

Closing The Gap

Solutions

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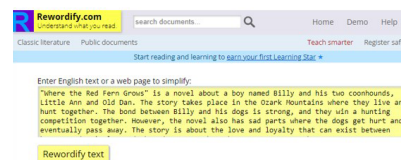


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Rewordify

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Teaching Students with
Complex Communication
Needs to Use Switches
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PHOTOGRAPHY

SAY CHEESE! Photography is for
everyone! Switch adapted
photography can be used during
photo booths at special events,
on field trips, or for everyday fun.
You can program a photo **recipe**
using two switches- one switch to
take a photo and a second switch
to flip the camera to selfie mode!



Teachers Guide to

Providing access through the use of text to speech tools:

Introduction:: IDEA 2004 requires school districts to provide students who have print-based disabilities access to their age or grade level curriculum yet many students who struggle with reading fail to receive access to text to speech (TTS) support tools. This article will provide strategies to assist teachers in the selection, delivery and implementation of TTS tools and accessible educational materials to make a difference in the lives of students who have print-based reading challenges.

IDEA 2004 requires local school districts to provide students who have print-based disabilities access to their age or grade level curriculum. This fact has been the law for years however, many students who struggle with reading fail to receive access to text to speech (TTS) support tools in a timely manner if at all. Providing access to grade level printed material is important. It offers the student the ability to gain exposure and knowledge of content across the curriculum, allows for the student to interact with rich vocabulary and assists the student in becoming a full participant in the classroom discussion and activities. In 2021, a group of educators from Wisconsin (and Midwest) collaborated on and published a guide titled, "WCASS Guide: How to provide students with IEPs Access to their grade level curriculum through text to speech." This comprehensive guide was so well received that it led to the state of Wisconsin's Department of Public Instruction to include an item in the IEP (effective 9/2022) specifically requiring teams to consider both access to grade level text and access to accessible educational materials, services, or devices in the Program Summary section of the IEP. In response, several organizations (including OSEP) urged members and states to consider including a similar item in their state IEP form. In preparation for the IEP change and the need for guidance on the use of TTS tools, a project was launched in the

summer of 2022 by Nissan Bar-Lev, former Director of Special Education, CESA 7, to gather information from stakeholders across the Midwest to produce a guide on how to use text to speech in the classroom for teachers, which I participated in. Unfortunately, in the midst of putting together this project, Nissan unexpectedly passed away. I was able to receive a draft copy of this guide before his untimely passing. This event led me to think about how I could condense and disseminate this valuable information among my colleagues.

Text to speech (TTS) tools may be helpful for many yet they are necessary for some. The school district that I work at, Oak Lawn Hometown School District 123, employs a UDL approach providing all students the ability to customize their access to curriculum as they need to. Because we have the UDL tool, everyone has access to a TTS tool however, it is important to understand the profiles of learners to determine, which students require the use of text to speech rather than "helpful" to have. There are several steps in this process:

STEP ONE:

In order to determine need, classroom teachers along with the team gather any relevant data about student reading competencies including: data from observations, performance



JANET M. KENNEDY, M.A., SLP/L. Janet is a Midwest mom of 3 adult children and 2 lovely dogs. She loves reading, gardening and traveling in her free time. She has over 21 years of experience working in the public school setting providing assistive technology consultation, training, plan implementation and professional development. She has diverse experience consulting on: assistive technology supports for literacy, UDL, accessible curriculum/ instructional materials, ESL, AAC and EdTech. She has extensive experience in iOS, Chromebook and Mac accessibility. She is highly experienced in providing staff and community trainings and workshops on assistive technology. Additionally she has presented on various topics related to assistive technology at National, State and local conferences.



Determining and delivery of supports needed for struggling readers

The process for determining the need for supports for struggling readers is twofold. Text to speech (TTS) tools may be helpful for many they are necessary for some. Students who struggle with print based learning are identified for TTS accommodations when a gap is noted between their achievement and grade level expectations. These students experience difficulty in gaining information from print based materials thus the printed text is the barrier therefore in addition to TTS, accessible educational materials (AEM) are needed.

TTS

AEM

Classroom based assessments, district assessment data, progress monitoring data are used to define the need.



Is the format (print based text) the barrier?
If so, then AEM needs must also be addressed.

SETT framework scaffold can help the team determine the students specific needs and help define the tool specifications



Look at materials used across the curriculum and determine what accessible formats are needed

Acquire tts tool. Use information gathered from feature match to determine options for trial.



Acquire accessible formats and enroll in Bookshare/Learning Ally.

Training and customization of the tool (adjust rate, text size, background)



Training and customization. Each AMP has different options for customization and use.

Develop a plan for use and train student as well as anyone who may support them including family.



Develop a plan for acquisition of materials. Consider all aspects of curriculum long/short term.

Collect data and review effectiveness of TTS tool. Implement a trial of a different tool if needed.



Continue to evaluate barriers for access within the curriculum and throughout the student's day.

Define and document plan in student's IEP.



Define and document plan in student's IEP.

Janet M. Kennedy, 2024

on classroom assessments, DRA progress monitoring, Words their Way, Foundations, fluency solutions and guided reading records, etc. In general, students are identified as candidates for text to speech tools (TTS) when a gap is noted between their achievement and grade level expectations. A print-based reading disability can impact a student's ability to decode and read text fluently as well as understand text that they are unable to decode. These students have difficulty in gaining information from print-based materials thus the print text is often a barrier in accessing the curriculum, thus both consideration for a text to speech tool and any accessible educational materials (AEM) is necessary.

It is also important to note any student who has a human reader accommodation. For example, a 4th grade student who is currently having a paraprofessional read text aloud. In this case, accommodations are already being provided, however the team may want to explore expanding the student's independent ability to access text.

STEP 2:

While all students have access to TTS tools, specific students identified as having a print-based disability must then have their individualized needs identified and need for accessible educational materials (AEM) outlined. A person-centered framework for assistive technology consideration such as the SETT Framework (Zambala, 1990) can guide the team in considering the individual needs of the student and their environment in relation to the selection of tools. This framework specifically focuses on guiding the team in determining student needs along with the needs for the environment, needs for specific tasks as well as important features that are needed in a tool. Next, if further information is necessary to determine the most effective support for a student the Protocol for Accommodations in Reading (PAR) or Universal Protocol for Accommodations in Reading (UPAR) by DeCoste and Wilson (2012) published by Don Johnston can be used. As DeCoste and Wilson (2012) note, the PAR and UPar provide a systematic way to compare reading across different accommodations (text to speech, human reader, student reader) in order to gain data to determine whether a reading accommodation is needed, what format of accommodation is best for the individual student and/or whether it is providing benefit. This tool can be helpful in determining the most appropriate reading accommodation for individual students, and I often acquire valuable information for writing the student's individual AT plan when I use it.

Once the team has clearly identified the need, text to speech tools that match the necessary features needed are acquired. There are a multitude of options available for the delivery of text to speech tools. Some of these options include:

- Text to speech on the device itself: Windows, Apple, Google & Kindle all have built-in accessibility settings on the device or within the operating system itself, which include text to speech.
- Support tools providing text to speech: Read&Write,

Snap&Read, Natural Reader, Voice Dream Reader, Speechify are just some of the many options that are available.

- Accessible Media Producers: Learning Ally and Bookshare, both include embedded text readers.
- Several curricular products include built-in audio support tools for all learners using a UDL framework.

This is where developing an individualized plan for a student is necessary. Each student is unique and their needs and comfort with each tool may be different.

When developing an individual plan, it is important to focus on the specific needs of the student as they may vary (e.g., a student might prefer to have a paper copy of a novel to scan as the TTS reader is reading from the computer screen while another student may prefer to have word-by-word highlighting activated and read directly from the screen). Relying on built-in audio support within curricular products solely may not provide enough access for the student to perform other tasks throughout their day, so a combination approach may be beneficial. Considerations for all aspects of the students day must be taken into account when developing a plan.

Access barriers can exist in the format of curricular materials themselves, therefore in conjunction with the determination of which tool best supports the student for TTS accommodations, determination must also be made for accessible educational materials (AEM). The term accessible format is defined within the Chafee Amendment (an amendment to the US copyright act) as “an alternative manner or form that gives an eligible person access to the work when the copy or phonorecord in the accessible format is used exclusively by the eligible person to permit him or her to have access as feasibly and comfortably as a person without such disability.” The team must look individually at the materials used across the curriculum and determine what barriers to access exist and what accessible formats are needed. For instance, a student may need access to several print-based novels in the ELA curriculum, and the school may only have these books in a paper-based format. Hence, a barrier exists for the student and they will need the novels in an alternative accessible format. The National Center on Accessible Educational Materials for Learning at CAST provides several resources that will be helpful in making this determination. One of which, the AEM Navigator tool is a planning resource that can assist teams in making decisions related to determining a student’s need for accessible formats, selecting the format(s) needed, acquiring materials, and determining the supports needed across a student’s day and environments. As noted in the National Center on Accessible Educational Materials guidance, there are several outcomes that are possible from this determination. First, it may be determined that the learner is able to read and access information within the same format of the instructional materials that are currently being used widely within the curriculum. Therefore, in this case, accessible formats are not needed. Second, it may be determined

that the learner is experiencing difficulty in accessing some or perhaps all of the text-based materials due to the formats that are currently being used within the curriculum itself, and the team then decides that the student needs access to curriculum materials presented in a different format. Third, it is sometimes possible that the evidence will show that the learner needs more modified content in order to successfully access the curriculum. Perhaps, the student may require access to materials that are of a lower reading level or changes within curricular expectations themselves may be necessary. In these instances, the learner may yet need some modified content in one or more accessible formats however the team feels that providing the current grade level accessible content alone is not going to be enough to solely support the student. This issue is sometimes the case with some of the learners who are on the Essential Elements track of the Common Core Curriculum. These students may need a combined approach in order to best access the content of the curriculum.

STEP 3:

Once decisions have been made for a TTS tool, the desired tool is deployed and a trial will then be implemented. If needed, AEM will also be acquired. These materials can be acquired by accessible media producers (AMPs), publishers themselves or materials can be converted by staff in-house through the use of scanning with optical character recognition or audio recording. The National Center On Educational Materials recommends first checking to see if the necessary materials are available through an Accessible Media Producer (AMP). Accessible media producers (AMPs) are services that convert books into more accessible formats through the Chafee Amendment in the US copyright act (1996). The two main AMPs are Bookshare a Benetech Initiative and Learning Ally. Students will need to qualify for these services based upon factors defined by each AMP. A recent check of Learning Ally noted that a student must have a “qualifying IEP or 504 plan or have been diagnosed with a print based disability” in order to qualify. Likewise, a recent check of Bookshare noted that “an expert must confirm the presence of a print-based disability that severely inhibits or prevents the student from reading traditional print materials” in order to qualify.

If the student qualifies for an exception in the copyright law via the Chafee Amendment and the desired materials are not available through the AMPs, a direct request can be made through the publisher themselves. In house conversion can also be an option. Tools are available to make this process easier such as the Audio Maker tool by Read&Write (Text Help). This tool allows web content to be clipped and turned into audio. Also school copiers that are newer will have an option for optical character recognition (OCR) scanning directly through the copier itself.

It is important for teachers to understand that without OCR, the copier only creates an image of text, not the actual text itself. Thus, if a text is scanned to PDF at the copier without OCR, modifications must be made to make the document accessible.



For instance a teacher heads to the copier and scans in a 3 page document about the Civil War and sends it off to the student via Google Classroom. The student opens the document and attempts to use a text to speech tool however cannot select any text. This is due to the fact that the document was scanned as an image rather than using OCR. There are several tools that can then be used to help with this on the student end if this issue occurs however, the easiest and best option is to first make it accessible using OCR. If that is not possible, or if something is inadvertently missed, there are OCR applications that can be used to convert that text. Snapverter by Text, Help and Prizmo are two options that I have successfully used in the past. If an iPad is available, it is now possible to snap a photo of the text then activate the spoken content:speak selection button in the settings to which the student then simply must highlight the text on the page and select “speak” from the options box to have it immediately read aloud. PDF accessibility tools such as Text Help’s OrbitNote may be helpful for students who need more global literacy supports to access PDFs. OrbitNote will allow for the student to use other tools such as speech recognition or word prediction to compose text in addition to having it read aloud. Other global literacy support tools such as Read&Write and Snap&Read offer OCR on the fly wherein the student is able to highlight inaccessible text and have it converted in real time. Again, when surveying the curriculum and looking at the formats that are prevalent within it, tools may need to be sampled to see which one makes the most difference for the student to most easily and independently access their learning materials. Students benefit from having options based upon their individual needs in accessing academic content.

If a student does not qualify for an AMP program or if the desired books cannot be located in the proper format, another option is available through a school or public library. Libraries offer digital reading materials that can be obtained through programs such as Libby, Hoopla or Overdrive or content can be purchased through online booksellers through programs such as Amazon (Audible) or Chirp Books. Other programs such as Tarheel Reader, Unite for Literacy and Epic are available for students who may have needed modified content in addition to accessible formats.

