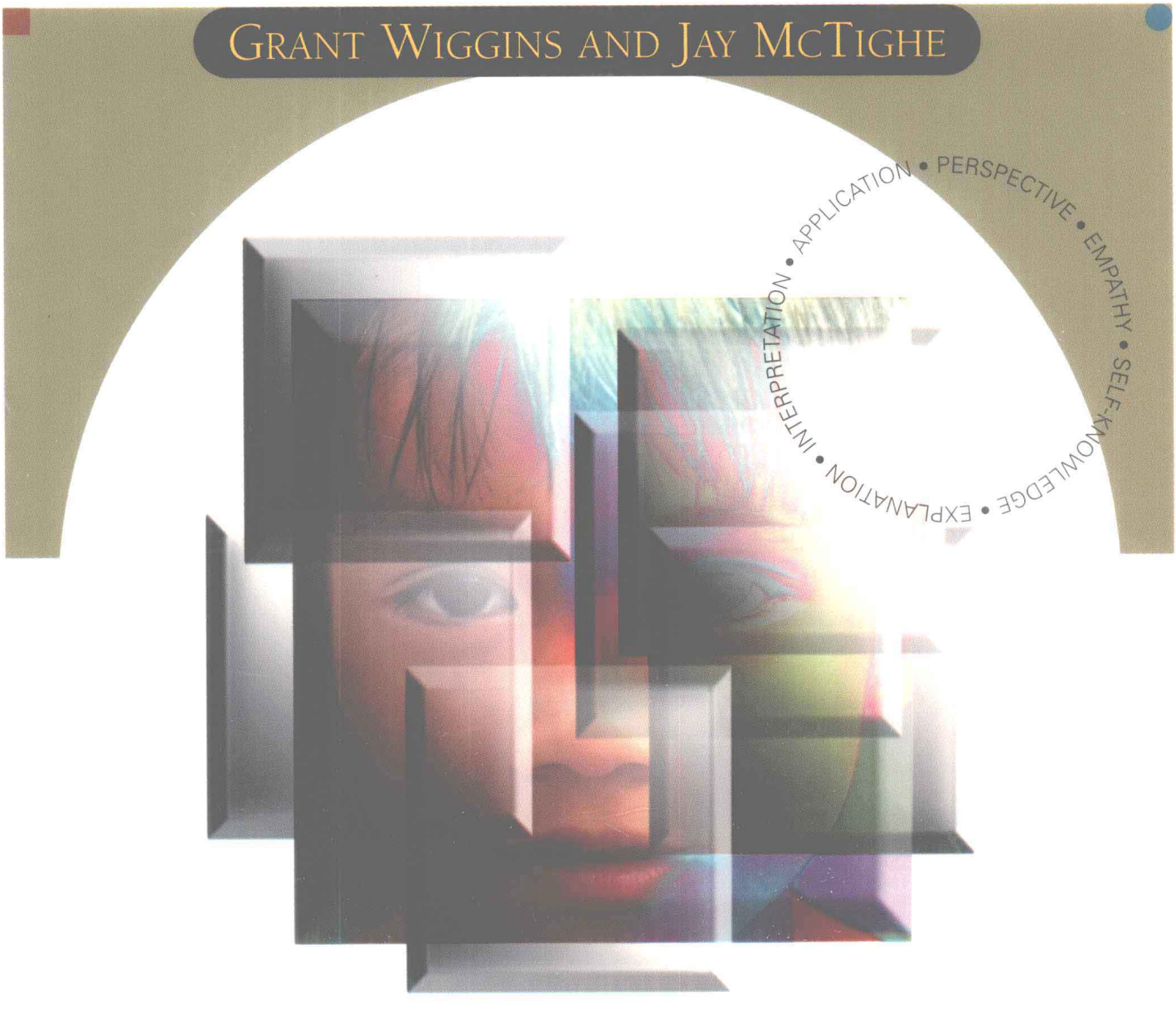
# UNDERSTANDING *by* DESIGN

GRANT WIGGINS AND JAY MCTIGHE



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# FOREWORD

TROUBLED BY THE INADEQUACY OF MULTIPLE-CHOICE tests, educators began in the 1980s to look for better ways to assess student learning. Now, after a decade of thoughtful experimentation with tasks, rubrics, exhibitions, and portfolios, our profession has reached a milestone. In numerous districts and schools, educators now feel comfortable developing, administering, and scoring performance tasks. And—because there is no point teaching to an ambitious standard if your assessment misses the mark—today's emphasis on standards is moving performance assessment from a trendy innovation to an accepted element of good teaching and learning.

