
Basic Instructional Design

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It is not difficult to recognize classrooms that are alive with purposeful activity and exude a feeling that “there’s important work going on here.” Students are engaged in their work. They understand the direction and importance of their activity. The teacher is a facilitator—coaching, questioning, and providing resources for students at opportune times. There is an atmosphere of authenticity that resembles real life. Independence is balanced with interdependence as a means to learning. Some of the time, students learn with others in small groups, some of the time they work independently, and at other times they are part of whole-class activity. Such a classroom does not just happen. It is the result of careful and precise planning by the teacher.

*The difference is in
the details . . .*

Nor is it difficult to recognize classrooms where learning has little direction or focus. Students are off task and lack a sense of purpose. They appear to be disinterested and bored with activities that hold little challenge. They neither understand the purpose of their work nor believe in its importance. Though the teacher may have good intentions, he or she has not created the foundation necessary for effective learning. There is little evidence of careful and precise planning for instruction.

A critical difference between these classrooms is the underlying plan that details what students will learn and how they will learn it. A well-functioning classroom is based on a well-designed plan. According to Costa and Garmston (1994, p. 90), “Planning may well include the most important decisions teachers make because it is the phase upon which all other decisions rest.” Good planning sets the stage for good teaching, which in turn fosters optimal learning. Teachers who know how to plan know precisely what they want to accomplish—or more exactly, what they want their students to accomplish. Poor planning results in no one, including the teacher, having a clear understanding of what is to be accomplished. Effective instruction starts with an organized instructional plan.

FROM HERE TO INTUITIVE TEACHING

Some teachers appear to be intuitive. They facilitate student learning with ease and agility. They are confident, insightful, and expert. They not only know the standards that constitute accomplished teaching but also are able to translate the standards into effective instruction. Becoming an exceptional teacher is a learning process that some believe never ends. The teacher is in a continual state of learning, building, and refining teaching practices. A theoretical model of the complex nature of exceptional teaching is shown in Figure 1.1. The outermost layer represents expert teaching actions and behaviors. It is where ease and competence are exhibited—where actions appear to be intuitive. It is easy to observe the effortless actions of teaching in the intuitive layer, but there is much more than meets the eye. Other layers, hidden from view, are powerful determiners of the outer layer.

Teaching expertise develops through the interaction of metacognition, reflection, practice, and experience.

At the core of the model in Figure 1.1 is the teacher's mental schema for teaching. It is an amalgam of all the information, concepts, skills, processes, attitudes, values, and beliefs the teacher holds regarding teaching. The second layer shows the interaction of metacognition, reflection, practice, and experience. This interaction impacts and changes the schema. The third layer is automaticity. *Automaticity* is behavior that develops through a multitude of repetitions; knowing how to do something and then engaging in repetitive practice. Such behaviors may be mental or physical (Samuels, 1994). Driving a car is an example of automaticity. The inexperienced driver consciously refers to mental notes regarding the physical act of turning the steering wheel and coordinating this with gas pedal pressure, all while visually judging distance to

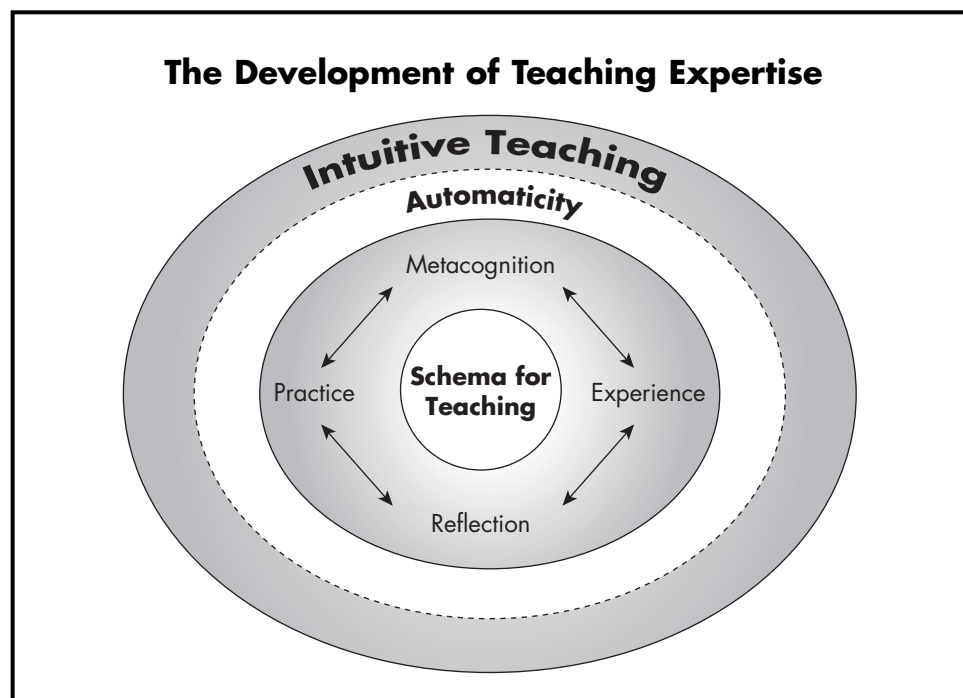


Figure 1.1 The Development of Teaching Expertise

remain in the appropriate lane and not impact the vehicle directly ahead. The experienced driver, on the other hand, turns the vehicle with effortless ease—with no apparent conscious thought given to the task. Driving the car has become automatic. In much the same manner, teaching becomes automatic.

The outermost layer of the illustration is intuitive teaching—the quick, effortless, competent action observed in exceptional teachers. Exceptional teachers combine automaticity and metacognition. They constantly assess the teaching-learning process, know when it is going well, know when to change something, and have a vast repertoire of automatic responses that may be brought into play. Developing this outer layer is a complex process that happens over time and is unique to each teacher.

Now, imagine the two-dimensional image in Figure 1.1 as a three-dimensional sphere made of clear plastic. Imagine the layers within the sphere separated by permeable membranes through which thoughts, ideas, learning, attitudes, beliefs, skills, and knowledge flow freely. Imagine that only the outermost layer of the sphere is observable to others. Those who observe the sphere see only the expert in action. Those who understand the complexity of teaching understand the knowledge, skills, processes, and multitude of experiences that shape the outermost layer.

EXPERIENCE AND PRACTICE

Experience is the heart of know-how, as in the expression: “He has real know-how.” Know-how does not just happen. It develops through experience and exposure to new ideas, methods, and strategies. It develops as the teacher thinks and reflects on the meaning of the experiences and fits new information into his or her pattern of knowledge. “Professional knowledge is seen as coming both from sources outside the teacher and from the teachers’ own interpretations of their everyday experiences” (Sparks-Langer & Colton, 1991, p. 37). Obviously, without exposure to new ideas and ways of doing things, teachers will continue for better or worse with their present practices.

