

Participant Resources

For

**Supporting Learners with
Special Needs Module**

**Keystones to Opportunity
2012-13**

Table of Contents

	Page
Adobe AIR 2 Runtime and AIM Explorer Installation -----	1
AIM Navigator Tool with Student Summary -----	3
Differentiated Instruction and Implications for UDL Implementation: NCAC -----	7
IDA: Information and Resources for Adolescents and Adults with Dyslexia-It's Never Too Late -----	31
IDA: Knowledge and Practice Standards for Teachers of Reading -----	34
Internet Resources: Supporting Learners with Special Needs -----	69
Low and Mid Tech Tool Trials -----	70
Microsoft Tech Directions -----	72
Reading Tools for Supporting Struggling Students -----	73
Screenreaders & Text-to-Speech Applications -----	74
Teacher's Desk Reference: Assistive Technology -----	76
Technology Assistance for Students -----	80
Using the text-to-speech feature -----	81
Writing Tools for Supporting Struggling Students -----	82

Adobe AIR 2 Runtime and AIM Explorer Installation

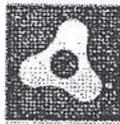
The AIM Explorer has a two-part installation for both PC and Macintosh. To run AIM Explorer, download and install the Adobe AIR 2 Runtime first and then download and install AIM Explorer. If the software is not installed in this exact order, then AIM Explorer will not run properly.

Steps for downloading and installing Adobe AIR 2 Runtime (11–17 MB):

Click the following link to download AIR 2 Runtime from the Adobe web site:

http://www.adobe.com/go/EN_US-H-GET-AIR.

On the Adobe Download web page, the Windows version is presented as the default choice:



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Adobe AIR enables you to have your favorite web applications with you all the time.

Adobe AIR 2.0.2 Installer
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Different operating system?

[Learn more](#) | [System requirements](#) | [Distribute Adobe AIR](#)

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For Windows, click **Download now** and follow the on-screen instructions.

For Mac, click **Different operating system?** Select Macintosh from the pull-down menu and click **Continue**.



Download the latest version of Adobe AIR

STEP 1 OF 2

Select an operating system

Macintosh

Continue

STEP 2 OF 2

Select version to download..

Adobe AIR 2.0.2 for MacOS X

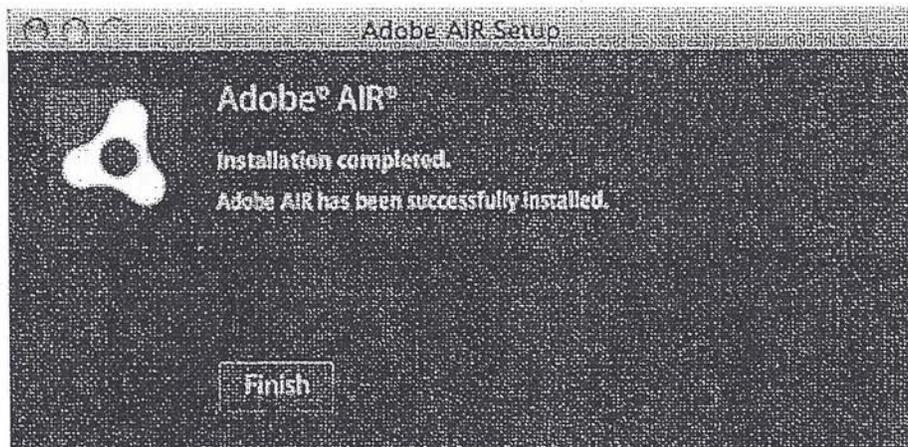
[System requirements](#)

16.97 MB

[Download now](#)

Then click **Download now** and follow the on-screen instructions.

When installation is complete, click **Finish**.



Steps for downloading and installing AIM Explorer (31 MB):

To download the AIM Explorer, right-click the following link and select **Save Target As** to download the application to your hard drive:

<http://aim.cast.org/sites/aim.cast.org/files/aimexplorer.air>

(**Note:** It is important to save the file via right-click rather than simply clicking on the link in the usual manner, as the mime type of the file could be misread by a browser and the download corrupted. Using **Save Target As** is the best way to install the Explorer.)

Steps for downloading AIM Explorer (31 MB) using Safari:

1. Right-click on the following link (to right click, hold down the CTRL key, and then click the mouse button)
<http://aim.cast.org/sites/aim.cast.org/files/aimexplorer.air>
2. A pop-up menu will appear. Select **Download Linked File As** from the menu, and then click **Save** to save the file to your computer.

Double-click the compressed file named **aimexplorer.air** and follow the on-screen directions. Adobe AIR will automatically generate the installation of the AIM Explorer.

If the installation does not begin automatically, install the application by right-clicking on the file and selecting **Open With** or **Install With**, and then browsing to AIR Installer in the Programs folder.

Once AIM Explorer has finished installing, it will open and display the home page of AIM Explorer.

To manually open AIM Explorer, find the Application folder on your hard drive and click the AIM Explorer shortcut.



AIM Navigator tool: <http://aim.cast.org/navigator/page/>

What is it?

The AIM Navigator is an interactive tool that facilitates the process of decision-making around accessible instructional materials for an individual student. The four major decision points in the process include 1) determination of need, 2) selection of format(s), 3) acquisition of format(s), and 4) selection of supports for use. The AIM Navigator also includes a robust set of guiding questions and useful references and resources specifically related to each decision point. Different scaffolds of support are built in so that teams can access information at the level needed to assist them in making informed, accurate decisions.

The AIM Navigator is NOT a screening or diagnostic tool that results in a prescriptive report. Rather, it is a process facilitator that guides the work of a collaborative team as they work through the AIM-related needs of individual students.

As a team works through the AIM Navigator, a step-by-step series of decision options from which to select are presented and text boxes in which information, evidence, and rationales upon which decisions are based can be entered. All decisions and supporting information is saved to a Student Summary that can be edited, saved, and printed. The AIM Navigator also includes an optional, running to-do List where team members can record responsibilities that need to be accomplished to ensure that what is needed is available to the student when needed.

Who is it For?

The AIM Navigator is designed to be used by IEP teams and other collaborative teams that include students, family, and pertinent school personnel.

How does it Work?

The AIM Navigator is a server-side application that requires connection to the Internet. There are two ways the AIM Navigator can be used.

Use Navigator with an email address associated with a student account

This option enables teams to work through the process, save, print all data, *and* retrieve all data at a later time. When this option is used, both student summaries and to-do lists are saved for later reference. All data is saved to a server and can be accessed at any time through a link sent to the associated email address. A team can re-enter the Navigator at any time to retrieve saved information, continue through the process, or edit a Student Summary and/or To Do List.

Use Navigator without an email address associated with a student account

This option enables teams to work through the process and collect all data to create a student summary and to-do list. A Student Summary and/or To Do List can be saved to a local computer or printed; *however*, when the browser is closed, information is not saved and cannot be retrieved.

AIM Navigator Accessibility

The AIM Navigator is designed to be fully accessible to people using a variety of assistive technologies. Elements on each of the AIM Navigator screens are accessible to screen readers.

Print Version

The print version of the AIM Navigator can be downloaded and then used as alternative to the online version when Internet connectivity is not available. It contains all of the information and resources in the online AIM Navigator including guiding questions, frequently asked questions, resources, and references. Appendices include a worksheet and to-do list that can be used to document decisions as the team proceeds through the process. The worksheet and to-do list are also provided as separate documents for ease of printing.

Go to the [AIM Navigator](http://aim.cast.org/navigator/page/) Online Tool

Updated: August, 2012

AIM Navigator Sample Student Summary

Johnny Jones

Grade: 7; Age: 13

Getting Started

Enter team members completing student summary (optional)

Johnny Jones (Student), Mr. and Mrs. Jones (Parents), Mrs. Zabala (teacher), Mrs. Carl (psychologist/diagnostician), Dr. Garza (Occupational Therapist), Mrs. Jensen (Physical Therapist)

NEED

This student requires exactly the same content in one or more specialized formats.

This student cannot use print-based instructional materials effectively at this time. The team anticipates that the student will make adequate progress if exactly the same information is presented in a specialized format: braille, large print, audio, or digital text.

Information that led to this decision

Johnny's reading comprehension and oral expression are on grade level based on teacher reports and achievement scores. However, due to an advancing degenerative physical condition, he has very poor fine motor control. He is unable to physically manipulate standard print-based textbooks.

SELECTION

Student's current skills, needs, and preferences:

Johnny has excellent reading comprehension and oral expression skills; his ability to critique, synthesize, and summarize information has developed significantly over the past few months. Due to Johnny's physical disability, however, printed text and written expression act as barriers for Johnny. For the most part, teachers are currently scanning text and saving it to Johnny's laptop so that he can read it using his head-controlled mouse or his low-pressure track-ball to navigate. His laptop is also equipped with speech recognition software so that Johnny can complete his written assignments. Whenever possible, teachers provide Johnny with an audio recording of the text, which Johnny listens to on his laptop or on his iPod when it is set up by his teacher. From a young age, Johnny has recognized the advantages technology brings to him and has become very technology savvy. He is concerned about the ongoing challenge of being able to use audio formats independently.

Environments in which specialized formats will be used:

Johnny needs to use specialized formats in classrooms for all content areas in which reading is required. During the day, he often uses a computer for classroom work—both reading and writing—but he tires easily and needs to be able to switch to audio formats for reading when he is tired. Johnny needs specialized formats at home to complete assignments. Finally, Johnny has a 1-hour bus ride to and from school, so he will benefit from being able to listen to audio formats on the bus.

Tasks for which specialized formats will be used:

Johnny needs specialized formats for all reading assignments in all subject areas and for all reading that is a part of classroom participation. He also needs to be able to use specialized formats for homework assignments in all subject areas in which reading is required.

Notes for Specialized Formats Needed

Digital Text:

Johnny needs robust navigation, text enlargement, text-to-speech, file management supports, audio notes, and connectivity with his assistive technology (see The AIM Products Feature Chart at http://aim.cast.org/experience/decision-making_tools/tutorials/aim_products_chart). He is an excellent reader; but due to occasional fatigue, he needs to be able to enlarge the text on his computer screen or to add audio by turning on the text-to-speech feature. He needs robust navigation features that enable him to move around within material quickly and with minimal physical effort. When the teacher asks the class to open to a specific place (e.g., chapter, section, page, or paragraph), Johnny needs to be able to move to that place without delay.

Audio:

Johnny needs audio menus that enable him to listen and select what is needed with a click of his trackball. He needs access to robust navigation features so he can quickly move around in the content to specific elements like chapters, headings, and page numbers. He also needs to be able to independently control the speed, volume, and voice of the playback device.

Large Print:

Not needed

Braille:

Not needed

Specialized Formats to Acquire

Subject	Title/ISBN	Digital	Audio
Math	Algebra 1: Structure and Method	✓	
Social Studies	Geography: The World and Its People	✓	✓
English Language Arts	The Language of Literature	✓	✓
Science	Cells, Heredity, and Classification	✓	

ACQUISITION

Student meets copyright criteria for specialized formats and is served in special education under IDEA

This student is eligible for specialized formats acquired from all five sources: NIMAC, AMPs, commercial sources, free sources, and, under some circumstances, locally created.

USE

What technology will be needed for the student to use the materials effectively?

The district has a membership with Bookshare and with Learning Ally. For the digital formats needed, DAISY files will be acquired from Bookshare along with the Bookshare Edition of Read: OutLoud that is

provided free-of-charge. For audio formats needed, files will be acquired from Learning Ally. The team will seek an audio playback device that will read the files and that can also be controlled independently by Johnny since the current set up on his iPod does not provide him with sufficient control. Johnny currently uses a laptop to read instructional materials that have been scanned. The team questions whether his laptop will need to be updated in order to handle the larger textbook files that have been converted to digital files from NIMAS source files.

What training for the student, educators, and family will be needed for the student to use the materials effectively?

Johnny, his parents, and the educators working with him will all need training in how to download files from Bookshare and how to use the Bookshare version of Read:OutLoud. Similar training will be needed on how to acquire files from Learning Ally and use them. Once an appropriate audio device has been identified, training will be needed for all involved.

What instructional strategies will be needed for the student to use the materials effectively?

Johnny has been using specialized formats for some time. He is very aware of the importance and benefits of using these formats and supporting technology. In order to ensure initial success upon which enhanced competency can be based, Johnny will need additional support as he adjusts to the addition of more complete materials and, possibly, more complex technology. Since the new formats and tools enable Johnny to become a more independent reader and writer, his teachers will provide opportunities in which their support (such as loading and navigating materials) will be decreased as his skills increase.

What support services will be needed for the student to use the materials effectively?

The assistive technology facilitator will be contacted to assist Johnny's team with the identification of an audio output device that will read Learning Ally files and that can be controlled by Johnny. This process needs to begin immediately, as it may take some time. The OT and PT will continue to provide services to ensure that Johnny is progressing in the use of his assistive technology and is using the devices effectively. The therapists will provide training to the teachers to help them to determine when and how to support Johnny in the use of the technology throughout the day.

What accommodations and/or modifications will be needed for the student to use the materials effectively?

No further accommodations or modifications related to Johnny's use of specialized formats are needed at this time.



National Center
on Accessing the
General Curriculum

NCAC

Differentiated Instruction and Implications for UDL Implementation

Effective Classroom Practices Report

This report was written with support from the National Center on Accessing the General Curriculum (NCAC), a cooperative agreement between CAST and the U.S. Department of Education, Office of Special Education Programs (OSEP), Cooperative Agreement No. H324H990004. The opinions expressed herein do not necessarily reflect the policy or position of the U.S. Department of Education, Office of Special Education Programs, and no official endorsement by the Department should be inferred.

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Differentiated Instruction and Implications for UDL Implementation

By Tracey Hall, Nicole Strangman, and Anne Meyer

Introduction

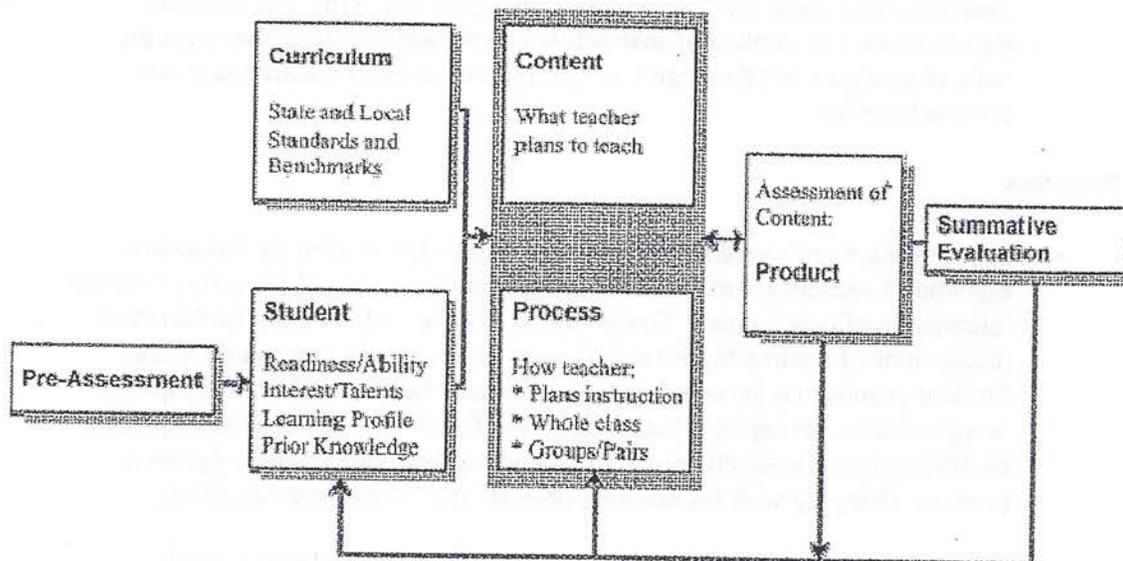
Not all students are alike. Based on this knowledge, differentiated instruction applies an approach to teaching and learning that gives students multiple options for taking in information and making sense of ideas. Differentiated instruction is a teaching theory based on the premise that instructional approaches should vary and be adapted in relation to individual and diverse students in classrooms (Tomlinson, 2001). The model of differentiated instruction requires teachers to be flexible in their approach to teaching and adjust the curriculum and presentation of information to learners rather than expecting students to modify themselves for the curriculum. Many teachers and teacher educators have recently identified differentiated instruction as a method of helping more students in diverse classroom settings experience success. This report examines information on the theory and research behind differentiated instruction and the intersection with Universal Design for Learning (UDL), a curriculum designed approach to increase flexibility in teaching and decrease the barriers that frequently limit student access to materials and learning in classrooms (Rose & Meyer, 2002). We begin with an introduction to differentiated instruction by defining the construct, then identifying components and features; additionally, we provide a sampling of applications. Next, we introduce UDL and the linkages with differentiated instruction both in theory and with specific lesson examples. The report concludes with a listing of web resources for further information and explicit examples.

This report on differentiated instruction and UDL begins with an introduction to differentiated instruction in which we provide the definition, a sampling of considerations and curriculum applications, and research evidence for effectiveness. The second part of the paper, the discussion moves to UDL applications of differentiated instruction. UDL is a theoretical approach that is based on research from the neurosciences and effective teaching practices. This portion develops an understanding of UDL and proceeds to identify the theoretical and teacher practice levels. Our document concludes with general guidelines for the implementation of UDL and a list of web resources that provide further information about differentiated instruction.

The literature review in this paper is also available as a stand alone document, with annotated references. Look for it on the Effective Classrooms Practices page of the National Center for Accessing the General Curriculum's web site http://www.cast.org/publications/ncac/ncac_diffinstruc.html.