STEP 4:

As outlined in the recent Myths and Facts surrounding assistive technology devices and services guidance from the U.S. Department of Education (January, 2024), The IEP team will need to consider to what extent a student requires training or technical assistance to use the AT. Per the guidance related to Myth 5, the Department of Education notes that the IEP team needs to consider and potentially provide AT services, including training for the child, family, educational professionals or any other individuals who may provide support for the student.

I have found that it is a common misconception that students automatically know how to use TTS or understand when and where is appropriate or necessary for them to use a TTS tool.

First and foremost, some level of training and support is typically provided to a student on an individual basis. As the district trainer and Assistive Technology Specialist for my school district, I also provide multiple training options for TTS including training for teachers, paraprofessionals, classrooms, individual students and their families. Training is also available for families and staff through our membership with Infinitect. The Infinitect classroom has many on-demand training resources as well as in-person training opportunities throughout the year that help grow the AT knowledge of teams. Over the past few years, I have found that many of the students quickly understand the mechanics of how to use TTS, they just need to understand when to use it, how to access it and how to trouble shoot if materials are not accessible.

It is also important to note that training needs for students, families and staff may vary depending upon the audience. For example, when working with families, some are comfortable with learning through the digital resources alone. While other times, an entire family will come in and I will run through the process on an individual basis with them and then answer any questions that they may have in person.

Here are some tips which may be helpful for training individual students:

- practice opening documents and using tts tool
- practice opening settings for the tool and learn to adjust
- select a reading voice
- adjust reading speed
- determine highlighting (if available), continuous reading, selected reading or sentence reading
- write a passage and use TTS tool for reading
- use TTS tool on various assignments (don’t forget math!)
- practice using TTS tool on websites

Both Bookshare and Learning Ally have setting options that will need to be customized and adjusted for an individual learner including:

- select text size and color
- select background color
- adjust reading speed
- select voice option

The use of TTS in testing is another consideration that the team must make. If a student requires the use of TTS in the classroom to access the curriculum then it must also be considered for testing. Per the Myths and Facts guidance related to Myth 8, the Department of Education notes that IEPs should include a statement on how AT devices can be utilized when participating in State testing and that the school team must understand how to use them. TTS options vary within standardized testing so this must be researched.

Accommodation guidance information can be obtained within each State’s individual assessment manual. It is important to note

that some tools may be blocked by the security platforms of the test itself and sometimes may need additional features activated. Some testing suites offer their own TTS options in suite however, they must be turned on in advance. It's important to consider all of these factors when developing a comprehensive plan for how a student will use TTS. This should be checked long before testing begins! Rogers, Thurlow, Lazarus, and Liu (2019), in their retrospective study of the research on testing accommodations from 2015-2016, found mixed results when looking at the overall effectiveness of accommodations. Their findings appear representative of the need to develop individualized plans based upon individual student's needs and preferences hence it is key to develop a plan ahead of time to address how accommodations will be used for testing.

STEP 5:

Once an AT plan is developed and finalized, it should be shared with the entire team. The plan should be comprehensive, taking into consideration all aspects of the curriculum and a student's day including both long and short term needs. It is also important to remember that in addition to ELA, students who struggle with reading may need to use TTS for multiple tasks including things such as: read daily posts on Google Classroom, word problems in math/math work, health units in PE, etc. Remember that reading and decoding text is a part of the student's entire day and there are many instances where the tool will be necessary. I have often found that this needs to be explicitly demonstrated to students. For instance, a student may be struggling with content in the health unit of physical education class and because it is not typical for them to use their TTS tool in that environment it is not thought of.

STEP 6:

Just like any other assistive technology accommodation, data on effectiveness will need to be collected and analyzed on a regular basis. Changes may need to be made along the way as the student progresses through their years of school as curriculum changes and support needs change along with that. If appropriate, transition plans may need to be developed to plan for big changes.

STEP 7:

Lastly, in Myth 6, the Department of Education notes that if AT devices and services are being made available, it must be included in the IEP. Thus, the plan will need to be documented and defined within the student's individualized education plan.

It is also important to note that further training and assistance may be needed along the way. I find that when a student realizes how helpful the tool is, they are wanting to learn more about how to use it in practical ways outside of the classroom. Assistance may be needed in showing a student and their family how to download and activate TTS on home based technologies. Teaching a child to

use TTS can become a life long benefit.

In sum, there are a few steps to develop a comprehensive plan for supporting a student who has a print-based reading disability. There are two main components of consideration for students who struggle with reading: use of text to speech and access to accessible educational materials. An accessible curriculum and access to accessible instructional materials are important in creating a universally designed learning environment where students who struggle with literacy can easily access grade level materials using TTS tools. Several supports and guides can be used to help guide teachers and teams in selecting appropriate TTS tools and in obtaining appropriate AEM as needed. Barriers in the use of text to speech tools can be mitigated with planning. Use of text to speech tools within testing is an important additional consideration for students who require the use of a text to speech tool. There are so many benefits from providing students with access to grade appropriate content through the use of TTS and AEM. In just a few steps, you can provide a student with a skill that may become a life long benefit.

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FREE Sponsored Webinar by PRC – Saltillo

Marvelous, Magical Minspeak

By Debbie Witkowski

Tuesday, August 20, 2024

11:00 am – 12:00 pm (Central Daylight Time)

Most robust AAC language systems represent language through single-meaning pictures and alphabet-based strategies, such as spelling, word prediction, and printed words. Minspeak systems are unique in that they offer a third method of representing language known as semantic compaction.

This webinar will explore the components of Minspeak systems that lead to successful communication including the semantic organization into word families, the predictable architecture of vocabulary storage, and the design that leads to motor automaticity.

Join us as we explore the marvels and magic of Minspeak systems and learn how the design of Minspeak programs and accompanying tools facilitate language learning and use.

Debbie Witkowski, MA, CCC-SLP, is a speech-language pathologist with 35 years of experience in AAC, she is the training and implementation specialist for the Minspeak Academy at PRC-Saltillo.

Learning Outcomes – as a result of this activity, participants will be able to:

- ✓ Explain how vocabulary is organized in a Minspeak system.
- ✓ Describe how vocabulary is accessed through predictable symbol sequences.
- ✓ Discuss how the design of Minspeak systems promotes motor automaticity.

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RECENTLY ADDED WEBINARS



Designing Accessible Content to Include All Students

By Kristin Leslie

Do you have students who are facing barriers to accessing core curriculum due to language, learning style or disability? Foundational to Multi-tiered Systems of Support (MTSS) is the belief that ALL students need access to core instruction. Assuring that students have “accessible versions of educational materials may mean the difference between learning barriers and learning opportunities.” (National Center on Accessible Educational Material).

As educators, we are tasked with providing learning materials that are accessible to diverse student groups. What resources are available to guide educators through this process? The Special Education Technology Center (SETC) in Washington State has created a free online learning course in an Open Educational Resources (OER) format to help educators navigate the process of vetting and creating educational material that is fully accessible to students, staff, and parents. Join us to discuss how to break down access barriers by integrating this professional development content in your classroom and district practices.

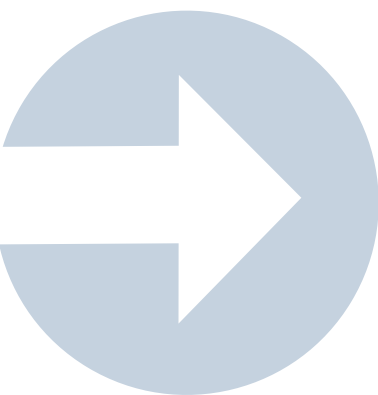


Systems and Structures that Support Assistive Technology

By Sarah Davidson and Nickie Woods

Setting up your class for students with complex learning needs requires a strong foundation in best practices for complex learners. Seeing is believing so come and get inspired! Learn how one public school, Fletcher Miller Special School, in Lakewood, CO, has built a program specializing in the complex and emergent population ages 3-21 years.

Participants will be given a front row seat to discover how AT at Fletcher Miller is supported by environmental considerations as well as school-wide planning and problem-solving structures (that include all team professionals). Explore examples of how AT, when powerfully combined with quality curriculum and specialized and targeted planning for emergent learners, is yielding powerful results. Leave empowered with pictures, videos, ideas, templates, connections, and inspiration for more targeted emergent instruction!



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STEM Workforce Stories

for Adolescents

Who Are Deaf or Hard of Hearing

Summary: This article will introduce readers to the STEM Workforce Stories. It will provide a description of the stories and their purpose. This will be followed by an explanation of why the stories are needed and how they were developed. The article will then point out how the stories are universally designed for personalized use. Description of the methodology, results, and key findings from testing will indicate the value the stories add to teaching and learning.

The STEM Workforce Stories (SWS) were developed for use in school and out-of-school settings by adolescents who are Deaf or hard of hearing. There are eight stories each of which is told by a STEM professional who is Deaf or hard of hearing. They include stories from a naturalist, a pharmacologist, a nurse practitioner, a water quality analyst, a microbiologist, a UX/UI Designer, a geologist, and a high school teacher. Their purpose is threefold: to contribute to the interest of students who are deaf or hard of hearing in STEM, to generate awareness of a representative range of STEM careers, and to recognize that they might, as other professionals who are deaf or hard of hearing

have done, pursue and succeed in a STEM career. Each story is aligned with the NGSS Science and Engineering Practices for K-12 Science Classrooms. Implementation strategies are provided and offer suggestions for integration of the stories into the curriculum in a variety of ways. Using a question-and-answer format, the STEM professionals describe their background, factors that led up to choosing and embarking on a STEM career, their day-to-day work life, impediments they encountered along the way and how they overcame them, and their advice for the next generation. Image 1 shows examples of some of the STEM professionals featured in the stories engaged in their work.



STEM Professionals at Work



JUDY VESEL, is the Principal Investigator for TERC's "Signing Math & Science" initiative—funded by NSF and the U.S. Department of Education. The SWS project and related initiatives are part of this body of work. Ms. Vesel has presented her work at many recent conferences including annual meetings of the Center for Advancement of Informal Science Education (CAISE), American Association of Museums (AAM), Assistive Technology Industry Association (ATIA), and Closing the Gap. E-mail: judy_vesel@terc.ed

WHY STEM CAREER STORIES ARE NEEDED

There is undeniable need for a diverse talent pool of STEM-literate Americans prepared for the jobs of the future. STEM careers make up a large majority of the fastest-growing careers in the USA (Bureau of Labor Statistics 2023). This increase is being driven by the growing worldwide demand for workers in lines of work that historically did not require STEM knowledge. This situation is expected to become more urgent. By 2026, STEM jobs are predicted to grow by 13% compared with 7% growth in the overall U.S. workforce (National Science Board, National Science Foundation, 2021).

While progress has been made in broadening participation of underrepresented groups in STEM, data show that persons with disabilities continue to remain underrepresented in STEM education and employment compared to their representation in the U.S. population (NCSES 2023). Regarding participation of persons who are Deaf or hard of hearing in the STEM workforce, they make up only about 2.8% of all STEM workers (NCSES 2021). Key factors that are believed to contribute to this are that persons who are Deaf or hard of hearing very often have little or limited awareness of the range of STEM career opportunities available or of examples of persons who are Deaf or hard of hearing and have pursued and succeeded in STEM careers (Gallaudet 2012). Studies reveal that seeing other people with disabilities having success in STEM boosts self-confidence (Jenson et al., 2011) and that having exposure to examples of STEM professionals who are Deaf or hard of hearing is an important factor in inspiring students' interest in a STEM career, the belief that they could be successful were they to pursue STEM, and willingness to self-advocate and persevere toward this goal (Vesel, Nave, & Robillard 2023).

Of the STEM career resources that are available for the purpose of informing and inspiring Deaf and hard of hearing students to pursue a STEM career, only a small number exist. They include a set of text profiles with limited information of men and women who are Deaf or hard of hearing and who have made significant contributions to STEM and a few online resources offered from the DeafTEC and CSD Learns Web sites. None of these are designed for classroom use. Teachers of students who are Deaf or hard of hearing also report that attention to STEM careers is not included in their science curriculum and that beyond a few sidebars in their science textbooks, they lack the resources they need to effectively provide their students with information about STEM careers (Vesel, Robillard, & Nave 2021). Given this absence of resources, there was a significant need for research and development of a beginning set of STEM career stories told by STEM professionals who are themselves Deaf or hard-of-hearing.

HOW THE STORIES WERE CREATED

A new and unique multi-step process for recording the videos was developed and implemented. It allowed for the STEM

professional, Bridge Multimedia (our organizational partner and content service provider), and the TERC team to be in graphically separate locations.

