

Sponsored by:  
Design Thinking and Communication Program  
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# STEAM

# See-Touch-Engage-

# Activate-Move

Prepared for:  
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Keith Boyd - Donor of Model Steam Engine

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DTC 2, Section 13, Team 2

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# Executive Summary

1. Project Problem
2. Project Requirements
3. Research and Development
4. Design Summary

# Introduction

Our mission is to design an interactive, immersive, accessible and educational exhibit of a 20th century steam engine for the Wilmette Historical Museum.

# Users



1

Visitors of  
Museum

2

Staff at  
Wilmette  
Historical  
Museum

3

Project  
Partners



# Requirements

1

Easily  
Maintained by  
Staff

2

Sustainable &  
Maintainable  
Design

3

Engaging to  
the public

4

Accessible to  
visitors of all  
ages and  
ability level

5

Must fit within  
exhibit  
confines

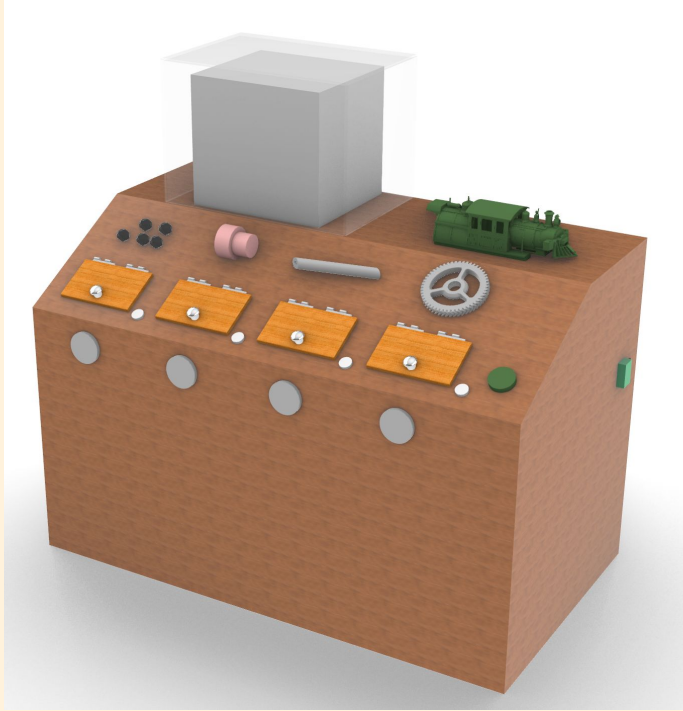
# An option for exhibit placement



# Design Concept and Rationale

	Description	Rationale
Base Assembly	Wooden base to be assembled by staff that supports the flipboard and touch board.	Minimal installation damage to exhibit spaces. Height and depth are ADA approved.
Flipboard	Question and answer panels with hinge movements	Hinges for simplicity, ease of use, and ease of replacement
Touch board	Tactile elements: coal replica, water chamber, spring-loaded piston, grooved flywheel	Kinesthetic learning improves retention
Static Displays	Model train immobilized via stand. Model steam engine under plexiglass.	Preserves artifact while providing visual reference. Avoids durability issues of operational parts.
Audio system	Button-triggered steam engine sounds as well as pre-recorded audio for the flip board text.	Increases accessibility and improves multi-modal learning. Parts are also low-cost (off-the-shelf).

# Design Concept Visualized





# The Steam Engine Storyline



Coal (chemical)

Burning releases stored energy and starts reaction

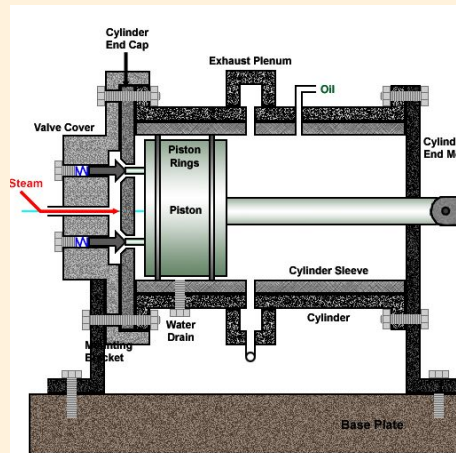
Key Concept: Combustion creates heat



Water Chamber/  
Boiler (Thermal)

