

## **Overview – In the Olympics, Are Women Improving Faster Than Men?**

### **Introductory comment**

**To the pupil** – One of the features of Olympic Games history is that women have had to win a series of battles to be able to compete. However while the performances (winning times and distances) of men in Olympic Games events are generally superior to those of women, women's performances often appear to be improving faster than men's.

Surely this means that in the near future women will overtake men – or does it?

### **1. Overview**

One of the features of Olympic Games history is that women have had to win a series of battles to be able to compete. However, since they have been competing, there have been many cases where the women, at least for a while, have been improving faster than men.

Is this trend likely to continue until women are out-performing men? One source of relevant data to help model the development of men's and women's performances is the winning performance in men's and women's events over successive Olympics. This data is not neat. There are trends, but there are also many 'outlier' performances – a performance that is quite different from the overall trend. A feature of this case is dealing with this very authentic data, recognising and dealing with outlier results and determining how well the data allows for the question to be answered.

### **2. Mathematical content**

In the Case Study students will be involved all phases of the 'handling data cycle'. Through this, pupils will be performing calculations in relation to absolute difference, rates of change and relative proportion. They will also be sketching graphs, finding lines of best fit on scatter plots and extrapolating them to find points of intersection. Other mathematical content includes estimation, arithmetic applied to calculations and manipulations with rational numbers, units, compound measures and conversions, presentation and analysis of grouped and ungrouped data, applications of ratio and proportion, accuracy and rounding, linear equations, formulae, expressions and identities, and mathematics as evidence. Prior understanding of the number work and graph sketching is necessary, but the case could be used to introduce ideas such as the handling data cycle and finding lines of

### **3. Organisation and pedagogy**

This Case Study would be suitable for year 8 or year 9 pupils, particularly those with a solid understanding of the content described above. The lesson notes provide suggestions as to how pupils may be extended further.. The open nature of this Case Study allows teachers to provide pupils with the degree of freedom that suits their particular capabilities.

This Case Study has been designed for pupils to complete individual work whilst working as part of a small group.. There is the scope to modify this as necessary for individuals or classes. The teacher will set the general direction for this Case Study and initiate changes of activities, however the case provides opportunities for teachers to allow more experienced and capable pupils more freedom to decide for themselves how they will proceed.

Homework will be used to complete tasks started in class as well as carry out further research into issues identified in class, therefore teachers and pupils need to recognize that homework completion is a very important aspect of this Case!

#### **4. General Advice**

Keep the Aim of the Case Study (making sense of real, messy data to determine trends) and the final task (using these trends to decide if women will overtake men) in mind at all times. Remind the pupils of them frequently to ensure that individual lessons have a focus and the entire case study has a clear and meaningful purpose.

Learn with the pupils. Work the task in preparation for the lessons. Examine the data and form your own opinion.

Allow the pupils the amount of freedom you are comfortable with. Discussions can be guided in a directed and ordered manner or in a less structured way with pupils exploring areas of interest on their own.

At all points where mathematical skills are required, quietly raise the pupils' awareness of the fact that this is happening, but do not introduce the skill before the need is apparent and clear.

#### **5. Resources**

This Case Study comes with detailed lesson plans as well as lesson outlines. Vignettes and teacher advice embedded with lesson plans help teachers work through key issues identified by those who have trialed this Case Study. It also comes with worksheets and full worked solutions with advice to teachers for working through specific sections of the inquiries. ICT is not essential to this Case Study although there is the scope to use specific programs, especially graphing programs, if available. Printing of worksheets for pupils to use is necessary.