FRIDAY, OCTOBER 1ST

Project Type?

Study

Experimental

Innovation

Topics that we like:

- Recreating blood cells
- Biomedical engineering
- Prosthetics for pets
- Sport science
- Soccer
- Badminton
- Plasma Technologies
- Making Plasma
- Aircrafts

Topic Question Finalization

What are the factors that affect the performance of a sprinter?

→ Does the music a track athlete listens to affect their performance in speed?
→ Does the water intake of a track athlete affect their performance in their sprint?
→ How does stretching impact the performance of a track athlete in their sprint?

Topic Context

When we started this project, we were very divided on what to do. Japleen wanted to go big with things like recreating blood cells and prosthetics, where Avantika "just wanted to blow stuff up". Whenever we found an idea, it just didn't work for the both of us. And we did actually agree on an idea at one point, to do research on plasma technologies and how we can use them for the benefit of humanity, but when we talked to a science team director and teacher in our school he told us that what we planned to do for our project was incredibly dangerous (it involved grapes and a microwave). This set back left us devastated, I mean Avantika was even going to bring a plasma ball into school for the project, it was quite unfortunate. But eventually due our love for our sports we bonded over the idea of doing a sport science project, something that benefited both of us as athletes. We settled on doing an experimental project on which factors improve our running (specifically sprinting) and how we can manipulate these factors to reach our peak performance.

Summary of Events

- We established our question and had it approved by the Science Fair Team's coordinator.

THURSDAY, OCTOBER 17TH

Background Information

- ★ What music genre best improves and facilitates superior performance in athletes.
  - https://pmc.ncbi.nlm.nih.gov/articles/PMC8167645/
- ★ What amount of water intake in suitable for the human body?
  - For a 150 lb. female: ~340-477 ml, and for a 200 lb. male: ~455-636 ml.
  - https://puresportsmed.com/blog/posts/the-hydration-debate-how-much-water-do-you-really-need#:~:text=The%20Recommended%20Guidelines,male
- ★ Does the amount of water you have in a day impact your performance in a sprint?
  - The American College of Sports Medicine suggests 5-7 ml of water per kg of body weight before exercise.
  - https://www.betterhealth.vic.gov.au/health/healthyliving/Exercise-the-low-down-on-water-and-drinks
- ★ Does music affect athletic performance
  - https://www.center4research.org/can-listening-music-improve-workout/#:~:text=Studies%20show%20that%20faster%2Dpaced,%2C%20pace%2C%20or%20repetitions%20completed.
- ★ What does water do for the human body
- ★ How do water levels impact the human body.
- ★ What does music do to the mind/body

Experiment Variables:

- Water Intake
- Stretching
- Music

Summary of Events

- Made and updated logbook
- Planning for experiment
- Creation of background information.

SUNDAY, OCTOBER 20TH

Experiment Factors and Planning

Music

a) Music Genres
    → Rap - FEIN by Travis Scott ft. Playboi Carti
    → Pop - California Girls by Katy Perry ft. Snoop Dogg
    → Classical - Fur Elise by Ludwig van Beethoven
    → Rock - Thunderstruck by AC/DC
    → Country - A Bar Song (Tipsy) by Shaboozey
    → No music
b) Give test subjects time between each run
c) Use Japleen's headphones (Sanitize with Lysol wipes between each use)
d) 1–2 day activity (depending on how much time it takes)

Water Intake

a) Over the course of 4 days
b) Each day is a different amount of water (100, 300, 500, 700 mL)
c) Cannot consume any additional water or other liquids that day before the experiment
d) Water provided when they get off their buses

Stretching

a) 1-3 day activity (depending on how much time it takes)

<u>Test Subject Options</u>

Priority: Karmin, Ram & Fejiro, Grace

Backups: Juliet, Jayden & Harlow, Nikola

<u>Summary of Events</u>

- Updated Logbook
- Discussed conditions for experiments
- Determined test subject options and found backups

(There is a large gap here because Avantika went on vacation and do work was done.)

THURSDAY, NOVEMBER 28TH

<u>Email</u>

Received Email:

Hi Japleen,

I was wondering what your hydration conditions will be and if you plan to purposely have participants underhydrated for the exercise. I was also wondering if all participants will at least have a warm up before exercise (whether they are in the stretching condition or not).

Thanks,
Christoff

Sent Email:

Hi Mr. Christoff,

Thank you for getting back to me. In terms of hydration conditions, we will tell our participants to not consume any water that day until they get to school. Once they are in school we will give them a water bottle (with either 100, 300, 500, or 700 mL of water) to finish by the time that we do the experiment They cannot consume any fluids other than water on the day(s) of the experiment.

