

# Using Universal Design for Learning to Design Standards-Based Lessons

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## Abstract

The Universal Design for Learning (UDL) framework can be used to proactively design lessons that address learner variability. Using UDL guidelines, teachers can integrate flexible options and supports that ensure that standards-based lessons are accessible to a range of learners in their classrooms. This article presents a process that teachers can use as they develop standards-based lesson plans. By “unwrapping” academic standards and applying UDL during the lesson planning process, teachers can identify clear goals aligned with an academic standard and develop flexible methods, assessments, and materials that address the needs and preferences of varied learners. General educators and special educators can use this process to develop inclusive lesson plans that address all learners, with and without disabilities.

## Keywords

special education, education, social sciences, curriculum, diversity and multiculturalism, teaching, students

Learner variability exists in every classroom. Although diversity is often thought of in relation to students’ backgrounds and abilities (e.g., students receiving special education services, English language learners, culturally and linguistically diverse students), variability is not limited to any particular category of students. Learner variability comes in many forms and applies to all students and includes individual and personal attributes of students that impact how they experience schooling. For example, students process information in different ways and work at different paces. They have varied family backgrounds, and bring different knowledge bases and experiences to class. Students vary in their approach to completing tasks (e.g., some find it easy to generate writing whereas others labor over the task), in the ways they interact and communicate in class (e.g., some are reserved whereas others are more talkative), and in the ways they organize and process information. In addition, Meyer, Rose, and Gordon (2014) note that “personal qualities and abilities continually shift, and they exist not within the individual but in the intersection between the individual and their environment, in a vast, complex, ever-changing dynamic balance” (p. 81). The existence of learner variability in any given classroom poses a complex set of factors for teachers to consider as they design instruction to meet the needs of all students. Developing lessons that align with grade-level academic standards while taking into account the varied needs of students is a common challenge for teachers.

Universal Design for Learning (UDL) is a framework for designing flexible instructional environments and proactively integrating supports that address learner variability.

UDL is based on the premise that instruction can be accessible to a wider range of learners when lessons are intentionally designed to include multiple means for accessing, processing, and internalizing information (Rose & Gravel, 2009). By considering the UDL guidelines during the lesson planning phase, teachers can build in flexible pathways from the outset, integrating elements that address the range of backgrounds, preferences, abilities, and needs of their students and ensure that their lessons are comprehensible and engaging for all.

Despite the fact that learner variability exists in all classrooms, UDL-based lesson development does not compel the teacher to develop unique paths for each student’s needs. Because learner variability is both systematic and predictable, teachers can reasonably predict some of the ways in which their students will vary and include flexible options that will support a range of learners in any given class. Teachers can address variability by including flexible pathways within a lesson, which in turn proactively provide supports and scaffolds that take into consideration the diverse attributes of students.

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I. Provide Multiple Means of Representation	II. Provide Multiple Means of Action and Expression	I. Provide Multiple Means of Engagement
<b>1. Provide options for perception</b> 1.1 Offer ways of customizing the display of information 1.2 Offer alternatives for auditory information 1.3 Offer alternatives for visual information	<b>4. Provide options for physical action</b> 4.1 Vary the methods for response and navigation 4.2 Optimize access to tools and assistive technologies	<b>7. Provide options for recruiting interest</b> 7.1 Optimize individual choice and autonomy 7.2 Optimize relevance, value, and authenticity 7.3 Minimize threats and distractions
<b>2. Provide options for language, mathematical expressions, and symbols</b> 2.1 Clarify vocabulary and symbols 2.2 Clarify syntax and structure 2.3 Support decoding of text, mathematical notation, and symbols 2.4 Promote understanding across languages 2.5 Illustrate through multiple media	<b>5. Provide options for expression and communication</b> 5.1 Use multiple media for communication 5.2 Use multiple tools for construction and composition 5.3 Build fluencies with graduated support for practice/performance	<b>8. Provide options for sustaining effort and persistence</b> 8.1 Heighten salience of goals and objectives 8.2 Vary demands and resources to optimize challenge 8.3 Foster collaboration and community 8.4 Increase mastery-oriented feedback
<b>3. Provide options for comprehension</b> 3.1 Activate or supply background knowledge 3.2 Highlight patterns, critical features, big ideas, and relationships 3.3 Guide information processing, visualization, and manipulation 3.4 Maximize transfer and generalization	<b>6. Provide options for executive functions</b> 6.1 Guide appropriate goal-setting 6.2 Support planning and strategy development 6.3 Facilitate managing information and resources 6.4 Enhance capacity for monitoring progress	<b>9. Provide options for self-regulation</b> 9.1 Promote expectations and beliefs that optimize motivation 9.2 Facilitate personal coping skills and strategies 9.3 Develop self-assessment and reflection
Resourceful, knowledgeable Learners	Strategic, goal-directed learners	Purposeful, motivated learners

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**Figure 1.** Universal Design for Learning (UDL) guidelines version 2.0.

In this article, we describe a process that teachers can use to develop standards-based lessons that address learner variability with UDL. By undertaking this process during the lesson planning phase, teachers can increase access for all learners, including students with disabilities and culturally and linguistically diverse students. We describe how teachers can (a) analyze and unwrap academic standards to determine the core skills and concepts that they need to teach and (b) apply UDL guidelines to the four lesson components—goals, assessments, methods, and materials. This process gives teachers a systematic way to design lessons that include flexible pathway and supports to help students progress toward mastery of standards-based lessons.

## Background on UDL

The UDL framework is based on three main principles of providing multiple means of representation, action and expression, and engagement (see Figure 1 for one-page overview of the UDL framework). These three principles of UDL are based on brain research on cognition and learning, which has shown that individuals process information in varying ways. The first principle, multiple means of representation, is linked to the “recognition” networks of the brain. The second principle, multiple means of action and expression, is linked to the “strategic” networks, and the third principle,

multiple means of engagement, is linked to the “affective” networks (Meyer et al., 2014). When we acquire new skills and knowledge, these three networks interact, allowing us to recognize, comprehend, internalize, express, and relate to the information we are learning. The UDL framework presents a structure for designing instructional environments and activities that take into account the varied ways in which these learning networks function for each individual.