The opportunity to learn new things is critical if teachers are to grow professionally. Professional development programs are one source of knowledge input. But not all things “learned” through professional development will be retained or used. Knowledge must be transferred and applied in real teaching situations. According to Bellanca (1995), effective professional development experiences are consistent with constructivist theory:

Constructivist theoreticians view learning transfer as the most complex and important element in the learning process. Without transfer either by hugging (an immediate connection within the curriculum) or bridging (a wider connection across the curriculum or into life), learning is incomplete. Thus, transfer cannot be an instructional afterthought or something that just “happens.” It must be a consciously planned result of taking something (a skill, idea, concept, value, etc.) and moving it somewhere (across a lesson, unit, course, job, etc.) by means of a carefully selected somehow. (p. 18)

*Effective teachers
plan precisely and
comprehensively.*

Effective teachers plan precisely and comprehensively. They have a clear picture of what they wish to accomplish and how they will go about doing it. They practice the elements of planning and teaching over and over, eventually reaching a point at which the elements and actions are internalized, allowing greater ease of use. But practice alone does not ensure improvement. New learning combined with metacognition and reflection contributes to effective practice.

When teachers plan instruction, they engage in a complex mental process. In the beginning, the process is conscious and deliberate. The novice teacher applies a great deal of thought to planning instruction. Every component, every step of the instructional plan is thought through and written out in detail. The teacher visualizes the enactment of the plan, makes changes, refines, and completes the plan. The experienced teacher, on the other hand, who has used the instructional design components in planning and teaching, has a well-developed schema for instructional planning. He or she plans easily and efficiently and no longer needs to attend to every precise detail. This teacher has reached a level of “knowing” the answers to a myriad of questions and decisions that accompany instructional planning. Deliberate thought is replaced by automatic action (Sparks-Langer & Colton, 1991). Instructional planning has reached a level of automaticity that resembles intuition. However, when questioned regarding the purposes, standards, connections, and approaches used, the accomplished teacher is able to fully explain the various lesson elements.

So, is there such a thing as intuitive teaching? Yes—and no. No if the definition of *intuitive* is instinctive. Yes, in terms of the development of automatic and metacognitive processes. Intuitive teachers are expert planners who understand instructional planning and know how to design instruction. “Intuition” develops through automaticity as teachers use prior knowledge, engage in precision planning, put plans into action, and reflect on the outcome of their instruction.

PROFESSIONAL TEACHING STANDARDS

Danielson’s *Enhancing Professional Practice: A Framework for Teaching* (1996) describes 22 components of teaching divided into four major domains: planning and preparation, classroom environment, instruction, and professional responsibilities. According to Danielson, this framework provides a road map for novice teachers and guidance for experienced teachers. Further, it may be used as a structure for focusing improvement efforts through professional conversation. *And* it communicates to the general public the competencies inherent in teaching.

As one delves into the planning and preparation components in the first domain of Danielson’s framework, the multifaceted nature of instructional planning becomes more apparent (Figure 1.2). We can see that the teacher’s knowledge and understanding of content (a necessary prerequisite) is by itself not sufficient for effective teaching. Likewise the knowledge and understanding

of students is not in itself sufficient for effective teaching. Other components—learning objectives, material resources, instructional strategies, and assessment—are woven into an organized and coherent plan of instruction. Like pieces of a puzzle, all components are necessary to achieve the complete picture.

Like Danielson's domains of teaching, professional standards define teaching for a wide range of audiences within and outside the education profession. Standards document what effective teachers should know and be able to do and provide a common language within which to discuss professional teaching. As important as instructional planning is, it would be a mistake to assume that it is the only component necessary to good teaching. An analysis of what constitutes effective teaching shows the complex interaction of many components. Teaching is far from a simple process. Professional teaching standards describe the important components of effective teaching and direct teachers' efforts toward the

kind of teaching that makes a difference in the classroom (Darling-Hammond, 1997). It matters greatly that teachers know and apply the professional standards. Standards of the Interstate New Teacher Assessment and Support Consortium (INTASC) and the National Board for Professional Teaching Standards are contained in the Resources section at the end of this book.

Components of Professional Practice

Domain 1: Planning and Preparation

Demonstrating knowledge of content and pedagogy

- Knowledge of content
- Knowledge of prerequisite relationships
- Knowledge of content-related pedagogy

Demonstrating knowledge of students

- Knowledge of characteristics of age-group
- Knowledge of students' varied approaches to learning
- Knowledge of students' skills and knowledge
- Knowledge of students' interests and cultural heritage

Selecting instructional goals

- Value
- Clarity
- Suitability for diverse students
- Balance

Demonstrating knowledge of resources

- Resources for teaching
- Resources for students

Designing coherent instruction

- Learning activities
- Instructional materials and resources
- Instructional groups
- Lesson and unit structure

Assessing student learning

- Congruence with instructional goals
- Criteria and standards
- Use for planning

SOURCE: From Danielson, C. (1996). *Enhancing Professional Practice: A Framework for Teaching*. Alexandria, VA: ASCD. Used with permission.

Figure 1.2 Components of Professional Practice

DESIGNING POWERFUL LESSONS

The word *design* functions as a verb and a noun. As a verb, *design* is a process that means to draw, plan, or outline. As a noun, *design* is a product, a plan, an

arrangement of details. Likewise, *instructional design* is both a process and a product. The teacher “draws” the instructional plan by first determining what learning standards will be taught and then deciding how the standards will be assessed—in other words, (a) what will students learn and (b) what will be the evidence of their learning? Once these decisions are made, the teacher determines appropriate teaching strategies and methods, selects resource and learning materials, and finally, reviews and fine-tunes the entire plan. Instructional design is not a linear process. During the planning phase, decisions are continually adjusted and modified as new ideas and insights present themselves. The final plan reflects the needs and interests of the students for whom it is developed and is a unique reflection of the teacher’s style and expertise. The lesson design overview is shown in Figure 1.3.

PLANNING A BASIC LESSON

A basic lesson is one that focuses on a single standard or performance descriptor. It may be a whole-class or small-group lesson. The three major components (or sections—see Figure 1.10) in planning a basic lesson are (1) Desired Results—Standards and Performance Descriptors; (2) Assessment—Evidence of Learning; and (3) Lesson Design. A detailed explanation of each section follows:

Desired Results—Learning Standards and Performance Descriptors

Just as professional teaching standards define teaching practices, learning standards define what students should know and be able to do. Over 50 years ago, Ralph Tyler (1949, p. 45) wrote, “The purpose of a statement of objectives is to indicate the kinds of changes in the student to be brought about so that the instructional activities can be planned and developed in a way likely to attain these objectives; that is, to bring about these changes in students.” Tyler’s description of learning objectives remains useful in planning instruction based on what students should know and be able to do. Today’s terminology of *standards*, *benchmarks*, and *performance descriptors* may differ from Tyler’s terms of *goals* and *objectives*, but his fundamental ideas still hold true. Today all states have developed content learning standards that are meant to give direction in planning instruction and provide the basis for student assessment. An example of a learning standard and its associated performance descriptor for each content area is shown in Figure 1.4. A complete list of learning standards may be found on each state’s official Web site. Further information on student learning standards of professional organizations is listed in the Resources section at the end of this book.

The process of instructional design begins with the learning standards or performance descriptors.

