Chapter 1

Backward Design

Design, v.,—To have purposes and intentions; to plan and execute
—Oxford English Dictionary

The complexity of design work is often underestimated. Many people believe they know a good deal about design. What they do not realize is how much more they need to know to do design well, with distinction, refinement, and grace.
—John McClean, "20 Considerations That Help a Project Run Smoothly," 2003

Teachers are designers. An essential act of our profession is the crafting 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 we have achieved our goals.

Like people in 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 explicit goals for specific 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. We can think of our designs, then, as software. Our courseware is designed to make learning more effective, just as computer software is intended to make its users more productive.

As in all the design professions, standards inform and shape our work. The software developer works to maximize user-friendliness and to reduce bugs that impede results. The architect is guided by building codes, customer budget, and neighborhood aesthetics. The teacher as designer is similarly constrained. We are not free to teach any topic we choose by any means. 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

useful framework to help us identify teaching and learning priorities and guide our design of curriculum and assessments. In addition to external standards, we must also factor in the needs of our many and varied students when designing learning experiences. For example, diverse student interests, developmental levels, large classes, and previous achievements must always shape our thinking about the learning activities, assignments, and assessments.

Yet, as the old adage reminds us, in the best designs form follows function. In other words, all the methods and materials we use are shaped by a clear conception of the vision of desired results. That means that we must be able to state with clarity what the student should understand and be able to do as a result of any plan and irrespective of any constraints we face.

You probably know the saying, "If you don't know exactly where you are headed, then any road will get you there." Alas, the point is a serious one in education. We are quick to say what things *we* like to teach, what activities *we* will do, and what kinds of resources *we* will use; but without clarifying the desired results of our teaching, how will we ever know whether our designs are appropriate or arbitrary? How will we distinguish merely interesting learning from *effective* learning? More pointedly, how will we ever meet content standards or arrive at hard-won student understandings unless we think through what those goals imply for the learner's activities and achievements?

Good design, then, is not so much about gaining a few new technical skills as it is about learning to be more thoughtful and specific about our purposes and what they imply.

Why "backward" is best

How do these general design considerations apply to curriculum planning? Deliberate and focused instructional design requires us as teachers and curriculum writers to make an important shift in our thinking about the nature of our job. The shift involves thinking a great deal, first, about the specific learnings sought, and the evidence of such learnings, before thinking about what we, as the teacher, will do or provide in teaching and learning activities. Though considerations about what to teach and how to teach it may dominate our thinking as a matter of habit, the challenge is to focus first on the desired learnings from which appropriate teaching will logically follow.

Our lessons, units, and courses should be logically inferred from the results sought, not derived from the methods, books, and activities with which we are most comfortable. Curriculum should lay out the most effective ways of achieving specific results. It is analogous to travel planning. Our frameworks should provide a set of itineraries deliberately designed to meet cultural goals rather than a purposeless tour of all the major sites in a foreign country. In short, the best designs derive backward from the learnings sought.

The appropriateness of this approach becomes clearer when we consider the educational purpose that is the focus of this book: understanding. We cannot say *how* to teach for understanding or *which* material and activities to use

until we are quite clear about which specific understandings we are after and what such understandings look like in practice. We can best decide, as guides, what "sites" to have our student "tourists" visit and what specific "culture" they should experience in their brief time there only if we are clear about the particular understandings about the culture we want them to take home. Only by having specified the desired results can we focus on the content, methods, and activities most likely to achieve those results.

But many teachers begin with and remain focused on textbooks, favored lessons, and time-honored activities—the inputs—rather than deriving those means from what is implied in the desired results—the output. To put it in an odd way, too many teachers focus on the *teaching* and not the *learning*. They spend most of their time thinking, first, about what they will do, what materials they will use, and what they will ask students to do rather than first considering what the learner will need in order to accomplish the learning goals.

Consider a typical episode of what might be called *content*-focused design instead of *results*-focused design. The teacher might base a lesson on a particular topic (e.g., racial prejudice), select a resource (e.g., *To Kill a Mockingbird*), choose specific instructional methods based on the resource and topic (e.g., Socratic seminar to discuss the book and cooperative groups to analyze stereotypical images in films and on television), and hope thereby to cause learning (and meet a few English/language arts standards). Finally, the teacher might think up a few essay questions and quizzes for assessing student understanding of the book.

This approach is so common that we may well be tempted to reply, What could be wrong with such an approach? The short answer lies in the basic questions of purpose: Why are we asking students to read this particular novel—in other words, what *learnings* will we seek from their having read it? Do the students grasp why and how the purpose should influence their studying? What should students be expected to understand and do upon reading the book, related to our goals beyond the book? Unless we begin our design work with a clear insight into larger purposes—whereby the book is properly thought of as a means to an educational end, not an end unto itself—it is unlikely that all students will *understand* the book (and their performance obligations). Without being self-conscious of the specific understandings about prejudice we seek, and how reading and discussing the book will help develop such insights, the goal is far too vague: The approach is more "by hope" than "by design." Such an approach ends up unwittingly being one that could be described like this: Throw some content and activities against the wall and hope some of it sticks.

Answering the "why?" and "so what?" questions that older students always ask (or want to), and doing so in concrete terms as the focus of curriculum

Design Tip

Consider these questions that arise in the minds of all readers, the answers to which will frame the priorities of coached learning: How should I read the book? What am I looking for? What will we discuss? How should I prepare for those discussions? How do I know if my reading and discussions are effective? Toward what performance goals do this reading and these discussions head, so that I might focus and prioritize my studies and note taking? What big ideas, linked to other readings, are in play here? These are the students' proper questions about the learning, not the teaching, and any good educational design answers them from the start and throughout a course of study with the use of tools and strategies such as graphic organizers and written guidelines.

planning, is thus the essence of understanding by design. What is difficult for many teachers to see (but easier for students to feel!) is that, without such explicit and transparent priorities, many students find day-to-day work confusing and frustrating.

