

JOHN HEFFERNAN, PHD 10/16/2021

HOW I USED COVID ITSELF TO MOTIVATE MY TECH STUDENTS

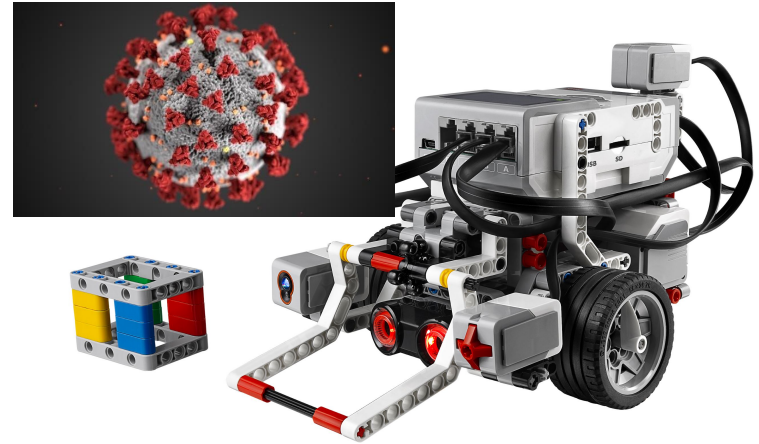
And Why They Liked It

kidsengineer.com

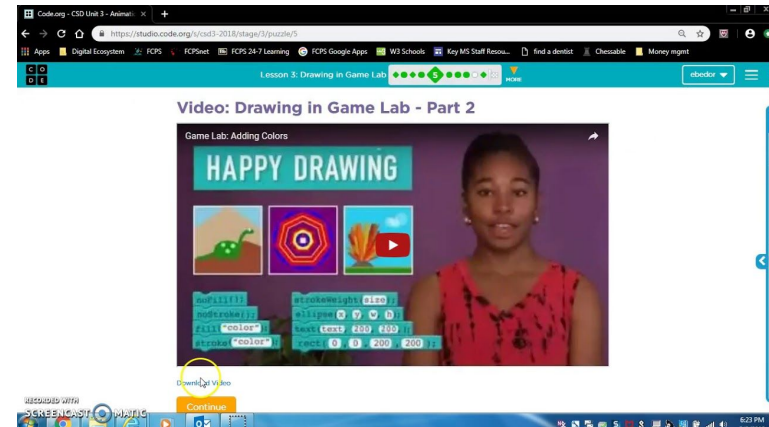
Resources -> Presentations



BACKGROUND



- Start of 2020-2021 school year
- All remote at this time
- High school - engineering design
- Middle school - Computer Science Discoveries
- Could send LEGO EV3 kits home
- CSD all online
- Google Meets and Docs





- Use pandemic to increase interest and motivation
- Express and work through feelings on pandemic
- Enable agency around pandemic
- Meet engineering and CS curriculum standards
- Retain project based format no matter the “mode”

MIDDLE SCHOOL COVID APPS

- **Modified Unit 1 CSD Design Your Own App Project (KE Resources)**
- **Unit taught students app inputs, outputs, processing types, storage**
- **Design (only) an app that helped with COVID**
- **Present remotely to class using Google Meet and Google Slides**

CUSTOM MASK APP



Inputs are information the person gives the computer

- I live in _____
- My address is _____
- I want the _____ custom made mask

Input's



Some of the many fabric choices



PANDEMIC ACTIVITY CHOOSER

Output Produced:

- Different activities for you to do that will keep you in a positive state of mind

The image shows a hand-drawn flowchart on a spiral notebook page, titled "Pandemic Activity Chooser". It consists of three main sections connected by arrows.

Section 1 (Top): Labeled "Good Morning" with a date field "9 ____". It asks "How are you feeling today?" and has four buttons: "Good", "Bad", "Meh", and "Sad". Below these is an "Other:" field. An arrow points down to the next section.

Section 2 (Middle): Labeled "Feeling: Good!" with a date field "9 ____". It asks "Today try:" and has a cloud-shaped button "Going for a run?". Below this are two bullet points: "• Yoga?" and "• Going on a hike?". At the bottom is an "Other:" field. An arrow points right to the third section.

Section 3 (Right): Labeled "Going for a run!" with a date field "9 ____". It says "Let's:" followed by a list of activities: "• count your steps!", "• See how far you go!", and "• See how fast you can go!". Below this is a "Let's go!" button and a "Get started" button.

