

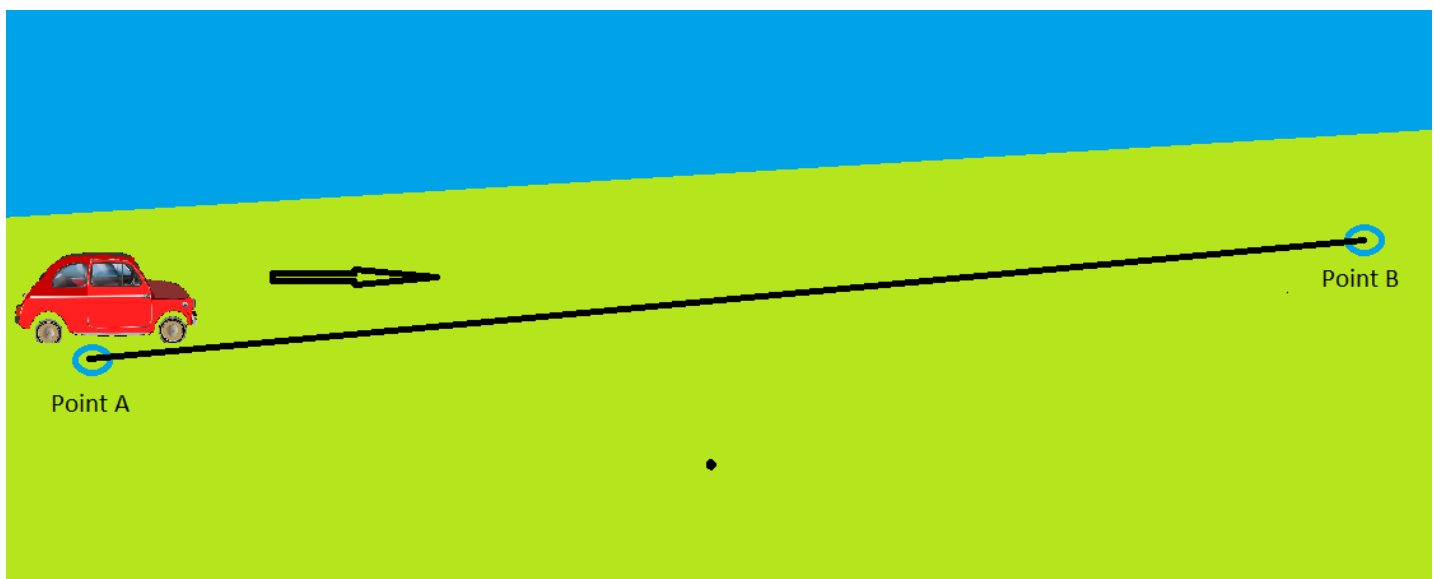
<b>SCENARIO</b>	
<b>Title</b>	Solving speed, time, and distance math problems.
<b>Summary</b>	The program can be used as part of a lesson while learning a formula on the relationship of speed, time and distance, as well as to learn and repeat problem solving using formula $v = \frac{s}{t}$ .
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<b>Didactic objectives</b>	
<b>General aim:</b>	
Students will better understand the relationship between speed, time and distance.	
<b>Tasks of the lesson:</b>	
Students will learn calculating distance, speed, or time when given two other values.	
Then students will move onto solving more complicated problems, for example, problems in which two objects are moving in the opposite direction or towards each other.	
Physics <input checked="" type="checkbox"/>	Mathematics <input checked="" type="checkbox"/> Information Technology <input type="checkbox"/> Robotics <input type="checkbox"/> Programming <input type="checkbox"/>
Education Level:	10-12 years <input checked="" type="checkbox"/> 12-14 years <input type="checkbox"/>
<b>Problem Statement</b>	
Speed, time, and distance problems are a part of mathematics curriculum. Younger students often struggle with such problems, thus this program will help them by visualising the problems.	
<b>BOM (Bill Of Materials needed)</b>	
Computer for each student, Scratch for Arduino, Arduino block with joystick and light (optionally possible to use buzzer).	

