

Supporting Literacy in Individuals with Autism through the use of Assistive Technologies

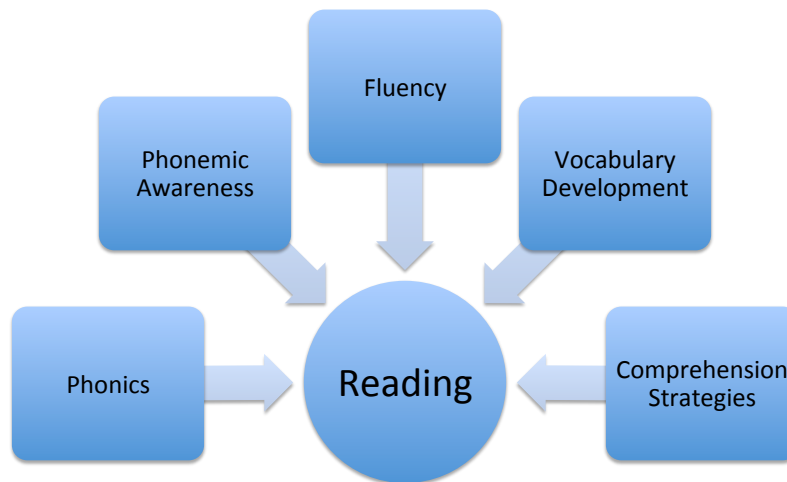
Amy Bixler Coffin, MS
amy_bixler@ocali.org

Jan Rogers, MS, OTR/L, ATP
jan_rogers@ocali.org

Objectives

- ✓ Gain understanding of common reading barriers for students with ASD
- ✓ Gain understanding of features of technology that address reading barriers
- ✓ Gain an understanding of the process for feature matching student needs and technology features

Components of Reading




Adapted from Ambruster et al. (2003)

O C A L I


The reading problems of those with autism spectrum disorder may not be obvious initially and may worsen over time.

O C A L I

Autism Spectrum Disorder Characteristics

DSM-5	Federal Definition of Autism
Fixated Interests and Repetitive Behaviors	
a) Stereotyped or repetitive speech, motor movements, or use of objects	<ul style="list-style-type: none"> •Engagement in repetitive activities and stereotyped movements •Disability affecting verbal communication •Disability affecting nonverbal communication •Disability affecting social interactions
b) Excessive adherence to routines, ritualized patterns of verbal or nonverbal behavior, or excessive resistance to change	<ul style="list-style-type: none"> • Resistance to environmental change or change in daily routine
c) Highly restricted, fixated interests that are abnormal in intensity or focus	<ul style="list-style-type: none"> • Engagement in repetitive activities
d) Hyper- or hypo-reactivity to sensory input or unusual interest in sensory aspects of environment	<ul style="list-style-type: none"> • Unusual responses to sensory experiences
	

Autism Spectrum Disorder Characteristics

DSM-5	Federal Definition of Autism
Qualitative Impairments in social communication	
a) Deficits in social-emotional reciprocity	<ul style="list-style-type: none"> •Disability affecting social interactions •Disability affecting verbal communication •Disability affecting nonverbal communication
b) Deficits in nonverbal communicative behaviors used for social interaction	<ul style="list-style-type: none"> •Disability affecting social interactions •Disability affecting verbal communication
c) Deficits in developing and maintaining relationships, appropriate to developmental level	<ul style="list-style-type: none"> •Disability affecting social interactions
	

Socialization and Literacy Impact

Adapted from Iland 2011

Area of Developmental Concern	Possible Effect on Literacy and Comprehension
Play skills	Cognitive development, learning and literacy
Shared enjoyment	Decreased time in shared activities including reading
Joint attention	Limited attending to reading activities with others
Imitative play	Practice of roles and actions in real life may impact understanding of those roles and actions in storybooks
Imaginary play	Understanding of imaginary content in books
Conversations with adults	Decreased language development
Social experiences	Limited SE yields limited understanding of vocab and storyline (plot, characters, etc.)
Social understanding	Difficulty relating to story lines and characters
Perspective taking	Understanding of characters and interactions

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Communication and Literacy Impact

Adapted from Iland 2011

Area of Developmental Concern	Possible Effect on Literacy and Comprehension
Language development	Comprehension of word, sentence and text
Oral language	Spoken language relates to written language
Recognizing and responding to non-verbal language	Misses context cues and foreshadowing
Literal interpretation of language	Difficulty with idioms, connotation, multiple meaning words, metaphors, figurative language, hyperbole and personification
Understanding relationships between words and meaning	Difficulty organizing and categorizing words impacting recall of information
Interpretative language abilities	Generating inferences, resolving ambiguity, cause and effect, monitoring comprehension
Difficulties with pronouns	Loss of meaning and confusion of characters
Difficulty generating questions while reading	Difficulty establishing meaning and relevance
Listening and understanding oral language	Misses out on content of oral literacy activities