The twin sins of traditional design

More generally, weak educational design involves two kinds of purposelessness, visible throughout the educational world from kindergarten through graduate school, as noted in the Introduction. We call these the "twin sins" of traditional design. The error of activity-oriented design might be called "hands-on without being minds-on"—engaging experiences that lead only accidentally, if at all, to insight or achievement. The activities, though fun and interesting, do not lead anywhere intellectually. As typified by the apples vignette in the Introduction, such activity-oriented curricula lack an explicit focus on important ideas and appropriate evidence of learning, especially in the minds of the learners. They think their job is merely to engage; they are led to think the learning *is* the activity instead of seeing that the learning comes from being asked to consider the *meaning* of the activity.

A second form of aimlessness goes by the name of "coverage," an approach in which students march through a textbook, page by page (or teachers through lecture notes) in a valiant attempt to traverse all the factual material within a prescribed time (as in the world history vignette in the Introduction). Coverage is thus like a whirlwind tour of Europe, perfectly summarized by the old movie title *If It's Tuesday, This Must Be Belgium,* which properly suggests that no overarching goals inform the tour.

As a broad generalization, the activity focus is more typical at the elementary and lower middle school levels, whereas coverage is a prevalent secondary school and college problem. Yet, though the apples and world history classrooms look quite different with lots of physical activity and chatter in the former versus lecturing and quiet note taking in the latter, the design result is the same in both cases: No guiding intellectual purpose or clear priorities frame the learning experience. In neither case can students see and answer such questions as these: What's the point? What's the big idea here? What does this help us understand or be able to do? To what does this relate? Why should we learn this? Hence, the students try to engage and follow as best they can, hoping that meaning will emerge.

MISCONCEPTION ALERT!

Coverage is not the same as *purposeful survey.* Providing students with an overview of a discipline or a field of study is not inherently wrong. The question has to do with the transparency of purpose. *Coverage* is a negative term (whereas *introduction* or *survey* is not) because when content is "covered" the student is led through unending facts, ideas, and readings with little or no sense of the overarching ideas, issues, and learning goals that might inform study. (See Chapter 10 for more on coverage versus uncoverage.)

Students will be unable to give satisfactory responses when the design does not provide them with clear purposes and explicit performance goals highlighted throughout their work. Similarly, teachers with an activity or coverage orientation are less likely to have acceptable answers to the key design questions: What should students understand as a result of the activities or the content covered? What should the experiences or lectures equip them to do? How, then, should the activities or class discussions be shaped and processed to achieve the desired results? What would be evidence that learners are en route to the desired abilities and insights? How, then, should all activities and resources be chosen and used to ensure that the learning goals are met and the most appropriate evidence produced? How, in other words, will students be helped to see *by design* the purpose of the activity or resource and its helpfulness in meeting specific performance goals?

We are advocating the reverse of common practice, then. We ask designers to start with a much more careful statement of the desired results—the priority *learnings*—and to derive the curriculum from the performances called for or implied in the goals. Then, contrary to much common practice, we ask designers to consider the following questions after framing the goals: What would count as evidence of such achievement? What does it look like to meet these goals? What, then, are the implied *performances* that should make up the assessment, toward which all teaching and learning should point? Only after answering these questions can we logically derive the appropriate teaching and learning experiences so that students might perform successfully to meet the standard. The shift, therefore, is away from starting with such questions as "What book will we read?" or "What activities will we do?" or "What will we discuss?" to "What should they walk out the door able to understand, regardless of what activities or texts we use?" and "What is evidence of such ability?" and, therefore, "What texts, activities, and methods will best enable such a result?" In teaching students for understanding, we must grasp the key idea that *we are coaches of their ability to play the "game" of performing with understanding, not tellers of our understanding to them on the sidelines.*

Design Tip

To test the merits of our claims about purposelessness, we encourage you to sidle up to a student in the middle of any class and ask the following questions:

What are you doing?

Why are you being asked to do it?

What will it help you do?

How does it fit with what you have previously done?

How will you show that you have learned it?

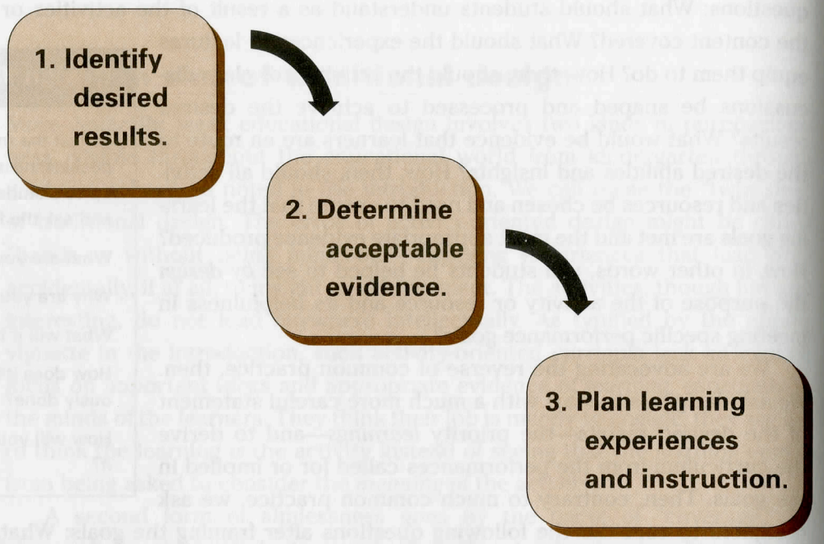
The three stages of backward design

We call this three-stage approach to planning "backward design." Figure 1.1 depicts the three stages in the simplest terms.

Stage 1: Identify desired results

What should students know, understand, and be able to do? What content is worthy of understanding? What *enduring* understandings are desired?