Definition

To differentiate instruction is to recognize students' varying background knowledge, readiness, language, preferences in learning and interests; and to react responsively. Differentiated instruction is a process to teaching and learning for students of differing abilities in the same class. The intent of differentiating instruction is to maximize each student's growth and individual success by meeting each student where he or she is and assisting in the learning process.



Adapted from Colangelo, L. & Jones, L., 2001

Figure 1. Learning Cycle and Decision Factors Used in Planning and Implementing Differentiated Instruction

Identifying Components/Features

According to the authors of differentiated instruction, several key elements guide differentiation in the education environment. Tomlinson (2001) identifies three elements of the curriculum that can be differentiated: Content, Process, and Products (Figure 1). These are described in the following three sections, which are followed by several additional guidelines for forming an understanding of and developing ideas around differentiated instruction.

- *Several elements and materials are used to support instructional content.* These include acts, concepts, generalizations or principles, attitudes, and skills. The variation seen in a differentiated classroom is most frequently in the manner in which students gain access to important learning. Access to the content is seen as key.
- *Align tasks and objectives to learning goals.* Designers of differentiated instruction view the alignment of tasks with instructional goals and objectives

as essential. Goals are most frequently assessed by many state-level, high-stakes tests and frequently administered standardized measures. Objectives are frequently written in incremental steps resulting in a continuum of skills-building tasks. An objectives-driven menu makes it easier to find the next instructional step for learners entering at varying levels.

- *Instruction is concept-focused and principle-driven.* The instructional concepts should be broad-based, not focused on minute details or unlimited facts. Teachers must focus on the concepts, principles and skills that students should learn. The content of instruction should address the same concepts with all students, but the degree of complexity should be adjusted to suit diverse learners.

Process

- *Flexible grouping is consistently used.* Strategies for flexible grouping are essential. Learners are expected to interact and work together as they develop knowledge of new content. Teachers may conduct whole-class introductory discussions of content big ideas followed by small group or paired work. Student groups may be coached from within or by the teacher to complete assigned tasks. Grouping of students is not fixed. As one of the foundations of differentiated instruction, grouping and regrouping must be a dynamic process, changing with the content, project, and on-going evaluations.
- *Classroom management benefits students and teachers.* To effectively operate a classroom using differentiated instruction, teachers must carefully select organization and instructional delivery strategies. In her text, How to Differentiate Instruction in Mixed-Ability Classrooms (Chapter 7), Carol Tomlinson (2001), identifies 17 key strategies for teachers to successfully meet the challenge of designing and managing differentiated instruction.

Products

- *Initial and on-going assessment of student readiness and growth are essential.* Meaningful pre-assessment naturally leads to functional and successful differentiation. Incorporating pre- and on-going assessment informs teachers so that they can better provide a menu of approaches, choices, and scaffolds for the varying needs, interests and abilities that exist in classrooms of diverse students. Assessments may be formal or informal, including interviews, surveys, performance assessments, and more formal evaluation procedures.

- *Students are active and responsible explorers.* Teachers respect that each task put before the learner will be interesting, engaging, and accessible to essential understanding and skills. Each child should feel challenged most of the time.
- *Vary expectations and requirements for student responses.* Items to which students respond may be differentiated so that different students can demonstrate or express their knowledge and understanding in different ways. A well-designed student product allows varied means of expression and alternative procedures and offers varying degrees of difficulty, types of evaluation, and scoring.

Additional Guidelines That Make Differentiation Possible for Teachers to Attain

- *Clarify key concepts and generalizations.* Ensure that all learners gain powerful understandings that can serve as the foundation for future learning. Teachers are encouraged to identify essential concepts and instructional foci to ensure that all learners comprehend.
- *Use assessment as a teaching tool to extend rather than merely measure instruction.* Assessment should occur before, during, and following the instructional episode, and it should be used to help pose questions regarding student needs and optimal learning.
- *Emphasize critical and creative thinking as a goal in lesson design.* The tasks, activities, and procedures for students should require that they understand and apply meaning. Instruction may require supports, additional motivation, varied tasks, materials, or equipment for different students in the classroom.
- *Engaging all learners is essential.* Teachers are encouraged to strive for the development of lessons that are engaging and motivating for a diverse class of students. Vary tasks within instruction as well as across students. In other words, an entire session for students should not consist of all drill and practice, or any single structure or activity.
- *Provide a balance between teacher-assigned and student-selected tasks.* A balanced working structure is optimal in a differentiated classroom. Based on pre-assessment information, the balance will vary from class-to-class as well as lesson-to-lesson. Teachers should ensure that students have choices in their learning.

Evidence of Effectiveness as a Classroom Practice

Differentiation is recognized to be a compilation of many theories and practices. Based on this review of the literature of differentiated instruction, the “package” itself is lacking empirical validation. There is an acknowledged and decided gap in the literature in this area and future research is warranted.

According to the proponents of differentiation, the principles and guidelines are rooted in years of educational theory and research. For example, differentiated instruction adopts the concept of “readiness.” That is, the difficulty of skills taught should be slightly in advance of the child’s current level of mastery. This is grounded in the work of Lev Vygotsky (1978), and the zone of proximal development (ZPD), the range at which learning takes place. The classroom research by Fisher et al., (1980), strongly supports the ZPD concept. The researchers found that in classrooms where individuals were performing at a level of about 80% accuracy, students learned more and felt better about themselves and the subject area under study (Fisher, 1980 in Tomlinson, 2000).

Other practices noted as central to differentiation have been validated in the effective teaching research conducted from the mid 1980’s to the present. These practices include effective management procedures, grouping students for instruction, and engaging learners (Ellis and Worthington, 1994).

While no empirical validation of differentiated instruction as a package was found for this review, there are a generous number of testimonials and classroom examples that authors of several publications and web sites provide. Tomlinson reports individual cases of settings in which the full model of differentiation was very promising and teachers using differentiation have written about improvements in their classrooms. (See the links to learn more about differentiated instruction).

Applications to General Education Classroom Settings

The design and development of differentiated instruction as a model began in the general education classroom. The initial application came to practice for students considered gifted but whom perhaps were not sufficiently challenged by the content provided in the general classroom setting. As classrooms have become more diverse, differentiated instruction has been applied at all levels for students of all abilities.

Many authors of publications about differentiated instruction, strongly recommend that teachers adapt the practices slowly, perhaps one content area at a time. Additionally, these experts agree that teachers should share the creative load by working together to develop ideas and menus of options for students. A number of web sites have been created in that include lessons to illustrate what teachers have created for instruction using the model of differentiated instruction. Several web sites are listed in a later section of this report.

Differentiated instruction is an instructional process that has excellent potential to positively impact learning by offering teachers a means to provide instruction to a range of students in today’s classroom situations. The next section of this report introduces the

reader to the theory and research behind Universal Design for Learning (UDL). We then investigate the links and connections between UDL and differentiated instruction. Additionally, we identify methods and materials that may be implemented to support the implementation of differentiated instruction in concert with the principles of UDL. Finally, a set of guidelines for UDL implementation are provided including a listing of web resources to provide further information on the concepts presented in this report.

An Introduction to Universal Design for Learning Applications

Universal Design for Learning is a theoretical framework developed by CAST to guide the development of curricula that are flexible and supportive of all students (Dolan & Hall, 2001; Meyer & Rose, 1998; Pisha & Coyne, 2001; Rose, 2001; Rose & Dolan, 2000; Rose & Meyer, 2000a, 2000b, 2002; Rose, Sethuraman, & Meo, 2000). The concept of UDL was inspired by the universal design movement in architecture. This movement calls for the design of structures that anticipate the needs of individuals with disabilities and accommodate these needs from the outset. Universally designed structures are indeed more usable by individuals with disabilities, but in addition they offer unforeseen benefits for *all* users. Curb cuts, for example, serve their intended use of facilitating the travel of those in wheelchairs, but they are also beneficial to people pushing strollers, young children, and even the average walker. And so, the process of designing for individuals with disabilities has led to improved usability for everyone.

Similarly, but uniquely, UDL calls for the design of curricula with the needs of all students in mind, so that methods, materials, and assessment are usable by all. Traditional curricula present a host of barriers that limit students' access to information and learning. Of these, printed text is particularly notorious. In a traditional curriculum, a student without a well-developed ability to see, decode, attend to, or comprehend printed text is compelled to adapt to its ubiquity as best as he or she can. In contrast, a UDL curriculum is designed to be innately flexible, enriched with multiple media so that alternatives can be accessed whenever appropriate. A UDL curriculum takes on the burden of adaptation so that the student doesn't have to, minimizing barriers and maximizing access to both information and learning.

The UDL framework guides the development of adaptable curricula by means of 3 principles (Figure 2). These 3 principles parallel 3 fundamentally important learning components and 3 distinct learning networks in the brain: recognition, strategy, and affect (Rose & Meyer, 2002). The common recommendation of these 3 principles is to select goals, methods, assessment, and materials in a way that will minimize barriers and maximize flexibility. In this manner, the UDL framework structures the development of curricula that fully support every student's access, participation, and progress in all 3 essential facets of learning.

Principles of the Universal Design for Learning Framework
<p>Principle 1: To support recognition learning, provide multiple, <u>flexible methods</u> of presentation</p>
<p>Principle 2: To support strategic learning, provide multiple, <u>flexible methods</u> of expression and apprenticeship.</p>
<p>Principle 3: To support affective learning, provide multiple, <u>flexible options</u> for <u>engagement</u>.</p>

Figure 2. The three UDL principles call for flexibility in relation to three essential facets of learning, each one orchestrated by a distinct set of networks in the brain.

Critical to successfully implementing UDL theory is the use of digital materials. Digital materials, unlike the conventional pedagogical mainstays, speech, printed text, and printed images, have an inherent flexibility. They can be modified in a host of ways, depending on the needs of the student. This flexibility makes it feasible to customize learning materials and methods to each individual.

For teachers wondering *how* to customize the curriculum, CAST has devised three sets of broad teaching methods that support each of the 3 UDL principles (Figure 3, Rose & Meyer, 2002). These teaching methods draw on knowledge of the qualities of digital media and how recognition, strategic, and affective networks operate. For example, the first Teaching Method to support recognition learning is to *provide multiple examples*. This teaching method takes advantage of the fact that recognition networks can extract the defining features of a pattern and differentiate it from similar patterns simply by viewing multiple examples. Although presentation of multiple examples might be challenging in a classroom limited to printed text and hard copy images, digital materials enable the assembly, storage, and maintenance of a large collection of examples in the form of digital text, images, sound, or video—all in the modest space of a classroom. This is one example of how digital materials and UDL Teaching Methods can facilitate the successful implementation of UDL.

The UDL Teaching Methods will anchor the upcoming discussion where we will highlight the ways in which computer simulations align with each of the 3 UDL principles. Within the context of these teaching methods, we'll show how computer simulations can support individualized instruction of recognition, strategic, and affective learning.

Network-Appropriate Teaching Methods
<p>To support diverse recognition networks:</p> <ul style="list-style-type: none">• Provide multiple examples• Highlight critical features• Provide multiple media and formats• Support background context
<p>To support diverse strategic networks:</p> <ul style="list-style-type: none">• Provide flexible models of skilled performance• Provide opportunities to practice with <u>supports</u>• Provide ongoing, relevant feedback• Offer flexible opportunities for demonstrating skill
<p>To support diverse <u>affective networks</u>:</p> <ul style="list-style-type: none">• Offer choices of content and tools• Offer adjustable levels of challenge• Offer choices of rewards• Offer choices of learning context

Figure 3. To help teachers support learners' diverse recognition, strategic, and affective networks, CAST has developed three sets of UDL teaching methods. These teaching methods can be used to make the curriculum more flexible and broadly supportive.

Differentiated Instruction and the Three Universal Design for Learning Principles

Differentiated instruction is well received as a classroom practice that may be well suited to the three principles of UDL. The following section looks at the three network appropriate teaching methods, recognition, strategic, and affective, in order to address the ways in which differentiated instruction coordinates with UDL theory. Certain instructional techniques have been found to be very effective in supporting different skills as students learn. Differentiated instruction is designed to keep the learner in mind when specifying the instructional episode.

Recognition learning. The first UDL principle focuses on pattern recognition and the importance of providing multiple, flexible methods of presentation when teaching patterns—no single teaching methodology for pattern recognition will be satisfactory for

every learner. The theory of differentiated instruction incorporates some guidelines that can help teachers to support critical elements of recognition learning in a flexible way and promote every student's success. Each of the three key elements of differentiated instruction, content, process, and product, supports an important UDL Teaching Method for individualized instruction of pattern recognition.

The content guidelines for differentiated instruction support the first UDL Teaching Method for recognition networks, *provide multiple examples*, in that they encourage the use of several elements and materials to support instructional content. A teacher following this guideline might help students in a social studies class to understand the location of a state in the union by showing them a wall map or a globe, projecting a state map, or describing the location in words. Also, while preserving the essential content, a teacher could vary the difficulty of the material by presenting smaller or larger, simpler or more complex maps. For students with physical or cognitive disabilities, such a diversity of examples may be vital in order for them to access the pattern being taught. Other students may benefit from the same multiple examples by obtaining a perspective that they otherwise might not. In this way, a range of examples can help to ensure that each student's recognition networks are able to identify the fundamental elements identifying a pattern.

This same use of varied content examples supports a second recommended practice in UDL methodology, *provide multiple media and formats*. A wide range of tools for presenting instructional content are available digitally, thus teachers may manipulate size, color contrasts, and other features to develop examples in multiple media and formats. These can be saved for future use and flexibly accessed by different students, depending on their needs and preferences.

The content guidelines of differentiated instruction also recommend that content elements of instruction be kept concept-focused and principle-driven. This practice is consistent with a third UDL Teaching Method for recognition, *highlight critical features*. By avoiding any focus on extensive facts or seductive details and reiterating the broad concepts, a goal of differentiated instruction, teachers are highlighting essential components, better supporting recognition.

The fourth UDL Teaching Method for recognition is to *support background knowledge*, and in this respect, the assessment step of the differentiated instruction learning cycle is instrumental. By evaluating student knowledge about a construct before designing instruction teachers can better support students' knowledge base, scaffolding instruction in a very important way.

Strategic learning. People find for themselves the most desirable method of learning strategies; therefore, teaching methodologies need to be varied. This kind of flexibility is key for teachers to help meet the needs of their diverse students, and this is reflected in the 4 UDL Teaching Methods. Differentiated instruction can support these teaching methods in valuable ways.

Differentiated instruction recognizes the need for students to receive *flexible models of skilled performance*, one of the four UDL Teaching Methods for strategic learning. As noted above, teachers implementing differentiated instruction are encouraged to demonstrate information and skills multiple times and at varying levels. As a result, learners enter the instructional episode with different approaches, knowledge, and strategies for learning.

When students are engaged in initial learning on novel tasks or skills, *supported practice* should be used to ensure success and eventual independence. Supported practice enables students to split up a complex skill into manageable components and fully master these components. Differentiated instruction promotes this teaching method by encouraging students to be active and responsible learners, and by asking teachers to respect individual differences and scaffold students as they move from initial learning to practiced, less supported skills mastery.

In order to successfully demonstrate the skills that they have learned, students need *flexible opportunities for demonstrating skill*. Differentiated instruction directly supports this UDL Teaching Method by reminding teachers to vary requirements and expectations for learning and expressing knowledge, including the degree of difficulty and the means of evaluation or scoring.

Affective learning. Differentiated instruction and UDL Teaching Methods bear another important point of convergence: recognition of the importance of engaging learners in instructional tasks. Supporting affective learning through flexible instruction is the third principle of UDL and an objective that differentiated instruction supports very effectively.

Differentiated instruction theory reinforces the importance of effective classroom management and reminds teachers of meeting the challenges of effective organizational and instructional practices. Engagement is a vital component of effective classroom management, organization, and instruction. Therefore teachers are encouraged to offer choices of tools, adjust the level of difficulty of the material, and provide varying levels of scaffolding to gain and maintain learner attention during the instructional episode. These practices bear much in common with UDL Teaching Methods for affective learning: *offer choices of content and tools, provide adjustable levels of challenge, and offer a choice of learning context*. By providing varying levels of scaffolding when differentiating instruction, students have access to varied learning contexts as well as choices about their learning environment.

Examples of UDL and Differentiated Instruction

The focus of the previous sections was to describe ways in which differentiated instruction supports the three principles of UDL and aligns with UDL teaching practices. Here, we present actual lesson plans employing differentiated instruction. The first is a product of a school that is working with CAST, and the second is from work outside of CAST. Each exemplifies applications of UDL in differentiated instruction. In the example from CAST,

we highlight the ways that differentiated instruction is used to implement UDL teaching methods. In the second, we identified UDL features implemented in a well designed differentiated instruction lesson in mathematics and recommend ways in which UDL could be applied to make an even more accessible, more flexible lesson.

CAST gathering evidence: The Life Cycle of Plants from the Planning for All Learners (PAL) toolkit. This lesson is a two-day instructional plan that is a part of a larger unit designed by a first grade teacher for a diverse class of students. Before teaching the lessons presented on this web site, the teacher introduced students to science concepts around the growth of seeds through oral presentation and in-class experiments. This lesson enabled the teacher to discuss, display, and increase student understanding of the science content and concepts.

The lesson plan addresses McRel, Massachusetts State and local District standards in Science and English Language Arts, by teaching students the necessary environmental variables about growth in plants, and the tools, skills and strategies required to do so. Student choice and access flexibility in the lesson exemplify applications of UDL. Table 1 contains a listing of UDL features made possible by elements of differentiated instruction employed in this lesson.