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Restrictive and Repetitive Behavior and Literacy Impact

Adapted from Iland 2011

Area of Developmental Concern	Possible Effect on Literacy and Comprehension
Limited general fund of knowledge	Understands less
Narrow focus of interest/knowledge	Generalization of info may be difficult
Exposure and then repeated exposure to a narrow range of topics	General reading materials less motivating and interesting, socialization impacted
Restricted or repetitive play, leisure, or academic activities	World, word and social understanding may result in decreased flexible thinking
Reading as a restricted and repetitive activity	Isolation results in decreased social understanding and application to materials
Literal, specific, and concrete understanding	Generalization and imagination may be limited and impact understanding
Restricted focus	Difficulty with multiple meaning words
Over-selective attention	Shifting focus or attends to multiple details
Self stimulatory behaviors	Limits engagement in reading activities

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1 Digital Text

OCALI

What can you do with digital text?



O C A L I

Digital text can be found in many places.....



e-mail



Download it



WWW
(html)



Create it



Textbook CDs



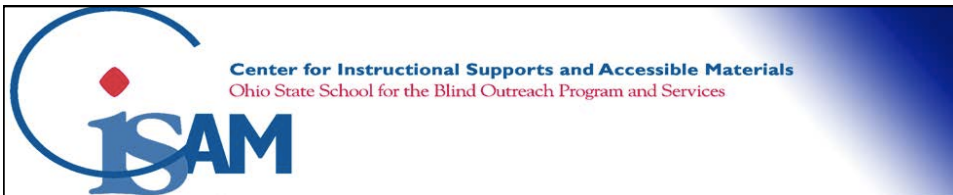
PDFs

O C A L I



<http://www.nimac.us/>

Text books published prior to 2006 may not be available



Paula Mauro, Project CISAM Coordinator
614.644.8465

pmauro@cisamoh.org



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Title, author or ISBN Log in

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www.bookshare.org

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SETT Framework

- Student
- Environment
- Task (what is the purpose?)
 - Connected to the standards
 - Need identified in the IEP
 - ID of weak skills through formative assessment
- Tool

Kim

- Very happy and social preschooler (4 years old)
- Word reading ability at a 5th grade level (Hyperlexic)
- Vocabulary understanding is below age range
- Generally gross and fine motor manipulation skills appropriate, but some difficulty with coordination and imitation
- Communication skills are delayed with difficulties in using vocabulary appropriately and word ordering
- Recites content of many different TV commercials and shows
- Visual motor skills delayed for prewriting
- ESL but family speaks primarily English
- Special interest is Nascar racing



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Environments

- Integrated preschool program in elementary building
- Twelve students (8 students neuro-typically developing, 4 students with special needs), one preschool teacher, one paraprofessional
- Center based activities involving hands-on/experiential learning, kinesthetic, music, sensory, etc.
- Receives speech and language therapy in classroom in small group (2 x's weekly)

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Tasks

- Ask and answer questions and comments about characters and major events in familiar stories
- Retell or re-enact familiar stories
- Communicate with others about text, listens to others, takes turns talking and stays on topic
- Recognize and read familiar words or environmental print



Matching Features to Student Needs

Needs	Features
Ask and answer questions and comments about characters and major events in familiar stories	Picture communication supports of relevant vocabulary text to aid in retelling and connecting words with the vocabulary meaning
Retell or re-enact familiar stories in appropriate order	Picture communication supports with sequencing features
Continue vocabulary development	Picture supports for vocabulary development
Find alternate ways to show what he knows since drawing, writing, & speaking skills are delayed	Manipulatives and/or technology choices
May need to capitalize on his special interest when possible to foster motivation and engagement	Use of Nascar when needed
Communicates with others (e.g., listens to others, takes turns talking and speaking about the topic or text being discussed)	Social narratives to support appropriate behavior



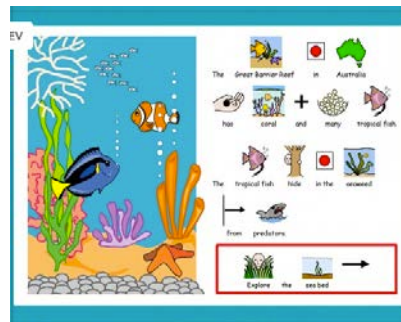
Tools for Trial



Picture Supports –Creating



Boardmaker
Mayer-Johnson

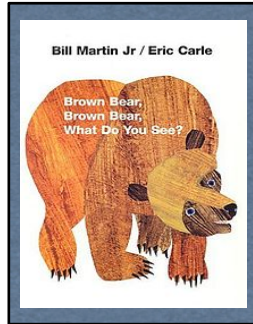


Writing with Symbols
Mayer Johnson (Win Only)