Figure 1.1
UbD: Stages of Backward Design



In Stage 1 we consider our goals, examine established content standards (national, state, district), and review curriculum expectations. Because typically we have more content than we can reasonably address within the available time, we must make choices. This first stage in the design process calls for clarity about priorities.

Stage 2: Determine acceptable evidence

How will we know if students have achieved the desired results? What will we accept as evidence of student understanding and proficiency? The backward design orientation suggests that we think about a unit or course in terms of the collected assessment evidence needed to document and validate that the desired learning has been achieved, not simply as content to be covered or as a series of learning activities. This approach encourages teachers and curriculum planners to first "think like an assessor" before designing specific units and lessons, and thus to consider up front how they will determine if students have attained the desired understandings.

Stage 3: Plan learning experiences and instruction

With clearly identified results and appropriate evidence of understanding in mind, it is now the time to fully think through the most appropriate instructional activities. Several key questions must be considered at this stage of backward design: What enabling knowledge (facts, concepts, principles) and

skills (processes, procedures, strategies) will students need in order to perform effectively and achieve desired results? What activities will equip students with the needed knowledge and skills? What will need to be taught and coached, and how should it best be taught, in light of performance goals? What materials and resources are best suited to accomplish these goals?

Note that the specifics of instructional planning—choices about teaching methods, sequence of lessons, and resource materials—can be successfully completed only after we identify desired results and assessments and consider what they imply. Teaching is a means to an end. Having a clear goal helps to focus our planning and guide purposeful action toward the intended results.

> **MISCONCEPTION ALERT!**
>
> When we speak of evidence of desired results, we are referring to evidence 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 tasks. Rather, the collected evidence we seek may well include traditional quizzes and tests, performance tasks and projects, observations and dialogues, as well as students' self-assessments gathered over time.

Backward design may be thought of, in other words, as purposeful task analysis: Given a worthy task to be accomplished, how do we best get everyone equipped? Or we might think of it as building a wise itinerary, using a map: Given a destination, what's the most effective and efficient route? Or we might think of it as planning for coaching, as suggested earlier: What must learners master if they are to effectively perform? What will count as evidence *on the field,* not merely in drills, that they really get it and are ready to *perform with understanding, knowledge, and skill* on their own? How will the learning be designed so that learners' capacities are developed through use and feedback?

This is all quite logical when you come to understand it, but "backward" from the perspective of much habit and tradition in our field. A major change from common practice occurs as designers must begin to think about assessment *before* deciding what and how they will teach. 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 and goals), backward design calls for us to make our goals or standards specific and concrete, in terms of assessment evidence, as we begin to plan a unit or course.

The logic of backward design applies regardless of the learning goals. For example, when starting from a state content standard, curriculum designers need to determine the appropriate assessment evidence stated or implied in the standard. Likewise, a staff developer should determine what evidence will indicate that the adults have learned the intended knowledge or skill before planning the various workshop activities.

The rubber meets the road with assessment. Three different teachers may all be working toward the same content standards, but if their assessments vary considerably, how are we to know which students have achieved what? Agreement on needed evidence of learning leads to greater curricular coherence and

more reliable evaluation by teachers. Equally important is the long-term gain in teacher, student, and parent insight about what does and does not count as evidence of meeting complex standards.

This view of focusing intently on the desired learning is hardly radical or new. Tyler (1949) described the logic of backward design clearly and succinctly more than 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)*

And in his famous book, *How to Solve It,* originally published in 1945, Polya specifically discusses "thinking backward" as a strategy in problem solving going back to the Greeks:

> *There is a certain psychological difficulty in turning around, in going away from the goal, in working backwards. . . . Yet, it does not take a genius to solve a concrete problem working backwards; anyone can do it with a little common sense. We concentrate on the desired end, we visualize the final position in which we would like to be. From what foregoing position could we get there? (p. 230)*

These remarks are old. What is perhaps new is that we offer herein a helpful process, a template, a set of tools, and design standards to make the plan and resultant student performance more likely to be successful by design than by good fortune. As a 4th grade teacher from Alberta, Canada, put it, "Once I had a way of clearly defining the end in mind, the rest of the unit 'fell into place.'"

The twin sins of activity-based and coverage-based design reflect a failure to think through purpose in this backward-design way. With this in mind, let's revisit the two fictitious vignettes from the Introduction. In the apples vignette, the unit seems to focus on a particular theme (harvest time), through a specific and familiar object (apples). But as the depiction reveals, the unit has no real depth because there is no enduring learning for the students to derive. The work is *hands-on* without being *minds-on,* because students do not need to (and are not really challenged to) extract sophisticated ideas or connections. They don't have to work at understanding; they need only engage in the activity. (Alas, it is common to reward students for mere engagement as opposed to understanding; engagement is necessary, but not sufficient, as an end result.)

Moreover, when you examine the apples unit it becomes clear that it has no overt priorities—the activities appear to be of equal value. The students' role is merely to participate in mostly enjoyable activities, without having to demonstrate that they understand any big ideas at the core of the subject (excuse the pun). All activity-based—as opposed to results-based—teaching shares the weakness of the apples unit: Little in the design asks students to derive

intellectual fruit from the unit (sorry!). One might characterize this activity-oriented approach as "faith in learning by osmosis." Is it likely that individual students will learn a few interesting things about apples? Of course. But, in the absence of a learning plan with clear goals, how likely is it that students will develop shared understandings on which future lessons might build? Not very.

In the world history vignette, the teacher covers vast amounts of content during the last quarter of the year. However, in his harried march to get through a textbook, he apparently does not consider what the students will understand and apply from the material. What kind of intellectual scaffolding is provided to guide students through the important ideas? How are students expected to use those ideas to make meaning of the many facts? What performance goals would help students know how to take notes for maximal effective use by the course's end? Coverage-based instruction amounts to the teacher merely talking, checking off topics, and moving on, irrespective of whether students understand or are confused. This approach might be termed "teaching by mentioning it." Coverage-oriented teaching typically relies on a textbook, allowing it to define the content and sequence of instruction. In contrast, we propose that results-oriented teaching employ the textbook as a resource but not the syllabus.