The UDL framework presents a set of guidelines for integrating flexible options into curriculum and instruction (see Figure 1) under the three domains of representation, action and expression, and engagement. UDL has nine guidelines and 31 “checkpoints” that provide greater definition on how a teacher can build flexible pathways into a lesson (Hall, Meyer, & Rose, 2012). Educators can refer to the UDL checkpoints as they design lessons, to intentionally consider and proactively build in strategies that support academic and affective needs of students (Israel, Ribuffo, & Smith, 2014). The 31 checkpoints define how to provide physical access, cognitive access, and options for engagement. *Physical access* refers to the representation of information and the formats by which students can receive/express information (e.g., vary the methods for response and navigation, offer alternatives for visual information). *Cognitive access* includes the provision of supports and scaffolds to help students achieve instructional goals. For example, checkpoints

under the UDL Guideline “Provide options for executive function” (e.g., goal setting, supporting planning and strategy development, and monitoring one’s own progress) are examples of methods to provide *cognitive access*. Some checkpoints address strategies to *foster student engagement* (e.g., optimize individual choice and autonomy, heighten salience of goals and objectives). The 31 UDL checkpoints provide a menu of ideas of various scaffolds and options that can be incorporated to make a lesson comprehensible and engaging for varied learners. The Center for Applied Special Technology website ([www.cast.org](http://www.cast.org)) has more information on how the guidelines can be applied to instruction. An interactive graphic of the UDL framework version 2.0 can be found on the National Center for Universal Design for Learning (NCUDL, 2010) website at <http://www.udlcenter.org/aboutudl/udlguidelines>.

A research base on how UDL can be applied to curriculum and instruction has been emerging in the past decade. A review of research studies on UDL in the classroom (Rao, Ok, & Bryant, 2014) found that researchers have applied UDL to various levels of curriculum and instruction. Researchers have examined how UDL can be applied to teacher-developed lessons and curricula (Browder, Mims, Spooner, Ahlgrim-DeLzell, & Lee, 2008; Dymond et al., 2006; King-Sears et al., 2015). Several studies have examined academic outcomes and engagement with UDL-based digital learning environments (Coyne, Pisha, Dalton, Zeph, & Smith, 2012; Dalton, Proctor, Uccelli, Mo, & Snow, 2011; Hall, Cohen, Vue, & Ganley, 2015; Marino et al., 2014; Rappolt-Schlichtmann et al., 2013). Studies have demonstrated that UDL-based instruction results in positive academic gains and increased engagement for students.

UDL focuses on the reduction of barriers in the learning environments to make lessons more inclusive for all students. Teachers can start by considering what the existing barriers are within a lesson and then develop an instructional plan that reduces those barriers by giving students various ways to access and engage with instructional activities. By considering what the barriers are, teachers can build in supports from the outset rather than modifying lessons after the fact to address the needs of learners. General educators and special educators can use UDL to create standards-based lessons for inclusive classroom settings (Meo, 2008). Although UDL-based lessons broaden access for varied learners and build in supports that can address a range of learner needs, it is worth noting that for some students, additional accommodations and modifications may also need to be made to address specific needs and objectives on their individualized education plans.

## Academic Standards and UDL

Academic standards are commonly used to articulate shared expectations of what students should learn as they progress through their schooling. Some countries have developed national curriculum frameworks that include academic

standards and achievement objectives for elementary and secondary grade levels. For example, Finland, Australia, and New Zealand have developed curriculum frameworks that specify benchmarks and learning objectives (Sargent, Houghton, & White, 2011) to be addressed in each grade level across in core content areas. Curriculum frameworks generally include guidance in the inclusion of all students in standards-based education, establishing an imperative to design standards-based instruction with necessary learning supports for students with special educational needs.

In the United States, the Common Core State Standards (CCSS) were developed as a set of national standards that states can choose to adopt. The CCSS is comprised of a common set of learning targets for Grades K-12 in two main domains, English language arts (ELA) and mathematics. In the CCSS, literacy is integrated across the content areas and content areas such as social studies, science, and technical subjects are addressed under the ELA domain. The CCSS establishes a shared set of expectations that focused on achievement for all students, including students who receive services for special education and English language learners (CCSS Initiative [CCSSI], 2015). The CCSS makes reference to UDL in the document titled “Application to Students With Disabilities,” which is available on the CCSS website (<http://www.corestandards.org/about-the-standards/frequently-asked-questions>). Aligned with the Individuals With Disabilities Education Act (IDEA) mandate to ensure access to the general curriculum for students with disabilities, this document notes that the CCSS can improve access to the rigorous academic content standards and identifies UDL as a means to create access, stating,

Promoting a culture of high expectations for all students is a fundamental goal of the Common Core State Standards. In order to participate with success in the general curriculum, students with disabilities, as appropriate, may be provided additional supports and services, such as: Instructional supports for learning-based on the principles of Universal Design for Learning (UDL) which foster student engagement by presenting information in multiple ways and allowing for diverse avenues of action and expression. (p. 1)<sup>1</sup>

## Designing Standards-Based Lessons With UDL

Academic standards are usually worded broadly, without being prescriptive about how to achieve the objectives defined within

<sup>1</sup>The definition of UDL is taken from the from the Higher Education Opportunity Act (PL 110-135 as a scientifically valid framework for guiding educational practice that (a) provides flexibility in the ways information is presented, in the ways students respond or demonstrate knowledge and skills, and in the ways students are engaged; and (b) reduces barriers in instruction, provides appropriate accommodations, supports and challenges, and maintains high achievement expectations for all students including students with disabilities and students who are limited English proficient.

the standard. The CCSS presents broad goals and benchmarks and does not dictate the means by which the standard should be met (Rose, Meyer, & Gordon, 2014). Teachers can design lessons to meet the standards using strategies and resources of their own choice. As they develop instructional activities, they can consider how to address standards and learner variability using UDL. Whereas the academic standards highlight “what” students should learn, UDL can be used to identify “how” lessons can be designed to minimize barriers and support students’ mastery of standards-aligned goals.