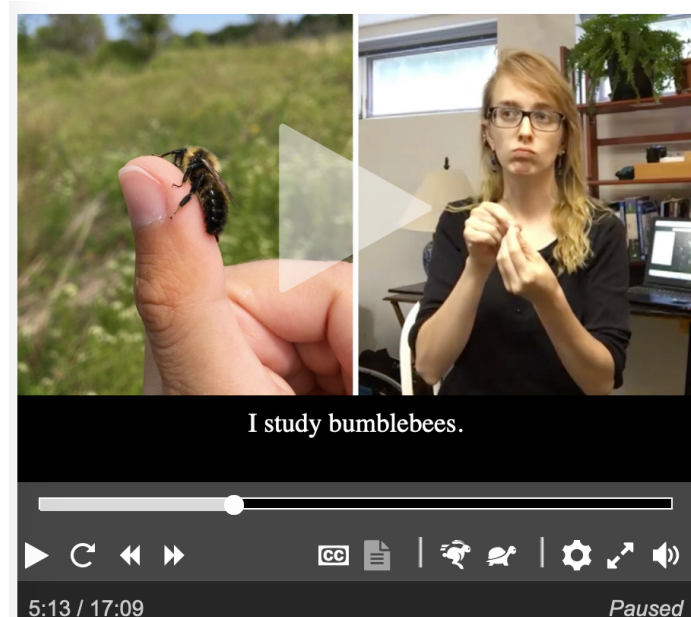
- Step 1 - Professionals were given a list of questions to help them shape what they would like to share.
- Step 2 - Pre-recording— The production team from Bridge Multimedia conducted a technical rehearsal to verify that the interviewee's computer (in Location A), Internet connection, the video recording environment, and lighting were recording-ready. Two sign language interpreters, the interviewer (in Location B) and the interviewee's back-translator (in Location C) were part of the process.
- Step 3 - Interview Recording—A Moderator/Interviewer who was ASL proficient was in Location A, the Interviewee was in Location B, the Interviewee's ASL back-translator/interpreter were in Location C, a Virtual videographer was in Location D, and individuals from Bridge Multimedia, located in New York City, were available for technical support. The interview process involved making video and audio recordings with the interviewee and interviewer (along with ASL interpreters) in ASL and spoken English on multiple computers over Zoom.
- Step 4 - Merging, Transcription and Creation of a Rough-Cut Version— The Bridge team merged the video and spoken recordings into a single Preliminary Version that included the video and a paper transcript of the English text.
- Step 5 - Review, Editing, and Creation of the Final Version— The interviewee and TERC team reviewed the Rough-Cut Version. A Final Version was created and reviewed for content, accuracy, and length.
- Step 6 - Division into Chapters and Integration of Introductory & Summary Information—The text was organized into chapters such as Beginnings, Reflections of the Professional, Challenges Encountered, and Advice for the Next Generation. An introductory piece about the STEM professional by a commentator who is ASL proficient and short summaries of what the professional shared were added.
- Step 7 - Image Integration—The professionals provided images of them at work, the types of data they use or collect, equipment they use, interactions with colleagues, places they have studied, and of their family, pets, interests, and travels.
- Step 8 - Integration of Closed Captions—Closed captions to enable reading while viewing material presented in ASL, spoken English, or both were incorporated.
- Step 9 - Final Mastering—Video and audio components were balanced to optimize playback across systems and media formats.

HOW THE STORIES ENABLE PERSONALIZED USE

Universal Design for Learning (UDL) features are incorporated into the stories (CAST 2018). Integration of this feature allows viewers to individualize their story experience. They can view a story in sign with captions, listen to it in English with or without



simultaneous sign interpretation or voice overlay; increase or decrease text size, loudness, and contrast; and play and replay all or parts of a story. They can also read a transcript of the story. Image 2 shows how options to use these features are incorporated into the story interface.



An Example of the Story Interface

WHAT WE HAVE LEARNED TO DATE

The research team conducted a proof-of-concept test with students in two schools for the deaf. One school was in Arizona. The other was in Boston. The test incorporated a mixed-methods design (Cresswell & Plano Clark 2007; Johnson, Onwuegbuzie, & Turner 2007) that integrated qualitative and quantitative methods. Data collection involved use of separate online post-use surveys—one for teachers and another for students. The surveys incorporated fixed and open-response items that were designed to support an analysis that was intended to answer several research questions, two of which are relevant to this article: 1) How do teachers make use of the stories? 2) What kinds of outcomes are made possible with use of the stories in terms of interest and engagement in STEM and pursuing a STEM career? Results and findings for each question are highlighted below.

Testing included 33 students who were Deaf or hard of hearing and their teachers. **Image 1** provides a snapshot of their demographics.

Results for Question 1 (How do teachers make use of the stories) are provided in **Figure 1**. Comments from teachers about suggested implementation strategies follow.

They suggested integrating them into core curriculum topics based on their alignment with the NGSS, using them as a component of a job awareness class, or incorporating them into career research projects. For example, integration into the curriculum might include the story from the naturalist being used when teaching ecology or to augment study of the decline of bee populations. The pharmacist's story could be used in a biology class when discussing modern medicine. The stories could also be used in a job awareness class or to help students with a career research project. They could be incorporated into an introduction to a relevant topic, used as a follow-up to an activity, or illustrate how professionals use a particular concept or skill. Power Point slides could be incorporated to provide additional information to elaborate on an aspect of a story after viewing.

Results for Question 2 (What kinds of outcomes are made possible with use of the stories in terms of interest and engagement in STEM and pursuing a STEM career?) are provided in **Figure 2**. Information from students about what they learned from the stories follows.

School A

Well, I noticed that deaf or hard of hearing persons have changed the world a lot because they (have been able) to stand up for themselves. This is good news and (gives) deaf or hard of hearing persons more opportunities.

I saw deaf or hard of hearing persons have experienced frustration throughout life.

I appreciated hearing about the scientist's frustration even in high school. It made me want to seek more help now and in the future.

School B

I'm sure (pursuing a STEM career) was full of challenges to face and (the scientist) didn't let doubt get in the way, and I'm really impressed with that.

They're very hard workers, even though (some) learn sign language late they just keep it up and are very patient with their process of learning.

That deaf can do it even if the career is involved with hearing. We can use devices for that.

It can be a struggle with real world things such as communicating with hearing people for jobs, transportation, becoming a doctor and more.

Deaf can support each other.

Deaf people can succeed and accomplish cool things. We can help inform and advise others.

CONCLUSIONS

With respect to implementation, it should be flexible and is largely dependent on the situation. With respect to what students learned, most agreed that the stories resulted in having found out something new about STEM and more about STEM

School	N	Members	Gender	Age	Race	Hearing Level	Communication Method
A	17	Teacher Students	Male Male-4 Female-3	--- 14-1 15-2 16-1 17-2 18-1	White/Caucasian Black/African American-3 B/AA, Hispanic/LatinX-3 Hispanic/LatinX-1	Hearing HH-1 Deaf-4 Deaf (CI)-1 HH (CI)-1	English ASL-4 English-1 Spanish-1 Simultaneous Communication-1
B	125	Teacher Students	Female Male-16 Female-10	--- 14-5 15-9 16-6 17-3 18-3	White/Caucasian White Caucasian-3 Hispanic LatinX-17 Hispanic LatinX, WC-3 Indigenous, B/AA-1 Indigenous, B/AA, W C.-1 Not Responded-1	Hearing HH-7 Deaf-16 Deaf (CI)-2 HH (CI)-1	English ASL-22 English-2 Simultaneous Communication-2

Image 3. Participant Demographics

School	Numbers of Stories Viewed	How Viewed	Integration
A	1	Alone	Discussed the story together afterwards
B	7	Alone	Discussed the story together afterwards

Figure 1. How Teachers Make Use of the Stories

School	Participant	Outcome	Result
A	Student	Found Out Something New About STEM	Strongly Agree 3; Agree 2; Disagree 2
A	Teacher	Found Out Something New About STEM	Strongly Agree
A	Student	Found Out More About STEM Careers	Strongly Agree 1; Agree 4; Somewhat Agree 1; Disagree 1
A	Teacher	Found Out More About STEM Careers	Strongly Agree
A	Student	Increased Interest in STEM	Strongly Agree 1; Somewhat Agree 4; Disagree 2
A	Teacher	Increased Interest in STEM	Strongly Agree
A	Student	Increased Interest in a STEM Career	Agree 3; Somewhat Agree 2; Disagree 2
A	Teacher	Increased Interest in a STEM Career	Strongly Agree
A	Student	Gave Me a More Positive View of Deaf/HH Persons	Strongly Agree 2; Agree 2; Somewhat Agree 1; Disagree 2
A	Teacher	Gave Students a More Positive View of Deaf/HH Persons	Strongly Agree
B	Student	Found Out Something New About STEM	Strongly Agree 8; Agree 10; Somewhat Agree 8
B	Teacher	Found Out Something New About STEM	Strongly Agree
B	Student	Found Out More About STEM Careers	Strongly Agree 8; Agree 10; Somewhat Agree 8
B	Teacher	Found Out More About STEM Careers	Strongly Agree
B	Student	Increased Interest in STEM	Strongly Agree 3; Agree 9; Somewhat Agree 12; Disagree 2
B	Teacher	Increased Interest in STEM	Agree
B	Student	Increased Interest in a STEM Career	Strongly Agree 3; Agree 6; Somewhat Agree 11; Disagree 5; NA 1
B	Teacher	Increased Interest in a STEM Career	Agree
B	Student	Gave Me a More Positive View of Deaf/HH Persons	Strongly Agree 9; Agree 10; Somewhat Agree 7
B	Teacher	Gave Students a More Positive View of Deaf/HH Persons	Somewhat Agree

Figure 2. Interest and Engagement in STEM and Pursuing a STEM Career

careers and increased their interest in both. Most students were interested in finding out what the STEM career involved and in seeing the professional at work as well as in learning about the emergence of the professional's interest in STEM and in factors that maintained their interest. Other areas of interest included becoming aware of the challenges and obstacles the various professionals encountered and how they overcame them and in getting advice about what to do and think about when pursuing STEM and a STEM career.

Although this was a small study, it provides valuable information about the value STEM career stories told by professionals who are Deaf or hard of hearing add to the learning of students. Additional testing with middle grade and high school students is underway. Outcomes will provide additional information about implementation and effectiveness of the stories.

PRODUCT INFORMATION

The stories were developed by [TERC](#) and [Bridge Multimedia](#). They were funded in part by the National Science Foundation, Grant No. DRL-2005511. Video versions are available free from <https://signsci.terc.edu/SWS/index.html>. They can also be used on phones and tablets using a Web browser.

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Building Sensory Routines: Supporting Neurodiverse Individuals with Sensory Processing Needs



SensoryRx is a company made up of people passionate about creating sensory solutions and providing every individual the opportunity to Find Focus through Movement™

DEVELOPING A SENSORY ROUTINE

As humans, we thrive on routine. It helps us create expectations and build habits. When things go awry in life, a routine can help us find our way back. This is exponentially valuable for individuals with sensory differences. Sensory processing plays a fundamental role in how we perceive and interact with the world around us, yet for many neurodiverse individuals, navigating sensory stimuli can pose significant challenges. It is important to understand the basics of building sensory routines tailored to the unique needs of sensory seekers and avoiders. By building routines throughout the day, these individuals can become more equipped to take on challenging situations or stimuli. It only makes sense that sensory motor activities have a routine too.

Understanding sensory processing needs is crucial for creating inclusive environments that promote well-being and engagement. From individuals who seek out sensory stimulation to those who actively avoid certain sensory inputs, each person's sensory profile is unique and dynamic. Creating a routine may help to enhance the participant's ability to differentiate between sensory stimuli, identify appropriate responses, improve daily participation, and boost quality of life. By embracing the principles of predictability, consistency, and flexibility, we can lay the groundwork for effective sensory routines that foster a sense of safety and empowerment.



KERRI NELSON, is an advocate for special needs and sensory issues, dedicated to fostering inclusion and accessibility. She works with SensoryRx to remove barriers hindering participation and pioneer innovative approaches to enhance accessibility. Working with SensoryRx, Kerri continues to inspire and empower others to embrace diversity and champion accessibility for all.



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UNDERSTANDING SENSORY PROCESSING NEEDS

SENSORY PROCESSING AND ITS SIGNIFICANCE FOR NEURODIVERSE INDIVIDUALS

Sensory processing encompasses the brain's ability to interpret and organize sensory information received from the environment, including touch, taste, smell, sight, sound, and movement. For neurodiverse individuals, this process can vary significantly from the neurotypical population, influencing how they perceive and respond to sensory stimuli. Understanding sensory processing is pivotal as it underpins many aspects of daily life, affecting behavior, emotions, and overall well-being. By recognizing the significance of sensory processing differences, we can begin to tailor interventions and supports that acknowledge and respect the diverse sensory needs of individuals.

SENSORY SEEKING AND SENSORY AVOIDING BEHAVIORS

Sensory seeking and sensory avoiding behaviors represent two distinct but interconnected aspects of sensory processing. Sensory seekers actively crave and seek out sensory experiences to regulate their arousal levels and engage with their environment. In contrast, sensory avoiders demonstrate hypersensitivity to certain sensory inputs, leading them to actively avoid or withdraw from stimuli that overwhelm or distress them. These behaviors manifest across various sensory modalities and can significantly impact an individual's ability to participate in daily activities and social interactions. Understanding the nuances of sensory seeking and avoiding behaviors is essential for developing effective strategies to support individuals with diverse sensory profiles.

