A COMPANION TO

The Understanding by Design Guide to Creating High-Quality Units

The Understanding by Design Guide to Advanced Concepts in Creating and Reviewing Units

Grant Wiggins and Jay McTighe

1703 N. Beauregard St. • Alexandria, VA 22311-1714 USA
Phone: 800-933-2723 or 703-578-9600 • Fax: 703-575-5400
Website: www.ascd.org • E-mail: member@ascd.org
Author guidelines: www.ascd.org/write

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The Understanding by Design Guide to

Advanced Concepts in Creating and Reviewing Units

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Introduction

The Understanding by Design Guide to Advanced Concepts in Creating and Reviewing Units is targeted to individuals and groups interested in refining their skills in designing units of study based on *The Understanding by Design Guide to Creating High-Quality Units*. This guide is also organized around a set of modules through which designers are guided. Figure 1 offers a graphic representation of the organization of the modules in this volume.

This guide looks more closely at refinements to the unit designs, while also introducing new material on self-assessment, peer review, implementation, and supervision of the unit—under the new headings of Stages 4, 5, and 6.

Each module in both *Guides* includes the following components:

- Narrative discussion of key ideas in the module
- Guiding exercises, worksheets, and design tips for unit design
- An example of an emerging design

Figure 1

Outline of Modules

Stage 1— Desired Results	Stage 2— Assessment Evidence	Stage 3— Learning Plan
Module I: Unpacking Standards	Module J: Identifying Evaluative Criteria for Assessments	Module K: Refining the Learning Plan in Stage 3
Module L: Sharpening Essential Questions and Understandings	Module M: Authentic Assessment and Validity	Module N: Differentiating—Tailoring the Learning Plan to the Learners
Module O: Designing the Lesson Plan for Your Unit		
Module P: Obtaining and Using Feedback		

- Review criteria (design standards) with prompts for self-assessment
- References for further information

In addition to the print format, the *Guide* features online resources correlated to the text. Many of the exercises and worksheets are accessible as downloads in electronic form, as are additional unit examples. The online portion of the *Guide* will allow updates (such as more unit examples and new resources) to be readily accessed.

Users of the *Guide*, especially beginners, are invited to follow the exercises and worksheets to assist them in thinking through the unit design process. However, it is important to always keep the end—a coherent and well-aligned unit plan—in mind. If you find an exercise or worksheet unnecessary, feel free to skip it. Also, think of the exercises and worksheets like the training wheels on a bicycle. Eventually you'll find that you no longer need them as your understanding of UbD deepens and your unit design skills become more effective and automatic.

The modular nature of the *Guide* means that users need not follow the modules in the order presented. Your interests, strengths, and prior experience as a designer will inevitably dictate how you use this *Guide* and the sequence you follow. Think of the *Design Guide*, then, as a cookbook. In a cookbook there are chapters devoted first to recipes of appetizers, then to soups and salads, then to fish and meat, vegetables, and desserts. Similarly, the *Guide* is organized by the "menu" of a unit's parts—the elements of the unit template. But although the cookbook is organized, you need not read it from cover to cover or make all the recipes in the order in which they appear. So, too, in unit design. Like the recipe creator, your path is informed by the need to put the final work in recipe form, but recipe creation is inherently nonlinear and messy as you try things out, alter various ingredients, and double-back to ensure that the final product works.

Module I

Unpacking Standards

Purpose: To prioritize and focus on our content obligations appropriately.

Desired Results:

Unit designers will understand that

- Standards by themselves are not a curriculum; a curriculum works with the standards to frame optimal learning experiences.
- Standards and most goal statements need to be analyzed or unpacked because they may
  - be ambiguous;
  - be too broad or too narrow; and/or
  - reflect different kinds of goals simultaneously (e.g., knowledge, skill, understanding, performance indicators).
- Unpacking standards helps to clarify the long-term intentions behind the standards, distinguish among goal types, and focus unit planning.

Unit designers will be able to

- Unpack standards and other established goals that apply to the unit, and place them in the proper Stage 1 boxes.

Module Design Goals: In this Module, you will learn various ways to unpack standards and other goals to properly identify the various Stage 1 elements. The end product will be a refined set of desired results identified in Stage 1.

You should work on Module I if you are obligated to pre-established standards (state/provincial/national) or other goals (e.g., from a school or district mission) and if you are unfamiliar with the process of unpacking standards or other goals into the UbD Template.

You might skim or skip Module I if you are not obligated to use established local, state, or national standards or other formal goals.

Many users of this *Guide* will need to address externally mandated goals of some kind—most commonly state, provincial, or national standards. The UbD Template has a specific box for such established goals, on the left side of Stage 1 (see Figure I.1). This placement is meant to signal an important idea about state standards and other such obligations. The standards are *not* the primary goals of your unit design. Meeting them is necessary but not sufficient.

Consider an analogy with home building and renovation. The standards are like the building code. Architects and builders must attend to them but they are *not* the purpose of the design. The house to be built or renovated is to meet the needs of the client in a functional and pleasing manner—while also meeting the building code as a part of the larger integrated and coherent whole.

Similarly, although unit designs have to validly address external standards, we always want to keep the long-term educational ends in mind: an engaging and meaningful learning experience that develops learner understanding and curiosity while also meeting standards. That's why we place standards on the side of Stage 1. In other words, standards by themselves are not a curriculum. A curriculum works with the standards in a way to frame optimal learning experiences. The standards are more like the ingredients list for a recipe than the final meal; they are more like the rules of the game instead of strategy for succeeding at the game. A curriculum fleshes out the best ways to honor one's obligations while making learning as engaging and effective as possible.

