

# UDL and Students with Significant Cognitive Disabilities: Ensuring All Means All

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### Abstract

*Universal Design for Learning (UDL) is a framework that depends on the capacity of educators to apply the UDL principles to the widest range of learners. However, many educators still need tools and professional development to apply the principles in a way that includes students with significant cognitive disabilities. In this paper, we describe the work of the National Center and State Collaborative (NCSC) and how the resources developed by NCSC, will help ensure that students with significant cognitive disabilities are included in the implementation of UDL and the Common Core State Standards. NCSC is comprised of 25 states and five national centers. The consortium has a U.S. Department of Education grant to develop an alternate assessment for English Language Arts and Mathematics, based on the Common Core State Standards, for students with significant cognitive disabilities. NCSC realized that educators need resources and professional development to teach the content that will be assessed. Therefore, in addition to the alternative assessments, NCSC is developing curriculum and instructional resources and professional development modules using UDL principles. These resources and modules will be publicly available for use in any state regardless of whether the state is using the NCSC assessments.*

### Keywords

- Universal Design for Learning
- Common Core State Standards
- Significant cognitive disabilities
- Alternate assessment,
- Instructional resources
- NCSC
- National Center and State Collaborative

### INTRODUCTION

The National Center and State Collaborative (NCSC) is comprised of 25 states and five national centers (See <http://www.ncscpartners.org>). In 2010, NCSC was awarded a grant by the U.S. Department of Education to develop new alternate assessments in math and English Language Arts (ELA) based on the Common Core State Standards (CCSS) for students with significant cognitive disabilities

by 2014-15.<sup>1</sup> The evidence-centered design of the NCSC assessments is infused with UDL. However, NCSC understands that assessing students without first providing opportunities for learning in a challenging, grade-level curriculum cannot be expected to result in meaningful changes in student outcomes. Therefore, the NCSC approach is to build these assessments as part of a broader system which includes curriculum and instructional resources. One of the quality indicators for the NCSC resources is the application of the UDL principles.

The foundational element of the NCSC curriculum, instruction and assessment framework is communicative competence (See Appendix 1). If a student cannot communicate what he knows and can do, then effective instruction cannot occur. Removing this barrier to learning is essential to including students with significant cognitive disabilities in UDL and CCSS implementation in a meaningful way. Therefore, providing multiple means of expression is a big part of the NCSC instructional and assessment framework.

### NCSC SCHEMA

The NCSC Schema (see Appendix 2) is divided into two parts. One part contains the curriculum resources (i.e., “what” to teach). The other part contains the instructional resources (i.e., “how” to teach”). Strategies, materials, and examples that model UDL are infused throughout these resources.

### Curriculum Resources

To address alignment with the CCSS as well as with a common understanding of academic learning, NCSC first adopted the learning progression frameworks (LPFs) developed through a project sponsored by the National Alternate Assessment Center (NAAC) at the University of Kentucky. The NAAC LPFs represent, for English Language Arts and mathematics, CCSS-defined content areas, and descriptions of “successively more sophisticated ways of thinking about a topic that can follow one another as students learn about and investigate a topic over a broad span of time” (p. 214, National Research Council, 2007; Hess, 2011).

The second step in NCSC’s approach to aligning curriculum, instruction, and assessment with one another and with the CCSS, is the development of Core Content Connectors

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<sup>1</sup> Some states may have different implementation timelines.

(CCCs), which link the content targets defined in the CCSS with the progress indicators described in the LPFs. The CCCs represent comprehensive and grade-appropriate content pathways through the CCSS for the instruction and assessment of students with significant cognitive disabilities. These pathways have been identified through literature reviews and the joint moderated judgment of experienced teachers in mathematics and ELA, as well as teachers of students with moderate to severe disabilities. They are not extended from the content in the CCSS, but instead transform priority standards from the CCSS into discrete, teachable and assessable content targets. These targets provide more frequent, smaller benchmarks as students with significant cognitive disabilities move through the core content in the CCSS.

Two sets of NCSC resources were then developed to help teachers gain a deeper understanding of the content. Both the Content Modules and the Curriculum Resource Guides were developed in collaboration with general and special education experts.

