

CYSF Logbook

December 3, 2023: Topic planning

↳ After we decided to work together, we brain-stormed ideas and topics we could use for science fair. So far we thought of a peace bridge structure test and some sort of invention that turns sound into energy.

Dec. 4, 2023: Topic planning

We still didn't decide what topic we were going to do. We thought of some more ideas like train crash protection.

Dec. 7, 2023: Topic planning

We are still planning, didn't decide anything yet.

Dec. 11, 2023: Topic planning

↳ We have thought of a potential topic for our project. We decided to do something related to treating allergies.

~~Dec. 13th 2023 We have decided~~

Dec. 13th 2023: We have decided to make "An Auto Deploying Epi-pen That Reacts To Anaphylactic Symptoms. In this topic we would make an Epi-pen that deploys epinephrine by itself.

December 14, 2023: Proposal

We handed in our science fair proposal about an auto-deploying Epi-pen and are waiting for the results.

Dec. 18, 2023: Proposal was approved so we could start our project.

Dec. 20 - Dec. 25: Research Days

↳ learned more about our topic help us understand how we would show our project.

Dec. 27, 2023 (12:01-12:34)

↳ we started on our presentation for science fair. For are presentation we used google slides as it made it easy for a presentation.

Jan 2, 2024: Research time period

Jan 5, 2024: We added to our presentation about what anaphylaxis is and an introduction paragraph. In addition to that we also mentioned our basic project info and how an Epi-pen works.

Jan 7, 2024: We did more research on the previous information in the slides and we also added how anaphylactic reactions can be handled.

Jan 13: The problem and solution was added to the slides and we began researching ideas to make an auto-deploying Epi-pen.

Jan. 15, 2024: (12:13pm - 5:33pm)

↳ We spent a lot of time working today. We decided on a design idea for our project. The design will be based off an insulin pump because an insulin pump can insert an administered amount of dosage automatically when symptoms or problems are detected.

CYSF Logbook Continued...

Jan 17: The design idea, design and planning, and Epi-pump explanation was added to our slides. The name of our invention "the Epi-pump" was based off the idea of an insulin pump and an Epi-pen. The pump will work just like an insulin pump except that our sensors will be different and our pump would insert a dosage of epinephrine instead.

Jan 19, 2024: We did further research on the functions of an insulin pump. On our slides added a diagram of our Epi-pump and also added a slide for the pump functions and design.

Jan. 20, 2024: We also put 2 slides for how the pump will work on our slides after doing more research on how to build a project.

Jan. 21, 2024: (12:43pm - 7:35pm)

↳ We have almost completed the entire presentation. The presentation now has slides for Epi-pump explanation and warnings of caution, a slide for how the sensors function, how to change the infusion set works, and slides to change the cannula, cartridge, our materials needed to build the pump and our model showcase. To make our slides look aesthetic, we added backgrounds for each slide as well.

Jan 22: We finished any pending work and added images.

Jan 24: We finished all references and decided to copy the information onto a different slides.

Jan 26: We did editing to finalize our project

Jan 27, 2024: We met up to take our project video. We submitted our presentation to our school judges.

February 5, 2024: We were notified about our project and learned we got to cities. We joined the CYSF platform and began to do work for the platform.

Feb. 9 - Feb. 16: We finished the forms, method, problem, and conclusion. Other research will be done today as well.

Feb. 18 - 27: We finished our additional citations, acknowledgements and our declarations. We also added additional information that our CYSF coordinator recommended.

Feb 29 - March 6: We re-created the circuit for our pump and drew our circuit diagram. We finished on the code and +

March 10, 2024: We finished the logbook and we are going to take the video for the platform today.

Aaryan
and
Mrigank

~~Components to build a smart watch~~

- ESP 32 micro controller
- magnetometer
- accelerometer
- battery protector ic
- ambient light sensor
- heart rate sensor

Project Information:

epinephrine stimulates insulin release by the activation of beta-adrenergic receptors.

How glucose monitor works → The sensor measures the level of glucose in the interstitial fluid (fluid surrounding the cell) every 10 seconds and changes it into an electrical signal.

