

TIME & SPORT

MEASURING TIME

9-15

CMA

VA

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MNS

HSS

CREATIVE AND
MANUAL
ACTIVITIES

VISUAL ARTS

LANGUAGES

MATHEMATICS
AND NATURAL
SCIENCES

HUMAN
AND SOCIAL
SCIENCES



Measuring Time

Information Sheet

Introduction

This sheet summarises the history of timepieces in general and timing in sports in particular.

It serves as a companion to the **Activity Sheet** on the same topic. This suggests activities to perform in class based on the “goal-oriented learning” approach, which will help students learn about time and timing in a perceptual, theoretical and reflective way.

RELATED DOCUMENTS

- TOM SCHOOLS Activity Sheet
“Measuring Time”
- TOM SCHOOLS Information Sheet
“Analysing motion, performance and sports records”
- TOM SCHOOLS Activity Sheet
“Analysing motion, performance and sports records”

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Cyclical time in the Ancient World

People have been interested in measuring time since civilisation began. At first, they relied mainly on looking at nature and the heavens, soon discovering points of reference and spotting cyclical movements in the stars at night. As they acquired knowledge of astronomy and mathematics, they came to understand and quantify the cycle of the days and years. In addition to the observations of their own eyes, they devised instruments such as the sundial and water clock to divide the daytime into sections. In the Ancient World, ideas of time were profoundly cyclical, following the annual rhythm of the seasons and religious festivals. Such ideas were closely linked to religion and mythology.

Since the 12th century B.C., calendars have been used to count the passage of the days. The ancient Babylonians divided the year into 360 days, arranged into 12 months of 30 days each. Each day was split into 12 hours. Over the centuries, different cultures have used a variety of calendars, many of them coexisting alongside each other; these include the Roman, Julian, Gregorian, Hebrew, Muslim and ancient Egyptian calendars and so on. Such calendars mainly had a social and religious role.

The ancient Olympic Games, held in honour of the gods, were celebrated every four years. This unit of time, also known as an "Olympiad", was very important in ancient Greek civilisation, and the four-year rhythm is perpetuated in the modern Olympic Games today.

Rationalising time

People were not content simply to observe nature. They also developed technology and mathematical skills, and have applied them to different aspects of daily life ever since the first devices were made to quantify time in a more precise way.

The sundial, invented by the Egyptians, enabled the day to be divided into twelve hours whose length varied according to the seasons. The Egyptians also used the water clock or clepsydra, which was a pot with markings on the side and a hole in the bottom: time could be measured by filling the pot and checking how much water remained. The Greeks then perfected the instrument by adding a dial and pointer, so that more precise measurements could be made.

As technology progressed, increasingly accurate instruments were produced, such as the hourglass, the mechanical clock (invented in the 14th century), the chronometer and portable measuring devices that were very important, among other things, for seafaring.

During the 19th century, the ownership of clocks gradually became more widespread as clock-making became industrialised. It was only the advent of the telegraph, however, and especially the spread of the railways that made it necessary for time to become standardised between different towns and cities. Further developments led to today's extremely refined measuring instruments, such as quartz watches and atomic clocks.

Time and sport

Although they had the technology and the mathematical knowledge to do so, the Ancient Greeks did not actually measure the achievements and results of athletes. The only thing that mattered was to be the victor, crowned by the gods. By contrast, the modern Olympic Games attach a great deal of importance to measuring results, so as to distinguish between the competitors and register new records in the record books. To this end, they use the best timing devices available. Technology and measuring time are an integral part of the Games, sharing a rich history of events, advances and discoveries.

Sports can be classified into three broad categories, according to their relationship to time:

- Sports which divide time into periods of a set duration, such as basketball, boxing, football, volleyball and so on. In these sports, dividing time into periods creates suspense, creating a history studded with sudden turnarounds and last-minute scores that are etched into the minds of the spectators.
- Sports which divide time into periods of no set duration, such as golf, table tennis, wrestling, curling etc.
- Timed sports, such as track athletics, cycling, bobsleigh, swimming, etc. This is the category in which measuring time takes centre stage: every hundredth of a second counts, and new records are inscribed into the history of the Games and of human performance.

The first race to be timed was a horse race in 1663; the times were given in minutes. Races were first timed in seconds in England in 1731, thanks to the invention of the stopwatch. By 1862, time could be measured to the nearest fifth of a second. In 1888, the result of a horse race was decided for the first time by a photograph taken of the finish. By 1924, electric chronographs were accurate to one hundredth of a second, although they did not yet manage to displace the handheld stopwatches to which race judges were strongly attached.

In 1930, chronographs accurate to 1/100th of a second were coupled with cameras overlooking the finish line for the first time. The photo-finish system was later adopted officially in 1968. Since 1973, it has been possible to measure sports records to the nearest 1/10,000th of a second by using a radio signal to synchronise the official chronometer with quartz oscillators.

The Olympic Games have not only pushed athletes of every era to go beyond their limits, they have also presented a challenge to technological progress, prompting new feats of high-precision chronometry.