

# TIME & SPORT

## MEASURING TIME

9-15

CMA

CREATIVE AND  
MANUAL  
ACTIVITIES

VA

VISUAL ARTS

L

LANGUAGES

MNS

MATHEMATICS  
AND NATURAL  
SCIENCES

HSS

HUMAN  
AND SOCIAL  
SCIENCES



# Measuring Time

## Activity Sheet

### Introduction

The various activities suggested here will make students aware of the diversity of the devices and systems used to measure time and help them understand why they are important in sport, especially at the Olympic Games.

This document is a companion to the **Information Sheet** on the same topic, which summarises the general history of time-measuring equipment with a particular focus on timing in sport.

The activities shown here may be performed alongside or after those shown in the **Information and Activity Sheets on "Analysing motion, performance and sporting records"**.

### LINKS TO THE SCHOOL PROGRAMME

MITIC, HSS–History, Visual Arts, Transversal Skills, Languages, Media, Images & ICT ...

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## Activity 1

## History of timepieces

## GENERAL EDUCATION / INTERDEPENDENCIES / GROUP PROJECTS

### Teaching objective

Give students an appreciation of the diversity of time-measurement devices and calendars in different historical periods and different cultures. Exercise their skills in oral and written expression.

### Time

Two or three periods, depending on speaking time

### Links to the school programme

Languages, History, Media, Visual arts.

Ask students to prepare a brief presentation on various timepieces in pairs or groups of three (Students aged 9 to 12: 5–10 minutes per group; Students aged 12 to 15: 10–15 minutes). For each timepiece, ask them to provide:

- some basic historical facts: e.g. when it was invented or popularised
- an illustration, which may be informational or more creative/artistic

Each presentation should be accompanied by a written summary (1/2 page A4) with an illustration. Compile the summaries into a class folder.

The two lists below offer a (non-exhaustive) range of instruments and calendars. A more complete list of calendars is provided in the appendix. A selection should be taken from various categories so as to familiarise students with the diversity of calendars used today and over the course of history. You can take examples from one or both lists, according to the age and ability of the students.

Sundial, incense clock, clepsydra, graduated candle, hourglass, mechanical clock, noonday gun, stopwatch, metronome, ancient Greek calendar, lunar calendar, Roman calendar, Julian calendar, Gregorian calendar

### FOR OLDER PUPILS (AGES 12–15)

Antikythera mechanism, clepsydra, shadow clock, nocturnal, ring dial, shepherd's dial, stopwatch, chronophotography, electric clock, quartz clock, electronic chronometry, atomic clock, photo-finish camera, ancient Greek calendar, lunar calendar

Set down historical dates in a table or on a timeline. See **Activity 4: Visualising time.** → Run through the instruments used to measure time in sport. Discuss the results with the whole class. This activity may be supplemented with the questions from Activity 2, "Linear and cyclical time".

**Activity 2****Linear and cyclical time****Teaching objective**

Encourage students to find reference points for the passage of time in nature, which tend to be forgotten nowadays. Probe the students' historical knowledge and get them to understand the difference between linear and cyclical time. Make connections between the methods used in the past and those used today.

**Time**

One period. May be used to supplement Activity 1.

**Links to the school programme**

HSS–History.

**Exercise 1****Questions to ask the class**

What things in nature can help us mark the passage of time?

Day/night, the positions of the sun, moon and stars, the seasons, etc.

How does the way people understand time differ between the ancient world and the modern world?

Ancient world: Cyclical time – time was marked by the movements of the heavens, day and night, the seasons, the lunar calendar, religious and mythological time, etc.  
Modern world: Linear time.

How often are the Olympics held?

Every four years.

What calendar did they use to determine when four years had passed?

The lunar calendar.

Continue by asking students to represent an entire year on one large piece of drawing paper, based on one of the things referred to in the discussion – the passing of the seasons, for instance. Alternative: a simultaneous representation of the past, present and future. For instance, the image of a driver with a landscape visible through the windscreen ahead and another in the rear view mirror.

**FOR OLDER PUPILS (AGES 12–15)**

How do you explain the difference between ancient and modern ideas of time? What milestones in history mark the stages of this change?

