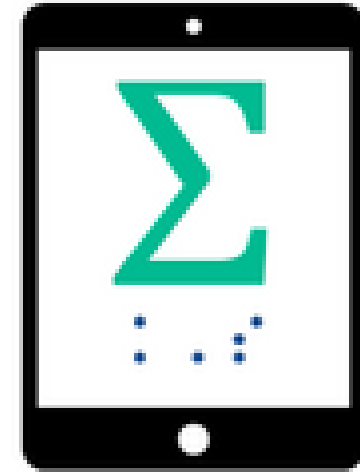


Digital Math: Workflows from Teacher to Student and Student to Teacher

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Perkins
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TEAM

TECH EQUITY AND ACCESS IN MATH

Objectives



Participants will

- Describe at least 2 workflows for producing accessible math.
- Identify 3 ways students can express their math learning.
- Describe 3 factors that may influence workflows.

Definition of Digital Workflow



- Refers to an efficient electronic system for accessing, processing, sharing, and storing work.
- Can reduce a student's reliance on others for accessible materials.
- Is tied to assessment and goals and aims to increase a student's independence and self-advocacy.
- Addresses needed skills for future access to work environments and higher learning.



- Planning tools
 - [Digital Math Workflow Planning Tool by Sara Larkin](#)
 - [Handout Digital Workflow Planning Tool by Jessica McDowell](#)
- Use to help teams
 - Determine possible digital workflows.
 - Assist with establishing priorities.
 - Plan how math content will get from the teacher to the student.
 - Plan how math work and answers will be shared from the student to the teacher.
 - Plan for what will take place when content is not accessible.

Factors Impacting Workflow



- Accessibility of apps and digital math content used by the school
- Availability of technology
- Skills of the TSVI and student
- Learning needs and preferences
- Age of the student



- PreK – Kindergarten
 - Using apps on a tablet
 - Learning gestures
- Elementary
 - Moving toward notetakers or refreshable braille displays
 - Working on keyboarding skills
- Middle school and high school
 - Increasing computer skills and web navigation
 - Learning how to use talking, notetaker, or web-based calculators

Don't Forget...



- It is important to promote strong TECH skills, so students can become more independent.
- There is still a place for manipulatives when students are first learning a concept or struggling with a concept.
- They say a picture is worth a thousand words, so there is still a need for tactile graphics when learning, teaching, or reinforcing math skills.
- There is still a need for the Perkins braillewriter when solving certain types of problems that involve multiple steps.



- Google documents still have a lot of accessibility issues with math expressions and equations.
- It is best to upload Microsoft Word documents into Google Drive rather than using Google documents.
- It is easier for students to use the Google Drive Desktop application so Google Drive will show up in File Explorer and Microsoft Word documents will open in Word instead of Google.
- If students upload Microsoft Word documents with math, it is important that the teacher not be in preview mode when viewing the math.



- Only as accessible as the content uploaded.
- Consider website and document accessibility.
- PDF files often decrease the accessibility of math content and traditional OCR frequently doesn't recognize math and pictures correctly.

[Demo of opening the same file saved 4 different ways and how it interacts with screen readers \(4:48\)](#)

Workflow: Student to Teacher



- Perkins braillewriter
- Braille notetaker
- Microsoft Equation Editor
- JAWS Braille Math Editor
- Equalize Editor
- Desmos Graphing Calculator
- Orion TI-84 Plus Talking Graphing Calculator

Perkins Braillewriter



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- Allows the student to move easily back and forth between what they have written in prior steps and what they want to write for the next step - gives them the big “picture”.
- Requires less working memory.
- Allows for symbols representing a word problem, arrays, fractions, number lines, etc.

