

WORKSHEETS FOR PUPILS

6.1 TIME MEASUREMENT (SUNDIALS, HOURGLASS)

Task 1a: A sundial

Description of the activity:

Preparation of the visit to the places with sundials in the vicinity of school or surrounding villages. (45 minutes)

Equipment: a notebook, a pencil

The teacher plans a route of excursion around the sundials near the school. He/she will be acquainted with the basic parts, description, accessibility, characteristics, and creators of the clock. He/she selects a simple clock to be drawn by pupils. If there are no sundials near the school, the sundials database can be used: http://www.astrohk.cz/slunecni_hodiny.html.

Pupils will make a drawing of the sundial and write important information about it. E.g. address, dial range, geographic orientation, graphical form, curiosities.

Pupils make a sundial using paper or prepared material. They complete the worksheet. (45 minutes)

Equipment: A paper plate, a stick, letters or a felt-tip pen

Pupils make the sundial in groups according to the instructions and complete the worksheet.

1) Discussion about different types of sundials:

The final lesson is accompanied by a slideshow of the images in the PowerPoint presentation. The presentation contains types of questions such as:

- a) When is it not possible to use sundials?
- b) Why do sundials show a different time than the radio-controlled clocks?
- c) Can we use a sundial at night? If yes, when?

2) Presentation of the photographs showing the construction of the sundials. The presentation is accompanied by a discussion with pupils.

6. Our solar system is a very small part of one of billions galaxies in the Universe

Questions:

- 1) Who or what can be the indicator in the sun clock? What properties do they need to have?
- 2) Could be a sundial constructed in our latitude used in the Poles and the Equator?
- 3) Can the sundial determine the change of the seasons?
- 4) Why is the half-axis tilted?
- 5) Name other historical gauges of time. Would you be able to design one and make it?

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Task 1b: An hourglass

- 1) What will the speed of the sand trickling through to the bottom depend on?
- 2) Put the sand in the bottle and estimate the time it takes for the sand to trickle through it?
- 3) Using a stopwatch, measure the time it takes for the sand to trickle through it.
- 4) Estimate the amount of sand for measuring of 3 minutes. Use a stopwatch to check your estimate.
- 5) Where can you use the hourglass?