In Classical civilisations, and right up until the end of the Middle Ages, people depended more closely on nature and aligned themselves with it. They lived in line with the natural rhythm of the days and seasons. At first, it was easier to measure time at night, by observing the stars. Later on, measuring instruments such as the sundial allowed the day to be divided into sections. After the Middle Ages, linear measuring instruments such as clocks and watches emerged and then spread throughout society as clock-making became more industrialised. The telegraph, and especially the spread of the railways, compelled people to synchronise time between different towns. → See Information Sheet

In ancient civilisations, what part of life were calendars most useful for?

Religion: they were used for celebrating festivals on set days.

Proceeding from this answer, probe students' knowledge about calendars around the world. Make comparisons with other cultures. → What's different about the Chinese and Muslim calendars, etc. Different ideas of time in different cultures: time is a cultural idea, different rhythms of life etc.

**Activity 3****Lengths of time in sports and daily life****Teaching objective**

This exercise will enable students to make connections between the lengths of time that different things take, with the goal of comparison and relative appreciation. It will also enable them to use narrative to add colour to rational data such as sports results.

**Time****Two periods****Links to the school programme****HSS, MITIC, Transversal skills.****Exercise 1**

Ask students to research original examples of lengths of time, in books or on the Internet. For example, the time it takes a flower to open, the lifespan of an insect, the lengths of famous films or songs, the length of a train journey or an aeroplane flight etc. They should find:

- Two time periods of between one and six hours
- Three time periods of less than an hour, one of which should be less than fifteen minutes

**Exercise 2**

Same exercise with one extra example in each category.

Also ask the students to look for examples of sport-related time periods (e.g. on [www.olympic.org](http://www.olympic.org)) in each of the following categories:

- Timed sports (see Appendix for list): at least three examples. For each one, note the name of the athlete, the date, location, feat and time achieved.
- Un-timed sports (see Appendix for list): at least one example. State the name of the sport, the date and the length of the event.

**FOR OLDER PUPILS (AGES 12–15)**

Ask students to research original examples of lengths of time, in books or on the Internet. For example, the time it takes a flower to open, the lifespan of an insect, the lengths of famous films or songs, the length of a train journey or an aeroplane flight etc. They should find:

- Two time periods of between one and six hours
- Three time periods of less than an hour, one of which should be less than fifteen minutes

Same exercise with one extra example in each category.

Students should provide a brief background story or additional explanation for each of their chosen examples, covering, for example, who the sportsperson was, the race course, historical background, weather conditions, technical background, press and public reactions etc.

Assign five timed sports and three sports in which time is divided into unlimited periods (see appendix) to each student, along with a historical period:

1896-1936 / 1948-1980 / 1984-present.

This will give each student a choice between a variety of sporting categories and enable the class to produce results spread across the entire period of the modern Olympic Games.

You should also ask the students to have an equal number of men and women in the examples they choose.

Group together periods of a similar length and match them with the ones identified earlier or with other events from daily life. For instance: → Length of a marathon = length of a film / waiting time at the airport.

**The results can also be used in "Activity 4: Visualising timespans"**

Get the class to go through the differences between time-limited sports and timed sports. How do the effects and emotions they produce differ?

Suspense, admiration of records, excitement, comparing results, surprise at sudden turnarounds, etc.

## Activity 4

## Visualising timespans

## Teaching objective

Give students a visual representation of ideas that can be quite abstract. Enable them to use the scales drawn up during the exercise to compare sports results. This can be used to supplement or underpin the preceding activities.

## Time

45 minutes per exercise

## Space required

Ideally at least 12 metres, under cover

## Links to the school programme

HSS – History – Geography, Mathematics.

Spatial representation of units of time: hours, days, centuries, etc. Below we list various units of measurement and indicate the space needed to represent certain periods.

- 1 cm = 1 second / 3 m 60 cm = 1 hour → you will need 10 m for marathon times → Alternatively, for sports where the measurement is more precise: 10 cm = 1 second
- 1 cm = 1 hour / 7 m 20 cm = 1 month
- 1 cm = 1 month / 12 cm = 1 year / 12 m = 100 years
- 1 cm = 1 year / 1 metre per century

Mark out various scales and create a timeline with dates on scale no. 4. Mark sports records or historical dates gathered during the other activities on the most appropriate scale. Some examples of records can be found in Appendix 4.

## FOR OLDER PUPILS (AGES 12–15)

Students ages 12 to 15 should do it in small groups supervised by the teacher.