In the ethics form, I mentioned that this experiment will be held over several days so four days we do hydration, one day stretching, and one day music. Only on the day that we are experimenting with hydration will we control their water and fluid intake, on the rest of the experiment days, we will tell them to consume how much they would on a regular day (it may seem like this variable isn't controlled and could vary the results, but we do this not to see how a tightly controlled environment would affect natural behaviours, but instead to observe outcomes under realistic conditions. Allowing participants to follow their natural routines makes sure that the results are more applicable and reflective of real-world scenarios.).

Regarding your warm up queries, yes. We do intend to have a short warm up every day consisting of regular stretches and warm up activities such as lunges, leg swings, forward holds, etc. The only day that the warm up routine will change would be on the day that we manipulate stretches.

Take care!
Japleen Kaur

Summary of Events

- Got email from CYSF Ethics team
- Responded to email (Japleen)
- Some research was done
- Updated Logbook

SATURDAY, OCTOBER 30TH

Email

Received Email:

Hi Japleen,

Thank you for your detailed response! I also wanted to ask about the intensity of the exercise and how much the participants will complete on testing day. I suggest keeping it at a level similar to what one might experience in a gym class. If you're conducting a sprint test, I recommend limiting participants to just one or a couple of sprints.

In addition to the intensity and amount of exercise they will be doing, how much time will pass between their arrival at school and the start of the exercise? Also, what is the age range of your participants?

Additionally, please remember to obtain informed consent, as this is required for any project involving human participants. Be sure to inform participants that they are not obligated to continue if they feel unprepared or uncomfortable at any point before or during testing. CYSF guidelines for exercise testing are quite strict, so I'm being a little more thorough in reviewing your project.

Thanks,
Christoff

Sent Email:

Hi Mr. Christoff,

Thank you for your quick response. Regarding intensity, we intend to keep it to a maximum of 6 sprints a day. I recognize it is a high number but the participant will be getting at least a 5-minute break between each sprint. It is very similar to an activity we do consistently in phys ed called Spark 500 (or Indy 500), where you get into small groups and do a relay-style race around the gym to see which can get the most laps in. If anything, the sprints will have considerably less intensity compared to our phys ed class. Regardless of the intensity or quantity of the sprints, we will be constantly checking on our participants' well-being and making sure they recover well between experiment days.

Continuing on with your intensity queries, our plan is to do the experiments during lunch periods, so around 3-4 hours after they arrive at school. All our participants are grade 9 students, so all participants will be between 13 and 15 years of age.

I can assure you that we will inform and constantly remind all participants that they have the right to back out at any point if they aren't ready or comfortable regarding the experiment. Also if it isn't bothersome, could you please provide us with the CYSF guidelines for exercise testing?

Take care!

Japleen Kaur

Summary of Events

- Got email from CYSF Ethics team
- Responded to email (Japleen)
- Updated Logbook

MONDAY, DECEMBER 2ND

Email

Received Email:

Hi Japleen,

I will approve your project as you suggest that it is lower intensity than what occurs in gym class.

Again, ensure that participants are fully aware their participation is voluntary, particularly during exercise testing. Regularly check in with participants during testing, and if they experience any negative symptoms, such as dizziness or severe fatigue, they should immediately withdraw. You may still use any data collected up to that point.

For reference, here are the CYSF guidelines: CYSF Policies. According to these guidelines, all exercise testing is classified as significant risk, requiring the completion of the Significant Risk Form 2B. However, after more thoroughly reviewing your project, I'm aware that your participants are young and healthy, and you have accounted for the necessary safety precautions.

Sorry, the CYSF policies did not link in my previous message. Here they are:
https://www.cysf.org/wp-content/uploads/CYSFS-Policies.pdf

Feel free to start your project and let me know if you have any questions at all,
Christoff

Ethics And Due Care Form 2A for project 'What are the factors that affect the performance of a sprinter?: Japleen Kaur ' is approved.

Thanks very much and good luck with your project!
Christoff

Sent Email:

Thank you so much! Have a great rest of your day.

Summary of Events

- Got email from CYSF Ethics team

- Responded to email (Japleen)
- Got project approved
- Updated Logbook

TUESDAY, DECEMBER 3RD

- Talked to Mrs. Bretner
- Got consent forms
- Updated Logbook

THURSDAY, DECEMBER 5TH

- Updated logbook
- Consent forms added and made tailored to experiment.
    - https://acrobat.adobe.com/id/urn:aaid:sc:VA6C2:0d2e8a39-40e4-4510-a739-9a3d54417cc8
- Emailed Supervisor asking for phone number regarding 2C risk form

Science Fair 2C Form
Hi Ms.Bretner,

Japleen and I need a phone number to put down for the 2C science fair form, that would go under your name. We already put the school phone down in the selected area, but are also wondering if you would like for us to put another number instead?