SENSORY PROCESSING CHALLENGES ON DAILY FUNCTIONING

Sensory processing challenges can exert a profound influence on daily functioning, encompassing various aspects of an individual's life, including self-regulation, socialization, and academic or vocational pursuits. Difficulty processing sensory information can manifest in a range of ways, from sensory overload and meltdowns to withdrawal and avoidance behaviors. These challenges may also intersect with other neurodevelopmental conditions, such as autism spectrum disorder and attention deficit hyperactivity disorder, further complicating the picture. By examining the impact of sensory processing challenges on daily functioning, we can better appreciate the complex relationship between sensory processing differences and overall well-being, informing the development of targeted interventions and supports to enhance quality of life for neurodiverse individuals.

SENSORY PROCESSING NEEDS OF SENSORY SEEKING INDIVIDUALS

Sensory seeking individuals demonstrate a high sensory tolerance coupled with an active response to sensory input. This sensory profile influences various aspects of their daily lives and necessitates tailored approaches to support their sensory needs effectively.

It is important to understand the underlying neurological threshold and response patterns of sensory seekers. Sensory seekers exhibit a high tolerance for sensory input, requiring substantial stimuli to elicit a response. This heightened threshold often leads them to actively seek out sensory experiences to meet their sensory needs. Their active response involves engaging in behaviors aimed at increasing sensory input or seeking out environments rich in sensory stimuli.

When identifying a sensory seeker at home, knowing the common signs is crucial. Sensory seekers frequently engage in tactile stimulation, such as touching people or objects around them. This behavior provides them with sensory input and helps regulate their arousal levels.

A hallmark behavior of sensory seekers is restlessness or fidgeting. They may exhibit constant movement, such as tapping their feet, shifting in their seats, or playing with objects to satisfy their need for sensory input.

Sensory seekers often seek out repetitive movements, such as jumping, spinning, or rocking, to fulfill their sensory cravings. These activities provide deep pressure and proprioceptive input, contributing to their sensory regulation.

In their mission for sensory stimulation, sensory seekers may engage in risky behaviors without considering the potential consequences. This behavior reflects their intense drive to fulfill their sensory needs, even if it means disregarding safety precautions.

Additionally, sensory seekers may exhibit oral sensory seeking behaviors, such as mouthing non-food items like pencils, pens, or clothing tags. This behavior provides oral stimulation and helps regulate their sensory system.

Recognizing the sensory processing needs of sensory seeking individuals is essential for providing appropriate support and accommodations. Failure to address these needs adequately can lead to challenges in various settings, including academic, social, and daily living environments. By understanding their sensory profile and implementing targeted strategies, such as providing sensory-rich activities or sensory tools, we can promote their engagement, well-being, and overall quality of life.

Creating sensory routines and incorporating sensory support into daily activities can benefit sensory seeking individuals. Providing opportunities for sensory input throughout the day, such as incorporating movement breaks, offering tactile materials, or creating sensory-friendly environments, can help meet their sensory needs and promote self-regulation. Additionally, collaborating with occupational therapists or sensory integration specialists can offer valuable insights and strategies for supporting sensory seeking individuals effectively.

By understanding and addressing the unique sensory processing needs of sensory seeking individuals, we can create inclusive environments that foster their engagement, participation, and overall success.

SENSORY PROCESSING NEEDS OF SENSORY AVOIDING INDIVIDUALS

It is crucial to understand the difference between sensory seeking and sensory avoiding behaviors. Understanding the sensory avoiding behaviors will help to make a better quality of life for those with these sensory processing needs.

In contrast to sensory seekers, sensory avoiders demonstrate a low tolerance for sensory input, requiring minimal stimuli to provoke a response. This hypersensitivity often leads them to actively avoid or withdraw from environments or situations that may overwhelm their sensory system. Their active response involves seeking ways to modify their environment to reduce sensory input and prevent overstimulation.



SensoryRx provides unique and versatile products that create movement opportunities for everyone – from power wheelchair users to high flying sensory seekers. Each custom setup includes a support structure, sensory attachments, and accessories.

Sensory avoiders often demonstrate a range of behaviors indicative of their hypersensitivity to sensory stimuli. They may easily become upset or distracted by loud or sudden noises, leading them to cover their ears or avoid noisy environments altogether.

Similarly, they exhibit hypersensitivity to certain tastes, smells, and textures, resulting in the avoidance of specific foods or activities that provoke discomfort. This avoidance extends to touch or activities involving messy or sticky textures, because they tend to find such sensations intolerable.

Sensory avoiders may struggle with balance activities or



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The SensoryRx team has been able to meet and partner with amazing people across the country and CTG has been a big reason for that!

feel uncomfortable in situations requiring coordination and spatial awareness, further limiting their engagement in certain activities.

They display a strong preference for routine and predictability. Deviation from familiar environments or routines may heighten their discomfort and exacerbate their sensory challenges. These behaviors collectively highlight the complex interplay between sensory avoidance patterns and the individuals' daily functioning, emphasizing the importance of understanding and addressing their unique sensory processing needs.

Recognizing the sensory processing needs of sensory avoiding individuals is vital for providing appropriate support and accommodations. Failure to address these needs adequately can lead to heightened anxiety, withdrawal, and challenges in various settings, including social interactions, academic environments, and daily living tasks. By understanding their sensory profile and implementing targeted strategies we can promote their engagement, comfort, and overall well-being.

Creating sensory-friendly environments and offering sensory

tools can significantly benefit sensory avoiding individuals. Providing opportunities for predictable and controlled sensory input, such as offering noise-canceling headphones or providing visual schedules, can help them feel more comfortable and regulated in their surroundings. Additionally, collaborating with occupational therapists or sensory integration specialists can offer valuable insights and strategies for supporting sensory avoiding individuals effectively.

By understanding and addressing the unique sensory processing needs of sensory avoiding individuals, we can create inclusive environments that foster their engagement, participation, and overall success.

THE BASICS OF BUILDING A SENSORY ROUTINE

SENSORY ROUTINES AND THEIR BENEFITS

Understanding the sensory preferences and needs of sensory seekers is a foundational aspect of providing effective support and intervention for individuals within this neurodiverse population. Sensory seekers exhibit a unique sensory profile characterized by a high tolerance for sensory input and an active response to stimuli. This means they actively seek sensory experiences to regulate their arousal levels and engage with their environment. By comprehensively understanding these sensory profiles, caregivers, educators, and therapists can develop tailored interventions that effectively meet the individual needs of sensory seekers.

Central to understanding sensory seekers is recognizing the diversity within their sensory profiles. While some may gravitate towards vestibular or tactile stimulation, others may exhibit a broader range of sensory-seeking behaviors. Additionally, sensory preferences may vary in intensity and fluctuate over time, making it essential for caregivers to continually assess and adapt their approaches to meet the evolving needs of seekers. By taking a holistic approach to understanding sensory preferences, caregivers can gain valuable insights into the unique sensory profiles of seekers and develop targeted strategies to support their sensory needs effectively.

Understanding the underlying sensory needs of seekers enables caregivers to identify the underlying motivations driving their sensory-seeking behaviors. Sensory seeking is often a means of self-regulation, allowing individuals to modulate their arousal levels and maintain a state of optimal alertness. By recognizing the functional significance of sensory-seeking behaviors, caregivers can develop interventions that address the underlying sensory needs of seekers and promote their overall well-being. Through close observation, collaboration with sensory integration specialists, and ongoing assessment, caregivers can gain a deeper understanding of the sensory preferences and needs of seekers, paving the way for targeted interventions that foster engagement, promote self-regulation, and enhance their overall quality of life.



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KEY COMPONENTS OF A SENSORY ROUTINE

Incorporating sensory-rich experiences into daily routines is crucial for promoting the holistic development and well-being of sensory seekers. These individuals thrive on intense sensory input, which plays a pivotal role in regulating their arousal levels, promoting engagement, and enhancing their overall sensory experiences. By integrating sensory-rich activities into daily routines, caregivers can provide opportunities for meaningful sensory exploration and stimulation throughout the day.

One effective strategy is to diversify sensory activities to target different sensory modalities within daily schedules. This approach ensures a well-rounded sensory experience, catering to their diverse sensory preferences and needs. Caregivers can incorporate activities such as swinging, jumping, climbing, or exploring tactile materials to provide seekers with opportunities for intense vestibular, proprioceptive, and tactile stimulation. Additionally, providing access to sensory-friendly environments equipped with sensory tools and equipment, such as swings, balance boards, or sensory mats, can offer seekers consistent opportunities for sensory engagement and exploration.

Moreover, caregivers can be creative in designing sensory activities that align with seekers' interests and preferences. Sensory-rich experiences can be seamlessly integrated into various daily routines, such as playtime, mealtime, or sensory breaks, to promote engagement and enhance sensory experiences. Incorporating sensory materials into play activities, such as sensory bins filled with sand, water, or textured materials, can engage seekers in tactile exploration and sensory discovery. Similarly, incorporating sensory-friendly mealtime activities, such as playing with textured food items or using sensory-

friendly utensils, can create positive mealtime experiences while providing seekers with opportunities for sensory stimulation. Through thoughtful planning and implementation, caregivers can effectively incorporate sensory-rich experiences into daily routines, fostering engagement, promoting self-regulation, and enhancing the overall well-being of sensory seekers.

CREATING A SUPPORTIVE SENSORY ENVIRONMENT

Caregivers, educators, and therapists play a crucial role in creating environments that foster sensory engagement and promote the overall well-being of seekers. By implementing thoughtful strategies and interventions, caregivers can provide seekers with meaningful opportunities for sensory exploration and stimulation throughout the day.

Create sensory-rich environments that offer seekers opportunities for sensory input and exploration. Caregivers can design sensory-friendly spaces equipped with a variety of sensory tools and equipment, such as swings, balance boards, sensory mats, or textured surfaces, that cater to the diverse sensory preferences and needs of seekers. These sensory-rich environments serve as safe and supportive spaces where seekers can engage in sensory activities, explore different sensory modalities, and regulate their arousal levels effectively.

Caregivers can be creative in designing sensory activities that appeal to seekers' interests and preferences. Sensory-rich experiences can be embedded into various daily routines to provide seekers with consistent opportunities for sensory exploration and stimulation. Incorporating sensory materials into play activities, such as sensory bins filled with sand, water, or tactile materials, can offer seekers opportunities for tactile exploration and sensory discovery. Similarly, incorporating sensory-friendly mealtime activities, such as playing with textured food items or using sensory-friendly utensils, can engage seekers in meaningful sensory experiences while promoting positive mealtime behaviors. Through thoughtful planning and implementation, caregivers can create environments that support sensory exploration and promote positive sensory experiences for seekers, fostering their holistic development and enhancing their overall quality of life.

BUILDING A ROUTINE FOR SENSORY AVOIDERS

COMMON TRIGGERS FOR SENSORY AVOIDERS

Understanding the sensory preferences and needs of sensory seekers is fundamental in providing tailored support and fostering their well-being. Sensory seekers, characterized by a high sensory tolerance and an active response, exhibit a distinct sensory profile that influences their interactions with the environment. By comprehensively grasping their sensory preferences, caregivers can design interventions that effectively meet their unique needs.

Central to understanding sensory seekers is recognizing



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their inclination towards intense sensory experiences. These individuals actively seek out stimuli to regulate their arousal levels and engage with their surroundings. Their preference for deep pressure, continuous movement, and tactile input underscores the importance of providing opportunities for sensory exploration and stimulation. By embracing their sensory-seeking tendencies, caregivers can create environments rich in sensory experiences, promoting engagement and enhancing their overall quality of life.

Understanding the sensory needs of seekers enables caregivers to implement strategies that optimize their sensory experiences. By recognizing their propensity for high levels of vestibular, tactile, and proprioceptive input, caregivers can incorporate activities that cater to these sensory modalities. This may involve providing access to sensory tools and equipment, such as swings, climbing structures, or textured materials, that offer opportunities for intense sensory stimulation. Additionally, being mindful of the individual's sensory preferences allows caregivers to adapt activities and routines to suit their specific needs, ensuring a supportive and enriching sensory environment.

Understanding the sensory preferences and needs of sensory seekers lays the foundation for effective support and intervention. By acknowledging their unique sensory profile and embracing their sensory-seeking tendencies, caregivers can create environments that foster engagement, promote self-regulation, and enhance their overall well-being. Through collaborative efforts and tailored strategies, we can empower sensory seekers to thrive and reach their full potential.

MINIMIZING SENSORY OVERLOAD AND CREATING CALMING ENVIRONMENTS

Suggestions for incorporating sensory-rich experiences into daily routines are essential for meeting the unique needs of sensory seekers. These individuals thrive on intense sensory input, which plays a crucial role in regulating their arousal levels and promoting engagement with their environment. Caregivers, educators, and therapists can effectively support sensory seekers by integrating sensory-rich activities into their daily routines, fostering sensory exploration and enhancing their overall well-being.

