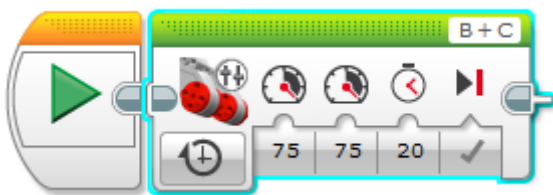


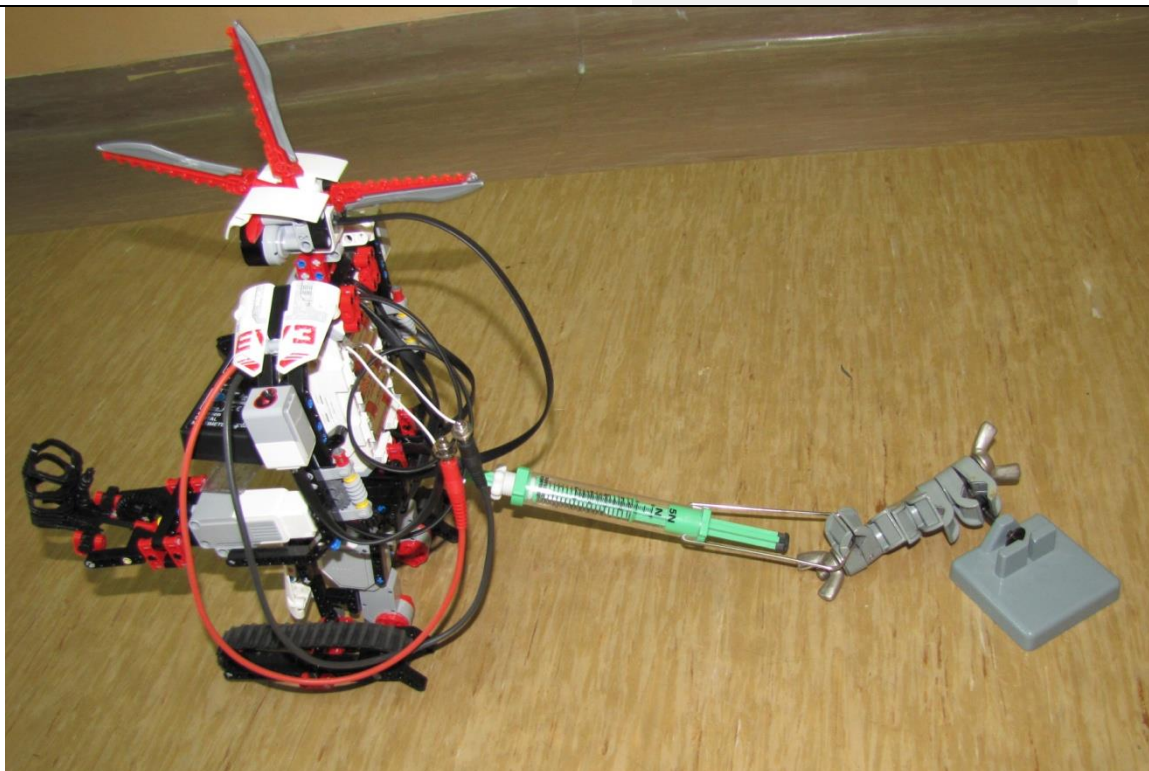
| SCENARIO        |  |                  |
|-----------------|--|------------------|
| <b>Title</b>    | <b>Straight line motion</b>  |                  |
| <b>Summery</b>  | Students will learn the concept of uniform uniform motion, the concept of speed and its units in the SI system. They will learn to plan tasks to determine the speed. Based on their experience, they will learn to read and make graphs of the speed versus time versus distance. |                  |
| <b>Author/s</b> | Jarosław Szczęsny  | Date: 21/11/2019 |