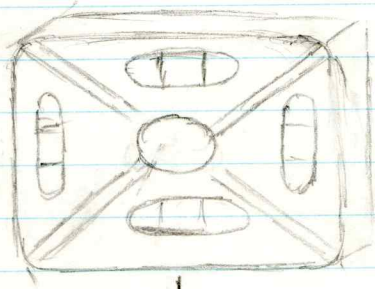
What sensors are in a glucose monitor → A CGM has three parts. First, there is a tiny sensor that can be inserted under your skin, often the skin on your belly or arm, with a sticky patch that helps it stay there. These sensors are called disposable sensors. Another type of CGM sensor - called an implant sensor - may be placed in your body.

Materials: sensors needed → photodiode sensor and chemical sensor.
↳ syringe needle, insulin pump machine, glucose monitor.

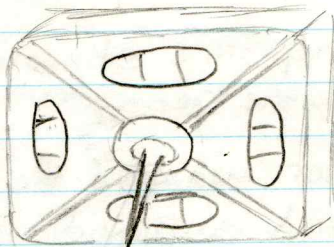
The insulin pump and monitor will be changed to react to anaphylaxis.

Insulin pumps work by delivering a basal, or set, rate of insulin through a tube called a cannula
↳ doctor determines the dosage rate

Insulin pumps consist of 3 parts. → The pump itself (which is a programmable electronic device that includes a user interface, electronic processor, worm screw to control dosing, and battery) a disposable reservoir that stores the insulin, and a disposable infusion set.