-TABLE 1 -

**UDL Features of the CAST PAL Toolkit Model
Gathering Evidence: Life Cycle of Plants**

UDL Teaching Method	Supportive Differentiated Instruction Feature(s)
Provide multiple examples.	In preparation for this lesson, the teacher created multiple examples of finding and identifying seeds. Additionally, the teacher provided several examples of finding appropriate texts to complete the assignment. Students have multiple examples of texts from which to find information about the life cycle of seeds. As another example, fast growing seeds were planted in the classroom, giving students the opportunity to observe the seed life cycle.
Highlight critical features.	Teacher provides critical information for the lesson through oral presentation and highlights critical features in written form, then monitors students to check their focus on important features of the lesson. Additionally, by having texts available in digital format, the teacher or students may literally highlight critical features of the text in preparation of lesson assignments.

Provide multiple media and formats.

The teacher located several (4–5) resources, in this case books of different reading difficulty, containing the same science constructs on seed life cycles. The books were then made available digitally as well as in audio format for flexible accessibility. Thus, materials were available in a variety of media and formats.

Support background context.

Several levels of preparation were designed to support background context:

- Before this assignment the teacher and students found seeds in a variety of vegetables and fruits. In this way, the concept of seeds was brought out of the abstract; students had experiences seeing and finding seeds from a range of plants.
- Careful instruction was organized to teach students the concept of finding a book that is “just right,” helping students to find a book that is challenging, yet not too difficult. This, helped keep students work and learn in their “zone of proximal development” when obtaining background information for the lesson.
- Students had the option to work in selected pairs as they search for answers to the science questions.
- During guided practice and independent practice portions of each lesson, the teacher provides supports by checking and prompting.

Provide opportunities to practice with support.

Offer flexible opportunities for demonstrating skill.

The design of this lesson allows students varied approaches throughout the lesson. Students may select their best or preferred type of working situation and means for responding.

Offer choices of content and tools.

The teacher organized the lesson at multiple points for choice of tools:

- choice of resource materials,
- choice of access (text, digital, audio), and
- choice of response style.

Offer adjustable levels of challenge.

The teacher offers multiple texts, representing a range of difficulty levels, and different means to access these texts. This helps to ensure that researching the answers to science questions is appropriately challenging for each student. For example, if decoding were challenging, the student could use a simpler text and/or access the information via audio or digital read-aloud.

Offer choices of learning contexts.

Throughout the lesson the teacher has organized several choices that help diversify the available learning contexts:

- students can select from a variety of methods to respond to the science questions (written, scribed, recorded),
- students can opt to work independently or with a partner during the assignment completion portion of the lesson, and
- students can select the “right book” based on difficulty and/or interest.

Association for Supervision and Curriculum Development *differentiating instruction web site* ***Differentiated Instruction Lesson Example, grade 6 mathematics***. This web site hosted by the Association for Supervision and Curriculum Development (ASCD) contains a number of lessons that illustrate different teachers’ examples of how to use the principles of differentiated instruction. We have selected a mathematics lesson for 6th grade focusing on the concept of patterns.

This instructional approach to teaching mathematics patterns has several exciting UDL features (see Table 2). Through the use of clearly stated goals and the implementation of flexible working groups with varying levels of challenge, this lesson helps to break down instructional barriers. We have identified additional ways to reduce barriers in this lesson even further by employing the principles of UDL teaching methods and differentiated instruction. We provide Table 3 with recommendations of employing teaching methods of UDL to support this lesson. Please note that we are not making generalized recommendations for making this lesson more UDL, but instead are focusing on ways that differentiated instruction, specifically, can help achieve this goal.

-TABLE 2 -

UDL Elements in a Differentiated Instruction Mathematics Lesson

UDL Teaching Method	Differentiated Instruction Features
Provide multiple examples.	The teacher provides multiple examples through the story of <i>The King's Chessboard</i> and other math problems.
Highlight critical features.	The teacher highlights critical features of the mathematics in the story by stopping and calculating the amount of rice accumulating and using a t-table to do so.
Provide multiple media and formats.	The teacher reads the story aloud and students have the story to read. The numbers are represented in the story and on the t-table.
Support background context.	Teachers analyze or pre-test students for key pre-skills and background knowledge.
Provide ongoing, relevant feedback.	In cooperative groups, students may receive feedback from the teacher and from peers.
Offer choices of content and tools.	Students are assigned to one of three groups tiered by difficulty; all students are working on the same task but with varying supports.
Offer adjustable levels of challenge.	Varied supports in the working groups alter the level of independence and difficulty in solving the task.

-TABLE 3 -

UDL Strategies to Further Minimize Lesson Barriers in a Differentiated Instruction Lesson Plan for Mathematics

Barrier	UDL Strategy
Deducting/constructing numeric functions.	Provide different demonstrations or models of how to use the tools employed in the lesson. Scaffold how to use the t-table and visualize the chessboard.
Students write an exit card to explain the mathematical story.	Provide alternative formats for students to express their interpretation of the story and the mathematical implications. For example, speaking, creating a diagram, numerical representations.

The Locker Problem.

Consider background knowledge for students entering this mathematical problem. What range of supports could be made available to provide the informational knowledge so that students can focus on the problem solving component?

Recommendations for Implementation at the Classroom Level

Although UDL applications of differentiated instruction already exist, they are admittedly hard to come by. Even with such models available, teachers face challenges in implementing them: the challenges of shifting away from traditional views of intelligence and traditional reliance on print media, the challenge of acquiring and mastering new technology, and the challenge of garnering support from the school system. The following sections offer recommendations that can help teachers overcome each one of these challenges.

Learn about Universal Design for Learning. The first and most basic step toward successfully implementing UDL is self-education. Although UDL has been more than a decade in the making, it is an approach that challenges many traditional educational perspectives and practices. Before teachers can implement UDL effectively, they may need to learn a different way of looking at their students and the materials that they use in the classroom. CAST has been working to disseminate UDL widely, and, consistent with the framework itself, have developed multiple avenues (direct and indirect, self-driven and trainer-taught, through text, speech, and interactive activities) through which individuals can learn about UDL and develop the skills necessary to put it into practice.

- *Visit the CAST web site.* The CAST web site devotes a large section to Universal Design for Learning. Here visitors will find an articulation of UDL, discussions of its core concepts, descriptions of UDL research projects, a listing of tools and resources that support UDL, and ideas and examples for implementing UDL.
- *Read CAST publications.* CAST has a range of publications highlighting UDL and UDL practice, including Teaching Every Student in the Digital Age (Rose & Meyer, 2002). The companion web site to the book provides an evolving set of resources and classroom examples, including interactive activities and an online community where visitors can ask questions and engage in discussion about UDL.
- *Enroll in an institute.* Professional development institutes by CAST teach professionals about the challenges of improving access to and progress participation in the general education curriculum and how to make the curriculum accessible for all learners.

- *Talk to others.* The Teaching Every Student section of the CAST web site includes an online community where teachers can communicate, collaborate, and obtain support from other educators who are exploring and teaching with UDL.
- Find more information and to engage in discussion about universal design and increasing access for students with disabilities at the web site for the Access Center (www.k8accesscenter.org) a national technical assistance center that is funded by the U.S. Department of Education, Office of Special Education Programs to make elementary and middle school curriculum more accessible to students with disabilities.

Inventory and build technology support. Technology, in particular digital media, makes UDL implementation practical and achievable in a diverse classroom. Digital materials make it possible for the same material to be flexibly presented and accessed—even adapted on a student-to-student basis.

Although we recommend that teachers try to build a library of digital materials, it is important to point out that UDL implementation can proceed successfully across a range of technology availability. The amount of technology available to teachers varies extensively—limited by district and school resources, both monetary and otherwise. Fortunately, a fairly simple step such as digitizing print materials can greatly ease UDL implementation. The 1996 United States copyright additions (Chapter 1 of Title 17 Section 121 of the United States Code), the Chafee Amendment, gives authorized entities the freedom to digitize otherwise proprietary materials for individuals that have disabilities that impede access to the printed version. An authorized entity is a nonprofit organization or governmental agency that has a primary mission to provide specialized services relating to training, education, or adaptive reading or information access needs of blind or other persons with disabilities. This provision makes special education teachers eligible to digitize printed text materials, a step that can help to diversify the presentation of materials for students with disabilities.

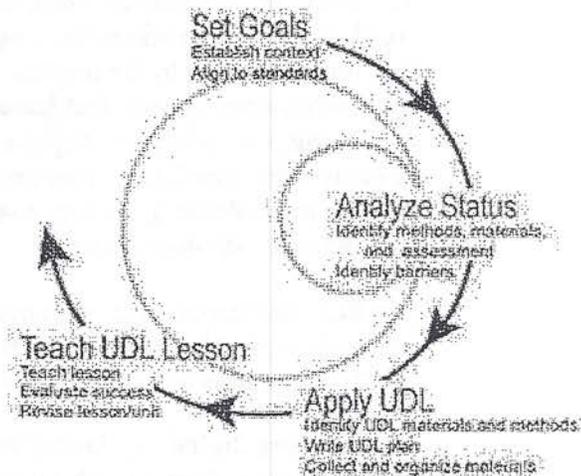
Another inexpensive but instrumental option for supplying a classroom with digital materials is the World Wide Web—a tremendous source of free digital material and much of this material is in a multimedia format, which can greatly improve access to students.

Having more digital media unquestionably enables teachers to implement UDL in a more extensive way. Teachers who have greater financial resources and district support can supplement their materials with innovative products such as multimedia composition tools (e.g., HyperStudio5, Kid Pix Deluxe 3X, PowerPoint), graphic organizer software (e.g., Inspiration, Kidspiration), text-to-speech and text-to-image programs (e.g., Universal Reader, Read&Write GOLD, Kurzweil 3000, JAWS, Intellitalk II), CD-ROM storybooks (e.g., Reader Rabbit's Reading Development Library), and learning software (e.g., funbrain.com, Edmark's various learning games).

Whether teachers are able to invest in the purchase of a lot of technology or not, UDL can proceed effectively. But taking inventory is an important step toward setting a realistic course of action. By inventorying the resources they have available to them, teachers can determine the level of UDL implementation appropriate to their classroom. For example, survey your classroom and your school media center for a clear idea of computer and projection systems and other technology hardware available to teachers and students. Check into scheduling issues around shared equipment. Additionally, test out web accessibility in your school computer lab(s) and media center(s) as appropriate. If the web is a tool you may use and ask students to access, how available is it? Ask for or take an inventory of your school or district software, find out what's available and if there are available licenses for computers in your classroom.

Effectively working with and managing technology can be a challenging process, so it is important as well to assess the available technology support. This may come in the form of a school or district help desk, computer teacher, computer resource specialist, technology integration teacher, etc., or one's own technology training. Find out what policies your school or district may have regarding the tools you may adopt for use in your planning and teaching. Installation of software and hardware on computers may be time consuming, plan for issues of timing in your implementation and installation of software and hardware. When you are ready to teach a lesson using some technologies new to you or your students, consider notifying your technology support person, to be at hand to help problem solve any unforeseen challenges with implementation.

Curriculum planning and delivery. Another important step in implementation of UDL in instruction is curriculum planning and delivery. To begin, we recommend that teachers have a basic understanding of UDL and a commitment to make the curriculum and learning accessible for all learners. While keeping in mind the three principles of UDL, based on the three networks recognition, strategic and affective, we have found the following process useful in designing lessons. The process includes four steps, based upon the principles and concepts of UDL, proven professional development strategies, and effective teaching practices; (a) Set Goals, (b) Analyze Status, (c) Apply UDL, and (d) Teach the UDL Lesson.



In the *Set Goals* stage of curriculum planning, we recommend that teachers establish the context for instruction. Context is usually driven or based on state standards, followed by the design of goals for the instructional episode. We recommend that all teachers closely evaluate these to assure alignment and assure that the means for attaining the goals are separated from the goals and standards.

Next, when designing a UDL lesson, teachers should *Analyze the Current Status* of the instructional episode. What are the current methodologies, assessments, and materials used to teach the lesson? Analyze these teaching procedures in relation to potential barriers of learners in the classroom. Do all students have access to the materials? Are students able to express themselves with the current methods and materials? There are a number of resources and tools available from CAST to analyze lessons in the Planning for All Learners Toolkit located on the TES web site.

The third recommended step of the planning process is to *Apply UDL to the Lesson/Unit*. This includes the goals, methods, assessments and materials used to implement the lesson. Create the UDL lesson plan, grounded in the learning goals, classroom profile, methods and assessment, and materials and tools. Then, collect and organize materials that support the UDL lesson.

In the final step, *Teach the UDL Lesson/Unit*, minimize barriers and realize the strengths and challenges each student brings to learning, rely on effective teaching practices, and apply challenges appropriate for each learner. In this way, instructors can engage more students and help all students progress. When teaching and evaluating students work, also evaluate and revise the lesson/unit to assure student access and success. You may obtain additional information about designing UDL methods, assessments, and materials, in Teaching Every Student in the Digital Age, Chapter 4.

Secure administrative support. School districts and administrations can be powerful sources of support—financial and otherwise. Administrative commitment to UDL can strengthen a teacher’s sense of mission and self-satisfaction and lead to important funding. A case in point is the town of Gloucester, Massachusetts. The principal for the school system is so convinced of the importance of digitized materials that he has set a mandate that teachers use only those textbooks that have a digitized version. Teachers will use a text-to-speech reader to further improve the accessibility of the text. Clearly, this kind of change would have happened much more slowly in the absence of such tremendous administrator-level support.

Administrator support can also help to facilitate funding, which although not a prerequisite for UDL, can create important opportunities. Funding might enable the purchase of equipment, professional development, and the launching of new UDL teaching projects. Districts vary widely concerning the types and level of funding that they offer teachers, but teachers who can convince their administrators of the value of UDL may be able to secure district-level grants, professional development awards, and sabbaticals. For example, in a North Shore Massachusetts school district, the Technology Program Manager and Special Education Director teamed with two teachers using UDL, were awarded a state-level technology grant to implement UDL. This is just one example of how support at the administrative level can facilitate the acquisition of materials that support UDL efforts in the classroom.

Parent education and involvement. Parents are another valuable resource for teachers building a UDL curriculum. There are at least two important ways that parents can be a resource: as advocates and as volunteers.

By educating parents about the UDL activities going on in the classroom, teachers can develop a support system of informed individuals who can assist with and advocate for UDL instruction. Teachers should think about ways to inform parents about classroom activities. Notes sent home, parent night presentations, and IEP meetings are all excellent opportunities to engage in this kind of communication. Once parents are educated about UDL they may wish to become involved themselves. There are many ways that parents can do this, including volunteering in the classroom and lending support at home. A few possibilities are helping to prepare materials, monitoring kids during UDL lessons, helping with technology, donating equipment, and supporting homework assignments.

Conclusion

Differentiated instruction, although somewhat still developing in educational settings, has received significant recognition. When combined with the practices and principles of UDL, differentiated instruction can provide teachers with both theory and practice to appropriately challenge the broad scope of students in classrooms today. Although educators are continually challenged by the ever-changing classroom profile of students, resources, and reforms, practices continue to evolve and the relevant research base should grow. And along with them grows the promise of differentiated instruction and UDL in educational practices.

Links to Learn More About Differentiated Instruction

Guild, P. B., and Garger, S. (1998). What Is Differentiated Instruction? Marching to Different Drummers, 2nd Ed. (ASCD, p.2)

<http://www.ascd.org/publications/books/198186.aspx>

Initially published in 1985, *Marching to Different Drummers* was one of the first sources to pull together information on what was a newly-flourishing topic in education. Part I defines style and looks at the history of style research; Part II describes applications of style in seven areas; Part III identifies common questions and discusses implementation and staff development.

The Access Center

<http://www.k8accesscenter.org/>

This web site belongs to the Access Center, a national technical assistance center, funded by the U.S. Department of Education's Office of Special Education Programs. The purpose of the K12 Access Center is to make elementary and middle school curricula more accessible to students with disabilities. The web site hosts chats and discussions and offers publications and presentations on topics related to accessing the general education curriculum, including Universal Design for Learning.

Tomlinson, C. A., (2000). **Differentiation of instruction in the elementary grades.**

ERIC Digest. ERIC_NO: ED443572.

<http://www.eric.ed.gov/ERICWebPortal/contentdelivery/servlet/ERICServlet?accno=ED443572>

To meet the needs of diverse student populations, many teachers differentiate instruction. This digest describes differentiated instruction, discusses the reasons for differentiated instruction, what makes it successful, and suggests how teachers may begin implementation.

Tomlinson, C. A., (1995). **Differentiating instruction for advanced learners in the mixed-ability middle school classroom. ERIC Digest E536.**

<http://www.eric.ed.gov/ERICWebPortal/contentdelivery/servlet/ERICServlet?accno=ED389141>

The ability to differentiate instruction for middle school aged learners is a challenge. Responding to the diverse students needs found in inclusive, mixed-ability classrooms is particularly difficult. This digest provides an overview of some key principles for differentiating instruction, with an emphasis on the learning needs of academically advanced students.

Tomlinson, C. A., & Allan, S. D., (2000). **Leadership for differentiating schools and classrooms. Association for Supervision and Curriculum Development.**

<http://www.ascd.org/publications/books/100216.aspx>

This web site contains two chapters from Tomlinson's recent publication: *Leadership for differentiating schools and classrooms, Association for Supervision and Curriculum Development*. This book is designed for those in leadership positions to learn about differentiated instruction.

Web Article: Mapping a route toward differentiated instruction.

<http://www.ascd.org/publications/educational-leadership/sept99/vol57/num01/Mapping-a-Route-Toward-Differentiated-Instruction.aspx>

Carol Ann Tomlinson, an Associate Professor of Educational Leadership, Foundations and Policy at the Curry School of Education, University of Virginia, Charlottesville, VA provides an article entitled: Mapping a route toward differentiated instruction. *Educational Leadership*, 57(1).