One key approach is to provide opportunities for multisensory experiences that cater to the diverse sensory modalities of seekers. Activities should focus on delivering high levels of vestibular, tactile, and proprioceptive input to meet their sensory needs effectively. Incorporating activities such as swinging, jumping, or climbing can provide the intense sensory stimulation that seekers crave, promoting engagement and self-regulation. Additionally, integrating sensory materials, such as textured surfaces or sensory bins filled with various tactile elements, can offer opportunities for tactile exploration and sensory discovery.



Furthermore, caregivers can create sensory-rich environments that encourage sensory exploration and engagement throughout the day. This may involve designing sensory-friendly spaces equipped with sensory tools and equipment, such as swings, balance boards, or sensory mats, that provide opportunities for sensory input and stimulation. By embedding sensory-rich experiences into daily routines, caregivers can promote sensory engagement and enhance the overall sensory experiences of seekers, fostering a supportive and enriching environment that caters to their unique needs.

Incorporating sensory-rich experiences into daily routines not only provides seekers with opportunities for sensory exploration and engagement but also promotes self-regulation and enhances their overall well-being. By embracing the sensory preferences and needs of seekers and integrating sensory-rich activities into their daily lives, caregivers can create environments that foster sensory engagement, promote positive sensory experiences, and support the holistic development of sensory seekers.

EXAMPLES OF ACTIVITIES AND TECHNIQUES TO HELP SENSORY AVOIDERS REGULATE THEIR SENSORY INPUT

Tips for providing opportunities for sensory exploration and stimulation are essential for supporting the sensory needs of

seekers effectively. Creating an environment that fosters sensory exploration allows seekers to engage with their surroundings in meaningful ways, promoting self-regulation and enhancing their overall well-being. Caregivers, educators, and therapists can implement various strategies to provide sensory-rich experiences that cater to the unique sensory preferences of seekers.

One key tip is to incorporate a variety of sensory activities into daily routines, offering seekers opportunities for diverse sensory experiences. This may involve incorporating activities that target different sensory modalities, such as vestibular, tactile, proprioceptive, and auditory input. By providing a range of sensory-rich experiences, caregivers can accommodate the diverse sensory needs of seekers and promote holistic sensory development.

Additionally, caregivers can be creative in designing sensory activities that appeal to seekers' interests and preferences. This may involve incorporating sensory materials, such as textured surfaces, sensory toys, or sensory bins filled with various tactile elements, that provide opportunities for tactile exploration and sensory discovery. Caregivers can also create sensory-friendly spaces equipped with sensory tools and equipment, such as swings, balance boards, or sensory mats, that offer opportunities for sensory input and stimulation.

Furthermore, caregivers can be mindful of the individual sensory preferences and sensitivities of seekers when planning sensory activities. By recognizing their specific sensory needs and preferences, caregivers can tailor sensory experiences to suit their unique requirements, ensuring a supportive and enriching sensory environment. Additionally, caregivers can observe and monitor seekers' responses to sensory activities, adjusting the intensity or duration of activities as needed to prevent overstimulation and promote comfort.

In conclusion, providing opportunities for sensory exploration and stimulation is essential for supporting the sensory needs of seekers. By incorporating diverse sensory activities into daily routines, being creative in designing sensory experiences, and tailoring activities to suit individual preferences, caregivers can create environments that foster sensory engagement and promote the overall well-being of seekers. Through these efforts, seekers can thrive and reach their full potential in a sensory-rich environment that meets their unique needs.

BUILDING A ROUTINE FOR SENSORY SEEKERS

UNDERSTANDING THE SENSORY PREFERENCES AND NEEDS OF SENSORY SEEKERS

Understanding the sensory preferences and needs of sensory seekers is a multifaceted endeavor that requires careful observation, assessment, and collaboration. Sensory seekers possess a unique sensory profile characterized by a high tolerance for sensory input and an active response to stimuli.

This means they actively seek sensory experiences to regulate their arousal levels and engage with their environment. Their sensory-seeking tendencies manifest in various behaviors, such as seeking deep pressure, continuous movement, or frequent tactile stimulation. By recognizing and comprehensively understanding these sensory preferences, caregivers, educators, and therapists can develop tailored interventions that effectively meet the individual needs of sensory seekers.

Central to understanding sensory seekers is recognizing the diversity within their sensory profiles. While some seekers may gravitate towards specific types of sensory input, such as vestibular or tactile stimulation, others may exhibit a broader range of sensory-seeking behaviors. Additionally, sensory preferences may vary in intensity and fluctuate over time, making it essential for caregivers to continually assess and adapt their approaches to meet the evolving needs of seekers. By taking a holistic approach to understanding sensory preferences, caregivers can gain valuable insights into the unique sensory profiles of seekers and develop targeted strategies to support their sensory needs effectively.

Furthermore, understanding the underlying sensory needs of seekers enables caregivers to identify the underlying motivations driving their sensory-seeking behaviors. Sensory seeking is often a means of self-regulation, allowing individuals to modulate their arousal levels and maintain a state of optimal alertness. By recognizing the functional significance of sensory-seeking behaviors, caregivers can develop interventions that address the underlying sensory needs of seekers and promote their overall well-being. Through close observation, collaboration with sensory integration specialists, and ongoing assessment, caregivers can gain a deeper understanding of the sensory preferences and needs of seekers, paving the way for targeted interventions that foster engagement, promote self-regulation, and enhance their overall quality of life.

SUGGESTIONS FOR INCORPORATING SENSORY-RICH EXPERIENCES INTO DAILY ROUTINES

Suggestions for incorporating sensory-rich experiences into daily routines are essential for supporting the holistic development and well-being of sensory seekers. Sensory seekers thrive on intense sensory input, which plays a pivotal role in regulating their arousal levels, promoting engagement, and enhancing their overall sensory experiences. By integrating sensory-rich activities into daily routines, caregivers, educators, and therapists can provide seekers with opportunities for meaningful sensory exploration and stimulation throughout the day.

One key strategy is to incorporate a variety of sensory activities that target different sensory modalities into daily schedules. This may involve providing opportunities for vestibular, tactile, proprioceptive, and auditory stimulation through a range of activities and experiences. For example,



As your sensory needs change, so can your solution!

caregivers can incorporate swinging, jumping, climbing, or bouncing activities to provide seekers with opportunities for intense vestibular input. Additionally, providing access to tactile materials, such as sand, water, or textured surfaces, can offer opportunities for tactile exploration and sensory discovery. By offering a diverse array of sensory experiences, caregivers can cater to the individual sensory preferences and needs of seekers, promoting engagement and enhancing their overall sensory development.

Furthermore, caregivers can be creative in designing sensory activities that appeal to seekers' interests and preferences. Sensory-rich experiences can be embedded into various daily routines, such as mealtime, playtime, or sensory breaks, to provide seekers with consistent opportunities for sensory exploration and stimulation. For example, incorporating sensory materials into mealtime activities, such as playing with textured food items or using sensory-friendly utensils, can offer seekers opportunities for tactile stimulation while promoting positive mealtime experiences. Similarly, incorporating sensory-rich play activities, such as messy play, water play, or sensory bins filled with various tactile materials, can engage seekers in meaningful sensory exploration and promote their overall sensory development.

Moreover, caregivers can create sensory-friendly environments that support sensory exploration and

engagement throughout the day. This may involve designing sensory-friendly spaces equipped with sensory tools and equipment, such as swings, balance boards, or sensory mats, that offer opportunities for sensory input and stimulation. Additionally, caregivers can establish sensory-friendly routines and rituals that incorporate sensory-rich experiences into daily activities, fostering engagement and promoting positive sensory experiences for seekers. By integrating sensory-rich activities into daily routines, caregivers can create environments that support the holistic development and well-being of sensory seekers, fostering engagement, promoting self-regulation, and enhancing their overall quality of life.

TIPS FOR PROVIDING OPPORTUNITIES FOR SENSORY EXPLORATION AND STIMULATION

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Pre Conference Workshops: Monday and Tuesday, October 21-22, 2024

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- | | | |
|---------------------------------------|---------------------------------|------------------------------|
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| ✓ AT CONSULTANTS | ✓ UNIVERSITY INSTRUCTORS | ✓ VISION SPECIALISTS |
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Free & Easy Tools

for Tiered Reading Supports in the Classroom

Educational policies in the United States mandate that all learners have access to a general education curriculum (Every Student Succeeds Act (ESSA), 2015; Individuals with Disabilities Education Improvement Act (IDEA), 2004). Additionally, ESSA and IDEA require learners with disabilities to demonstrate proficiency in comprehending text. Recent data shows 3rd-grade through 12th-grade students who receive special education services range from 11.7-18.8 percent proficient with reading (United States Department of Education, 2021). Therefore, making reading content accessible to all learners in the classroom is critical (Zaugg, 2023).

As the U.S. educational system strives toward inclusion, more students served under IDEA spend most of their school day in the general education setting (National Center for Education Statistics, 2022). In focusing on inclusion, some educators may encounter challenges providing access to grade-level content to students whose reading and comprehension are below grade level. Implementing tiered reading in the classroom is crucial for catering to diverse learning needs. This approach acknowledges students possess varying proficiency levels and ensures instructional strategies align with individual abilities. By offering a tiered structure, educators can provide targeted interventions

for struggling readers, challenge advanced learners, and tailor content to meet the unique requirements of each student. This personalized approach enhances engagement, fosters a positive learning environment, and maximizes overall academic growth (Denton et al., 2013). Supporting tiered reading in the classroom empowers educators to address the spectrum of abilities present, fostering a more inclusive and practical learning experience for all students (Stewart et al., 2005). In this article, the authors present four steps educators can use to support tiered reading in any subject area, along with free resources to help modify grade-level reading content to give all readers access to the curriculum.

4 STEPS EDUCATORS CAN USE TO SUPPORT TIERED READING IN THE CLASSROOM

Using the 245-page book “Where the Red Fern Grows,” the lead author used five free resources, [ChatGPT](#), [MagicSchool.ai](#), [Rewordify](#), [Textcompactor](#), [Clusive](#), and [Tar Heel Reader](#), to demonstrate how educators can support tiered reading in the classroom. The italicized text represents the responses from different websites when given the prompt or when content was copied and pasted.



TIFFANIE ZAUGG is PhD. candidate who has forged a career in special education, centered around inclusive technology and a fervent commitment to ensuring equal access to instruction for all learners. Her expertise, honed through roles in academia and practical settings, encompasses developing and implementing innovative educational strategies bridging gaps in learning. Tiffanie's work, deeply rooted in her passion for educational equity, is helping to shape accessible learning environments for diverse student populations.



DR. ERIKA MOORE, Ph.D., is an inclusive specialist and postdoctoral fellow at the University of Central Florida. Dr. Moore specializes in digital equity and inclusion for individuals with intellectual disabilities and ASD.

STEP 1: ASK CHATGPT TO SUMMARIZE A BOOK OR CHAPTER (FOR EXAMPLE, WHERE THE RED FERN GROWS).

ChatGPT is a language model developed by OpenAI. It uses machine learning algorithms to understand natural language and provide responses to questions or prompts given by users. The purpose is to assist with various tasks, including answering questions, providing information, and generating text on multiple topics. Below are examples of some of the commands/prompts educators can provide ChatGPT to produce summarized reading content of a text.

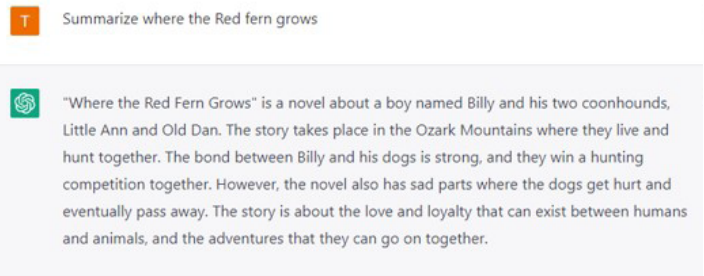


Figure 1 - ChatCPT

When the author instructed ChatGPT to summarize the book *Where the Red Fern Grows*, ChatGPT outputted: *"Where the Red Fern Grows" is a novel by Wilson Rawls that tells the story of a young boy named Billy Colman who lives in the Ozark Mountains. Desperate for his own hunting dogs, Billy works hard to save up enough money to buy two Redbone Coonhounds. He names them Old Dan and Little Ann, and together, they form an inseparable bond.*

The story explores themes of determination, love, and loss as Billy trains his dogs to become the best hunting team in the area. Their adventures and challenges in the rugged landscape are a significant part of the narrative. The novel is particularly noted for its vivid depiction of rural American life and the deep connection between the boy and his dogs.

Tragically, the story takes a somber turn when, after winning a coon-hunting contest, a series of events leads to a heartbreaking conclusion. Both dogs demonstrate extraordinary loyalty and bravery, ultimately leading to their demise. The novel ends with Billy discovering a red fern growing between their graves, a symbol of eternal peace and a reminder of their enduring spirit and love."