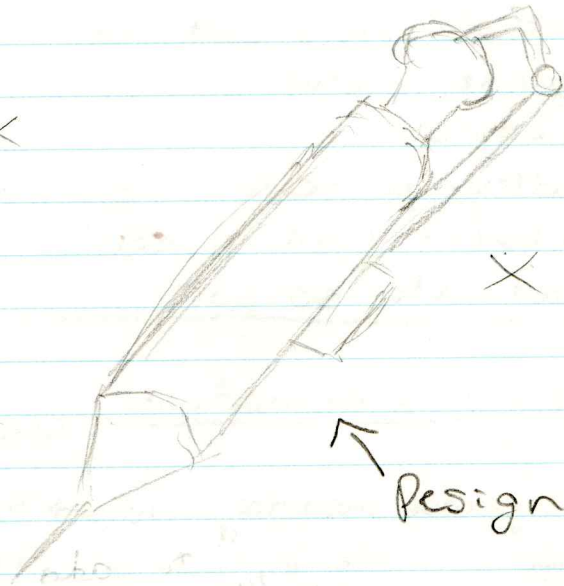


X



X

Design 2



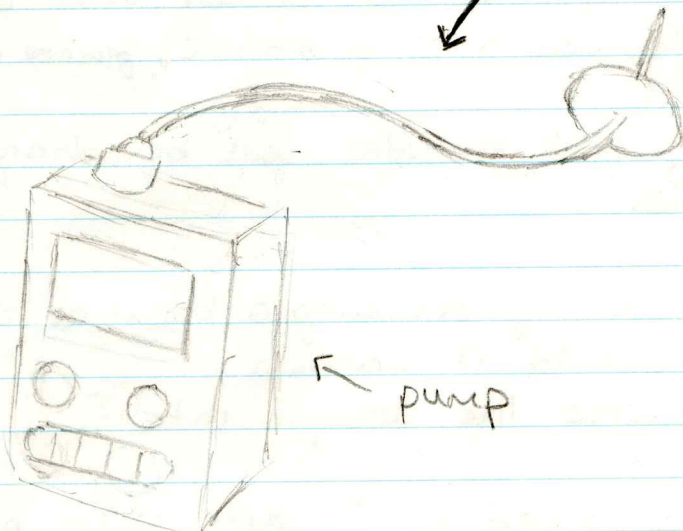
X

Design 1



X

Design 3



pump



Monitor

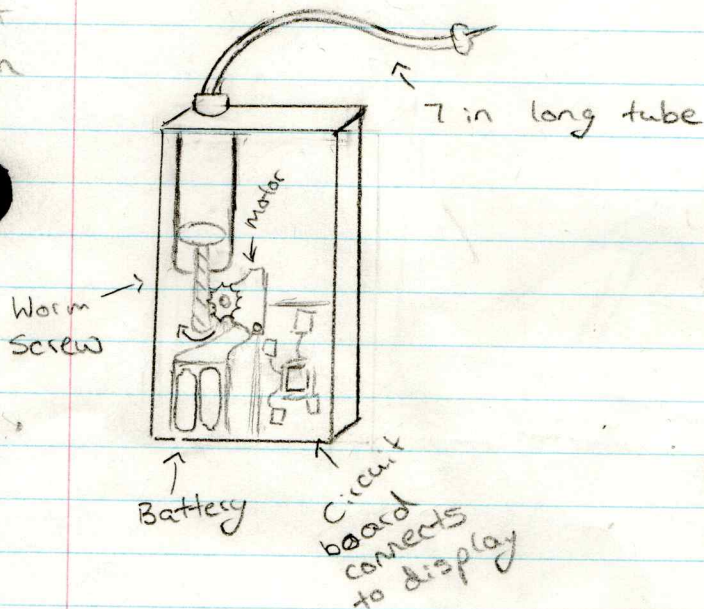
- Peace bridge structure test
- Turning sound into energy
- Gamma rays into energy
- Train crash protection
- ph of a substance can affect bacteria in raw meat.

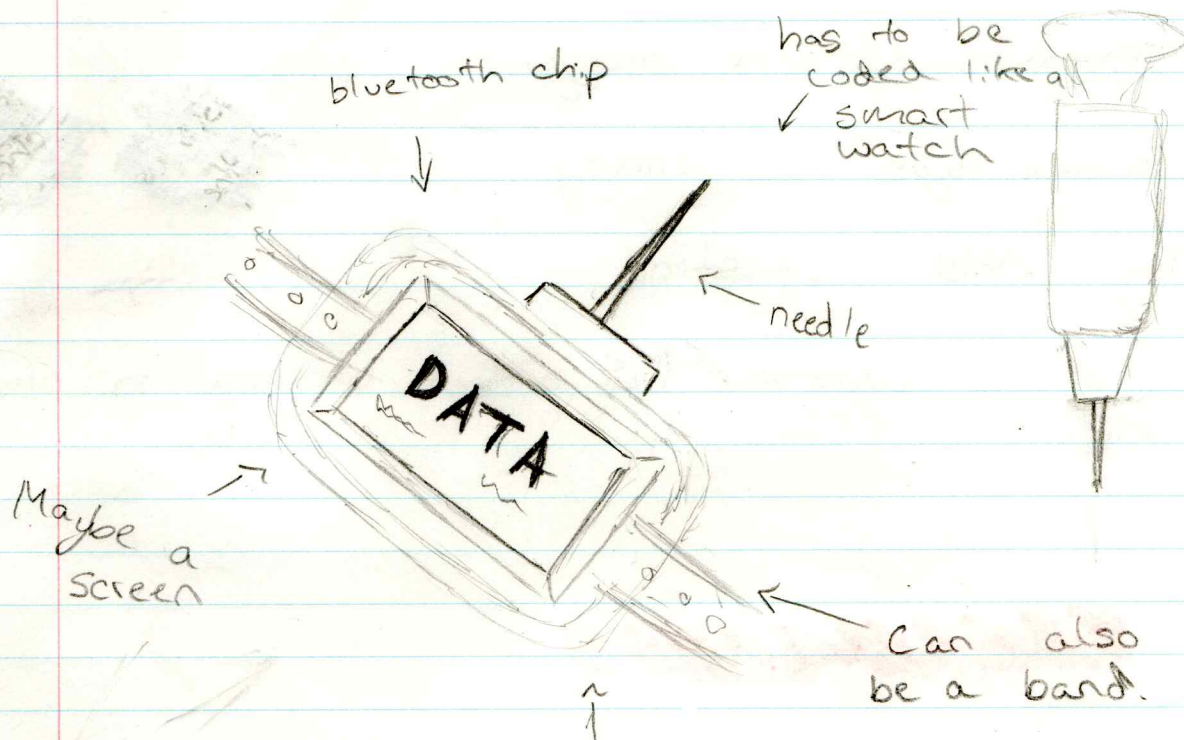
~~XXXXXXXXXXXX~~

ATSAMD21G18A MCU

Dec. 15,
project
hand-in

Final Design - Epipump





Plaster can be replaced