A backward design template

Having described the backward design process, we now put it together in a useful format—a template for teachers to use in the design of units that focus on understanding.

Many educators have observed that backward design is common sense. Yet when they first start to apply it, they discover that it feels unnatural. Working this way may seem a bit awkward and time-consuming until you get the hang of it. But the effort is worth it—just as the learning curve on good software is worth it. We think of Understanding by Design as software, in fact: a set of tools for making you ultimately more productive. Thus, a practical cornerstone of Understanding by Design is a design template that is meant to reinforce the appropriate habits of mind needed to complete designs for student understanding and to avoid the habits that are at the heart of the twin sins of activity-based and coverage-based design.

Figure 1.2 provides a preliminary look at the UbD Template in the form of a one-page version with key planning questions included in the various fields. This format guides the teacher to the various UbD elements while visually conveying the idea of backward design. Later chapters present a more complete account of the template and each of its fields.

Although this one-page version of the template does not allow for great detail, it has several virtues. First, it provides a *gestalt,* an overall view of backward design, without appearing overwhelming. Second, it enables a quick check of alignment—the extent to which the assessments (Stage 2) and learning activities (Stage 3) align with identified goals (Stage 1). Third, the template

Figure 1.2
1-Page Template with Design Questions for Teachers

Stage 1—Desired Results

Established Goals: (G)
- What relevant goals (e.g., content standards, course or program objectives, learning outcomes) will this design address?

Understandings: (U)
Students will understand that . . .
- What are the big ideas?
- What specific understandings about them are desired?
- What misunderstandings are predictable?

Essential Questions: (Q)
- What provocative questions will foster inquiry, understanding, and transfer of learning?

Students will know . . . (K)
- What key knowledge and skills will students acquire as a result of this unit?
- What should they eventually be able to do as a result of such knowledge and skills?

Students will be able to . . . (S)

Stage 2—Assessment Evidence

Performance Tasks: (T)
- Through what authentic performance tasks will students demonstrate the desired understandings?
- By what criteria will performances of understanding be judged?

Other Evidence: (OE)
- Through what other evidence (e.g., quizzes, tests, academic prompts, observations, homework, journals) will students demonstrate achievement of the desired results?
- How will students reflect upon and self-assess their learning?

Stage 3—Learning Plan

Learning Activities: (L)

What learning experiences and instruction will enable students to achieve the desired results? How will the design
- W = Help the students know **W**here the unit is going and **W**hat is expected? Help the teacher know **W**here the students are coming from (prior knowledge, interests)?
- H = **H**ook all students and **H**old their interest?
- E = **E**quip students, help them **E**xperience the key ideas and **E**xplore the issues?
- R = Provide opportunities to **R**ethink and **R**evise their understandings and work?
- E = Allow students to **E**valuate their work and its implications?
- T = Be **T**ailored (personalized) to the different needs, interests, and abilities of learners?
- O = Be **O**rganized to maximize initial and sustained engagement as well as effective learning?

can be used to review existing units that teachers or districts have developed. Finally, the one-page template provides an initial design frame. We also have a multipage version that allows for more detailed planning, including, for example, a Performance Task Blueprint and a day-by-day calendar for listing and sequencing key learning events. The *Understanding by Design Professional Development Workbook* (McTighe & Wiggins, 2004, pp. 46–51) includes a six-page template that allows for more detailed planning.

We regularly observe that teachers begin to internalize the backward design process as they work with the UbD Template. Stage 1 asks designers to consider what they want students to understand and then to frame those understandings in terms of questions. In completing the top two sections of the Stage 1 portion of the template, users are prompted to identify the Understandings and Essential Questions to establish a larger context into which a particular unit is nested.

Stage 2 prompts the designer to consider a variety of assessment methods for gathering evidence of the desired Understandings. The two-box graphic organizer then provides spaces for specifying the particular assessments to be used during the unit. Designers need to think in terms of collected evidence, not a single test or performance task.

Stage 3 calls for a listing of the major learning activities and lessons. When it is filled in, the designer (and others) should be able to discern what we call the "WHERETO" elements.

The *form* of the template offers a means to succinctly present the design unit; its *function* is to guide the design process. When completed, the template can be used for self-assessment, peer review, and sharing of the completed unit design with others.

To better understand the template's benefits for the teacher-designer, let's take a look at a completed template. Figure 1.3 shows a completed three-page version of the template for a unit on nutrition.

Notice that the template in Figure 1.3 supports backward design thinking by making the longer-term goals far more explicit than is typical in lesson planning, and we can follow those goals through Stages 2 and 3 to ensure that the design is coherent. The focus on big ideas in Stage 1 is transparent, without sacrificing the more discrete elements of knowledge and skill. Finally, by calling for appropriately different types of assessment, the template reminds us that we typically need varied evidence and assessments grounded in performance to show transfer, if understanding is our aim.

Design standards

Accompanying the UbD Template is a set of Design Standards corresponding to each stage of backward design. The standards offer criteria to use during development and for quality control of completed unit designs. Framed as questions, the UbD Design Standards serve curriculum designers in the same

Figure 1.3
3-Page Nutrition Example

Stage 1—Identify Desired Results

Established Goals:

G

Standard 6—Students will understand essential concepts about nutrition and diet.
6a—Students will use an understanding of nutrition to plan appropriate diets for themselves and others.
6c—Students will understand their own individual eating patterns and ways in which those patterns may be improved.

What essential questions will be considered?