In the following sections, we present a process for developing standards-based lessons, using UDL to increase access for all learners. We provide an example of how this process can be applied to one standard. The process has two parts: (a) unwrapping the standard (Ainsworth, 2003) and (b) applying UDL guidelines to four lesson components during the lesson planning process. This process can be used by teachers to develop standards-based lessons and to proactively integrate a variety of instructional supports that address learner variability.

### Unwrapping Standards

Academic standards are written as broad goal statements that provide the foundations for instruction by denoting the skills and knowledge that students should acquire each year. The wording of a standard can be complex and dense, incorporating multiple skills and concepts within one statement. The standards are intended to guide instructional planning. However, because the standards are meant to be broad and provide guidelines for what students should master, the wording often leaves room for teachers to analyze and interpret the standard and design lessons accordingly. Teachers can “unwrap the standard” to clarify the specific knowledge and skills they will address as they design lessons.

Ainsworth (2003) describes a process for coding or “unwrapping” the standards, breaking wording down into component parts. Morgan et al. (2014) illustrate how a table with two columns can be used to unwrap the standard, to identify the core skills and concepts that need to be taught. Teachers can use this unwrapped standard as the basis for defining instructional goals and designing instructional activities.

Unwrapping a standard consists of identifying two parts of the standard to determine what students need to do and know. First, you identify the skills within the standard, by finding words that denote what the student must be able to do. Skills often correspond to the verbs in the standard, because verbs define the action required. Next, you identify the key concepts, the knowledge and background that a student needs to have to complete the skill. Within the wording of a standard, the nouns and descriptive phrases often correspond to the concepts that students need to learn.

Figure 2 illustrates how this process can be applied to one CCSS ELA standard. The standard we unwrap in this example is a CCSS ELA Literacy Writing standard (CCSS.

**CCSS.ELA-Literacy.W.3.3, 4.3, 5.3:**

**Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.**

Skills	Concepts
<ul style="list-style-type: none"> <li>• Write narratives</li> <li>• Develop experiences or events</li> </ul>	<ul style="list-style-type: none"> <li>• Effective technique</li> <li>• Descriptive details</li> <li>• Clear event sequences</li> </ul>

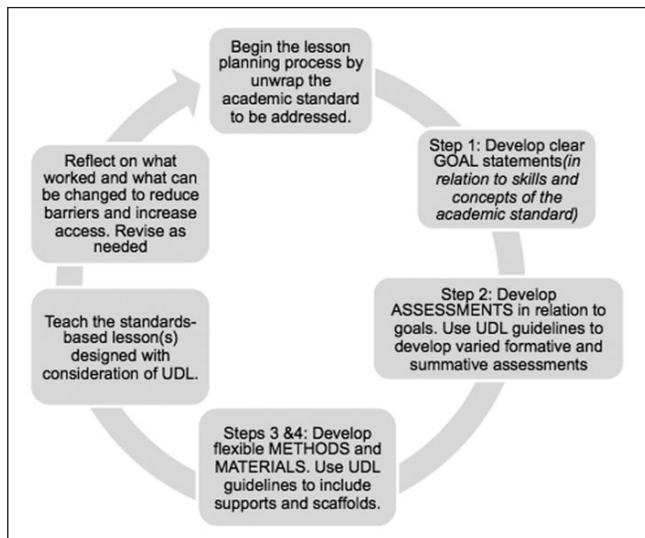
**Figure 2.** Example of how a CCSS ELA literacy writing standard can be unwrapped. By unwrapping a standard, teachers can identify the core skills and the concepts to address as they design a lesson. To begin unwrapping the standard, teachers can start by highlighting and underlining keywords (in this example, the skills are highlighted as bold text and the concepts are underlined). CCSS = Common Core State Standards; ELA = English language arts.

ELA-Literacy.W.3.3, 4.3, 5.3) that is used in Grades 3 to 5. In the example, we have used bolded text to denote the skills and underlined the phrases that denote the concepts. The example presents one way to unwrap this standard; individuals may interpret the wording differently and feel that other words and phrases denote skills/concepts within the standard. It is acceptable to code the standards in varied ways. The essence of the “unwrapping” process is to make sense of the wording of the standard by considering its component parts to identify the core skills and concepts that should be addressed.

By breaking down the standard and examining its component parts, the teacher can determine how to develop an instructional plan that addresses the skills and concepts within the standard. In the example in Figure 2, by noting down the verbs that denote the skills embedded in this standard’s wording, it becomes clearer that the standard addresses two skills, “write narratives” and “develop experiences or events.” The unwrapped standard also highlights the concepts that students should develop and demonstrate through a lesson that addresses this standard. Students will need to use “effective technique,” incorporate “descriptive details,” and develop “clear event sequences.” After unwrapping the standard, the teacher can consider how to develop lesson(s) that support students as they progress toward mastery of the skills and concepts identified.

### Applying UDL to Lesson Components

UDL can be applied to the four lesson components—goals, assessments, methods, and materials—in relation to the skills and concepts denoted in an academic standard. Regardless of the various formats used for lesson plans, the lesson planning



**Figure 3.** UDL cycle of instructional planning. This diagram illustrates the steps of the process of unwrapping standards and designing UDL-based lessons. UDL = Universal Design for Learning.

process typically entails these common elements that correspond to the four lesson components: identifying lesson goals and objectives that align to standards (goals), developing instructional strategies (methods), choosing resources and materials (materials), and assessing student progress and outcomes (assessment). Figure 3 illustrates the cycle of instruction, denoting how academic standards can guide the development of goals, which, in turn, guide the development of assessments, methods, and materials.

