All elite athletes and their trainers need to know world record times. These provide the benchmark for performance.

Women’s marathon

The world record for the women’s marathon has gradually got shorter since the race was opened to women in the late 1960s.

Draw a graph to show how the world record times for the women’s marathon have changed over that past 50 years.

What do you think the record might be in 2020? What about in 2050?
How the record for the Women’s Marathon race has changed since 1967
## World record times for the Women’s marathon from 1967 to 2009

<table>
<thead>
<tr>
<th>Hrs:Mins:Secs</th>
<th>Name</th>
<th>Country</th>
<th>Date of race</th>
<th>Location of race</th>
</tr>
</thead>
<tbody>
<tr>
<td>03:15:23</td>
<td>Maureen Wilton</td>
<td>Canada</td>
<td>May 6, 1967</td>
<td>Toronto, Canada</td>
</tr>
<tr>
<td>03:07:27</td>
<td>Anni Pede-Erdkamp</td>
<td>West Germany</td>
<td>August 16, 1967</td>
<td>Waldniel, Germany</td>
</tr>
<tr>
<td>03:02:53</td>
<td>Caroline Walker</td>
<td>United States</td>
<td>February 28, 1970</td>
<td>Seaside, Oregon, USA</td>
</tr>
<tr>
<td>03:01:42</td>
<td>Elizabeth Bonner</td>
<td>United States</td>
<td>May 9, 1971</td>
<td>Philadelphia, USA</td>
</tr>
<tr>
<td>02:55:22</td>
<td>Elizabeth Bonner</td>
<td>United States</td>
<td>August 19, 1971</td>
<td>New York City, USA</td>
</tr>
<tr>
<td>02:49:40</td>
<td>Cheryl Bridges</td>
<td>United States</td>
<td>December 5, 1971</td>
<td>Culver City, USA</td>
</tr>
<tr>
<td>02:46:37</td>
<td>Michiko Gorman</td>
<td>United States</td>
<td>December 2, 1973</td>
<td>Culver City, USA</td>
</tr>
<tr>
<td>02:46:24</td>
<td>Chantal Langlacé</td>
<td>France</td>
<td>October 27, 1974</td>
<td>Neuf-Brisach</td>
</tr>
<tr>
<td>02:43:55</td>
<td>Jacqueline Hansen</td>
<td>United States</td>
<td>December 1, 1974</td>
<td>Culver City, USA</td>
</tr>
<tr>
<td>02:40:16</td>
<td>Christa Vahlensieck</td>
<td>West Germany</td>
<td>May 3, 1975</td>
<td>Dülmen, Germany</td>
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<tr>
<td>02:38:19</td>
<td>Jacqueline Hansen</td>
<td>United States</td>
<td>October 12, 1975</td>
<td>Eugene, USA</td>
</tr>
<tr>
<td>02:35:16</td>
<td>Chantal Langlacé</td>
<td>France</td>
<td>May 1, 1977</td>
<td>Oiartzun, Spain</td>
</tr>
<tr>
<td>02:34:47</td>
<td>Christa Vahlensieck</td>
<td>West Germany</td>
<td>September 10, 1977</td>
<td>Berlin Marathon</td>
</tr>
<tr>
<td>02:31:23</td>
<td>Joan Benoît</td>
<td>United States</td>
<td>February 3, 1980</td>
<td>Auckland, NZ</td>
</tr>
<tr>
<td>02:30:58</td>
<td>Patti Catalano</td>
<td>United States</td>
<td>September 6, 1980</td>
<td>Montreal, Canada</td>
</tr>
<tr>
<td>02:30:27</td>
<td>Joyce Smith</td>
<td>United Kingdom</td>
<td>November 16, 1980</td>
<td>Tokyo, Japan</td>
</tr>
<tr>
<td>02:29:57</td>
<td>Joyce Smith</td>
<td>United Kingdom</td>
<td>March 29, 1981</td>
<td>London Marathon</td>
</tr>
<tr>
<td>02:29:02</td>
<td>Charlotte Teske</td>
<td>West Germany</td>
<td>January 16, 1982</td>
<td>Miami, USA</td>
</tr>
<tr>
<td>02:26:12</td>
<td>Joan Benoît</td>
<td>United States</td>
<td>September 12, 1982</td>
<td>Eugene, USA</td>
</tr>
<tr>
<td>02:25:28</td>
<td>Grete Waitz</td>
<td>Norway</td>
<td>April 17, 1983</td>
<td>London Marathon</td>
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<tr>
<td>02:24:26</td>
<td>Ingrid Kristiansen</td>
<td>Norway</td>
<td>May 13, 1984</td>
<td>London Marathon</td>
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<tr>
<td>02:21:06</td>
<td>Ingrid Kristiansen</td>
<td>Norway</td>
<td>April 21, 1985</td>
<td>London Marathon</td>
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<tr>
<td>02:20:47</td>
<td>Tegla Loroupe</td>
<td>Kenya</td>
<td>April 19, 1998</td>
<td>Rotterdam Marathon</td>
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<td>02:20:43</td>
<td>Tegla Loroupe</td>
<td>Kenya</td>
<td>September 26, 1999</td>
<td>Berlin Marathon</td>
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<tr>
<td>02:19:46</td>
<td>Naoko Takahashi</td>
<td>Japan</td>
<td>September 30, 2001</td>
<td>Berlin Marathon</td>
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<tr>
<td>02:18:47</td>
<td>Catherine Ndereba</td>
<td>Kenya</td>
<td>October 7, 2001</td>
<td>Chicago Marathon</td>
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<tr>
<td>02:17:18</td>
<td>Paula Radcliffe</td>
<td>United Kingdom</td>
<td>October 13, 2002</td>
<td>Chicago Marathon</td>
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<tr>
<td>02:15:25</td>
<td>Paula Radcliffe</td>
<td>United Kingdom</td>
<td>April 13, 2003</td>
<td>London Marathon</td>
</tr>
</tbody>
</table>