Unpacking Standards

Standards can be somewhat opaque, and they often vary in clarity, complexity, and specificity. Some standards are broad, cutting across many courses and grade levels; others are narrow and content-specific. Some refer to content that must be taught; other standards refer to performance levels that must be achieved.

A standard has to be treated like any other nonfiction text; that is, we have to carefully analyze and interpret its meaning. A standard poses a challenge similar to the one posed by determining the meaning of the Bill of Rights in specific situations. In fact, a standard represents key principles that demand constant thought and discussion. That's what we mean by saying that educators need to "unpack" standards for local use. The practical meaning of a standard is not self-evident even if the writing is clear.

Consider this example:

> **Virginia History 5.7**
>
> The student will understand the causes and effects of the Civil War with emphasis on slavery, states' rights, leadership, settlement of the west, secession, and military events. [*Source:* VA Curriculum Framework United States History to 1865; Commonwealth of Virginia Board of Education Richmond, Virginia Approved—July 17, 2008]

Figure I.1

Unpacking Standards Stage 1—Mathematics

<table>
<tr><th colspan="3">Stage 1—Desired Results</th></tr>
<tr><td rowspan="8">Established Goals

Common Core State Standards in Math

Interpret the structure of expressions
1. Interpret expressions that represent a quantity in terms of its context.

Write expressions in equivalent forms to solve problems
3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

Rewrite rational expressions
6. Rewrite simple rational expressions in different forms.

Mathematical Practices
1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.</td><td colspan="2">Transfer</td></tr>
<tr><td colspan="2">Students will be able to independently use their learning to . . .
Solve nonroutine problems by persevering: simplify them, interpret expressions, and use equivalent forms based on the properties of real numbers and the order of operations.</td></tr>
<tr><td colspan="2">Meaning</td></tr>
<tr><td>UNDERSTANDINGS
Students will understand that . . .
1. In mathematics, we accept certain truths as necessary to permit us to solve problems with logical certainty (e.g., the properties of real numbers), whereas other rules are conventions that we assume just for effective communication.
2. We can use the commutative, associative, and distributive properties to turn complex and unfamiliar expressions into simpler and familiar ones when problem solving.</td><td>ESSENTIAL QUESTIONS
Students will keep considering . . .
1. What important rules and conventions are required to make algebra “work”?
2. How can we simplify this expression?</td></tr>
<tr><td colspan="2">Acquisition of Knowledge & Skill</td></tr>
<tr><td>Students will know . . .
1. The commutative property and to which operation it applies (and when it does not apply).
2. The associative property and to which operation it applies (and when it does not apply).
3. The distributive property and to which operation it applies (and when it does not apply).
4. The “order of operations” mathematicians use and why is it needed.
5. What PEMDAS mean.
6. What it means to “simplify” an expression via equivalent forms.</td><td>Students will be skilled at . . .
1. Writing expressions in equivalent forms.
2. Revealing and explaining properties represented.
3. Rewriting rational expressions in different forms.
4. Identifying equivalence that results from properties and equivalence that is the result of computation.
5. Justifying steps in a simplification or computation by citing applicable laws, properties, conventions.</td></tr>
</table>

What does "understand" mean here? Does it mean *make meaning* of and *transfer*? Or does it mean something narrower like *analyze*? Or is the demand far more modest, namely "Accurately state and explain what others—credible experts—have analyzed the causes and effects to be, as found in textbooks" (in other words "understand" = "know")? As you can see, how we teach and how we assess this standard is greatly affected by the outcome of our inquiry. Such unpacking is essential at the local level if the standards are to be validly and consistently addressed across teachers, given the ambiguity of the key verb.

Even if we agree on what "understand" means here, there is a second question that must still be considered: What is an adequate understanding for a 5th grader? In other words, how well must a student understand the causes and effects? How sophisticated should that understanding be, to be a fair expectation of a 5th grader? In other words, merely knowing the content to be addressed is not enough information for local action. We need to analyze all relevant text to infer a reasonable performance standard for assessing student work, that is, to know when student work related to the standard is or isn't meeting the standard.

Structure and Organization of Standards

Another reason for unpacking has to do with the fact that standards are typically written in a hierarchical outline form. In many documents, the first level is the most broad and comprehensive statement, and the second and third levels are typically more concrete and narrowly focused. Each discrete element and outcome of learning is listed in an analytic fashion.

Alas, as we well know from experience what seems like a good idea in theory—a hierarchical list of key elements—has an unfortunate common unintended consequence. Some educators think that standards, arranged as organized in lists, need to be covered, one by one, in lessons and units. Not only is this practice unwise pedagogically; it is not the writers' intent. Some standards documents offer explicit cautions against such decontextualized teaching; for example:

> Many of the objectives/benchmarks are interrelated rather than sequential, which means that **objectives/benchmarks are not intended to be taught in the specific order in which they are presented. Multiple objectives/benchmarks can and should be taught at the same time.** [emphasis in the original]
>
> *Source*: 2007 Mathematics Framework, Mississippi Department of Education, p. 8

Here is how the Common Core State Standards in English Language Arts are introduced:

> While the Standards delineate specific expectations in reading, writing, speaking, listening, and language, each standard need not be a separate

> focus for instruction and assessment. Often, several standards can be addressed by a single rich task. (*Source:* Common Core State Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects, p. 5)

Alas, this advice is routinely overlooked or ignored in local curriculum work. And yet the distinction between discrete elements and a more integrated curriculum plan is just common sense. A good meal is more than just the listed ingredients in the recipe; a successful home renovation doesn't merely involve contractors addressing each isolated piece of the building code; music is not made by learning hundreds of discrete notes, key signatures, and tempos in isolation from performance. In fact, if transfer and meaning making are the goals of education, they can *never* be achieved by a curriculum that just marches through discrete content elements, no matter how sensible the hierarchical list is as an *outline* of a subject's high points.