After unwrapping the academic standard, teachers can begin the lesson planning process by reflecting on four key questions listed in Table 1. Teachers can choose to apply UDL guidelines to one or more of the lesson components. There is no prescriptive way to apply UDL; it is left to a teacher’s discretion to add flexibility and options in ways that are best suited to the standards and content being addressed. Knowing the needs of their students, teachers can apply UDL guidelines in various ways to address their particular context. This process of designing lessons with UDL can be applied to an individual lesson or a series of lessons; because standards are written as broad learning targets, it can require a series of lessons (e.g., a unit of instruction on a topic) or various lessons over the course of several months or an academic year to address a specific standard.

In the sections below, we describe how UDL can be applied to goals, assessments, methods, and materials. In Table 2, we provide an example of the process, demonstrating how these four lessons components connect to one another and to the academic standard being addressed by a lesson. In the example in Table 2, we refer to the ELA standard unwrapped earlier (see Figure 1) and illustrate how a teacher can develop clear goal statements based on an

**Table 1.** Considering UDL for Lesson Components.

Lesson component	Questions to ask when considering flexible components and UDL
Goals	Based on the academic standard addressed in this lesson, what are the skills and concepts that we want students to master?
Assessments	How can students demonstrate achievement of the identified goals in varied ways?
Methods	What supports and scaffolds can be used as part of instruction to help students acquire the content and demonstrate what they have learned?
Materials	What resources, materials, and tools can be used to provide multiple means to represent and express information and concepts or to engage with content?

Note. UDL = Universal Design for Learning.

unwrapped standard and subsequently reduce barriers by building flexible pathways in the assessments, methods, and materials related to the goals.

**Step 1: Goals**

Developing clear goal statements is a first step to designing standards-based lessons that are accessible for all learners. By writing clear goal statements, teachers can articulate how their lesson objectives connect to the academic standard, and clearly define what they expect students to learn in a lesson. In the process of identifying clear goals, teachers can consider potential barriers students may have when reaching the goal and, as a result, include flexible options in their methods, materials, and/or assessments to support students as they learn skills and concepts. For standards-based lessons, teachers can develop clear goals statements by unwrapping the academic standard and then asking the question, “Based on the standard, what are the skills and concepts that we want students to master?”

Academic standards often include words that specify *how* students should express knowledge. For example, in Figure 2, the CCSS ELA standard starts with the phrase “write narratives.” After noting that the standard includes information on a specific format for expression of knowledge (in this case, writing), teachers can consider how they would like to develop a goal statement for their lesson based on this standard. Teachers can use professional judgment to develop goals based on the standard, taking into consideration the needs of students and the goals of a lesson. In some cases, it might be appropriate to modify the format to help students develop mastery of the various skills and concepts within a standard.

One teacher might decide to interpret the standard literally and clarify that the goal is to have students “write narratives.” Another teacher might decide that the goal is for students to learn how to develop narratives without

**Table 2.** Addressing Standard With UDL-Based Flexible Lesson Components.

Lesson components	Skills	Concepts	UDL guidelines addressed
Unwrap the standard	<ul style="list-style-type: none"> <li>• Write narratives</li> <li>• Develop experiences or events</li> </ul>	<ul style="list-style-type: none"> <li>• Effective technique</li> <li>• Descriptive details</li> <li>• Clear event sequences</li> </ul>	
Step 1: Goals (Develop clear goal statements based on unwrapped standard)	<ul style="list-style-type: none"> <li>• Students will create narratives in written, oral, or multimedia format (chosen by student)</li> <li>• In their narratives, students will describe experiences or events.</li> </ul>	<ul style="list-style-type: none"> <li>• Students will understand elements of effective technique in narratives (e.g., including details, sequencing events clearly).</li> <li>• Students will demonstrate their knowledge of effective technique by including descriptive details and clear event sequences in their narratives.</li> </ul>	<p>Guideline 5: Provide options for expression and communication</p> <p>5.1. Use multiple media for communication</p> <p>5.2. Use multiple tools for construction and communication</p> <p>Guideline 7: Provide options for recruiting interest</p> <p>7.1. Optimize individual choice and autonomy</p>
Step 2: Assessments (Develop formative and summative assessments related to goal statements)	<ul style="list-style-type: none"> <li>• As a summative assessment, teacher will evaluate student acquisition of skills through                             <ul style="list-style-type: none"> <li>○ Presentations (posters or multimedia projects)</li> <li>○ Oral or audio-recorded presentations</li> <li>○ Written narrative</li> </ul> </li> <li>• Teacher will provide a rubric with clear criteria for elements that should be in the narrative in any of the formats selected by students</li> </ul>	<ul style="list-style-type: none"> <li>• As a formative assessment, teacher will evaluate artifacts that students create as they develop their narratives. Artifacts include storyboard worksheets, graphic organizers, sequencing cards. Teacher will provide feedback during narrative development process to help students use effective technique.</li> </ul>	<p>Guideline 5: Provide options for expression and communication</p> <p>5.1. Use multiple media for communication</p> <p>5.2. Use multiple tools for construction and communication</p> <p>Guideline 6: Provide options for executive function</p> <p>6.1. Guide appropriate goal setting</p> <p>6.4. Enhance capacity for monitoring progress</p> <p>Guideline 8: Provide options for sustaining effort and persistence</p> <p>8.4. Increase mastery-oriented feedback</p>
Step 3: Methods (Develop instructional strategies that integrate supports and scaffolds)	<ul style="list-style-type: none"> <li>• Students will have a choice of format</li> <li>• Students will develop the components of their narrative through activities that include scaffolds/supports</li> <li>• Students will have opportunities to practice component skills, such as describing experiences or events, incrementally (see “Concepts” column)</li> </ul>	<ul style="list-style-type: none"> <li>• As a whole group activity, teacher and students will read and analyze components of narratives; students will identify descriptive details and event sequences; teacher will highlight essential elements of a good narrative (effective technique).</li> <li>• To make connections to concepts that students are familiar with and to increase relevance and authenticity, teacher asks students to develop descriptive details about artifacts that have meaning to them (photos they take, objects they bring from home). In small groups, students will practice developing descriptive details about their artifact. Students will develop descriptive details about their artifact in small group with peer and teacher feedback.</li> </ul>	<p>UDL Guideline 9: Provide options for self-regulation motivation</p> <p>9.1. Promote expectations and beliefs that optimize motivation</p> <p>9.3. Develop self-assessment and reflection</p> <p>Guideline 2: Provide options for language, mathematical expressions, and symbols</p> <p>2.1. Clarify vocabulary and symbols</p> <p>2.2. Clarify syntax and structure</p> <p>2.4. Promote understanding across languages</p> <p>2.5. Illustrate through multiple media</p> <p>Guideline 3: Provide options for comprehension</p> <p>3.1. Activate or supply background knowledge</p> <p>3.2. Highlight patterns, critical features, big ideas, and relationships</p> <p>3.3. Guide information processing, visualization, and manipulation</p>

