



Assistive Technology For Learning Disabilities

No/Low Tech to High Tech

Heather R Koren, ATP
Director of Assistive Technology
Westminster Technologies

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Presenter

- RESNA Certified ATP
- M.S. in Rehabilitation Science and Technology
- Taught undergraduate and graduate level assistive technology courses at East Carolina University
- Developed an online graduate certificate program in AT for East Carolina University



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Key Learning Objectives

- Identify examples of low- and high-tech assistive technology for:
 - Reading
 - Writing
 - Math
 - Organization
- Tech Finding Resources



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Reading

Tools to assist with decoding, fluency, and comprehension.



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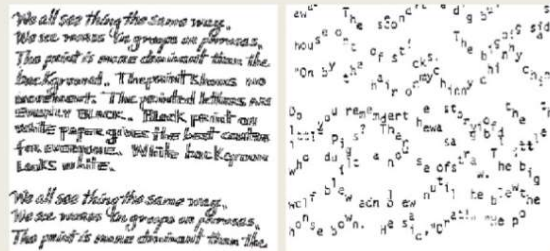
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Reading

Reading Disability

- Reading Fluency
- Decoding
- Reading Comprehension
- Recall
- Writing
- Spelling

A Dyslexic Student May Read Text As..



<https://www.slideshare.net/TMSussex/open-dyslexic-30981091>

Reading

- Text-to-speech (TTS)
- Audiobooks/ Digital TTS Books
- Optical Character Recognition (OCR)
- Annotation Tools
- Display control
- Dictionary/Thesaurus



Reading – No/Low tech

- Quiet Location



- Highlighting Text



- Extended Time



- Colored Reading Overlays

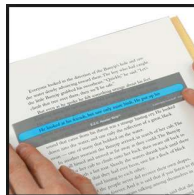


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Reading – Low/Mid tech

- Reading Guides



- Talking Dictionary



- Books on Tape



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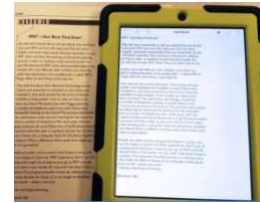
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Reading – High tech

- Reading Pens
 - C-Reader Pen



- OCR



- WizCom Reading Pen 2



- Portable Book Readers



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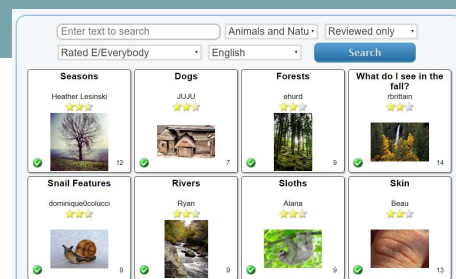
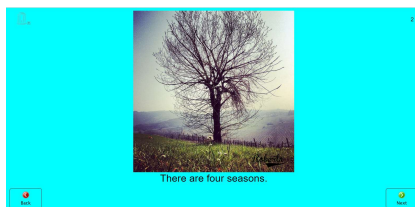
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Reading – Apps/websites

Tar Heel Reader:

<https://tarheelreader.org/>

- Read a Book or Write a Book
- Choose Speech Options
- Choose Page and Text Colors



Step 2: Enter a short sentence for each page

Step 3: Fill in the details

Title: Author: Language:

Optionally: Categorize your book

Step 4: Publish



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Reading – Apps/websites

Read&Write for Google

- Support tools
 - Web
 - Google Drive files
 - Google Docs
 - Google Slides
 - PDF
 - ePubs
- TTS
- Text highlighting/summarizing
- Speech to text
- Word Prediction
- Talking Dictionary/Picture Dictionary



Highlight any passage of text and hear it read out loud.

Word Prediction helps

There's a Talking Dictionary, Picture Dictionary



These colored highlighters are really useful for collecting and summarizing key information.



