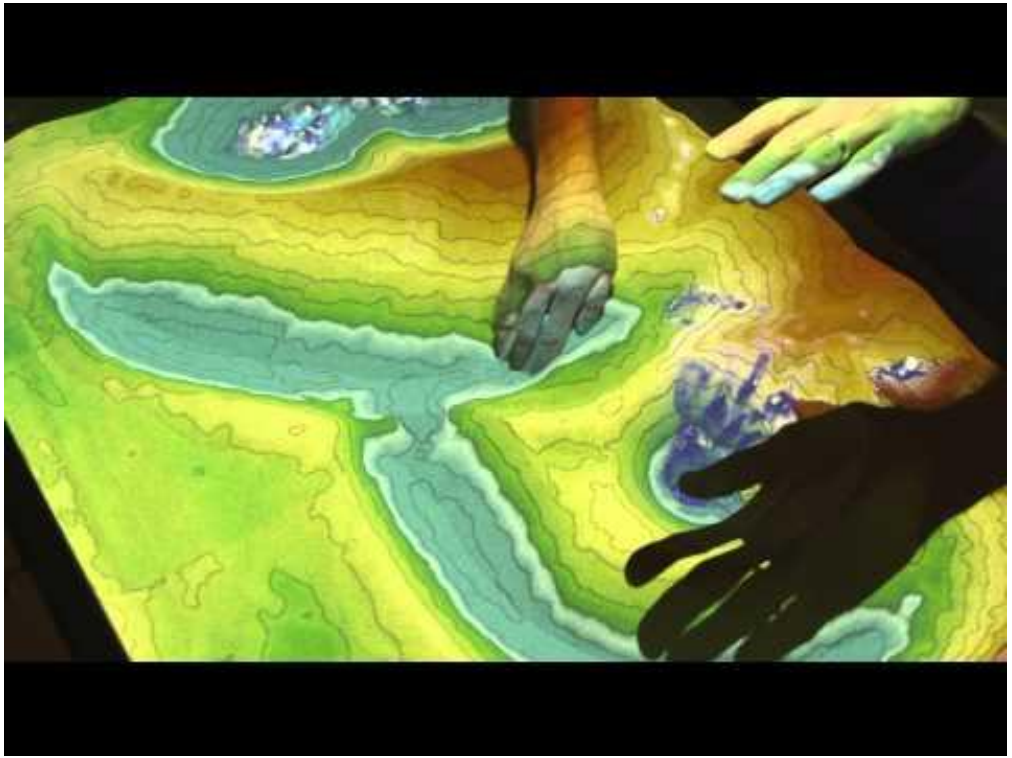
Las Positas AR Sandbox

By Students: Ashley McDaniel, Yosef Mirsky, Kyle Minchokovich, William Kossow

Overview

- Goal
- Background
- Requirements
- Progress
- Build

Goal



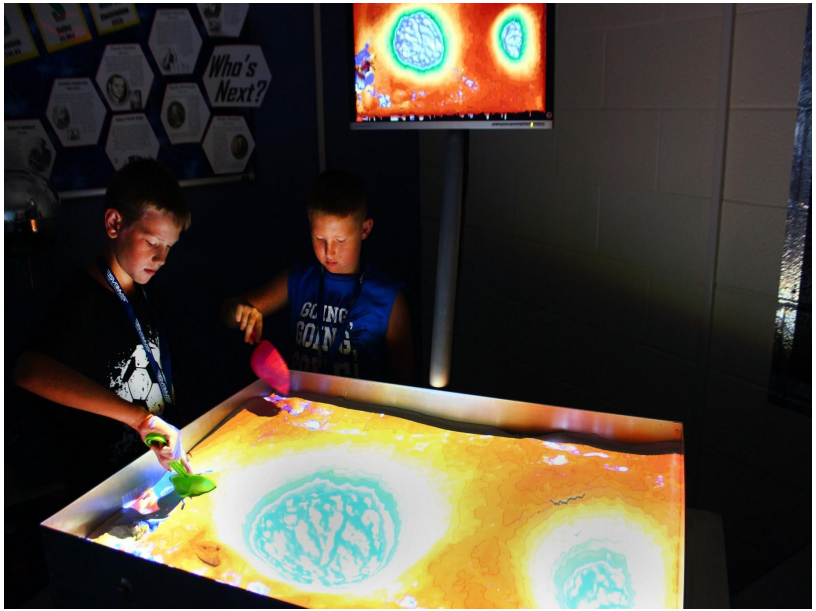
Motivation

- To build an Augmented Reality Sandbox for the Geology department
- Create topographical models by shaping sand
- Sand is augmented in real time by an elevation color map, topographic contour lines, and simulated water.
- Teaches geographic, geologic, and hydrologic concepts