Q

- What is healthful eating?
- Are you a heathful eater? How would you know?
- How could a healthy diet for one person be unhealthy for another?
- Why are there so many health problems in the United States caused by poor nutrition despite all the available information?

What understandings are desired?

U

Students will understand that . . .

- A balanced diet contributes to physical and mental health.
- The USDA food pyramid presents relative guidelines for nutrition.
- Dietary requirements vary for individuals based on age, activity level, weight, and overall health.
- Healthful living requires an individual to act on available information about good nutrition even if it means breaking comfortable habits.

What key knowledge and skills will students acquire as a result of this unit?

Students will know . . .

K

- Key terms—protein, fat, calorie, carbohydrate, cholesterol.
- Types of foods in each food group and their nutritional values.
- The USDA food pyramid guidelines.
- Variables influencing nutritional needs.
- General health problems caused by poor nutrition.

Students will be able to . . .

S

- Read and interpret nutrition information on food labels.
- Analyze diets for nutritional value.
- Plan balanced diets for themselves and others.

Figure 1.3 (continued)
3-Page Nutrition Example

Stage 2—Determine Acceptable Evidence

What evidence will show that students understand?

Performance Tasks:

T

You Are What You Eat—Students create an illustrated brochure to teach younger children about the importance of good nutrition for healthful living. They offer younger students ideas for breaking bad eating habits.

Chow Down—Students develop a three-day menu for meals and snacks for an upcoming Outdoor Education camp experience. They write a letter to the camp director to explain why their menu should be selected (by showing that it meets the USDA food pyramid recommendations, yet it is tasty enough for the students). They include at least one modification for a specific dietary condition (diabetic or vegetarian) or religious consideration.

What other evidence needs to be collected in light of Stage 1 Desired Results?

OE

Other Evidence:
(e.g., tests, quizzes, prompts, work samples, observations)

Quiz—The food groups and the USDA food pyramid

Prompt—Describe two health problems that could arise as a result of poor nutrition and explain how these could be avoided.

Skill Check—Interpret nutritional information on food labels.

Student Self-Assessment and Reflection:

SA

1. Self-assess the brochure, *You Are What You Eat.*
2. Self-assess the camp menu, *Chow Down.*
3. Reflect on the extent to which you eat healthfully at the end of unit (compared with the beginning).

Figure 1.3 (continued)
3-Page Nutrition Example

Stage 3—Plan Learning Experiences

What sequence of teaching and learning experiences will equip students to engage with, develop, and demonstrate the desired understandings? Use the following sheet to list the key teaching and learning activities in sequence. Code each entry with the appropriate initials of the WHERETO elements.

L

1. Begin with an entry question (Can the foods you eat cause zits?) to hook students into considering the effects of nutrition on their lives. **H**
2. Introduce the Essential Questions and discuss the culminating unit performance tasks (Chow Down and Eating Action Plan). **W**
3. Note: Key vocabulary terms are introduced as needed by the various learning activities and performance tasks. Students read and discuss relevant selections from the Health textbook to support the learning activities and tasks. As an ongoing activity, students keep a chart of their daily eating and drinking for later review and evaluation. **E**
4. Present concept attainment lesson on the food groups. Then have students practice categorizing pictures of foods accordingly. **E**
5. Introduce the Food Pyramid and identify foods in each group. Students work in groups to develop a poster of the Food Pyramid containing cut-out pictures of foods in each group. Display the posters in the classroom or hallway. **E**
6. Give quiz on the food groups and Food Pyramid (matching format). **E**
7. Review and discuss the nutrition brochure from the USDA. Discussion question: Must everyone follow the same diet to be healthy? **R**
8. Working in cooperative groups, students analyze a hypothetical family's diet (deliberately unbalanced) and make recommendations for improved nutrition. Teacher observes and coaches students as they work. **E-2**
9. Have groups share their diet analyses and discuss as a class. **E, E-2** (Note: Teacher collects and reviews the diet analyses to look for misunderstandings needing instructional attention.)
10. Each student designs an illustrated nutrition brochure to teach younger children about the importance of good nutrition for healthy living and the problems associated with poor eating. This activity is completed outside of class. **E, T**
11. Students exchange brochures with members of their group for a peer assessment based on a criteria list. Allow students to make revisions based on feedback. **R, E-2**
12. Show and discuss the video, "Nutrition and You." Discuss the health problems linked to poor eating. **E**
13. Students listen to, and question, a guest speaker (nutritionist from the local hospital) about health problems caused by poor nutrition. **E**
14. Students respond to written prompt: Describe two health problems that could arise as a result of poor nutrition and explain what changes in eating could help to avoid them. (These are collected and graded by teacher.) **E-2**
15. Teacher models how to read and interpret food label information on nutritional values. Then have students practice using donated boxes, cans, and bottles (empty!). **E**
16. Students work independently to develop the three-day camp menu. Evaluate and give feedback on the camp menu project. Students self- and peer-assess their projects using rubrics. **E-2, T**
17. At the conclusion of the unit, students review their completed daily eating chart and self-assess the healthfulness of their eating. Have they noticed changes? Improvements? Do they notice changes in how they feel and their appearance? **E-2**
18. Students develop a personal "eating action plan" for healthful eating. These are saved and presented at upcoming student-involved parent conferences. **E-2, T**
19. Conclude the unit with student self-evaluation regarding their personal eating habits. Have each student develop a personal action plan for their "healthful eating" goal. **E-2, T**

way that a scoring rubric serves students. When presented to students before they begin their work, the rubric provides them with a performance target by identifying the important qualities toward which they should strive. Similarly, the Design Standards specify the qualities of effective units according to the Understanding by Design framework. Figure 1.4 (p. 28) presents the four UbD Design Standards with accompanying indicators.