Grant Wiggins and Jay McTighe have played starring roles in the growth and maturation of performance assessment. As a respected speaker and consultant, Grant Wiggins has brought vision, conviction, and intellectual rigor to communities struggling with the effort to make schooling more authentic. Jay McTighe, who has also consulted with educators throughout North America, is especially known for his enterprising leadership of the Maryland Assessment Consortium, a statewide collaboration that began in 1991 to support educators working on standards-based education. Separately and together, Wiggins and McTighe refined processes for designing and scoring tasks, insisting on quality work not only from students and teachers but from themselves as well. And, though they focused on assessment, they were always concerned with the

full range of teaching and learning. Educators who looked to them for guidance often began by asking about assessment but were soon deeply engaged with curriculum and instruction.

Which brings us to this book, and the milestone it represents. Beginning with a quest for alternatives to prevailing modes of assessment, the performance movement has put performance itself at stage center. It no longer makes sense, if it ever did, to call test scores "performance." Performance is doing something that is valued in the world outside schools. In a way, then, for our evaluations to be valid, we must assess performance. So what is new here? What kinds of performance have we been assessing all along, and what have we been trying to assess with conventional tests?

The milestone I am talking about is the simple but compelling insight that is the foundation for this book: Performance assessment is especially useful for assessing two types of learnings. One is very familiar. If you want to know whether students can give a persuasive speech, shoot a free throw, sing a tune, solve a quadratic equation, or perform a laboratory procedure, ask them to do it. If the performance is valued for its own sake and the curriculum is intended to help students learn it, assess the performance as directly as possible. That is one kind of performance assessment, and teachers have been using it for generations.

This book, though, focuses on a different use for performance assessment, which is less obvious but very powerful. From years of experience developing, testing, and critiquing assessment tasks, the authors have concluded that performance is the key to assessing understanding. This kind of performance is tricky, though. Yes, we certainly want students to understand, but exactly what is understanding? And how can we be sure that a particular performance reveals it?

Wiggins and McTighe offer us a framework for teacher planning quite different from the one we know all too well. Designing lessons for understanding begins with what we want students to be able to do and proceeds to the evidence we will accept that they have learned it. Only then does it turn to how they will learn it. Along the way we must be clear about what we want students to understand, and what we mean by understanding.

These are matters at the heart of our profession, but they are very demanding, so much so that we would rather avoid them. Luckily, Wiggins and McTighe not only raise tough issues—they help us think them through. They offer filters for each stage of the design process and criteria for essential questions. They propose six facets of understanding and show what each facet suggests about assessment. Finally, they consider the implications for organization of the curriculum and for instruction. Strong, solid stuff.

A milestone does not necessarily mark the end of the journey. Education has a long way to go before the ideas explained here become standard practice. But with this book, we are on our way, and an exhilarating journey it promises to be.

—Ron Brandt

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Finally, we thank our wives and children for their support. Many, many hours of late-night, early-morning, and weekend work went into the development of the ideas and the book—hours that should have been spent playing catch, timing laps, and cleaning closets. We trust that they . . . understand.

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# INTRODUCTION

CONSIDER THE FOLLOWING FOUR VIGNETTES AND WHAT they suggest about understanding and the design of curriculum and assessments. Two are true. Two are fictionalized accounts of familiar practice.

## Vignette 1

As part of a workshop on "understanding," a veteran high school English teacher entered the following reflection in a learning log about her own experience as a high school student:

> I felt then that my brain was a way station for material going in one ear and (after the test) out the other. I could memorize very easily and so became valedictorian, but I was embarrassed even then that I understood much less than some other students who cared less about grades.

## Vignette 2

For two weeks every fall, all the 3rd grade classes participate in a unit on apples. The students engage in a variety of activities related to the topic. In language arts, they read *Johnny Appleseed* and view an illustrated filmstrip of the story. They each write a creative story involving an apple and then illustrate their stories using tempera paints. In art, students collect leaves from nearby crab apple trees

and make a giant leaf print collage on the hallway bulletin board adjacent to the 3rd grade classrooms. The music teacher teaches the children songs about apples. In science, they use their senses to carefully observe and describe the characteristics of different types of apples. During mathematics, the teacher demonstrates how to "scale up" an applesauce recipe to make a quantity sufficient for all the 3rd graders.