Speech to Text accurately transcribes your students' words



<https://www.texthelp.com/en-us/products/free-for-teachers/>

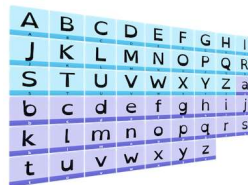
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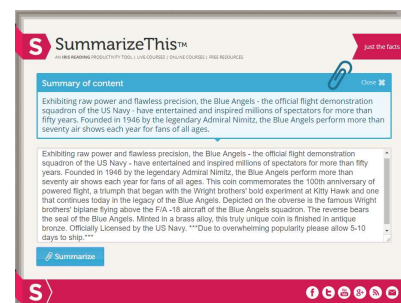
Reading – Apps/websites

Chrome Web Apps and Extensions

- [ATbar](#)
- [BeeLine Reader](#)
- [OpenDyslexic](#)
- [SummarizeThis](#)



BeeLine Reader is a research-backed tool that improves reading ability for students of all ages and skill levels. By displaying text using color gradients that wrap from the end of one line to the beginning of the next, BeeLine



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Reading – Apps/websites

Tablet and Smart Phone Apps

- [Voice Dream Reader](#)
- [ReadMe!](#)
- [Rewordify](#)
- [Claro ScanPen](#)

truth is so well fixed in the minds of
the **surrounding** families, that he is
considered the rightful property of



| From frustration... | ...to understanding |
|--|---|
| The ravenous throng scampers toward the delectable viands, which the chef had impeccably arrayed on the table. | The extremely hungry crowd ran toward the delicious food, which the chef had extremely well organized (into rows) on the table. |

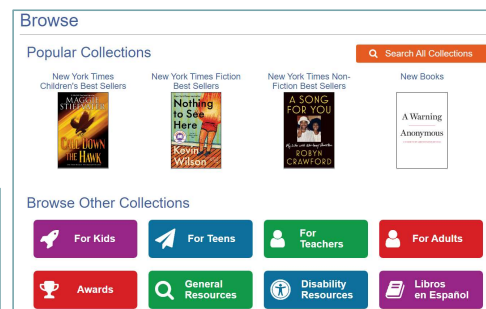
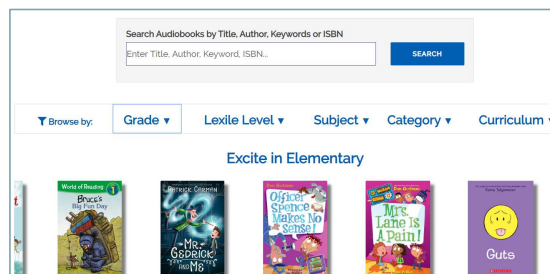


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Reading – Apps/websites

- [Bookshare](#)
- [Learning Ally](#)



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Writing

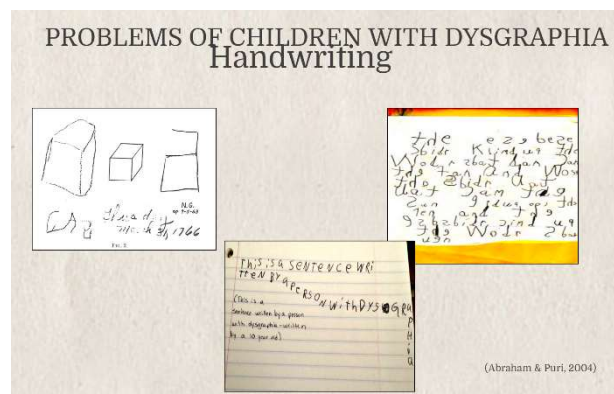
Tools to assist with physical aspect of writing, spelling, punctuation, grammar, word usage and organization.