If a large outdoor space, such as a playing field, is available, use a scale of 1 hour = 1 cm. Allow 90 m of space to mark down your events. Ask the students to mark days / months / years along the scale. If the space is large enough, indicate the dates of the most recent / forthcoming Olympic Games. Mark a point (on a piece of card) to represent the first Olympic Games.

Using another scale, ask the students to break down an hour into minutes and seconds.

36 m = 1 hour. Mark out various points on the scale to represent the time taken by sports events.

Comment on the different scales.

## Exercise 1

Students aged 8 to 12 should do this activity as a class under the teacher's leadership.

## Materials required

Chalk, masking tape and coloured marker pens. Measuring tape, folding rule and ordinary rulers. Various readily visible objects such as balls or wooden cubes that can be used to mark different time points.

This exercise should ideally be performed outdoors or in a long corridor. You can keep the markings made and reuse them for the other exercises in this folder.

If you have already carried out "Activity 3: Lengths of time in sports and daily life", ask the students to note down their time periods on Post-It notes.

**Activity 5****Calculating speed****Teaching objective**

Exercise mathematical skills and convert time into distance and speed using real life examples from the Olympic Games. Encourage students to think about the slim margins that separate contestants.

**Time**

45 minutes.

**Links to the school programme**

MITIC, Mathematics.

Get the class to respond to the results of this exercise. Do they think the gaps are small or large? Ask them to research the records from a single sport at different Olympic Games and comment on how the records have developed over the years.

What can you say about the timing and judging equipment needed?

*It needs to be extremely accurate.*

Ask students to name different types of equipment

*Chronometer, photo-finish camera, etc.*

**FOR OLDER PUPILS (AGES 12–15)****Exercise 1**

Put together a series of results from a single Olympic event – these can be found at [www.olympic.org](http://www.olympic.org) and on the Internet generally. Work out the time differences between the gold, silver and bronze medallists.

Calculate the speed of the race competitors. What average distance do they cover in a minute, a second, a tenth of a second and a hundredth of a second? How far apart were the contestants when they arrived at the finish line?

## Activity 6

## Image analysis

## Teaching objective

This activity allows students to describe a still or moving image using a specialised vocabulary. A comparative exercise encourages students to spot and identify particular aspects of the images.

## Time

One period.

Links to the school programme

Visual art, Languages, MITIC.

Ask the class to describe the image/sequence using a specialised vocabulary.

Compare the colour image with one of the black-and-white photos:

Note and describe the various aspects involved in judging and timing the event, based on one of the video sequences or pictures.

Starting gun, start/finish lines and lane markings, photo-finish camera on finish line, video of race, lane judges.

Do the same for the resources that allow today's spectators and television viewers to view events and judge performances

Live broadcast, events displayed on giant screens, results displays.

→ Not to mention rail-mounted cameras tracking each race, photographers, on-screen results, events shown in full with action replays, slow motion etc.

## Exercise 1

Watch the video of a sports contest on:  
[www.olympic.org](http://www.olympic.org).

For example, the 2012 men's 200 m final:  
[www.olympic.org/video-fr/bolt-leads-jamaican-200-m-clean-sweep-highlights](http://www.olympic.org/video-fr/bolt-leads-jamaican-200-m-clean-sweep-highlights)

Or the 2008 men's 100 m final:  
[www.olympic.org/video-fr/athletisme-finale-100m-hommes-beijing-2008-record-mondial-usain-bolt](http://www.olympic.org/video-fr/athletisme-finale-100m-hommes-beijing-2008-record-mondial-usain-bolt)

Or these images from the Appendix (p16-18):



## Annex

### Activity 1–List of calendars 1/2

#### Lunar

- Islamic calendar
- Nepal Sambat calendar
- Thai lunar calendar

#### Luni-solar

- Assyrian calendar
- Hebrew calendar
- Japanese calendar
- Malayalam calendar
- Buddhist calendar
- Hindu calendar
- Goki calendar
- Tibetan calendar
- Chinese calendar
- Jain calendar
- Javanese calendar