(continued)

**Table 2. (continued)**

Lesson components	Skills	Concepts	UDL guidelines addressed
		<ul style="list-style-type: none"> <li>• To develop concept of clear event sequences, students will develop short sequences of events, share with each other, and assess whether they make sense. Students can use a variety of tools to develop their sequences (post-it notes, index cards on which they draw images/write text, PowerPoint slides on which they place digital images and type in captions).</li> <li>• Students who prefer to develop their narratives orally will be guided to record what they will say and elaborate on their ideas with teacher feedback.</li> <li>• Teacher will provide supports for developing vocabulary and making connections to background knowledge about narratives. Students can use graphic organizers (paper or digital) to generate a word bank for their narrative, ELL students can generate ideas using first language, etc.</li> </ul>	<p>Guideline 5. Provide options for expression and communication</p> <p>5.3. Build fluencies with graduated support for practice/ performance</p> <p>Guideline 6: Provide options for executive function</p> <p>6.2. Support planning and strategy development</p> <p>Guideline 7. Provide options for recruiting interest</p> <p>7.2. Optimize relevance, value, and authenticity</p> <p>Guideline 8. Provide options for sustaining effort and persistence</p> <p>8.3. Foster collaboration and community</p>
<p>Step 4: Materials that provide flexible ways to develop and express skills and knowledge)</p>	<ul style="list-style-type: none"> <li>• Materials that support the student-selected formats               <ul style="list-style-type: none"> <li>○ Written report</li> <li>○ Poster (for presentation)</li> <li>○ Multimedia presentation</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Storyboard worksheet (paper worksheet with boxes on which students draw images and write captions)</li> <li>• Graphic organizer (paper based or digital)</li> <li>• Recording tools (apps on a mobile device or on a laptop)</li> </ul>	<p>Guideline 1. Provide options for perception</p> <p>1.2. Offer alternatives for auditory information</p> <p>1.3. Offer alternatives for visual information</p> <p>Guideline 4. Provide options for physical action</p> <p>4.1. Vary the methods for response and navigation</p> <p>4.2. Optimize access to tools and assistive technologies</p>
			<p>Guideline 5: Provide options for expression and communication</p> <p>5.2. Use multiple tools for construction and communication</p>

Note. The table illustrates how the standard connects with goals, assessments, methods, and materials. Using the example of the CCSS ELA Literacy standard that was unwrapped in Figure 1, this table denotes how a teacher can develop lesson components that address skills and concepts within the standard: CCSS.ELA-Literacy.W.3.4.3, 5.3; Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences. UDL = Universal Design for Learning; ELL = English language learner; CCSS = Common Core State Standards; ELA = English language arts.

defining the specific format in the goal statement. This teacher might want to give students options to develop a narrative with a choice of formats (e.g., oral retelling, multimedia presentation, in writing). She or he can develop a goal statement that states that students can “create narratives in written, oral, or multimedia format,” denoting the connection to the academic standard and clearly stating how it was modified for purposes of this lesson. Another teacher might decide that the ultimate goal is to have students write narratives, as stated in the standard, but to give students flexible pathways that incorporate other formats for expression during the instructional process. This teacher can design a lesson in which students have the choice to develop their narratives in various formats as they work toward ultimately creating a written narrative. In these ways, based on their objectives for a lesson and for their students, teachers can develop clear goal statements in relation to the academic standard.

Stating a clear goal statement is important because the goal drives the other lesson components (assessments, methods, materials). For example, if the teacher’s goal for a particular lesson is to have all students “write narratives” in this specific format, it is important to consider the fact that writing can pose barriers for some students. The teacher can take into consideration ways to facilitate the writing process. Some students benefit from drafting their writing on a computer and/or utilizing software that helps them organize or generate words (e.g., graphic organizer software; Bouck, Meyer, Satsangi, Savage, & Hunley, 2015). Students can also develop fluency with writing through the use of multimodal scaffolds, such as writing captions to images, describing their narratives orally, or recording their narratives before putting them in written format (Rao, Dowrick, Yuen, & Boisvert, 2009; Wolsey & Grisham, 2012). By including these options, as appropriate, within a lesson, the teacher can build in supports to help students master the goal. In contrast, if a teacher’s goal is to have students develop a narrative in a format of their choice, the teacher can provide supports and scaffolds for students to help them develop their work. By starting the planning process with a clear goal statement, teachers can make key decisions about the scaffolds and supports they can include within their instructional activities.

Table 2 illustrates how the UDL framework can be used to define clear goal statements and how the assessments, methods, and materials for the lesson are linked to that goal statement. In the “Goals” row of Table 2, the teacher chooses to modify the “write narratives” skill within the standard and allows students the choice to “create narratives” in varied formats of their choice. This aligns with the UDL by (a) giving students the opportunity to use multiple media for communication (UDL Checkpoint 5.1), (b) letting students use multiple tools for construction and composition (UDL Checkpoint 5.2), and (c) optimizing individual choice by

letting students select their preferred format for expression (UDL Checkpoint 7.1). The teacher also develops a clear goal statement to address the three main concepts within the standard stating that, “students will demonstrate their knowledge of effective technique by including descriptive details and clear event sequences in their narratives.” By clearly describing what is expected of the students, the teacher can build in supports to help students achieve these goals linked to the standard.