Misconception Alert

Standards documents are written in a hierarchical list format. This analytic framing of standards can easily mislead teachers into the following misconceptions:

- The standard clearly expects me to teach and test each objective in isolation.
- I'll just focus on the top level (i.e., the broadest) standard. Then, I can justify most of what I already do as meeting the standard.
- I'll just focus on the lowest levels and check off these very specific objectives that are covered in my normal unit. Then, I have addressed the standard.

Each claim is inaccurate and leads to needlessly isolated and ineffective teaching and assessment.

Different Goal Types in the Standards

A third reason for unpacking standards results from the fact that standards not only come in different shapes and sizes, but typically address different *types* of learning goals. It is not uncommon for a standard to mix together acquisition, meaning, and transfer goals in the same list without calling attention to the fact that each type of goal is different and likely requires different instructional and assessment treatments. Here is an example from the Common Core State Standards for 5th grade math:

> Number and Operations in Base Ten—5.NBT
>
> *Understand the place value system.*
>
> 1. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.

2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
3. Read, write, and compare decimals to thousandths.
4. Use place value understanding to round decimals to any place.

As we interpret the standards, 1 and 2 are really about meaning-making (though the verb "recognize" may lull some into thinking that this is about low-level acquisition), 3 is a mixture of acquisition ("read and write") and meaning-making ("compare"), and 4 could be either skill focused or transfer focused, depending upon how novel, complex, and unprompted the tasks given to students. The careful interpretation is why it is neither redundant to have a separate section on the Template for unit-relevant standards (or established long-term goals) nor superfluous to place the appropriate parts of a standard into the Stage 1 and 2 boxes, with additional clarifying language when needed. *When completed, Stage 1 provides evidence that the standards were unpacked in a transparent way, and shows how the various goals properly relate to one another.*

So, rather than simply lumping all standards together and calling them your unit goals, we strongly recommend that designers carefully examine each standard and place its components—whether stated or implied—in the *appropriate* Stage 1 box: Transfer, Essential Questions, Understandings, Knowledge, or Skill.

Misconception Alert

Be careful if you work in a state that makes reference to "big ideas" and "essential questions" in their standards. They do not always correspond to how we define these terms in UbD. For example, Florida highlights certain standards by labeling them big ideas, but this use of the phrase is meant to simply signal *priorities* in general rather than specific transferable ideas to be grasped and used.

> MA.5.A.2, BIG IDEA 2: Develop an understanding of and fluency with addition and subtraction of fractions and decimals. (*Source:* www.floridastandards.org/Standards/PublicPreviewIdea196.aspx)

Similarly, some states have listed essential questions in their standards or resource documents, but most of these would not meet the UbD design standard. For example, consider two listed "essential questions" in *The Virginia History and Social Science Standards of Learning Curriculum Framework 2008*, a companion document to the 2008 *History and Social Science Standards of Learning:*

- What are the seven continents?
- What are the five oceans?

Although these questions may point toward important knowledge, they are certainly *not* essential in the UbD sense because they are factual questions, not designed to cause in-depth inquiry and discussion. In sum, beware—especially when familiar jargon is used in the documents.

Turning Standards into Sound Curriculum, Instruction, and Assessment

Based on these cautions and mindful of the need for practical tools in working through these issues, we offer the following five tips for unpacking the standards.

Tip 1. Look at all key verbs to clarify and highlight valid student performance in which content is used. Carefully analyze the verbs and try to determine their meaning for assessment and thus instruction. For example, does "respond to" mean "resonate with" or "write about" or "make a personal connection to the text"? What counts as "understanding" the causes and effects of the Civil War? For example, does "understand" in this case mean "accurately recall what the textbook said" were the major causes? Or are the students expected to make their own analyses, based on primary and secondary source evidence, and also defend them? Obviously, the answers affect the overall unit design and, especially, the assessments.

One would hope, of course, that the language used in standards documents is consistent and grounded in a valid framework such as Bloom's taxonomy. For example, it seems reasonable to assume that phrases like "analyze" or "solve problems" are meant to signal more higher-order inferential work than is required by standards that say "describe" or "identify."

Our experience from working with standards-writing committees proves that verbs are not always used in a consistent or appropriate manner. Nor are glossaries containing operational definitions of key verbs usually provided. Making matters worse, most standards documents do not state whether there is a *pedagogical* rationale behind the use of specific verbs or instead whether the verbs vary for *aesthetic* reasons (to avoid repetition in the text).

We recommend that your committee members scour relevant websites and communicate with state education departments to clarify this basic issue when necessary. We also highly recommend that educators look at whatever test specifications exist for state standards because the test-maker needs this same information in order to construct valid measures. In some states, the test specifications found under the state assessment section are more helpful than the standards themselves. For example, take a look at Florida Math Test Specifications at http://fcat.fldoe.org/pdf/G9-10_Math_Specs_1-39.pdf.