Project Requirements

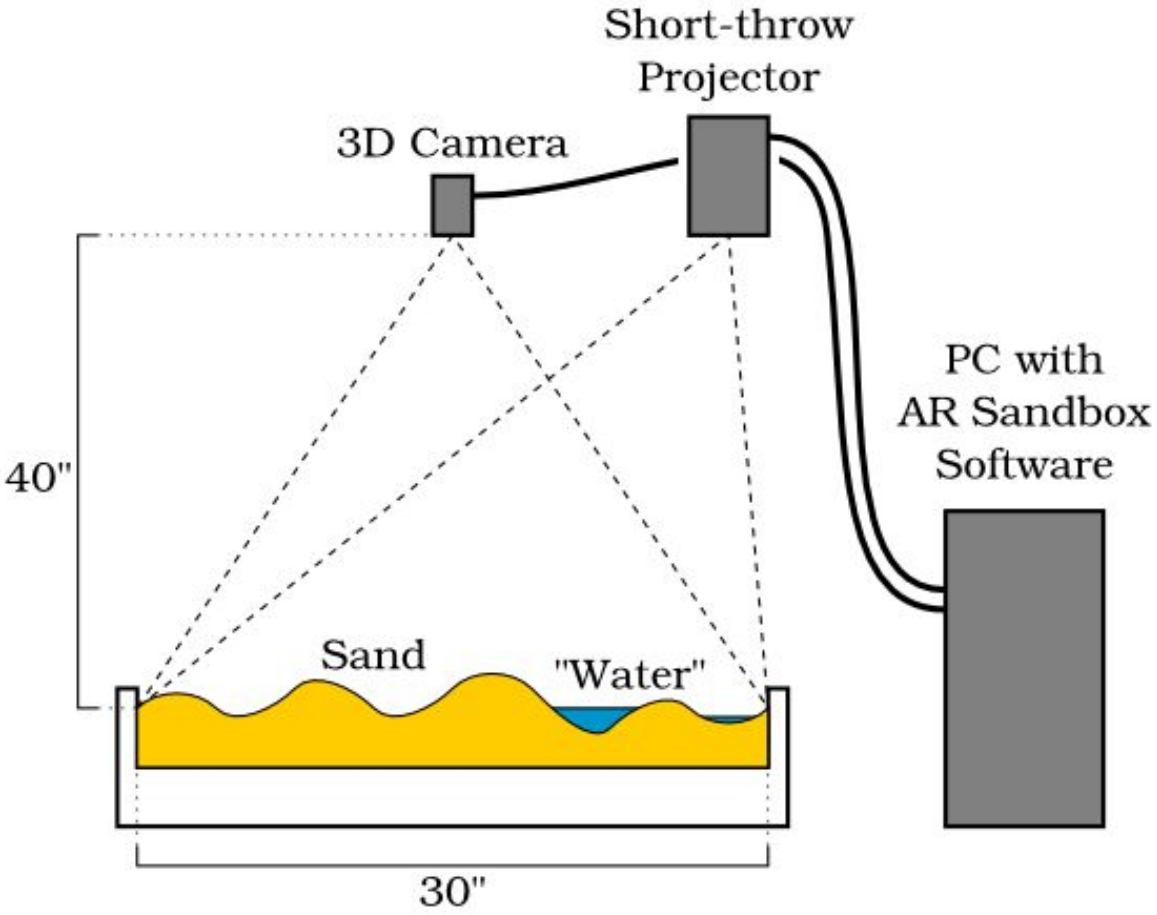
- Working AR Sandbox

  Components:
  - A working PC with AR Sandbox software installed
  - Sturdy Table built to hold sand
  - Microsoft Kinect
  - Short-throw Projector



Project Constraints

- 4:3 aspect ratio sandbox to match the Kinect's field of view
- Place projector and Kinect camera 40" above sandbox
- Depth of sand around 4" or 10 cm this equals 2.77 cubic feet
- Dedicated PC
- AR sandbox software set up to start automatically when the computer boots
- Sturdy base to hold sandbox and sand
- Must be safe for students to use
- Use polyurethane on sandbox plywood to make waterproof and rot-resistant
- Budget estimate: $1800
- Must Finish by May 2018