The Content Modules are an online multimedia resource that provides teachers with a deeper understanding of complex concepts in mathematics and ELA. Each Content Module includes a sample universally designed lesson plan as well as a second lesson plan with a template for applying the principles of UDL. The Curriculum Resource Guides show how the content is taught in general education and provides ideas for teaching across content areas, assessment examples, ideas for real life use, examples of modifications and adaptations for students with specific learning needs, and ways to promote college and career readiness. The specific learning needs addressed include sensory differences, motor differences, limited evidence of experience/skill, limited motivation/attention, and lack of or extremely limited use of speech. See Appendix 3 and Appendix 4 for examples of UDL charts in the ELA and math Curriculum Resource Guides that address these different learning needs. The information provided in the Curriculum Resource Guides on incorporating UDL when planning instruction can be utilized by teachers as they implement NCSC instructional resources, as well as when they develop new lesson plans.

### **Instructional Resources**

NCSC resources provide a range of instructional tools for meeting the needs of all students. These resources are grounded in the assumption of the least restrictive environment for learning, in both the context of grade-level peers and the content. The NCSC UDL Units and Lesson Plans provide models of universally designed instruction based on the CCSS for that grade-level. They model how to teach the Core Content Connectors from the NCSC content model in the context of general education lessons. The Units and Lesson Plans incorporate multiple means of engagement, representation, and expression into the lesson designs. Specific strategies and supports are included for students who are emerging readers and/or emerging com-

municators. They also include formative classroom assessments that help teachers understand where students may need more intensive supports as they work in the context of the grade-level curriculum.

For students who need more intensive supports to be successful in the grade-level curriculum, the NCSC project offers additional resources for teachers to build intensive instruction based on evidence-based practices. These Math and English Language Arts Activities with Scripted Systematic Instruction (MASSIs, or in the case of English language arts, LASSIs) provide instructional resources for the prioritized content for the NCSC Summative Assessment at increasing levels of difficulty. The entry points are appropriate for students with little to no understanding of the content, but they continue through to higher levels of full understanding of the targeted skills and knowledge. They incorporate real-life applications and hands-on activities. The MASSIs and LASSIs are generally designed to be used in conjunction with the UDL units and lessons. Data sheets are provided for monitoring progress as well as a skills test for practicing responding in a testing context. The NCSC Instructional Resource Guide provides guidance for teachers by explaining and providing examples on how to use the evidence-based prompting and instructional strategies.

### **NCSC WIKI**

The NCSC Curriculum and Instructional Resources, as well as the professional development modules, are gradually being posted to a publicly available wiki (See <https://wiki.ncscpartners.org>). Educators and researchers from any state can use the materials on the wiki, regardless of whether the state is adopting the NCSC assessment. (A screenshot of a UDL lesson page from the wiki is presented in Appendix 5).

### **EVALUATION OF RESOURCES**

NCSC member states are forming a post-grant governance group to manage and evaluate the curriculum and instructional resources through long-term implementation and measurement of outcomes. The NCSC project validity team is preparing to design a post project validity evaluation and research agenda for states to implement as materials go to scale. Included within the agenda are model demonstration projects, linking classrooms across states and contexts in intensive evaluation of UDL practices and outcomes. Data from these projects will be used to improve existing modules and develop additional resources.

### **CONCLUSION**

Universal Design for Learning (UDL) is a framework that depends on the capacity of educators to apply the UDL principles to the widest range of learners. However, many educators still need tools and professional development to apply the principles in a way that includes students with significant cognitive disabilities. NCSC's work will help ensure that students with significant cognitive disabilities are included in the implementation of UDL and the Com-

mon Core State Standards. Educators and researchers who are working on UDL implementation should review the resources in the NCSC wiki to determine how they can best be used to complement other initiatives.