Tip 2: Look at the recurring nouns that signal big ideas. A related approach to unpacking standards involves finding important nouns, that is, key concepts, principles, themes, and issues that can be turned into essential questions and understandings. Here is an example from the Common Core State Standards that illustrate this approach (bold added to key nouns that signify big ideas):

> Expressions and Equations 7.EE
>
> Use **properties of operations** to generate **equivalent expressions**.
>
> 1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
> 2. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."* (p. 49)

Notice how the phrases we boldface also suggest possible essential questions and Understandings that could be put in the UbD planner:

- How can we simplify this problem by using equivalent expressions and properties? How can we rewrite this equation to reveal important relationships and meanings?
- Problem solving often requires finding equivalent expressions in which complex elements are made simpler and more familiar via the properties of operations.

Tip 3: Identify and analyze the key adjectives and adverbs to determine valid scoring criteria and rubrics related to successful performance against the standards.

The qualifiers of the verbs and nouns can provide a useful and efficient way to build a set of local rubrics to ensure that assessment is standards based and consistent across assignments. Here is an example, using a reading standard, in which key qualifiers are in bold and implicit qualifiers are added in italics:

> Cite **strong and thorough** textual evidence to support *an accurate and justified* analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain. (From Common Core State Standards ELA, Grades 11–12. Key Ideas and Details, Informational Text p. 40)

So the rubric titles might be Quality of Evidence Cited and Quality of Analysis Made.

Tip 4. Identify and/or infer the long-term transfer goals by looking closely at the highest-level standards and indicators for them, or inferring the transfer goal from the content and justification for the standard. Even if the standard stresses important content, it typically states or implies key performance related to that content. In other words, if that's the content, what are students eventually expected to do with it? Long-term transfer goals answer the "Why are we learning this?" question. Ask yourself

- What should students be able to do well on their own while using this content, to truly meet this standard and its purpose? (*complex performance ability*)

- What does "perform well" mean for each standard? (*specific performance standards and criteria for evaluating complex performance*)

In the event that the documents for your state, province, or nation do not identify such long-term performance goals, we recommend that you look at the introductory pages for each discipline. Larger goals, purposes, or intentions of the standards are often presented in the opening section before the specifics are listed.

Tip 5: Consider the standards in terms of the long-term goal of autonomous performance. To stress the transfer aspect of the goal, make a point of highlighting the idea that students are expected to perform with content autonomously. The most concrete and helpful way to do this is to make explicit and write in a phrase that is unfortunately implicit in most standards: ***on their own***. Students must be able to use content autonomously, without the need for extensive scaffolding, reminders, and hints. So, add "on their own" to each standard to better grasp the kind of independent transfer expected.

Now, consider how the use of this phrase could influence assessment and instruction. For example, it suggests the need for a "gradual release" of teacher direction over time so that learners develop increasing capacity for independent performance. The following examples, from the Common Core State Standards, in which we added the key phrase, underscore this point:

GRADE 5 READING: Key ideas and details.

Students ***on their own***

1. Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
2. Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.
3. Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text. (*Source:* Common Core State Standards, p. 12)

GRADE 8 MATHEMATICS: Functions.

Students ***on their own***

- Define, evaluate, and compare functions.
- Use functions to model relationships between quantities.

(*Source:* Common Core State Standards, p. 53)

Far too many teachers heavily scaffold learning activities, discussions, exercises, and assessments right up until the end of the year. Students then get too little practice and feedback in identifying main ideas or solving multistep problems *on their own*. It should not surprise us, then, when students do poorly on these abilities on standardized tests.

In fact, the Common Core State Standards document in English Language Arts explicitly stresses independence as one of seven key traits that present an emerging "portrait of students who meet the standards":

> *They demonstrate independence.*
>
> Students can, without significant scaffolding, comprehend and evaluate complex texts across a range of types and disciplines, and they can construct effective arguments and convey intricate or multifaceted information. Likewise, students are able independently to discern a speaker's key points, request clarification, and ask relevant questions. They build on others' ideas, articulate their own ideas, and confirm they have been understood. Without prompting, they demonstrate command of standard English and acquire and use a wide-ranging vocabulary. More broadly, they become self-directed learners, effectively seeking out and using resources to assist them, including teachers, peers, and print and digital reference materials. (p. 7)

Using other Common Core Standards, we offer additional examples about how the standards can be unpacked to represent every element in Stage 1 of the Template in Figures I.2 and I.3.

Figure I.4 is worksheet designed as a matrix to help you unpack standards.

Design Tip: Here are some basic rules for interpreting established standards:

- Look closely at verbs, but be aware that not all standards documents use verbs consistently to signal the type of goal or degree of cognitive demand. Check your state or provincial documents for guidance.
- Some standards statements begin with a low-level verb (identify, describe, state). Don't be confused into thinking that this automatically signals a skill. Generally, such statements call for knowledge. For example, "Identify parts of speech" specifies declarative knowledge because it means that "the student will know the parts of speech," despite the action verb in the beginning. Look at the test specifications for the standards for clarification.
- When higher-order verbs are used (analyze, infer, generalize), the goal can be ambiguous. If the verb is followed by or describes general abilities, it is likely stating a transfer goal. However, the verb may be used as a performance indicator and thus will be more useful for determining specific assessment evidence in Stage 2. (See the following section for further discussion.)