Braille Notetaker



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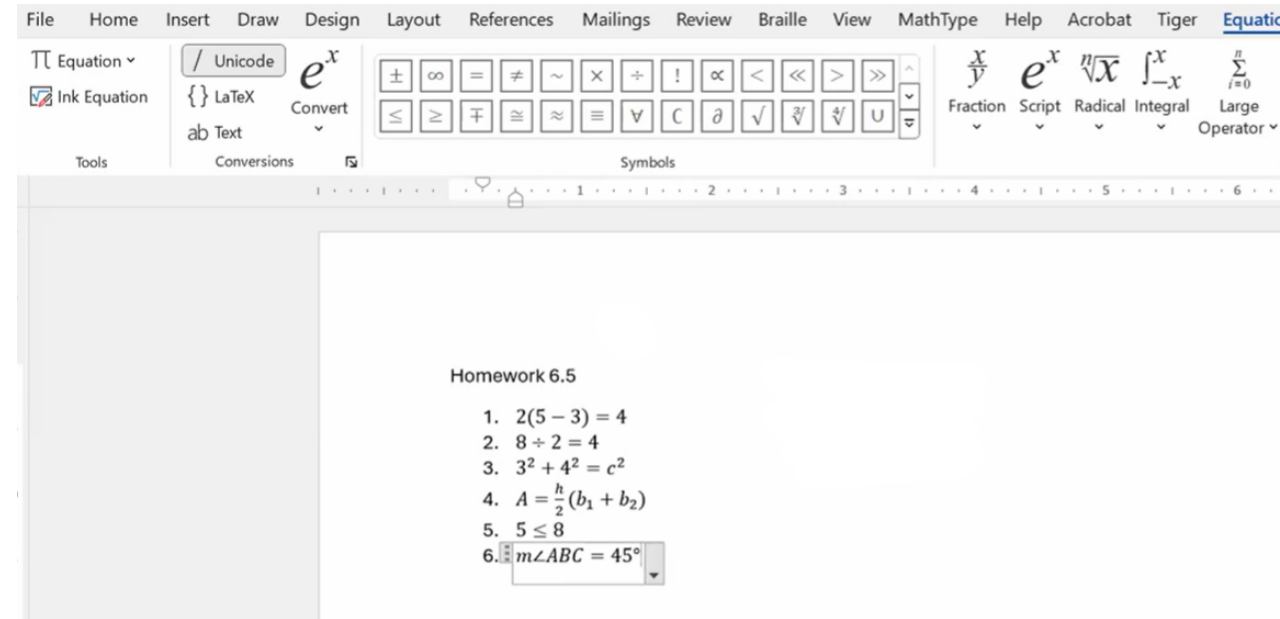
- Allows the student to use their braille math code.
- Includes a scientific calculator and graphing calculator, although the graphing calculator is limited to the single line display or print image.
- Allows student to email the math teacher and have it show up in print on the teacher end.

Microsoft Equation Editor



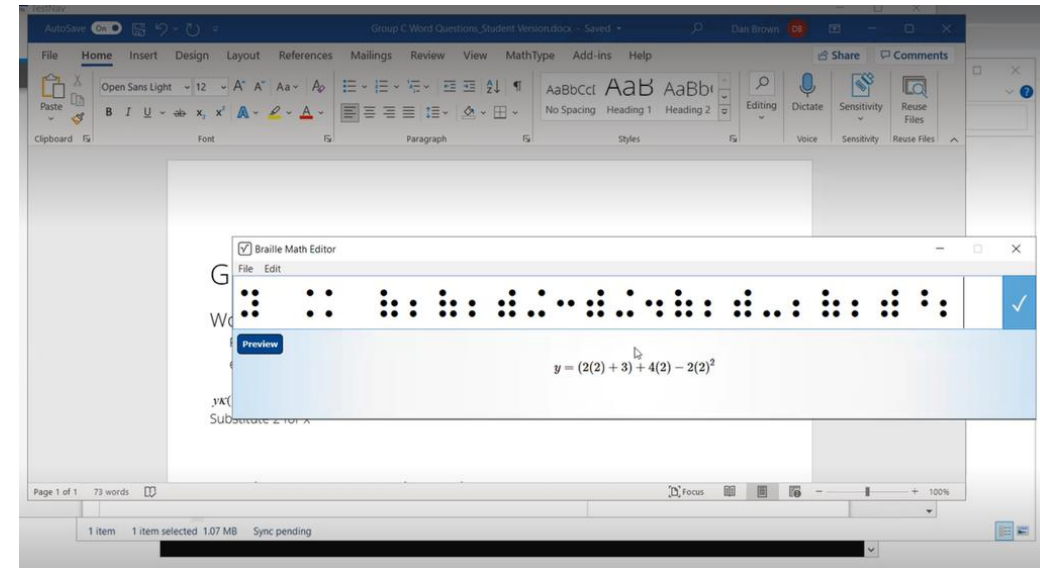
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- Already well-known and used by math teachers.
- Available in Microsoft Word
- Accessible using a screen reader.
- Shows in print as student types.
- Requires keyboarding skills.
- Allows student to email the teacher.
- Displays in Nemeth with refreshable braille display.
- [Demo of Equation Editor \(4:58\)](#)
- [Comprehensive List](#)