A highlight of the unit is the field trip to a local apple orchard, where students watch cider being made and go on a hayride. The culminating unit activity is the 3rd grade apple fest, a celebration for which parent volunteers dress as apples and the children rotate through various activities at stations—making applesauce, competing in an apple "word search" contest, bobbing for apples, completing a math skill sheet containing word problems involving apples, and so on. The fest concludes with selected students reading their apple stories while the entire group enjoys candy apples prepared by the cafeteria staff.

## Vignette 3

A test item on a national mathematics assessment presented the following question to 8th grade students:

"How many buses does the army need to transport 1,128 soldiers if each bus holds 36 soldiers?"

Almost one-third of the 8th graders answered the question, "31 remainder 12" (Schoenfeld, 1988, p. 84).

## Vignette 4

It is late April and the panic is beginning to set in. A quick calculation reveals to the world history teacher that he will not finish the textbook unless he covers an average of 40 pages per day until the end of school. He decides, with some regret, to eliminate a mini-unit on the Caribbean and several time-consuming activities, such as a mock United Nations debate and vote, and discussions of current international events in relation to the world history topics students have studied. To prepare his students for the departmental final exam, the teacher will need to switch into a fast-forward lecture mode.

* * *

Each of these vignettes reveals some aspect of understanding and design. (By the way, the odd-numbered vignettes are true; the others may as well be, given common practice.)

## A Familiar Truth

The reflection of the high school English teacher reveals a familiar truth—even good students don't always display a deep understanding of what's been taught even though conventional measures (e.g., course grades and cumulative GPA) certify success. In her case, testing focused predominantly on the recall of information from textbooks and class presentations. She reported that she rarely was given assessments that called for her to demonstrate deeper understanding.

The fictionalized apples unit presents a familiar scene—an activity-oriented curriculum—in which

students participate in a variety of hands-on activities. Such units are often engaging for students. The units may be organized, as in this vignette, around a theme and provide interdisciplinary connections. But questions remain. To which ends is the teaching directed? What are the big ideas and important skills to be developed during the unit? Do the students understand what the learning targets are? How often does the *evidence* of learning from the unit (e.g., the leaf print collage, creative writing stories, and completed word searches) reflect worthwhile content standards? What understandings will emerge from all these activities and will endure?

The mathematics test item reveals another aspect of understanding, or lack of it. While the students computed accurately, they had not grasped the meaning of the question or had apparently not understood how to use what they knew to reach an answer of 32 buses. Could it be that these students had mastered the decontextualized drill problems in the math book and on worksheets but had little opportunity to apply mathematics in real-world applications? Should we conclude that the students who answered, "remainder 12," *really* understand division and its use?

Nearly every teacher can empathize with the world history teacher's struggle, given the pressures to cover textbook material. The challenge is exacerbated by the natural increase of knowledge in fields such as science and history, not to mention additions to the curriculum in recent years (e.g., computer studies and drug education). At its worst, a coverage orientation—marching through the chronology of a textbook irrespective of desired results, student needs and interests, or apt assessment evidence—may defeat its own aims. For what do students remember, much less understand, when surface coverage is valued over uncovering? Such an approach could be labeled "teach, test, and hope for the best."

## What the Book Is About

This book is about understanding and its various facets. We think that understanding is not a single concept but a family of interrelated abilities—six different facets—and an education for understanding develops them all. This book is also about design—the design of curriculums to engage students in exploring and deepening their understanding of important ideas *and* the design of assessments to reveal the extent of their understandings. In this book, we explore a number of related ideas:

- Explore common curriculum, assessment, and instruction practices that may interfere with the cultivation of student understanding.
- Examine a *backward design* process and consider its value in helping to avoid common inadequacies in curriculum and assessment planning.
- Present a theory of the six facets of understanding and explore its theoretical *and* practical implications for curriculum, assessment, and teaching.
- Propose an approach to curriculum and instruction designed to engage students in inquiry, promote "uncoverage," and make the understanding of big ideas more likely.
- Examine a continuum of methods for appropriately assessing the degree of student understanding.
- Consider the role that predictable student misunderstandings should play in the design of curriculums, assessment, and instruction.

- Offer a template to assist in designing curriculums and assessments that focus on student understanding.
- Propose a set of design standards for achieving quality control in curriculum and assessment designs.

This book is intended for educators interested in enhancing student understanding and in designing more effective curriculums and assessments to promote understanding. The audience includes teachers at all levels (elementary through university), subject-matter and assessment specialists, curriculum directors, pre- and in-service trainers, and school-based and central office administrators and supervisors.