Writing

Writing Disability

- Illegible Handwriting
- Inconsistent Spacing
- Poor Spatial Planning
- Poor Spelling
- Difficulty Composing
- Thinking and Writing at the same time



(Abraham & Puri, 2004)

<https://www.emaze.com/@AOTIFRFR/dysgraphia-pptx>

Writing

- Handwriting tools (pencil grips)
- Keyboards/Touchscreens
- Dictation (speech-to-text)
- Word prediction
- Spell Check/Grammar Check
- Text-to-Speech (TTS)
- Graphic Organizers
- Dictionary/Thesaurus



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Writing – No/Low Tech

- Pencil Grips



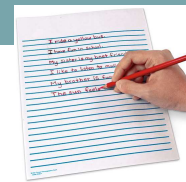
- Modified Pens/Pencils



- Writing Guides



- Raised Line Paper



- Slant Board



- Word Cards

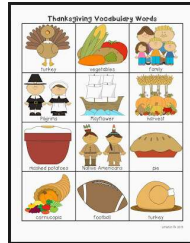


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Writing – No/Low Tech

- Picture Supports



- Word Banks

| | | |
|---------|---------|---------|
| whisper | tiptoe | glance |
| bawl | hasten | gaze |
| joke | hop | peer |
| demand | clamber | spot |
| rage | dart | seek |
| groan | race | observe |
| jabber | scurry | witness |
| agree | sprint | gape |
| wail | gallop | glimpse |
| beg | shuffle | glare |
| respond | stroll | watch |
| shriek | strut | spy |
| thunder | trudge | snoop |

- Talking Spelling Tools



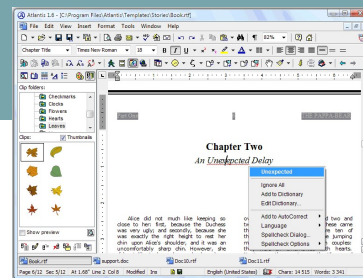
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Writing – High Tech

Word Prediction

- Reduces keystrokes
- Anticipates next word
- Programs consider:
 - Typical spelling errors
 - Reversals common with Dyslexia
 - Grammar-based prediction



Word Processing Programs

- Spelling/Grammar Checks
- Auto Correct
- Dictionary and Thesaurus
- Abbreviation Expansion
- Highlighting
- Add Picture Support
- Reviewing Capabilities



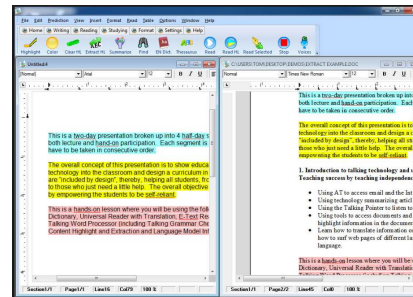
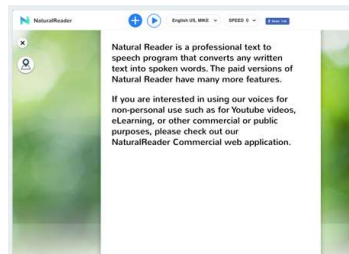
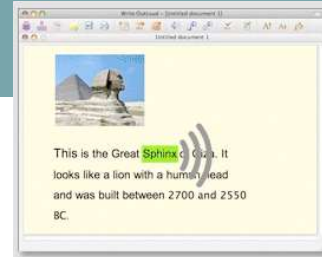
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Writing – High Tech

Text-to-Speech and Talking Word Processors

- [Natural Reader](#)
- Premier Talking Word Processor



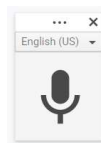
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Writing – High Tech

Voice Recognition

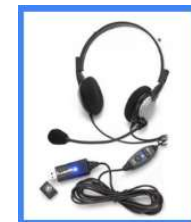
- Dragon Naturally Speaking
 - Continuous speech
 - Up to 160 words per minute
 - Voice commands for creating, editing, formatting, creating email
 - Text-to-speech capability
 - Customize vocabulary
 - Launch programs through voice commands
 - App now available for iOS and Android



- Google Voice Typing
- Built-in Voice Typing
 - Microsoft
 - iOS
- Apps/Extensions

