Time table:

Dates	Disscussion
Dec 25, 2023	Choosing a topic
Dec 27, 2023	Getting Started\Hypothesis\Research\Materials
Jan 10, 2024	Variables\Application
Jan 13, 2024	Research
Jan 21, 2024	Expirement
Jan 27, 2024	Work on trifold
Jan 28, 2024	Continued making trifold
Feb 3, 2024	Practise presentation
Feb 4, 2024	Practise practise
Feb 5, 2024	Practise

Topics:

These are the topics we came up with:

- Do babies really look like their parents?
- Why do paper cuts hurt so much?
- How do you purify water?
- How do traffic lights work?
- How does cancer work?
- Which music is most addicting?
- How does the electrical pen work?
- What happens if you mix acids on a leaf?

We think that our favourite projects from our list are: the how does

- How does cancer work?
- Why do paper cuts hurt so much?
- How do traffic lights work?
- How does the electrical pen work?

After some deciding, we think that traffic lights would be really cool. We are going to do that one.

We came up with this topic because we see traffic lights every day, yet we dont know anything about them. We also wanted to do something with electricity, or more specifically, coding so we decided traffic lights would work

Research

- Traffic lights keep drivers and people safe.
- Keeps the road free from car accidents, and makes the road run efficiently
- Every traffic light is made of three things. A signal head, controller, and the detectors
- Red means stop, green means go, and yellow means get ready to stop
- Traffic lights use sensors or timers. Each one is better for different scenarios (or intersections)
- Timer based systems are most common type of system
- At some intersections, timers aren't always the best. Example: A timer traffic light at an intersection between a major boulevard and a small ~~blue~~ avenue would probably make drivers on the main road when they didn't need to.

Website Greenlight traffic engineering

- traffic engineering deals with the safety and efficient moving of people and cars on the road
- They are responsible for the planning, designing, and building for traffic lights

Questions:

How

- We learnt that for sensors, there is always a box, but is there, and box for timers and why or why not?

Nacto.com

- Real traffic lights have 60 to 90 seconds for the Green and Red traffic lights.
- Long signal cycles can become frustrating because you have to wait for quite some time.

Rosenberg and Gluck

- In the past, intersections ~~that~~ did not have a stop sign, Yield sign, traffic light, or a traffic officer.
- The rule for traffic lights are out is you must come to a complete stop at intersections or roadways where the traffic lights are not on.

~~Simmons and Fletcher~~

Question for Affan uncle
How do you protect the traffic lights from different Weather scenaireos.

December 27, 2023 # Logbook

Noor and Aliza's science project!
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Question:
- How does the right color traffic light turn on at the right time?

Notes:
once we finsh our research, we will do our hypothesis, and our expirement will be coding traffic lights.

Research:
- There is a inflared sonsor ^that finds energy that comes from the vehicles, and sends a 'message' to the traffic light, so the color can change.
- Yellow warns you to slow down because its about to change into red.
- In large cities, traffic light are usually operated from timers instead of sensors.
- In empty, more open the traffic light
- Traffic flows, speed limimts can determine the length of each traffic signal.
- Traffic light pattern is red, red and amber, green, amber and then red again.

Hypothesis:
If we put the wires in the correct spots, and make sure the LED's and resistors are all lined up and code it at the right time, for the right amount of seconds, we think it should work properly.

⑤

December 27, 2023
Materials:

-220/330 ohms (6)   -Port

-Yellow led (x2)   -Laptop

-Green led (x2)   -9v battery

-Red led (x2)

-Usb cable (1)

-UNO R3 (microprocessor)

-Breadboards (2)

-Jumper wires (x14)

Notes\research

If we used the wrong resistor the traffic lights would'dit work. For our experiment, we can only use 220 and 330 ohms. If we do other ones it wont work.

Websites we used:
-WWW.calgary.ca - calgary.ca/roads/traffic.signals.html
-Cysf.org - cysf.org/
-Smraza
-Arduino IDE - arduino.cc/en/software
-Auto.how stuff works.com
-Amperite - amper.te.com/blog/how-does-a-traffic-light-light-work/

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Dec 27, 2023   Experiment

Procedure:

Step 1: Put the black wire in the ground pin and put it on the negative side of the breadboard
Step 2: Put 220 resistor in the breadboard next to the black wire
Step 3: Repeat 2 more times
Step 4: Connect red wire to D7
Step 5: Code it on the computer
Step 6: Plug the wire into the computer, so you can test it, and see how it works.

Observations:

When we tested the code, it didn't light up like a traffic light, instead it was more of a trailing effect. So we will code it better this time.

Trial 2: The yellow keeps blinking, but red and green are both fine.

Trial 3: We ruined the coding by removing all the I s, so it didn't work

Trial 4: We did it we got the yellow led to stop blinking and now is stays solid for 1 second.

Notes: Because we have the experiment done, we have to do the variables. We already know what all the answers are, because the experiment is done. We also wanted to add that the coding was a bit hard, but we did it with a few trials and mista...

The controlled variable
Our controlled variables are: bread board, wires, arduino board, resistors, website for instructions

The manipulated variable
What we will purposely change is the coding. We cant change the wiring, because then the board wont work. We have to change the coding so that we can get the coding right.

The responding variable
If we change the coding on purpose, then based on how the coding is coded, that is how the traffic light will work

Application
We use traffic in our every day lives. They help with the flow of of traffic. They also help us avoid car crashes and help make the whole car traffic process run smoothly. If we did't have traffic lights, there would be car crashes all over the road! The colors on the traffic lights help us know when we should go, when we shouldn't, and when we have to go slowley, or more cautious. We asked a few drivers if they accually look for the people, or depend on the traffic lights. Many of them said they really just depend on the traffic lights, so we wanted to know how they time... so perfectly.

Notes: We have decided to make another traffic light because we realized that 2 traffic lights would make more sense, so we could show the different times. We will follow the same procedure, but we will just put the wires in the other digital pins.

①

	TF1	Time	TF2	Time
Red	off		on	
Yellow	off		of	
Green	on		off	

②

	TF1	Time	TF2	Time
Red	off		on	
Yellow	on			
Green	off			

Trial 1: Both green's are on, both reds are on and both yellow's are on the same time

Trial 2: We messed it up because we forgot to work on traffic light 2

Trial 3: We got traffic light 1 to work but traffic light 2 on the other hand, is not working! we are getting so frustrated :(

Trial 4: The traffic light one green led is on while traffic light two's red led is on! We did the first step!!

Trial 5: We changed the code and it works but the yellow turned on when the red was still on.

Our results we want to get

LOOP	Red	Yellow	Green	Time(s)
TF 1	off	off	on	6 secs
TF 2	on	off	off	6 secs
T F1	off	on	off	2 secs
TF2	on	off	off	2 secs
TF1	on	off	off	2 secs
TF2	on	off	off	2 secs
TF 1	on	off	off	6 secs
TF2	off	off	on	6 secs
TF1	on	off	offs	2 secs
TF2	off	on	offs	2 secs
TF 1	on	off	off	2 secs
TF2	on	off	off	2 secs