#### Solar

- Algerian calendar
- Proleptic Julian calendar
- Tamil calendar
- Florentine calendar
- Badī' calendar
- Revised Julian calendar
- Thai calendar
- Haab calendar
- Bengali calendar
- Kurdish calendar
- Xhosa calendar
- Irish calendar
- Berber calendar
- Lithuanian calendar
- Yazidi calendar
- Positivist calendar
- Coptic calendar
- Masonic calendar
- Yoruba calendar
- French Revolutionary calendar
- Ethiopian calendar
- Ming calendar
- Zoroastrian calendar
- Roman calendar
- Gregorian calendar
- Mossi calendar
- Armenian calendar
- Rumi calendar
- Proleptic Gregorian calendar
- Nanakshahi calendar
- Aztec Xiuhpohualli calendar
- Soviet calendar
- Indian national calendar
- Nepalese calendar
- Byzantine calendar
- Swedish calendar
- Juche calendar
- Persian calendar
- Essene calendar
- Etruscan calendar
- Julian calendar
- Roman calendar

#### Others

- 360-day calendar
- Fiscal calendar (260 days)
- Long count
- 52-week calendar
- Igbo calendar
- Aztec Venusian calendar (584 days)
- Mesoamerican calendar
- Akan calendar
- Roman Catholic liturgical calendar
- Mayan calendar:
- Mesopotamian calendar
- Astronomical calendar
- Aztec Tonalpohualli calendar
- Short count
- Tzolk'in calendar (260 days)
- Bali calendar (210 days)

#### Ancient calendars

- Lunar
- Babylonian calendar
- Germanic calendar
- Rapa Nui calendar
- Ancient Greek calendar
- Bulgar calendar
- Ancient Greek calendar
- Runic calendar
- Luni-solar
- Coligny or Gaulish calendar
- Macedonian calendar
- Attic calendar
- Ancient Egyptian calendar
- Metonic cycle

## Annex

### Activity 1 – List of calendars 2/2

#### Proposed reforms

- Holocene calendar
- International Fixed calendar
- Newtown calendar
- Perpetual calendar
- Universal calendar

#### Extraterrestrial

- Darian calendar (for Mars)
- Miscellaneous
- Discordian calendar
- Pataphysical calendar

### Activity 3

#### Timed sports

- Athletics races
- Walking
- Rowing
- Canoeing
- Cycling
- Show jumping
- Swimming
- Triathlon
- Sailing
- Bobsleigh
- Skeleton
- Luge
- Speed skating
- Cross-country skiing
- Alpine skiing
- Freestyle skiing (moguls)
- Ski cross
- Snowboarding: parallel slalom
- Snowboarding: giant slalom

#### Time divided into periods of a set duration

- Basketball
- Boxing
- Football
- Fencing (team)
- Weightlifting
- Handball
- Field hockey
- Judo
- Water polo
- Modern pentathlon
- Taekwondo
- Clay pigeon shooting
- Volleyball
- Biathlon
- Ice hockey
- Figure skating

#### Time divided into periods of no set duration

- Golf
- Table tennis
- Tennis
- Wrestling
- Fencing (individual)
- Curling

### Activity 5 – 12 – 15

#### Examples of speed calculations (100 metre sprint):

|                |      |                          |
|----------------|------|--------------------------|
| Carl Lewis     | 1991 | 9.86 secs = 36.51 km / h |
| Maurice Greene | 1999 | 9.79 secs = 36.77 km / h |
| Usain Bolt     | 2008 | 9.69 secs = 37.15 km / h |
| Usain Bolt     | 2009 | 9.58 secs = 37.58 km / h |