## Terminology

A few words about terminology are in order. Educators involved in reform work know that the words *curriculum* and *assessment* have almost as many meanings as there are people using the terms. In this book, *curriculum* refers to a specific blueprint for learning that is derived from content and performance standards. Curriculum takes content and shapes it into a plan for effective teaching and learning. Thus, curriculum is more than a general framework, contrary to many state and district documents on curriculum; it is a specific plan with identified lessons in an appropriate form and sequence for directing teaching.

The etymology of the word *curriculum* suggests this meaning: A curriculum is a particular "course to be run," given a desired endpoint. A curriculum is more than a syllabus, therefore: Beyond mapping out the topics and materials, it specifies the activities, assignments, and assessments to be used in achieving its goals. The best curriculums, in other words, are written from the learner's point of view and the desired achievements. They specify what the learner will do, not just what the teacher will do.

By *assessment* we mean the act of determining the extent to which the curricular goals are being and have been achieved. Assessment is an umbrella term we use to mean the deliberate use of many methods to gather evidence to indicate that students are meeting standards. When we speak of evidence of understanding, we are referring to information gathered through a variety of formal and informal assessments during a unit of study or a course. We are not alluding only to end-of-teaching tests or culminating performance tasks. Rather, the collected evidence we seek may well include observations and dialogues, traditional quizzes and tests, and performance tasks and projects, as well as students' self-assessments gathered over time. In fact, a central premise of our argument is that understanding can be developed and evoked only through multiple methods of assessment.[1]

By *achievement target* we mean what has often been termed "intended outcomes" or "performance standards." All three terms refer to the desired impact of teaching and learning—what a student should be able to do and what standard should be used to signify understanding. Achievement target properly suggests that we keep aiming for a result using curriculum and instruction. Note that content standards are different from performance standards. Content standards specify the inputs—What is the content that should be covered? Performance standards specify the desired output—What must the student do, and how well, to be deemed successful?

Many district and state documents unhelpfully blur this distinction.

The word *understanding* naturally deserves clarification and elaboration, but that work is the challenge for the rest of the book. Understanding turns out to be a complex and confusing target even though we aim for it all the time. In this book, we use "understand" to mean that a student has something more than just textbook knowledge and skill—that a student really "gets it." Understanding, then, involves sophisticated insights and abilities, reflected in varied performances and contexts. We also suggest that different kinds of understandings exist, that knowledge and skill do not automatically lead to understanding, that misunderstanding is a bigger problem than we realize, and that assessment of understanding therefore requires evidence that cannot be gained from traditional testing alone.

## What the Book Is Not About

*Understanding by Design* is not a prescriptive program. Rather than offering a step-by-step guide, the book provides a conceptual framework, design process and template, and an accompanying set of design standards. We offer no specific curriculum but rather a way to design or redesign any curriculum to make student understanding more likely.

*Understanding by Design*, therefore, should not be seen as competing with other programs or approaches. In fact, its theory of understanding and the backward design process are compatible with several prominent educational initiatives, including problem-based learning (Stepien & Gallagher, 1997), Socratic seminar, 4-MAT (McCarthy, 1981), Dimensions of Learning (Marzano & Pickering, 1997), *The Skillful Teacher* (Saphier & Gower, 1997), and the recently published book (Wiske, 1997) and workbook (Blythe & Associates, 1998) from the Project Zero team at the Harvard Graduate School of Education on teaching for understanding.

We are restricting our inquiry into understanding in an important way. While teaching for in-depth understanding is a vital aim of schooling, it is only one of many. We are thus not suggesting here that all teaching be geared at all times toward deep and sophisticated understanding. Clearly, there are circumstances when this depth is neither feasible nor desirable. For example, learning the alphabet, acquiring certain technical skills such as keyboarding, and developing the basics in foreign language do not call for in-depth understanding. In some cases, the developmental level of students will determine how much abstract conceptualization is appropriate. Sometimes familiarity as a goal, rather than depth, is quite sufficient for certain topics.

This book is thus built upon a conditional: *If* educators wish to develop greater in-depth understanding in their students, *then* how should they go about it?

One warning, though. All teachers talk about wanting to get beyond coverage to ensure that students really understand what they learn. Although we talk this way, readers may find that what they thought was effective teaching for understanding really wasn't. In fact, we predict that readers will be somewhat disturbed by how hard it is to specify what understanding looks like and how easily educators can lose sight of understanding even as they try to teach for it.

One further point about our approach. Throughout the book, we offer what we call

"misconception alerts" in which we try to anticipate reader misconceptions about the lines of argument and ideas being proposed. This format has a message: Teaching for understanding must successfully predict such misunderstandings if it is to be effective. Indeed, central to the design approach is the need to design lessons and assessments that anticipate, evoke, and overcome the most likely student misconceptions. We put the alerts in boxes for quick accessibility, and the first one is on this page.

