	STE(A)M activity
Title	The shadow of objects throughout the seasons
Content knowledge	Objects shadow, change?
Methodology	Doing experiments with a one meter stick, measuring tape and camera or mobile phone.
Technology	Kahoot, PPT, Word
Duration	4 months
SAMR model (level of transformation technology produce)	Use the camera to record and edit the experiment Prepare a quiz using the Kahoot application.
Target group (age, course)	13 years old, physics
Resources	One-meter stick, Measuring tape camera, computer and mobile phone.
Learning Objectives, Skills and competencies or. (Aims to be accomplished)	The goal of this study is for students to become aware of shade change through the day and realize that shade also changes over the months as seasons passes by. Conclude that shade reaches its minimum at the time of the spring equinox. Students have to research who was the first scientist to think about this, and what he did. Books, Internet, Kahoot, Word) Development of digital competences
Didactic sequence -Description of every lesson with added attention to the diversity of students	They prepared the experiment in accordance with the instructions at home and presented in group (3 our 4 persons) in the class. 1. Title of the experiment – “Perimeter of planet Earth” 2. Theoretical basis of the experiment Present the theoretical background of the experiment. At least 15 lines. 3. The task You say what you will present in the experiment. 4. One meter stick, Measuring tape

camera, computer and mobile phone.

5. Perform the experiment (describe the work):

6. Results (also draw the apparatus or sketch of the experiment)

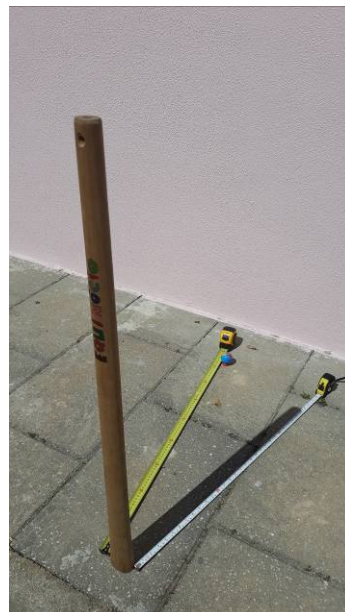
8. What did you conclude when trying?

10. Literature used

Sequence

1. Students made a group presentation to show us what they have concluded.
Teacher comments on their work.







Isadora dadilda Vitorino da Costa Girio

2019.04.11

- My name: Isadora Girio
- I'm a Teacher of physics and chemistry in Middle School
- at D. Manuel Martins, Setúbal, Portugal
- Prof.Isadora@hotmail.com
- Day: 21 March 2019
- Dohr: 12h 41 min 07 local time (GMT+1)
- Latitude: **38,522727**
- Longitude: **- 8,857159**
- Gnomon length: 1 m.
- Length of the shadow: **0,75 m**
- Calculates distance to the Estarreja City: 248 kilometers
- attachment-28585

During the 21 of March



Escola D. Manuel Martins
- Setúbal
- PORTUGAL

Latitude **38,522727**
Longitude **- 8,857159**
Gnomon length: **1 m.**
Length of the shadow: **0,75 m**
Our angle is 36.86°

Evaluation

(what are we going to evaluate, how, whom...)

CRITERIA FOR ASSESSING SELECTED TRIAL

What is being assessed

1. content - instructions for preparing the experiment - (professional and language correctness, originality and selected pictorial materials (recommended work)) (25 points)

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	2. written literature used (20 points) 3. relevance criteria (15 points) 4. appearance (without the use of gestures, free speech, loud, distinct, excites the interest of listeners, eye contact, linguistic correctness) (15 points) 7. defense (knowledge of the theoretical starting points and the practical implementation of the experiment) (25 points) Total 100 points 0-49 (1); 50-64 (2); 65-79 (3); 80-89 (4); 90-99 (5)
Conclusions	By measuring the shadow of a stick we can determine the perimeter of the Earth. All made with simple calculations adequated to the students age.
Improvements	They have improved the skills of experimenting, preparing presentations and developing digital competences.