The standards contribute to design work in three ways:

- *As a reference point during design*—Teachers can periodically check to see, for example, if the identified understandings are truly big and enduring, or if the assessment evidence is sufficient. Like a rubric, the questions serve as reminders of important design elements to include, such as a focus on Essential Questions.
- *For use in self-assessment and peer reviews of draft designs*—Teachers and peers can use the criteria to examine their draft units to identify needed refinements, such as using the facets to dig deeper into an abstract idea.
- *For quality control of completed designs*—The standards can then be applied by independent reviewers (e.g., curriculum committees) to validate the designs before their distribution to other teachers.

Our profession rarely subjects teacher-designed units and assessments to this level of critical review. Nonetheless, we have found structured peer reviews, guided by design standards, to be enormously beneficial—both to teachers and their designs (Wiggins, 1996, 1997). Participants in peer review sessions regularly comment on the value of sharing and discussing curriculum and assessment designs with colleagues. We believe that such sessions are a powerful approach to professional development, because the conversations focus on the heart of teaching and learning.

We cannot stress enough the importance of using design standards to regularly review curriculum—existing units and courses as well as new ones being developed. It is often difficult for educators, both novice and veteran, to get in the habit of self-assessing their designs against appropriate criteria. A prevailing norm in our profession seems to be, "If I work hard on planning, it must be good." The UbD Design Standards help to break that norm by providing a means for quality control. They help us validate our curriculum's strengths, while revealing aspects that need improvement.

In addition to using the UbD Design Standards for self-assessment, the quality of the curriculum product (unit plan, performance assessment, course design) is invariably enhanced when teachers participate in a structured peer review in which they examine one another's unit designs and share feedback and suggestions for improvement. Such "critical friend" reviews provide feedback to designers, help teachers internalize the qualities of good design, and offer opportunities to see alternate design models. ("Gee, I never thought about beginning a unit with a problem. I think I'll try that in my next unit.")

Figure 1.4
UbD Design Standards

Stage 1—To what extent does the design focus on the big ideas of targeted content?

Consider: Are . . .

- ❍ The targeted understandings enduring, based on transferable, big ideas at the heart of the discipline and in need of uncoverage?
- ❍ The targeted understandings framed by questions that spark meaningful connections, provoke genuine inquiry and deep thought, and encourage transfer?
- ❍ The essential questions provocative, arguable, and likely to generate inquiry around the central ideas (rather than a "pat" answer)?
- ❍ Appropriate goals (e.g., content standards, benchmarks, curriculum objectives) identified?
- ❍ Valid and unit-relevant knowledge and skills identified?

Stage 2—To what extent do the assessments provide fair, valid, reliable, and sufficient measures of the desired results?

Consider: Are . . .

- ❍ Students asked to exhibit their understanding through authentic performance tasks?
- ❍ Appropriate criterion-based scoring tools used to evaluate student products and performances?
- ❍ Various appropriate assessment formats used to provide additional evidence of learning?
- ❍ The assessments used as feedback for students and teachers, as well as for evaluation?
- ❍ Students encouraged to self-assess?

Stage 3—To what extent is the learning plan effective and engaging?

Consider: Will the students . . .

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

Consider: Is the learning plan . . .

- ❍ Tailored and flexible to address the interests and learning styles of all students?
- ❍ Organized and sequenced to maximize engagement and effectiveness?

Overall Design—To what extent is the entire unit coherent, with the elements of all three stages aligned?

Design tools

In addition to the design standards, we have developed and refined a comprehensive set of design tools to support teachers and curriculum developers. This is hard work! We have found that an array of scaffolds—prompts, organizers, idea sheets, and examples—help educators produce higher-quality designs. A full set of these resources is available in the *UbD Professional Development Workbook*.

We think that a good template serves as an intelligent tool. It provides more than a place to write in ideas. It focuses and guides the designer's thinking throughout the design process to make high-quality work more likely. In practice, curriculum designers work from a copy of the template, supported by specific design tools and numerous filled-in examples of good unit designs. In this way, we practice what we preach with students; models and design standards are provided up front to focus designer performance from the start.[1]

But why do we refer to the template, design standards, and corresponding design tools as "intelligent"? Just as a physical tool (e.g., a telescope, an automobile, or a hearing aid) extends human capabilities, an intelligent tool enhances performance on cognitive tasks, such as the design of learning units. For example, an effective graphic organizer, such as a story map, helps students internalize the elements of a story in ways that enhance their reading and writing of stories. Likewise, by routinely using the template and design tools, users will likely develop a mental template of the key ideas presented in this book: the logic of backward design, thinking like an assessor, the facets of understanding, WHERETO, and design standards.

By embodying the Understanding by Design elements in tangible forms (i.e., the template and design tools), we seek to support educators in learning and applying these ideas. Thus, the design tools are like training wheels, providing a steadying influence during those periods of disequilibrium brought on by new ideas that may challenge established and comfortable habits. Once the key ideas of Understanding by Design are internalized, however, and regularly applied, the explicit use of the tools becomes unnecessary, just as the young bicycle rider sheds the training wheels after achieving balance and confidence.

■ MISCONCEPTION ALERT!

Though the three stages present a logic of design, it does not follow that this is a step-by-step process in actuality. As we argue in Chapter 11, don't confuse the logic of the final product with the messy process of design work. It doesn't matter exactly where you start or how you proceed, *as long as you end up with a coherent design* reflecting the logic of the three stages. The final outline of a smoothly flowing college lecture rarely reflects the back-and-forth (iterative) thought process that went into its creation.

Backward design in action with Bob James

Setting: *We are inside the head of Bob James, a 6th grade teacher at Newtown Middle School, as he begins to design a three-week unit on nutrition. His ultimate*

design will be the unit provided above in Figure 1.3. But Bob is new to UbD, so his design will unfold and be revised over time. Throughout the book we'll show his thinking—and rethinking—as he considers the full meaning of the template elements.