symbolstix™
Symbolstix by N2Y





communication board



symbols for book adaption

<http://www.baltimorecityschools.org/site/Default.aspx?PageID=1446>



Picture Supported Digital Books and Supplemental Activities

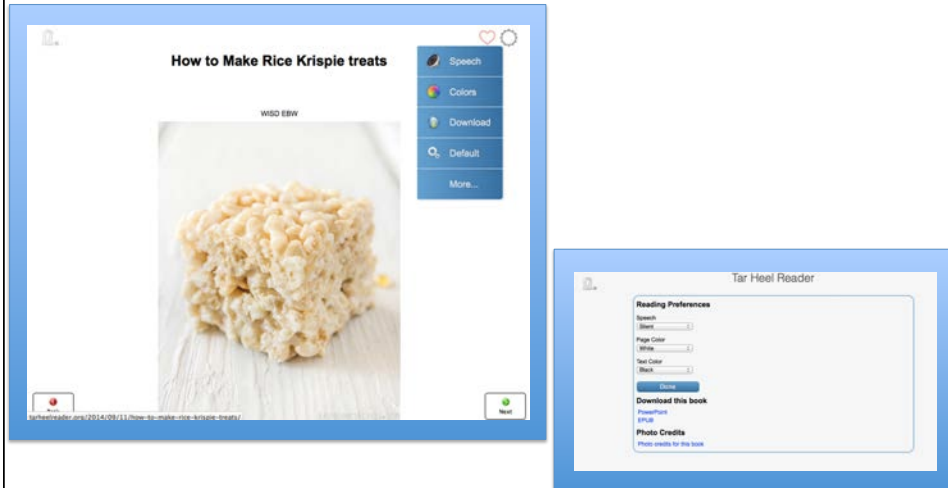


Power Point Books

<http://www.setbc.org/setbc/accessiblebooks/>



Tar Heel Reader



<http://tarheelreader.org/>

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Sentence Strips



Speechie Speaking

<https://www.youtube.com/watch?v=Xi7tv4LoMGU>

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Picture Supported Digital Books and Supplemental Activities



Digital Book



Listen and Match Activity



Sentence Construction

Clicker

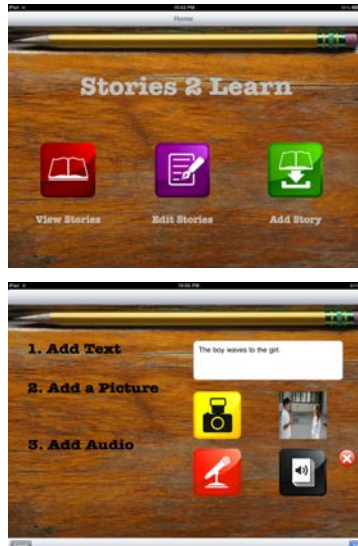
<http://www.cricksoft.com/us/home.aspx>



My Turn



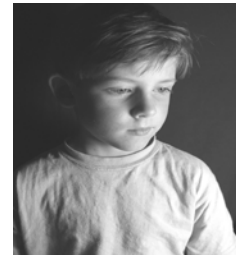
Social Narratives-Apps



Stories2Learn
App by MDR

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Jonah



- Third grader in general education setting
- Enjoys electronic media
- Uses iPad at school for recreation and leisure
- Excels in math computation
- Good word recognition and spelling but has difficulty understanding the true meaning of many vocabulary words
- Struggles with sequencing, listening capacity, cause-effect, interpreting, predicting, summarizing and making inferences
- Tends to keep to himself in social situations

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Environments

- 3rd grade general education classroom
- 24 students in the class
- Students sit at tables (4 students per table)
- Jonah sits at table next to teacher's desk
- Attends small group social skills lesson once a week for 30 minutes with SLP/Guidance Counselor



Tasks

- Can share own point of view and identify how it is different from that of the narrator or characters
- Describe the relationship between events, steps and ideas in a text, using time, sequence, and cause/effect language
- Follow conversational rules (i.e. listening to other, taking turns and speaking one at a time)



Matching Features to Student Needs

Needs	Features
Describe the relationship between events, steps and ideas in a text, using time, sequence, and cause/effect language	Graphic organizers
Can share own point of view and identify how it is different from that of the narrator or characters	Embedded notes and prompts within a story Highlighting of key points in books
Understand meaning of vocabulary words in text	Picture/video dictionaries
Follow conversational rules (i.e. listening to others, taking turns and speaking one at a time)	Video Modeling



