

# Metrology

## Measurement in Sport



# Time

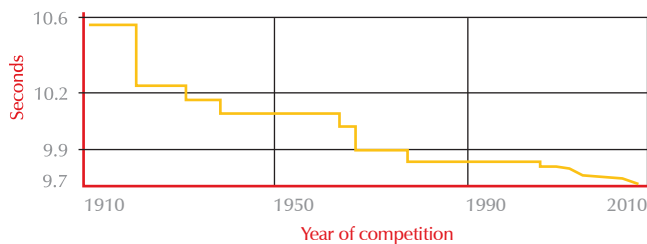
Accurate timing is key to many Olympic events, with hundredths of a second often being all that separates winners from losers.

The exact measurement of time is a very well-developed science, and the world's most accurate clocks would not lose or gain a second in thirty million years. What is more challenging in the Olympics is deciding and determining exactly what events are to be timed – such as what counts as the end of a race. For instance, the 100 m sprint ends when a runner's torso reaches a point exactly over the finish line – and this event is measured by an automatic "slit-video" camera, which scans the finishing line up to 2000 times a second. Human judges then view the images to decide who wins.

**Did you know?** It takes a few hundredths of a second for the sound of a starting pistol to travel along a row of runners, so those closer to the gun used to hear it first. Now, loudspeakers behind each runner relay the sound simultaneously.

The accuracy of a clock is checked by being compared with more accurate ones. Most clocks, including those used at the Olympics, are based on the natural "tick" of a crystal of quartz. The accuracy of this tick is compared ultimately with that of an atomic clock.

Until 1956, the second was defined as 1/86,400 of a day – but the day's length varies due to the irregular spin of the Earth, so the second is now defined in terms of an atomic radiation.



Athletes have accelerated over the last century: this graph shows the progressively lower times taken to run the men's 100 metres. Note the change in the uncertainty of results once the manual timing is replaced by automatic electronic timing in 1976.

**World Metrology Day 20 May 2008**

*No games without Measurement*

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