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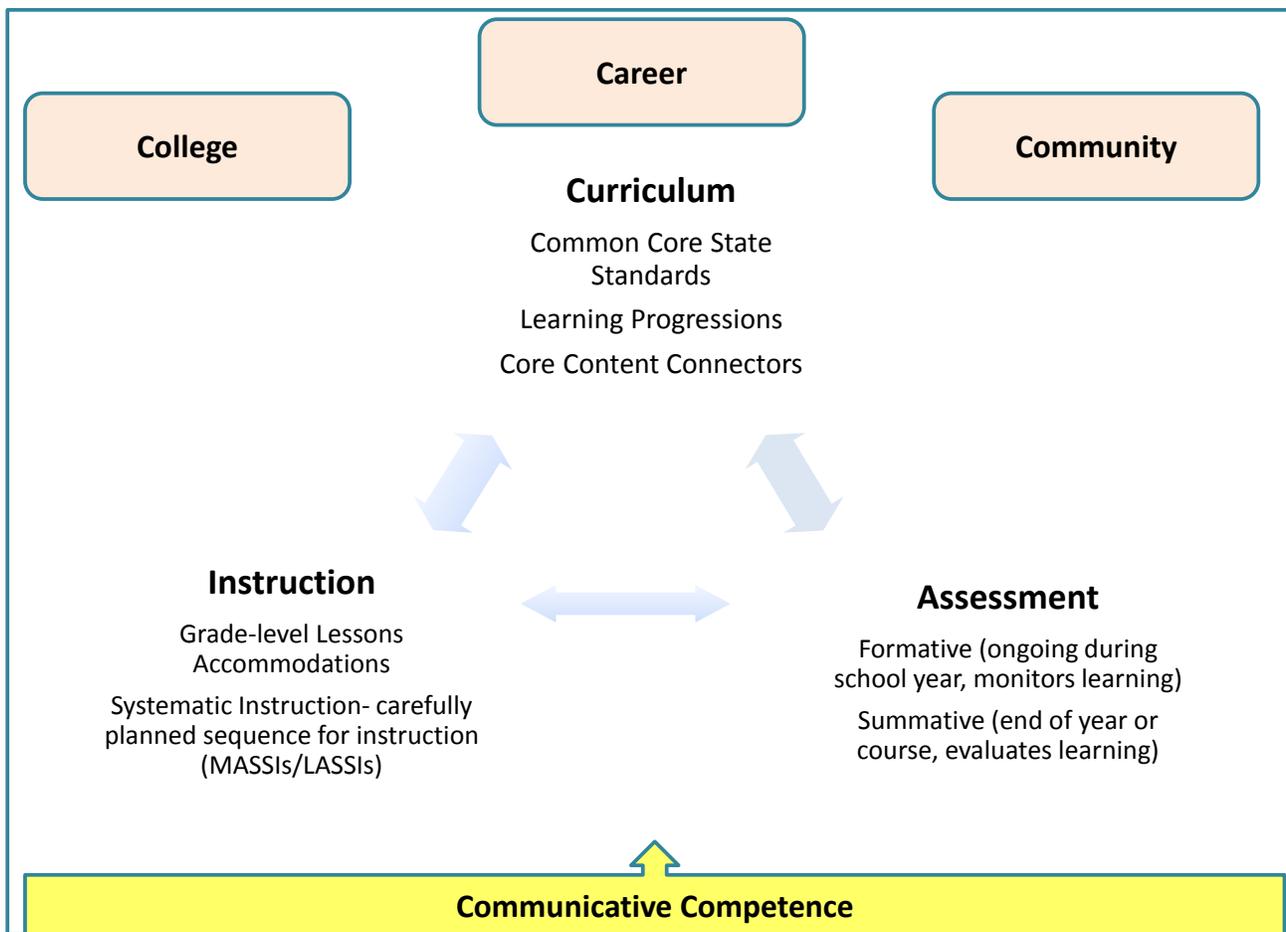
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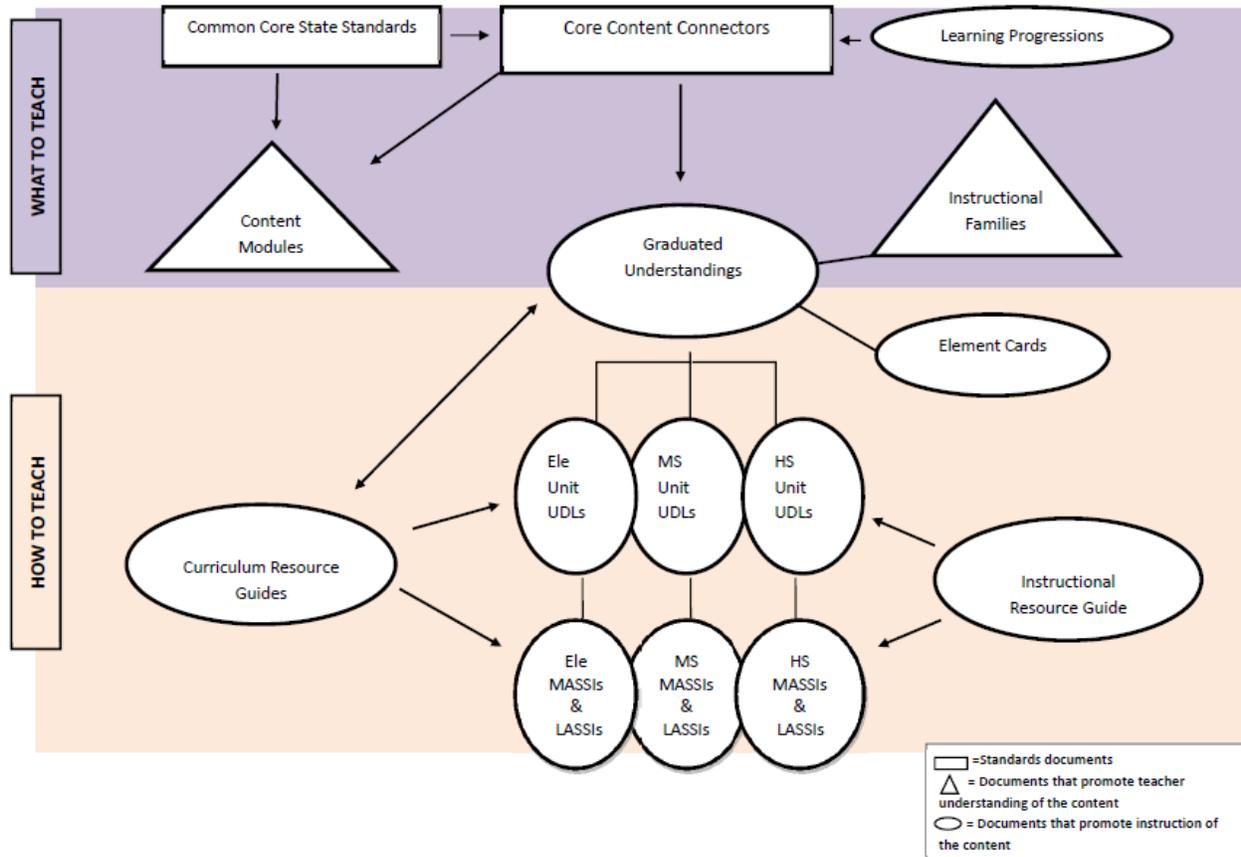
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**Appendix 1**