**References:**
For a particular athletic event, the world record for men is generally faster, longer or higher than the world record for women. But by how much?

<table>
<thead>
<tr>
<th>Event</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>100m</td>
<td>9.58s</td>
<td>10.49s</td>
</tr>
<tr>
<td>400m</td>
<td>43.18s</td>
<td>47.60s</td>
</tr>
<tr>
<td>1,500m</td>
<td>3:26:00</td>
<td>3:50:46</td>
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<td>5,000m</td>
<td>12:37:35</td>
<td>14:11:15</td>
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<tr>
<td>Marathon</td>
<td>2:03:59</td>
<td>2:15:25</td>
</tr>
<tr>
<td>High jump</td>
<td>2.45m</td>
<td>2.09m</td>
</tr>
<tr>
<td>Long jump</td>
<td>8.95m</td>
<td>7.52m</td>
</tr>
<tr>
<td>Pole vault</td>
<td>6.14m</td>
<td>5.06m</td>
</tr>
<tr>
<td>50m freestyle</td>
<td>20.94m</td>
<td>23.73s</td>
</tr>
<tr>
<td>400m freestyle</td>
<td>3:40:07</td>
<td>3:59:15</td>
</tr>
<tr>
<td>1,500m freestyle</td>
<td>14:34:56</td>
<td>15:42:54</td>
</tr>
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</table>

Find a sensible way to make comparisons. Are the differences similar for all types of event?
Sports commentators need to be able to remember lots of facts about the best athletes – and the world and national records for their events.

Match the men’s world record times, distances and scores to the correct events.

<table>
<thead>
<tr>
<th>Track</th>
<th>Field</th>
<th>World records</th>
</tr>
</thead>
<tbody>
<tr>
<td>200m</td>
<td>18.29m</td>
<td>19.19s</td>
</tr>
<tr>
<td>19.19s</td>
<td>Triple jump</td>
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</table>

**World record match**
<table>
<thead>
<tr>
<th>Track</th>
<th>Field</th>
<th>Swimming</th>
<th>World record</th>
</tr>
</thead>
<tbody>
<tr>
<td>100m</td>
<td>Pole vault</td>
<td>50m freestyle</td>
<td>2h 3min 59s</td>
</tr>
<tr>
<td>1,500m</td>
<td>Long jump</td>
<td>1,500m freestyle</td>
<td>6.14m</td>
</tr>
<tr>
<td>20km</td>
<td>High jump</td>
<td>50m breastroke</td>
<td>3min 26.0s</td>
</tr>
<tr>
<td>110 hurdles</td>
<td>Javelin</td>
<td>100m</td>
<td>56min 26.0s</td>
</tr>
<tr>
<td>Marathon</td>
<td>Shot put</td>
<td>1,500m</td>
<td>14min 34.6s</td>
</tr>
<tr>
<td></td>
<td>Decathlon</td>
<td>freestyle</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,500m</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>50m</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>freestyle</td>
<td></td>
</tr>
</tbody>
</table>
Working at play: World records

Description

Working with elite athletes means understanding how prowess in sport changes over time. The world record time provides a vital benchmark of performance against which all athletes may aspire.

For Women's marathon, pupils will need the Women's marathon data sheet which shows the progression of world record times from 1967 to the present day.