Short-throw
Projector
3D Camera
PC with
AR Sandbox
Software
40"
Sand
"Water"
30"

How we Met the Project Requirements

- Preliminary Drawings
- Build List of Materials
- Ordering Materials and Receiving Funding
- 3D Model Parts of Sandbox
- Assembly Views of Sandbox
- Testing out PC, Projector and equipment
- Planning how to build sandbox
- Review
- Build Sandbox
- Working Prototype for Innovation Fair

Expenses

Sandtastik: $15 and $25 per 25lb about $150

PC: $ 700

Projector: $600

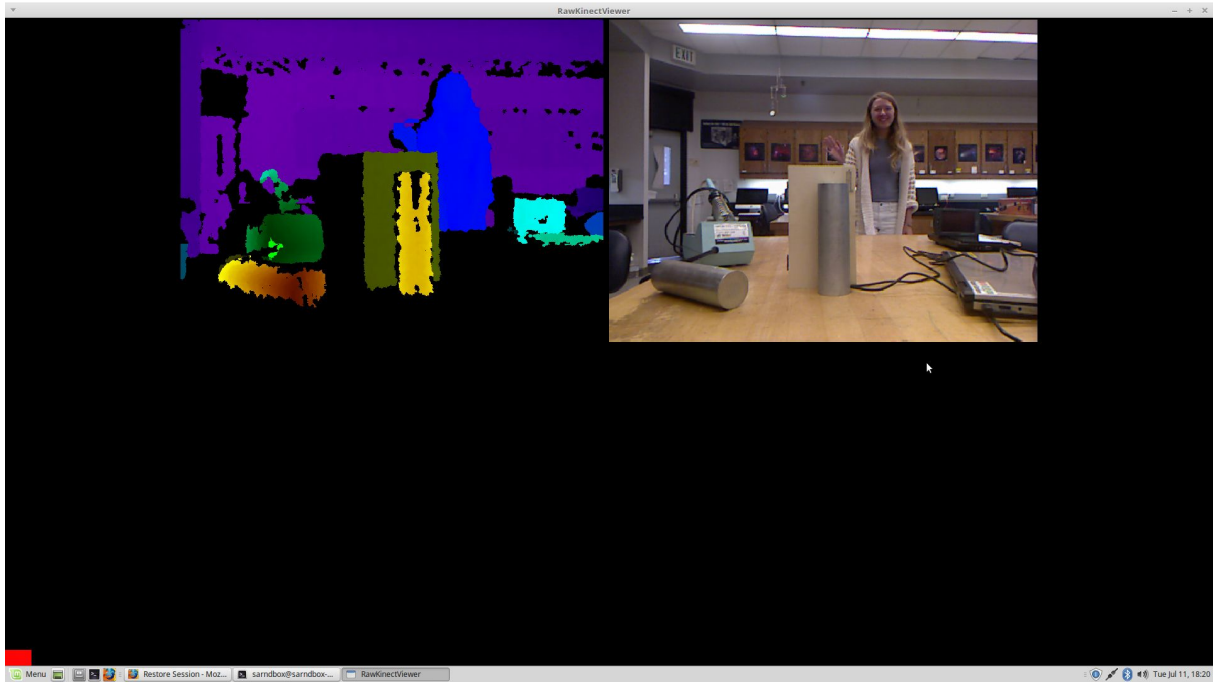
Monitor and Keyboard: $150

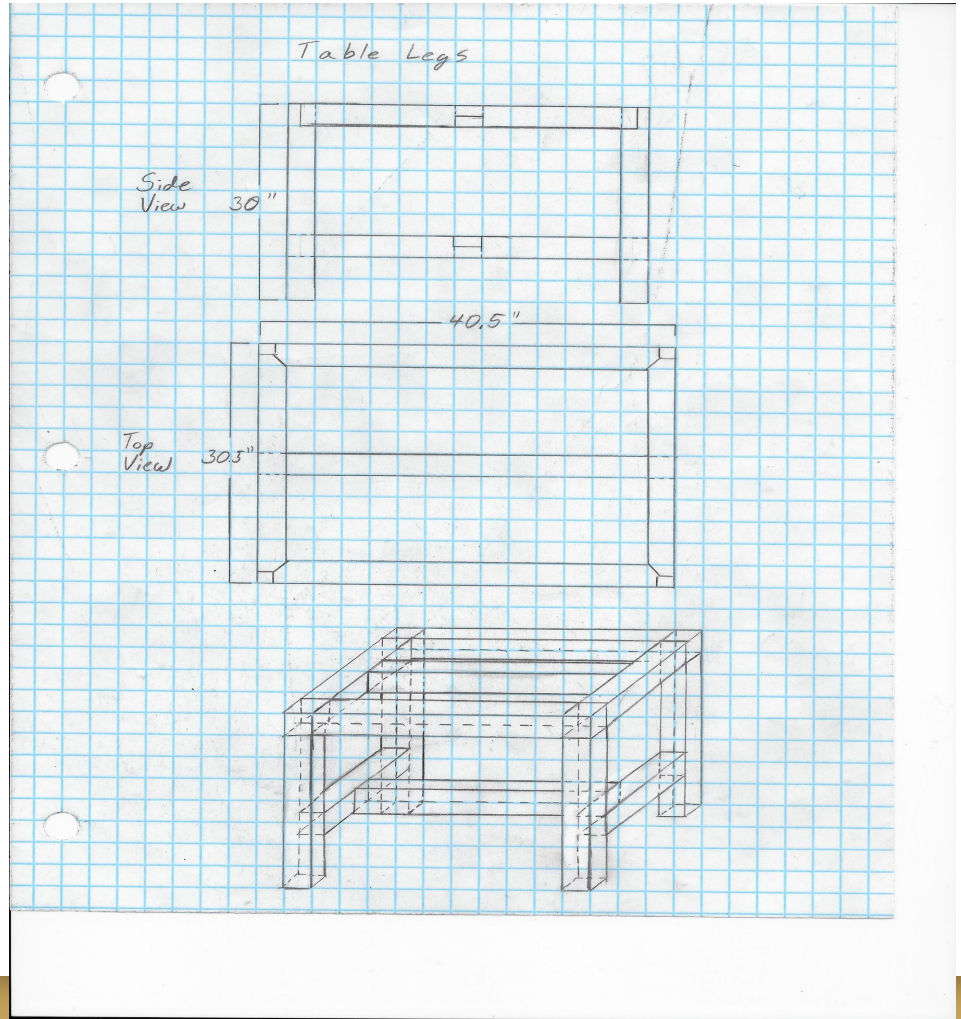
Wood and table parts: $ 250

Summer Progress

- Bought and assembled PC components
- Downloaded and installed the AR Sandbox software running on Linux