Willis, S. & Mann, L., (2000). **Differentiating instruction: Finding manageable ways to meet individual needs (Excerpt). Curriculum Update.**

<http://www.ascd.org/publications/curriculum-update/winter2000/Differentiating-Instruction.aspx>

Based on the concept that "one size does not fit all" the authors describe the teaching philosophy of differentiated instruction. More teachers are determined to reach all learners, to challenge students who may be identified as gifted as well as students who lag behind grade level. This article excerpt describes the essential components of differentiated instruction beginning with three aspects of curriculum: content, process, and products.

The Association for Supervision and Curriculum Development (ASCD) Web Site

<http://www.ascd.org/research-a-topic/differentiated-instruction-resources.aspx>

A site by ASCD (2000) which discusses differentiated instruction. Page links to other pages with examples from a high school and elementary school, key characteristics of a differentiated classroom, benefits, related readings, discussion, and related links to explore.

Preparing Teachers for Differentiated Instruction

<http://www.ascd.org/publications/educational-leadership/sept00/vol58/num01/-Preparing-Teachers-for-Differentiated-Instruction.aspx>

This web site, provided by Educational Leadership, links the reader to a brief summary of an article by Holloway. The author has provided a bulleted summary regarding the principles and theories that drive differentiated instruction.

Holloway, J. H., (2000). Preparing Teachers for Differentiated Instruction.

Educational Leadership, 58(1).

<http://web.uvic.ca/~jdurkin/edd401/Differentiated.html>

This site is from an education course by Dr. John Durkin. It includes a diagram with suggestions for approaches to differentiated instruction. It also includes a listing of what differentiated instruction is and is not, rules of thumb on how to instruct, and management strategies.

Web Site: for Teachers, Administrators, and Higher Education

www.teach-nology.com/litined/dif_instruction/

This web site is designed for educators and uses technology to inform teachers about current practices, literature, the law in education, as well as professional development. Additionally, links to articles including research on educational practices including links to information on differentiated instruction are included. CAST. *Teaching Every Student*. (n.d). Retrieved September 15, 2003, from <http://www.cast.org/teachingeverystudent/>.

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Tomlinson, C. A., (2001). *How to differentiate instruction in mixed-ability classrooms*. (2nd Ed.) Alexandria, VA: ASCD.

Tomlinson, C. A., & Allan, S. D., (2000). *Leadership for differentiating schools and classrooms*. Alexandria, VA: ASCD.



INFORMATION AND RESOURCES FOR ADOLESCENTS AND ADULTS WITH DYSLEXIA—IT'S NEVER TOO LATE

Beginning in grade 4, skilled reading is necessary for school achievement in all subject areas. Beyond school, reading proficiency is just as important for job success. As we grow and mature, more and more is expected of all of us. But for individuals with dyslexia, the demands of school and the workplace are especially great.

It is often assumed that students have acquired sufficient decoding, and that their reading struggles are only comprehension related. However, struggling readers with dyslexia may have significant difficulty with word recognition and might not have established skills to identify unfamiliar words. Older students with untreated dyslexia have not benefitted from years of reading, and the exposure to various kinds of complex texts. This disadvantage may hold them back with other key aspects of reading such as vocabulary, background knowledge, and comprehension skills. It can also affect their ability to spell and write, making it difficult for them to accurately express their knowledge and ideas.

After grade 4, it is often assumed that an individual who cannot read should be assisted with accommodations and technology aides rather than receive direct reading instruction. However, a wealth of evidence shows that intensive, high quality literacy instruction can help students who are struggling build the skills they need to succeed in high school and beyond (Alliance for Excellent Education, 2006). In other words, it is never too late. Older students with dyslexia, including adults, can benefit from specialized reading and writing instruction, but it is essential for them to find an instructor who is highly trained to successfully teach individuals with dyslexia.

Identifying and Addressing Instructional Needs

A diagnostic evaluation will indicate all areas of reading and writing that should be addressed. If an individual has not yet established sufficient word level skills, direct instruction is necessary. "Under the right conditions, intensive and skillful instruction in basic word reading skills can have a significant impact on the comprehension ability of students in fifth grade and beyond" (Center on Instruction, 2008). The Center on Instruction's report of research findings indicates the following are key recommendations for teaching word study to older students:

Teach students...

- to identify and break words into syllable types
- when and how to read multisyllabic words by blending the parts together
- to recognize irregular words that do not follow predictable patterns
- the meanings of common prefixes, suffixes, inflectional endings, and roots. Instruction should include ways in which words relate to each other (for example, trans: transfer, translate, transform, transition).
- how to break words into word parts and to combine word parts to create words based on their roots, bases, or other features
- how and when to use structural analysis to decode unknown words

Factors for School Success

First and foremost, an older student with dyslexia should have skilled instruction in deficit areas of reading and writing as determined by an

Adolescents and Adults with Dyslexia – Page 2

evaluation. If the student cannot decode or spell efficiently and accurately, he or she will need proficient instruction in these areas to progress to more advanced levels of reading and writing.

In addition to direct instruction, the following considerations may assist in school success:

- subject area tutors;
- accommodations such as extended time and oral exams;
- modification of assignments;
- reduced course load;
- major course of study in areas of individual strength;
- small classes; and
- technology aides such as text readers, smartpen, and spelling and grammar checks.

Factors for Job Success

Individuals with dyslexia may not be alone when struggling with the reading and writing demands of the workplace. Approximately 40% of high school graduates lack the literacy skills employers seek (Achieve Inc., 2005). An adult with dyslexia may have difficulty with work-training courses, even literacy classes, if these are not presented in ways that accommodate their learning needs.

Adults with dyslexia can succeed in the workplace with training and other written materials in an accessible format, restructured job tasks, and assistive technology, for example, text reading systems, reading pens, speech recognition systems, and portable word processors with spell and grammar checking. The **Americans with Disabilities Act of 1990 as amended 2008 (ADA)** is a federal civil rights law designed to prevent discrimination and enable individuals with disabilities to participate fully in all aspects of society. The ADA protects an individual's right to request reasonable accommodations for the hiring process and on the job. A key principle of the ADA is that individuals with disabilities who want to work and are qualified to work must have

an equal opportunity to work. To be protected under ADA, you must have a disability as defined by the ADA, and you must also be able to do the job you want or were hired to do, with or without reasonable accommodations.

While early intervention is the best way to help students get on track with their reading and writing, it is never too late to help older students and adults make progress and succeed. With proper evaluation and appropriate instruction and accommodations, adolescents and adults can achieve their goals, too, and make their own unique contributions to the workforce and society.

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Adolescent Literacy Web Resources

All About Adolescent Literacy

www.adlit.org

This website is funded by the Carnegie Corporation of New York and the Ann B. and Thomas L. Friedman Family Foundation. It is directed to educators and parents of struggling adolescent readers and writers.

Alliance for Excellent Education

www.all4ed.org/

The Alliance for Excellent Education is a policy and advocacy organization dedicated to transforming high schools so that every student graduates and is ready for postsecondary education and success in life. It focuses on secondary-school students whose achievement is in the lowest quartile. Two of the Alliance's key reports are *Reading Next: A Vision for Action and Research in Middle and High School Literacy* (Biancarosa & Snow, 2004) and *Writing Next: Effective Strategies to Improve Writing of Adolescents in Middle and High Schools* (Graham & Perin, 2007).

Americans with Disabilities Act

<http://www.ada.gov/workta.htm>, or call the toll free ADA Information Line at 800-514-0301 (voice) or 800-514-0383 (TTY).

Bookshare®

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Carnegie Corporation's Advancing Literacy Initiative www.carnegie.org/literacy/index.html

The Carnegie Corporation's Education Division began an Advancing Literacy initiative in 2003 to affect adolescent literacy policy, practice, and research. Publications include *Time To Act: An Agenda for Advancing Adolescent Literacy for College and Career Success*, *Writing Next: Effective Strategies to Improve Writing of Adolescents in Middle and High Schools*, and *Reading Next: A Vision for Action and Research in Middle and High School Literacy*.

Center on Instruction

www.centeroninstruction.org/index.cfm

The U.S. Department of Education sponsors The Center on Instruction, whose parent group is the RMC Research Corporation from Portsmouth, New Hampshire. Included in their publications is the second edition of the *Effective Instruction for Adolescent Struggling Readers*, a revision of the 2008 version. This version presents information based on findings from *Interventions for Adolescent Struggling Readers: A Meta-Analysis with Implications*.

The International Dyslexia Association (IDA) thanks Barbara A. Wilson for her assistance in the preparation of this fact sheet.

"promoting literacy through research, education and advocacy"™

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Fact sheet revised February 2012.



Knowledge and Practice Standards for Teachers of Reading International Dyslexia Association

Executive Summary

Reading Difficulties, Including Dyslexia, Are Very Common

Reading difficulties are the most common cause of academic failure and underachievement. Learning to read and write is not natural or easy for many—if not most—students, especially those with dyslexia and related language problems. The National Assessment of Educational Progress consistently finds that about 36% of all fourth graders read at a level described as “below basic.” Between 15 and 20% of young students are doomed to academic failure because of reading and language processing weaknesses, unless those weaknesses are recognized early and treated skillfully. Another 20–30% are at risk for inadequate reading and writing development, depending on how—and how well—they are taught. Most of these at-risk students are ineligible for special education services and are dependent on the instruction given in the regular classroom or other supplementary services. However, of those students who are referred to special education services in public schools, approximately 85% are having severe difficulties with language, reading, and writing. Clearly, responsibility for teaching reading and writing must be shared by classroom teachers, reading specialists, and special education personnel.

Effective Instruction Is Key

Although dyslexia and related reading and language problems may originate with neurobiological differences, they are mainly treated with skilled teaching. Informed and effective classroom instruction, especially in the early grades, can prevent or at least effectively address and limit the severity of reading and writing problems. Potential reading failure can be recognized as early as preschool and kindergarten, if not sooner. A large body of research evidence shows that with appropriate, intensive instruction, all but the most severe reading disabilities can be ameliorated in the early grades and students can get on track toward academic success. For those students with persistent dyslexia who need specialized instruction outside of the regular class, competent intervention from a specialist can lessen the impact of the disorder and help the student overcome and manage the most debilitating symptoms.

What is the nature of effective instruction for students at risk? The methods supported by research are those that are explicit, systematic, cumulative, and multisensory, in that they integrate listening, speaking, reading, and writing. The content of effective instruction emphasizes the structure of language, including the speech sound system (phonology), the writing system (orthography), the structure of sentences (syntax), the meaningful parts of words (morphology), meaning relationships among words and their referents (semantics), and the organization of spoken and written discourse. The strategies emphasize planning, organization, attention to task, critical thinking, and self-management. While all such aspects of teaching are essential for students with dyslexia, these strategies also enhance the potential of all students.

Are Teachers Prepared?

Teaching language, reading, and writing effectively, especially to students experiencing difficulty, requires considerable knowledge and skill. Regrettably, the licensing and professional development practices currently endorsed by many states are insufficient for the preparation and support of teachers and specialists. Researchers are finding that those with reading specialist and special education licenses often know no more about research-based, effective practices than those with general education teaching licenses. The majority of practitioners at all levels have not been prepared in sufficient depth to prevent reading problems, to recognize early signs of risk, or to teach students with dyslexia and related learning disabilities successfully. Inquiries into teacher preparation in reading have revealed a pervasive absence of rich content and academic rigor in many courses that lead to certification of teachers and specialists. Analyses of teacher licensing tests show that typically, very few are aligned with current research on effective instruction for students at risk. When tests are aligned with scientific research, far too many teacher candidates are unable to pass them. To address these gaps and promote more rigorous, meaningful, and effective teacher preparation and professional development, IDA has adopted this set of knowledge and practice standards.

Standards for Practice

IDA's *Knowledge and Practice Standards for Teachers of Reading* provide a content framework for courses and course sequences. In addition, they delineate proficiency requirements for practical application of this content (e.g., interpretation of assessments, delivery of differentiated instruction, and successful intervention with a child or adult with a reading disability). The first section specifies what all teachers of reading should know and be able to do, as well as ethical standards for the profession. The second section offers guidelines for the additional practical teaching skills necessary for teaching students with dyslexia and related difficulties. The standards are organized and presented in the following order:

SECTION I: Knowledge and Practice Standards

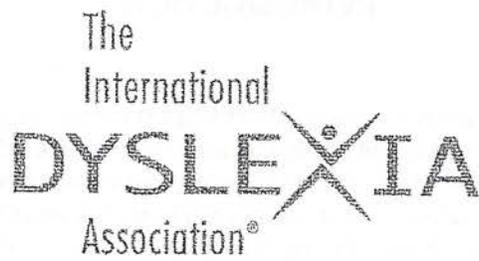
1. Foundation Concepts about Oral and Written Language Learning
2. Knowledge of the Structure of Language
3. Knowledge of Dyslexia and Other Learning Disorders
4. Interpretation and Administration of Assessments for Planning Instruction
5. Structured Language Teaching:
 1. Phonology
 2. Phonics and Word Study
 3. Fluent, Automatic Reading of Text
 4. Vocabulary
 5. Text Comprehension
 6. Handwriting, Spelling, Written Expression
6. Ethical Standards for the Profession

SECTION II: Guidelines Pertaining to Supervised Practice of Teachers of Students with Documented Reading Disabilities or Dyslexia Who Work in School, Clinical, or Private Practice Settings

- A. Level I expectations for teachers.
- B. Level II expectations for specialists.

Guidance and Support for Teachers

In summary, learning to teach reading, language, and writing is a complex undertaking. The competence and expertise of teachers can be nourished with training that emphasizes the study of reading development, language, and individual differences. In addition, teachers need supervised practice opportunities to be successful, especially if they are responsible for students with dyslexia and other reading difficulties. If teachers are better prepared, the impact of reading difficulties, including dyslexia, will be lessened and many more students will receive the instruction and support that they require to reach their potential. We owe them no less.



Knowledge and Practice Standards for Teachers of Reading

**International Dyslexia Association,
Professional Standards and Practices Committee
2010**

Louisa Moats, Committee Chair
Suzanne Carreker
Rosalie Davis
Phyllis Meisel
Louise Spear-Swerling
Barbara Wilson

INTRODUCTION

Purpose of These Standards

The International Dyslexia Association (IDA) offers these standards to guide the preparation, certification, and professional development of those who teach reading and related literacy skills in classroom, remedial, and clinical settings. The term *teacher* is used throughout this document to refer to any person whose responsibilities include reading instruction. The standards aim to specify what any individual responsible for teaching reading should know and be able to do so that reading difficulties, including dyslexia, may be prevented, alleviated, or remediated. In addition, the standards seek to differentiate classroom teachers from therapists or specialists who are qualified to work with the most challenging students.

Although programs that certify or support teachers, clinicians, or specialists differ in their preparation methodologies, teaching approaches, and organizational purposes, they should ascribe to a common set of professional standards for the benefit of the students they serve. Compliance with these standards should assure the public that individuals who teach in public and private schools, as well as those who teach in clinics, are prepared to implement scientifically based and clinically proven practices.

Background: Why These Standards Are Necessary

Reading difficulties are the most common cause of academic failure and underachievement. The National Assessment of Educational Progress consistently finds that about 36% of all fourth graders read at a level described as "below basic." Between 15 and 20% of young students demonstrate significant weaknesses with language processes, including but not limited to phonological processing, that are the root cause of dyslexia and related learning difficulties. Of those who are referred to special education services in public schools, approximately 85% are referred because of their problems with language, reading, and/or writing. Informed and effective classroom instruction, especially in the early grades, can prevent and relieve the severity of many of these problems. For those students with dyslexia who need specialized instruction outside of the regular class, competent intervention from a specialist can lessen the impact of the disorder and help the student overcome the most debilitating symptoms.

Teaching reading effectively, especially to students experiencing difficulty, requires considerable knowledge and skill. Regrettably, current licensing and professional development practices endorsed by many states are insufficient for the preparation and support of teachers and specialists. Researchers are finding that those with reading specialist and special education licenses often know no more about research-based, effective practices than those with a general education teaching license. The majority of practitioners at all levels have not been prepared in sufficient depth to recognize early signs of risk, to prevent reading problems, or to teach students with dyslexia and related learning disabilities successfully. Inquiries into teacher preparation in reading have revealed a pervasive absence of substantive content and academic rigor in many courses that lead to certification of teachers and specialists. Analyses of teacher licensing tests show that typically, very few are aligned with current research on effective instruction for students at risk. To address these gaps, IDA has adopted these standards for knowledge, practice, and ethical conduct.

Research-based Assumptions about Dyslexia and Other Reading Difficulties

These standards are broadly constructed to address the knowledge and skill base for teaching reading in preventive, intervention, and remedial settings. Underlying the standards are assumptions about the nature, prevalence, manifestations, and treatments for dyslexia that are supported by research and by accepted diagnostic guidelines. These assumptions characterize dyslexia in relation to other reading problems and learning difficulties, as follows:

- Dyslexia is a language-based disorder of learning to read and write originating from a core or basic problem with phonological processing intrinsic to the individual. Its primary symptoms are inaccurate and/or slow printed word recognition and poor spelling – problems that in turn affect reading fluency and comprehension and written expression. Other types of reading disabilities include specific difficulties with reading comprehension and/or speed of processing (reading fluency). These problems may exist in relative isolation or may overlap extensively in individuals with reading difficulties.
- Dyslexia often exists in individuals with aptitudes, talents, and abilities that enable them to be successful in many domains.
- Dyslexia often coexists with other developmental difficulties and disabilities, including problems with attention, memory, and executive function.
- Dyslexia exists on a continuum. Many students with milder forms of dyslexia are never officially diagnosed and are not eligible for special education services. They deserve appropriate instruction in the regular classroom and through other intervention programs.
- Appropriate recognition and treatment of dyslexia is the responsibility of all educators and support personnel in a school system, not just the reading or special education teacher.
- Although early intervention is the most effective approach, individuals with dyslexia and other reading difficulties can be helped at any age.

