"Parking sensor "

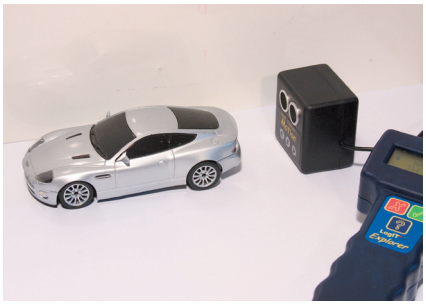
Sensor: Motion sensor

Overview:
This simple experiment allows pupils to make a parking sensor which will produce an audible warning when a car gets too close to a wall. It requires the LogIT Explorer Controller set in order to produce the control of the buzzer contained in the controller kit.
It is hoped that pupils will get a visual reinforcement of distance and how the motion of the 'car', by being plotted on a graph, will be a help to graph interpretation in science.

Equipment required: LogIT Explorer
LogIT Explorer Motion sensor
LogIT Explorer Controller set (buzzer to be used)
Clamp stand (optional)

Hazards:
Take care if using clamp stands that they cannot fall off the bench.
This experiment can be done on the floor if space allows.
Always check your local regulations or the school advisory service such as CLEAPSS or SSERC for guidance on the use of any hazardous material or procedure.

Setup:

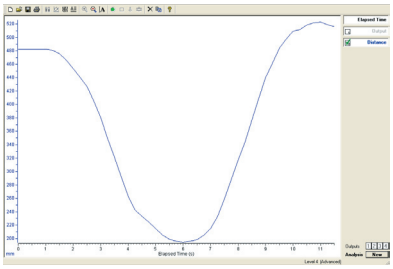


1. Connect the Explorer controller to channel 1 of Explorer.
2. Connect the buzzer to the controller.
3. Connect the Motion sensor to channel 2 of Explorer.
4. Mount the sensor in a clamp stand or place on a box.
5. Connect the Explorer to the computer and start the datalogging software. If using LogIT Lab select 'Autolog' when prompted from the 'Select New Activity' screen.

Note: You need to set up the control options. Select 'Logging' from the menu bar at the top of the screen (Insight users select 'Set-up') then select 'Control' from the drop down menu. Select 'Turn output 1 on' from the drop down list and type in a number to represent the distance (in mm) at which you want the buzzer to sound. Make sure 'Enable' is checked and then click 'OK'. You can select a distance above or below the entered value. Insight users can also select a time for how long the buzzer should sound for.

Method:
When ready click 'Start' to begin logging.
Pupils can then move the sensor to and from a wall. When the buzzer sounds, pupils should look at the graph being plotted and see how the graph relates to the physical distance from the wall.
When the car has moved forwards and backwards a few times, stop logging.

Results:
Look at the graph.
How does the resultant graph relate to the motion of the car?
Can you spot from the graph when the buzzer might have gone off?
You could ask pupils to explain how the graph shows the movement of the car. Can they decide whether the car was moving forward or backward from the graph?



Going further:
From the graph, can your more advanced pupils calculate the speed of the car.
What happens to the graph if the car moved in the same way but moved at different speeds? You could ask pupils to predict what the graph might look like.
You could use the bulb in the controller to make a visual alert for the driver.