# Example of UDL Table in ELA CR Guide

## 6.2 Incorporate Universal Design for Learning (UDL) in planning, and provide for additional Differentiated Instruction when Teaching Reading Informational Texts

Some examples of options for teaching vocabulary and acquisition skills to students who may present instructional challenges due to:				
	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/skill or motivation/attention	Limited or no speech
<b>Representation</b>	Use a talking device such as an avatar; use large print text, raised text or Braille; use objects and images to represent vocabulary words and answers to questions; use online dictionaries that will pronounce the words and read the definitions aloud; use matching picture cards with words and their meanings; add sound effects when appropriate (e.g., sound of a whale, busy city streets, a tornado); <u>preteach</u> basic concepts of a topic using objects; color photos related to topics; <u>Smartboard</u> can be used during instruction.	Student scans an array of possible options and uses a switch to select the correct vocabulary word or answer to questions; use computer representation of word meanings that can be manipulated with switch; place response options on a slant board or eye gaze board; create a vocabulary matching exercise in the classroom that the student can walk or ride on in wheelchair to find the matching words and meanings (this can include picture clues or objects).	Use motivating objects (e.g., pizza, coloring markers in a box, piece of a Lego set) to incorporate key vocabulary and details from text; incorporate technology including computer representations, videos, animations, and talking avatar; allow students to self-select topics for study; use You Tube that is related to instruction; <u>Smartboard</u> can be used during instruction.	Have student use online dictionary to pronounce and define words; use online visual dictionary to increase vocabulary; students can use one to one correspondence to match words or objects with definitions; <u>preteach</u> vocabulary using AAC devices; highlight vocabulary words within the context of the print, keep to one vocabulary word per page and keep an AAC device with matching word with the text; use an <u>iPad</u> during instruction. *Suggestions from other columns may be applicable here.