Tools for Trial



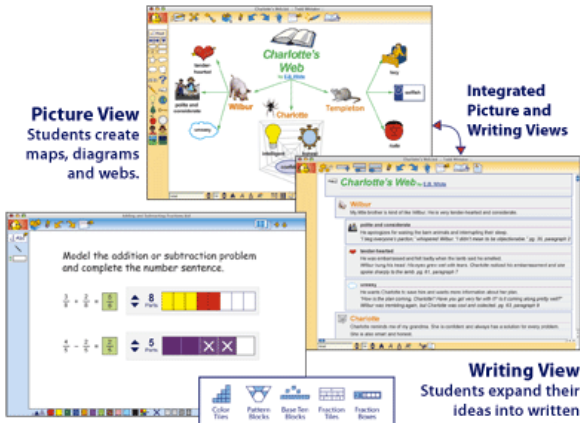
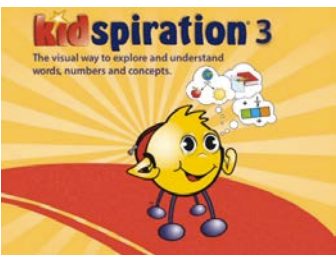
Picture View
Students create maps, diagrams and webs.

Integrated Picture and Writing Views

Math View
Students use visual math tools to understand essential math concepts.


Writing View
Students expand their ideas into written expression.

<http://www.inspiration.com/>

O C A L I


Reading/Writing Software




<http://www.freedomsscientific.com/LSG/products/wynn.asp>

Read&Write GOLD

<http://www.texthelp.com/North-America/our-products/readwrite>



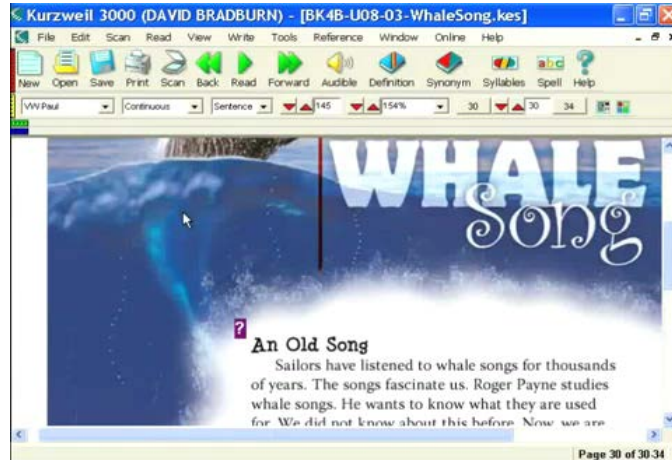
<http://donjohnston.com/solo/#.UypmuF6prGs>



<http://www.kurzweiledu.com/products/kurzweil-3000-firefly-overview.html>

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Embedded Notes

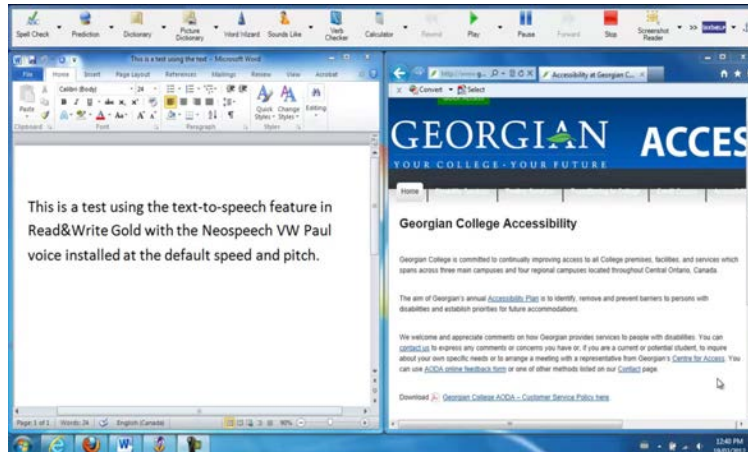


Kurzweil 3000

<http://youtu.be/6TJlpZKlasQ>



Highlighter Feature with Extraction

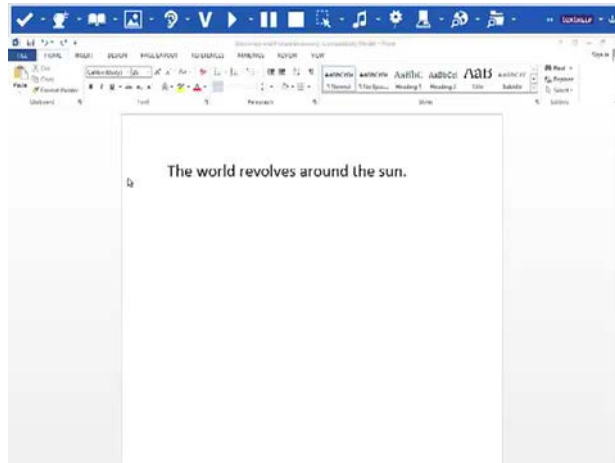


http://www.youtube.com/watch?v=Hv_OWdFlc20&feature=share&list=PLD2510358B7CFD5A5&index=1

http://www.youtube.com/watch?v=Hv_OWdFlc20&feature=share&list=PLD2510358B7CFD5A5&index=1