The process of instructional design begins with learning standards or performance descriptors. It is this desired end result that drives the planning process and provides the focus and direction for the lesson activities. A clear, precise statement of what students are expected to know and do is the starting point for lesson design (Skowron, 2000). It is important to know that there is a clear distinction and an obvious connection between a learning standard and

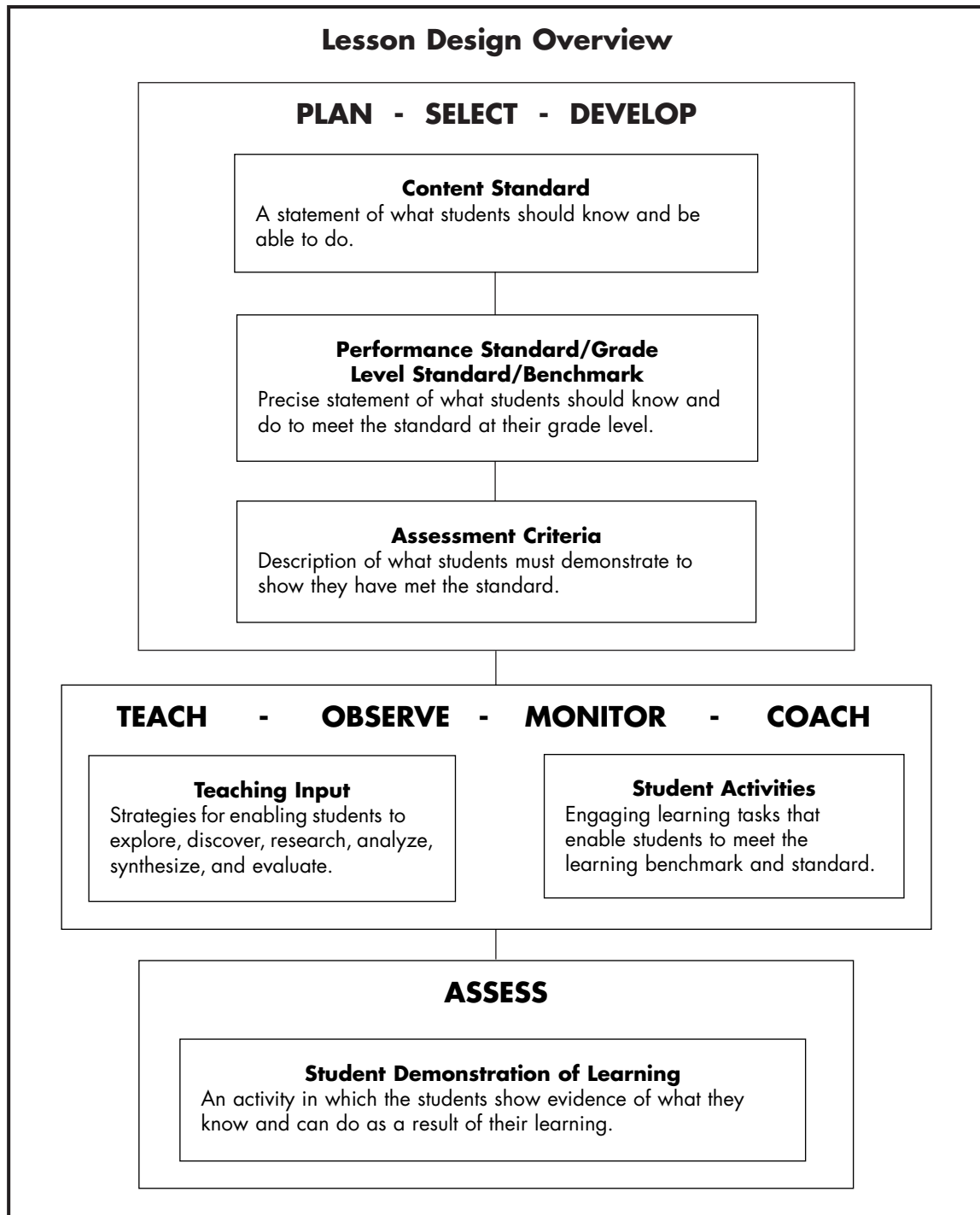


Figure 1.3 Lesson Design Overview

an instructional activity. The *learning standard* clearly states what students should know and do. The *instructional activity* is the vehicle to helping students achieve the standard. It is this desired end result that drives the planning process and provides the focus and direction for the lesson. Wiggins and McTighe (1998) tell us to begin with the end in mind—think first about the desired results.

Content Standards and Performance Descriptors: Examples		
Content Area	Learning Standard	Performance Descriptor
Language Arts	Apply reading strategies to improve understanding and fluency.	Identify text structure (description, comparison, cause/effect, sequence) of informational text.
Mathematics	Solve problems using comparison of quantities, ratios, proportions, and percentages.	Create and explain ratios and proportions that represent quantitative relationships.
Social Studies	Understand the development of economic systems.	Describe the impact of trade on the development of early civilizations.
Science	Know and apply concepts that describe how living things interact with each other and with their environment.	Identify survival characteristics of organisms.
Fine Arts	Apply skills and knowledge necessary to create and perform in one or more of the arts.	Sing or play an instrument with expression and accuracy music representing diverse cultures or styles.
Physical Development	Know and apply the principles and components of health-related fitness.	Describe the benefits of maintaining a health-enhancing level of fitness. Participate in physical activity for the purpose of sustaining or improving one's level of fitness.
Foreign Language	Understand oral communication in the target language.	Follow instructions in the target language, given one step at a time, for a wide range of activities.

Figure 1.4 Content Standards and Performance Descriptors: Examples

Assessment—Evidence of Learning

Assessment, or evaluation, is a part of the teaching and learning process. As an evaluative tool, assessment provides information on how well students are progressing toward meeting the standards. As an instructional tool, assessment provides information on student strengths and weaknesses and is used to plan further instruction.

The purpose of assessment is to determine what students have learned in relation to the learning standards. Clear, focused standard statements are targets that lead the way to precise and accurate assessments (Stiggins, Arter, Chappuis, & Chappuis, 2004). For example, if students are expected to write an informational essay that is organized and coherent, then the essay is assessed for organization and coherence. If students are expected to apply correct

spelling and grammar in their writing, then their written work is assessed for their ability to apply these conventions. If recall and recognition of information are expected, a multiple-choice or short-answer test would suffice. The link between the standard and assessment should be obvious and understandable. When this is the case, there is no need for additional “test prep.” The learning activities themselves are the preparation—and in some cases, may even be the assessment.

Student Evaluation Standards

Assessment must be ethical and concerned for students’ well-being. Policies and procedures for assessment should be available to staff, students, parents, and the community. Assessments should be purposeful and useful and provide data that will enhance student learning. The assessments should be practical and nondisruptive by providing information in an efficient manner. And assessments must be accurate; that is, the assessment data should provide sound information that can be analyzed and lead to valid conclusions. Accurate assessments are reliable and valid instruments; they are useful in acquiring data for evaluative and instructional purposes. A reliable assessment yields consistent results. It is free of measurement errors that would distort students’ scores. A valid assessment accurately measures what we want it to measure (Popham, 2005). The assessment measures what was taught.

Assessment data should provide sound information that can be analyzed and lead to valid conclusions.