Thanks,
Avantika & Japleen

FRIDAY, DECEMBER 6TH

- Gave out consent forms.
    - https://acrobat.adobe.com/id/urn:aaid:sc:VA6C2:0d2e8a39-40e4-4510-a739-9a3d54417cc8
- Told people about the experiment, and explained process.
- Got Information and selected candidates
- Looked for different locations for the running process
- Shared Spotify playlist with each other (@Japleen Kaur Sandhu -> @Avantika Kachru)
- Identified participants homeroom class
- Updated Logbook

NAME	Harlow Turner	Kartikeya Pappu	Daniel Emrich	Jaycee Brauzea
AGE	14	14	14	14
GENDER	Female	Male	Male	Female

WEIGHT	120lbs (54.4kg)	110lbs (50.2kg)	131.83 lbs. (59.8 kg)	83lbs (37.7kg)
HEIGHT	5'5ft (1.65m)	5'6ft (1.68m)	5'10ft (1.77m)	5'3ft (1.54m)
CLASS	9C	9C	9C	9C

MONDAY, DECEMBER 9TH

- Found track, that is safe and useable throughout testing dates.
- Measured different possible tracks incase initial track fails
- Measured out 100m on current track
- Formed playlist for music runner
    - https://open.spotify.com/playlist/0v5MA2ovEWnpRKK9uiVYOO?si=69c93980bd664249
    - Included one song per genre
- Started Kartikeya's testing after receiving part permission from signed form.
    - Used his athletic earbuds: Skullcandy INK'D Earset
- Layed out cones marking any hazards
- Marked start and finish with cones
- Got through 2 genres of music with runner #1 (Kartikeya)

RAP – FEIN by Travis Scott ft. Playboi Carti	13.6 seconds
POP – California Girls by Katy Perry ft. Snoop Dogg	14.8 seconds

FRIDAY, JANUARY 1ST 2025

- Made significate risk form 2B and started filling it in.
- Started to identify risks, and other deeper topics on the 2B risk form
- Asked participants for weight & height.
- Created height, weight, gender, class chart. Allowing us to keep track of participants.
- Updated Logbook
- Sent email regarding access to gym on Fridays.

Request for Gym Access on Fridays During Nutrition Break

Dear Ms. Donaldson,

We hope this message finds you well. We are writing to you to request permission to use the gym during the nutrition break on Fridays for a science fair experiment. The experiment involves running, and the gym provides the ideal space to ensure accurate results and a safe environment. We have sent out emails to some teachers to help supervise while we are in the gym. This way we are as safe as possible.

Please let me know if this can be arranged or if there are any steps we need to take to make this possible. We appreciate your support in helping us complete our project.

Thank you for your time and consideration.

Best regards,
Avantika & Japleen

THURSDAY, JANUARY 2ND

- Added charts for runner data
    - Test for music runner #1 (Kartikeya Pappu)

Music Genres – Kartikeya Pappu	Speed/Run Time
RAP – FEIN by Travis Scott ft. Playboi Carti	13.6 seconds
POP – California Girls by Katy Perry ft. Snoop Dogg	13.61 seconds
CLASSICAL – Fur Elise by Ludwig van Beethoven	14.39 seconds
ROCK – Thunderstruck by AC/DC	13.98 seconds
COUNTRY – A Bar Song (Tipsy) by Shaboozy	13.69 seconds
NO MUSIC (Controlled)	13.70 seconds

    - Test for music runner #2 (Daniel Emrich)

Music Genres – Daniel Emrich	Speed/Run Time
RAP – FEIN by Travis Scott ft. Playboi Carti	14.52 seconds
POP – California Girls by Katy Perry ft. Snoop Dogg	14.8 seconds
CLASSICAL – Fur Elise by Ludwig van Beethoven	- seconds
ROCK – Thunderstruck by AC/DC	- seconds
COUNTRY – A Bar Song (Tipsy) by Shaboozy	- seconds
NO MUSIC (Controlled)	14.64 seconds

Emails

Request to Use Hallways for Science Fair Experiment

Dear Mrs. Riddick,

I hope this message finds you well. I am writing to formally request permission to use the grade 7, 8, and 9 hallways during SPARK time from January 7 to January 23 (dates may vary depending on progress) for our science fair project. Our experiment investigates how music genre, water intake, and stretching routines affect sprint performance over a 100-meter distance. The study involves four participants completing sprints under varying conditions, aiming to identify the factors that can optimize athletic performance. This project has the potential to provide meaningful insights into how external and physiological factors influence speed and flexibility, benefiting not only our research but also the wider athletic community.