Online you will find worksheets set up in different ways and with varying examples to help you unpack standards. Figure I.5, Unpacking Standards Worksheet—Reading; Figure I.6, Unpacking Standards Worksheet—English Language Arts; Figure I.7, Unpacking Standards Matrix—Mathematics; Figure I.8, Unpacking Standards Matrix—History; Figure I.9, Unpacking Standards Worksheet—Civics; Figure I.10, Unpacking Standards Worksheet—Social Studies; Figure I.11, Unpacking Standards Worksheet Stages 1–3; Figure I.12, Designing Units Based on Content Standards; Figure I.13, Unpacking Standards Worksheet.

Figure I.2

Unpacking Standards Stages 1–3—English Language Arts

Key Ideas and Details

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

Stage 1: Different Goal Types

What are the key higher-order VERBS, and what do they suggest the general long-term transfer goal is? *Students eventually need to be able, on their own, to…*

- Determine what the text says explicitly and infer what the text implies, regardless of text or genre.

What are the key NOUNt CONCEPTS, and what do they suggest the big ideas to be mastered and used are? *Students will need to organize their thinking, knowledge, and skill around such ideas/questions as…*

- Logical inferences.
- Textual evidence.

What VERBS state or imply specific skills to be mastered? *Students need to be able to demonstrate such skills as…*

- Cite specific textual evidence.

What key FACTS must be known and used? *Students need to know such facts as…*

- Definitions of "logical," "inference," "evidence," "support."
- The facts stated in the text.

Stage 2: Assessment

What are the key VERBS, and what do they suggest the specific assessments need to be? *Students will need to show they can…*

- Determine what the text says explicitly.
- Make logical inferences (from the text).
- Support conclusions drawn from the text.
- Cite specific textual evidence.

What are the key ADJECTIVES and ADVERBS, and what do they suggest the key criteria for judging work should be? *Student performance and products will need to reveal to what extent students …*

- Read *closely*.
- Make *logical* inferences.
- Cite *specific* textual evidence.

Stage 3: Learning Plan

What do the verbs, nouns, and verb modifiers imply for instruction? *The standard can only be reached if students are given instruction, practice, and feedback in…*

- How to make sense of a text, how inference is different from inspecting the text, and seeing the difference between sound and unsound evidence and inference when claims are made about the text.

Source: Standard excerpt from College and Career Readiness Anchor Standard in *Common Core State Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects*, p. 35.

Figure I.3

Unpacking Standards Worksheet—Mathematics

<table>
<tr>
<td rowspan="5">Common Core Best Practice #4

Model with mathematics.
Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. . . .

Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships. . . .

They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.</td>
<td>Transfer goals in the VERBS:</td>
<td>• Apply what they know to everyday problems.
• Make assumptions and approximations.
• Analyze relationships mathematically and draw conclusions.
• Interpret results in context.
• Simplify a complicated situation.
• Reflect and improve model.
• Be able to identify important quantities in a practical situation.</td>
</tr>
<tr>
<td>Criteria in the ADVERBS and ADJECTIVES:</td>
<td>• Mathematically proficient
• Context-sensitive
• Comfortable
• Important quantities
• Routinely interpret</td>
</tr>
<tr>
<td>Possible task ideas:</td>
<td>• Plan a school event.
• Analyze a problem in the community.</td>
</tr>
<tr>
<td>Stated or implied big ideas in the NOUNS:</td>
<td>• Simplification of a complicated situation
• Proportional reasoning
• Problems</td>
</tr>
<tr>
<td>Possible Understandings:
Students will understand that . . .
• Mathematical models simplify and connect phenomena so that we might better understand them.
• Mathematical models must be viewed critically so that they do not mislead us into thinking that reality is that simple.</td>
<td>Possible Essential Questions:
• How can I simplify this complexity without distorting it?
• How do I know if my model is a good one here (for this particular situation)?
• What are the limits of my model?</td>
</tr>
</table>

Figure I.4

Unpacking Standards Matrix—Mathematics

Insert (within 1 or more cells) important learning activities and performance tasks that require strategic thought and real-world competence in the use of content. Refer back to the transfer and meaning goals to determine the kinds of complex work and thinking expected of students.

<table>
<tr><th>MATH PRACTICE STANDARDS

MATH CONTENT STANDARDS
3rd Grade</th><th>1
Make sense of problems and persevere in solving them</th><th>2
Reason abstractly and quantitatively</th><th>3
Construct viable arguments and critique the reasoning of others</th><th>4
Model with mathematics</th><th>5
Use appropriate tools strategically</th><th>6
Attend to precision</th><th>7
Look for and make use of structure</th><th>8
Look for and express regularity in repeated reasoning</th></tr>
<tr><td>Represent and solve problems involving multiplication and division.</td><td colspan="4" rowspan="4">5–6 authentic performance tasks of increasing complexity over the course of the year in which students have to figure out what the problem is asking, figure out which operation to use and when to use it, develop a general math model for such problems, and defend an answer in a realistic situation. For example: prepare a budget for a class trip, a home renovation, a year's wardrobe, mindful of budget constraints and unit costs, etc.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Understand properties of multiplication and the relationship between multiplication and division.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Multiply and divide within 100.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Solve problems involving the four operations, and identify and explain patterns in arithmetic.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Use place value understanding and properties of operations to perform multidigit arithmetic.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Develop understanding of fractions as numbers.</td><td colspan="2" rowspan="3">3–4 authentic tasks requiring students ON THEIR OWN to realize that fractions are involved, determine the fractions, and use operations on the fractions to calculate solutions, and represent their findings graphically.</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.</td><td></td><td colspan="2">Activities and assessments that require students to judge, calculate, and defend the appropriate degree of precision in varied contexts where precision needs vary.</td><td></td><td></td><td></td></tr>
<tr><td>Represent and interpret data.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Geometric measurement: understand concepts of area and relate area to multiplication and to addition.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Addressing the Standards

A clear understanding of standards is necessary but insufficient because we need to know what follows for instruction and, especially, assessment. Unless our local assessments properly assess against the standards, as noted earlier, we will unwittingly only refer to the standards instead of actually meeting them. Thus, a key design question is as follows: how much assessment evidence and instruction, and of what kind, is needed to fully *address* and *meet* the standards?