How to Use These Standards

The standards outline the 1) content knowledge necessary to teach reading and writing to students with dyslexia or related disorders or who are at risk for reading difficulty; 2) practices of effective instruction; and 3) ethical conduct expected of professional educators and clinicians. Regular classroom teachers should also have the foundational knowledge of language, literacy development, and individual differences because they share responsibility for preventing and ameliorating reading problems.

The standards may be used for several purposes, including but not limited to:

- course design within teacher certification programs;
- practicum requirements within certification programs;
- criteria for membership in IDA's coalition of organizations that provide training and supervision of teachers, tutors, and specialists (note that additional requirements for membership are to be determined);
- criteria for the preparation of those professionals receiving referrals through IDA offices; and
- a content framework for the development of licensing or certification examinations.

How to Read the Standards

The Standards include two major sections. Section I addresses foundation concepts, knowledge of language structure, knowledge of dyslexia and other learning disorders, administration and interpretation of assessments, the principles of structured language teaching, and ethical standards for the profession. Section II addresses skills to be demonstrated in supervised practice. In Section I, Standards A, B, C, and E are presented in two columns. The column on the left refers to content knowledge that can be learned and tested independent of observed teaching competency. The column on the right delineates the practical skills of teaching that depend on or that are driven by content knowledge. The exception to this format is Standard D. It includes a third column on the right that specifies in greater detail what the teacher or specialist should be able to do.

Many of the standards are followed by the designation of (Level 1) or (Level 2). These designations indicate whether the standard should be met by novice teachers in training (Level 1) or by specialists with more experience and greater expertise (Level 2). In Section II, the recommended standards for preparation of teachers and specialists are distinguished by these two levels.

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SECTION I: KNOWLEDGE AND PRACTICE STANDARDS

A. Foundation Concepts about Oral and Written Learning

Content Knowledge	Application
<p>1. Understand and explain the language processing requirements of proficient reading and writing</p> <ul style="list-style-type: none"> • Phonological (speech sound) processing • Orthographic (print) processing • Semantic (meaning) processing • Syntactic (sentence level) processing • Discourse (connected text level) processing 	<p>1. a. Explain the domains of language and their importance to proficient reading and writing (Level 1).</p> <p>b. Explain a scientifically valid model of the language processes underlying reading and writing (Level 2).</p>
<p>2. Understand and explain other aspects of cognition and behavior that affect reading and writing</p> <ul style="list-style-type: none"> • Attention • Executive function • Memory • Processing speed • Graphomotor control 	<p>2. a. Recognize that reading difficulties coexist with other cognitive and behavioral problems (Level 1).</p> <p>b. Explain a scientifically valid model of other cognitive influences on reading and writing, and explain major research findings regarding the contribution of linguistic and cognitive factors to the prediction of literacy outcomes (Level 2).</p>
<p>3. Define and identify environmental, cultural, and social factors that contribute to literacy development (e.g., language spoken at home, language and literacy experiences, cultural values).</p>	<p>3. Identify (Level 1) or explain (Level 2) major research findings regarding the contribution of environmental factors to literacy outcomes.</p>
<p>4. Know and identify phases in the typical developmental progression of</p> <ul style="list-style-type: none"> • Oral language (semantic, syntactic, pragmatic) • Phonological skill • Printed word recognition • Spelling • Reading fluency • Reading comprehension • Written expression 	<p>4. Match examples of student responses and learning behavior to phases in language and literacy development (Level 1).</p>
<p>5. relationships among phonological skill, phonic decoding, spelling, accurate and automatic word recognition, text reading fluency, background knowledge, verbal reasoning skill, vocabulary, reading comprehension, and writing.</p>	<p>5. Explain how a weakness in each component skill of oral language, reading, and writing may affect other related skills and processes across time (Level 2).</p>

Content Knowledge	Application
<p>6. Understand and explain the known causal relationships among the major components of literacy development change with reading development (i.e., changes in oral language, including phonological awareness; phonics and word recognition; spelling; reading and writing fluency; vocabulary; reading comprehension skills and strategies; written expression).</p>	<p>6. Identify the most salient instructional needs of students who are at different points of reading and writing development (Level 2).</p>
<p>7. Know reasonable goals and expectations for learners at various stages of reading and writing development.</p>	<p>7. Given case study material, explain why a student is/is not meeting goals and expectations in reading or writing for his or her age/grade (Level 1).</p>

Explanatory Notes

An extensive research base exists on the abilities that are important in learning to read and write, including how these abilities interact with each other, how they are influenced by experience, and how they change across development. Teachers' knowledge of this research base is an essential foundation for the competencies and skills described in subsequent sections of this document.

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Content Knowledge	Application
<p>6. Understand and explain the known causal relationships among the major components of literacy development change with reading development (i.e., changes in oral language, including phonological awareness; phonics and word recognition; spelling; reading and writing fluency; vocabulary; reading comprehension skills and strategies; written expression).</p>	<p>6. Identify the most salient instructional needs of students who are at different points of reading and writing development (Level 2).</p>
<p>7. Know reasonable goals and expectations for learners at various stages of reading and writing development.</p>	<p>7. Given case study material, explain why a student is/is not meeting goals and expectations in reading or writing for his or her age/grade (Level 1).</p>

Explanatory Notes

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B. Knowledge of the Structure of Language

Content Knowledge	Application
<p>Phonology (The Speech Sound System)</p> <p>1. Identify, pronounce, classify, and compare the consonant and vowel phonemes of English.</p>	<p>1. a. Identify similar or contrasting features among phonemes (Level 1). b. Reconstruct the consonant and vowel phoneme inventories and identify the feature differences between and among phonemes (Level 2).</p>
<p>Orthography (The Spelling System)</p> <p>2. Understand the broad outline of historical influences on English spelling patterns, especially Anglo-Saxon, Latin (Romance), and Greek.</p> <p>3. Define <i>grapheme</i> as a functional correspondence unit or representation of a phoneme.</p> <p>4. Recognize and explain common orthographic rules and patterns in English.</p> <p>5. Know the difference between "high frequency" and "irregular" words.</p> <p>6. Identify, explain, and categorize six basic syllable types in English spelling.</p>	<p>2. Recognize typical words from the historical layers of English (Anglo-Saxon, Latin/Romance, Greek) (Level 1).</p> <p>3. Accurately map graphemes to phonemes in any English word (Level 1).</p> <p>4. Sort words by orthographic "choice" pattern; analyze words by suffix ending patterns and apply suffix ending rules.</p> <p>5. Identify printed words that are the exception to regular patterns and spelling principles; sort high frequency words into regular and exception words (Level 1).</p> <p>6. Sort, pronounce, and combine regular written syllables and apply the most productive syllable division principles (Level 1).</p>
<p>Morphology</p> <p>7. Identify and categorize common morphemes in English, including Anglo-Saxon compounds, inflectional suffixes, and derivational suffixes; Latin-based prefixes, roots, and derivational suffixes; and Greek-based combining forms.</p>	<p>7. a. Recognize the most common prefixes, roots, suffixes, and combining forms in English content words, and analyze words at both the syllable and orpheme levels (Level 1). b. Recognize advanced morphemes (e.g., chameleon prefixes) (Level 2).</p>
<p>Semantics</p> <p>8. Understand and identify examples of meaningful word relationships or semantic organization.</p>	<p>8. Match or identify examples of word associations, antonyms, synonyms, multiple meanings and uses, semantic overlap, and semantic feature analysis (Level 1).</p>

Syntax

- | | |
|--|--|
| 9. Define and distinguish among phrases, dependent clauses, and independent clauses in sentence structure. | 9. Construct and deconstruct simple, complex, and compound sentences (Level 1). |
| 10. Identify the parts of speech and the grammatical role of a word in a sentence. | 10. a. Identify the basic parts of speech and classify words by their grammatical role in a sentence (Level 1).
b. Identify advanced grammatical concepts (e.g., infinitives, gerunds) (Level 2). |

Discourse Organization

- | | |
|--|--|
| 11. Explain the major differences between narrative and expository discourse. | 11. Classify text by genre; identify features that are characteristic of each genre, and identify graphic organizers that characterize typical structures (Level 1). |
| 12. Identify and construct expository paragraphs of varying logical structures (e.g., classification, reason, sequence). | 12. Identify main idea sentences, connecting words, and topics that fit each type of expository paragraph organization (Level 2). |
| 13. Identify cohesive devices in text and inferential gaps in the surface language of text. | 13. Analyze text for the purpose of identifying the inferences that students must make to comprehend (Level 2). |

Explanatory Notes

Formal knowledge about the structure of language—recognizing, for example, whether words are phonetically regular or irregular; common morphemes in words; and common sentence structures in English—is not an automatic consequence of high levels of adult literacy. However, without this kind of knowledge, teachers may have difficulty interpreting assessments correctly or may provide unintentionally confusing instruction to students. For instance, struggling readers are likely to be confused if they are encouraged to sound out a word that is phonetically irregular (e.g., *some*), or if irregular words, such as *come* and *have*, are used as examples of a syllable type such as “silent e.” Similarly, to teach spelling and writing effectively, teachers need a knowledge base about language structure, including sentence and discourse structure. Research suggests that acquiring an understanding of language structure often requires explicit teaching of this information and more than superficial coverage in teacher preparation and professional development.

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C. Knowledge of Dyslexia and Other Learning Disorders

Content Knowledge	Application
<p>1. Understand the most common intrinsic differences between good and poor readers (i.e., cognitive, neurobiological, and linguistic).</p>	<p>1. a. Recognize scientifically accepted characteristics of individuals with poor word recognition (e.g., overdependence on context to aid word recognition; inaccurate nonword reading) (Level 1). b. Identify student learning behaviors and test profiles typical of students with dyslexia and related learning difficulties. (Level 2).</p>
<p>2. Recognize the tenets of the NICHD/IDA definition of dyslexia.</p>	<p>2. Explain the reasoning or evidence behind the main points in the definition (Level 1).</p>
<p>3. Recognize that dyslexia and other reading difficulties exist on a continuum of severity.</p>	<p>3. Recognize levels of instructional intensity, duration, and scope appropriate for mild, moderate, and severe reading disabilities (Level 1).</p>
<p>4. Identify the distinguishing characteristics of dyslexia and related reading and learning disabilities (including developmental language comprehension disorder, attention deficit hyperactivity disorder, disorders of written expression or dysgraphia, mathematics learning disorder, nonverbal learning disorders, etc.).</p>	<p>4. Match symptoms of the major subgroups of poor readers as established by research, including those with dyslexia, and identify typical case study profiles of those individuals (Level 2).</p>
<p>5. Identify how symptoms of reading difficulty may change over time in response to development and instruction.</p>	<p>5. Identify predictable ways that symptoms might change as students move through the grades (Level 2).</p>
<p>6. Understand federal and state laws that pertain to learning disabilities, especially reading disabilities and dyslexia.</p>	<p>6. a. Explain the most fundamental provisions of federal and state laws pertaining to the rights of students with disabilities, especially students' rights to a free, appropriate public education, an individualized educational plan, services in the least restrictive environment, and due process (Level 1). b. Appropriately implement federal and state laws in identifying and serving students with learning disabilities, reading disabilities, and dyslexia (Level 2).</p>

Explanatory Notes

To identify children with dyslexia and other learning disabilities, teachers must understand and recognize the key symptoms of these disorders, as well as how the disorders differ from each other. In order to plan instruction and detect older students with learning disabilities who may have been overlooked in the early grades, teachers also should understand how students' difficulties may change over time, based on developmental patterns, experience, and instruction, as well as on increases in expectations across grades.

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D. Interpretation and Administration of Assessments for Planning Instruction

Content Knowledge	Application	Observable Competencies for Teaching Students with Dyslexia and Related Difficulties
<p>1. Understand the differences among screening, diagnostic, outcome, and progress-monitoring assessments.</p> <p>2. Understand basic principles of test construction, including reliability, validity, and norm-referencing, and know the most well-validated screening tests designed to identify students at risk for reading difficulties.</p> <p>3. Understand the principles of progress-monitoring and the use of graphs to indicate progress.</p> <p>4. Know the range of skills typically assessed by diagnostic surveys of phonological skills, decoding skills, oral reading skills, spelling, and writing.</p> <p>5. Recognize the content and purposes of the most common diagnostic tests used by psychologists and educational evaluators.</p> <p>6. Interpret measures of reading comprehension and written expression in relation to an individual child's component profile.</p>	<p>1. Match each type of assessment and its purpose (Level 1).</p> <p>2. Match examples of technically adequate, well-validated screening, diagnostic, outcome, and progress-monitoring assessments (Level 1).</p> <p>3. Using case study data, accurately interpret progress-monitoring graphs to decide whether or not a student is making adequate progress (Level 1).</p> <p>4. Using case study data, accurately interpret subtest scores from diagnostic surveys to describe a student's patterns of strengths and weaknesses and instructional needs (Level 2).</p> <p>5. Find and interpret appropriate print and electronic resources for evaluating tests (Level 1).</p> <p>6. Using case study data, accurately interpret a student's performance on reading comprehension or written expression measures and make appropriate instructional recommendations.</p>	<p>1. Administer screenings and progress monitoring assessments (Level 1)</p> <p>2. Explain why individual students are or are not at risk in reading based on their performance on screening assessments (Level 1).</p> <p>3. Display progress-monitoring data in graphs that are understandable to students and parents (Level 1).</p> <p>4. Administer educational diagnostic assessments using standardized procedures (Level 2).</p> <p>5. Write reports that clearly and accurately summarize a student's current skills in important component areas of reading and reading comprehension (Level 2).</p> <p>6. Write appropriate, specific recommendations for instruction and educational programming based on assessment data (Level 2).</p>

Explanatory Notes

Teachers' ability to administer and interpret assessments accurately is essential both to early identification of students' learning problems and to planning effective instruction. Appropriate assessments enable teachers to recognize early signs that a child may be at risk for dyslexia or other learning disabilities, and the assessments permit teachers to target instruction to meet individual student's needs. Teachers should understand that there are different types of assessments for different purposes (e.g., brief but frequent assessments to monitor progress versus more lengthy, comprehensive assessments to provide detailed diagnostic information), as well as recognize which type of assessment is called for in a particular situation. Teachers need to know where to find unbiased information about the adequacy of published tests, and to interpret this information correctly, they require an understanding of basic principles of test construction and concepts such as reliability and validity. They also should understand how an individual student's component profile may influence his or her performance on a particular test, especially on broad measures of reading comprehension and written expression. For example, a child with very slow reading is likely to perform better on an untimed measure of reading comprehension than on a stringently timed measure; a child with writing problems may perform especially poorly on a reading comprehension test that requires lengthy written responses to open-ended questions.

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E-1. Structured Language Teaching: Phonology

Content Knowledge	Observable Competencies for Teaching Students with Dyslexia and Related Difficulties
<ol style="list-style-type: none"> 1. Identify the general and specific goals of phonological skill instruction. 2. Know the progression of phonological skill development (i.e., rhyme, syllable, onset-rime, phoneme differentiation). 3. Identify the differences among various phonological manipulations, including identifying, matching, blending, segmenting, substituting, and deleting sounds. 4. Understand the principles of phonological skill instruction: brief, multisensory, conceptual, and auditory-verbal. 5. Understand the reciprocal relationships among phonological processing, reading, spelling, and vocabulary. 6. Understand the phonological features of a second language, such as Spanish, and how they interfere with English pronunciation and phonics. 	<ol style="list-style-type: none"> 1. Explicitly state the goal of any phonological awareness teaching activity (Level 1). 2. <ol style="list-style-type: none"> a. Select and implement activities that match a student's developmental level of phonological skill (Level 1). b. Design and justify the implementation of activities that match a student's developmental level of phonological skill (Level 2). 3. Demonstrate instructional activities that identify, match, blend, segment, substitute, and delete sounds (Level 1). 4. <ol style="list-style-type: none"> a. Successfully produce vowel and consonant phonemes (Level 1). b. Teach articulatory features of phonemes and words; use minimally contrasting pairs of sounds and words in instruction; support instruction with manipulative materials and movement (Level 2). 5. <ol style="list-style-type: none"> a. Direct students' attention to speech sounds during reading, spelling, and vocabulary instruction using a mirror, discussion of articulatory features, and so on as scripted or prompted (Level 1). b. Direct students' attention to speech sounds during reading, spelling, and vocabulary instruction without scripting or prompting (Level 2). 6. Explicitly contrast first and second language phonological systems, as appropriate, to anticipate which sounds may be most challenging for the second language learner (Level 2).

Explanatory Notes

Phonological awareness, basic print concepts, and knowledge of letter sounds are foundational areas of literacy. Without early, research-based intervention, children who struggle in these areas are likely to continue to have reading difficulties. Furthermore, poor phonological awareness is a core weakness in dyslexia. Ample research exists to inform teaching of phonological awareness, including research on the phonological skills to emphasize in instruction, appropriate sequencing of instruction, and integrating instruction in phonological awareness with instruction in alphabet knowledge. Teachers who understand how to teach these foundational skills effectively can prevent or ameliorate many children's reading problems, including those of students with dyslexia.