Activity 1: Women’s marathon
Activity 2: Record differences
Activity 3: World record match

A grid is provided for the pupils to use but, depending on the pupils, you may prefer to provide a plain sheet of graph paper so that they need to engage with deciding how to scale and label their axes appropriately.

This graph shows the data points plotted:

Pupils might notice:

- There was a fairly steady decline in record times between 1967 and 1985.
- There was no improvement from 1985 to 1998.
- The reduction in times again progressed in 2002 and 2003: it can be seen from the data sheet that this was due to one woman, Paula Radcliffe.

Pupils are invited to predict what the world record might be in 2020 and 2050. Draw out in the discussion that such a prediction is very difficult – the long period where there was no improvement points to the fact that data from the past may not always allow accurate prediction. Nevertheless, it might be fair to suggest that the times are likely to continue to decrease slightly. If pupils wish to look at other events, appropriate data is readily available on the Internet.
Record differences presents some world record times and distances for a range of athletics and swimming records for men and for women. Pupils are invited to find a way to analyse the difference between men and women. Use a class discussion to draw out that this is best done by considering the difference between the sexes as a ratio perhaps expressed as a percentage. In running and swimming events, men are about 10% faster, whilst in jumping events, the difference appears to be more like 20%.

Organise the pupils into small groups with a set of cards for each group for World record match as discussion will help them develop strategies to complete all the matches.

The correct matches, together with other brief details are shown below:

<table>
<thead>
<tr>
<th>Athletics – Track</th>
<th>Perf</th>
<th>Units</th>
<th>Athlete</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>100m</td>
<td>9.58</td>
<td>s</td>
<td>Usain Bolt</td>
<td>16/08/2009</td>
</tr>
<tr>
<td>400m</td>
<td>43.18</td>
<td>s</td>
<td>Michael Johnson</td>
<td>26/08/1999</td>
</tr>
<tr>
<td>1,500m</td>
<td>03:26.0</td>
<td>min:s</td>
<td>Hicham El Guerrouj</td>
<td>14/07/1998</td>
</tr>
<tr>
<td>3Km</td>
<td>07:20.7</td>
<td>min:s</td>
<td>Daniel Komen</td>
<td>01/09/1996</td>
</tr>
<tr>
<td>20Km</td>
<td>56:26.0</td>
<td>min:s</td>
<td>Haile Gebrselassie</td>
<td>27/06/2007</td>
</tr>
<tr>
<td>Marathon</td>
<td>02:03:59</td>
<td>h:min:s</td>
<td>Haile Gebrselassie</td>
<td>28/09/2008</td>
</tr>
<tr>
<td>110 Metres Hurdles</td>
<td>12.87</td>
<td>s</td>
<td>Dayron Robles</td>
<td>12/06/2008</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Athletics – Field</th>
<th>Perf</th>
<th>Units</th>
<th>Athlete</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Jump</td>
<td>2.45</td>
<td>m</td>
<td>Javier Sotomayor</td>
<td>27/07/2019</td>
</tr>
<tr>
<td>Pole vault</td>
<td>6.14</td>
<td>m</td>
<td>Sergey Bunka</td>
<td>31/07/1994</td>
</tr>
<tr>
<td>Long jump</td>
<td>8.95</td>
<td>m</td>
<td>Mike Powell</td>
<td>30/08/1991</td>
</tr>
<tr>
<td>Shot put</td>
<td>23.12</td>
<td>m</td>
<td>Randy Barnes</td>
<td>20/05/1990</td>
</tr>
<tr>
<td>Javelin throw</td>
<td>98.48</td>
<td>m</td>
<td>Jan Zelezný</td>
<td>25/05/1996</td>
</tr>
<tr>
<td>Decathlon</td>
<td>9026</td>
<td>points</td>
<td>Roman Šebrle</td>
<td>27/05/2001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Swimming (men's)</th>
<th>Perf</th>
<th>Units</th>
<th>Athlete</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>50m freestyle</td>
<td>20.94</td>
<td>s</td>
<td>Frederick Bousquet</td>
<td>27/04/2009</td>
</tr>
<tr>
<td>50m breaststroke</td>
<td>26.67</td>
<td>s</td>
<td>Cameron Van Der Burgh</td>
<td>29/07/2009</td>
</tr>
<tr>
<td>1,500m freestyle</td>
<td>14:34.6</td>
<td>min:s</td>
<td>Grant Hackett</td>
<td>29/07/2001</td>
</tr>
</tbody>
</table>

The mathematics

This topic gives opportunities to explore real data. Women's marathon involves constructing a statistical chart whilst ratio and percentage are used in Record difference. Logical thinking is needed in World record match.