Picture Supported Dictionary



Picture Dictionary-Read Write Gold

<http://youtu.be/8Nf0KZEKYrA>



Vocabulary Support

**Using Read&Write GOLD's
Vocabulary List Builder
for New Word
Attainment**

Vocabulary List Builder

<http://www.youtube.com/watch?v=2Iq8UjZS06E&list=PL942D07588DD28062&feature=share>



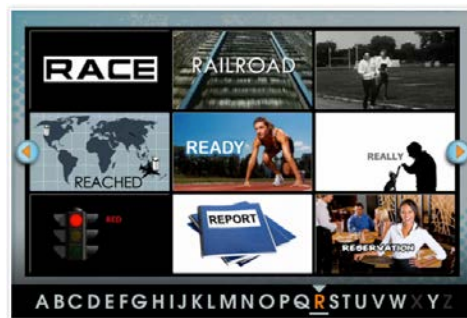
UDL Book Builder Editions by CAST

The screenshot displays the UDL Book Builder interface. At the top center, there is an illustration of a green tadpole. Below it, the text reads: "Then, tadpoles' legs begin to grow. The back legs are bigger than the front legs." To the right of the main content area is a "Terry's Tips" box featuring a cartoon horse character and the text: "Notice how Pedro asks a very specific question about the text that is important to know and remember." On the left side, there is a "Pedro" box with a question: "How many legs do you see? What do they look like?" and a "Listen Again" button. At the bottom of the interface, there are icons for "Pedro", "Hall", and "Monty", a "< Hide" button, and a page indicator showing "1 of 13". The text "Created with CAST's UDL Book Builder" is visible at the bottom center of the interface.

<http://bookbuilder.cast.org>



GCF
Vocabulary Videos

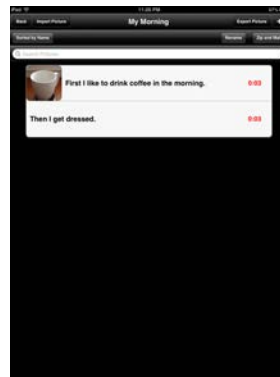
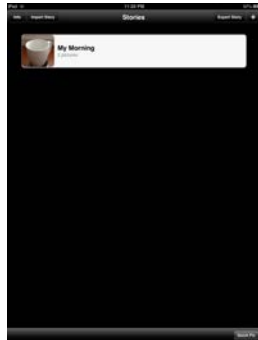


<http://www.gcflearnfree.org/>





Video Modeling-Apps

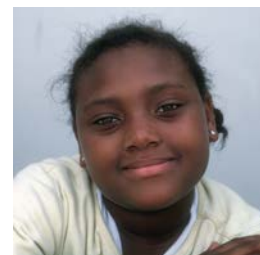


My Pictures Talk
Grembe



Jada

- Seventh grader
- Enjoys listening to music and dancing
- Likes animated movies
- Limited verbal language
- Fine motor limitations and no standard keyboard access
- Cognitively delayed
- Behavior and engagement are communication modes
- Auditorily sensitive
- No word recognition
- Hits, screams, bangs head and throws objects when frustrated



Environments

- Resource room for language arts and math
- 12 students, one special education teacher, two paraprofessionals
- Attends social studies, science, all related arts classes in general education setting with shared paraprofessional
- Receives speech and language therapy once a week for 42 minutes in resource room
- Receives occupational therapy once a week for 42 minutes in resource room or related arts class when applicable



Tasks

- Determine the meaning of words and phrases in text
- Compare and contrast a text to other media versions of text content
- Read and comprehend science/technical texts independently and proficiently



