Virtual Maker-Ed Unconference
Facilitation Agenda & Notes

Show & Tell: Building Machines at Home with SketchUp, a Laser Cutter, and the Post Office
Presented by Josh Merrow

Group Norms
Please view on VMEU website

Helpful Facilitation Prompts, as needed:

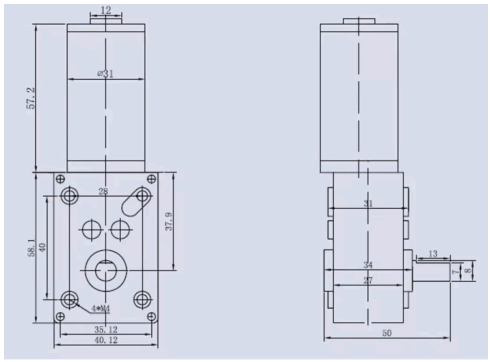
- Everyone whip around to introduce and share needs
- designate notetaker (use shared discussion notes space below)
- "One common challenge I hear among us is..."
- What is one constructive idea you or your school have already started working on?
- What are top-of-mind concerns?
- Share out of logistics ideas - tech support, class sizes, costs, transportation, sanitation, seating, sharing supplies, schedules
- How might we share supplies and/or plan for equity of student experience?
- Generation of maker topic activities or ideas, websites that could be useful, etc.

Discussion Notes & Resources

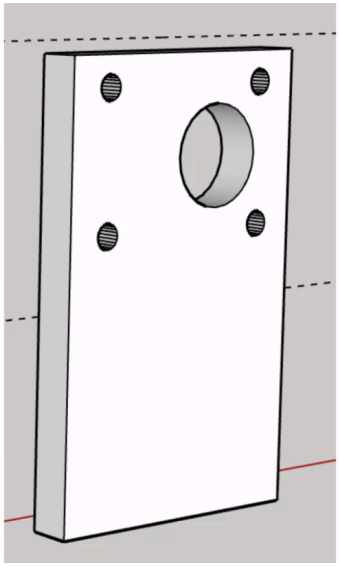
Slide deck:
https://docs.google.com/presentation/d/1xBHjvRbpWvs_0KpoGvcO1ibJiIsMIhqexcd85CfYMtA/edit?usp=sharing
Full writeup coming soon at https://lindylabs.org
Questions, comments? jmerrow@riverdale.edu

will be shared to larger Maker community at the conclusion of the conference

- Design engineering class - high school juniors and seniors
- Design a machine using Sketch-Up.
- Josh would cut the parts up and send them to the students
- SketchUp Quickstart
- First Assignment - design a dream house and a soundtrack in the background
- Next did a unit about gears work - Gears Video
- Sketched it on paper first. Examples:
    - Pull back car with gears
    - Some people sketch in real world 3d - make marbles go up and go down ramps and then back up.

    - Wanted to make a machine that would throw a ball back to him when he took a shot
- Parts:
    - BBQ Motor Worm Gear Motor 12v/24V DC self locking turbo worm metal gearbox 31zy
    - Cheaper on alibaba or gearbest
- Challenged them to make a 3d model of this motor in sketchup:
- 

- Flanges $3-4 each - between a motor and a wooden gear
    - One size for motor shaft one size for ⅜ dowels
        - Coupling connector accessory fittings motors silver
    - How can we make sure they spin together. Screw those into the gears
- Asked to make a motor mount - m4 size holes
- Home depot 5mm plywood subflooring
- Allows you to screw motors into pieces of wood.
- Wooden motor mount



- **Material specs and notes**

Plywood for parts, including gears, is 5/32" thick. We're starting with pieces that are 24x20", so don't make anything bigger than that. Gears should be smaller - see below.

Axles are 3/8" diameter, max length 12"

Holes that axles go through need to be bigger than the 3/8" axle-

- Holes in gears where the gear turns with the axle should be 13/32"
- Holes in gears where the gear spins freely on the axle should be 7/16"
- Holes in supports wherein the axle spins freely should be 7/16" also

See axle flange image in this folder for dimensions

Minimum gear diameter 3" (wooden gears can't be too small)

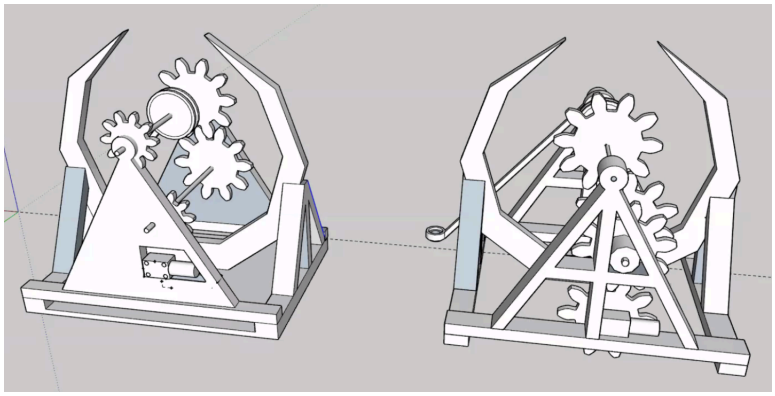
Maximum gear diameter 8" (bigger gears warp)

To mesh, ratio of # of teeth and pitch diameter must be the same for each gear

Gear spacing (center to center) must be sum of pitch radii

Motor mount: see diagram in this folder for screw hole placement. Use .18" diameter holes for screws.

Remember that we need to be able to take your model apart to prepare the cutting file- every distinct part- axles, gears, structural panels, etc - should be defined as a component.

- Each class met 3 times a week and reflected on current progress what worked and what didn't
- Catapult: 2.5 feet high! (too big and expensive to ship)
- 
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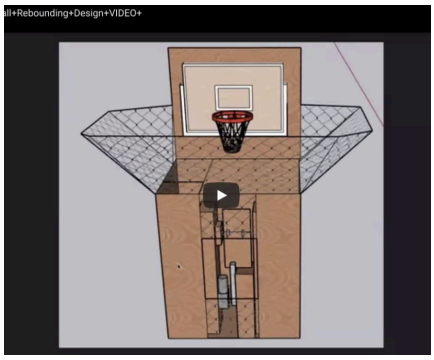
- 

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Optional Space to add Contact Information

As with the notes, will be shared to larger Maker community at the conclusion of the conference

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