The Student Evaluation Standards: How to Improve Evaluations of Students, developed by the Joint Committee on Standards for Educational Evaluation (2003), categorizes student evaluation standards into four areas:

1. Propriety standards which relate to individual rights and ethical use
2. Utility standards which define use and purpose
3. Feasibility standards which describe practical use
4. Accuracy standards which ensure the use of sound information to produce justifiable conclusions

A summary of *Student Evaluation Standards* is contained in the Resources section at the end of this book.

Types of Assessment

In the broadest sense, assessments may be classified as selected response or performance based. *Selected response assessments* include the pencil-and-paper “traditional” forms of testing (i.e., true-false, multiple choice, short answer). These assessments are useful in determining the student’s content knowledge related to facts, information, and processes. *Performance-based assessments* are those that allow students to demonstrate what they can do with the learning they have acquired, such as writing an essay, conducting research, preparing a report, presenting a demonstration, singing, playing a musical instrument, and performing a physical activity. Student performance is assessed with a rubric that accurately and precisely describes the criteria for that performance.

Monitoring Student Progress

Monitoring students as they engage in a learning task is an informal type of assessment and a crucial aspect of teaching. It is important for students to receive feedback on their progress throughout the learning activity. At times encouragement or positive affirmation is all that is needed. At other times clarification or instructional guidance is necessary to prevent misunderstandings. When confused, some students ask for help, but others do not. And still others do not even know they are confused. Monitoring all students is important to obtain diagnostic feedback and determine when intervention through reteaching or additional practice is necessary.

Marzano (2003) endorses the need for effective feedback that is timely and content related. Students benefit when provided with specific comments on what they need to adjust, add, or delete throughout the learning process. Merely indicating right or wrong answers does little to help students improve (Stronge, 2002).

There are several ways to monitor students, ranging from observation in the classroom setting to performance tests and quizzes. Questions that help guide the monitoring process are as follows:

- Does the student exhibit confusion?
- Is the student off task?
- Has the student finished too soon or not soon enough?
- Does the student understand the directions?
- Is there some prior knowledge or prerequisite information the student needs?
- Does the student's response indicate understanding?

It is important for students to receive feedback on their progress throughout the learning activity.

An observation checklist is a tool to monitor student progress during a learning activity. The checklist contains key criteria against which the students are observed (Burke, 2005). The teacher notes the student's performance related to the criteria and indicates whether or not the student meets the criteria. A sample checklist for informational reading at the elementary level appears in Figure 1.5. The checklist helps the teacher determine which students have common difficulties. These students may then be grouped for reteaching, reinforcement, or practice activities.

Another form of student monitoring is through direct questioning on what is being learned. Questioning may be through a verbal exchange between teacher and student or in written form through quizzes, summaries, or reflections. The type of monitoring a teacher chooses to do depends on the demands of the learning situation and the level of complexity and difficulty of the learning standards. Generally, more complex learning is better monitored through direct questioning and observation of performance. Literal learning is more easily monitored through written quizzes and tests.

OBSERVATION CHECKLIST Using Reading Strategies With Nonfiction Text					
• Formulates predictions					
• Verifies predictions					
• Formulates questions					
• Visualizes text					
• Understands descriptions					
• Identifies sequence and order					
• Compares and contrasts ideas or concepts					
• Identifies cause-effect relationships					
• States opinions and reasons					
• Explains problems and solutions					
• Uses inferential thinking					
• Connects sources of information					
• Self-monitors					
1 = basic (does not perform without assistance) 2 = developing (performs with some support) 3 = proficient (performs independently)					

Figure 1.5 Observation Checklist: Using Reading Strategies With Nonfiction Text

Uses of Assessment

Students want to know how they will be assessed and evaluated. Parents also want to know what their student is learning and how he or she is progressing. Assessment tools such as rubrics and checklists help students and parents understand what is to be learned by pointing out criteria and performance levels (Burke, 2005). When students and parents know the criteria and expectations, student performance often improves.

Assessment in and of itself does not lead to improvement. The real value in assessment data is realized when it is analyzed to determine student strengths and weaknesses and plan further instruction (Gandal & McGiffert, 2003).

Alignment of learning standards, instructional activities, and assessment ensures that students are assessed on what is taught.

Lesson Design

When statements of what is to be learned and how we will measure that learning are in place, instructional activities are planned. *Instructional activities* are what the teacher does to teach the learning standard. The *lesson plan* is a specific and concise outline of what is intended to occur in the lesson. Since assessment is aligned to a learning standard, classroom instruction likewise must be aligned to that standard. Alignment of learning standards, instructional activities, and assessment ensures that students are assessed on what is taught. The components of the lesson plan are described below.

Opening

The opening of the lesson sets the stage for what is to follow. The anticipation that is created motivates students and piques their interest (Hunter, 1984). An effective opening activates students' schemata by tapping into their prior knowledge and making connections to new learning. Calling to mind what is already known is critical for learning. Jensen (2000) says that the more associations and connections one makes, the more firmly new information is "woven in neurologically." There is greater depth of meaning when new information is connected to existing knowledge. The lesson opening, therefore, should be structured to help students recall what they already know, understand the relevance of what they will learn, and be aware of what they will know and be able to do as a result of the learning activity. In other words, students should consciously connect new learning to previous learning. The teacher facilitates this process through effective opening activities.

Teaching Strategies/Activities (Input)

Teaching strategies are selected based on the type of content to be taught and the needs and abilities of the students. *Teaching strategies* are what the teacher does to develop background and set the stage for the learning activities students will engage in. Strategies may include demonstrating, modeling, explaining, and questioning. The input provided at this point gives students enough information to proceed confidently with the learning tasks. It does not preclude exploration and discovery on their part.

Student Activities

To learn, a student engages in some activity. The teacher selects or develops an instructional activity that "fits" the learning standard and the students' needs and abilities. An instructional activity is always related to the learning standard—it is not an end in itself. A learning activity may be as simple as reading a text passage, or it may be a more complex activity such as gathering data from multiple sources for problem solving. Today, an abundance of instructional activities is offered in teaching manuals, professional journals, books, newsletters, software, and on the Internet. Far more activities are available than can possibly be used by any given teacher or student. The teacher must be selective.

Effective learning activities enable students to reach specified standards. Several aspects of learning must be considered as learning activities are

developed. This is not as simple as it may sound. Whether or not students are interested in an activity has an impact on their motivation to complete the activity, which affects their attention to the task and how much learning they will retain (Cummings, 1980). Therefore learning activities should be appealing and interesting to students. Activities should also be at an appropriate level of challenge to maintain interest—neither too easy nor too difficult. Knowing the range of students' abilities helps in planning activities that have an appropriate level of challenge. Activities should also be efficient, not overly complicated, and take only the amount of time necessary for learning to occur.

Types of Student Learning Activities. Student learning may be categorized according to the type of thinking it involves. Some learning is *literal*; it involves understanding and remembering information, facts, or steps in a process. It includes relatively simple activities for acquiring basic information and facts.

In *relational learning*, students connect or unite information or concepts from one or more sources including their own background knowledge and prior understandings. The thinking process involves associations between new learning and previously learned material.

Transformational learning involves students in transcribing and applying what they know in a different way. Transformational thinking becomes more complex and involves converting new learning through known applications.

Extensional learning activities ask students to take their learning and extend it using literal, relational, and transformational strategies to create, produce, originate, evaluate, and in other ways exhibit their learning in a unique way. Examples of types of learning activities are shown in Figure 1.6.