Matching Features to Student Needs

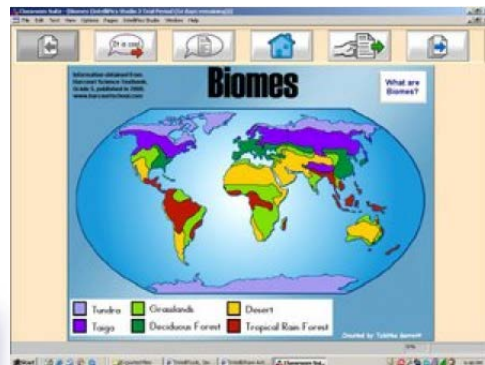
Needs	Features
Fine motor support to show what she knows	Alternate access (touch screen vs expanded keyboard)
Read and comprehend science/technical texts independently and proficiently	Alternate access software that includes the features of embedding video presentation of content, picture supported text, text-to-speech with highlighting, expanded keyboard access, custom layouts/content of supporting activities
Compare and contrast a text to other media versions of text content	See above features
Determine the meaning of words and phrases in text	Picture supports of words and content
Communication supports that are durable due to destructive behaviors, to show what she knows, to comment, request, etc.	AAC, cells, voice output vs. no voice output d/t/ auditory sensitivities, picture supports of vocabulary
Reduce auditory input	Noise cancelling devices (headphones, ear-buds)



Tools for Trial



Picture Supported Digital Books and Supplemental Activities



Intellitools Classroom Suite and
Intellikeys

<http://www.intellitools.com/classroom-suite.html>



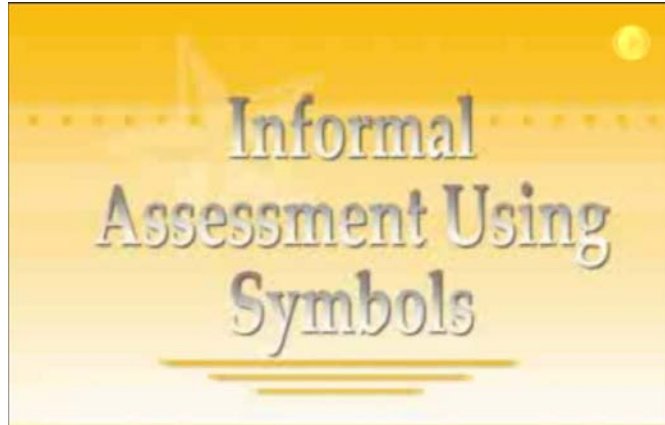
You Tube Video of Biomes



<https://www.youtube.com/watch?v=ZouWMVyz9v8>



Video: Showing What You know with Symbols and Biome Activity



<http://sda.doe.louisiana.gov/ResourceFiles/Literacy/Informal%20Assessment%20Using%20Symbols.wmv>



Mid Tech Leveled
Communication System with
Voice Output
Tech Speak
<http://amdi.net>

Theme: Rainforest Vocabulary can be used for bulletin boards, memory games, etc.

rain forest 	rain forest 	armadillo 	tarantula
anteater 	iguana 	jaguar 	crocodile
equator 	chimpanzee 	toucan 	toad
boa constrictor 	sloth 	piranha 	tapir
floor 	understory 	canopy 	emergent

Low Tech Content Specific Communication Board

<http://fdlrsregion3curriculumvisuals.wikispaces.com/Biomes>



Auditory Sensory Support



Noise Cancelling Headphones

Earbuds and sound choices

O C A L I

Adam



- Junior in high school
- Attends career center
- Prefers working independently
- Interested in how technology works (repair/technician)
- Literal comprehension skills are fairly good
- Detail oriented
- Deficits in working memory, organization skills, sequencing and planning and accessing relevant background knowledge
- Pragmatic skills deficits
- Verbalization skills more advanced than comprehension of vocabulary

O C A L I

Environments

- Attends high school for required language arts and math courses
- Participates in Interactive Technology Program at career center (2 year program)
- "Case manager" connects with Adam weekly at career center



Tasks

- Determine meaning of symbols, words and phrases when used in scientific or technical context
- Organize self, materials and information for school and work
- Answer questions or solve problems using a variety of media or formats
- Respond appropriately to social situations in the work place



Matching Features to Student Needs

Needs	Features
Mobile solutions for school and work environment	Mobile technologies
Determine meaning of symbols, words and phrases when used in scientific or technical context	Dictionary support, homophones, Confusable words in DJ or RWG
Organizational skills support	Graphic Organizers
Answer questions or solve problems using a variety of media or formats	Adapted websearch tools, video chat tools, voice activated electronic personal assistant "tell me the definition of...."
Pragmatic skills support	Video modeling