Summer Progress: Testing out the Kinect 3D vision and Calibration



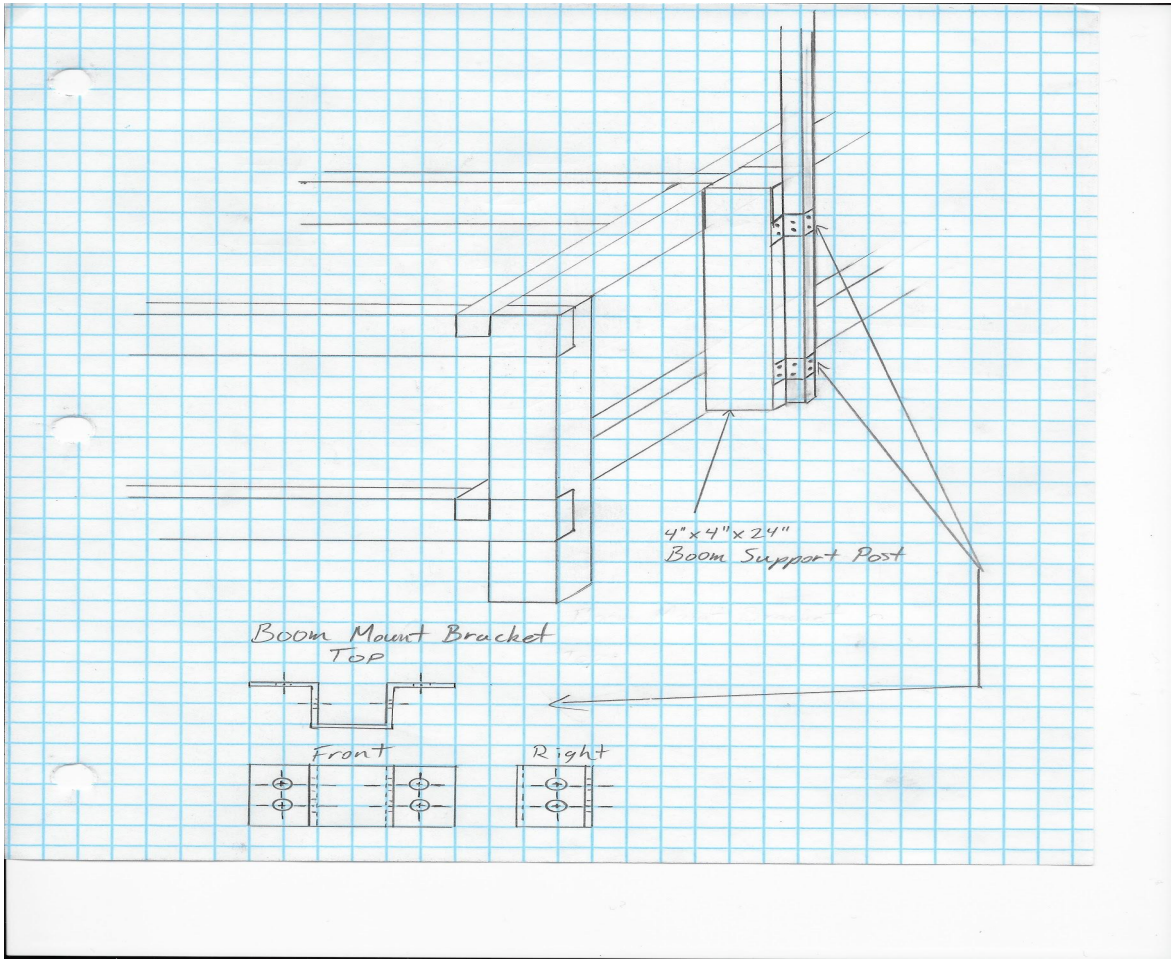