## Step 2: Assessments

Assessments are closely tied to instructional goals. The goal statement(s) describes what the teacher would like students to learn, do, or engage with to reach mastery of skills/content related to a standard. To assess whether students are reaching mastery, teachers can build in two kinds of assessments—formative assessments that allow students to demonstrate their progress as they learn and summative assessments that show what a student has learned from the lesson or at the end of a unit. UDL guidelines can be applied to developing both formative and summative assessments. The teacher can begin by asking the question “How can students demonstrate achievement of the identified goals in varied ways?”

If the goal statement does not state the specific format for demonstration of knowledge, the teacher can evaluate a student’s knowledge by offering options of various formats, not limiting the evaluation to just one type of product. In the example in Table 2, the teacher gives the students various choices for the end product. The student can create a poster, multimedia presentation, oral presentation, or a written narrative. This gives students the opportunity to use (a) multiple media for communication (UDL Checkpoint 5.1) and (b) multiple tools for construction and composition (UDL Checkpoint 5.2). When students are given choices of various formats, it is useful to provide clear criteria for what is expected. By creating a checklist or rubric, teachers can establish expectations and clarify what the end product must include, regardless of the format the student chooses. Using these criteria, the teacher can assess students’ progress toward or mastery of the skills and concepts learned during the lesson(s). This aligns with UDL by (a) guiding appropriate goal setting by clearly articulating the end goals (UDL Checkpoint 6.1) and (b) enhancing the capacity for monitoring progress by providing a format for students to assess their own work (UDL Checkpoint 6.4).

Many times, teachers are required to use a summative assessment in a specific format (e.g., a written report that all teachers at the grade level have assigned). In this case, flexibility can be built into formative assessments of a student’s progress prior to the summative assessment. If the student has to ultimately generate a written narrative, the artifacts that a student creates in the development process can be assessed along the way. As an interim step to developing a report, the student can be asked to orally state the key points or to create

a presentation that includes the key points. The teacher can assess whether the student is demonstrating proficiency with the concepts within the standard (e.g., effective technique, descriptive details, and clear event sequences) and provide feedback to the student to support the development of his or her written narrative. If students have used other supports such as graphic organizers, audio recordings, drawings, they can also turn in these artifacts along with the written narrative. By assessing these formative stages, teachers can “provide mastery-oriented feedback” (UDL checkpoint 8.4) and assess the interim steps a student takes to generate the final written narrative. For students who struggle with or feel anxious about tests, assessing their formative work can be a way to provide incremental feedback, give students opportunities to make progress with skills with feedback, helping them feel like more successful learners and building a sense of confidence as learners. These strategies align with UDL checkpoints of (a) promoting expectations and beliefs that optimize motivation (UDL Checkpoint 9.1), (b) facilitating personal coping skills and strategies (UDL Checkpoint 9.2), and (c) giving students the opportunity to develop self-assessment and reflection (UDL Checkpoint 9.3).

*A note on standardized testing.* Teachers often have to prepare students for standardized tests, limiting the flexibility they can provide in a lesson. In this case, teachers can identify goals that are directly linked to test-taking strategies and provide students with supports and practice to be able to respond effectively to standardized test formats (Novak, 2014). For example, a goal might be to have students gain comfort with standardized test structures, to help students prepare for the test and to minimize stress. Within a standards-based lesson, the teacher can include goals related to the content being taught and also include goals related to familiarizing students with the formats they will encounter on the test when they are assessed on this content. UDL guidelines that align with standardized test preparation are (a) providing clarification of test language (UDL Checkpoint 2.1), (b) highlighting patterns that the student can expect to find in the test (UDL Checkpoint 3.2), (c) building fluency in the test format through practice (UDL Checkpoint 5.3), (d) minimizing threats and distractions by pre-teaching specific test-taking strategies (UDL Checkpoint 7.3), and (e) facilitating personal coping skills by preparing the student for the test (UDL Checkpoint 9.2).

### Step 3: Methods

Methods are at the heart of the instructional process; these are the strategies teachers use to implement a lesson to convey information and engage students in the process of developing mastery of skills and content. After unwrapping the standard, stating a clear goal, and determining how students will be assessed, there are numerous ways in which teachers

can apply UDL to the instructional strategies they will use during a lesson. Because the lesson goals are linked to the skills/concepts identified within the standard, the teacher can use UDL to ensure that students have flexible and engaging ways to work toward that goal, as they progress toward mastery of the academic standard that guides the lesson. As they consider instructional strategies to use, teachers can ask the question “What supports and scaffolds can be used as part of instruction to help students acquire the content and demonstrate what they are learning?”

Many of the UDL checkpoints provide direct suggestions for supports that can be used during instruction. UDL Guideline 2 (provide options for language, mathematical expressions, and symbols) and Guideline 3 (provide options for comprehension) and their checkpoints suggest various techniques that can help make information comprehensible to a wide range of learners. The UDL checkpoints also provide ideas for scaffolds that can be provided during instructional activities. Scaffolds are the incremental supports that are provided during the instructional process and can be faded as students master concepts. Scaffolds are useful in addressing learner variability because they can be used by each student to the degree that they are needed. Given the varied background experiences, knowledge, and abilities of students, scaffolds can provide varied levels of support and/or challenge for students as needed. For example, teachers can provide scaffolds to support executive function, which falls under UDL Guideline 6. Executive function refers to the individual’s ability to organize, manage, and act upon information. Teachers can build in scaffolds for executive function by integrating opportunities for goal setting, planning and strategy development, and self-monitoring as part of the activities within a lesson. Teachers can also ask themselves where they can build fluency with new skills/content by providing graduated support for practice and performance (UDL Checkpoint 5.3). These scaffolds can address learner variability by providing students with various supports as they learn, giving them ways to practice and master skills as appropriate for their ability levels.