Discrete vs Continuous Speech

- Discrete: short pause between each word
- Continuous: speak at a normal rate



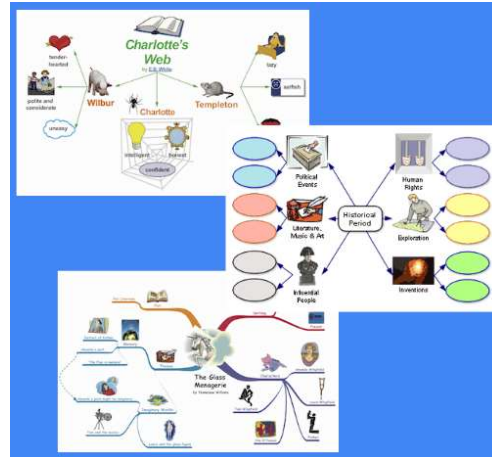
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Writing – High Tech

Digital Graphic Organizers

- Inspiration: 6-Adult
- Kidspiration: K-5
 - Used for visual mapping, outlining, writing, & making presentations
 - Brainstorm ideas, create a visual outline then convert to text
 - Plan and organize written work
 - Communicate and present information



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Writing – High Tech

Digital Graphic Organizers

- Google Drawing
- [Mind Maps](#)
- [MindMeister](#)

Name: _____ Date: _____

Sandwich Chart
Double-click in the shapes to type in the sentences of your paragraph.

Topic sentence:

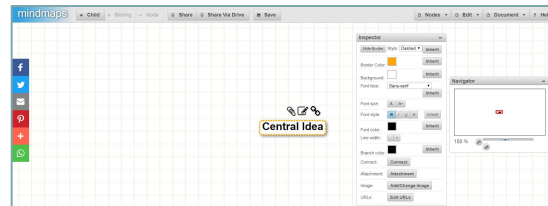
Detail #1:

Detail #2:

Detail #3:

Concluding sentence:

Print this form: www.campuswriting.com

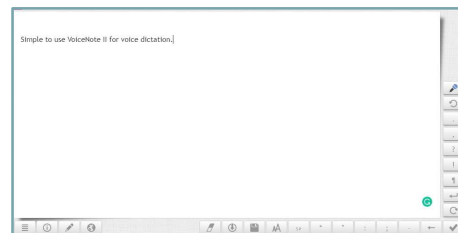
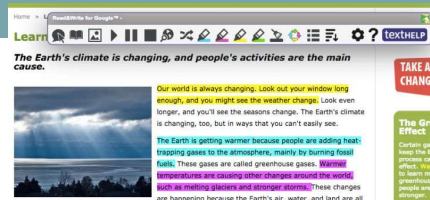


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Writing – Apps/Extensions

- [Read&Write](#) for Google
- [Co:Writer Universal](#)
- [VoiceNote II](#)

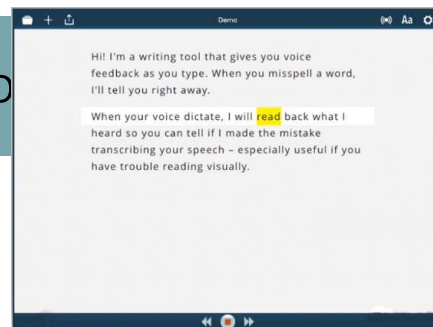
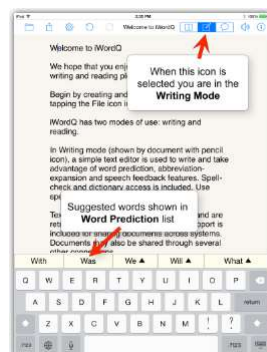


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Writing – Apps/Extensions

- [Voice Dream Writer](#)
- [iWordQ](#)
- [Ginger](#)



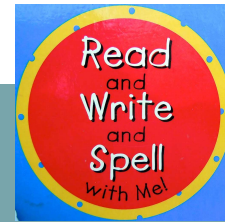
For years I have been working with students, teaching them how to design great buildings and offices. A few years ago, I have decided it time to leave the academy and establish my own office, focusing on architecture and urban planning. The beginning was not as simple as I thought it would be. I have decided how to run a business, but with time the office became successful. designing their next place starting from small office into a large company. Ability to listen every project as they're designing the next place to live or work.

