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### Final Project Proposal

Most track athletes only care about two things regarding competition: What place they get and what time they achieve. As a sprinter in high school and college, I can attest that this is true. Hours upon hours of training go into each race, so the time achieved can be either exhilarating or devastating. However, sprinters must consider the many factors affecting race times. In this project, I will explore how the location of competition affects race times on a small scale with my high school conference and on a larger scale in professional track. The overall question I'm answering is: Are some tracks faster than others, and if so, why?

The first question I will explore is: Is my high school track slower than other tracks in my area? I always felt like I ran slowly on Princeville's track (my high school track). To determine whether other athletes were experiencing the same increase in time, I formed a data set using meet results from athletic.net. The columns of this set include athlete, race time, school, location, meet type, length of race, date, and school year of athlete. This data set is paired with another that records wind speed, temperature, and humidity for each of the track meets. The Princeville track has existed for three years, so the data set consists of times from 2021, 2022, and 2023. From those years, I took the results of the 100m, 200m, and 400m for every meet Princeville's men's team competed in. From this set, I calculated Z-scores fixed by athlete and race length to determine how far athletes deviated from their average time depending on which track they ran on. Using these Z-scores should give an overall indication of whether or not Princeville's track is the slowest.

The second data set I am using is from worldathletics.org, which ranks the fastest track times in the world each year. I formed a data set of 9000 results from the fastest sprinters in the world by pulling the top 1000 times for the 100m, 200m, and 400m for 2021, 2022, and 2023. The columns of this set

record race time, wind, athlete, nationality, location, date, and length of race. Using the same Z-score calculation mentioned above, I can investigate how professional sprinters' times differ in relation to location.

After determining the overall fastest and slowest tracks for both sets, I will investigate how the results change as we consider the many factors that go into each race. For example, I will individually look at which track is the fastest for the 100, 200, and 400. I will also include the type of meet, how far into the track season each meet is, temperature, school year and wind speed. After investigating both data sets in this manner, I will discuss how the different factors affect which tracks we view as the fastest. In terms of reliability, there is some room for error on athletic.net because coaches can make mistakes as they enter names and times. However, throughout the process of scraping the data set and using Excel filters, I've been able to check for most of those errors. The world athletics data matched up well with my knowledge of sprinting in 2021, 2022 and 2023. In addition, since I manually pasted in the data for both sets, checking for errors as I went along, I feel confident about the validity of the data.

## Data Sets

Athletic.net for High School Data

<https://www.athletic.net/team/16637/track-and-field-outdoor/2024>

Excel

[https://docs.google.com/spreadsheets/d/e/2PACX-1vRvj2xskMORIZ2FIglxmwFLc0quU77KRxAStuyw4bhVJJD-Czo\\_eH4iz9DBygPTw/pub?output=xlsx](https://docs.google.com/spreadsheets/d/e/2PACX-1vRvj2xskMORIZ2FIglxmwFLc0quU77KRxAStuyw4bhVJJD-Czo_eH4iz9DBygPTw/pub?output=xlsx)

World Athletics.org for Professional Data.

<https://worldathletics.org/records/toplists/sprints/100-metres/outdoor/men/senior/2023?regionType=world&timing=electronic&windReading=regular&page=1&bestResultsOnly=false>

Excel

<https://docs.google.com/spreadsheets/d/e/2PACX-1vT2pWxDcNSgiSS5Lpz-oxBSqp3wa3Qb1e6K-bE5LOTh9EPqO8-OhnD33Fn-67QCJQ/pubhtml>