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E-2. Structured Language Teaching: Phonics and Word Recognition

Content Knowledge	Observable Competencies for Teaching Students with Dyslexia and Related Difficulties
<ol style="list-style-type: none"> 1. Know or recognize how to order phonics concepts from easier to more difficult. 2. Understand principles of explicit and direct teaching: model, lead, give guided practice, and review. 3. State the rationale for multisensory and multimodal techniques. 4. Know the routines of a complete lesson format, from the introduction of a word recognition concept to fluent application in meaningful reading and writing. 5. Understand research-based adaptations of instruction for students with weaknesses in working memory, attention, executive function, or processing speed. 	<ol style="list-style-type: none"> 1. Plan lessons with a cumulative progression of word recognition skills that build one on another (Level 1). 2. Explicitly and effectively teach (e.g., information taught is correct, students are attentive, teacher checks for understanding, teacher scaffolds students' learning) concepts of word recognition and phonics; apply concepts to reading single words, phrases, and connected text (Level 1). 3. Demonstrate the simultaneous use of two or three learning modalities (to include listening, speaking, movement, touch, reading, and/or writing) to increase engagement and enhance memory (Level 1). 4. Plan and effectively teach all steps in a decoding lesson, including single-word reading and connected text that is read fluently, accurately, and with appropriate intonation and expression (Level 1). 5. Adapt the pace, format, content, strategy, or emphasis of instruction according to students' pattern of response (Level 2).

Explanatory Notes

The development of accurate word decoding skills—that is, the ability to read unfamiliar words by applying phonics knowledge—is an essential foundation for reading comprehension in all students. Decoding skills often are a central weakness for students with learning disabilities in reading, especially those with dyslexia. Teachers' abilities to provide explicit, systematic, appropriately sequenced instruction in phonics is indispensable to meet the needs of this population, as well as to help prevent reading problems in all beginning readers. Teachers should also understand the usefulness of multisensory, multimodal techniques in focusing students' attention on printed words, engaging students, and enhancing memory.

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E-3. Structured Language Teaching: Fluent, Automatic Reading of Text

Content Knowledge	Observable Competencies for Teaching Students with Dyslexia and Related Difficulties
<ol style="list-style-type: none"> 1. Understand the role of fluency in word recognition, oral reading, silent reading, comprehension of written discourse, and motivation to read. 2. Understand reading fluency as a stage of normal reading development; as the primary symptom of some reading disorders; and as a consequence of practice and instruction. 3. Define and identify examples of text at a student's frustration, instructional, and independent reading level. 4. Know sources of activities for building fluency in component reading skills. 5. Know which instructional activities and approaches are most likely to improve fluency outcomes. 6. Understand techniques to enhance student motivation to read. 7. Understand appropriate uses of assistive technology for students with serious limitations in reading fluency. 	<ol style="list-style-type: none"> 1. Assess students' fluency rate and determine reasonable expectations for reading fluency at various stages of reading development, using research-based guidelines and appropriate state and local standards and benchmarks (Level 1). 2. Determine which students need a fluency-oriented approach to instruction, using screening, diagnostic, and progress-monitoring assessments (Level 2). 3. Match students with appropriate texts as informed by fluency rate to promote ample independent oral and silent reading (Level 1). 4. Design lesson plans that incorporate fluency-building activities into instruction at sub-word and word levels (Level 1). 5. Design lesson plans with a variety of techniques to build reading fluency, such as repeated readings of passages, alternate oral reading with a partner, reading with a tape, or rereading the same passage up to three times. (Level 1). 6. Identify student interests and needs to motivate independent reading (Level 1). 7. Make appropriate recommendations for use of assistive technology in general education classes for students with different reading profiles (e.g., dyslexia versus language disabilities) (Level 2).

Explanatory Notes

Reading fluency is the ability to read text effortlessly and quickly as well as accurately. Fluency develops among typical readers in the primary grades. Because fluency is a useful predictor of overall reading competence, especially in elementary-aged students, a variety of fluency tasks have been developed for use in screening and progress-monitoring measures. Furthermore, poor reading fluency is a very common symptom of dyslexia and other reading disabilities; problems with reading fluency can linger even when students' accuracy in word decoding has been improved through effective phonics intervention. Although fluency difficulties may sometimes be associated with processing weaknesses, considerable research supports the role of practice, wide exposure to printed words, and focused instruction in the development and remediation of fluency. To address students' fluency needs, teachers must have a range of competencies, including the ability to interpret fluency-based measures appropriately, to place students in appropriate types and levels of texts for reading instruction,

to stimulate students' independent reading, and to provide systematic fluency interventions for students who require them. Assistive technology (e.g., text-to-speech software) is often employed to help students with serious fluency difficulties function in general education settings. Therefore, teachers, and particularly specialists, require knowledge about the appropriate uses of this technology.

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E-4. Structured Language Teaching: Vocabulary

Content Knowledge	Observable Competencies for Teaching Students with Dyslexia and Related Difficulties
<ol style="list-style-type: none"> 1. Understand the role of vocabulary development and vocabulary knowledge in comprehension. 2. Understand the role and characteristics of direct and indirect (contextual) methods of vocabulary instruction. 3. Know varied techniques for vocabulary instruction before, during, and after reading. 4. Understand that word knowledge is multifaceted. 5. Understand the sources of wide differences in students' vocabularies. 	<ol style="list-style-type: none"> 1. Teach word meanings directly using contextual examples, structural (morpheme) analysis, antonyms and synonyms, definitions, connotations, multiple meanings, and semantic feature analysis (Levels 1 and 2). 2. Lesson planning reflects: <ol style="list-style-type: none"> A. Selection of material for read-alouds and independent reading that will expand students' vocabulary. B. Identification of words necessary for direct teaching that should be known before the passage is read. C. Repeated encounters with new words and multiple opportunities to use new words orally and in writing. D. Recurring practice and opportunities to use new words in writing and speaking.

Explanatory Notes

Vocabulary, or knowledge of word meanings, plays a key role in reading comprehension. Knowledge of words is multifaceted, ranging from partial recognition of the meaning of a word to deep knowledge and the ability to use the word effectively in speech or writing. Research supports both explicit, systematic teaching of word meanings and indirect methods of instruction such as those involving inferring meanings of words from sentence context or from word parts (e.g., common roots and affixes). Teachers should know how to develop students' vocabulary knowledge through both direct and indirect methods. They also should understand the importance of wide exposure to words, both orally and through reading, in students' vocabulary development. For example, although oral vocabulary knowledge frequently is a strength for students with dyslexia, over time, low volume of reading may tend to reduce these students' exposure to rich vocabulary relative to their typical peers; explicit teaching of word meanings and encouragement of wide independent reading in appropriate texts are two ways to help increase this exposure.

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E-5. Structured Language Teaching: Text Comprehension

Content Knowledge	Observable Competencies for Teaching Students with Dyslexia and Related Difficulties
<ol style="list-style-type: none"> 1. Be familiar with teaching strategies that are appropriate before, during, and after reading and that promote reflective reading. 2. Contrast the characteristics of major text genres, including narration, exposition, and argumentation. 3. Understand the similarities and differences between written composition and text comprehension, and the usefulness of writing in building comprehension. 4. Identify in any text the phrases, clauses, sentences, paragraphs and "academic language" that could be a source of miscomprehension. 5. Understand levels of comprehension including the surface code, text base, and mental model (situation model). 6. Understand factors that contribute to deep comprehension, including background knowledge, vocabulary, verbal reasoning ability, knowledge of literary structures and conventions, and use of skills and strategies for close reading of text. 	<ol style="list-style-type: none"> 1. <ol style="list-style-type: none"> a. State purpose for reading, elicit or provide background knowledge, and explore key vocabulary (Level 1). b. Query during text reading to foster attention to detail, inference-making, and mental model construction (Level 1). c. Use graphic organizers, note-taking strategies, retelling and summarizing, and cross-text comparisons (Level 1). 2. Lesson plans reflect a range of genres, with emphasis on narrative and expository texts (Level 1). 3. Model, practice, and share written responses to text; foster explicit connections between new learning and what was already known (Level 1). 4. Anticipate confusions and teach comprehension of figurative language, complex sentence forms, cohesive devices, and unfamiliar features of text (Level 2). 5. Plan lessons to foster comprehension of the surface code (the language), the text base (the underlying ideas), and a mental model (the larger context for the ideas) (Level 2). 6. Adjust the emphasis of lessons to accommodate learners' strengths and weaknesses and pace of learning (Level 2).

Explanatory Notes

Good reading comprehension is the ultimate goal of reading instruction. Reading comprehension depends not only upon the component abilities discussed in previous sections, but also upon other factors, such as background knowledge and knowledge of text structure. In order to plan effective instruction and intervention in reading comprehension, teachers must understand the array of abilities that contribute to reading comprehension and use assessments to help pinpoint students' weaknesses. For instance, a typical student with dyslexia, whose reading comprehension problems are associated mainly with poor decoding and dysfluent reading, will need different emphases in intervention than will a poor comprehender whose problems revolve

around broad weaknesses in vocabulary and oral comprehension. In addition, teachers must be able to model and teach research-based comprehension strategies, such as summarization and the use of graphic organizers, as well as use methods that promote reflective reading and engagement. Oral comprehension and reading comprehension have a reciprocal relationship; good oral comprehension facilitates reading comprehension, but wide reading also contributes to the development of oral comprehension, especially in older students. Teachers should understand the relationships among oral language, reading comprehension, and written expression, and they should be able to use appropriate writing activities to build students' comprehension.

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E-6. Structured Language Teaching: Handwriting, Spelling, and Written Expression

Content Knowledge	Observable Competencies for Teaching Students with Dyslexia and Related Difficulties
<p>Handwriting</p> <ol style="list-style-type: none"> 1. Know research-based principles for teaching letter naming and letter formation, both manuscript and cursive. 2. Know techniques for teaching handwriting fluency. 	<p>Handwriting</p> <ol style="list-style-type: none"> 1. Use multisensory techniques to teach letter naming and letter formation in manuscript and cursive forms (Level 1). 2. Implement strategies to build fluency in letter formation, and copying and transcription of written language (Level 1).
<p>Spelling</p> <ol style="list-style-type: none"> 1. Recognize and explain the relationship between transcription skills and written expression. 2. Identify students' levels of spelling development and orthographic knowledge. 3. Recognize and explain the influences of phonological, orthographic, and morphemic knowledge on spelling. 	<p>Spelling</p> <ol style="list-style-type: none"> 1. Explicitly and effectively teach (e.g., information taught is correct, students are attentive, teacher checks for understanding, teacher scaffolds students' learning) concepts related to spelling (e.g., a rule for adding suffixes to base words) (Level 1). 2. Select materials and/or create lessons that address students' skill levels (Level 1). 3. Analyze a student's spelling errors to determine his or her instructional needs (e.g., development of phonological skills versus learning spelling rules versus application of orthographic or morphemic knowledge in spelling) (Level 2).
<p>Written Expression</p> <ol style="list-style-type: none"> 1. Understand the major components and processes of written expression and how they interact (e.g., basic writing/ transcription skills versus text generation). 2. Know grade and developmental expectations for students' writing in the following areas: mechanics and conventions of writing, composition, revision, and editing processes. 	<p>Written Expression</p> <ol style="list-style-type: none"> 1. Integrate basic skill instruction with composition in writing lessons. 2. <ol style="list-style-type: none"> a. Select and design activities to teach important components of writing, including mechanics/ conventions of writing, composition, and revision and editing processes. b. Analyze students' writing to determine specific instructional needs. c. Provide specific, constructive feedback to students targeted to students' most critical needs in writing. d. Teach research-based writing strategies such as those for planning, revising, and editing text.

3. Understand appropriate uses of assistive technology in written expression.

e. Teach writing (discourse) knowledge, such as the importance of writing for the intended audience, use of formal versus informal language, and various schemas for writing (e.g., reports versus narratives versus arguments).

3. Make appropriate written recommendations for the use of assistive technology in writing.

Explanatory Notes

Just as teachers need to understand the component abilities that contribute to reading comprehension, they also need a componential view of written expression. Important component abilities in writing include basic writing (transcription) skills such as handwriting, keyboarding, spelling, capitalization, punctuation, and grammatical sentence structure; text generation (composition) processes that involve translating ideas into language, such as appropriate word choice, writing clear sentences, and developing an idea across multiple sentences and paragraphs; and planning, revision and editing processes. Effective instruction and intervention in written expression depend on pinpointing an individual student's specific weaknesses in these different component areas of writing, as well as on teachers' abilities to provide explicit, systematic teaching in each area. Teachers must also be able to teach research-based strategies in written expression, such as those involving strategies for planning and revising compositions, and they should understand the utility of multisensory methods in both handwriting and spelling instruction. Assistive technology can be especially helpful for students with writing difficulties. Teachers should recognize the appropriate uses of technology in writing (e.g., spell-checkers can be valuable but do not replace spelling instruction and have limited utility for students whose misspellings are not recognizable). Specialists should have even greater levels of knowledge about technology.

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F. Follow Ethical Standards for the Profession

Ethical Principles for Service Providers, Conference Exhibitors, and Advertisers

These principles are to be used by employees, board members, and branch officers of the International Dyslexia Association (IDA) in deciding whether members, conference exhibitors, conference or workshop presenters, and/or advertisers in IDA publications are serving the best interest of the public. These principles are intended to safeguard and promote the well-being of individuals with dyslexia and related learning difficulties, to promote the dissemination of reliable and helpful information, and to ensure that standards of best practice are upheld by the organization and its activities.

Practitioners, publishers, presenters, exhibitors, advertisers, and any others who provide services to individuals with dyslexia and related difficulties:

1. strive to do no harm and to act in the best interests of those individuals;
2. maintain the public trust by providing accurate information about currently accepted and scientifically supported best practices in the field;
3. avoid misrepresentation of the efficacy of educational or other treatments or the proof for or against those treatments;
4. respect objectivity by reporting assessment and treatment results accurately, honestly, and truthfully;
5. avoid making unfounded claims of any kind regarding the training, experience, credentials, affiliations, and degrees of those providing services;
6. respect the training requirements of established credentialing and accreditation organizations supported by IDA;
7. engage in fair competition;
8. avoid conflicts of interest when possible and acknowledge conflicts of interest when they occur;
9. support just treatment of individuals with dyslexia and related learning difficulties;
10. respect confidentiality of students or clients; and
11. respect the intellectual property of others.

SECTION II: GUIDELINES PERTAINING TO SUPERVISED PRACTICE OF TEACHERS OF STUDENTS WITH DOCUMENTED READING DISABILITIES OR DYSLEXIA WHO WORK IN SCHOOL, CLINICAL, OR PRIVATE PRACTICE SETTINGS¹

Training programs for individuals who are learning to work with challenging students often distinguish levels of expertise by the skills and experience of the individual and the amount of supervised practice required for certification. These levels are labeled differently by various programs and are distinguished here by the designation of "Level I" and "Level II."

- C. Level I individuals are practitioners with basic knowledge who:
1. demonstrate proficiency to instruct individuals with a documented reading disability or dyslexia;
 2. implement an appropriate program with fidelity; and
 3. formulate and implement an appropriate lesson plan.
- D. Level II individuals are specialists with advanced knowledge who:
1. may work in private practice settings, clinics, or schools;
 2. demonstrate proficiency in assessment and instruction of students with documented reading disabilities or dyslexia;
 3. implement and adapt research-based programs to meet the needs of individuals.

To attain Level I status, an individual must:

- pass an approved basic knowledge proficiency exam;
- complete a one-to-one practicum with a student or small group of one to three well-matched students who have a documented reading disability. A recognized, certified instructor* provides consistent oversight and observations of instruction delivered to the same student(s) over time, and the practicum continues until expected proficiency is reached.**
- demonstrate (over time) instructional proficiency in all Level 1 areas outlined on IDA Knowledge and Practice Standards, Section I that is responsive to student needs.
- Document significant student progress with formal and informal assessments as a result of the instruction.

To attain Level II status, an individual must:

- Pass an approved advanced knowledge proficiency exam
- Complete a 1:1 practicum with a student or small group of well-matched students (1-3) who have a documented reading disability. A recognized, certified instructor* provides consistent oversight and observations of instruction delivered to the same student(s) over time, and the practicum continues until expected proficiency is reached.**
- Demonstrate (over time) diagnostic instructional proficiency in all Level 1 and 2 areas outlined on IDA Standards document, Section I.
- Provide successful instruction to several individuals with dyslexia who demonstrate varying needs and document significant student progress with formal and informal assessments as a result of the instruction.
- Complete an approved educational assessment of a student with dyslexia and/or language-based reading disability, including student history and comprehensive recommendations.

¹ (Tier 3 in an RTI system; students who may be eligible for special education or intensive intervention; students referred for clinical services because of learning difficulties; or students who qualify for dyslexia intervention services where available.)

*A recognized or certified instructor is an individual who has met all of the requirements of the level they supervise but who has additional content knowledge and experience in implementing and observing instruction for students with dyslexia and other reading difficulties in varied settings. A recognized instructor has been recommended by or certified by an approved trainer mentorship program that meets these standards. The trainer mentorship program has been reviewed by and approved by the IDA Standards and Practices Committee.

**Documentation of proficiency must be 1) completed by a recognized/certified instructor providing oversight in the specified program; 2) completed during full (not partial) lesson observations; and 3) must occur at various intervals throughout the instructional period with student.