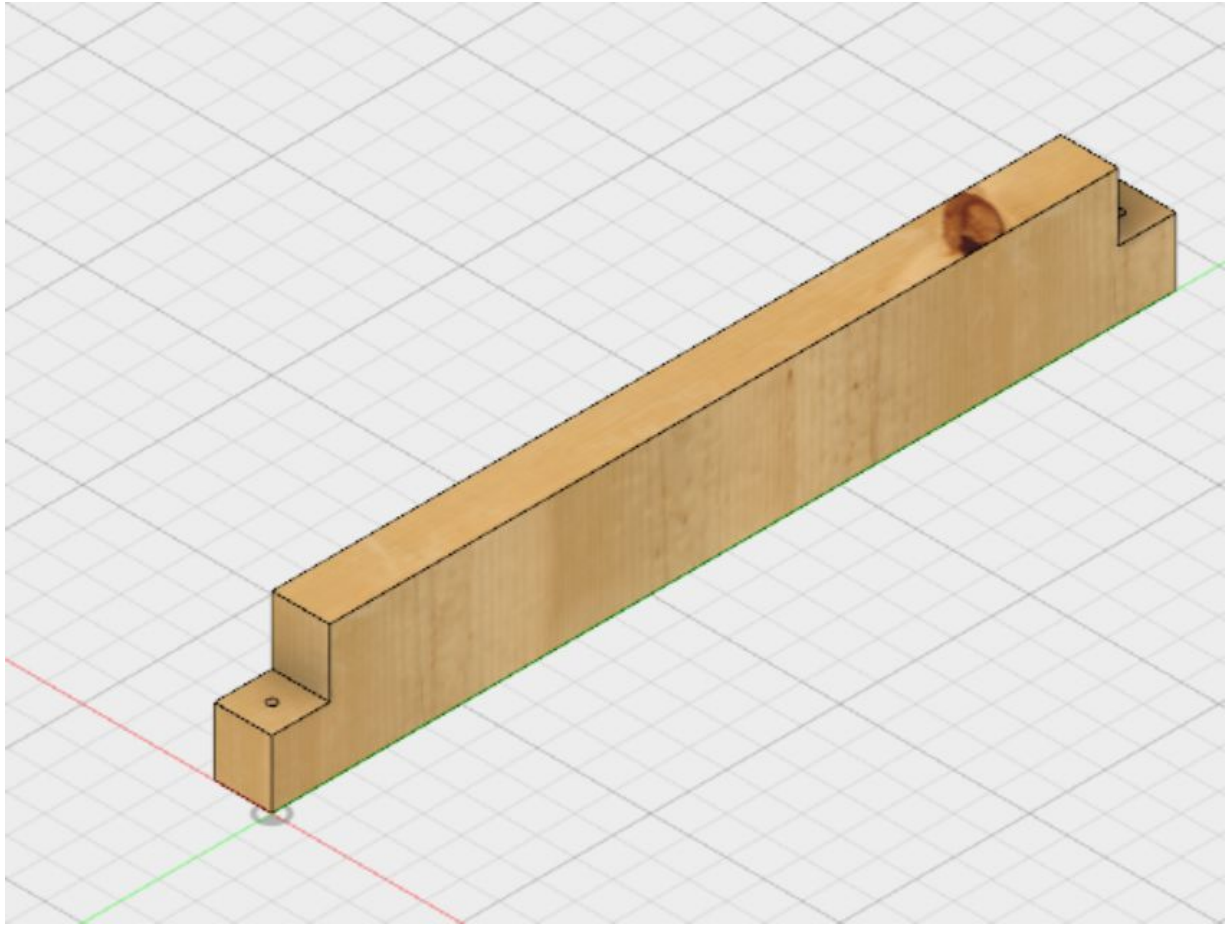
Drawings

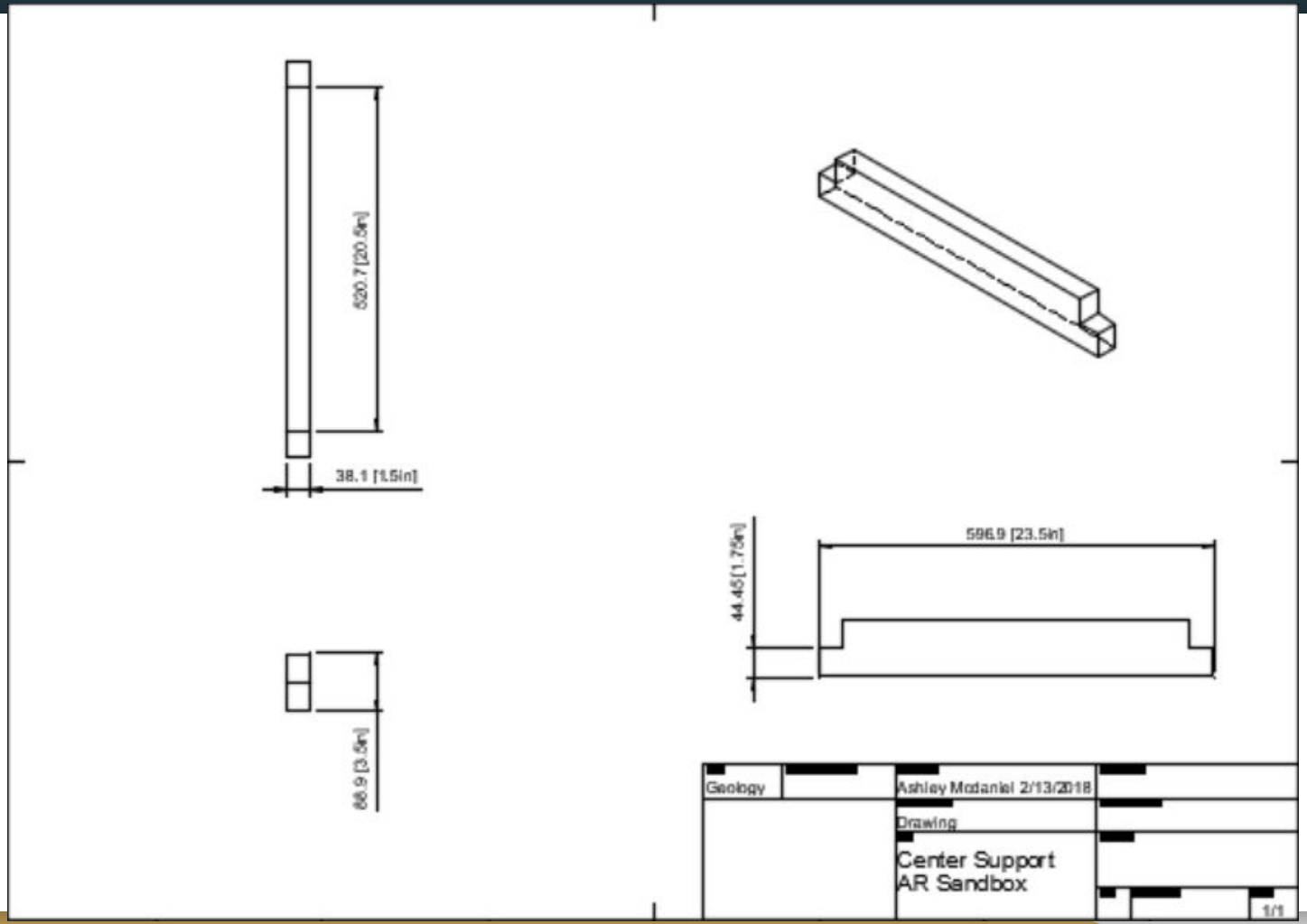
- Preliminary drawings by Kyle M.
- Demonstrates initial idea of sandbox table structure