Being able to influence dramatically on people's lives is something that cannot be described easily and is very excited for the



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Reading & Writing

Tools to assist with both reading and writing.



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Reading & Writing

WYNN

- Full editing features: modify electronic files, scan pages, or create documents
- Text highlighting at word level
- Talking dictionary and thesaurus
- Study tools: highlighting, bookmarking, text/voice notes, etc.
- Teacher lockout for tests
- Read internet, word prediction, create outlines, etc.



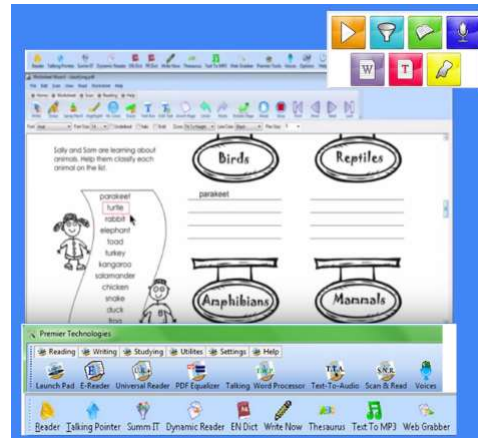
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Reading & Writing

Premier

- Worksheet Wizard
- Talking Dictionary
- E-Text Reader
- Scan and Read Pro
- PDF Equalizer
- Text-to-Audio
- Text Cloner Pro
- Write Now
- Talking Word Processor
- Chrome Tools



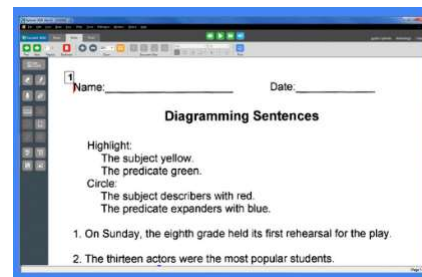
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Reading & Writing

Kurzweil

- Reading, Writing, Study Skills program
- Scan documents
- Type documents
- Use spelling, grammar and thesaurus or dictionary
- Highlight words or sentences
- Create or scan tests/worksheets
- Create graphical outline
- Text-to-speech with text highlighting
- Can be used in combination with Microsoft and other word processing programs



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Reading & Writing

Read&Write

- Toolbar can be used with any program
- Includes following features:
 - Text-to-speech (TTS)
 - Phonetic spell checker
 - Word prediction
 - Talking dictionary
 - DAISY Reader
 - Study Skills Tools (highlighters, create vocabulary lists, etc.)
 - OCR



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Math

Tools to assist with computing, organizing, aligning and copying problems.



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Math

Math Disability

- Poor Comprehension of Math Symbols
- Memorizing and Organizing Numbers
- Difficulty Telling Time
- Trouble with Counting

$$\begin{array}{r} 54 \\ - 35 \\ \hline 29 \end{array}$$

12345678

12345678

$$\begin{array}{r} 72 \\ + 31 \\ \hline 103 \end{array}$$

<https://www.cognifit.com/pathology/dyscalculia>

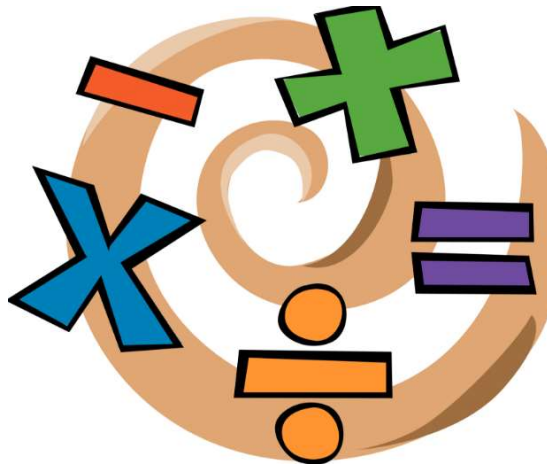
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Math