When the author asked ChatGPT to summarize Chapter 1 of *"Where the Red Fern Grows"*: In Chapter 1 of *"Where the Red Fern Grows,"* the narrator, an adult reflecting on his childhood, encounters a dogfight while walking home from work in the Snake River Valley, Idaho. The sight of a Redbone hound being attacked prompts him to intervene and save the dog. Afterward, he takes care of the injured dog, and this encounter evokes memories of his childhood and his own redbone coonhounds.

The chapter sets the stage for the story by introducing the theme of a deep connection between humans and dogs. It also hints at the narrator's past experiences with his own dogs, which are central to the narrative. This chapter serves as a prologue to the main story, which is about the narrator's childhood in the Ozark Mountains and his adventures with his beloved hounds, Old Dan and Little Ann. The emotional depth of the chapter foreshadows the poignant and heartfelt story that follows.

With ChatGPT's summarized text, educators can modify the content to the desired reading level or complexity. Changing text complexity changes the text's vocabulary to the specific reading level the educator wants for their students. The changing text complexity allows students reading above or below the reading level of the text to read the content independently with their peers.

STEP 2: COPY AND PASTE THE TEXT FROM CHATGPT OR OTHER TEXT INTO THE YELLOW BOX ON REWORDIFY OR MAGICSSCHOOL. AI TEXT LEVELER-TOOL. ANOTHER ALTERNATIVE IS TO ASK CHATGPT TO REWRITE THE CHAPTER 1 SUMMARY AT A FIRST-GRADE LEVEL.

The first text modifying resource, [Rewordify](#), changes the text complexity of difficult words in English. Enter a sentence, paragraph, whole chapter, or website URL into the yellow box at the top. Click the box "Rewordify text," and you will instantly see the complexity of the text change. The words highlighted in yellow are the words the complexity has changed. [Rewordify](#) also offers learning activities for the learners to learn the words changed.

(See Figure 2)

Here is an example of the Chapter 1 summary provided by ChatGPT copied and pasted in Rewordify: In Chapter 1 of *"Where the Red Fern Grows,"* the (person telling the story), an adult reflect-

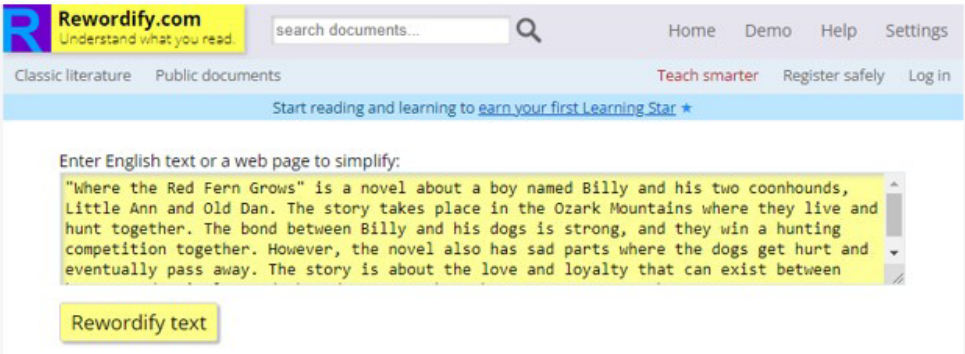


Figure 2 - ReWordify

ing on his (related to the time when a person is a child), meets a dogfight while walking home from work in the Snake River Valley, Idaho. The sight of a Redbone dog being attacked causes/reminds him to get involved/help and save the dog. Afterward, he takes care of the hurt dog, and this meeting reminds people of/brings out memories of his (the time when a person is a child) and his own red-bone coonhounds. The chapter sets the stage for the story by introducing the theme of a deep connection between humans and dogs. It also hints at the (person telling the story)'s past experiences with his own dogs, which are central to the story. This chapter serves as a (first or introductory scene) to the main story, which is about the (person telling the story)'s (the time when a person is a child) in the Ozark Mountains and his fun trips with his loved dogs, Old Dan and Little Ann. The emotional depth of the chapter predicts the emotional and emotional story that follows.

Another text modifier, **MagicSchool.ai**, also changes text complexity by pasting the text into the original text box and choosing the reading level of the text needed for the students. (See Figure 3) Here is an example of Chapter 1 with the reading level changed to a 1st-grade level: *In Chapter 1 of "Where the Red Fern Grows," a grown-up tells a story about when he was a kid. He sees a fight between two dogs while walking home from work in Idaho. One of the dogs is hurt, so he saves it. This reminds him of his own dogs when he was young. This chapter is the beginning of the story. It shows that people and dogs can have a special connection. It also hints that the narrator had his own dogs before. The main story is about the narrator's childhood in the mountains and*

the adventures he had with his dogs, Old Dan and Little Ann. This chapter is important because it shows that the story will be sad and meaningful.

Additionally, **ChatGPT** allows changes to the text complexity of the Chapter. When asked to write Chapter 1 at a first-grade level, this was the response: Chapter 1 of "Where the Red Fern Grows" for a first-grade level: Once upon a time, there was a man who found a hurt dog. The dog was scared and needed help. The man was kind and wanted to make the dog feel better, so he took the dog home and took care of it. The man remembered when he was a little boy. He had two special dogs that he loved very much. Their names were Old Dan and Little Ann. They were the best friends a boy could have. They went on many adventures together in the woods. The man smiled as he thought about his two dogs and the fun times they had. He knew he would tell us all about them. And that is how our story begins, with the man and his wonderful memories of Old Dan and Little Ann.

This scaffold may be the only change learners need. However, if the learner needs more scaffolding, copy and paste the text into **Textcompactor**. Text leveling provides materials for instruction with simplified vocabulary and sentences that are less complex than materials written on grade level. It is essential to ensure the content aligns with the original materials and meets the expectations of the grade level standards (Iowa Department of Education, 2019).

Text Leveler Tool

Take any text and adapt it for any grade level to fit a student's reading level / skills.

Share this tool

Grade Level:

Kindergarten

Original Text

perseverance. He develops a deep connection with his dogs and relies on them not only as hunting partners but also as loving companions. Together, they face adversity, including a legendary and dangerous ghost raccoon.

Tragedy strikes when a mountain lion attacks Old Dan and Little Ann, resulting in Old Dan's death. Billy and Little Ann are devastated, but Little Ann's grief becomes overwhelming, and she dies shortly after. The deaths of his beloved dogs deeply affect Billy, teaching him about the power of love and sacrifice.

In the end, Billy learns to appreciate the memories and experiences he had with his dogs and cherishes the bond they shared. The story highlights the themes of love, loss, and the resilience of the human spirit.

Text Rewritten on Kindergarten Reading Level:

"Where the Red Fern Grows" is a story about a boy named Billy. He lives in the mountains and wants to have two hunting dogs. Billy saves money and buys two puppies. He names them Old Dan and Little Ann. They go on hunting adventures together and become good friends.

Billy learns about loyalty and friendship from his dogs. They help him during challenges and they meet wild animals in the woods. They even face a scary ghost raccoon.

Something sad happens when a mountain lion hurts Old Dan and Little Ann. Old Dan dies and Little Ann is very sad. She also dies soon after. Billy is very sad too, but he learns about love and sacrifice because of his dogs.

At the end of the story, Billy remembers the good times with his dogs. He loves them a lot and the story is about love, loss, and being strong.

Figure 3 - MagiSchool.ai

Text Compactor
Free Online Automatic Text Summarization Tool

[Home](#)
[About](#)

Follow these simple steps to create a summary of your text.

Step 1
Type or paste your text into the box.

"Where the Red Fern Grows" is a novel about a boy named Billy and his two coonhounds, Little Ann and Old Dan. The story happens in the Ozark Mountains where they live and hunt together. The bond between Billy and his dogs is strong, and they win a hunting competition together. However, the novel also has sad parts where the dogs get hurt and eventually die. The story is about the love and loyalty that can exist between humans and animals, and the fun trips that they can go on together.

Step 2
Drag the slider, or enter a number in the box, to set the percentage of text to keep in the summary.

25 %

Step 3
Read your summarized text. If you would like a different summary, repeat Step 2. When you are happy with the summary, copy and paste the text into a word processor, or [text to speech program](#), or [language translation tool](#)

"Where the Red Fern Grows" is a novel about a boy named Billy and his two coonhounds, Little Ann and Old Dan. The bond between Billy and his dogs is strong, and they win a hunting competition together.

© 2010-2016 [Knowledge by Design, Inc.](#)

Figure 4 - Text Compactor

STEP 3 (IF NEEDED): COPY AND PASTE THE TEXT FROM REWORDIFY, MAGICSSCHOOL AI, OR CHATGPT INTO TEXTCOMPACTOR. DRAG THE SLIDER TO THE PERCENTAGE FOR THE PASSAGE SUMMARY.

The free online summarization tool, [Textcompactor](#) allows for copying and pasting text and choosing what percentage of the text should be summarized. It can summarize text from 0-100%.

(See Figure 4)

When using the Textcompactor for ChatGPT's summary of Chapter 1 at 25%, here was the response: *In Chapter 1 of "Where the Red Fern Grows," the narrator, an adult reflecting on his childhood, encounters a dogfight while walking home from work in the Snake River Valley, Idaho. Afterward, he takes care of the injured dog, and this encounter evokes memories of his childhood and his own redbone coonhounds. The chapter sets the stage for the story by introducing the theme of a deep connection between humans and dogs.* Read the summarized text to determine if the summary is correct.

Here is an example of taking ChatGPT's first-grade level text from Chapter 1 and summarizing it down to 25%: *Once upon a time, there was a man who found a hurt dog. The man was kind and wanted to make the dog feel better, so he took the dog home and took care of it. The man remembered when he was a little boy.*

How easy was that? With a few copies and pastes, the educator now has different levels of support for grade-level content text for the classroom. All the educators need to know is how to copy and paste and the reading levels of their students.

STEP 4 (IF NEEDED): PROVIDE THE TEXT WITH TEXT-TO-SPEECH SUPPORT.

Now the text complexity and length have been changed; where should the text be put for students to read? There are numerous places where one could copy and paste the final text. Educators could paste it into a document or presentation slides, but what if the student needs to be able to read it with their ears? There are numerous options for text readers; however, we



will focus on these two free websites: [Clusive](#) and [Tar Heel Reader](#).

Clusive is a website where educators can upload text for students to read. The teacher can see the students' active reading time. The student can share their reactions to the readings, which the teacher is able to see, along with customizing knowledge questions for the students. The students can customize Clusive with the customizable reading tools, word look-up, and the reading level best suited for them.

Tar Heel Reader allows teachers to create books from copied text. While this is a free website, the educator must email tarheelreader@cs.unc.edu for the access code for writing books. There is no access code for the use of already created books. Tar Heel Reader has a vast collection of Flickr images and allows for the upload of personal images. Another great feature of this site is its switch accessibility, which allows students who use switches to activate the computer or turn the book's pages.

(See Figure 5)

Figure 1 visually shows how the tools fit within the Response to Intervention tiers. Moving from the bottom tier (Tier 1) to the top tier (Tier 3) in the Response to Intervention (RTI) model involves a progressive increase in the intensity and individualization of support based on the student's needs. Here is how the progression typically works:

Tier 1 (Universal Instruction): All students receive high-quality, research-based instruction in the general education classroom. Regular assessments and screenings identify students who struggle to progress at this level (IDEA, 2017).

Tier 2 (Targeted Interventions): Students not adequately responding to Tier 1 instruction receive additional support. This includes small-group interventions targeting specific skill deficits. Educators closely monitor students' progress and adjust interventions as needed (IDEA, 2017).

Tier 3 (Intensive Interventions): Students who continue to struggle despite Tier 2 interventions receive more intensive,

individualized support. Tier 3 intervention may involve one-on-one instruction or specialized interventions. The focus is on addressing significant learning or behavioral challenges (IDEA, 2017).

The movement through these tiers is dynamic and data-driven, based on regularly monitoring student progress and response to interventions. The goal is to provide the right level of support at the right time to ensure each student's academic success.

ACCESSIBILITY AND ARTIFICIAL INTELLIGENCE IN EDUCATION

With just the simple commands of copy and paste, the possibilities of creating accessible reading content are endless. Leveraging AI to support tiered reading in the classroom presents an innovative approach to personalized education. By harnessing artificial intelligence, educators can analyze students' reading abilities, track progress, and dynamically adjust instructional content. AI algorithms can identify students' strengths and challenges, allowing for the creation of tiered interventions catering to diverse learning needs. This technology facilitates real-time adaptation, providing targeted support for struggling readers while offering enriched materials for advanced learners. Integrating AI in tiered reading enhances efficiency, promotes engagement, and ensures a more tailored and inclusive educational experience, ultimately optimizing academic outcomes for every student.