Stage 1: Identify desired results

The template asks me to highlight the goals of the unit, and for me that means drawing upon our state standards. In reviewing our standards in health, I found three content standards on nutrition that are benchmarked to this age level:

- Students will understand essential concepts about nutrition.
- Students will understand elements of a balanced diet.
- Students will understand their own eating patterns and ways in which these patterns may be improved.

Using these standards as the starting point, I need to decide what I want my students to take away from the unit. Knowledge and skill are what I have always focused on: knowledge of the food pyramid, the ability to read labels in the store and at home, and so on. Although I've never deliberately thought about *understandings,* per se, I like the concept and think that it will help me focus my teaching and limited class time on the truly important aspects of this unit.

As I think about it, I guess what I'm really after has something to do with an understanding of the elements of good nutrition so students can plan a balanced diet for themselves and others. The big ideas have to do with nutrition and planning meals in a feasible way. Then, the important questions are, So, what is good for you? What isn't? How do you know? What makes it difficult to know and to eat right? (The good taste of junk food makes it difficult!)

This idea is clearly important, because planning nutritious menus is an authentic, lifelong need and a way to apply this knowledge. I'm still a little unclear about what "an understanding" means, though, in this context. I'll need to reflect further on what an understanding is and how it goes beyond specific knowledge and its use. The basic concepts of nutrition are fairly straightforward, after all, as are the skills of menu planning. Does anything in the unit require, then, any in-depth and deliberate *uncoverage*? Are there typical misunderstandings, for example, that I should more deliberately focus on?

Well, as I think about it, I have found that many students harbor the two misconceptions that if food is good for you, it must taste bad; and if it is sold in famous and popular places, it must be okay. One of my goals in this unit is to dispel these myths so that the students won't have an automatic aversion to healthy food and unwittingly eat too much unhealthy stuff. In terms of the potential for engagement—no problem there. Anything having to do with food is a winner with 10- and 11-year-olds. And there are some points to menu planning (such as balancing cost, variety, taste, and dietary needs) that are not at all obvious. This way of thinking about the unit will enable me to better focus on these points.

Stage 2: Determine acceptable evidence

This will be a bit of a stretch for me. Typically in a three- or four-week unit like this one, I give one or two quizzes; have a project, which I grade; and conclude with a unit test (generally multiple choice or matching). Even though this approach to assessment makes grading and justifying the grades fairly easy, I have always felt a bit uneasy that these assessments don't reflect the point of the unit and that the project grade sometimes has less to do with the key ideas and more to do with effort. I think I tend to test what is easy to test instead of assessing for my deeper goals, above and beyond nutritional facts. In fact, one thing that has always disturbed me is that the kids tend to focus on their grades rather than on their learning. Perhaps the way I've used the assessments—more for grading purposes than to help shape and document learning—has contributed somewhat to their attitude.

Now I need to think about what would serve as evidence of the ideas I'm focusing on. After reviewing some examples of performance tasks and discussing "application" ideas with my colleagues, I have decided tentatively on the following task:

> *Because we have been learning about nutrition, the camp director at the outdoor education center has asked us to propose a nutritionally balanced menu for our three-day trip to the center later this year. Using the food pyramid guidelines and the nutrition facts on food labels, design a plan for three days, including three meals and three snacks (a.m., p.m., and campfire). Your goal: a tasty and nutritionally balanced menu.*

I'm excited about this idea because it asks students to demonstrate what I really want them to take away from the unit. This task also links well with one of our unit projects: to analyze a hypothetical family's diet for a week and propose ways to improve their nutrition. With this task and project in mind, I can now use my quizzes to check students' knowledge of the food groups and food pyramid recommendations, and a lengthier test to check for their understanding of how a nutritionally deficient diet contributes to health problems. Hey! This is one of the better assessment plans I have designed for a unit, and I think that the task will motivate students as well as provide evidence of their understanding.

Stage 3: Plan learning experiences and instruction

This is my favorite part of planning—deciding what activities the students will do during the unit and what resources and materials we'll need for those activities. But according to what I'm learning about backward design, I'll need to think first about what essential knowledge and skills my students will need if they're going to be able to demonstrate in performance the understandings I'm after.

Well, they'll need to know about the different food groups and the types of foods found in each group so that they'll understand the USDA food pyramid

recommendations. They'll also need to know about human nutritional needs for carbohydrates, protein, sugar, fat, salt, vitamins, and minerals, and about the various foods that provide them. They'll have to learn about the minimum daily requirements for these nutritional elements and about various health problems that arise from poor nutrition. In terms of skills, they'll have to learn how to read and interpret the nutrition-fact labels on foods and how to scale a recipe up or down, because these skills are necessary for their culminating project—planning healthy menus for camp.

Now for the learning experiences. I'll use resources that I've collected during the past several years—a pamphlet from the USDA on the food groups and the food pyramid recommendations; a wonderful video, "Nutrition for You"; and, of course, our health textbook (which I now plan to use selectively). As I have for the past three years, I'll invite the nutritionist from the local hospital to talk about diet and health and how to plan healthy menus. I've noticed that the kids really pay attention to a real-life user of information they're learning.

My teaching methods will follow my basic pattern—a blend of direct instruction, inductive methods, cooperative-learning group work, and individual activities.

Planning backward to produce this new draft has been helpful. I now can more clearly see and state what knowledge and skills are essential, given my goals for the unit. I'll be able to concentrate on the more important aspects of the topic (and relieve some guilt that I'm not covering everything). It's also interesting to realize that even though some sections of the textbook chapters on nutrition will be especially useful (for instance, the descriptions of health problems arising from poor nutrition), other sections are not as informative as other resources I'll now use (the brochure and the video). In terms of assessment, I now know more clearly what I need to assess using traditional quizzes and tests, and why the performance task and project are needed—to have students demonstrate their understanding. I'm getting a feel for backward design.