By definition, in UbD any goal (including a standard) is only "addressed" if we address it *explicitly* in Stage 2 and Stage 3. Yet, we have observed a tendency for some designers to list every conceivably relevant standard in Stage 1 that *may* come into play, no matter how superficially. Too often, designers simply check off that the unit *relates* to a standard without actually teaching and assessing it. For example, in a high school unit on persuasive writing, the temptation is to list benchmarks related to rules of grammar or subject-verb agreement—and then, for good measure, reference all the speaking and listening standards because they will be discussed. While such skills are certainly related to the unit topic, they are *not* the main focus of this unit; and assessments only touch on them incidentally. We discourage listing all facts, concepts, or skills that *might* be used within the unit.

Our rule of thumb is straightforward: only list the standards that are explicitly assessed and taught to. Otherwise, you will deceive yourselves about how well the standards have been addressed and be even more prone to "teaching by mentioning"—that is, listing the standard on a unit plan or posting it on the board without any in-depth instruction or assessment. Such practices do *not* constitute a standards-based system. A standard is only addressed if the unit *validly assesses* for its achievement (Stage 2) and if there are *multiple relevant learning opportunities* to help students achieve it (Stage 3). In addition, most standards would only be fully addressed once the standard is addressed in multiple units.

Design Tip: A standard or benchmark should only be listed in Stage 1 if it is explicitly assessed in Stage 2 and included in one or more learning events in Stage 3. Furthermore, when sharing units with other teachers, indicate whether the listed standard should receive minor emphasis and be addressed in a few learning events, or major emphasis and be addressed in numerous learning events and assessed.

Local Assessment: Where the Rubber Meets the Road

"Addressing" the standards in teaching and assessment design is necessary but not sufficient. The aim is for student performance to meet the standards or exceed them. After all, standards aren't met by what the teacher designs and does, but are met through the work that students produce. Thus the question when we consider standards implementation: *Is student work up to standard* (even if the assessments we designed validly address the standards)? If we have truly addressed the standards

(as reflected in valid assessments) and if students have truly met the standards locally (as reflected in valid and reliable scoring), then we should be confident about their ability to perform on tests designed backward from the same standards.

Alas, the inability to make such an accurate prediction is arguably one of the greatest weaknesses in U.S. education: local tests and grades rarely predict state and national performance, with dire consequences for students, teachers, and administrators. By contrast, think of sports where we can see in weekly results (based on time) how our team stacks up against local, regional, state, and national competition. A coach at a small school does not deceive herself about student performance. The official times tell a different tale: not one of her runners is likely to place in the top 50 in the end-of-season regional or sectional meet. The sooner the runners know this, the better. And the same is true for academic achievement.

That is why more and more schools have signed on to provide Advanced Placement or International Baccalaureate classes. Our point is not to promote these or any other programs, but such adoption is sensible if we want to be sure that local assessment is valid and compares reasonably with assessments used in other schools. The ideal solution, we think, is to strive for valid and rigorous local assessment, with regular audits of such validity and rigor, so that students, parents, and other stakeholders can have confidence in local assessment.

Our students and their coaches, or teachers, need to know where they really stand week in and week out against established performance benchmarks. Local assessments must aspire to give us information about that standing, whether or not we adopt external programs. No surprises, no excuses. We should know where we stand against standards before it is too late to do anything about it.

Mission-Related (and Other Established) Goals

Whether you are obligated to state or national standards, there are typically other long-term established goals to consider in Stage 1. For example, the mission statement of a district or school contains outcomes that can and must be included in unit plans somewhere. Similarly, some states and districts have committed to cultivating 21st century skills, which need to be woven into unit designs. As a practical matter, in almost every state there are subjects and topics taught for which there are no externally established standards or standardized tests (e.g., physics or drawing). Presumably there are local program goals for these areas, and they should be placed in the Goals box and unpacked into the other appropriate Stage 1 boxes on the Template. While people within and outside schools acknowledge the importance of goals like critical thinking and effective teamwork, worthy goals of this sort often fall through the cracks of day-to-day teaching and assessing. Indeed, in many schools these important aims become mere platitudes or empty rhetoric on plaques in the hall rather than obligatory long-term objectives.

Self-Assessment and Peer Assessment

Use the following questions to self-assess the Stage 1 portion of your draft unit plan. Unit designers can sometimes get too close to their work, therefore we recommend that you show your plan to a colleague and ask him or her for feedback as well. See Module P for an in-depth account of self-assessment and peer review.

- Are all goals (including those derived from standards and other established goals) properly placed as transfer (T), understandings (U), knowledge (K), and skill (S)?
- Does Stage 1 include *only* those goals that will be explicitly taught and assessed?
- Is there proper alignment among the various Stage 1 goals?

