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Accessible STEM Resources

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This document is designed to support instructors who are interested in getting started creating accessible STEM resources. It lists a number of background resources on digital accessibility broadly and then specific tools and skills that will help with implementation.

Background on Digital Accessibility

Getting started with digital accessibility and making online resources more accessible.

- [What is Digital Accessibility?](#) | Deque Systems (video 2:40 min, English cc) - “Digital Accessibility is the practice of making digital documents, web and mobile apps accessible to everyone... including people with disabilities.”
- [How People with Disabilities Use the Web](#) | W3C Web Accessibility Initiative - “This resource introduces how people with disabilities, including people with age-related impairments, use the Web. It describes tools and approaches that people with different kinds of disabilities use to browse the Web and the barriers they encounter due to poor design. It helps developers, designers, and others to understand the principles for creating accessible websites, web applications, browsers, and other web tools.”
- [Web Accessibility Perspectives Videos](#): Explore the Impact and Benefits for Everyone | W3C Web Accessibility Initiative (videos English cc and audio described) - “Web accessibility is essential for people with disabilities and useful for all. Learn about the impact of accessibility and the benefits for everyone in a variety of situations.”

Speaking and Reading Math Aloud

Making digital math that can be read aloud by screen readers and other assistive technology is the first step to creating accessible STEM materials. But, digital math is not necessarily accessible math. For example, Microsoft Equation Editor is not fully screen reader compatible. It produces math as images that would then need a text alternative (image description) in order to be accessible. EquatIO, MathType and MathJax are alternative easy to create math that can be read aloud. Use the resource below to develop your understanding and skills of how to create digital math that is natively accessible.

- [Accessible Math](#) | DIAGRAM Center - “Making math accessible means providing multiple ways for students to interact with math content, including equations, graphs, and other notation. Below are some resources developed by the DIAGRAM Center to

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address issues in accessible math. We continue to focus on math as a core area for development and will add new tools and resources as they become available.”

- [EquatIO](#) | TextHelp - “EquatIO is a math creation and manipulation application that allows you to create, edit, insert, and read aloud digital math in Microsoft Word, Chrome, and the Canvas learning management system.”
- [MathType](#) | Wiris - “Easily write math equations from anywhere! Your solution to creating quality math formulas in your documents and digital content.”
- [MathJax](#) | MathJax - A JavaScript display engine for mathematics that works in all browsers. MathJax provides tools to transform your content from traditional print sources into modern, accessible web content and ePubs.
 - [MathJax a11y tool demos](#) (English cc) - A series of videos demonstrating MathJax a11y on YouTube.
 - [Getting started with MathJax](#) - Instructions for integrating MathJax with your content.
- [MathTalk™ Speech Recognition Math Software](#) - MathTalk is a unique speech recognition mathematics software which allows the user to voice math.

Creating Accessible Images

STEM in addition to having a multitude of equations that need to be made accessible, also has a significant number of images. Below are some resources that help practitioners expand their skills and leverage existing resources for accessible STEM images.

- [Chemistry Examples](#) | Progressive Accessibility Solutions - Examples of accessible chemical structure diagrams
- [Imageshare](#) | Benetech - “Library of 3383 accessible STEM media resources.”
- [Analytics Company Introduces Free Browser Extension that Converts Graphs and Charts into Sound - COOL BLIND TECH](#) - a free browser extension that converts graphs and charts into sound, allowing users to create digital maps that can be explored using non-visual methods.

Also see [SAS Graphics Accelerator](#) in the Advanced Resources section.

- [Effective Practices for Description of Science Content within Digital Talking Books](#) | National Center for Accessible Media - This website provides both general guidelines that should be followed when describing STEM images and many examples of how the guidelines can be implemented.

Leveraging LaTeX

Use tools like LaTeX and others to convert content to more accessible formats.

- [Getting started with LaTeX](#) (video 35:25 min, English cc) - “In this video, you will get a quick introduction to LaTeX—what it is, why you might want to use it, and what some of its features are. By the end of the video, you will be ready to create your own beautiful LaTeX documents.”
- [Pandoc](#) - a multiformat document converter. Can be used to convert LaTeX to HTML.
- [Text4ht](#) - “Text4ht is a system for converting documents written in TeX/LaTeX/ConTeXt/etc. to HTML, various XML flavors, braille, etc., optionally using MathML.”
- [AsciiMath](#) - a math markup language that works with MathJax (preferred) or an AsciiMath -> MathML converter
- [MathML for Accessible Math Markup](#) - MathML is a markup language that provides semantic understanding and proper syntax to assistive technologies like screen readers.

Accessibility Checklists

- [STEM OER Accessibility Framework and Guide: A Practical Guide for Curators and Authors of STEM Open Educational Resources](#) - Guide and checklist organized by WCAG criteria: perceivable, operable, understandable, and robust plus STEM-specific applications. Includes a list of resources and tips for applying the framework.

Professional Development on STEM Accessibility

Professional development and networking resources for learning new skills and communicating about STEM accessibility.

- [CAST: UDL Science Notebook: Building Teacher Skills](#) - universal design project SNUdle (Science Notebook in a Universal Design for Learning Environment) for improving teacher skills and student abilities using inquiry science techniques
- [University of Washington Alliance for Access to Computing Careers](#) - “High school, college, and graduate students with disabilities can connect with mentors and professionals to learn about internships and other opportunities in computing fields.”
- [Home | SciAccess: The Science Accessibility Conference](#) - “dedicated to promoting innovative approaches to equitable science access” and addressing “societal and educational barriers to science faced by students, professionals, researchers, and members of the public who have disabilities.”

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- [Professional Development | Independence Science](#) - webinars “by an access technology company that specializes in the development of text-to-speech enabled scientific data collection interfaces to empower print-disabled students to have more hands-on quantifiable learning experiences individually or as part of laboratory teams in science laboratory learning environments.”
- [Teach Access](#) - “an active collaboration among education, industry, and disability advocacy organizations to address the critical need to enhance students’ understanding of digital accessibility as they learn to design, develop, and build new technologies with the needs of people with disabilities in mind.”

Advanced Resources

These resources are for the more advanced user in STEM accessibility that may be useful for topics outside of the scope of this document.

- [Code Jumper](#) - program that teaches students who are blind or visually impaired computer coding.
- [Accessible Coding: What's Out There? | Paths to Technology](#) | **Perkins eLearning (blog)** - In this short article [we'll] look at three sites dedicated to teaching code – Codecademy, Free Code Camp and HTML Dog - with particular focus on how usable they are for people with vision loss.
- **Accessibility at SAS | SAS data analytics software company**
 - [SAS corporate accessibility statement](#)
 - [SAS YouTube channel with accessibility training series](#)
 - [SAS® Disability Support Center](#): resources for SAS users with disabilities
 - [SAS Graphics Accelerator](#) - “SAS Graphics Accelerator enables users with visual impairments or blindness to create, explore, and share data visualizations. It supports alternative presentations of data visualizations that include enhanced visual rendering, text descriptions, tabular data, and interactive sonification. Sonification uses non-speech audio to convey important information about the graph.”

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