Drawings

- Showing how boom holding projector and Kinect will attach to sandbox



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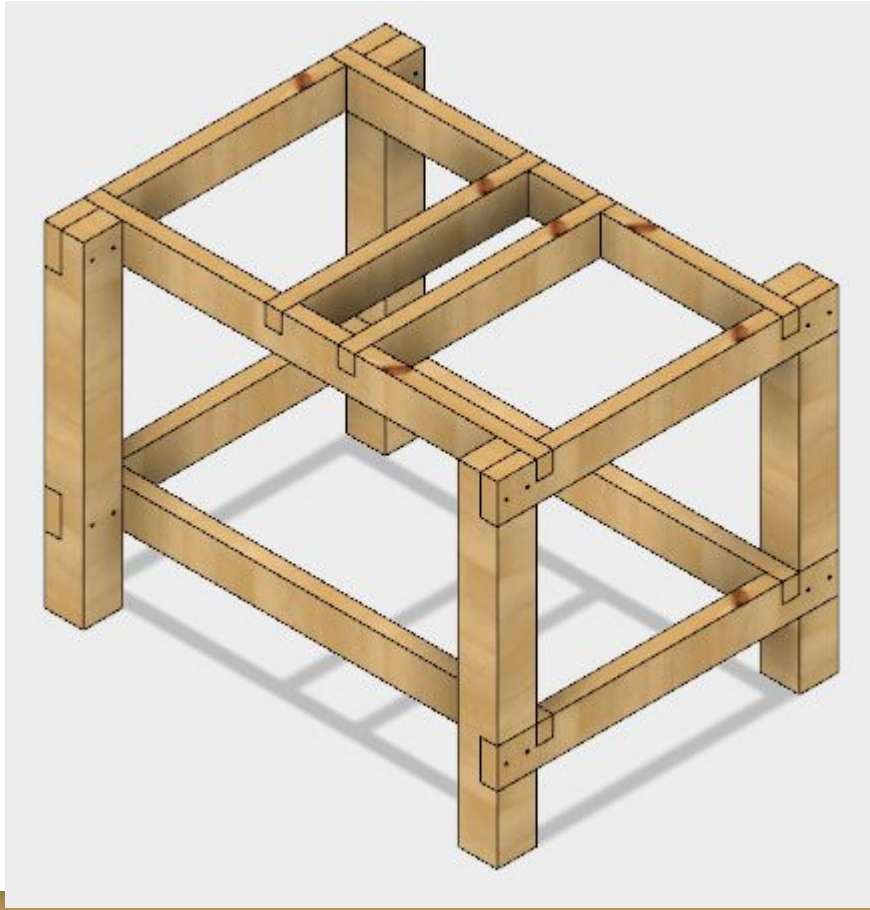
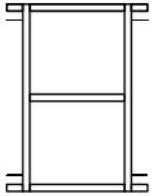
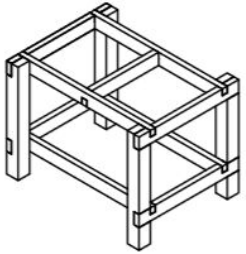
Geology
Ashley Mcdaniel 2/13/2018
Drawing
Center Support
AR Sandbox
1/1