APP PRESENTATION



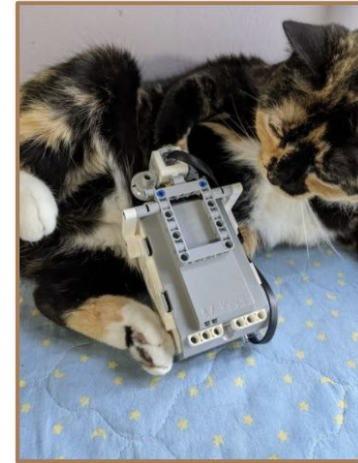
Rachel Wood

SOCIAL DISTANCE WARNING BOTS

- High school - kits sent home
- Mini-lessons on EV3 aspects
- EDP built into project documentation
- Sensor limited solutions

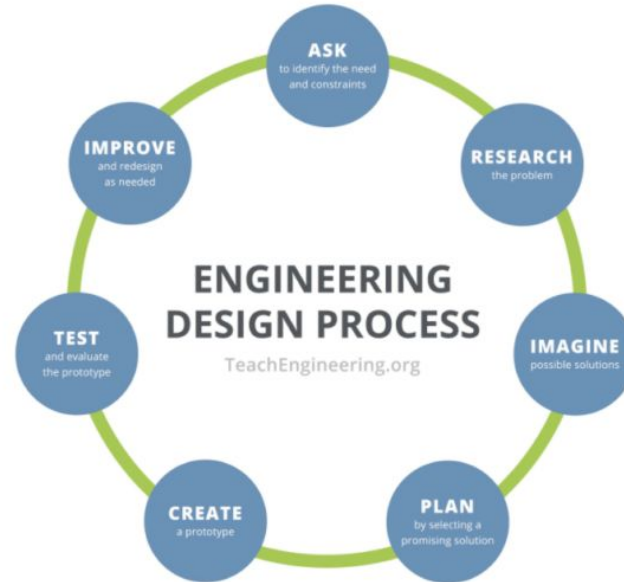
Final Solution

- My final solution was a very simple EV3 brick with an ultrasonic sensor on top and a reinforced belt clip on the back.
- The program contained a switch inside of an infinite loop. The switch uses the ultrasonic sensor to determine if there is an object within 6 feet of the sensor. If this is true, the robot displays an upset face and emits an unpleasant tone. If it is false, the robot displays a happy face and stays silent.
- [\[Video of test\]](#)

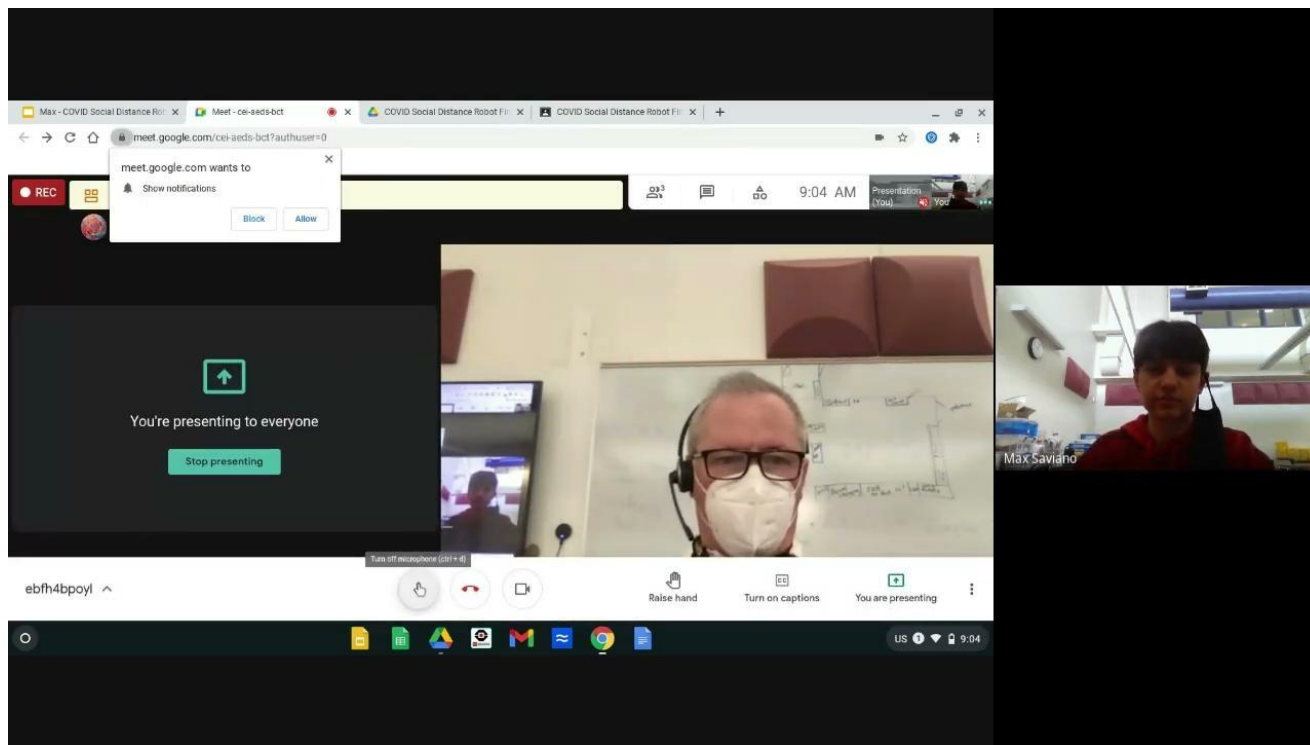


Reflection

- I learned that the engineering design process is, like my program, and endless loop. There will be many renditions before arriving at a final product.
- Next time, I would manage my time better and make sure I'm not leaving everything until the last minute. I would also try to keep my workspace more organized so I can work more efficiently.



