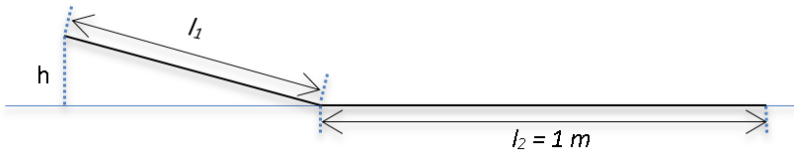
SCENARIO		
Title	Calculation of average movement speed	
Summery	In our environment, something is constantly moving. Some objects move faster, other move slower. The speed of the moving machine is indicated by the speedometer. The activity is designed to measure the moving subject's time with the help of sensors and calculate the average speed.	
Author/s	Kristina Višnevskienė	Date: 25/09/2019

Didactic objectives
To develop the students' ability to calculate the average speeds of movement in practice.
Physics☒ Mathematics☒ Information Technology☐ Robotics☒ Programming☒
Education Level: 10-12 years☒ 12-14 years☐
Problem Statement
Explain the concepts of trajectory, path, time, speed, average speed and acceleration. Calculate the path, speed, time, average speed, and acceleration using the formulas.
BOM (Bill Of Materials needed)
Computer, program Scratch
Activity description

The following steps are programmed using Scratch:

1. An inclined plane must be placed on a flat surface.
2. Measure the length of the plane l_1 taking into account the absolute error.
3. Measure 1 m from the edge of the flatbed and record $l_2 = 1$ m.



4. Calculate total length $(s = l_1 + l_2)$.

5. Determine the height of the sloping plane (h = 5 cm).
6. A metal ball is released from the top of the sloping plane freely. A sensor measures the ball rolling time at the end of the track t_1.
7. The average speed of movement is calculated $v_1 = s : t_1$.
8. When changing the height of the sloping plane (8 cm, 11 cm, 14 cm, 17 cm), repeat steps 5 to 6.

Resources

1. To analyze the obtained experimental results.
2. To make conclusions: what determines the average speed.

Students' Evaluation

The first level of achievement.
With the assistance of the teacher, he / she performs the study, measures the length and time, and calculates the average speed, using the detailed description and tools available.

The second level of achievement.
Independently conducts research, concludes, and explains the results. It is able to express thoughts clearly in writing. Development abilities to convert units of speed.

The third level of achievement.
Students are able to formulate an answer, use meaningful concepts properly (average speed, time, path, sloping plane), fluent in natural science understanding. They could perform well calculations and arrange units.

Bibliography

Handbook for 8 class

Scalability

Mathematics: Understanding and applying tables and formulas.
Information Technology: Scratch Application.

More information

Influence of speed on mechanical energy.