- Calculators
- Math notation tools
- Graph Paper
- Graphing Tools
- Drawing Tools
- Equation-solving tools
- Manipulatives
- Graphic Organizers
- TTS
- Dictation



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Math – No/Low tech

- Tactile
 - Manipulatives



- Visual Aids

| | |
|-------|----|
| 1 x 2 | 2 |
| 2 x 2 | 4 |
| 3 x 2 | 6 |
| 4 x 2 | 8 |
| 5 x 2 | 10 |
| 6 x 2 | 12 |

- Number Stones



- Reduction of Problems per page

| | | |
|-----|-----|-----|
| 3 | 1 | 7 |
| + 0 | + 1 | + 2 |
| 7 | 4 | 4 |
| + 6 | + 6 | + 2 |
| 7 | 9 | 2 |
| + 8 | + 6 | + 7 |



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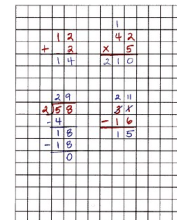
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Math – No/Low tech

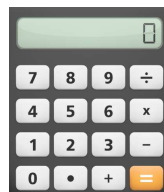
- Fact Charts

| x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----|----|----|----|----|----|----|----|----|----|-----|
| 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 2 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| 3 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 |
| 4 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 |
| 5 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| 6 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 |
| 7 | 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 |
| 8 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 |
| 9 | 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 |
| 10 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

- [Grid Paper](#)



- Calculator



- Highlighting Math Symbols



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Math – High tech

Graphing Calculators

- Visualize math
 - Type equation: view equations, graphs, coordinates
 - Used in algebra, pre-calculus, biology, physics, trigonometry, etc.
- Advanced statistics and financial features, graphical analysis, data analysis, logarithm, etc.



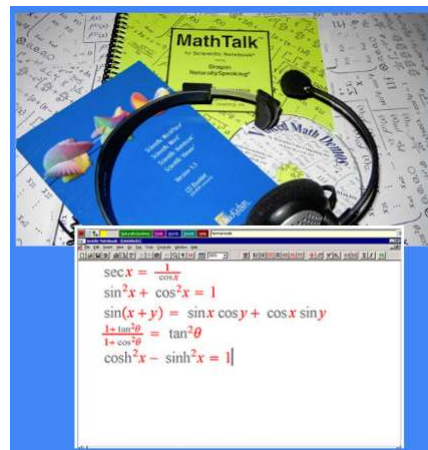
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Math – High tech

MathTalk

- Provides voice recognition for sophisticated math: pre-algebra, algebra, trig, calculus, statistics
- Graphing capabilities
- Translate to Braille
- Evaluate, factor, combine, expand, simplify, check equality, and solve equations
- Save, print, email homework



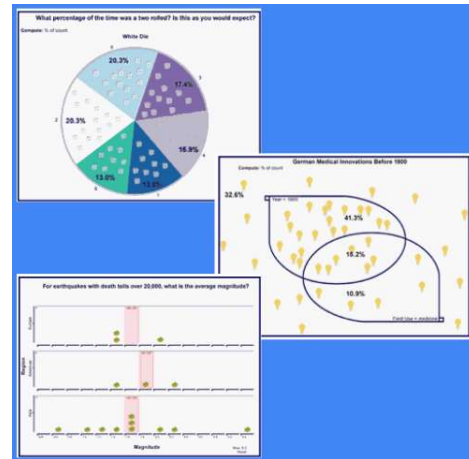
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Math – High tech