EXAMPLE PRESENTATION



WHAT STUDENTS THOUGHT - MINI-STUDY

- 11 students video interviewed as part of presentation (n=11)
- Common themes - some expected, some unexpected
- Coded for common themes and analyzed using NVivo (qualitative research tool)
- Hands on (n=5)
- Fun (n=13)
- Challenging (n=5)
- No limits (n=5)
- Expected fun and creative
- Unexpected - hard and challenging in a good way



QUOTES - INTERESTING AND FUN

- I think it was really fun. It wasn't the easiest thing to do but it was fun to think and be open to a bunch of things and possibilities because there weren't any limitations.
- I liked it. It was pretty interesting. You had to think.
- Unlike most of the school projects I found it pretty interesting and fun. For once, we actually got to use our creativity – without too many constraints – to be able to do a school project. Yeah, I enjoyed it.

QUOTES - PANDEMIC

- I think was pretty fun specially because it's a very unique project especially since we are in such a unique time right now and I like how the project was catered to what's happening in the real world right now.
- It just really made me think of a social distancing and how important it is to social distance. Other than that, this robot isn't a solution or isn't a cure for the actual virus but it can just ease the situation at hand.

QUOTES - ENGINEERING

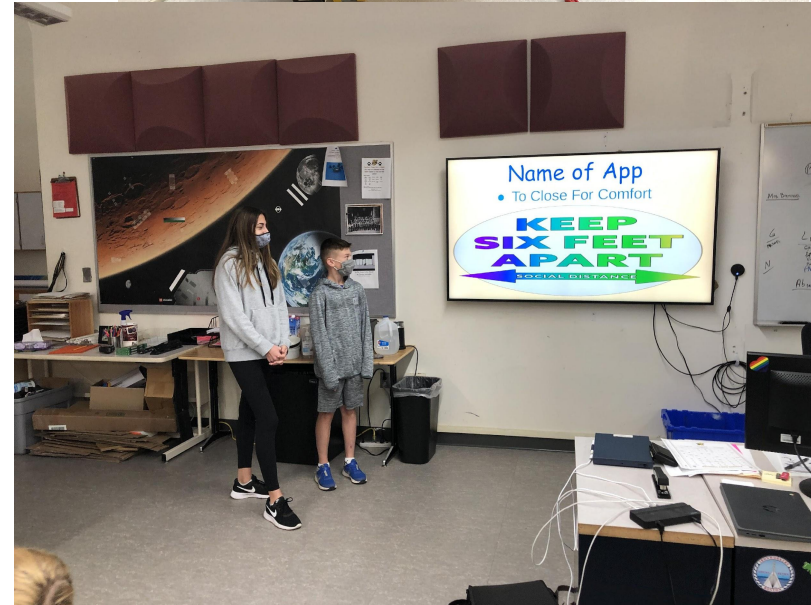
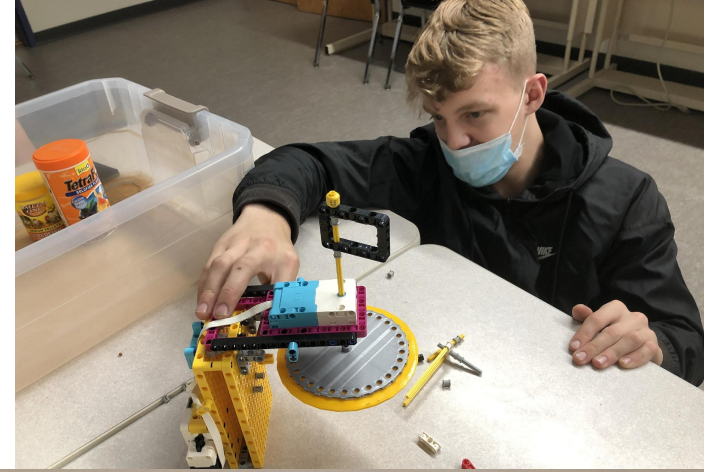
- Yeah, I think it did I think it has taught me that engineering is pertinent in every aspect of life – especially COVID – because you need engineers to... Say you're doing research: you're trying to find a vaccine, you're trying to figure out what will prevent it from spreading, and you need to use engineering to find solutions to those problems.

FINAL QUOTE

- It was very interesting because I didn't have like a certain design that I had to create and it's like I could virtually make anything. That's where my creative side comes in and I can take whatever is inside the kit that was given to us and create a robot and is very cool because I am a hands-on person. So, I like working on what is directly what's in front of me...

CONCLUSION

- COVID projects highly motivating and allowed students agency as a way to help deal with pandemic
- This year allowed app of their choice - some did COVID apps
- Fish feeders with laser cutting and 3D printing



MAKE YOUR OWN MUSICAL INSTRUMENT

- All remote, all school project
- In collaboration with music teacher - instrument families
- Students had to make an instrument at home
- Had to play Hot Cross Buns
- Mix of music, engineering, science, ELA



Questions and Comments

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