To ensure the safety and convenience of all students, we have planned the experiment during SPARK time when the hallways are less crowded. We will request an announcement in the daily video announcements to inform students to use restrooms and complete other activities before SPARK to avoid disruptions. Additionally, only the grade 7, 8, and 9 hallways will be used, and we will avoid the hallways connected to the main entrance for safety reasons.

We have requested for this experiment to supervised by Mr. Butler, Mrs. Vergie, Ms. Donaldson, and Mr. Dhanoa with them alternating supervision dates. The study involves four active participants completing sprints under varying conditions, aiming to identify the factors that can optimize athletic performance. The participants are Kartikeya Pappu (Class 9C), Juliet Benson (Class 9C), Daniel Emrich (Class 9C), and Grace Abaku (Class 9E). We also have six backups ready to step in if needed. All participants have provided their consent, and their parents have been informed, approved, and have given us written consent for their children to be in this experiment.

While this may temporarily affect SPARK activities, we will make every effort to minimize disruptions by communicating the plan well in advance. At the end of each session, we will ensure the hallways are left clean and organized, removing cones and tape daily.

We believe this project offers a valuable opportunity and aligns with the spirit of innovation and learning in our school. Your approval would enable us to execute this experiment successfully and contribute meaningful results to our science fair projecct. In conclusion, we would like to know if this arrangement could be made possible. Thank you so much for considering our request. Please feel free to reach out if you have any questions or need further details regarding the potential arrangement.

Sincerely,

Japleen Kaur Sandhu and Avantika Kachru

Grade 9, Class 9C

Science Fair Project Supervision

Dear (Teacher),

Hope you're having a good day and an exciting winter break! This email is concerning our supervision needs for our science fair experiment. Japleen and I would need a volunteer during our science fair tests. This time would just be during spark is only around 15 minutes. We are working on getting our time out of spark approved by our homeroom teacher (Ms. Witte) and Ms. Riddick. The party that would need to be supervised is around six people including Japleen and I. The experiment includes testing each participating runner's sprinting capabilities, and what factors can affect a 100m sprint. Our efforts are focused on getting access to the hallways during spark, by contacting the office and should hopefully have safe and clear access to them in our provided times. We were wondering if you would be able to lend us your morning spark times to supervise the activity. We may also need some supervision time in the gym on Friday, during the 15-minute nutrition break. Japleen and I are hoping to do this between January 7th and January 24th. We truly appreciate your consideration and assistance, and we hope you can help us bring our experiment to life during this time.

Best Regards,
Avantika & Japleen

Testing Period

MONDAY, JANUARY 13TH

- Stretch Testing – Day 1 (Dynamic) for Ram
- Control Testing for Dan and Harlow

TUESDAY, JANUARY 14TH

- Water Testing – Day 1 (100 mL) for all
- Control Testing for Jaycee

WEDNESDAY, JANUARY 15TH

- Water Testing – Day 2 (300 mL) for all
- Science Fair Studies on Google Meet

THURSDAY, JANUARY 16TH

- Water Testing- Day 3 (500 mL) for all
- Stretch Testing – Day 2 (Static) for Ram

FRIDAY, JANUARY 17TH

- Water Testing - Day 4 (700mL) for all

MONDAY, JANUARY 20TH

- Ram leaves
- Music Testing – Day 1 (Pop: California Girls by Katy Perry) for Dan, Harlow, and Jaycee

TUESDAY, JANUARY 21ST

- Music Testing – Day 2 (Rap: FEIN by Travis Scott ft. Playboi Carti) for Dan, Harlow, and Jaycee

WEDNESDAY, JANUARY 22ND

- Music Testing - Day 3 (Fur Elise by Beethoven) for Dan, Harlow, and Jaycee
- Science Fair Studies on Google Meet

THURSDAY, JANUARY 23RD

- Music Testing - Day 4 (Thunderstruck by ACDC) for Dan, Harlow, and Jaycee

FRIDAY, JANUARY 24TH

- Music Testing - Day 5 (Tipsy (A Bar Song) by Shaboozy) for Dan, Harlow, and Jaycee

MONDAY, JANUARY 27TH

- Stretch Testing – Day 1 (Static) for Dan, Harlow, and Jaycee

TUESDAY, JANUARY 28TH

- Stretch Testing – Day 2 (Dynamic) for Dan, Harlow, and Jaycee

WEDNESDAY, JANUARY 29TH

- Science Fair Studies on Google Meet