### Activity description

Students must know formula  $v = \frac{s}{t}$  and their variations  $s=v*t$  and  $t = \frac{s}{v}$ . If it is needed, it could be revised before the start of the class.

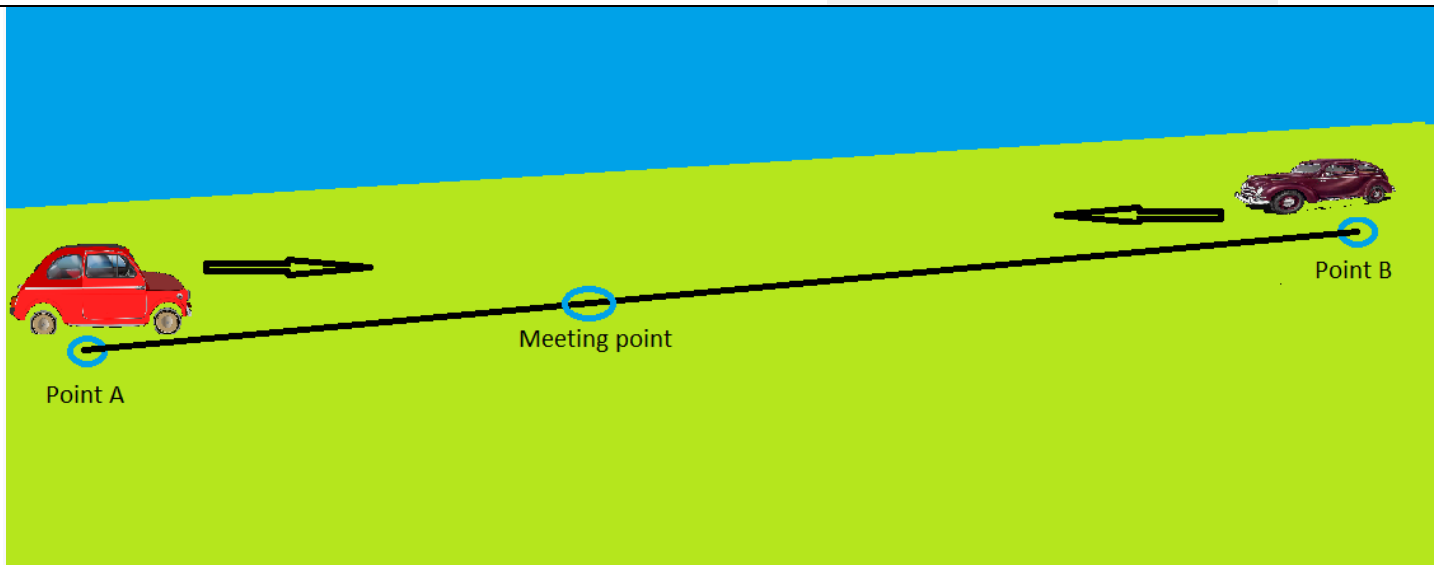
Two of the following three values appear on the screen: speed, distance, or time. Using the appropriate formula the student should calculate the third value, and enter it using the keyboard or the joystick. The car on the screen begins to move towards the finish. If the value calculated by the student is correct, the car will stop at the designated place at the finish. If the value calculated by the student is incorrect, the car will not reach the finish line or will pass it depending on the given answer.



#### 2nd optional scenario

Four of the following five values for two cars appear on the screen: speed of the first car ( $v_1$ ), speed of the second car ( $v_2$ ), distance ( $s$ ) or time ( $t$ ). The illustration indicates that the cars are moving from different points to each other and that after some time they are to meet at the designated point.