In the example in Table 2, the teacher uses various supports and scaffolds to help students “demonstrate their understanding of effective technique by including descriptive details and clear event sequences in their narratives,” which is the instructional goal linked to the concepts for the standards that guide this lesson. To do this, the teacher includes activities that give students opportunities to describe objects and reflect on how they can be more accurate or vivid in their descriptions. She asks students to bring in artifacts that are meaningful to them and to come up with as many descriptive words about that object. In this way, she addresses various UDL guidelines related to vocabulary. This activity helps (a) students clarify vocabulary and symbols (UDL Checkpoint 2.1), (b) students clarify syntax and structure (UDL Checkpoint 2.2), (c) promote understanding

across languages for students who are culturally and linguistically diverse (UDL Checkpoint 2.4), and (d) illustrate concepts with the use of multiple media (UDL Checkpoint 2.5). This activity also engages students in the development of the concept by starting with something that is relevant and authentic to them (UDL Checkpoint 7.2). The teacher can use various formats for this activity to support student learning. For example, they can first describe their objects to a small group and get feedback from their classmates. Then they can share their artifact and descriptive details with the whole class. This fosters community and collaboration in a way that can be supportive for students (UDL Checkpoint 8.3). These activities serve to give students opportunities to clarify and practice what they are expected to do before they are asked to work on their narratives independently (UDL Checkpoint 6.2).

To develop students' understanding of "clear event sequences," the teacher does a guided activity in which the students reflect on narratives she has chosen to identify the event sequences. This can (a) activate or supply background knowledge before students try to develop event sequences on their own (UDL Checkpoint 3.1) and (b) highlight patterns, critical features, big ideas, and relationships (UDL Checkpoint 3.2). Teachers can also provide students with images or strips of text that they have to sequence to practice what a clear event sequence is, guiding information processing and visualization (UDL Checkpoint 3.3). These are just a few examples of instructional supports and scaffolds that a teacher can integrate to address specific skills and concepts of the standards-based lesson. All the supports described above can be helpful to a range of students by providing various options that support perception, comprehension, processing, expression, and engagement for varied learners. Integrating strategies that motivate and engage students during the learning process is an essential aspect of learning as students build skills and knowledge.

#### **Step 4: Materials**

The resources and materials that teachers use in a lesson should align closely with the instructional strategies and scaffolds used in the lesson. Teachers can decide how to provide flexible options and support learning processes using a variety of materials. Materials can include "no tech" or low tech resources such as post-it notes, index cards, and flash cards. They can include high tech tools, such as computers and tablets. Materials can be used to help students chunk information (e.g., writing down information on an index card or brainstorming and generating a classroom list with post-it notes) or process information in varied ways (e.g., using graphic organizers to organize information). Teachers can ask themselves, "What resources, materials, and tools can be used to provide multiple means to represent and express information and concepts or to engage with content?"

Teachers can also include materials that support the process of learning. For example, a mobile device such as a tablet or smartphone can be used to have the students record what they have to say as an interim step to developing a written narrative. Sometimes materials and tools are made available only to specific students, for example, visual organizers or technology tools are given to students who have that on their individualized educational plans (IEPs). For a UDL-based lesson, it is optimal to provide supports to all students and give students the choice to use various materials, instead of providing them as modification or accommodation only for specified students.

In the example in Table 2, the teacher uses a "storyboard worksheet" to help students develop a narrative. This worksheet provides a way for students to plan out their narrative using images and captions. The teacher also gives students the opportunity to use digital graphic organizer software to brainstorm ideas prior to creating their storyboard. Students can also use digital devices, such as apps on a tablet or smartphone or software on a laptop to record their thoughts and to use their audio recordings to develop structured narratives. The use of these materials (a) offers alternatives for auditory information (UDL Checkpoint 1.2) and for visual information (UDL Checkpoint 1.3), (b) varies the methods for communication (UDL Checkpoint 4.1), (c) gives students access to tools and assistive technologies (UDL Checkpoint 4.2), and (d) lets students use multiple tools for construction and communication (UDL Checkpoint 5.2).

*A note about digital tools.* It is worth mentioning that although UDL does not require the use of technology, digital tools help to create flexible environments. For example, laptops and tablets present text in a digital format. This "digital text" inherently includes options that increase flexibility and access. For example, digital text can be easily manipulated. The font size or color can be modified, text spacing can be changed, and text-to-speech features of the computer can be used to listen an audio version of the text on screen. Digital text can also be linked to definitions, words, and phrases. Digital text can be formatted to help students chunk information and to remove visual clutter. For teachers who have the opportunity to integrate computers or tablets into the classroom, digital text and media provide many options for flexibility that can support student needs during the learning process, consistent with UDL Guideline 1 (provide options for perception) and UDL Guideline 4 (provide options of physical access). Simply providing students with digital text may not be enough however. It is important for teachers to know how digital text can be used as part of a set of flexible methods and materials to make content more accessible to students. To this end, it is important to provide teachers with the professional development and support to understand how to incorporate these features into their instructional strategies.

## Conclusion

Academic standards provide a benchmark for essential skills and knowledge that students need to master as they progress through the grade levels. Teachers can identify goals that are aligned to academic standards and provide various ways for achieving the goals, integrating instructional strategies that serve as supports and scaffolds to help all students progress toward mastery of the standards-based lessons. The instructional design process described in this article highlights how teachers can proactively differentiate lessons using the UDL guidelines as a menu of options to consider during the lesson planning process. The example of how UDL can be applied to the lesson components to address one ELA standard illustrated just a few ways in which teachers can integrate flexible goals, methods, materials, and assessments. Teachers are free to choose the elements that resonate for them, given the reality of their classrooms and the initiatives at their schools. If a school has adopted a packaged curriculum, teachers may not have room to make all components flexible, but can ask themselves how to add in some flexibility, as a scaffold to having students reach the end goals. By considering UDL during the planning process and adding in flexible pathways to reaching the learning goals, teachers can reduce barriers that exist in curricula and increase opportunities that allow all learners to reach the same high standards.