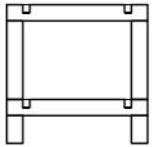
3D Modeling

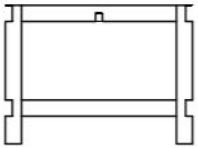


- Table structure for the sandbox rendered in Autodesk Fusion 360



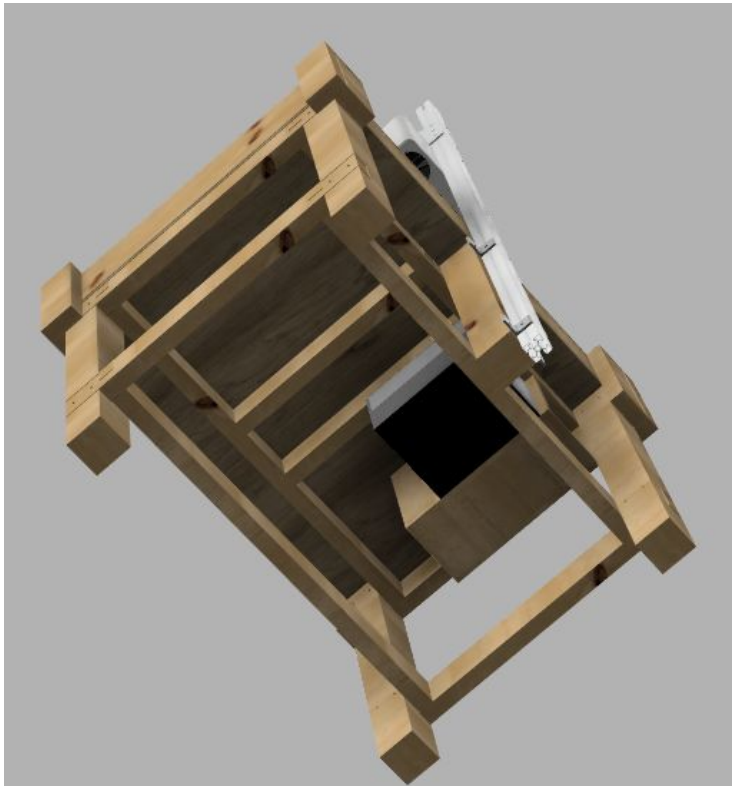


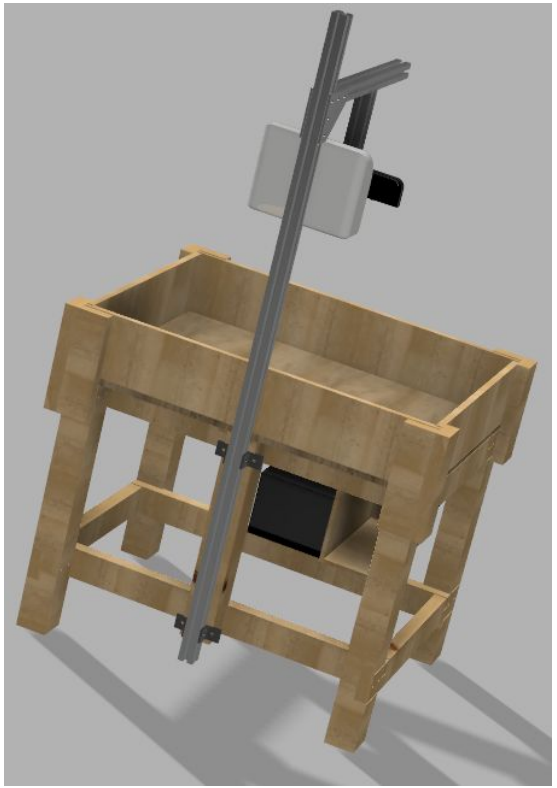




Dept.	Technical reference	Created by	Approved by
Geology		Ashley Mcdaniel 2/13/2018	2/12/18
		Document type: Drawing	Document status:
		Title: Table Assembly AR Sandbox	DWG No.
			Rev. / Date of issue / Sheet: 1/1

- Complete AR Sandbox 3D model





Takeaway Points

The purpose of this project was to build an AR Sandbox for the students of LPC and gain experience on the steps of engineering a project

Progress: Budget, Planning, 3D modeling complete

Next step: Build prototype over spring break

First public demo: Innovation Fair

References

UC Davis Sandbox:
https://arsandbox.ucdavis.edu/instructions/

Thank you

Professor White

Dean Nan Ho

Carol Edson

Keith Level and Mark Newton