**Annex**

## Activity 4

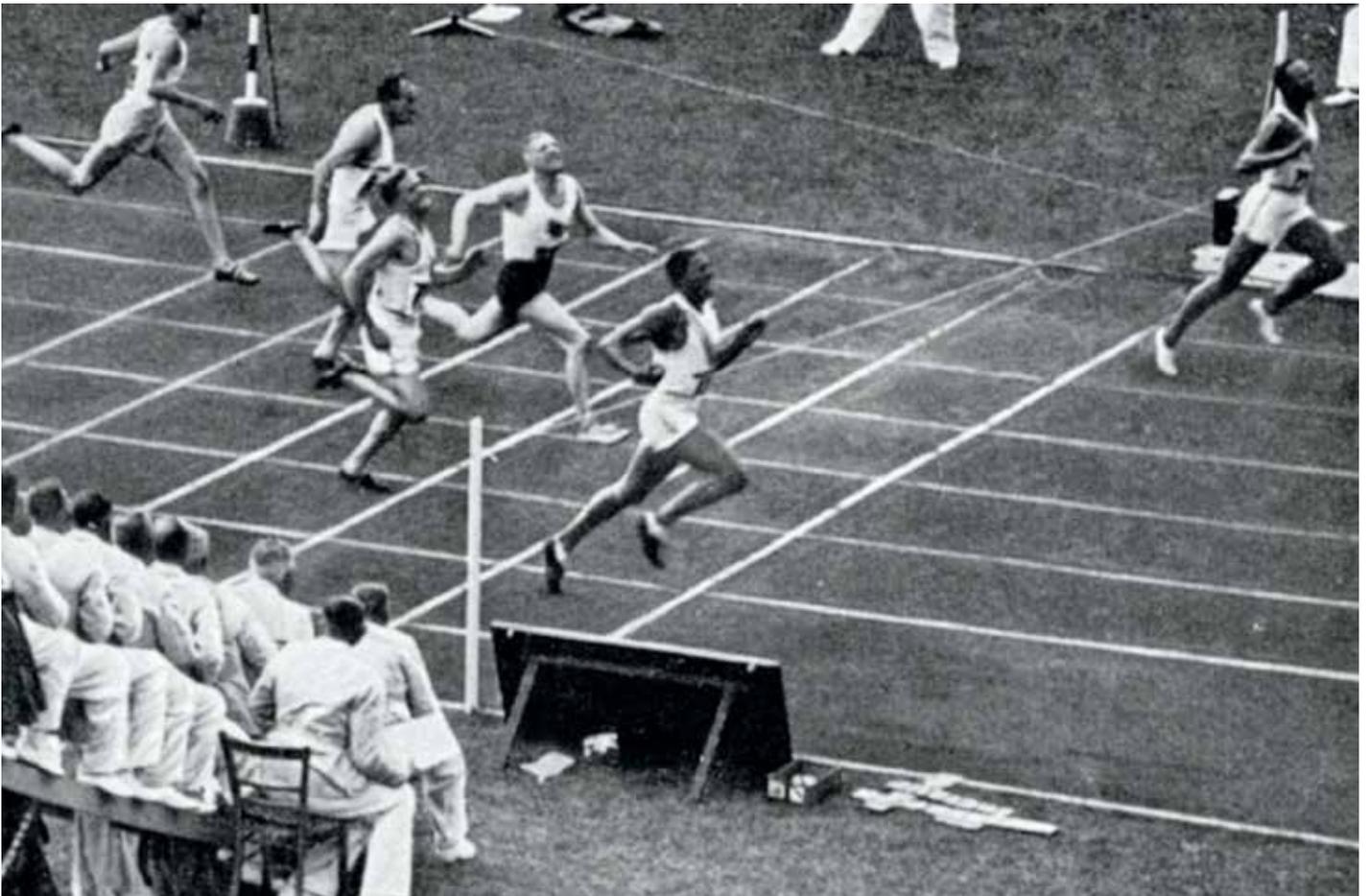
**Examples of records and results**

- 9:58** Usain Bolt's 100 metres world record, set at the World Championships in Berlin in 2009.
- 2:58:50** Time recorded by the winner of the first marathon, Spiridon Louis of Greece, at the Athens Games in 1896. The winning time in the men's marathon at London in 2012 was 2:08:01, while the winner of the women's marathon covered the distance in 2:23:07.
- 1:04:84** Difference between time recorded in the 100 metres freestyle swimming by Pieter van den Hoogenband (47:84) and Eric Moussambani (1:52:72) at the Sydney Games. Moussambani's time was nevertheless a personal best and national record.
- 42:93** Difference between the first world record for the 100 metres freestyle swimming set by Martha Gerstung in 1908 and the world record set by Britta Steffen in 2009, an average improvement of 0.43 seconds per year.
- 26** Years for which the women's 100 metres world record of 10:49 seconds, set by Florence Griffith-Joyner at Indianapolis in 1988, has stood.

**Annex**

## Activity 6 – Image analysis

## 1. Berlin Olympics 1936, athletics, men's 100 m



**Annex**

## Activity 6 – Image analysis

## 2. Tokyo Olympics 1964, athletics, men's 5000 m



**Annex**

## Activity 6 – Image analysis

## 3. Beijing Olympics 2008, athletics, men's 100 m