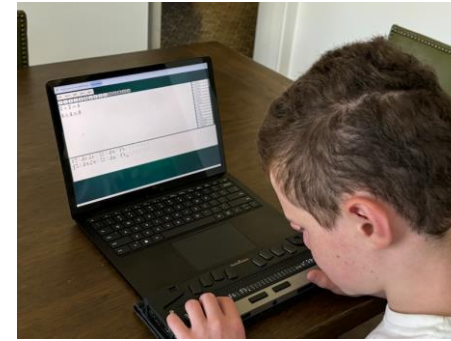




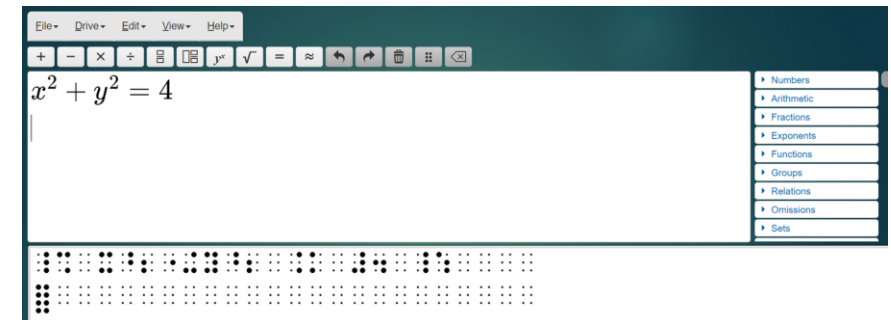
- Available in Microsoft Word with JAWS.
- Allows the student to type and view on a refreshable braille display.
- Defaults to Nemeth, but now supports UEB Math/Science as well
- Shows in print as student types.
- Allows student to email to the teacher.
- [Demo Video](#) (3:57)
- [Student demo video \(Nemeth\)](#) (18:21)
- [Demo video \(UEB\)](#) (18:58)
- [Post with instructions](#)



Equalize Editor (Student Perspective)



- Instantly shows up in braille when typing in print.
- Instantly show up in print when typing in braille.
- Allows the student to type in Nemeth Code and view in Nemeth Code.
- Can be saved as HTML for viewing in any web browser.
- Allows the use of palettes when a symbol is unknown.
- Does not support UEB Math/Science.
- [The Teacher Hat Video](#)
- [The Student Hat Video](#)
- [EE You Tube Channel](#)

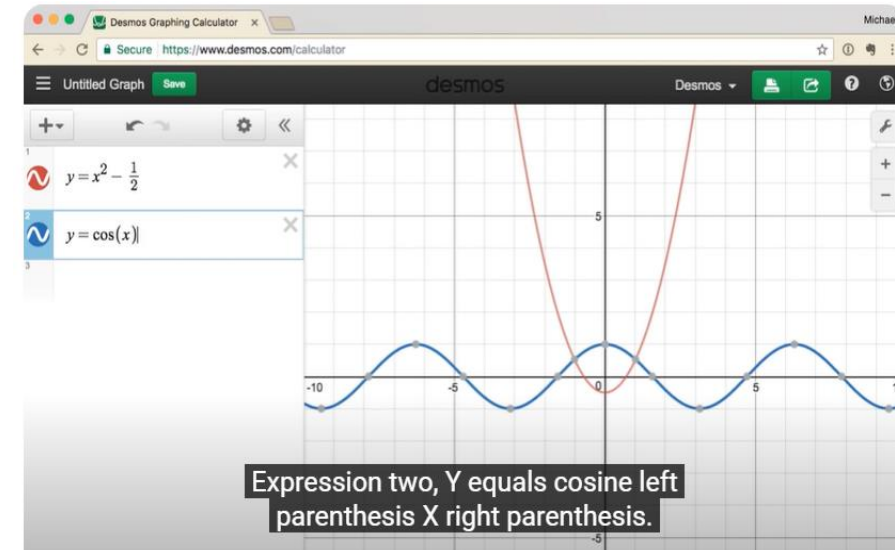


Desmos Graphing Calculator (Student Perspective)



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- Generally used in middle/high school.
- Allows the student to
 - Share graphs with teacher.
 - Find key/important points on graphs independently.
 - Can be used as a scientific calculator as well.
 - Use with web browser and screen reader.
 - [Accessibility information and demo](#)
 - [TSBVI Tech Tea Time Webinar](#)
 - Geometry Tool is in progress.



Orion TI-84 Plus Talking Graphing Calculator



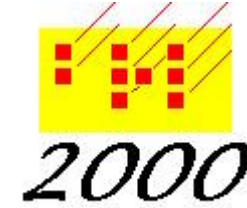
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- Generally used around middle school or high school.
- Allows the student to
 - Use what other students are using.
 - Find key/important points on the graph independently.
 - Use the scientific portion and/or the graphing portion in the same device.
 - [Orion TI-84+ Talking Graphing Calculator Resources](#)



- Translation Software
- MathKicker.ai
- Microsoft Word with Equation Editor
- Equalize Editor
- Desmos Graphing Calculator

Translation Software (Braille2000)



- You can currently save Microsoft Word files as RTF files and then open them in Braille 2000.
- [Braille2000](#) has the ability to do UEB Technical, UEB with Nemeth, EBAE with Nemeth, and NUBS.
- At this time, V3 is coming along and should be ready yet this summer and will have a Math Tools Option.
- V3 will open .DOCX files and understands OMML and MathML, including math operators, math symbols, Greek letters, subscripts, superscripts, fractions, radicals, and combinations of these.
- [2023 POSB STEM Conference Handout](#)

Translation Software (Duxbury DBT)



- Most robust translation software for math and formatting
- Create math in Microsoft Word for text plus math expressions/equations using [MathType](#) or MS Equation Editor and SWIFT for translation to Nemeth Code or UEB Math/Science.
- [Duxbury DBT](#) works with most embossers.
- [MathType with DBT and SWIFT Demo Video](#) (13:34)
- It helps to have [SWIFT](#) installed in Microsoft Word to decrease the number of Nemeth Code switch indicators.

