completion

Learning Indicators

C. Instruction *(continued)*	
Computer-Based Instruction	
1. Students are engaged and on task.	
2. Students are comfortable with the program and its navigation.	
The teacher:	
3. Travels about the room to assist students.	
4. Has documentation of the computer program's alignment with standards-based objectives.	
5. Maintains a record of student mastery of standards-based objectives.	
6. Assesses student mastery in ways other than those provided by the computer program.	
Homework, Communication with Parents	
The teacher:	
1. Maintains a file of communication with parents.	
2. Regularly assigns homework (4 or more days a week).	
3. Checks, marks, and returns homework.	
4. Includes comments on checked homework.	
5. Counts homework toward the student's report card grade.	
6. Systematically reports to parents the student's mastery of specific objectives.	

	Assessing the Current Situation		Adding the Missing Pieces	
	Yes	No	Primary Responsibility	Target Date for Completion

Learning Indicators

D. Professional Development	
1. Professional development for teachers includes observations by the principal related to indicators of effective teaching.	
2. Professional development for teachers includes observations by peers related to indicators of effective teaching.	
3. Professional development for teachers includes self-assessment related to indicators of effective teaching.	
4. Teachers are required to make individual professional development plans based, in part, on classroom observations.	
5. Professional development of individual teachers includes an emphasis on indicators of effective teaching.	
6. Professional development for the whole faculty includes assessment of strengths and areas in need of improvement from classroom observations of indicators of effective teaching.	
7. Teacher evaluation examines the same indicators used in professional development.	
8. The principal plans opportunities for teachers to share their strengths with other teachers.	

	Assessing the Current Situation		Adding the Missing Pieces	
	Yes	No	Primary Responsibility	Target Date for Completion

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