

Sundial

General information			
Respective blueprint	Sundial		
Description	In this lesson, pupils will build a sundial. Students will discover how it works and the historical background of its invention.		
Learning objectives	At the end of this session, pupils will be able to : <ul style="list-style-type: none"> • explain how a sundial works; • understanding the use of sundial in its own cultural and historical contexts; • find the centre of a circle; 		
Related curricular subjects	Mathematics – history - sciences		
Duration	Several hours		
Level of difficulty	Basic	Medium	Advanced
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Inclusivity guidelines			
How to integrate students with SLD	<ul style="list-style-type: none"> • Formulate short, simple instructions that only require one action at a time. • If you give oral instructions, make sure you keep track of them in the form of pictograms or written on the board. • When you give instructions (oral or written), make sure to highlight the word of action so pupils know what they are expected to do. • When it's possible, you can show the expected result of the manipulation. • When creating groups, try to place students who are having difficulties with students who are generally more advanced so that they can help each other (for example, a dyspraxic student will have a lot of difficulty with cutting tasks). 		
How to integrate students who work faster	<ul style="list-style-type: none"> • Ask the pupils who finished their tasks earlier to do some research on sundials (history, where it has been invented, where you can find them, etc.). They can present their findings to the class orally or with a poster. 		

Step by step description of the lesson

Step 1: Introduction

Estimated time: 10 – 15 min

Before the lesson, hide any clocks, alarm clocks or watches that might tell the time.

Ask the pupils to tell you what time it is at the moment. If they have already learned to tell the time, they will naturally look for a clock or watch. Ask them how they knew what time it was before clocks and watches were invented.

If they don't mention sundials, show them photos of different types of sundial. Ask the children how a sundial works. Make a note of all the explanations given so that you can come back to them later.

This step is an opportunity to gather the pupils' initial ideas about sundials.

Step 2: Creating a simplified sundial

**Estimated time: 25 minutes
+ all afternoon**

The teacher suggests making a simplified sundial.

Before starting, the teacher explains how to find the centre of a circle. To do this, you need to draw two chords of the circle and find their median. The point where the two medians meet is the centre of the circle.

In small groups, the pupils follow the construction plan to make a sundial.

It is important to complete this sequence before midday so that the whole class can go out at exactly midday to start graduating the sundial.

This sequence is also an opportunity to explain how a compass works.

Step 3: Feedback on the activity:

Estimated time: 50 min (or more)

The next day, the pupils go to get their sundials and notice that they haven't been able to trace all the hours (because they haven't been at school all day). The teacher asks them to find a way of completing their sundials. The pupils observe a 15° angle between each time marking.

This enables the pupils to complete their sundials.

The teacher gets them to think about the limits of this simplified sundial by asking questions such as: can we tell the time exactly with this sundial? What does this sundial actually show us?

- ➔ The times shown on the sundials above are for illustrative purposes only, to show that the amount of sunshine varies throughout the year.
- ➔ Observing shadows can be very rewarding if done over a long enough period. In summer, when the sun is closer to its zenith, the shadow is smaller than in winter. This shows us that the height of the Sun in the sky is not the same in different seasons. The length of the day is also different. This phenomenon is linked to the Earth's revolution around the Sun, which takes place with an axis of rotation whose direction is constant in relation to the Earth's plane of revolution around the Sun.

Historical background :

By showing photos of different sundials, you can provide an introduction to the evolution of time measurement. For more advanced students, you could ask them to research the development of time measurement throughout history and create a timeline of the different instruments used.

Step 4: Extension

Estimated time:

If there are sundials in your area, it might be interesting to go and look at some. If this is not possible, you can show photos (or videos).

Ask the students to look at the numbers on the sundial. They won't find any, as the numbers used to be written in Roman numerals. This is a good introduction to the use and operation of Roman numerals.

Assessment activities

Activity 1: Self-assessment activity

Ask the students to self-assess their performance during the group activity, using the grid on page 4.

Self-assessment encourages learning and improves performance. Self-evaluation is systematically formative. Its aim is to highlight areas for improvement.

Activity 2: Assessment of the presentation of a research project on the history of time measurement.

Students can be assessed when presenting their research on the history of time measurement.

Different skills can be assessed (formatively or certifiably if the skill has already been explained and worked on)

- Ability to find relevant information;
- Ability to synthesise information;
- Accuracy of historical facts;
- Correct location of historical facts on a map of Europe;
- Ability to work in a team;
- Oral expression ;
- Written expression (on the material presented);

➔ See evaluation grid page 5

Oral presentation – evaluation grid

	Note
Oral expression	
During my presentation, I paid attention to the volume of my voice	/1
During my presentation, I paid attention to the speed of my voice.	/1
My sentences were well constructed.	/2
I answered the questions clearly, precisely and in well-constructed sentences.	/1
Written expression (on the material presented)	
My sentences are well constructed.	/2
My handwriting is neat and legible.	/1
I didn't leave any spelling mistakes.	/2
Team work	
I cooperated actively within the group.	/1
I respected the other group members at all times.	/1
I respected the deadlines	/1
I was able to recognise and accept the skills and knowledge of the other members of the group.	/1
I knew how to ask for help when I needed it	/1
Research and presentation of information	
The historical facts presented are accurate.	/2
I have summarised the information presented, selecting the most important.	/2
I have correctly located the historical facts on the map of Europe.	/2
The historical facts are correctly placed on the timeline.	/2
The information presented is sufficient and useful for understanding	/2
	/ 25

DiSClaimer

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.



**Co-funded by
the European Union**