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Internet Resources: Supporting Learners with Special Needs

- AIM Center on Accessible Instructional Materials: <http://aim.cast.org>
- AT4 Leaders resources; <https://sites.google.com/site/at4leaders/>
- Best Practices Videos IU 17:
<http://www.iu17.org/39391012910933373/blank/browse.asp?A=383&BMDRN=2000&BCOB=0&C=50659>
- Bookshare: <https://www.bookshare.org/>
- Building the Foundation:
<http://www.centeroninstruction.org/files/Building%20the%20Foundation.pdf>
- CAST Center for Applied Special Technology: <http://www.cast.org>
- Classroom Reading Instruction that supports Struggling Readers: Key Components for Effective Teaching by Carolyn A Denton, Children's Learning Institute, University of Texas health Science Center Houston: <http://rtinetwork.org/essential/tieredinstruction/tier1/effectiveteaching>
- Council for Exceptional Children (CEC): www.cec.sped.org/
- * Differentiation Central: <http://www.differentiationcentral.com/whatisdi.html>
- International Dyslexia Association (IDA): <http://www.interdys.org/>
- International Reading Association (IRA): www.reading.org/
- Literacy Milestones from Birth to Age Six: <http://www.rif.org/us/literacy-resources/articles/literacy-milestones-from-birth-to-age-six.htm>
- Microsoft office: Using Text to Speech feature: <http://office.microsoft.com/en-us/word-help/using-the-speak-text-to-speech-feature-HA102066711.aspx>
- National Center on Accessible Instructional Materials (AIM): <http://aim.cast.org/>
- Natural Reader: <http://www.naturalreaders.com/>
- PaTTAN: RtII, Reading, Accessible Instructional Materials, Assistive Technology, Data Analysis, Resources: www.pattan.net
- PaTTAN Technology Tool Kit: <http://udltechtoolkit.wikispaces.com/>
- Pennsylvania's Standard Aligned System (SAS) Web Portal <http://pdesas.org>
- Reading Rockets: Reading and the Brain: <http://www.readingrockets.org/shows/launching/brain/>
- RTI Action Network: <http://rtinetwork.org/>
- Text to Speech materials directions: http://aim.cast.org/learn/e-resources/software-based/screenreaders_tts
- Voluntary Model Curriculum Lesson Plans: <http://www.pdesas.org/module/content/search/vmc.aspx>
- Infant/Toddler environment Rating Scale, Revised edition: <http://ers.fpg.unc.edu/node/84>

Low and Mid Tech Tool Trials

Tools already used circled Tools to recommend checked

Reading Tools		
-Color	<input type="checkbox"/> Reading Helpers <input type="checkbox"/> See It Right! Color Filters <input type="checkbox"/> Heads Up Frames <input type="checkbox"/> Neon Highlighter Set <input type="checkbox"/> Neon Lites Assortment <input type="checkbox"/> Other: _____	
-Guides/Magnifiers	<input type="checkbox"/> Magnifying Bar <input type="checkbox"/> Pocket Magnifier <input type="checkbox"/> Signature Guide <input type="checkbox"/> Writing Guide <input type="checkbox"/> Finger Grip Ruler <input type="checkbox"/> Other: _____	
-Note-Taking	<input type="checkbox"/> Highlighter Tapes (3-line) <input type="checkbox"/> Hefty Tabs <input type="checkbox"/> Highlighter Tapes (Narrow) <input type="checkbox"/> Color Coding Dots <input type="checkbox"/> Correction and Cover-Up Tape <input type="checkbox"/> Post-It Pagemarkers <input type="checkbox"/> Redi-Tag Page Flag Arrows <input type="checkbox"/> Other: _____ <input type="checkbox"/> Post-It Mini Tape Flags <input type="checkbox"/> Erasable Highlighters	
-Electronic	<input type="checkbox"/> Franklin Homework Wiz / Spelling Ace <input type="checkbox"/> Speaking H.W. Wiz / Spelling Ace <input type="checkbox"/> Light Wedge <input type="checkbox"/> Other: _____	
-Miscellaneous	<input type="checkbox"/> PageUp <input type="checkbox"/> Stickin' Place Magnetic Sheet <input type="checkbox"/> PortaBook <input type="checkbox"/> EZ Book Clip <input type="checkbox"/> Other: _____	
Writing Tools		
-AT Pens/Erasers/ Pencils	<input type="checkbox"/> Assistive Pen Set <input type="checkbox"/> Remedy Pen (Comfort Grip Pen) <input type="checkbox"/> Evo Pen <input type="checkbox"/> Gel Pen <input type="checkbox"/> RinG-Pen <input type="checkbox"/> Red-Light Note-Taking Pen <input type="checkbox"/> Multi-Color Light Pen <input type="checkbox"/> NitewriterPen <input type="checkbox"/> Smiley Light-Up Pen <input type="checkbox"/> Magic Rub Erasers <input type="checkbox"/> Other: _____	
-Grips	<input type="checkbox"/> Specialized Pencil and Grip Set <input type="checkbox"/> Add-A-Grip <input type="checkbox"/> Baseball Foam Grip <input type="checkbox"/> Bulb Grip <input type="checkbox"/> The Pencil Grip <input type="checkbox"/> Foam Grip <input type="checkbox"/> Solo Grip <input type="checkbox"/> Grotto Grip	
-Paper	<input type="checkbox"/> Bright Lines Paper (Narrow) <input type="checkbox"/> Bold Lines <input type="checkbox"/> Bright Lines Paper (Kindergarten) <input type="checkbox"/> Math Grids <input type="checkbox"/> Stop 'n Go Raised Line Paper <input type="checkbox"/> Note-Taking Paper <input type="checkbox"/> Narrow Ruled Raised Line Paper <input type="checkbox"/> Guide Write Paper (s) <input type="checkbox"/> Wide Ruled Raised Line Paper <input type="checkbox"/> Wide Line T-K Spacing Paper <input type="checkbox"/> Narrow Line T-K Writing Paper <input type="checkbox"/> Narrow Line T-K Spacing Paper <input type="checkbox"/> Colored Paper: _____ <input type="checkbox"/> Story Paper (Narrow) <input type="checkbox"/> Story Paper (Kindergarten)	
-Guides	<input type="checkbox"/> Signature Guide <input type="checkbox"/> Writing Guide <input type="checkbox"/> Other: _____	
-Stamps	<input type="checkbox"/> Alpha-Numeric Rubber Stamp Set <input type="checkbox"/> Black Stamp Ink <input type="checkbox"/> Other: _____	
-Markerboards	<input type="checkbox"/> Personal Size Markerboard <input type="checkbox"/> Magnetic <input type="checkbox"/> Writing Markerboards <input type="checkbox"/> White Board Crayons <input type="checkbox"/> Other: _____	
-Electronic	<input type="checkbox"/> Franklin Homework Wiz <input type="checkbox"/> Spelling Ace <input type="checkbox"/> Speaking required <input type="checkbox"/> AlphaSmart 3000 <input type="checkbox"/> Dana <input type="checkbox"/> Other: _____	
-Color	<input type="checkbox"/> Neon Highlighter Set <input type="checkbox"/> Highlighter Tapes (3-line) <input type="checkbox"/> Erasable Highlighters <input type="checkbox"/> Color Coding Dots <input type="checkbox"/> Highlighter Tapes (narrow) <input type="checkbox"/> Color Ink _____ <input type="checkbox"/> Other: _____	
-Miscellaneous	<input type="checkbox"/> PageUp <input type="checkbox"/> Keystick Labels <input type="checkbox"/> Other: _____	
Math Tools		
-Calculation	<input type="checkbox"/> Math Shark <input type="checkbox"/> TI-15 Explorer Calculator <input type="checkbox"/> Talking Calculator <input type="checkbox"/> Talking Calculator w/ Clock <input type="checkbox"/> Giant Calculator <input type="checkbox"/> Other: _____	
-Measuring	<input type="checkbox"/> Finger Grip Ruler <input type="checkbox"/> Master Ruler <input type="checkbox"/> Other: _____	
-Stamps	<input type="checkbox"/> Clock Stamp Set <input type="checkbox"/> Number and Operation Stamps <input type="checkbox"/> Fraction Stamps <input type="checkbox"/> Fractiongrams <input type="checkbox"/> X-Y Axis Stamp <input type="checkbox"/> Numberline Stamp Set <input type="checkbox"/> Thermometer Stamp <input type="checkbox"/> Black Stamp Ink <input type="checkbox"/> Colored Stamp Ink <input type="checkbox"/> Other: _____	

-Color	<input type="checkbox"/> See It Right! Color Filters <input type="checkbox"/> Reading Helpers <input type="checkbox"/> Highlighter Tapes (3-line) <input type="checkbox"/> Highlighter Tapes (narrow) <input type="checkbox"/> Neon Highlighter Set <input type="checkbox"/> Neon Lites Assortment	<input type="checkbox"/> Heads Up Frames <input type="checkbox"/> Color Coding Dots <input type="checkbox"/> Other: _____
-Time	<input type="checkbox"/> Clock Stamp Set <input type="checkbox"/> Clock Markerboard Set	<input type="checkbox"/> Other: _____
-Money	<input type="checkbox"/> Coin Abacus <input type="checkbox"/> Coin-u-lator	<input type="checkbox"/> Money Calc
-Markerboards	<input type="checkbox"/> Place-Value Markerboard <input type="checkbox"/> Personal Size Markerboard <input type="checkbox"/> Clock Markerboard Set	<input type="checkbox"/> Magnetic <input type="checkbox"/> Other: _____
-Tracking/ Alignment	<input type="checkbox"/> Math Grids <input type="checkbox"/> Other: _____	<input type="checkbox"/> Intelli-Gear CD
-Miscellaneous	<input type="checkbox"/> Signature Guide <input type="checkbox"/> PageUp <input type="checkbox"/> Other: _____	<input type="checkbox"/> Stickin' Place Magnetic Sheets <input type="checkbox"/> Math Line <input type="checkbox"/> Math Tables
Organizational Tools		
-Color	<input type="checkbox"/> Transparency Files <input type="checkbox"/> Highlighter Tapes (3-line) <input type="checkbox"/> Highlighter Tapes (narrow) <input type="checkbox"/> Neon Highlighter Set <input type="checkbox"/> Neon Lites Assortment	<input type="checkbox"/> Color Coding Dots <input type="checkbox"/> Other: _____
-Note-Taking	<input type="checkbox"/> Post-It Pagemarkers <input type="checkbox"/> Redi-Tag Page Flag Arrows <input type="checkbox"/> Sheer Post-It <input type="checkbox"/> AT Notebook <input type="checkbox"/> Tape Recorder: _____ <input type="checkbox"/> Other: _____	<input type="checkbox"/> Post-It Mini Tape Flags <input type="checkbox"/> Hefty Tabs <input type="checkbox"/> Post-It Notes
-Recorders	<input type="checkbox"/> Multi-Channel Digital Recorder <input type="checkbox"/> 2 Channel Digital Recorder	<input type="checkbox"/> Other: _____
-Time	<input type="checkbox"/> Time Timer <input type="checkbox"/> Other: _____	
-Miscellaneous	<input type="checkbox"/> Math Grids <input type="checkbox"/> Stickin' Place Magnetic Sheets <input type="checkbox"/> Keystick Keyboard Labels <input type="checkbox"/> Intelli-Gear <input type="checkbox"/> Hemi-Sync: _____ <input type="checkbox"/> Other: _____	<input type="checkbox"/> Finger Grip Ruler <input type="checkbox"/> PageUp
Environmental Tools		
	<input type="checkbox"/> Non-Slip Pad <input type="checkbox"/> Hemi-Sync CD - Remembrance <input type="checkbox"/> Music (Specify: _____) <input type="checkbox"/> Scent (Specify Scent: _____) <input type="checkbox"/> Lighting (Specify Color, Style, Watt of Bulb: _____) <input type="checkbox"/> Other: _____	

Microsoft tech directions

Microsoft Windows Accessibility features

- One practical application of a slider is a cognitive rescaling intervention utilizing the AutoSummary feature in Microsoft Word (Edyburn, 2002).
- <http://www.microsoft.com/enable/products/chartwindows.aspx>

Auto Summarize

- This feature automatically creates a summary of any on-screen document. Because the summary is created by a computer, and not a person, it is important for teachers to review summaries and original texts prior to relying upon any summary.
- To create an AutoSummary:
- Open the file to be summarized
- Tools>>>AutoSummarize. A window will open
- Select the options you want from this window, and click OK.

Microsoft Word Accessibility

- To configure the Spelling Checker: Tools>>>Options>>>Spelling & Grammar
- To configure the Grammar Checker: Tools>>>Options>>>Spelling & Grammar>>>Options
- To show readability statistics: Tools>>>Options>>>Spelling & Grammar

It is useful as an approximation of the level of reading skills needed to read any particular text, and it is certainly imperfect.

Inserting Text Comments and Voice Comments

- To insert a text comment, click on the Insert menu and select Comment
- A text box will appear in the right hand margin. Insert your cursor in the box and type your comment.
- To insert a voice comment, click on the Insert menu and select Object. A dialogue box with a list will appear. Scroll down to Wave Sound and select that item. A recording box will appear on the screen. Click on the little red box to record your message

Hyperlinks

- In Word, immediately after you type a URL (e.g. <http://www.cast.org>) and press enter, a hyperlink will automatically be created for you.
- Sometimes it is better to make a hyperlink using a word or phrase that will identify where the link is taking you to. Alternatively, you can link to web pages, sound files (you can record your own), video files, other Word documents, spreadsheets—in fact, any other type of file. In addition, you can link to a bookmark, which allows you to create custom glossaries of word definitions.

Text-to-Speech (TTS) in Word Documents

- In Word, go to the Tools and select Speech. One of three things will happen:
- The speech menu bar will appear at the top of your screen.
- The dialogue box will appear for speech recognition, cancel this. The menu bar should now appear at the top of your screen.
- You may need to install the speech tools. If this is true, the installation dialogue box will appear. Just follow directions.

Technology Changes Everything

Recent changes in technology:

- Make it possible to communicate with more people than ever before
- Enable learning any time, any place, any how
- Facilitate personalization
- Promote participation in content, knowledge, and collaboration
- Brenda Gourley, EDUCAUSE Review, Vol. 45, no. 1 (January/February 2010): 30-41.

Reading Tools for Supporting Struggling Students

Digital Video

Search for videos online using Google or the search engine of your choice. Use the video filter. If YouTube is blocked in your school, add "-YouTube" to your search query.

See if your district or IU has a subscription to one of these services. (Your librarian may know!)

- Safari Montage: <http://www.safarimontage.com/Content/Default.aspx>
- Discovery Education Streaming <http://www.discoveryeducation.com/administrators/curricular-resources/streaming/>

80 Alternatives to YouTube

http://issuu.com/medkh9/docs/eighty_alternatives_to_youtube?mode=window&backgroundcolor=%23222222: A free download e-book with 80 alternatives and descriptions.

"Watch and Learn <http://currikiblog.wordpress.com/2010/07/13/watch-and-learn/> - 20 free educational web sites"

Khan Academy <http://www.khanacademy.org/>: a library of over 300 instructional videos.

MIT Video <http://video.mit.edu/>: a collection of more than 10,000 educational videos organized into more than 150 channels.

TedED <http://ed.ted.com/>: library of educational videos, modeled after TED.com <http://www.ted.com/>, and incorporating a variety of tools to help teachers use and create video for their lessons. Read a review [here](#).

Mathcasts <http://math247.pbworks.com/w/page/20517538/K-7%20Mathcasts%20500%20Project-500-Math-VoiceThreads!>

Text-to-Speech

Text-to-Speech Demonstrations:

- AIM Explorer http://aim.cast.org/experience/decision-making_tools/aim_explorer This is a free simulation that combines grade-leveled digital text with access features common to most text readers. It was designed to be used by a reader working collaboratively with an educator, tutor, parent, or assistive technology specialist as a guide. This Adobe Air application can be downloaded from the National AIM Center <http://aim.cast.org/>.
 - Find out more about AIM in PA on the AIM page <https://sites.google.com/site/uequalseverybody/home/engaging-with-text> (See the PA AIM Guidelines.)
- You can find a list of sources of E-text <https://sites.google.com/site/at4leaders/reading-tools/text-to-speech/e-text-and-audio> on this page of this site.
- Word Talk <http://www.wordtalk.org.uk/Home/>: free text-to-speech, works in MS Word (Highlights at word, phrase, sentence level.)
- Natural Readers http://www.naturalreaders.com/freeinfo_win.htm: free text-to-speech, works in .doc, .pdf, and on web.
- Bookshare: This is your source for textbooks and other print materials in electronic format.
- Tarheel Reader <http://tarheelreader.org/> a collection of free, easy-to-read, and accessible books on a wide range of topics. They can be read via text-to-speech, and accessed in a variety of ways (e.g., keyboard, switch, etc.)
- Learn more about adapted books at The Complex <https://sites.google.com/site/thepacomplex/adapted-books> - a site containing resources for instruction for students with complex support needs.

You may also be interested in exploring these features related to text-to-speech:

Loads of e-text sites and resources on the E-text and Audio

<https://sites.google.com/site/at4leaders/reading-tools/text-to-speech/e-text-and-audio> page

Other text-to-speech voices at www.nextup.com.

Built in Text-to-speech in your operating systems:

Mac Accessibility and Literacy learning

<http://www.apple.com/accessibility/macosx/literacylearning.html>

Windows Narrator <http://windows.microsoft.com/en-US/Windows7/Hear-text-read-aloud-with-Narrator>

E-RESOURCES
[Accessibility Resources](#)
[Hardware-Based Resources](#)
[Software-Based Resources](#)
[Screenreaders & Text-to-Speech Applications](#)
[Software for DTBs](#)
[Other Software](#)
[Online Resources](#)
[History of the e-book](#)
Screenreaders & Text-to-Speech Applications

Screenreader applications read aloud a variety of content formats via TTS (text-to-speech). See also the [Software for DTBs](#) page.

Balabolka

Babolka is a text-to-speech (TTS) program. All computer voices installed on a system are available to Balabolka. On-screen text can be saved as a WAV, MP3, OGG or WMA file. The program can read clipboard content, view text from DOC, RTF, PDF, FB2 and HTML files, customize font and background color, control reading from the system tray or by global hotkeys. It can also be run from a flash drive. Go to the [Balabolka web site](#) for more information.

DSPEECH

DSPEECH is a TTS (text-to-speech) freeware program with integrated ASR (automatic speech recognition) functionality. It is able to read aloud written text and choose sentences to be pronounced based on vocal answers of a user. It can be run from an external flash drive and can record its TTS output to an MP3 file. Go to the [DSPEECH web site](#) for more information.