The categorization of learning into literal, relational, transformational, and extensional domains allows teachers to use the wording of state learning standards as they plan lessons. The categories are not totally isolated, separate entities; there is a degree of overlap. Strictly defined, separate categories of learning activities are probably not possible, but understanding general categories of learning helps to focus the planning of activities in relation to the learning standards. An important caveat to this categorization of learning activities is that all students should participate in all types of learning. It would be a drastic mistake to treat these categories as a hierarchy in which students begin with literal learning, staying there until the teacher decides mastery is obtained and then moving on to the next category. Linear use of learning categories is neither indicated nor effective. It is contrary to theory and research, which suggests an overlap and integration of the various types of thinking (Good & Brophy, 1997). It is not possible to totally isolate levels of thinking into separate compartments; they are interrelated and iterative (Ellis & Fouts, 1997).

Describing Learning Activities. The wording of the learning standard is a guide to the teacher in developing learning activities. The wording of the learning activity guides the students in the learning task. Therefore, a critical part of instructional planning is the description, explanation, or directions for a learning activity. The wording of the description is carefully chosen to convey

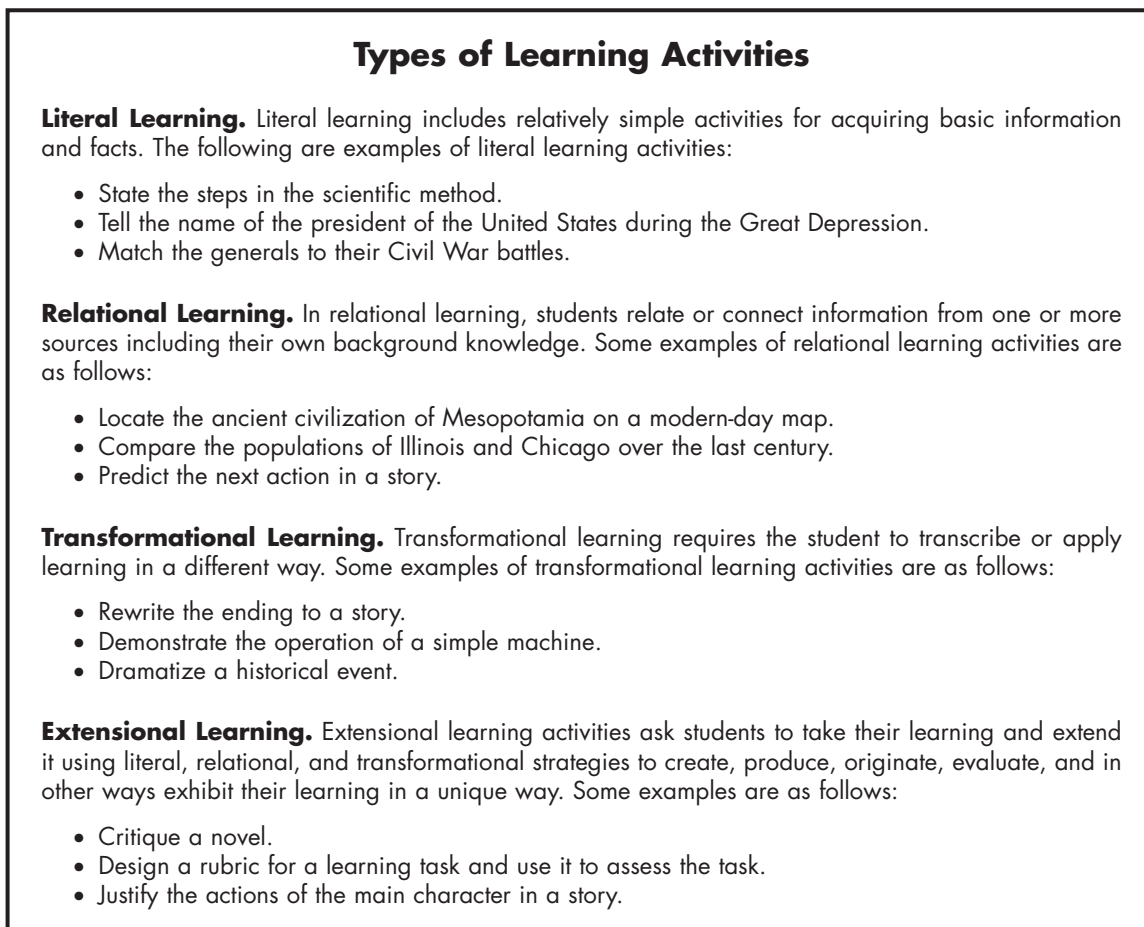


Figure 1.6 Types of Learning Activities

precisely what students are to accomplish. Selecting appropriate terminology for the learning activity is necessary to design coherent and organized instruction. If the students are asked only to *list* events in chronological order, it is not fair to expect that they will *analyze* those events. If *analysis* behavior is expected, the terminology that conveys this expectation must be used. The key word in the description of an instructional activity is the linchpin and, therefore, must be carefully chosen. The key word is a verb that indicates the action of the student in the learning process. For example: “*Compare* the educational systems of the United States and Canada.” A list of suggested terms (verbs) for learning activities is contained in Figure 1.7. Teachers may find it helpful to refer to this list in describing instructional activities.

Student engagement is a high-priority consideration in instructional design.

Engaged Learning. How students learn is just as important as what they learn. Student engagement is a high-priority consideration in instructional design. Danielson (1996, p. 95) states, “Engaging students in learning is the *raison d’être* of education. All other components are in the service of student engagement.” But engaged learning activities are not selected merely for their hands-on quality and potential for enjoyment. The purpose of engagement is to heighten students’ interest and motivation as they learn important concepts,

Designing Learning Activities: Terms to Use

Use the following terms to design instructional activities that correspond to the learning standard.

Literal Learning

Count	Identify	Outline
Define	Label	Quote
Find	List	Recall
	Match	Tell
	Name	

Relational Learning

Compare	Discuss	Predict
Conclude	Explain	Report
Contrast	Generalize	Restate
Demonstrate	Interpret	Review
Describe	Locate	Sequence
Differentiate	Measure	Show
	Paraphrase	Summarize

Transformational Learning

Analyze	Debate	Research
Apply	Deduce	Rewrite
Change	Demonstrate	Select
Characterize	Diagram	Separate
Choose	Distinguish	Use
Collect	Dramatize	
Compute	Examine	

Extensional Learning

Appraise	Criticize	Judge	Prioritize
Assess	Decide	Justify	Produce
Choose	Design	Make up	Propose
Compose	Develop	Originate	Prove
Conclude	Evaluate	Perform	Rank
Construct	Integrate	Plan	Rate
Create	Invent	Pretend	

Figure 1.7 Designing Learning Activities: Terms to Use

skills, and processes. Students are engaged when they are involved in planning, setting goals for their learning, choosing activities, and even developing assessments. Engagement provides the conditions in which concepts are made meaningful.

Humans organize ideas, concepts, beliefs, attitudes, opinions, and emotions in complex mental networks call "schema."