Further Information on the Ideas and Issues in This Module

Understanding by Design, 2nd ed. (Wiggins & McTighe, 2005). Chapter 3, "Gaining Clarity on Our Goals," offers an extended discussion of the issues raised in this module. A review of Chapter 1 on backward design may be useful for novices to this approach to unit design. The most practical discussion of goals and what they imply is found in Chapter 11 on the design process, in which the original template is described and a typical unit is shown before (without using) understanding by design, and how that unit is transformed by using UbD.

Understanding by Design: Professional Development Workbook (McTighe & Wiggins, 2004). Examples, worksheets and design tools for unpacking standards to identify understandings and essential questions derived from standards can be found on pages 81–83, 104–105, and 120–125.

Schooling by Design: Mission, Action, and Achievement (Wiggins & McTighe, 2007). Chapter 1 discusses mission and standards to show how many state standards at the highest level focus on transfer as a goal. Chapter 2 discusses the idea of the curriculum "blueprint" and purpose as separate from "meeting the building code"—addressing content standards. Chapter 3 discusses how district/school curriculum should be developed with a focus on transfer goals and big ideas.

Conclusion

Congratulations on completing this *Guide*! No doubt you'll agree that UbD unit design is challenging work. Nonetheless, we trust that the tools, tips, exercises, and examples have been helpful. In this concluding section, we offer tips for moving forward with UbD and cautionary notes to help you avoid unintentionally undermining your efforts.

Tips for Moving Forward

Start small. As with any other skill, practice in designing units will improve your ability and efficiency. In fact, if you keep at it, we predict that your experience will parallel that of thousands of other teachers who have found that UbD unit design becomes a way of thinking. However, we caution against trying to plan *everything* you teach using UbD, at least at first. Because this design process is demanding, we recommend planning two or three units a year as a start. Then expand to additional units in future years.

Work collaboratively. If possible, work with a colleague or two when planning UbD units. Most designers find it valuable to bounce ideas around during design, give each other feedback along the way, and examine student work together. Once you and your teammates get the hang of it, you can "work smarter" by dividing up the planning work among department or grade-level teams; perhaps you take the lead in developing Units 1 and 3, while your teammate plans Units 2 and 4. Then you share.

Think big. As you now know, the *Guide* has focused on designing units of study within which individual lessons are planned. However, you may have wondered: If we truly apply backward design, wouldn't it make sense to design the overall curriculum and courses *before* units and lessons? Well, yes. In an ideal world, unit designers would be able to draw upon overarching elements (transfer goals, understandings, essential questions, cornerstone assessments, and multigrade rubrics) that had already been established at the programmatic, departmental, and course levels. Indeed, that is the approach to district and school curriculum planning that we advocate and describe in *Schooling by Design* (Wiggins & McTighe, 2007).

However, our experience in introducing the understanding by design framework to teacher-designers favors the Goldilocks approach; that is, begin in a design space that is just right: bigger than a daily lesson but smaller than a year-long curriculum.

Once you become comfortable planning at the unit level, it makes sense to think bigger and map the entire year using UbD elements. Indeed, this is a natural evolution for school teams as well as district curriculum committees.

Plan to adjust based on results. As noted in Module P, unit design is a means to an end—engaging and effective learning. Consequently, the most effective teachers constantly monitor the effects of their designs, along the way through formative assessments and at the conclusion by analyzing student performance. We recommend that you get in the habit of planning adjustments to your design (during and after) in real time. Working with electronic design templates makes ongoing revision a natural part of the overall process.

How Not to "Kill" UbD

We end on a cautionary note, suggested by the section title. Alas, too many well-meaning administrators and enthusiastic teachers have unwittingly killed UbD instead of helping it flourish and grow. Here are six potential problems with corresponding recommendations for avoiding them, presented in chart form:

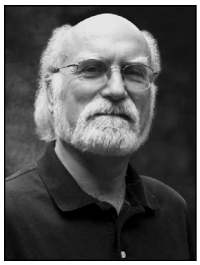
Ways to Kill UbD from the Start	Ways to Nurture UbD
1. Mandate that all teachers must use UbD for *all* of their planning immediately (without sufficient training, ongoing support, or structured planning time).	1. Think big, but start small: • Work with volunteers at first. • Ask all teachers to plan one unit per semester to start. • Encourage teachers to work with a colleague or team, and begin with a familiar unit topic. • Provide some designated planning time.
2. Introduce UbD as *this* year's focus (suggesting that UbD can be fully implemented in a year and that last year's initiative bears no relation to it). This approach fosters a "this too shall pass" attitude among staff.	2. Develop and publish a multiyear plan that shows how UbD will be slowly yet systematically implemented as part of a strategic plan.

Ways to Kill UbD from the Start	Ways to Nurture UbD
3. Attempt to implement too many initiatives *simultaneously* (e.g., UbD, differentiated instruction, curriculum mapping, and professional learning communities).	3. Develop a multistage, multiyear plan to improve a current initiative via UbD; for example: • Curriculum mapping • Differentiation via essential questions and authentic tasks • Unpacking standards via "big ideas" Develop a one-page graphic showing how all initiatives are really interconnected parts of an overall effort (using analogies such as the limbs of a tree, pieces of a puzzle, supports of a building).
4. Assume that staff members understand the need for UbD or will naturally welcome it.	4. Establish the need for a change (the diagnosis) before proposing UbD as the prescription. Make sure that staff see UbD as an appropriate response to a need they recognize and own.
5. Provide one introductory presentation on UbD and assume that teachers can implement UbD well.	5. Design professional development backward from your goals. Build a year with design workshops, study groups, and action research, during which staff go through many cycles of learning, trying, and getting feedback and then adjusting according to feedback.
6. Offer UbD training for teachers but not for administrators. Conversely, administrators and supervisors need the same training as teachers.	6. Establish parallel tracks of training for administrators in which they learn how to supervise and support UbD—for example, how to conduct in-class look-fors, establish peer reviews of units, form PLC teams to analyze assessment results.