| Didactic objectives  |
|--|
| <p><b>General objectives:</b></p> <ul style="list-style-type: none"> <li>- Introduction of the concept of uniform linear motion.</li> <li>- Introduction of the concept of speed and its units in the SI system.</li> <li>- Planning, conducting and analyzing experiments related to determining speed.</li> <li>- Reading and plotting speed versus time versus time graphs.</li> </ul> <p><b>Specific lesson objectives:</b></p> <p>Students will be able to:</p> <ul style="list-style-type: none"> <li>- indicate examples of movement in the surrounding reality,</li> <li>- use physical quantities: path, speed, time to describe uniform linear motion,</li> <li>- calculate the speed units in the SI system,</li> <li>- make graphs of the dependence of the road and speed on time for uniform linear motion</li> <li>- plan the experience related to determining the speed of movement (e.g. during walking, running, cycling); estimates the order of magnitude of the expected result;</li> <li>- read data from the table; read the speed and distance traveled from diagrams of the dependence of the road and speed on time in uniform linear motion,</li> <li>- draw graphs of the dependence of the road and speed on time in uniform linear motion,</li> <li>- use physical quantities: path, speed, time to solve simple computational tasks related to uniform linear</li> </ul> |

|  |                                      |   |   |                                      |
|--|--------------------------------------|---|---|--------------------------------------|
| motion,<br>- solve problems using the relationship between road, speed and time in straight line traffic.  |                                      |   |   |                                      |
| Physics <input type="checkbox"/>   | Mathematics <input type="checkbox"/> | Information Technology <input type="checkbox"/> | Robotics <input checked="" type="checkbox"/>    | Programming <input type="checkbox"/> |
| Education Level:   |                                      | 10-12 years <input type="checkbox"/>            | 12-14 years <input checked="" type="checkbox"/> |                                      |
| <b>Problem Statement</b>   |                                      |   |   |                                      |
| - What is straight line motion?<br>- What is speed and what is its unit in the SI system?<br>- How to determine the speed?   |                                      |   |   |                                      |
| <b>BOM (Bill Of Materials needed)</b>  |                                      |   |   |                                      |
| - computer station<br>- LEGO MINDSTORMS EV3 robot<br>- instruments for experiments: tube with water and air bubble, stopwatches, markers.  |                                      |   |   |                                      |
| <b>Activity description</b>  |                                      |   |   |                                      |
| 1. Organizational and organizational activities<br>2. Introduction to the topic - a reminder of the basic concepts describing movement.<br>3. Performance demonstration examining uniform motion.<br>4. Introduction of the concept of speed and its unit and formula.<br>5. Exercise in reading and drawing graphs of speed versus time and road versus time<br>6. Planning and conducting by the students an experiment on determining the speed of movement, e.g. during walking, running (group work)<br>7. Practical exercises - working with the LEGO MINDSTORMS EV3 robot.<br>reading the force acting on the drawn body (what force balances it?),<br>creating a table of the length of road sections traveled by the robot at equal intervals.<br>8. Summary and end of the lesson. |                                      |   |   |                                      |
| <b>Resources</b>   |                                      |   |   |                                      |
| water tube and air bubble, stopwatches, highlighters, LEGO MINDSTORMS EV3 robot  |                                      |   |   |                                      |



**„InnoExperiment – Innovative Approach to Teaching through Experiment”**  
**Project Leader:** Zespół Szkolno – Przedszkolny w Goniądzu (ZSP)



### Students' Evaluation

The student will be assessed for commitment and proper performance of tasks.

### Bibliography

Spotkania z fizyką - Podręcznik do fizyki dla klasy siódmej szkoły podstawowej

Authors: Grażyna Francuz-Ornat, Teresa Kulawik, Maria Nowotny-Róžańska

<https://www.robocamp.pl/pl/lego-mindstorms-ev3-wersja-domowa-edukacyjna/>

### Scalability

Script modification and improvement.

### More information

Solving tasks using the program.

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