Water heats up and turns to steam which rises

Key Concept: Hot steam builds pressure



Piston  
(mechanical)

Pressure from steam pushes piston back and forth

Key Concept: Difference in pressure causes motion



Flywheel  
(Rotational)

Smooths out acceleration of piston so wheels have constant speed

Key Concept: Conservation of Angular Momentum

# User Testing Results

Flipboard:

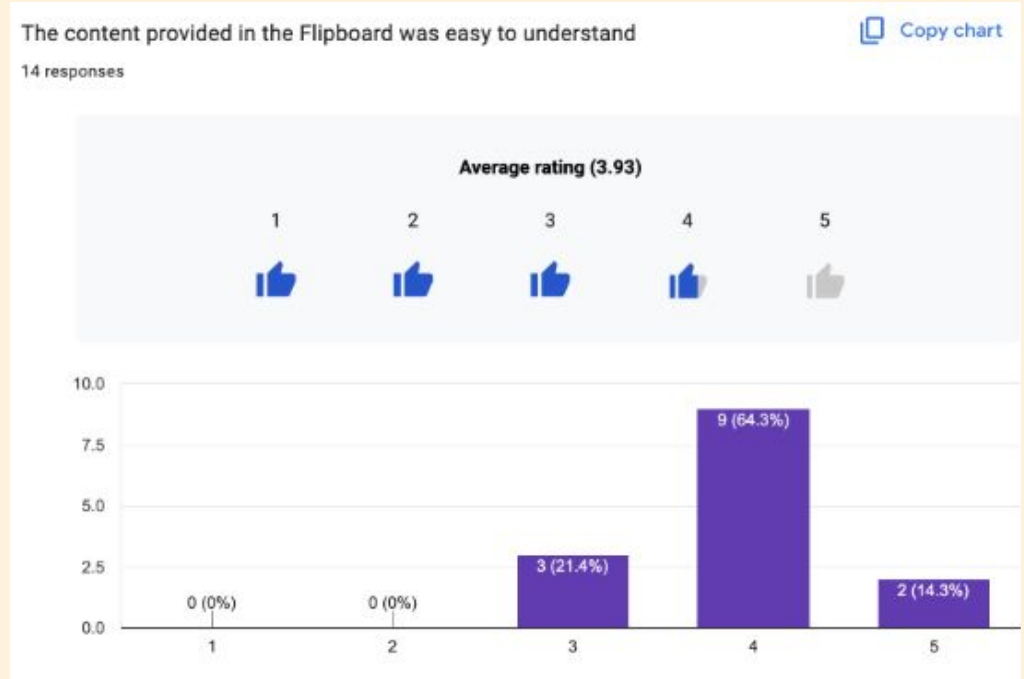
- Ease of use
- Understanding

Touch board:

- Interactive elements

Recall our mission statement

- Interactive
- Immersive
- Accessible
- Educational



# Additional Research

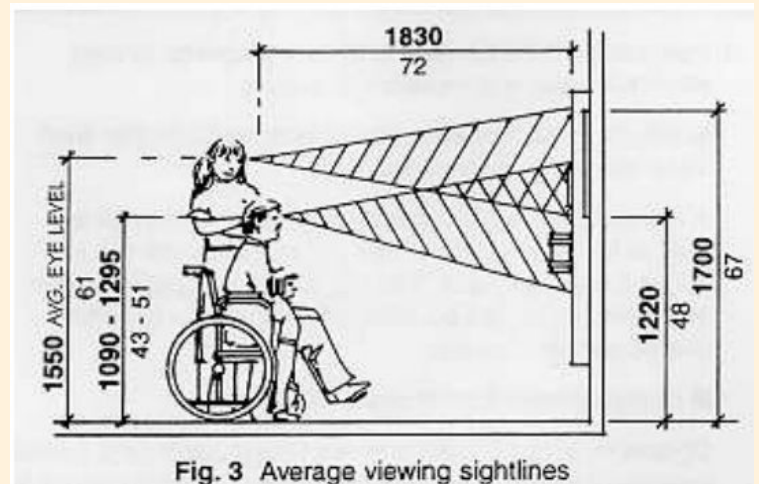
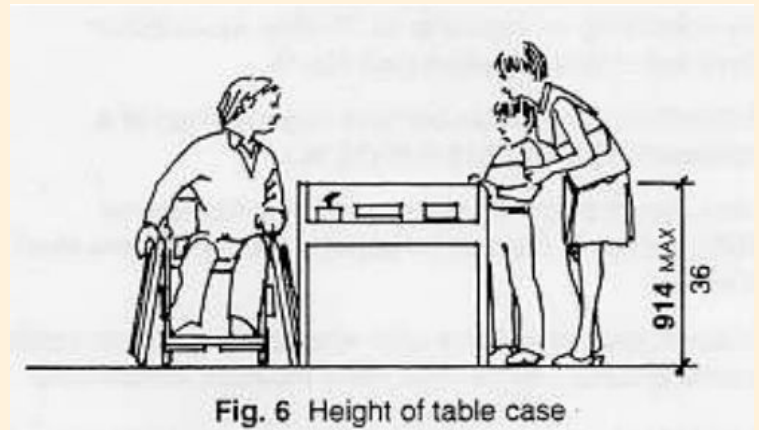
Researched ADA standards for museum exhibit creation that included

- Accessible fonts and font sizes
- Accessible dimensions of exhibit
  - Height
  - Width
  - Depth

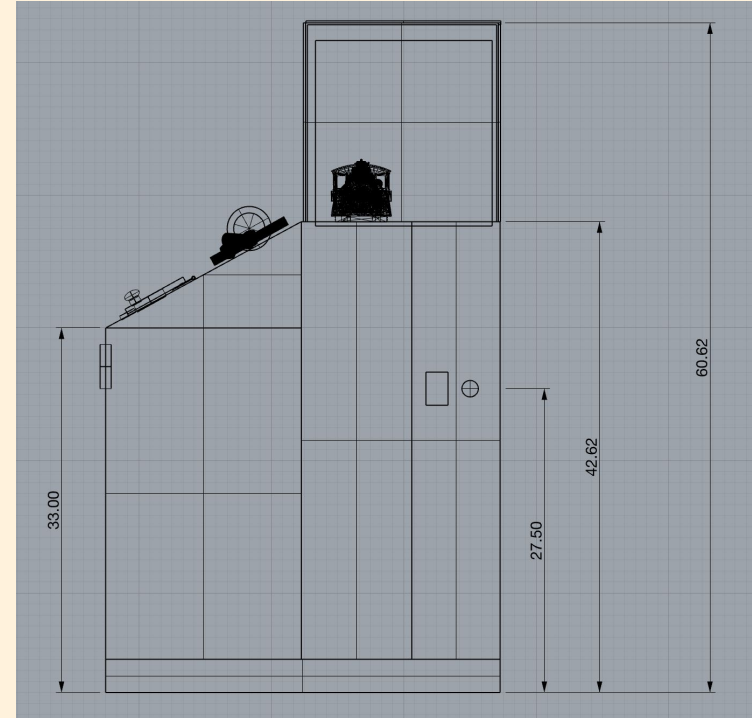
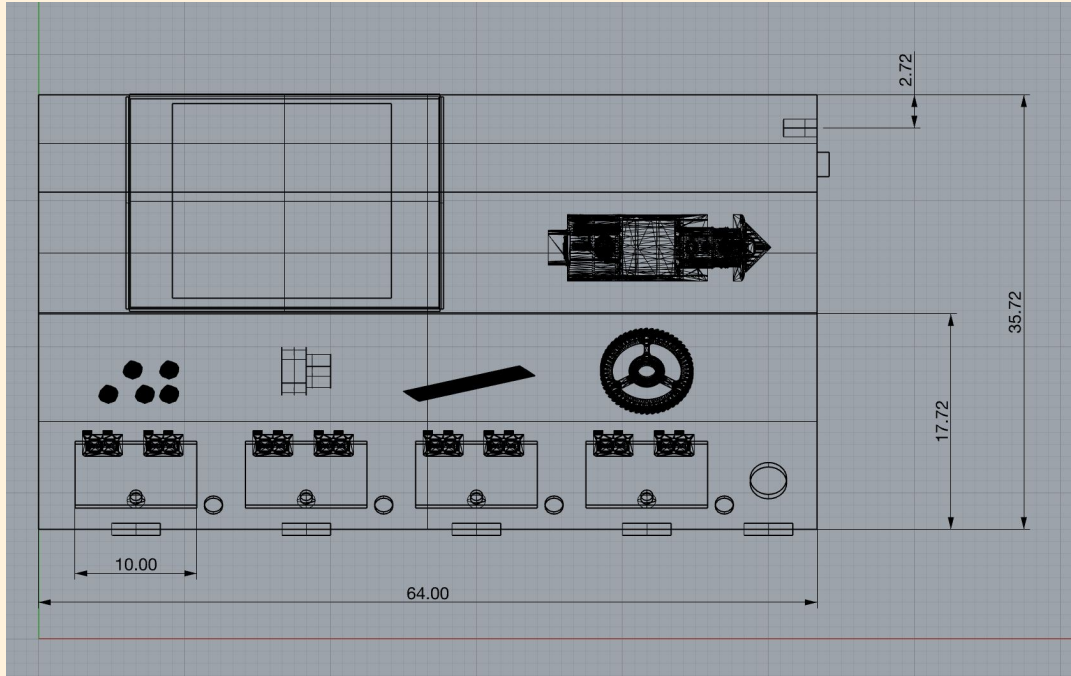
**Fig. 14** Font Samples