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## References

- Ainsworth, L. (2003). *"Unwrapping" the standards: A simple process to make standards manageable*. Englewood, CO: Lead + Learn Press.
- Bouck, E. C., Meyer, N. K., Satsangi, R., Savage, M. N., & Hunley, M. (2015). Free computer-based assistive technology to support students with high-incidence disabilities in the writing process. *Preventing School Failure, 59*, 90-97. doi:10.1080/1045988X.2013.841116
- Browder, D. M., Mims, P. J., Spooner, F., Ahlgrim-Delzell, L., & Lee, A. (2008). Teaching elementary students with multiple disabilities to participate in shared stories. *Research and Practice for Persons With Severe Disabilities, 33*, 3-12. doi:10.2511/rpsd.33.1-2.3
- Common Core State Standards Initiative. (2015). *Application to students with disabilities* [Webpage]. Retrieved from <http://www.corestandards.org/wp-content/uploads/Application-to-Students-with-Disabilities-again-for-merge1.pdf>
- Coyne, P., Pisha, B., Dalton, B., Zeph, L. A., & Smith, N. C. (2012). Literacy by design: A universal design for learning approach for students with significant intellectual disabilities. *Remedial and Special Education, 33*, 162-172. doi:10.1177/0741932510381651
- Dalton, B., Proctor, C. P., Uccelli, P., Mo, E., & Snow, C. E. (2011). Designing for diversity: The role of reading strategies and interactive vocabulary in a digital reading environment for fifth-grade monolingual English and bilingual students. *Journal of Literacy Research, 43*, 68-100. doi:10.1177/1086296X103978732
- Dymond, S. K., Renzaglia, A., Rosenstein, A., Chun, E. J., Banks, R. A., Niswander, V., & Gibson, C. L. (2006). Using a participatory action research approach to create a universally designed inclusive high school science course: A case study. *Research and Practice for Persons With Severe Disabilities, 31*, 293-308. doi:10.1177/154079690603100403
- Hall, T. E., Cohen, N., Vue, G., & Ganley, P. (2015). Addressing learning disabilities with UDL and technology: Strategic reader. *Learning Disability Quarterly, 38*, 72-83. doi:10.1177/0731948714544375
- Hall, T. E., Meyer, A., & Rose, D. (2012). *Universal design for learning in the classroom: Practical applications*. New York, NY: Guilford Press.
- Israel, M., Ribuffo, C., & Smith, S. (2014). *Universal design for learning: Recommendations for teacher preparation and professional development* (Document No. IC-7). Retrieved from <http://cedar.education.ufl.edu/tools/innovation-configurations>
- King-Sears, M. E., Johnson, T., Berkeley, S., Weiss, M., Peters-Burton, E., Evmenova, A., . . . Hursh, J. (2015). An exploratory study of universal design for teaching chemistry to students with and without disabilities. *Learning Disability Quarterly, 38*, 84-96. doi:10.1177/0731948714564575
- Marino, M. T., Gotch, C. M., Israel, M., Vasquez, E., Basham, J. D., & Becht, K. (2014). UDL in the middle school science classroom: Can video games and alternative text heighten engagement and learning for students with learning disabilities? *Learning Disability Quarterly, 37*, 87-99. doi:10.1177/0731948713503963
- Meo, G. (2008). Curriculum planning for all learners: Applying universal design for learning (UDL) to a high school reading comprehension program. *Preventing School Failure: Alternative Education for Children and Youth, 52*(2), 21-30. doi:10.3200/PSFL.52.2.21-30
- Meyer, A., Rose, D. H., & Gordon, D. (2014). *Universal design for learning: Theory and practice*. Wakefield, MA: Center for Applied Special Technology. Retrieved from <http://udltheory-practice.cast.org/login>
- Morgan, J., Brown, N., Hsiao, Y., Howerter, C., Juniel, P., Sedano, L., & Castillo, W. (2014). Unwrapping academic standards to increase the achievement of students with disabilities. *Intervention in School and Clinic, 49*, 131-141. doi:10.1177/105345121349
- National Center on Universal Design for Learning. (2010). *UDL guidelines version 2.0* [Webpage]. Retrieved from <http://www.udlcenter.org/aboutudl/udlguidelines>
- Novak, K. (2014). *UDL now: A teacher's Monday morning guide to implementing the common core standards using universal design for learning*. Wakefield, MA: CAST Professional Publishing.
- Rao, K., Dowrick, P., Yuen, J., & Boisvert, P. (2009). Writing in a multimedia environment: Pilot outcomes for high school students in special education. *Journal of Special Education Technology, 24*, 27-38. doi:10.1177/016264340902400103

- Rao, K., Ok, M. W., & Bryant, B. R. (2014). A review of research on universal design educational models. *Remedial and Special Education, 35*, 153-166. doi:10.1177/0741932513518980.
- Rappolt-Schlichtmann, G., Daley, S. G., Lim, S., Lapinski, S., Robinson, K. H., & Johnson, M. (2013). Universal design for learning and elementary school science: Exploring the efficacy, use, and perceptions of a web-based science notebook. *Journal of Education Psychology, 105*, 1210-1225. doi:10.1037/a0033217
- Rose, D. H., & Gravel, J. W. (2009). Getting from here to there: UDL, global positioning systems, and lessons for improving education. In D. T. Gordon, J. W. Gravel, & L. A. Schifter (Eds.), *A policy reader in universal design for learning* (pp. 5-18). Cambridge, MA: Harvard Education Press.
- Rose, D. H., Meyer, A., & Gordon, D. (2014). Reflections: Universal design for learning and the common core. *The Special EDge, 27*(2), 3-5.
- Sargent, C., Houghton, E., & White, E. (2011). *Thematic Probe: Curriculum specification in seven countries: April 2011*. Slough, UK: National Foundation for Educational Research. Retrieved

from <https://www.nfer.ac.uk/research/centre-for-information-and-reviews/inca/TP%20Curriculum%20specification%20in%20seven%20countries%202011.pdf>

- Wolsey, T. D., & Grisham, D. L. (2012). *Teaching Practices That Work: Transforming writing instruction in the digital age: Techniques for grades 5-12*. New York, NY: Guilford Publications.

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