# Olympic Records

Students use scatter plots and linear regression to analyze data about olympic records in running, swimming, or speed skating.

## **The Issue**

Olympians and coaches often look at data from past world record events to inform their training. Because the physiological attributes required to be a good sprinter, for example, are quite different from those required to be a good long distance runner, there is no simple formula to predict optimal performance. Factors that contribute to athleticism vary widely. As such, it is useful to examine the data to search out patterns and trends to make predictions about what might happen in the future.

## **Objectives**

Students will use scatter plots, correlation, and lines of best fit to make predictions about world records data.

## **Phases of the Project**

### **1. Choose your dataset.**

Decide whether you will explore running, swimming, or speed skating. You can check out the data by clicking through the pages on [this spreadsheet](https://docs.google.com/spreadsheets/d/10aT0EX0jBFKlcH9C3d_GdyPJg1Qs8xWXfZI0TsSzP7k/edit?usp=sharing).

### **2. Compute average speeds.**

* Open the [Olympic Records Starter File](https://code.pyret.org/editor#share=1hQ9acqsDeWuMKlTVj8EJS3GOnxSxsA2w&v=1904b2c) in Pyret. Load the men’s table and the women’s table for the dataset you’ve chosen to explore.
* On each of those two tables, build a column that computes the average speed for each event.

### **3. Create scatter plots with lines of best fit.**

* Use Pyret to create two scatter plots (men’s records, women’s records) that plot the relationship between average speed and distance.
* Add a line of best fit to each plot.

### **4. Analyze and share your results via slides or a written report.**

Please include the following data and displays:

* Your three-column tables (including average speeds)
* Your scatter plots, with lines of best fit and the accompanying equations provided
* Include a link to your Pyret code that you used to produce the above data and displays

Provide responses to the following questions about your lines of best fit on each of your two graphs:

* What does the slope represent?
* What does the y-intercept represent?
* What does the line of best fit represent?
* What does the correlation coefficient (r) represent?

Please also discuss:

* How are the men’s events and the women’s events alike and different? What factors do you think play a role here?
* What sort of prediction can you make using the lines of best fit? How confident would you be to use this prediction to assist athletes?

| **"A Legal Ruling on Their Womanhood"** At various points since women started competing in the Olympics in 1900, there has been a concern about the possibility of teams cheating by having men compete in women’s fields. Currently, to prevent any competitor from having an allegedly unfair advantage, female athletes are subjected to testosterone tests. As a result, female athletes with naturally high testosterone levels - who, in most cases, are from Africa and South Asia - face a difficult situation. For instance, Namibian track and field stars [Christine Mboma and Beatrice Masilingi](https://www.bbc.com/news/world-africa-57748135) must choose either to take medication to lower their testosterone levels or opt out of the Olympics entirely. Although some commentators feel that a third category is necessary at the Olympics (aside from just “men” and “women”), others believe that testing testosterone levels results in discrimination. Research shows, for instance, that in a group of elite male athletes, all with varying testosterone levels, those with higher levels of testosterone will not necessarily perform better than males with lower levels. |
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## **Resources**

Wikipedia World Record progressions for [running](https://en.wikipedia.org/wiki/Athletics_record_progressions) Wikipedia World Record progressions for [swimming](https://en.wikipedia.org/wiki/List_of_world_records_in_swimming) Wikipedia World Record progressions for [speed skating](https://en.wikipedia.org/wiki/List_of_world_records_in_speed_skating)

(Based on a project by Joy Straub)

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