Meanwhile, new and innovative technology, such as artificial intelligence (AI), has caused many educators to become concerned about the quality and integrity of students' work. Educators can not ignore AI's effectiveness in fostering a more equitable learning experience for students with disabilities. AI and machine learning have transformed education by fostering personalized and accessible teaching and learning experiences. Reframing our beliefs about machine learning has opened op-

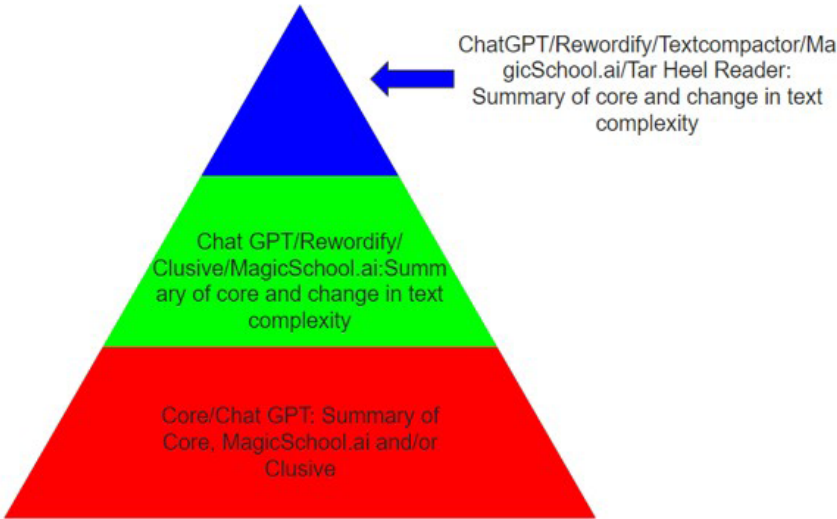


Figure 5- Tiered Supports Tools

portunities for developing accessible and efficient reading supports for the 21st-century inclusive classroom.

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Switch It Up in a NY Minute!

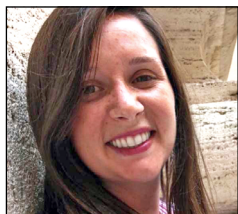
Teaching Students with Complex Communication Needs to Use Switches



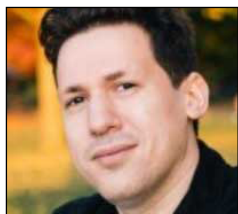
GRETCHEN HANSER, MS, OTR/L, PhD has worked in the field of assistive technology and literacy for students with significant disabilities for over 25 years. She is an educator and an occupational therapist. Her primary focus has been on augmentative and alternative communication and literacy for students with the most significant disabilities. She has worked in a variety of educational settings developing model classrooms, developing school based assistive technology centers, providing teacher and related service provider trainings, participating in assistive technology assessment teams and working directly with students and staff in the classroom. Gretchen has taught university classes and presents nationally and internationally on these subjects. She is currently the Director of Assistive Technology and Literacy Instruction at the International Academy of Hope in NYC.



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INTRODUCTION

Students with Complex Communication Needs (CCN), significant physical disabilities, and Cortical Vision Impairment (CVI) have profound challenges with communication, mobility and physically accomplishing basic school tasks. Throughout the day, they may be “observers from the bleachers”, having little opportunities for true, independent participation and access to activities. Figuring out how to reverse this and put students in the driver’s seat might appear complex at first, but it is a very do-able process once you breakdown the components! When it comes to learning, finding what is meaningful for these students is key to unlocking their potential. Yet, despite our best efforts, we sometimes find ourselves facing roadblocks. We have all most likely experienced this. Is your student showing disinterest in using switches? Does your student bang and throw switches? Are you struggling to teach them the essential skills of scanning on an augmentative and alternative communication (AAC) device? Perhaps you’ve been stuck in a rut, using the same tired switch games year after year, feeling like creativity has hit a dead end. If any of this sounds familiar, fear not! This article is here to offer a fresh perspective with solutions to help you **"SWITCH IT UP"** and to reignite enthusiasm in your students and your classroom.

GUIDING PRINCIPLES

Successful teaching of switch access is not just about the activity and the AT, but it’s also about the professionals’ being on the same page with the important beliefs and knowledge.

NO COGNITIVE PREREQUISITES: Professionals may believe that students need to have a certain prerequisite set of cognitive skills for using switches. Students may bang, slap and attempt to throw switches. This often leads to professionals thinking that these students “aren’t ready” for switches or that they need to work on cause/effect. These students typically end up getting access to only “cause/effect,” activities devoid of social interactions and real-life context – which is what they really need to build understandings.

WATCH OUT FOR A TESTING AGENDA: Professionals may focus on accuracy and timing of switch access in a mechanical trials-based manner. This type of testing agenda where students have to hit switches on demand does not allow students to develop the thought processes and problem-solving skills which are necessary for developing the motor planning skills needed for switch access. Instead, make switch activities authentic and based on real life, motivating interactions. While it is important to track progress, gathering data can be done through naturally occurring activities.

CORTICAL VISION IMPAIRMENT (CVI): *Many of our students have CVI.* CVI is a complicated, and often unrecognized diagnosis, and each student has different visual abilities and needs. Some students may benefit from switch activities with black backgrounds with simple neon-colored items with slight animation to help engage students’ vision. Whatever their needs are, don’t let vision be a gatekeeper to engaging in switch activities. Students with CVI may have difficulty looking and listening simultaneously-especially in busy, loud classrooms. Bottom line is...don’t force students to use their vision for activities. If it is already hard to use a switch, decrease the visual demands. Choose activities that have auditory and tactual components so that vision is not necessary. Talk to your Teacher of the Visually Impaired (TVI) for guidance about students’ vision needs, as well as the visual presentation and positioning of switch activities.

FIND THE RIGHT ACCESS METHOD: *Students with significant physical issues often end up with the wrong access method to access AAC device and basic school tasks. Many students struggle to use an AAC device with their hands or eye gaze and can point to just a few individual messages. Frequently, those students would have access to far more vocabulary if they could use switches for scan through the messages. Another common scenario is when students are struggling to use 1 switch with high reaction time demands when they should be learning to use 2 switches! Professionals need to use the access framework to determine the access method that gives the students access to as much vocabulary as possible-with room to grow.*

BALANCE THE PHYSICAL & LANGUAGE DEMANDS: When struggling switch users are faced with learning to use switches with AAC devices and during academics, they often fail because, the cognitive/language demands AND the physical demands – simultaneously – are far too high resulting in student shut down. Struggling switch users will have far more success when these skills are broken apart. *“Learning motor skills requires conscious effort and, therefore, occupies the individual’s working memory until it reaches a level of automaticity. The brain’s working memory can only focus on a limited amount of information at one time. Anything that is not automatic occupies working memory, which limits available working memory for learning new tasks. It is now widely accepted that individuals can learn skills in parallel,” (Burkhart, 2018).* Focus on building the physical skills for switches during fun, failure free motor activities with minimal language demands. During lessons with heavy language demands, such as using AAC devices/academics, minimize the physical demands so that students can devote their energy and focus to the content. A possible solution in these situations is partner assisted scanning (PAS). PAS can be an invaluable strategy for giving struggling scanners access to AAC. During PAS, the communication partner verbally and/or auditorily lists out choices for the student. When the student sees and/or hears what they want,



the student signals the partner using whatever physical method is the easiest. You might setup switches connected to a voice output communication aid (VOCA) with messages such as “that’s the one” or “no, not that one.” However, if the student is having trouble with switches, it’s best to have the student use unaided communication strategies, such as gestures and/or facial expressions. Keep in mind, when teaching language, you want to focus on communication—not accurate switch use. With the motor demands at a minimum, professionals can even use PAS to teach students the vocabulary and layout on SGDs. This allows students to develop a mental map of their vocabulary to make it easier to layer on physical switch access component. The other bonus to PAS is that it can also be done auditorily using partner assisted AUDITORY scanning (PAAS). This is an ideal method for students with vision issues as it requires no vision. See Linda Burkhart’s work for a wealth of resources on students with complex needs and PAS and PAAS: <https://lindaburkhart.com/>

PLAN SWITCH OPPORTUNITIES THROUGHOUT THE DAY:

One hour of switch work a day isn’t going to be enough to help our students develop the physical skills for switch access. Our students have extremely challenged motor skills and will need time to develop the movement and the fluency for using switches. According to the Fitts and Posner stages of motor learning, it takes ongoing repetitions to learn a motor pattern with automaticity where the student can do the movement without thinking about it. Therapists determined that once movements performed by children with cerebral palsy were automatic, it became easier for them to process the cognitive and language components behind switch use (Beauchamp et al., 2018). According to Burkhart (2004), new neurological connections that lead to learning these movements to the level of automaticity require thousands of repetitions that include purpose and variation.

MODEL, MODEL, MODEL: Part of developing motor planning is knowing what the activity is and what the outcome looks like. The adults need to model switch use. Once the adult models, there should be no requirement that the student copies the movement. Adults need to model and move on to show the student how the activity works.

GROWTH OCCURS OVERTIME: Take into mind that our students may not initially be proficient with using switches - this takes time and teaching! Some students might take a couple years to become a reasonable scanner. For these students, it is not necessarily about immediate, accurate, independent switch use to access AAC. It’s about students learning to communicate with robust vocabulary on an AAC system, regardless of the access method.

LET STUDENTS MAKE MISTAKES: Given our students’ limited experiences with switches, it is important to give them ample opportunities to experiment and make mistakes in order to build problem solving skills which ultimately contributes to motor

planning. This concept is no different than the opportunities that children without disabilities get when learning to use new tools.

THE POWER OF PERSONALLY MEANINGFUL: *Start out with things that students care about. This type of intrinsic motivation drives attention and engagement which leads to the development of motor planning. Learning to use a switch may be hard, and even abstract for many students. The best way to teach this abstract concept is to layer it on top of something students already know.*

FOCUS ON SOCIAL INTERACTIONS & FOSTERING ENGAGEMENT: *Be careful about parking students at the computer on their own with switches - unless the student really wants that.* For students who need more feedback, success of learning rests on the social interaction in real life contexts. Involve peers! When planned correctly, *switch activities should be fun, interactive and a great way to foster relationships!*

ATTRIBUTING MEANING: *This is something we do naturally for young children when they do something random and make errors. It is natural that young children would make errors because they don’t know enough about what they are doing. Adults respond to children’s random attempts and errors to teach them what it means. Adults tell the child what they saw and then they make a connection between the child’s behavior and the something real in the activity. It’s important to do the same thing with our students using switches who are learning so many new skills! For example, a student briefly looks at the computer with a game and then look down at switch and starts to bang it. Adult response: “I saw you look at the computer screen. Oh look-there is a game there! I wonder if that is what you were thinking about! Look- we can press the switch to play it! Let’s do it together.” Over time, attributing meaning to students’ random behaviors builds their conceptual knowledge and awareness about their actions.*

USE A FRAMEWORK AS A GENERAL GUIDE: It’s important to not have switch activities be drill based and mastery based. Students need to be exposed to lots of different types of activities. Our students need systematic teaching which starts with a purposeful activity, knowing the type of motor demands and language demands of the task and how it needs to be graded for the student. The Stepping Stones Framework to 2 Switch Scanning (Burkhart, 2018) is an invaluable resource for students who will eventually be doing switch scanning to access AAC. It breaks down the cognitive and motor concepts of learning to use switches with suggestions for activities based on the students’ needs. To see Linda’s presentation, go to ableU (from AbleNet) www.youtube.com/@ableu InclusiveTLC has an extensive Switch Progression Roadmap which can be downloaded from their website. It is a guide that describes the different physical skills needed for switch access, along with a wide range of appropriate activities and the needed AT.

THE TOOLS

ACCESS TOOLS

There are SO many different types of switches, either commercially available and DIY. They are all different in regard to size, shape, color, strength requirements, travel, sensitivity, auditory feedback, tactile feedback, visual feedback and durability. The key point is that all of our students have different physical abilities and sensory needs. Students need to be carefully assessed for the types of movements they can make, along with their strength, sensory needs, timing, endurance and personal preferences. Once these things are considered, the appropriate switch should be selected to match the students' needs. This can be done informally through professionals' observations. This is not a one size fits all approach!

SWITCH MOUNTS

In many cases, students will need a mount to position the switch in the spot where the student can move. For example, if a student can turn their head, a mount would be used to position the switch next to their head where it is easiest for them to activate. There are many different types of mounts and finding the right one makes all of the difference.

INFUSE EMERGENT LITERACY: Many of our students have had very limited opportunities, if any, to engage with writing and exploring books as they can't physically hold them. Many of them are "emergent" readers and writers and need to have the early literacy opportunities similar to young children before they start school. We know those early emergent experiences pave the way for conventional literacy when children enter school and learn to formally read and write.

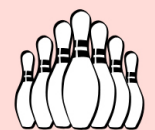
Emergent literacy is meant to be the play of young children- we can do the same thing with our students, but with switches to experiment with books and writing with alternative pencils! The beauty of emergent literacy is that it's about exploration which fits the needs of our students who are exploring using switches! No correct answer or accuracy is needed!

At iHope, we have found that all of the above beliefs are the foundation for teaching switch use. Now, let's turn to tools and activities for getting your students going! From play and art to games, toys, cooking, books, apps, alternative pencils, practical jokes, and DIY tips, we'll explore creative avenues to engage students and enhance their AAC learning experience.