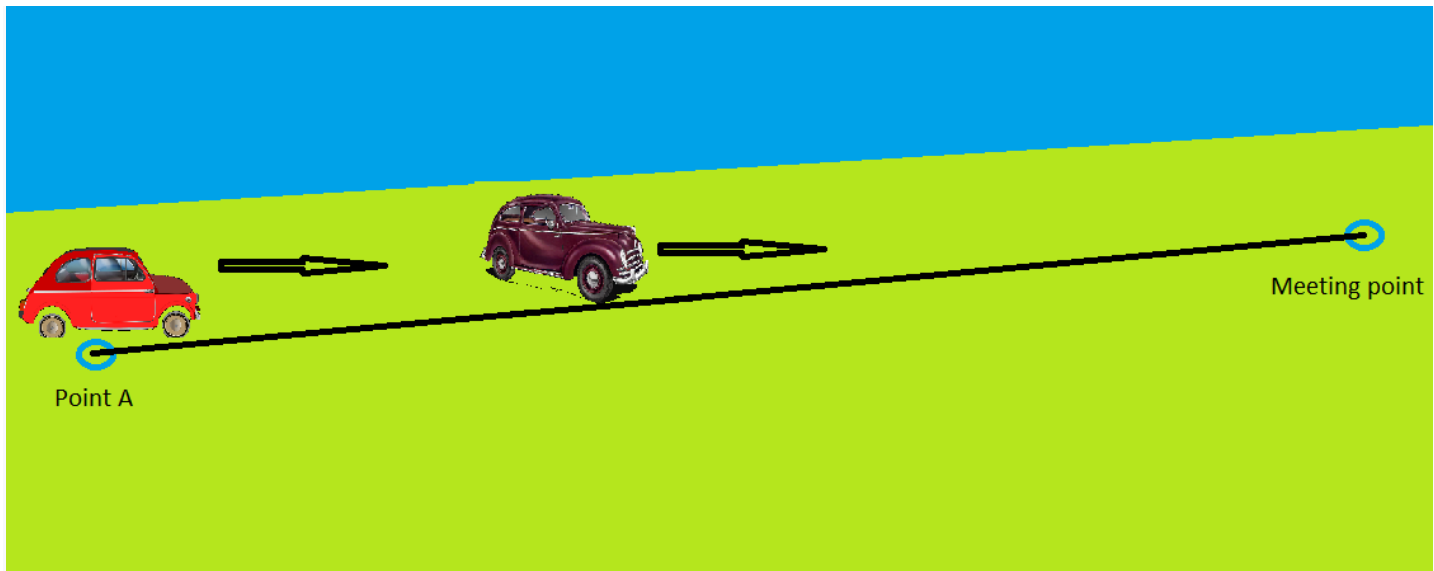
Using the appropriate formulas, the student should calculate the unknown value and enter it using the keyboard or the joystick. The cars on the screen will begin to move. If the values calculated by the student are correct, the cars will stop at the same spot. If the values calculated by the student are incorrect, the cars will not reach each other or they will continue moving some time after meeting.



### 3rd optional scenario

Three of the following four values for two cars appear on the screen: speed of the first car ( $v_1$ ), speed of the second car ( $v_2$ ), distance of the first car ( $s_1$ ), distance of the second car ( $s_2$ ), or time ( $t$ ). The illustration indicates that the cars are moving from different points same direction (the first car is chasing the second car,  $v_1 > v_2$ ) and after some time they are to meet at the designated point.

Using the appropriate formulas, the student should calculate the unknown value and enter it using the keyboard or the joystick. The cars on the screen will begin to move. If the values calculated by the student are correct, the cars will stop at the same spot. If the values calculated by the student are incorrect, the cars will not reach each other or they will continue moving some time after meeting.



„InnoExperiment – Innovative Approach to Teaching through Experiment”

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### Resources

Scratch for Arduino.  
Pictures of various cars collections.  
Animations (illustrations) of a moving one car and moving two car in the same direction and opposite directions

### Students' Evaluation

By using the program, students will improve their skills in solving math problems for speed, time, and distance.  
The student will also have better understanding of the relationship between speed and time and distance.

### Bibliography

Žydrūnė Stundžienė "Matematika tau plus 5 klasė", Vilnius, TEV (Mathematics textbook for class 5)

### Scalability

Speed, path and time are important concepts we encounter not only in mathematics, but also science classes or real life.

### More information

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