Reader, brace thyself! We are asking you to think differently about time-honored habits and points of view about curriculum, assessment, and instruction. As you will see, teaching for understanding requires rethinking what we thought we knew—whether the "we" involves students or educators. But we believe that you will find much food for thought here as well as many practical tips on how to achieve student understanding by design.

**Endnote**

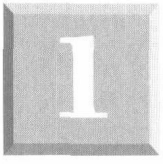
1. A more comprehensive discussion of assessment can be found in Wiggins (1998).

**MISCONCEPTION ALERT**

*Only alternative methods of teaching and assessing can yield understanding.* Nothing could be further from the truth. The challenge is to *expand* a teaching repertoire to make sure that a greater diversity of appropriate methods of instruction are used than are found in most classrooms. (See Chapters 6, 7, and 10.)

*Our approach is against traditional testing.* Not so. Here, too, we seek to expand the normal repertoire to make sure that more appropriate diversity is found in classroom assessment. The challenge is to know which method to use when, and why. (See Chapters 1 and 5.)

*Our approach is against letter grades.* Also not true. By and large, letter grades are here to stay, and nothing in this book is incompatible with grades, transcripts, and college admission requirements. The book should help teachers, especially those at the secondary level, better justify their grading system and provide students with improved feedback about what grades stand for.





# WHAT IS BACKWARD DESIGN?

*To begin with the end in mind*
*means to start with a clear understanding of*
*your destination. It means to know where you're going so*
*that you better understand where you are now so that the steps*
*you take are always in the right direction.*
—STEPHEN R. COVEY
*THE SEVEN HABITS OF HIGHLY EFFECTIVE PEOPLE*

Design—(vb) To have purposes and intentions; to plan and execute
—*OXFORD ENGLISH DICTIONARY*

TEACHERS ARE DESIGNERS. AN ESSENTIAL ACT OF OUR profession is the design of curriculum and learning experiences to meet specified purposes. We are also designers of assessments to diagnose student needs to guide our teaching and to enable us, our students, and others (parents and administrators) to determine whether our goals have been achieved; that is, did the students learn *and* understand the desired knowledge?

Like other design professions, such as architecture, engineering, or graphic arts, designers in education must be mindful of their audiences. Professionals in these fields are strongly client centered. The effectiveness of their designs corresponds to whether they have accomplished their goals for the end users. Clearly, students are our primary clients, given that the effectiveness of curriculum, assessment, and instructional designs is ultimately determined by their achievement of desired learnings.

As with other design professions, standards inform and shape our work. The architect, for example, is guided by building codes, customer budget, and aesthetics. The teacher as designer is similarly constrained. We are not free to teach any topic we choose. Rather, we are guided by national, state, district, or institutional standards that specify what students should know and be able to do. These standards provide a framework to help us identify teaching and learning priorities and guide our

design of curriculum and assessments. In addition to external standards, we also consider the needs of our students when designing learning experiences. For example, student interests, developmental levels, and previous achievements influence our designs.

## Are the Best Curricular Designs "Backward"?

How, then, do these design considerations apply to curriculum planning? We use curriculum as a means to an end. We focus on a particular topic (e.g., racial prejudice), use a particular resource (e.g., *To Kill a Mockingbird*), and choose specific instructional methods (e.g., Socratic seminar to discuss the book and cooperative groups to analyze stereotypical images in films and on television) to cause learning to meet a given standard (e.g., the student will understand the nature of prejudice, and the difference between generalizations and stereotypes).

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

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

Backward design may be thought of as purposeful task analysis: Given a task to be accomplished, how do we get there? Or one might call it planned coaching: What kinds of lessons and practices are needed to master key performances? The approach to curricular design we are advocating is logically forward and commonsensical but backward in terms of conventional habits, whereby teachers typically think in terms of a series of activities (as in the apples unit presented in the Introduction) or how best to cover a topic (as in the world history vignette).

This backward approach to curricular design also departs from another common practice: thinking about assessment as something we do at the end, once teaching is completed. Rather than creating assessments near the conclusion of a unit of study (or relying on the tests provided by textbook publishers, which may not completely or appropriately assess *our* standards), backward design calls for us to operationalize our goals or standards in terms of assessment evidence as we *begin* to plan a unit or course. It reminds us to begin with the question, What would we accept as evidence that students have attained the desired understandings and proficiencies—*before* proceeding to plan teaching and learning experiences? Many teachers who have adopted this design approach report that the