Tools for Trial



Full Featured Reading/Writing Software



<http://www.donjohnston.com/products/solo/index.html>

Read&Write GOLD

<http://www.texthelp.com/North-America/our-products/readwrite>



<http://www.freedomscientific.com/LSG/products/wynn.asp>



<http://www.kurzweiledu.com/default.html>



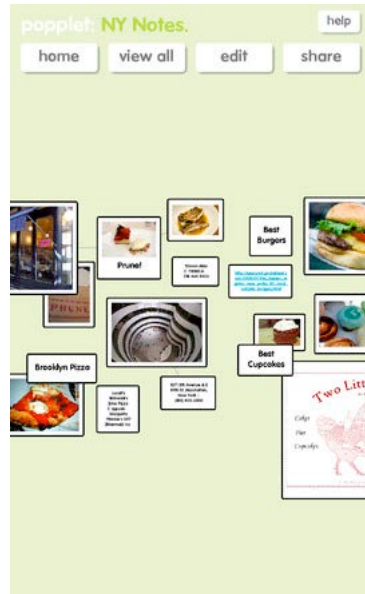
Merriam-Webster Dictionary



Electronic File Management Systems



Popplet



Inspiration and Inspiration Maps

The image displays four windows from the Inspiration Maps software. The top-left window is 'Diagram View', showing a central node with several branches. The top-right window is 'Outline View', displaying a hierarchical list of text. The bottom-left window is 'Map View', showing a spatial arrangement of nodes. The bottom-right window is 'Presentation Manager', showing a slide titled 'Reduce Usage' with a list of items. To the right of these windows is a small icon of a blue cloud with three yellow circles and arrows pointing from the cloud to the circles.

<http://www.inspiration.com/>
<https://itunes.apple.com/us/app/inspiration-maps/id510031612?mt=8>

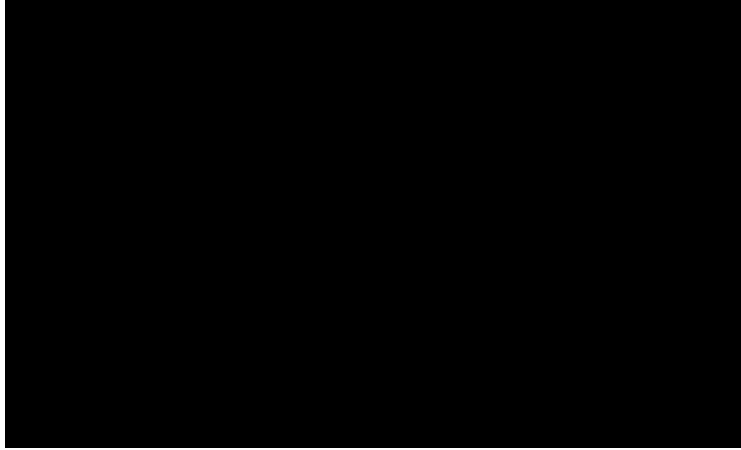


The image shows a Google search for 'abraham lincoln'. A dropdown menu is open, showing filters for 'All results', 'Reading level', 'Private', 'Nearby', and 'Verbatim'. The 'Reading level' filter is selected, and a bar chart shows the distribution of results by reading level: Basic (36%), Intermediate (63%), and Advanced (1%). Below the chart, there are search results for 'Abraham Lincoln - Wikipedia, the free encyclopedia' and 'News for abraham lincoln'.

Google Search Reading Levels



You Tube Tutorials



<https://www.youtube.com/watch?v=GHloD6zECsM>

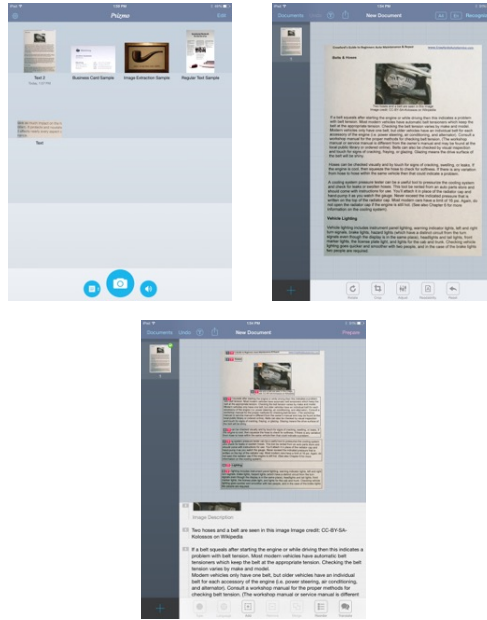


Siri
Apple iOS

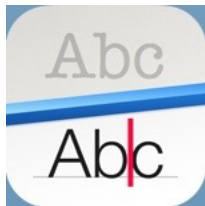




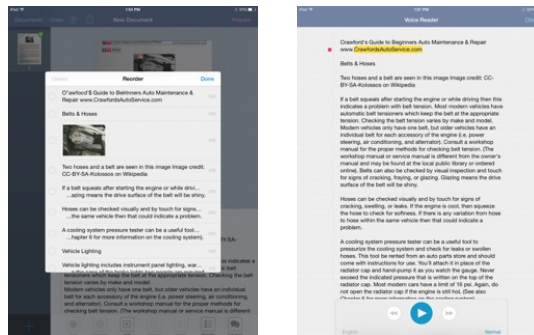
Prizmo



OCALI



Prizmo



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Virtual Mentoring-Synchronous