Brain-Compatible Activities. Recent research into how the brain learns provides a rich source of information for teachers as they plan instruction. Humans organize ideas, concepts, beliefs, attitudes, opinions, and emotions in complex mental networks called "schema." *Schemata* are the building blocks of cognition (Rumelhart, 1982). When new ideas and concepts are connected to existing schemata, they become part of it (Sousa, 2005). Effective teaching therefore helps students connect new concepts to their existing prior knowledge. Students must activate the appropriate schema that fits the particular learning context (Vacca, 2002). Blachowicz and Ogle (2001) explain the importance of connecting one's prior knowledge during reading as an ongoing process that not only facilitates comprehension but is necessary for it.

Teachers frame instruction around brain-compatible learning to maximize learning. Robin Fogarty (1997) tells us that brain-compatible classrooms differ from others in three major ways. First, brain-compatible learning is integrated, not isolated. Second, threat and anxiety are diminished, allowing students to function at high levels. And third, learning involves real or simulated "whole" experiences that tap into many ways of thinking, expressing, and doing.

Teachers use many effective brain-based strategies to deepen students' understanding. The engaged learning activities in Figure 1.8 are adapted from the work of Eric Jensen (2000). These activities involve students and provide opportunities for them to do something with information and concepts they are learning. The common elements of all these activities are applying, transforming, and extending concepts and information through communicating and creating. These activities engage students in learning by allowing them to *do* something, to *use* concepts, ideas, strategies, and processes. This use and manipulation of material is the vehicle to deepen understanding by weaving it into existing knowledge.

Closing/Summary/Reflection

When one connects new learning to prior knowledge, one's mental map of information, concepts, skills, processes, attitudes, values, and beliefs related to a topic is expanded. This mental map is the schema or linked collection of related thoughts and ideas and is the operating base within which new information is integrated. The schema is expanded and understanding deepened through metacognitive processing and reflection. Seifert (1999) states that reflection is the partner of experience. Reflection and experience lead us to construct meaning. It is therefore important that students have opportunities for metacognitive processing throughout, and especially at the conclusion of, a learning experience. Notebook journals, audio journals, and sketch pads are some means for students to reflect and record the impact of their learning and thinking.

Engaged Learning Activities

- 1. Graphic Organizers**

Use graphic organizers to create mind maps for students, thereby strengthening learning and subsequent recall of material. When the graphic organizers are personalized to match the needs and backgrounds of the students, they become even more powerful. A slightly different twist is to use pictures or drawings instead of words to create a mind map.
- 2. Creative Retelling**

Weave content information into a story using known genres such as fables, tall tales, songs, and myths. In this manner, the information is transformed into a different setting.
- 3. Peer Presenting**

Use an “each one, teach one” model, or in some manner allow students to teach each other. Explaining strengthens understanding.
- 4. Model Making**

Create models (two- or three-dimensional) to produce a concrete representation of an abstract concept.
- 5. Performance**

Transform information or a concept into a performance using drama, music, or dance. Write about the solution to a math problem or create a poem about a science concept.
- 6. Role Playing**

Provide simulated experiences by having some students assume the role of historical or fictional characters while other students take on the role of reporter in an interview activity.
- 7. Debate, Discuss, Debrief**

Provide opportunities for students to explain their thinking in a nonthreatening environment. Communication is the key for deepening understanding.
- 8. Game Making**

Use a known game genre into which the new concepts and material are incorporated.
- 9. Presentations**

Provide opportunities for students to use technology or visual aids or to process information and transform it for others.

SOURCE: Jensen, E. (2000). *Brain-Based Learning*. San Diego, CA: The Brain Store.

Figure 1.8 Engaged Learning Activities

Materials/Resources

The variety of instructional materials available is extensive and at times overwhelming. Learning resources and materials must, of course, be appropriate to the needs and interests of the students. Sometimes the only materials needed are a pencil and paper (or word processor). Other times, more extensive resources are needed for exploration and research. Generally the teacher selects learning resources for young learners. But as students take more responsibility for their learning, they begin to search out information and learning resources

on their own. Guidance and support at this stage helps students become independent learners and users of the vast number of resources at their disposal.

Although the practice is not as prevalent today as in the past, some schools use a commercial textbook program as the required curriculum. When this is the case, state or district learning standards are used as a filter in selecting what is important to teach from the textbook. A comparison of learning standards and textbook objectives points out instructional priorities and enables the teacher to eliminate some textbook material. This standards-driven approach makes the curriculum more manageable.

Technology-related materials can support and enhance student learning. However, as with all materials, those that are technology based should be carefully chosen. Technology to support teaching the learning standards is the foremost consideration. Some technology-based applications can include the following:

- Explore a concept using videos, computer software programs, or Web sites.
- Present a concept or idea using videos or presentation software such as PowerPoint.
- Analyze and sort data and information using database programs.
- Create artistic products using graphic and sound design.

Other resources for learning extend beyond the classroom into the community. Partnerships with governmental agencies, local businesses, and professional organizations can be a source of extended learning opportunities for students. Joining resources helps build greater understanding of the relationship between schooling and real-world applications.

Practice and Follow-up Activities

Not all students progress at the same pace. Monitoring and observing students during the lesson will indicate which students need more instruction or practice. For these students, it is appropriate to provide additional activities to reinforce learning. Practice activities should be interesting, well designed, and assigned only as necessary. Teachers find it helpful to keep a file of related worksheets and activities for these occasions.

Assessment

Assessment of student learning typically occurs at the conclusion of the lesson. The assessment provides feedback to the student and the teacher and gives direction for future lesson planning.

Performance Expectations

Performance expectations describe how well students are expected to do on the assessment. Expectations are often in the form of a grading scale. The

decision as to cutoff points for grades or “passing” is made before the assessment is given and is made known to all students.

Timing the Lesson

The amount of time necessary for a lesson is an important planning consideration. The teacher must allocate a reasonable amount of time for students to learn new concepts and balance this with the amount of total time in the school year (or semester) available to teach the required curriculum. It may be enjoyable to spend three weeks on a dinosaur unit, but in terms of how much time is required for the entire curriculum, it may not be reasonable. It is important to know the curriculum and determine how much time is to be allocated to each segment.

The amount of time available in a class period is also considered as the lesson is developed. The school calendar and the daily schedule will impact how much time is available for each lesson. The nature of the lesson itself is another consideration in determining the amount of time allotted. Concepts that involve analysis or synthesis may require a longer time period or extend over several class periods. Less complex learning that involves presentation of factual information may not require as much time.

It is important to allocate a reasonable amount of time for a lesson, but it is equally important to maintain flexibility. If a lesson ends with 10 minutes to spare, it is good practice to have a follow-up activity in place that can be tapped into. Likewise, if a lesson requires more than the allotted time, adjustments in the daily or weekly schedule will be required. A summary of the lesson plan components is shown in Figure 1.9.

