Grade / Age: 10-14, 14-18
Topic: Physics, STEAM
Subject area: uniformly varied rectilinear motion
Keywords: reaction distance, braking distance
Single/ teamwork: single
Language: (English or Local) English
Duration: 30 min

Description of the Task:
We notice an obstacle on the road where we are driving. In the GeoGebra file below, varying our speed and average decelerations for different road conditions, let's see how far down the road can we stop? What is the reaction time? How does stopping distance depend on speed?
https://www.geogebra.org/classic/psdxd6y4

Solutions of the Task:
In the GeoGebra file, the velocity-time graph is drawn, taking into account the reaction time. The graph shows when the car stops. The braking distance can also be calculated from the area below the speed-time graph.
At a certain distance an obstacle is detected. Adjust the distance, check under which conditions the collision can be avoided.

Prior knowledge: uniformly varied rectilinear (slowing, accelerating) motion

Comments:
For 10-14 year olds, the ready-made solution is tested, and the conversion of speed units can be practised.
For middle school students, we can also discuss the details of calculating the stopping distance.

Connection to other subjects/topics/areas:
mathematics, informatics