Inspiration – Plots & Graphs

- Visual learning diagrams for math
 - Bar graphs
 - Stack plots
 - Pie charts
 - Axis plots
 - Venn diagrams
- Organize math data



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Math – High tech

texthelp EquatIO

- Chrome browser extension
- Digital math assistant
- Add expressions to Google Docs, Forms, Slides, Sheets, & Drawings
- Math to speech and Speech to Math capabilities
- Math prediction
- Free version with limited features

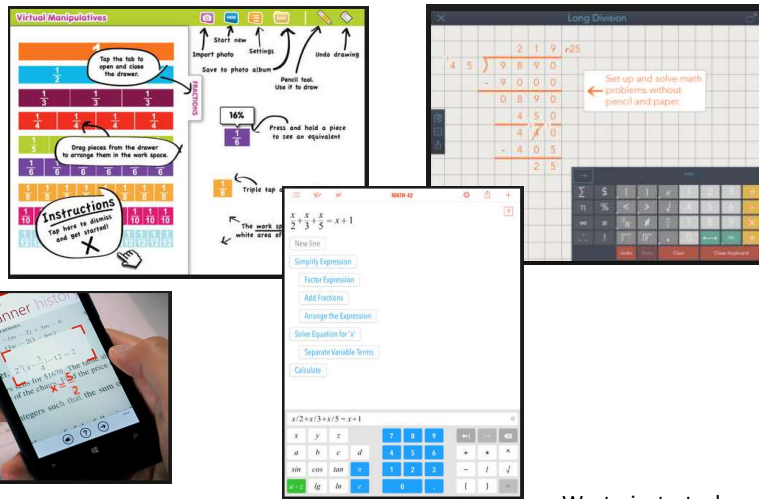


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Math – Apps/Extensions

- Virtual Manipulatives
- [ModMath 2.0](#)
- [Photomath](#)
- Math 42

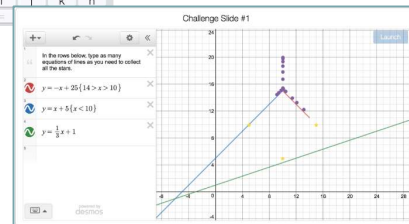
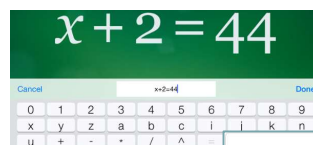


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Math – Apps/Extensions

- [Hands-On Equations](#)
- [Algebra Touch](#)
- [Desmos](#)
- [Math Learning Center](#)



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Organization

Tools to assist with planning, organizing and keeping track of assignments, schedules and tasks.



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Organization

Organization Issues

- Time estimation to complete tasks
- Setting goals
- Tackling projects
- Remembering when assignments are due
- Keeping track of materials
- Remembering necessary materials needed to complete assignments
- Cleaning up and organizing



- Designating and using a specific place for items
- Being on time
- Returning to a task after being interrupted
- Making decisions
- Performing more than one task at a time



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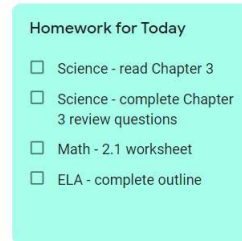
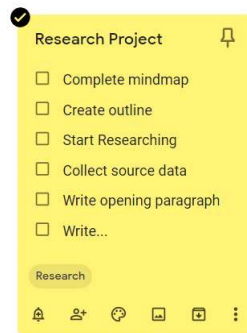
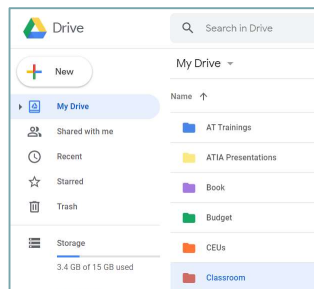
Organization – No/Low Tech

- Visual Schedules

Organization – Mid to High Tech

Digital Organization

- Google Drive
- [Google Keep](#)