USING THE BASIC INSTRUCTIONAL DESIGN PLANNING GUIDE

An effective basic lesson is developed when the teacher understands the components of the lesson planning process and carefully thinks through each of the components: standards and performance descriptors, assessment, and the lesson itself, which includes teaching strategies and student activities. The Basic Instructional Design Planning Guide (Figure 1.10) is a tool to assist teachers in thinking through all the components of an effective lesson. It comprises three sections: Section 1: Desired Results—Standards and Performance Descriptors; Section 2: Assessment—Evidence of Learning; and Section 3: Lesson Design. Each of these three sections includes three columns: “Planning Questions and Decisions,” “Information and Data Sources,” and “Notes and Comments.” The Planning Questions and Decisions column poses a series of key questions to guide and stimulate thinking during the planning process. The Information and Data Sources column lists the types of resources and data sources that will facilitate answering the questions in column one. The Notes and Comments column provides information that will further clarify and assist in answering questions in column one.

Summary of Components of an Effective Lesson Plan

- Statement of what is to be taught (standards/performance descriptors)
- Introduction or opening of the lesson
The introduction sets the stage and motivates students to engage in the lesson activity.
- Teaching strategies
The teacher models, explains, demonstrates, or otherwise presents what students are to learn.
- Student activities
Students engage in learning new concepts or reinforcing what the teacher has presented.
- Closing/summary/reflection
The conclusion of the lesson provides opportunities for students to reflect on their learning and/or summarize what they have accomplished.
- Materials/resources
Materials are available that assist students in practicing the concepts presented in the lesson.
- Practice and follow-up assignments
Additional activities are assigned as needed.
- Assessment
Students are assessed in relation to the learning standard.
- Performance expectations
Expectations for performance on the assessment are clearly defined and communicated.
- Timing
Sufficient time is allocated to the learning activity.

Figure 1.9 Summary of Components of an Effective Lesson Plan

Below are suggestions for using the planning guide:

1. Read the planning guide in its entirety.

It is good practice to become thoroughly familiar with the planning guide before using it. Doing so saves time in the long run. Get the “big picture” in mind before filling in the details.

2. Think it through.

Begin with Section 1: Desired Results—Standards and Performance Descriptors. Think about the questions in column one of the planning guide and write down your thoughts and ideas. Consult the data and information sources suggested in column two. Think about your current teaching assignment and the data and information you have available as well as what you may need to obtain. The Notes and Comments column provides further information to consider. Continue through Section 2: Assessment—Evidence of Learning

and Section 3: Lesson Design. The result of your thinking provides the foundation for a well-designed, effective lesson. An example of the thinking process of a middle school science teacher is shown in Figure 1.11. A Basic Instructional Design Preliminary Planning reproducible (pp. 31–32) is provided to record your thinking.

3. Synthesize the information.

The thinking process described above provides a great deal of information which now must be synthesized into a coherent plan for instruction. The lesson plan specifies the instructional process that will occur in the classroom. An example of a lesson plan for a Grade 7 science class is shown in Figure 1.12. An example of a lesson plan for Grade 1 reading is shown in Figure 1.13. A reproducible master is included for lesson planning.

Preservice and novice teachers will find it helpful to follow all the steps in the guide. When teachers become very familiar with the planning guide, they are able to take shortcuts in planning by using the lesson plan form without filling out the planning guide. This shortcut is possible when the planning questions are practiced and well known. Understanding the thinking process involved in planning a basic lesson makes subsequent planning easier and provides a foundation for planning more complex instruction.

REFLECTIVE PRACTICE: INNER DIALOGUE

Merely following an outline or filling in a template is not sufficient to develop skill in instructional design. Planning is a metacognitive, reflective process in which the teacher thinks, reflects, adjusts, and fine-tunes the various components until a coherent plan emerges. When reflection is an intrinsic part of the instructional design process and teachers take time to analyze their planning efforts, they learn through their experiences, and future planning becomes more effective and efficient.

What Costa (1991) called “inner dialogue” is essential to professional growth, change, and improvement. Reflection is important to the planning process. Planning is a skill, and it becomes stronger with experience and practice. As with all learning, reflection deepens understanding. The Inner Dialogue page in Figure 1.14 is provided for reflections on the planning process, including pros and cons, benefits, and challenges.

BASIC INSTRUCTIONAL DESIGN PLANNING GUIDE

SECTION 1: Desired Results—Standards and Performance Descriptors		
Lessons are grounded on standards and performance descriptors. Use these questions to plan a basic lesson.		
Planning Questions and Decisions	Information and Data Sources	Notes and Comments
<p>1. What do students need to learn? What is the specific learning standard/performance descriptor to be taught?</p>	<p>District curriculum guides, district and state standards documents</p> <p>Student needs as determined by test data (formal and informal), school improvement goals, district goals</p>	<p>What students need to learn is the first critical question a teacher considers in planning. A decision regarding what is to be taught is made before selecting or designing learning activities.</p> <p>A clear statement of what students are to do provides clarity and focus in planning.</p>

Figure 1.10 Basic Instructional Design Planning Guide

SECTION 2: Assessment—Evidence of Learning		
Assessment of students must be aligned to what students should know and be able to do as defined in the learning standards and performance descriptors. Use these questions as a thinking guide to plan assessment procedures.		
Planning Questions and Decisions	Information and Data Sources	Notes and Comments
1. How will students demonstrate what they have learned?	See curriculum resource information and best practices information related to types of assessment: criterion-referenced assessment, standardized assessment, performance assessment, and in-class observation.	Assessments must be valid and reliable indicators of students' performance.
2. What assessment materials are available and what materials need to be developed?	Assessment items are often part of textbook materials. District or school assessments may be available and in some cases required.	Select an assessment strategy that is aligned to what is being taught. Commercially prepared assessments have often been field tested for reliability. Be sure the test relates directly to the learning standard and performance descriptor. Teacher-made tests can be tricky to develop. Whenever possible, try out a teacher-made assessment (perhaps with another class) before using it to evaluate students.
3. How will the assessment be evaluated or scored?	Scoring keys are efficient for limited-response items. Electronic scoring may be more efficient if appropriate. Rubrics for written responses may be available in district curriculum guides, teacher manuals, and other sources.	Consistency is important in assessment. Students should be assessed in a like manner unless there is a valid, documented reason for not doing so.
4. How will assessment results be reported?	Grading scales, report cards, or portfolios may be required. If feasible, electronic data may also be useful.	In addition to assessment, consider instructional feedback to students based on assessment results.
5. What further practice and follow-up assessment can be provided for students who fall below expectations?	Additional commercially developed or teacher-prepared activities may be used for further practice. Alternative test forms may be used for retesting.	It is efficient to have a file of alternative practice activities and test forms available when needed. Consider creating or selecting these as the lesson is developed.
6. How will the assessment results be used?	Be aware of district policies and handbooks that describe the use of assessment results.	Use assessment results to determine student strengths and weaknesses and plan the next lessons.

Figure 1.10 (Continued)

SECTION 3: Lesson Design		
Learning activities and teaching strategies are based on what students need to learn and how they will be assessed. Use these questions as a thinking guide to plan a basic lesson.		
Planning Questions and Decisions	Information and Data Sources	Notes and Comments
1. What is the specific learning standard or performance descriptor addressed in the lesson?	See Section 1 of this planning guide.	Maintain focus on the specific standard and performance descriptor in developing all aspects of the lesson plan.
2. What is a motivating opening for the lesson?	Curriculum guides, teaching manuals, professional literature, best practices information, etc., are sources of information for lesson development.	Consider use of electronic resources and other technological materials. Use the Lesson Plan template to consolidate, summarize, and sequence the lesson information.
3. What teaching strategies will be effective?		
4. What learning activities will students engage in?		
5. What opportunities will students have to reflect on their learning?		
6. What materials and resources are needed to support and enhance learning?		
7. How will student progress be monitored?		
8. What forms of follow-up practice may be used?		
9. How long will the lesson take?		
10. Are there any foreseeable pitfalls in this lesson?		
11. What alternatives are there if the lesson doesn't work out?		

