

Uniform Linear Motion in One Dimension Grade 11 Physics – Kinematics

<h2 style="color: #004a87;">Lesson</h2>	Cross Curricular	Computational Thinking
	Safety Notes	When cart is running, keep fingers off the track. Practice proper posture when using a computer.

<p>Big Ideas</p> <ul style="list-style-type: none"> Investigate, in qualitative and quantitative terms, uniform and non-uniform linear motion, and solve related problems; <p>Learning Goals</p> <ul style="list-style-type: none"> Students will learn linear motion in one dimension. Students will learn about scalar quantities and how to use them to solve one-dimension problems. Students will learn about computational thinking. Students will code a timer to detect motion. 	<p>Specific Expectations</p> <ul style="list-style-type: none"> solve problems involving distance, position, and displacement conduct an inquiry into the uniform and linear motion of an object (e.g., use probeware to record the motion of a cart moving at a constant velocity)
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Description

Students will learn about scalar quantities and utilize these scalar quantities to solve simple one-dimension problems.

<p>Materials</p> <ul style="list-style-type: none"> <i>Uniform Linear Motion in One Dimension</i> handout <i>Uniform Linear Motion in One Dimension</i> PowerPoint Micro:bit Aluminum Foil Alligator clips (class set) Spring Track Car (10) Internet Internet Accessible Devices such as Chromebooks, Computers, or Ipads 	<p>Accommodations/Modifications</p> <p>Students have the opportunity to type, verbally record with speech-to-text software, and draw their answers.</p>
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Introduction

- Educators should have students organized into groups of 2 or 3 prior to the beginning of class.
- Introduction: View video <https://www.khanacademy.org/science/ap-physics-1/ap-one-dimensional-motion/ap-physics-foundations/v/introduction-to-vectors-and-scalars>
- After viewing the video, the educator will direct students, in pairs, to a t-chart comparing scalars and vectors. Students are encouraged to use words, drawings, different fonts, etc. to demonstrate their ideas.

Action

- Facilitate collaborative class discussion with Slides 2-5 in the *Uniform Linear Motion in One Dimension PowerPoint* and the **Introduction** section of *Uniform Linear Motion in One Dimension* handout.
- Facilitate collaborative problem solving with Slides 6-8 in the *Uniform Linear Motion in One Dimension PowerPoint* and the **Problem-Solving** section of *Uniform Linear Motion in One Dimension* handout.
- Educators will provide most of the materials for the experiment, such as the car, alligator clips, aluminum foil, and microbits. However, if students wish to design an experiment with additional materials, they are responsible to bring them in.
- Students will then design and conduct a working experiment. The educator will review the expectations for the experiment on Slides 9 and 11 in the *Uniform Linear Motion in One Dimension PowerPoint*.
- Students will create a coded timer using the **Micro:bit Brainstorming** section of the *Uniform Linear Motion in One Dimension* handout and the [Makecode.microbit.org](https://makecode.microbit.org) website.
- Educators can provide students with this coded timer example on Slide 12-13 in the *Uniform Linear Motion in One Dimension PowerPoint*, https://makecode.microbit.org/_F4oYvfJ2DePR.
- Students will create a one-minute abstract video, a detailed procedure, a completed observation table, and a graph of the results. Educators can choose to have students either submit or discuss the student work as a class.

Consolidation/Extension

- To consolidate the lesson, the educator will direct students, in their groups, to complete the questions on Slide 14 in the *Uniform Linear Motion in One Dimension PowerPoint*.
- Educators will conduct a class discussion with the students on the consolidation questions.