WALKING TOYS



Art! Dip the toy's feet in paint and the student can use their switch to make the pig walk and paint on paper! OR, can attach a thick marker onto the side of the toy for it to drag across paper to make lines.



Bowling! Line up some pins or blocks and have the toy walk to them and knock them over.



Delivery! Wrap a Velcro strap around the toy and Velcro on different tools for carrying things, such as a small plastic cup or a small envelope. Even pass notes in class!!



GENERAL TIPS

Students eventually get tired of simply turning this toy on/off, so why not use this walking toy as part of a really purposeful activity!



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POUR CUP



Enabling Devices



Michael Dicipinigaitis

GENERAL TIPS

Set-up the adaptive pour cup in the visual field that is best for your student. You can further adapt pour-cup activities by adding a brightly colored cup, which can be attached with Velcro or an elastic band in place of the clear cup. You can also add colored tap to the clear cup to increase your student's visual attention. To add auditory feedback, pair the pour cup with the “toy setting” on a Step by Step. When paired with auditory feedback, this allows the pour cup to move for the duration of the audio recording with just one switch hit. This can be helpful for students who have challenges sustaining hold to on their switch for extended periods. This sustain hold can also be achieved with a Switch Latch Timer.

ACTIVITY IDEAS



The Pour cup can be used for a variety of **art activities**. Try pouring paint onto a canvas! Create sand art bottles or necklaces. Make custom candles by pouring in layers of paraffin wax beads. Design one of a kind soap by pouring colored oils into molds!



Cooking! The Pour Cup is perfect kitchen tool. Follow recipes or make your own culinary creation. Take cooking a step further by hosting your own drink stand. Pour lemonade, juice or ice tea for friends, family and your community. For student's who receive their nutrition via a g-tube use the pour cup with a funnel to increase a your students autonomy.



Don't forget about your furry friends! A pour cup is perfect for feeding a family pet. It can help with other **chores** like watering plants or changing the water in a fish bowl!



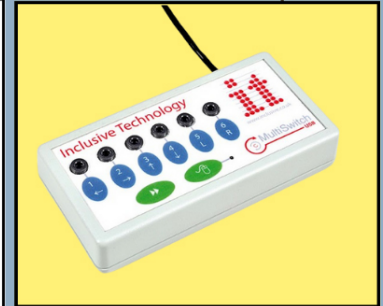
COMPUTER SWITCH INTERFACE



Remember, many of these students have not experienced the ability to plow through books independently-the way that little kids learn how to use books. So, you might see lots of “speed” reading and switch banging to turn pages. You’ll need to work to find books that are REALLY personally meaningful and motivating to your students to catch their attention and interest. For students with CVI, use books with audio read back. For students with earlier phases of CVI-don’t make them look at the book. Focus on building their ideas of real stories through auditory channels.



Hitch 2.0 by Ablenet



Inclusive Multiswitch



Tarheel Reader
www.tarheelreader.org

Free website full of age respectful, simple books about a range of categories! Written by teachers, therapists, students + more! It is switch accessible and has many other access features, such as changing font/page color for students with vision issues. Can create favorites pages. And wait there’s more! You can download books as PowerPoints to create even more customizations for students with CVI.



Epic Books
www.getepic.com

Subscription website with a large range of books- including kids’ National Geographic magazines. Students can turn pages and pause/play the audio with their switches.

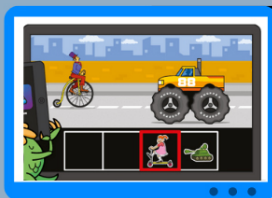
Read to Me books: Switch can be setup to pause/play audio. Switch Equivalent: Mouse Click
All Other Books: student can turn pages. Switch Equivalents: Left Arrow & Right Arrow



Shiny Learning
www.shinylearning.co.uk

Subscription based website with excellent switch accessible games. They have free games as well. Balloon Pop is a favorite game-see how many balloons your students can pop in 2 minutes!

Switch Equivalents: space & enter



Help Kidz Learn
www.helpkidzlearn.com

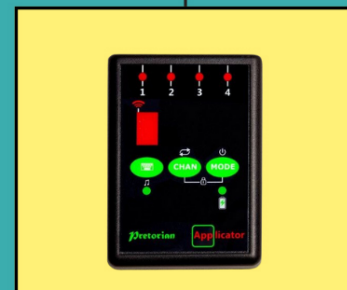
Subscription based website with over 100 different games which can be accessed through different physical methods, such as direct pointing, mouse, eye gaze and 1-2 switches. Many of the games have black backgrounds, simple high contrast graphics, animation and can be appropriate for students with CVI.

Switch equivalents: space & enter

iPad SWITCH INTERFACE



Tapio
Origin Instruments



Applicator
Inclusive Technologies



Blue2
Ablenet



GENERAL TIPS

Utilize the accessibility features built into Apple products. By creating and using **recipes**, you can use switches for activities beyond scanning! A **recipe** allows for a switch to control one specific preprogrammed action (i.e., scrolling or tapping on a specific point on the screen). This simple feature provides switch users access to tablet or smart phone navigation. From here the activities are endless!

When making a custom recipe keep the orientation of your iPad in mind (horizontal vs vertical) as the target spot may change with different orientation.

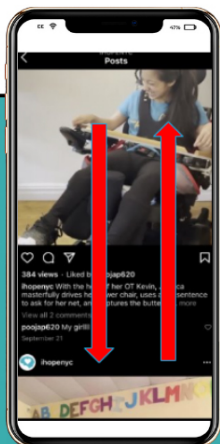
Use a piece of tape to mark out the target spot for yourself.

A Tapio is a great interface as it plugs directly into the iPad. This is helpful for environments where there are multiple students using blue tooth functions and for caregivers who might find Bluetooth connection challenging. If you're using a Tapio you can change the positioning of the small dip switches on the back to turn off repeated hit feature if it takes your student a little extra time to release from the switch.

ACTIVITY IDEAS

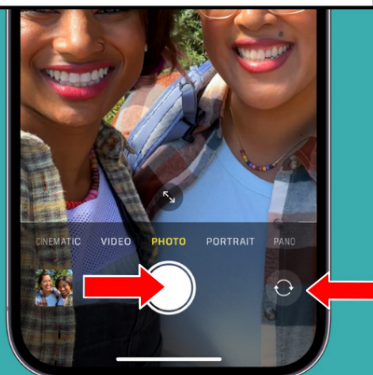
SOCIAL MEDIA

Who doesn't love social media? Using an iPad switch interface and **recipes** programmed for scrolling, switch users can spend hours on Instagram or TikTok! A **recipe** programmed for scrolling can also be used for online shopping and browsing photos.



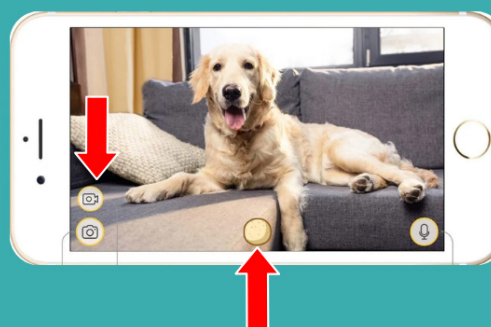
PHOTOGRAPHY

SAY CHEESE! Photography is for everyone! Switch adapted photography can be used during photo booths at special events, on field trips, or for everyday fun. You can program a photo **recipe** using two switches- one switch to take a photo and a second switch to flip the camera to selfie mode!



FEED YOUR PET!

Pet lovers with interactive doggy cameras like Furbo, can send their four legged friends treats from a far with the right technology. Program a recipe to press on the "throw treat icon", "picture icon", or "voice message" button to say hi to your pet from school or work!



POWERLINK



Ablenet



GENERAL TIPS

Besides, simply turning the lights on/off, there are endless activities you can do with a pour cup! Keep in mind that anything you plug into an outlet can bring access to switch users. Powerlink's have different settings which can be used for different activities. The direct setting turns on an appliance for as long as the switch is activated. The latch setting turns the appliance on with one switch hit and stays on until an additional switch hit turns it off. You can also set an appliance to stay on for a designated number of seconds or minutes on the timed setting! Remember that your appliance needs to be turned on in order to work with Powerlink. If your appliance has a on button that needs to be help, consider tapping it down to keep it toggled on!

ACTIVITY IDEAS



Plug your blender, hand mixer or coffee grinder into the Powerlink and transform your home with an accessible kitchen. This can be a great way for students to puree their own food!



A Hair dryer is great for drying and styling hair but can also be used for games and experiments. Create your own Pinball-using hairdryers as flippers or predict how far a blow dryer will blow an item.



You may not think of a Leaf blower as an adaptive sporting tool but with a Powerlink it can be used to launch balls into a hoop for an adaptive basketball game!

Scissors



GENERAL TIPS

Electric scissors can be used with a battery interrupter and switch for so many activities. Remember that the scissors will need to be turned on in order of them to work with a switch. While you normally squeeze the scissors to turn them on you can tape them in the squeezed position! You can obviously use electric scissors for so many craft activities- collages, paper rings, decorations etc.

ACTIVITY IDEAS



What's more motivating than giving a haircut? Scissors can be used to trim a doll's hair or give a hair cut to a friend or parent.



Involve students in school events by holding ribbon cutting ceremonies! Cut a ribbon to start the parade, unveiling openings of new school spaces or openings of student run stores.



Work on ADL or vocational skills by cutting open packages and cutting out labels!

OTHER "MUST HAVE" ACCESS TOOLS

Timer Boxes: Some activities require quick switch hits and releases, like reading books. Other activities require students to hold down the switch for an extended period of time, like when cutting out a picture using switch adapted scissors. If holding a switch down is challenging for a student, a switch latch & timer box allows you to set a designated amount of time the tool will stay on with just one switch hit. These can be found www.adaptation.com.

Battery Interrupters: There are many wonderful vendors that sell toys which are already switch adapted, such as Adaptive Tech Solutions, Inclusive TLC, Adapted Creations on Etsy and Enabling Devices. However, you can also buy a battery-operated toy and switch adapt it yourself! You can do this with a "battery interrupter." You can buy a battery interrupter online or get one from a local Makers' group. There are also DIY directions online.

AT for the Activities

While switches and other technologies allow open doors to

physical participation, they are not the sole determining factor of effectiveness. Ultimately, what holds the most significance is the meaningfulness of the activities and the social interaction. You don't need to have a lot of fancy AT to get started...and it doesn't all need to be on the computer! At iHope, our program has a basic set of AT tools, but we use them for MANY different purposes. We are going share our favorite classroom tools, from walking toys, computer and iPad switch interfaces, alternative pencils, PowerLink, to switch adapted scissors, pour cups, ball throwers and other toys. Once you start seeing these ideas- you'll come up with many more of your own!

CONCLUSION:

We hope this article inspires your team to 'Switch it Up'. Taking the time to understand your students' unique needs, motivations and interests can spark countless ideas for accessible activities. The enthusiasm for discovering new ways to engage students becomes infectious among team members, fostering growth for both students and those who support them!



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MORE WAYS TO...

SWITCH *it up*



SUPER SOAKER

Aside from more obvious uses, adapted squirt guns can be used to make beautiful art by spreading paint over a canvas!



ALL TURN IT

The All Turn from Ablenet! This spinner can be used for making random choices and playing all sorts of games. The possibilities are endless! Change out the number overlay and add your own choices on the spinner.



SPIN ART

Make beautiful pieces of art! PLUS take it up a notch by turning it into a two switch activity by using the pour cup to pour the paint, while it's spinning.



PIE IN THE FACE

With Pie in the Face, you never know which switch hit will launch the pie! **WARNING:** It's not a game for the faint of heart.

It can also be used to launch ping pong balls into a bowl.

ALTERNATIVE PENCILS



Students who are learning to use switches typically have great difficulty holding & fluently writing with a conventional writing tool such as a pen or a pencil. They need an alternative to this...an "alternative pencil!"

- An alternative pencil contains the full alphabet. For students who have no way to write and are learning to use switches, an alphabet flip chart is a good place to start.
- Flip charts/flip books are generally accessed via partner assisted visual and/or auditory scanning. The helper presents the letters to the student and the student indicates what they want. When the student selects a letter, the adult writes it down.
- A flip chart or flip book should be designed based on the students' physical, receptive language and vision skills. **Vision is NOT required when writing with these.** The alphabet can be very visually complex. Many students with CVI do NOT look at the letters and instead write based on auditory input.



For 3D conceptual support, can add hot glue or other textures to the letters. Adhesive back felt or foam letters also work well.

Writing Tips: For emergent students who have never experienced writing, let them experiment. They may bang the switch and pick the same letter over and over. That's OK!

Consider how young children without disabilities learn to write. They get tons of opportunities to "scribble" and explore. It's important to give our kids the same thing.

Get a motivating reason for the student to write. Don't focus on spelling or copying! Make it fun. Make it personally meaningful. Make something happen because of their writing.

See the Center for Literacy & Disability Studies, UNC-Chapel Hill for more info!
www.med.unc.edu/healthsciences/clds/

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