JAWS

The most widely used screenreader on the market, JAWS was "developed for computer users whose vision loss prevents them from seeing screen content[.] JAWS reads aloud what's on the PC screen" (*from the web site*). JAWS works with a variety of formats and applications, including Lotus Symphony and Notes, [Microsoft Office](#) Suite, MSN Messenger, WordPerfect, Adobe Acrobat Reader, DAISY, Internet Explorer, and Firefox. JAWS also offers braille output to a refreshable braille display, instead of or in combination with TTS. Other features include compatibility with dual monitor use, screen magnification, and availability in 23 languages. Go to [Freedom Scientific's JAWS web page](#) for more information.

Kurzweil 3000

Kurzweil 3000 is a text-to-speech software program for special education students, adult learners with learning disabilities, and English language learners (ELL). It is effective for use in a classroom, in a business environment, or for individual use at home. Kurzweil 1000 is also available; it is a vision-impaired, text-to-speech assistive software program. Go to the [Kurzweil Products](#) web page for more information.

Microsoft Word

Using the macro capabilities of Microsoft Word, it is possible to add a "Speak Text" toolbar to that application. For specific instructions, see http://www.gmayor.com/word_text_to_speech.htm.

NaturalReader 10.0/2.0

NaturalReader freeware reads selected text in HTML, Word, RTF, text, PDF formats. Version 10.0 is for Windows and version 2.0 is for Macs. Features of the free version include a floating toolbar that can be used with Word, Outlook, PowerPoint, and Explorer; adjustable voice speed with two voices. Go to the [Natural Reader](#) web site for more information.

NVDA

NVDA (NonVisual Desktop Access) is "a free and open source screen reader for the Microsoft Windows operating system. Providing feedback via synthetic speech and Braille, it enables blind or vision impaired people to access computers running Windows for no more cost than a sighted person. Major features include support for over 20 languages and the ability to run entirely from a USB drive with no installation" (*from the web site*). Supported formats: web browsers, email clients, internet chat programs, and office suites including WordPad, Notepad, Internet Explorer, [Mozilla Firefox](#), Outlook Express, Word, Excel, and free office suite Open Office. Go to the [NVDA web site](#) for more information.

PDF Equalizer

PDF Equalizer can open and read aloud any version of a PDF file. The built-in NOTES function allows note-taking and notes can be "synchronized" with the relevant PDF page. PDF Equalizer also has a built-in text-to-MP3 audio converter and a talking dictionary. Go to the [PDF Equalizer web site](#) for more information.

ReadPlease 2003

"Reads any text you see on your screen—all-purpose text-to-speech software" (from the web site). Works with Windows OS. Use by copying and pasting text from Word, RTF, or text documents. Features of the free version include change of font size and background color and adjustable voice speed with three Microsoft voices. A simple program, its advantage is its ease of use. Go to the [ReadPlease web site](#) for more information.



Text Reader 1.2

Text Reader opens plain text files and then exports them either to AIFF files or directly to an iTunes playlist (optionally encoding them with iTunes' default preferences). Adjust rate and pitch of speech of an AIFF file as it is saved. Go to the [Text Reader web site](#) for more information.



TextSpeech Pro 1.0

TextSpeech Pro reads books, documents, emails with a choice of natural human voices. Reads any document (PDF, Word, HTML, text, XML, etc.) aloud, and includes Cepstral voices (as an included or optional component to the software). Synthesize speech from text and use the high-quality voices (Deluxe version) in most Mac OS X applications. Export text to a variety of audio file formats (Deluxe version). Go to the [TextSpeech Pro web site](#) for more information.



UniversalReader Plus

UniversalReader Plus is a very easy-to-use reading utility. It works with virtually any application. Use it to read email, Word documents, and web pages. Select content to be read, click on the floating toolbar, and it starts to read. It takes about two minutes to install and even less time to learn how to use. Go to the [UniversalReader Plus web site](#) for more information.



Window-Eyes

Window-Eyes screenreader is "a leading software application for the blind and visually impaired, which converts components of the Windows operating system into synthesized speech allowing for complete and total access to Windows based computer systems" (from the web site). Works with Excel, Word, PowerPoint, Outlook, HTML, text, PDF, flash; supports braille display. Features include ten voices; remote access; beginner, intermediate, and advanced menu levels; ability to read text under a mouse pointer as it moves; and more. Go to the [Window-Eyes web site](#) for more information.



WordTalk 4.2

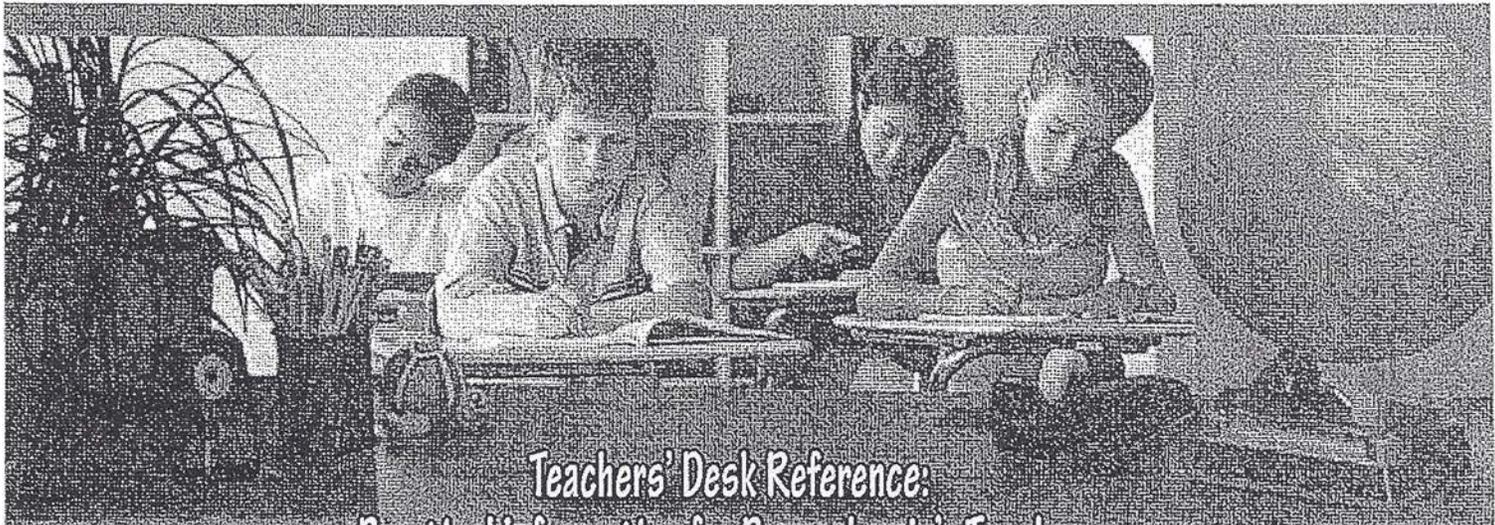
Word Talk is a free plug-in developed for use with all versions of Microsoft Word (from Word 97 on), which can help people with reading difficulties use Microsoft Word more effectively. Go to the [Word Talk web site](#) for more information.

<i>More to Learn</i>				
ACCESSIBLE MEDIA	PRACTICE	POLICY	ALL ABOUT AIM	RESEARCH
Images	Production	Federal	Who?	AIM Research
Text	Acquisition & Distribution	State Information	What?	UDL Research
Audio	Use	State Resources	Why?	AT Research
Video	Future Considerations	Local	How?	
	NIMAC			
HISTORY & ARCHIVES				
NIMAS-Related Archives				
AIM Consortium Archives				
Other Archives				

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Teachers' Desk Reference: Practical Information for Pennsylvania's Teachers

Assistive Technology

As a teacher, you have the responsibility to design learning environments that are responsive to diverse student needs and to foster participation and achievement. You may have students in your class or school who need assistive technology (AT) to communicate or to help them access, participate, and/or respond to instruction within the general education classroom. This Teachers' Desk Reference provides an overview of what assistive technology is and how it can benefit students both in school and in their everyday lives.

What is assistive technology?

An assistive technology **device**, as defined by IDEA 2004, is *any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of a child with a disability*. Assistive technology devices range in complexity from no- or low-tech tools such as a pencil grip or a customized mouse to high-tech tools, such as specialized software or electronic voice-output communication devices. This definition does not include medical devices that are surgically implanted (such as a cochlear implant) or the replacement of any such device.

IDEA – and Pennsylvania Chapters 14 and 711 – require that teams consider assistive technology needs (also referred to as assistive devices) for every student with an Individualized Education Program (IEP).

Assistive technology, as defined by the federal law, may also be a **service** – *any service that directly assists a child with a disability in the selection, acquisition, or use of an assistive technology device*. AT services may include evaluating a student's need for assistive technology; selecting or adapting AT devices; or coordinating AT services such as training for the student, the student's family, and educational team members.

Who uses assistive technology?

Assistive technology devices and services may be used by students with disabilities to increase access to the general curriculum and help these students make progress toward attaining their Individualized Education Program (IEP) goals. Without the use of AT, some students would not be able to access the classroom or instruction due to physical, cognitive, sensory, or learning disabilities.

A broad range of students may require AT in school to remove barriers in various settings. An individual student may need a range of AT options/tools dependent upon the tasks to access the curriculum.

Decisions about which students should use assistive technology are not made based on the

nature or severity of a student's disability. Assistive technology is not just for certain types of learners. Students may require AT devices and services to communicate, to see or hear, to read, to write or to spell, to use a computer, to turn a page, or to travel down the hall to the lunch room.

How is the need for assistive technology determined?

Determining Use of AT

IDEA – and Pennsylvania Chapters 14 and 711 – require that teams consider assistive technology needs (also referred to as assistive devices) for every student with an IEP. Not all students with disabilities will need AT to access the curriculum or work toward their IEP goals, but the team must consider AT needs as part of the IEP process.

Once it is determined that a student may need AT, a multidisciplinary team should take a systematic approach to exploring AT options for that student. The team should consider the following when exploring options for a student:

- Activities and routines of the student's day (participation demands and opportunities, including expressive communication, reading, writing, and activities of daily living).
- Academic tasks (curricular demands and local and state assessments).
- AT options that may help the student to meet the above demands.
- Data available on AT devices and services that have been tried already.

Questions for the IEP Team to Consider

Does the student need AT:

- To meaningfully participate in the general curriculum?
- To participate in academic or functional activities?
- To access print materials?
- To access auditory information?
- For written communication and/or computer access?

- For augmentative/alternative communication (AAC)?
- To participate in state and local assessments?

Does the student require AT services for:

- Evaluating AT needs?
- Purchasing, leasing, or acquiring AT devices?
- Selecting, designing, fitting, customizing, and/or adapting AT devices?
- Coordinating and using other therapies, interventions, or services with AT devices (i.e., who will charge/maintain device and provide updates)?
- Training or technical assistance for student, family, professional?

What types of assistive technology are available?

Students may require a variety of tools ranging from no- to low- to high-tech options:

- **No-tech AT** usually refers to simple, nonelectronic solutions that provide access and improve function for the students. These AT solutions may be created or purchased commercially at relatively low cost, and may include devices such as adapted spoon handles, customized pencil grips, or picture communication displays.
- **Low-tech AT** may be relatively simple or commercially available electronic devices such as single message communicators, portable word processors, and talking calculators.
- **High-tech AT** devices are more complex electronic devices, such as computers and specialized software. High-tech devices often incorporate multiple features and may be used to meet a variety of needs. The use of high-tech AT is usually combined with low-tech systems that can be used in particular situations or to provide back-up in the event of breakdown.

Any low- or high-tech items may be considered AT when their use increases or maintains the student's ability to function and participate, both socially

and academically, in the school environment. See Figure 1 for examples.

Figure 1. Examples: Low-Tech and High-Tech Assistive Technology

Low-Tech AT	High-Tech AT
<ul style="list-style-type: none"> • Pencil grips or adapted pens, pencils, and markers • Raised-line paper, magnifiers, or slant boards • Name stamps (such as those used for signatures) • Book holders or page turners • Large key or talking calculators • Communication pictures, displays, or books • Digital/tape recorders • Head stick or mouth stick • Portable word processors and electronic spell checkers and dictionaries 	<ul style="list-style-type: none"> • Dynamic display voice-output communication devices • Integrated computer software systems with text-to-speech reading features, and supports for writing and studying • Voice recognition computer software • Adapted or alternative keyboard, trackballs, and switches that allow a student to access computer software programs • Note-taking devices with speech and Braille features

How can you find out more about assistive technology and services in Pennsylvania?

The Pennsylvania Training and Technical Assistance Network (PaTTAN) offers numerous resources for educators and families.

- **Assistive Technology EXPO**—The yearly event is held in late fall at multiple locations across the commonwealth. Staff and families can try AT devices and ask questions of manufacturers and vendors at the expo.
- **Assistive Technology Purchasing Program (ATPP Bid)** is available to provide AT device bid prices to local educational agencies (LEAs).

- **Professional Development**—Visit the PaTTAN website at www.pattan.net to find out about AT professional development opportunities and resources. Under *Educational Initiatives*, click on *Assistive Technology*.

- **AT Consultants** are available to answer questions and direct school staff and families to appropriate AT resources. Each intermediate unit (IU) also has a staff member specifically trained in AT who can assist school teams.

PaTTAN King of Prussia	800-441-3215
PaTTAN Harrisburg	800-360-7282
PaTTAN Pittsburgh	800-446-5607

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DEPARTMENT OF EDUCATION

Bureau of Special Education
Pennsylvania Training and Technical Assistance Network

Technology Assistance for Students: The Student needs assistance with...

Reading (Decoding, Comprehension, Fluency) and needs text-to-speech

Operating System	Text (.txt)	Word Documents (.doc/ .docx)	HTML (web pages)	.pdf
Windows	Narrator and WordPad, Notepad ClipSpeak	Speak in Quick access toolbar (Office 2007 and 2010)	NaturalReader SpeechUtil (Firefox add-in)	Adobe Reader X
Macintosh	VoiceOver and TextEdit Highlight text and press Option+ESC	VoiceOver (through Pages) Highlight text and press Option+ESC	VoiceOver and Safari Speak Highlight text and press Option+ESC	Adobe Reader
iOS	VoiceOver and Quicklook or Pages iOS 5- Enable Read selection in accessibility	VoiceOver and Pages	VoiceOver and Safari	iBooks and VoiceOver

Reading and needs text simplification

Operating System	Text (.txt)	Word Documents (.doc/ .docx)	HTML (web pages)	.pdf
Windows			Readability and Windows Explorer, Firefox	
Macintosh			Read button in Safari	
iOS			Finger spread gesture to enlarge text	

Writing tools for spelling grammar and word completion

Operating System	Text (.txt)	Word Documents (.doc/ .docx)	HTML (web pages)	.pdf
Windows	Windows Speech Recognition	Windows Speech Recognition		
Macintosh	Press escape for word completion	Press escape for word completion		
iOS	Dragon Dictation App	Dragon Dictation App		

Writing Tools for Supporting Struggling Students

"There is no medium of expression that is equally suited for all students or for all kinds of communication....Alternative modalities for expression should be provided both to level the playing field among students, and to introduce all students to the full range of media that are important for communication and literacy in our multimedia culture." Rose & Gravel, 2011

Why you need to know about Pen-Pencil Alternatives

- If you can't read you probably can't spell. This makes for poor written work.
- If you can't read you probably have trouble constructing sentences, because you haven't been exposed to print sentence structure.
- Spoken language is generally sentence fragments; these don't translate well to the page- so speech-to-text is usually not the solution we think it could be.
- Written language needs to sound good and look good. This could be impossible if you are disorganized or have motor issues at any level.
- This is not new - but it's still worth the read: How Computers Change the Writing Process for People with Disabilities <http://www.ldresources.org/?p=172> (Richard Wanderman, 2004)

Looking at Keyboarding/Typing

- Computers and word processing can be a solution to writing problems. But typing isn't an instant skill!
- The problem with touch typing is this - if you can't handle a pencil all that well, the chances are good that getting the right fingers on the keys will be a problem too.
- Just My Type: <http://www.billziegler.com/> Learning the keyboard by typing text that is meaningful to the student.
 - Copying - but with an idea that student owns name, news, story,
 - Audio, error free, customized keyboard layout if needed,
 - Data collection

Looking at Spelling

- Ginger Software: <http://www.gingersoftware.com/> Grammar Checker and Spell Checker
 - Based on the context of each sentence, Ginger corrects your spelling and grammar mistakes in MS-Word, Outlook, PowerPoint, IE, Firefox, Chrome.

Looking at Organization

- Report Cards: <http://www.billziegler.com/> A beginning writing strategy tool that makes editing and organizing easy, and provides options for voice recording to capture ideas that are often lost when the writing process is difficult.
- Here is a link to some research <http://www.graphicorganizers.com/SMARTSheet-Research/writing-smartsheets-studies.html> around the process strategies reflected in Report Cards.

Looking at Other Means of Expression

Voice Recording as a Writing Alternative

- Just Say It: <http://www.billziegler.com/just-say-it.html> a voice recording template for both teacher and student to record voice. May be used as a means to complete an assignment (such as end-of-chapter questions) or as a study tool.
- Voice Thread: <http://voicethread.com/> is an online multimedia tool that utilizes voice recording, text entry, video (webcam) recording, paired with an image. Multiple people can contribute or comment.
- Foto Babble <http://www.fotobabble.com/> is another online tool that is a great example of multimedia that can be used to engage learners to show what they know and think using photos and voice.
- Link to this site "1001 Super Tools for Teachers" <http://www.esc4.net/default.aspx?name=ses.webinars> for how-to-webinars on VoiceThread and a variety of other tools.