*Courtesy Parks Canada  
Design Guidelines for Media Accessibility*

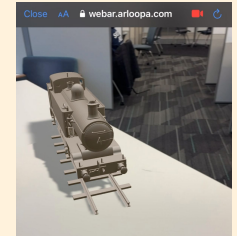
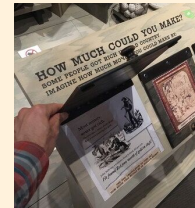
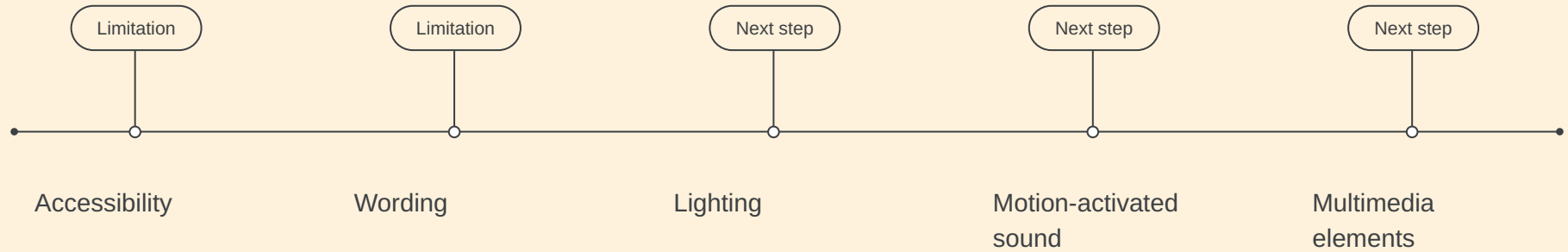
Accessible for text (weight %, x-height %, width %)	Not accessible for text (weight %, x-height %, width %)
Serif	Serif
Times Roman (11, 69, 105)	<b>Times Bold</b> (19, 67, 101)
New Century Schoolbook (13, 71, 103)	<b>New Century Schoolbook Bold</b> (22, 69, 106)
Sans Serif	Sans Serif
Helvetica (12, 72.5, 89)	Helvetica Light (7, 72.5, 81)
Univers 55 (14, 70, 93)	Univers 45 (7, 71, 84)
Futura (12, 62, 77)	Futura Light (6, 61, 63)
	Decorative
	Quinospil (9, 31, 130)



# How our design meets requirements



# Limitations and Next Steps



# Conclusion

STEAM education

Inclusive Accessibility

Sustainable Operation

Thank you!