References

Wiggins, G., & McTighe, J. (2007). *Schooling by design*. Alexandria, VA: ASCD.

About the Authors



Grant Wiggins is president of Authentic Education in Hopewell, New Jersey. He earned his EdD from Harvard University and his BA from St. John's College in Annapolis. Grant and his colleagues consult with schools, districts, and state and national education departments on a variety of reform matters. He and his colleagues also organize conferences and workshops, and develop print and web resources on key school reform issues.

Grant is perhaps best known for being coauthor, with Jay McTighe, of *Understanding by Design*, the award-winning and highly successful program and set of materials on curriculum design used all over the world, and of *Schooling by Design*. He is also a coauthor for Pearson Publishing on more than a dozen textbook programs in which UbD is infused. His work has been supported by the Pew Charitable Trusts, the Geraldine R. Dodge Foundation, and the National Science Foundation.

For 25 years, Grant has worked on influential reform initiatives around the world, including Ted Sizer's Coalition of Essential Schools; the International Baccalaureate Program; the Advanced Placement Program; state reform initiatives in New Jersey, New York, and Delaware; and national reforms in China, the Philippines, and Thailand.

Grant is widely known for his work in assessment reform. He is the author of *Educative Assessment* and *Assessing Student Performance*, both published by Jossey-Bass. He was a lead consultant on many state assessment reform initiatives, such as the portfolio project in Vermont and performance assessment consortia in New Jersey and North Carolina.

Several journals have published Grant's articles, including *Educational Leadership* and *Phi Delta Kappan*. His work is grounded in 14 years of secondary school teaching and coaching. Grant taught English and electives in philosophy, coached varsity soccer and cross country, as well as junior varsity baseball and track and field. He also plays in the Hazbins, a rock band. Grant may be contacted at gwiggins@authenticeducation.org.

Jay McTighe brings a wealth of experience developed during a rich and varied career in education. He served as director of the Maryland Assessment Consortium, a state collaboration of school districts working together to develop and share formative performance assessments. Prior to this position, Jay was involved with school improvement projects at the Maryland State Department of Education where he directed the development of the Instructional Framework, a multimedia database on teaching. Jay is well known for his work with thinking skills, having coordinated statewide efforts to develop instructional strategies, curriculum models, and assessment procedures for improving the quality of student thinking. In addition to his work at the state level, Jay has experience at the district level in Prince George's County, Maryland, as a classroom teacher, resource specialist, and program coordinator. He also directed a state residential enrichment program for gifted and talented students.

Jay is an accomplished author, having coauthored 10 books, including the best-selling *Understanding by Design* series with Grant Wiggins. He has written more than 30 articles and book chapters, and has published in leading journals, including *Educational Leadership* (ASCD) and *The Developer* (National Staff Development Council).

Jay has an extensive background in professional development and is a regular speaker at national, state, and district conferences and workshops. He has made presentations in 47 states within the United States, in 7 Canadian provinces, and 18 other countries on 5 continents.

Jay received his undergraduate degree from the College of William and Mary, earned his master's degree from the University of Maryland, and completed postgraduate studies at the Johns Hopkins University. He was selected to participate in the Educational Policy Fellowship Program through the Institute for Educational Leadership in Washington, D.C., and served as a member of the National Assessment Forum, a coalition of education and civil rights organizations advocating reforms in national, state, and local assessment policies and practices. Contact information: Jay McTighe, 6581 River Run, Columbia, MD 21044-6066 USA. E-mail: jmctigh@aol.com.

Related ASCD Resources: Understanding by Design

At the time of publication, the following ASCD resources were available (ASCD stock numbers appear in parentheses). For up-to-date information about ASCD resources, go to www.ascd.org.

ASCD EDge Group

Exchange ideas and connect with other educators interested in Understanding by Design on the social networking site ASCD EDge® at http://ascdedge.ascd.org/ or log onto ASCD's website at www.ascd.org and click on Research a Topic.

Print Products

Integrating Differentiated Instruction and Understanding by Design: Connecting Content and Kids Carol Ann Tomlinson and Jay McTighe (#105004)

Making the Most of Understanding by Design John L. Brown (#103110)

Schooling by Design: An ASCD Action Tool (#707039)

Schooling by Design: Mission, Action, and Achievement Grant Wiggins and Jay McTighe (#107018)

Understanding by Design Expanded 2nd edition Grant Wiggins and Jay McTighe (#103055)

The Understanding by Design Guide to Creating High-Quality Units Grant Wiggins and Jay McTighe (#109107)

The Understanding by Design Professional Development Workbook Jay McTighe and Grant Wiggins (#103056)

DVDs

Connecting Differentiated Instruction, Understanding by Design, and What Works in Schools: An Exploration of Research-Based Strategies with Carol Ann Tomlinson, Jay McTighe, Grant Wiggins, and Robert J. Marzano (#609012)

The Whole Child Initiative helps schools and communities create learning environments that allow students to be healthy, safe, engaged, supported, and challenged. To learn more about other books and resources that relate to the whole child, visit www.wholechildeducation.org.

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