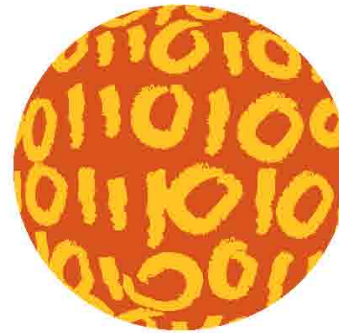



benetech

TECHNOLOGY
SERVING HUMANITY



 Open and
Interactive Widgets
for STEM

EDUPUB 2013, October 29, 2013





EPUB 3 is a Website in a Box





Let's Not Repeat Mistakes

- Accessibility should not be an afterthought
- Last 10 years have been spent fixing accessibility problems with rich internet applications
- Let's spend the next 10 years doing and not asking others to fix
- Innovate accessibility with everything else



STEM Content is the Most Challenging

- Graphs, charts and infographics
- Simulations
- Interactive Number Lines
- Quizzes and other assessments
- Software code emulators
- 3D models

Solute Amount (moles)
lots
none

Solution Volume (Liters)
full
low

Concentration (Molarity)
high
zero

Show values

Solute: ■ Drink mix ▲





Building Blocks Exist

Requirements	Technologies & Standards
Interactivity	JavaScript, WAI-ARIA and IndieUI (W3C WG stage)
Visual Rendering backed by Rich Semantics	SVG and MathML (need better support & APIs)
Multi-modal delivery	Web Audio, Web Speech APIs and Haptics (nascent)

Needs Innovation

DEMO
TIME!



SVG Graph Sonification Demo

We can see that the graph touches the x -axis at $x = 1$.

We can also solve this equation by factoring. If we set $y = 0$ and factor, we obtain $(x - 1)^2 = 0$, so $x = 1$. Since the quadratic function is a perfect square, we get only one solution for the equation--it's just the same solution repeated twice over.

When the graph of a quadratic function touches the x -axis at one point, the quadratic equation has one solution and the solution is called a *double root*.

Case 3: The parabola does not cross or touch the x -axis. An example of this is $y = x^2 + 4$:

Sonify Coordinates Reset



Proposal

Widget library for publishers and other creators

- Open source – ideally commercial friendly licenses
- Community driven
- Born accessible
- Customizable – ideally just via CSS and configuration
- Enables collaboration between content creators, accessibility experts, educators and practitioners
- Builds upon existing projects, such as D3 and jQuery
- Test cases for browser & reading system



Next Steps

- W3C Community Group
 - <http://www.w3.org/community/stemwidgets>
 - ETS, IDRC, Metrodigi, OERPUB, PhET, Wolfram Research
- Contributions
 - Benetech (<http://github.com/benetech/svg-sonifier>)
- Community Management
 - Developers
 - Outreach and education
 - Funding and sponsor needed for this