

Sonification

Definition

Sonification is the use of non-speech audio to convey information or to interpret data found in visual charts, graphs and other digital content.

Why Is Sonification Important On An iPad?

For decades, **sonification** has helped make digital charts and graphs accessible to individuals who are blind or have low vision. Examples include:

- Talking graphing calculators
- Digital math tools like Desmos
- Sonified maps, such as Google Maps, allowing users to follow digital street lines using sound

How Sonified Lines Work

On touchscreen devices, sonified lines provide auditory feedback as users drag their fingers along a digital path.

- **If the finger stays on the line**, a continuous sound plays.
- **If the finger moves off the line**, the sound stops, signaling the user to correct their movement.
- This method is used to trace shapes, follow lines, read graphs, and navigate digital interfaces.

While sonified lines are relatively new for tracing digital lines, they have high potential to become a standard accessibility tool for making digital STEM content fully accessible.

Sonification in VoiceOver Playground App

The VoiceOver Playground app uses sonification to teach children how to **drag in straight lines** across an iPad screen.

- Tracking a straight horizontal line is a pre-reading skill for all children.
- Dragging in a straight line is a crucial tech skill for navigating digital layouts.
- The sonification-based Drag Lessons help children practice dragging in a straight line by stopping the sound when they veer off the path.
- The program systematically develops dragging skills, progressing from horizontal lines to vertical lines, and then to diagonal lines.

Prerequisites

- Horizontal Dragging (sonified)
- Vertical Dragging (sonified)

Warm Up Activities

- Tactile Lines Activity

How Does VoiceOver Announce Sonification?

- VoiceOver does not announce sonification.
- Sonification is a non-speech sound that is heard when touching a line or object that has been sonified by the app developer.

Earcons vs. Sonification

- **Earcons** are quick, subtle sounds (e.g., a click when moving to the next item).
- **Sonification** is continuous auditory feedback, used when tracing a line or convey data in a graph.

Lessons

Lesson 1: Horizontal Dragging (Sonified)

Lesson 2: Vertical Dragging (Sonified)

Lesson 3: Diagonal Dragging (Sonified)

- **Goal:** learn to drag in a straight diagonal line using sonification.
- **Screen Layout:**
 - A butterfly is in the top-right corner.
 - A flower is in the bottom-left corner.
 - A diagonal green line connects them.
- **Breakdown:**
 - Lightly drag your index finger across the top of the screen until you hear the butterfly.
 - Drag your finger down diagonally, following the sonified line.
 - Stop when you reach the flower.
 - Repeat the activity dragging from the butterfly in the top right to the flower in the bottom left.
 - The butterfly moves to the top left corner and the flower to the bottom right.
 - Drag from the top left to the bottom right two times to complete the lesson.

This structured approach helps build spatial awareness and dragging in a diagonal line while reinforcing STEM accessibility skills through sonification.