Figure 1.10 (Continued)

BASIC INSTRUCTIONAL DESIGN PLANNING GUIDE: EXAMPLE FROM GRADE 7 SCIENCE

SECTION 1: Desired Results—Standards and Performance Descriptors

Lessons are grounded on standards and performance descriptors. Use these questions to plan a basic lesson.

**1. What do students need to learn? What is the specific learning standard/
performance descriptor to be taught?**

Students will distinguish between mixtures that are solutions and those that are not.

This performance descriptor is part of the district curriculum in understanding solutions. It aligns to the state and the National Science Teachers Association (NSTA) standards.

Figure 1.11 Basic Instructional Design Planning Guide: Example From Grade 7 Science

SECTION 2: Assessment—Evidence of Learning			
1. How will students demonstrate their learning?	Science log entry of experiment—steps and conclusions	Selected-response test (20 items including multiple choice and short answer)	Present oral report of experiment and conclusions to class. This is an ongoing activity. A few students will do an oral presentation for each major unit of study.
2. What assessment materials are available and what materials need to be developed?	Use standard format provided by the Science Department.	Textbook	Develop description of the oral presentation to go along with the rubric.
3. How will the assessment be scored?	Rubric provided by the Science Department	Answer key (20 items, 5 points each) Use Scantron for scoring.	Generic presentation rubric
4. How will the assessment be reported?	Copy of rubric showing performance level will be returned to students. Teacher comments will be included as appropriate. Provide time for student conferences if requested by student or for students who need additional personal feedback.	Grades will be determined according to the schoolwide grading scale. Go over test items with students.	Copy of rubric showing performance level will be returned to students. Teacher comments will be included as appropriate.
5. What further practice and follow-up assessment can be provided for students who fall below expectations?	Return science log to student with feedback on what is needed to meet expectations. Students make revisions as necessary (before scheduling oral presentation).	Select alternative activities in teacher's manual for reinforcement of content. (Unit 3, pages 101–109)	A follow-up assessment is not available.
6. How will the assessment results be used?	Determine which students need additional practice. Include results in quarterly report card grade.	Determine which students need reinforcement of content information. Students make corrections as necessary—no extra credit. Include results in quarterly report card grade.	The rubric will provide feedback to the student. A total of 20 points will be included in the student's final report card grade.

Figure 1.11 (Continued)

SECTION 3: Lesson Design

1. What is the specific learning standard or performance descriptor addressed in the lesson?

Students will distinguish between mixtures that are solutions and those that are not.

2. What is a motivating opening for the lesson?

Set up as a problem-solving activity related to a real-life application: forensic scientist working with a detective to solve a criminal case. Show two containers of liquid and ask how they would identify the one that has water and the one that contains another substance. Ask students why such identification is necessary or important. Record responses for later review.

3. What teaching strategies will be effective?

Possibilities include the following: Review and develop background information through discussion, reading, research, and questioning the teacher. Use KWL strategy. Invite a chemist from local industry to talk with students about real-life applications. Conduct demonstration or experiment. Use lab record/report activity.

4. In what learning activities will students engage?

Students will conduct a lab experiment in groups of three.

Students will record the experiment procedure and outcomes in their personal lab books.

Whole-class discussion of findings and outcomes.

5. What materials are needed for this lesson?

Safety goggles, lab aprons, graduated cylinders, clear plastic glasses or beakers, stirring rods, six prepared mixtures (water/milk, water/sugar, water/oil, water/rubbing alcohol, water/drink mix, sand/salt).

For Tyndall effect: Flashlight, cardboard, metric ruler, pencil.

Also, students may keep notes on word-processing program. The computer probe equipment is also a possibility—perhaps as a demonstration.

6. What opportunities will students have to reflect on their learning?

At the conclusion of the lesson, students will write on three new things they learned as a result of the lesson and how these three things have application to their everyday life. (This could be part of the assessment.)

7. How will student progress be monitored?

During lab work, the teacher will observe students and check for proper use of equipment and following directions. Spot checks of lab book entries will be made.

8. What forms of additional practice may be necessary?

Students who miss this session or need further input may review textbook diagrams and explanations of the Tyndall effect and solutions. A video disc segment on solutions may be viewed. Or, they could partner with another student to review science log entries.

9. How long will the lesson take?

Two class periods will be scheduled for this lesson. I may have to provide additional time to get all presentations in—or I could have just a few groups present. Other groups could present for other lessons.

10. Are there any foreseeable pitfalls in this lesson?

Students must perform the experiment carefully to obtain the desired results. Students will need teacher supervision and direction in carrying out the experiment to ensure safety and proper use of lab equipment. Extra mixtures will be available in case of spills.

11. What alternatives are there if the lesson doesn't work out?

A demonstration will be used if the student activity doesn't work out as planned. Students will observe and record their findings in their science logs.

Figure 1.11 (Continued)

Lesson Plan—Grade 7 Science		
Learning Standard (concepts, skills, processes)		
Students will differentiate between mixtures that are solutions and those that are not.		
Lesson Design	Materials	Student Grouping Arrangement
<ul style="list-style-type: none"> • Opening (outcomes/purpose/expectations) Describe problem scenario: A forensic scientist is working with a detective to solve a criminal case. Show two beakers. Ask: How can the scientist tell which beaker contains water and which contains a mixture of salt and water? Discuss responses. Record responses for later review. Ask: Why is it important to be able to identify substances? 	Beakers/mixtures Chart paper, markers	Whole class
<ul style="list-style-type: none"> • Teaching Strategies/Activities (demonstration, modeling, explanation, directions, etc.) Describe lab setup and activity. (Refer to lab activity manual) Review lab safety. Distribute/review experiment procedure. 		
<ul style="list-style-type: none"> • Student Activities Complete lab activity. Record findings in lab manual. 	Safety glasses, lab aprons, graduated cylinders, clear beakers, stirring rods, six prepared mixtures, testing substances as listed in activity manual	Three students per group (prearranged by teacher) Lab manual entries—individual
<ul style="list-style-type: none"> • Closing (connections/summary/reflection) Groups 1, 2, and 3 to report findings. Compare results. Verbalize conclusions. Review opening activity discussion. Discuss what was learned in the lab activity. Record two or more important concepts from this experiment in lab manual. 		Whole class Lab manual entry—individual
<p>Practice Activities/Assignments</p> <p>View video disc segment on this experiment and record results in lab manual.</p>		Individual or small group, depending on who is absent. Arrange with resource center for viewing and completion of work.
<p>Assessment of Student Learning</p> <ol style="list-style-type: none"> 1. In small groups, students will use the rubric to evaluate their lab manual entries. 2. 20-item completion test on content. 		

Figure 1.12 Lesson Plan—Grade 7 Science