

**Problem of the Week: Week 2 (Sum1): Year 10: Statistics: Bivariate data and univariate data**

- use and interpret scatter graphs of bivariate data; recognise correlation and know that it does not indicate causation; draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends whilst knowing the dangers of so doing.
- interpret, analyse and compare the distributions of data sets from univariate empirical distributions through:
  - appropriate graphical representation involving discrete, continuous and grouped data, **{including box plots}**
  - appropriate measures of central tendency (including modal class) and spread **{including quartiles and inter-quartile range}**

**David and Goliath**

<https://nrich.maths.org/7360>

In the tables below are some of the top performing shot putters of all time, their weight in kilograms, and the distance they threw in metres.

Look at the two data sets. Do any results stand out?

**What questions occur to you?**

Choose appropriate statistical analyses to answer some of your questions.  
Are there any other data you will need to collect?

You may wish to use the spreadsheet called 'shot-putting' containing the two data sets.

It is suggested that heavier competitors are at an advantage in the shot put.  
Do the data support that claim?

What would be the effect on the competition of introducing weight categories (like those found in boxing or weightlifting), or giving lighter shots to lighter competitors?

(See next page for data tables)

**You could plot the data on a scatter graph to give you a feel for any relationships / correlation**

**There are no right or wrong answers in this task. You are being asked to look at the data and justify your ideas and conclusions using statistical diagrams and calculations.**

**Men's shot put:**

Name	Weight (kg)	Distance (m)
Randy Barnes	137	23.12
Ulf Timmermann	118	23.06
Alessandro Andrei	118	22.91
Werner Günthör	130	22.75
Kevin Toth	144	22.67
Udo Beyer	135	22.64
John Brenner	127	22.52
Adam Nelson	115	22.51
Reese Hoffa	133	22.43
Sergey Smirnov	126	22.24
John Godina	129	22.20
Sergey Gavryushin	95	22.10
Sergey Kasnauskas	126	22.09
Aleksandr Baryshnikov	130	22.00
Gregg Taffalis	132	21.98
Mikhail Kostin	120	21.96
Tomasz Majewski	132	21.95
Remigius Machura	118	21.93
Cottrell J. Hunter	135	21.87
Mike Stulce	122	21.82

**Women's Shot Put:**

Name	Weight (kg)	Distance (m)
Natalya Lisovskaya	105	22.63
Ilona Briesenick	95	22.45
Helena Fibingerová	95	22.32
Claudia Losch	84	22.19
Meisu Li	92	21.76
Natalya Akhriemenko	90	21.73
Vita Pavlysh	90	21.69
Xinmei Sui	90	21.66
Verzhinia Veselinova	95	21.61
Margitta Pufe	90	21.58
Ines Müller	90	21.57
Nunu Abashidze	105	21.53
Zhihong Huang	100	21.52
Larisa Peleshenko	95	21.46
Heike Hartwig	95	21.31
Liane Schmuhl	90	21.27
Astrid Kumbernuss	90	21.22
Kathrin Neimke	90	21.21
Helma Knorscheidt	90	21.19
Heidi Krieger	95	21.10

**NOTES AND BACKGROUND**

Data source: [IAAF](#)

Mass of shot for male competitors: 7.260 kg (16 lb)

Mass of shot for female competitors: 4 kg (8.82 lb)

**Challenge**

IF you are feeling confident with this task, and you have internet access, research other data about top performing sports people.

Use graphs and averages to support any observations you make.

For example, the BBC provides results and times for different sporting events

<https://www.bbc.com/sport/athletics/world-championships-outdoor/results>