Translation Software (Tiger Software Suite)



- Create math in Microsoft Word for text plus math using [MathType](#) or MS equation Editor to produce UEB Math/Science or Nemeth.
- [Tiger Translation Software](#) works with Tiger embossers.
- [Tiger Software Suite Demo Video](#) (2:35)
- Images can also be included.
- There is not a way to decrease the number of Nemeth Code switch indicators. They need to be manually removed for consecutive math problems.
- Formatting must be done by hand.

Translation Software (BrailleBlaster)



- Has an ASCII Math Hub that allows you to enter math directly within BrailleBlaster.
- Allows you to open Microsoft Word documents with Equation Editor math content and translates the math content to Nemeth Code or UEB Math/Science, but doesn't work with MathType
- Doesn't automatically add the Nemeth switch indicators when using Nemeth Code.
- Allows entering of spatial math.



- Sign up for a free MathKicker.ai account by going to the site and clicking on TRY MATHKICKER.
- You will receive an email that says "Click here..." with two different links. Save the pages as favorites!
 - Convert pdf/image file to .docx (results in Word file with Equation Editor math content)
 - Convert pdf/image file to HTML
 - Convert image to .docx from clipboard
 - Convert image/pdf to mathkicker editor
- [Information and Tutorial Video of MathKicker.ai](#) (4 videos)

Math Editor Comparison



- Either MathType or Microsoft Equation Editor
 - Sending electronically to a student who will open it on a computer with or without a braille display attached.
 - Using Duxbury DBT or Tiger Software Suite for Nemeth or UEB Math/Science.
- Microsoft Word Equation Editor when
 - Using BrailleBlaster for either Nemeth or UEB Math/Science.
 - Sending electronically to a student who will open it on a BrailleSense.



- Create math in Microsoft Word for text and Equation Editor for math expressions/equations.
- Add graphics by taking screen snippings of pictures and add alt text descriptions or replace with "See tactile graphic..."
- Accessible with notetakers (BrailleSense 6) or computers w/ braille displays and screen readers.
- [Demo of Equation Editor](#) (4:58)
- [Comprehensive List](#)

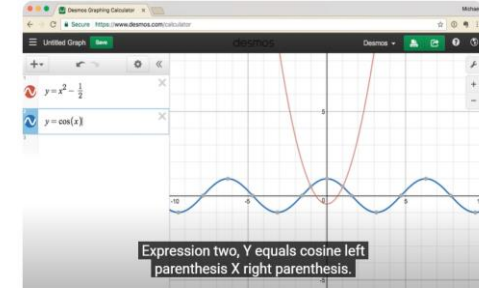
Equalize Editor (Teacher Perspective)

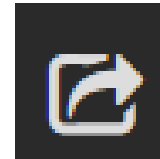


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- Used to be called the Accessible Equation Editor.
- Converts print to braille and braille to print in real time.
- Save as an HTML file or a BRF file.
- Learn how using the tutorials are under the Help menu.
- Student can use with a braille display attached to a computer.
- [The Teacher Hat Video](#)
- [The Student Hat Video](#)
- [EE YouTube Channel](#)

Desmos Graphing Calculator (Teacher Perspective)



- Go to the [Desmos website](https://www.desmos.com/calculator).
- Click on the Graphing Calculator button.
- Type in an equation to graph or type the word "table" and enter the values for a table.
- Type Alt-Ctrl-S or click the Share Graph icon. 
- Type Ctrl-C to Copy the URL or click the Copy button.
- Go to a document or email.
- Type Ctrl-V to paste the URL link into the document or email.

Thank you!

Workflow Webpage

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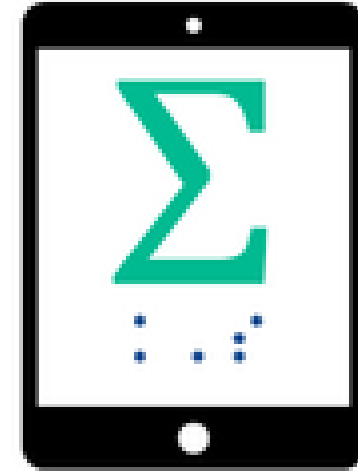
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