Comments on the design process

Notice that the process of developing this draft nutrition unit reveals four key aspects of backward design:

1. The assessments—the performance tasks and related sources of evidence—are thought through prior to the lessons being fully developed. The assessments serve as teaching targets for sharpening the focus of instruction and editing the past lesson plans, because they define in very specific terms what we want students to understand and be able to do. The teaching is then thought of as *enabling* performance. These assessments also guide decisions about what content needs to be emphasized versus that which is not really essential.

2. It is likely that familiar and favorite activities and projects will have to be further modified in light of the evidence needed for assessing targeted standards. For instance, if the apples unit described in the Introduction were planned using this backward design process, we would expect to see revisions in some of the activities to better support the desired results.

3. The teaching methods and resource materials are chosen last, with the teacher keeping in mind the work that students must produce to meet the standards. For example, rather than focusing on cooperative learning because it's a popular strategy, the question from a backward-design perspective becomes, What instructional strategies will be most effective in helping us reach our targets? Cooperative learning may or may not be the best approach, given the particular students and standards.

4. The role of the textbook may shift from being the primary resource to being a support. Indeed, the 6th grade teacher planning the nutrition unit realized the limitations of relying on the text if he is to meet his goals. Given other valuable resources (the USDA materials, the video, and the nutritionist), he no longer felt compelled to cover the book word for word.

This introductory look is intended to present a preliminary sketch of the big picture of a design approach. Bob James will be refining his unit plan (and changing his thinking a few times) as he gains greater insight into understanding, essential questions, valid assessment, and the related learning activities.

A preview

Figure 1.5 presents the key elements of the UbD approach and thus an outline of points to come in the book. In the following chapters we "uncover" this design process, examining its implications for the development and use of assessments, the planning and organization of curriculum, and the selection of powerful methods of teaching. But a few explanatory points about each column in Figure 1.5 are appropriate to prepare you for what is to come throughout the book.

The chart is best read from left to right, one row at a time, to see how the three stages of design might look in practice. An outline of the three-stage design process for each of the three basic elements (the desired results, the assessment evidence, and the learning plan) is highlighted in the column headings. Begin with a key design question; ponder how to narrow the possibilities through intelligent priorities (Design Considerations); self-assess, self-adjust, and finally critique each element of design against appropriate criteria (Filters); and end up with a product that meets appropriate design standards in light of the achievement target (What the Final Design Accomplishes).

In summary, backward design yields greater coherence among desired results, key performances, and teaching and learning experiences, resulting in better student performance—the purpose of design.

Figure 1.5
The UbD Design Matrix

Key Design Questions	Chapters of the Book	Design Considerations	Filters (Design Criteria)	What the Final Design Accomplishes
Stage 1 • What are worthy and appropriate results? • What are the key desired learnings? • What should students come away understanding, knowing, and able to do? • What big ideas can frame all these objectives?	• Chapter 3—Gaining Clarity on Our Goals • Chapter 4—The Six Facets of Understanding • Chapter 5—Essential Questions: Doorways to Understanding • Chapter 6—Crafting Understandings	• National standards • State standards • Local standards • Regional topic opportunities • Teacher expertise and interest	• Focused on big ideas and core challenges	• Unit framed around enduring understandings and essential questions, in relation to clear goals and standards
Stage 2 • What is evidence of the desired results? • In particular, what is appropriate evidence of the desired understanding?	• Chapter 7—Thinking like an Assessor • Chapter 8—Criteria and Validity	• Six facets of understanding • Continuum of assessment types	• Valid • Reliable • Sufficient	• Unit anchored in credible and useful evidence of the desired results
Stage 3 • What learning activities and teaching promote understanding, knowledge, skill, student interest, and excellence?	• Chapter 9—Planning for Learning • Chapter 10—Teaching for Understanding	• Research-based repertoire of learning and teaching strategies • Appropriate and enabling knowledge and skill	• Engaging and effective, using the elements of WHERETO: • *Where is it going?* • *Hook the students* • *Explore and equip* • *Rethink and revise* • *Exhibit and evaluate* • *Tailor to student needs, interests, and styles* • *Organize for maximum engagement and effectiveness*	• Coherent learning activities and teaching that will evoke and develop the desired understandings, knowledge, and skill; promote interest; and make excellent performance more likely

Chapter 2

Understanding Understanding

The most characteristic thing about mental life, over and beyond the fact that one apprehends the events of the world around one, is that one constantly goes beyond the information given.

—Jerome Bruner, *Beyond the Information Given,* 1957, p. 218

Education. That which discloses to the wise and disguises from the foolish their lack of understanding.

—Ambrose Bierce, *The Devil's Dictionary,* 1881–1906

This book explores two different but related ideas: design and understanding. In the previous chapter we explored good design in general and what the template specifically calls for. But before we can go into depth about the template, we need to step back and consider the other strand of the book—understanding. Bob James was a bit confused about "understandings." His confusion turns out to be a fairly common problem. When we ask designers in workshops to identify desired understandings and thus to distinguish between desired "knowledge" and "understanding," they are often puzzled. What's the difference? What *is* understanding? And so we pause to consider a question that turns out to be essential: How well do we understand understanding? What is it we are after when we say we want students to understand this or that? Until now, we have written about understanding as if we fully understood what we were after. But as we shall see, the irony is that though we all claim as teachers to seek student understanding of the content, *we* may not adequately understand this goal. This may seem like an odd claim. Teachers knowingly aim for understanding every day, don't they? How can we not know what we are aiming for? Yet plenty of evidence suggests that "to understand" and "to teach for understanding" are ambiguous and slippery terms.

We see some of this conceptual uncertainty in the *Taxonomy of Educational Objectives: Cognitive Domain.* The book was written in 1956 by Benjamin Bloom and his colleagues to classify and clarify the range of possible intellectual objectives, from the cognitively easy to the difficult; it was meant to classify