# Example of UDL Table in Math CR Guide

## 6.2b Incorporate Universal Design for Learning (UDL in planning, and provide for additional differentiated Instruction when teaching Equations.

Some examples of options for teaching equations to students who may present instructional challenges due to:

	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/attention.	Lack of or extremely limited use of speech.
<b>Options for Representation</b>	<p><b>Provide auditory options</b></p> <ul style="list-style-type: none"> <li>-Talking calculator when solving equations;</li> <li>-Text-to-speech software or voice recordings to read aloud story problems</li> <li>-Single message sequence voice–output devices to count aloud</li> <li>-Captioning software that presents auditory information visually</li> </ul> <p><b>Provide tactile options:</b></p> <ul style="list-style-type: none"> <li>-Object cues, using miniature objects or other tangible symbols to assist with problem comprehension and operations</li> <li>-Tactile equation mat</li> <li>-Create numbers and symbols out of tactile materials such as sandpaper or <a href="#">wikki stix</a></li> </ul> <p><b>Provide visual and manipulative options to scaffold representation of concepts:</b></p>	<p><b>Reduce Physical Effort</b></p> <ul style="list-style-type: none"> <li>-When reading word problems, student can scan array of key math operation words and select correct key word and operation for equation</li> <li>- Place equations and graphic organizers on slant board or eye gaze board</li> <li>-Display flip chart, interactive white board or other teaching materials at student eye level</li> <li>-Utilize a switch instead of a computer mouse or software that allows the mouse to be controlled with the students' head rather than their hands</li> </ul>	<p><b>Illustrate through multiple media</b></p> <ul style="list-style-type: none"> <li>-Utilize interactive whiteboard</li> <li>-Incorporate interactive websites that provide nonlinguistic tools for exploring math concepts :</li> </ul> <p>                     Illuminations  <a href="http://illuminations.nctm.org/ActivitySearch.aspx">http://illuminations.nctm.org/ActivitySearch.aspx</a> </p> <p>                     Math Open Reference  <a href="http://www.mathopenref.com/">http://www.mathopenref.com/</a> </p> <p>There are many resources listed here:  <a href="http://www.udlcenter.org/implementation/examples">http://www.udlcenter.org/implementation/examples</a> </p> <ul style="list-style-type: none"> <li>-Use virtual <b>manipulatives</b> and technology to show equations</li> <li>-Incorporate computer representations, videos, and animations</li> </ul>	<p><b>Provide customized display of information</b></p> <ul style="list-style-type: none"> <li>-Consistent model by utilizing modes of communication used by students (point to symbols representing concepts, operations)</li> <li>-Teacher model competent use of AAC during instruction</li> </ul>

## Appendix 5

**Lesson 1: Introduction – 10 minutes**

### High School Mathematics UDL Instructional Unit-Lesson 1

**Contents** [\[hide\]](#)

- 1 Materials and Vocabulary
- 2 Lesson Introduction
- 3 Body
- 4 Practice
- 5 Closure
- 6 Resources

#### A. Activate Previous Knowledge

1. Lead a short discussion about how to [find perimeter and area of rectangles](#).
  - Review with students the concepts of perimeter and area.
  - Discuss how these concepts are used in real life examples.
    - Example 1: A runner is practicing by running along the fence line of a parking lot. Is he running the perimeter of the parking lot or is he running the area?
    - Example 2: The school is getting new carpet in the classroom. Will the workers need to figure out the area of the classroom or the perimeter?

Break class into small groups to answer exercises.

1. Using figures (rectangles and squares) drawn on grid paper or formed on Geoboards, find the perimeters and areas.
2. Remind students that answers should/must include the appropriate units of measure.

**Multiple means of representation:** Use models and/or drawings during large group instruction. Allow students to have a copy of a drawing or a model at their desks.

**Multiple means of expression:** Provide a list of formulas to determine area and perimeter or provide options for using manipulatives and/or computer models.

**Multiple means of engagement:** Allow students to use paper/pencil, manipulatives, computer, etc. to complete exercises.

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