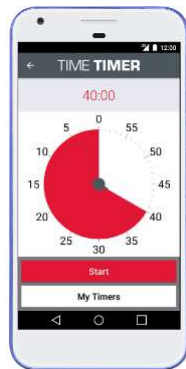
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Organization – Apps/Extensions

Timers

- [Time Timer](#)
 - App
 - Standard
- [Time Tracker](#)
- [Resetea](#)



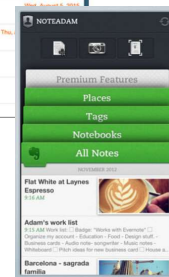
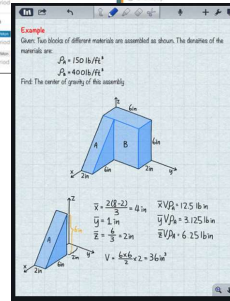
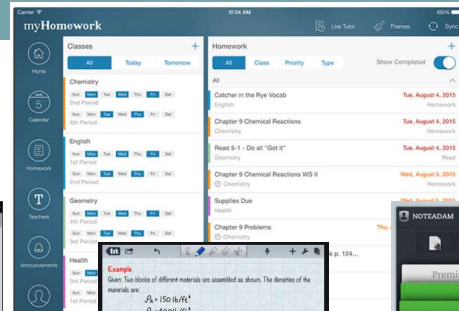
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Organization – Apps/Extensions

Smart Phones/Tablets

- Built-in Calendars
- Built-in Notes
- Other Apps:
 - Dropbox
 - [Evernote](#)
 - [MyHomework](#)
 - [30/30](#)
 - [Notability](#)



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Tech Resources

App Finders



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Understood.org Tech Finder

- Find expert approved apps
- Browse/Search by
 - Issue (reading, writing, math, organization, etc.)
 - Grade
 - Technology Type
 - All
 - Apps
 - App name

Find Apps

| Browse | Search |
|------------------------|--------|
| Select issue | ▼ |
| Select grade | ▼ |
| Select technology type | ▼ |
| Find Apps | |

Powered by  common sense media

www.understood.org/en/tools/tech-finder



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Augsburg University

- AT apps resource
 - Free/Low-Cost Apps
 - Listed by types of AT
 - Reading
 - Writing
 - Organization/Task Management
 - Dictation (Speech-to-Text)
 - Vision
 - Time Managements/Distracton Free
 - Research Tools
 - Communication
 - Built-in Accessibility
 - Notetaking
 - Mind Mapping/Brainstorming



<https://www.augsburg.edu/class/groves/assistive-technology/everyone/>



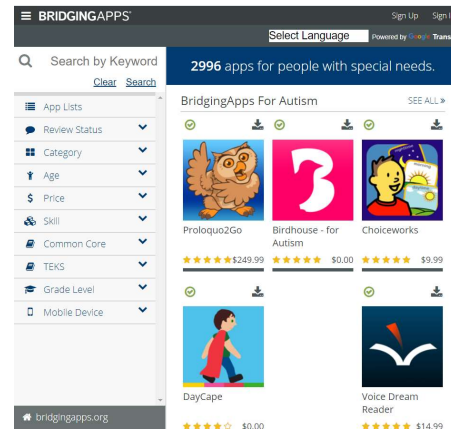
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Bridging Apps

- Almost 3,000 apps for special needs students.

- Category
- Age
- Price
- Skill
- Common Core
- TEKS
- Grade Level
- Mobile Device



<https://search.bridgingapps.org/dashboard>



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Questions



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Resources

A.T. TIPSCAST: <https://attipscast.com/>

Augsburg University: CLASS Disability Resources:
<http://www.augsburg.edu/class/groves/assistive-technology/everyone/>

“Bookshare: Providing Accessible Materials for Students with Print Disabilities.” *IRIS Center*, Vanderbilt University,
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Any Questions after Webinar

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