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COMPUTATIONAL THINKING - LESSON SCRIPT

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Lesson information:	Subject:	Physics
	Duration:	2x45 min
	Grade/level:	1 st grade of middle school / 7 th grade of primary school
	Age:	14
	Topic:	Measuring velocity of a physical body.

The curriculum specifications and requirements:

The core curriculum of Physics for the 3rd educational stage

1. Rectilinear motion and forces. Pupil:
 - 1) uses the concept of velocity to describe motion; converts units of velocity;
 - 5) differentiates between average and temporary velocity in non-uniform motion;
9. Experimental requirements. Pupil:
 - 2) determines velocity of relocating (for example while marching, running, swimming, cycling) using measurement of distance and time;

Since 2017 the core curriculum of teaching Physics in grades 4th- 8th:

II. Motion and forces. Pupil:

- 4) uses the concept of velocity to describe rectilinear motion; calculates its value and converts its units; applies connection between velocity with way and time that was needed to travel a distance while doing calculations;
- 18) experimentally:
 - b) determines velocity from measurement of time and way with the use of analogue or digital devices or software used to measure on video pictures

The aims of the lesson:	Pupil:
	<ul style="list-style-type: none">• knows difference between average and temporary velocity• knows how to determine average and temporary velocity of a physical body in experimental way

Previous knowledge:

Pupil knows:

- concept of velocity of a physical body
 - concept of uniform motion
 - formula needed to calculate velocity in uniform motion
 - units of velocity
 - knows when motion is uniform and non-uniform
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The forms of work:

- group work
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The methods of work:

- practical
 - prescinding (what is insignificant)
 - discussion
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Teaching aids:

For each group: smartphone, computer/laptop with video edition application, tape measure, small heavy ball (metal ball or other small heavy thing)

The range of using ICT:

- recording of the experiment
 - determining velocity of a physical body
 - checking the knowledge
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The course of lesson:

- Teacher activities
- Pupil activities
- The schedule

1. Introduction - organisational activities

Greeting the pupils, checking the register, giving the topic of the lesson and introducing the aims of the lesson

5min**2. Reminding information**

Pupils do exercise on the platform learningapps.org. They do it in groups.
<https://learningapps.org/3675941>.

10 min**3. Problem: How to measure average and temporary velocity of a physical body?**

First pupils discuss in groups and answer questions:

1. What kind of data is needed?
2. What do they want to determine (what kind of velocity: average or temporary)?
3. What physical formulas must be used?
4. How to use ICT tools to make measurements?
5. Which factors have influence on the result and which aren't important?
6. What sequence of doing activities must be chosen?

Pupils write on their worksheets answers for these questions and all results of measurements and calculations. Teacher doesn't correct students' mistakes. Any mistakes in determining velocity should be found by students themselves at the end of the experience and comparison of results

between groups.

15 min

4. Conducting the experiment

Pupils work in groups. They record with the use of smartphone falling of a ball from determined height (at least 2,5m, all groups from the same height) against tape measure or measured graduation on the wall. Next they export the film on the computer/laptop and start it in the program for editing videos.

On the film with tape measure they read endured way from a timeline - time of motion of the ball.

- a) Pupils calculate average velocity and give accuracy of the result.
- b) Pupils calculate velocity of a physical body after going 1 m and 2 m of the way and give accuracy of their results. Pupils try to increase accuracy of their calculations.

Pupils can use calculator <https://www.calkoo.com/pl/czas-predkosc-i-odleglosc>

45 min

5. Groups present received results. Next they swap worksheets to analyse them. Pupils search for possible mistakes in conducting experiment or calculations of other groups.

20 min

6. Evaluation

Teacher checks results of group work.

5 min

Specific information:

- Programs
- Links
- Etc

<https://www.calkoo.com/pl/czas-predkosc-i-odleglosc>

<https://learningapps.org/3675941>.

Attachments:

- Worksheets
 - Programs
 - files necessary
 - Etc
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