<https://www.apple.com/ios/facetime/>



<http://www.skype.com>

OCALI

Virtual Mentoring-Asynchronous/Video Modeling



<http://voicethread.com/>

OCALI

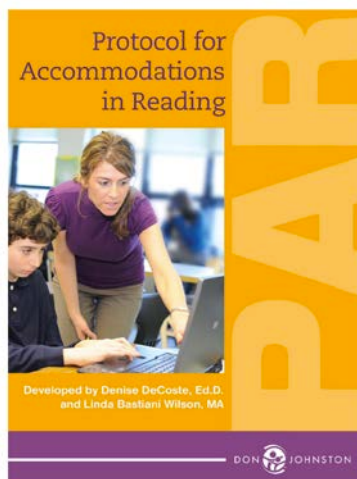
Making Final Decisions

- ✓Trials of tools
- ✓Data collection on relevant variables related to the tasks, environments, and needs
- ✓Ongoing progress monitoring



O C A L I

Assessment Tool for Technology Based Reading Accommodations



<http://www.donjohnston.com/products/par/index.html>

O C A L I

National Center on Accessible Educational Materials

Search

Home > About AEM > Navigating AEM > Supporting Learners > Policies & Systems > Creating AEM >

Access for Learning


Welcome to the National Center on Accessible Educational Materials. This site provides resources for educators, parents, students, publishers, conversion houses, accessible media producers, and others interested in learning more about AEM and implementing AEM and NIMAS.

[Learn about Accessible Educational Materials >](#)



<http://aem.cast.org/navigating/aem-navigator.html#.Vbfg88bFilw>

OCALI



**AUTISM INTERNET
MODULES**

- Language and Communication
- Restricted Patterns of Behavior, Interests, and Activities
- Sensory Differences
- Overview of Social Skills Functioning and Programming
- Visual Supports
- Speech Generating Devices (SGD)

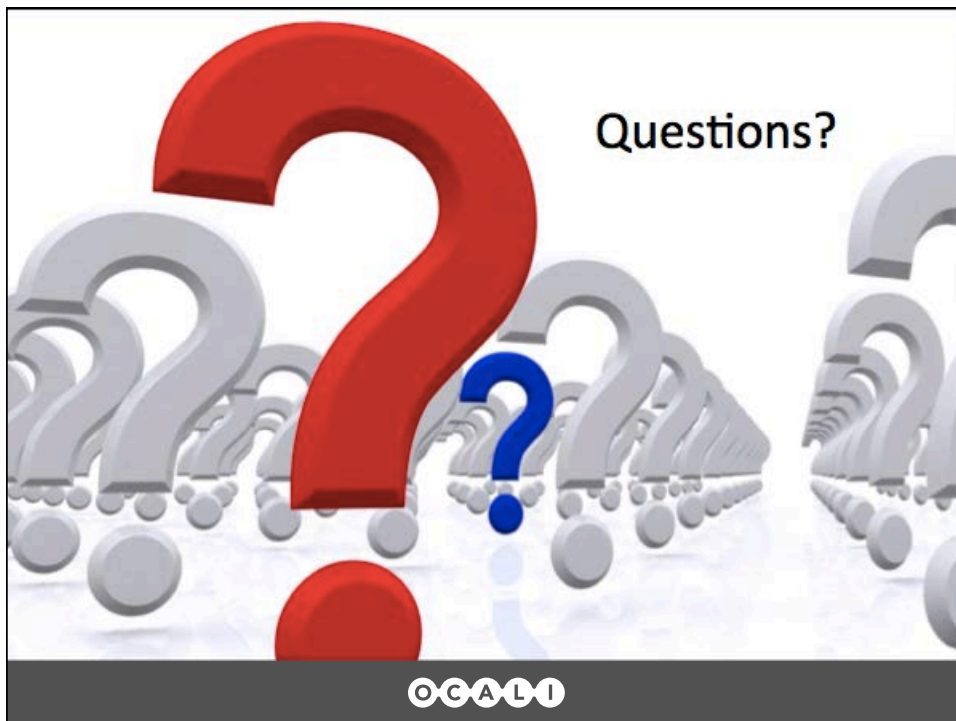
www.autisminternetmodules.org



ASSISTIVE TECHNOLOGY INTERNET MODULES

Reading Access – WATI – Part 1
Reading Access – WATI – Part 2
Communication – WATI – Part 1
Communication – WATI – Part 2 (coming sooner)
Communication – WATI – Part 3 (coming soon)

www.atinternetmodules





linking research to real life.

A division of the ESC of Central Ohio 