

EPPro8 Challenge

Engineer Problem Solve Innovate

Laser Tracking

A meteor is heading towards earth.

The Space Agency needs you to build a laser tracking system that can track the meteor and calculate its position.



This challenge contains optional activities using the EPro8 Electronics Starter Kit.

Laser Construction

Criteria The magnifying glass and torch are mounted on an aluminium rod so that the beam creates a focused pattern on the roof.



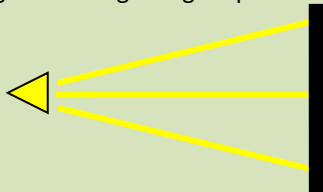
Instead of a torch, you can use the light from your EPro8 Electronics Starter Kit.

Hint

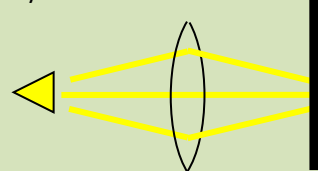
This is not actually a laser but a spot light. Use a red joiner to mount the magnifying glass.

Use a rubber bands to mount the torch.

The beams from the light all go in different angles creating a large "spot" on the roof.



The lens of the magnifying glass bends the beams of light so they focus on the wall.



The position of the magnifying glass is important. If it is too close or too far away the projection will be blurry.

One Dimensional Tracking

Criteria	The “laser” assembly is mounted on a stand. Rotating a crank handle caused the beam to track from one end of the roof to the other.
Hint	Connect the “laser” assembly and a large gear to an axle. Balance the assembly by mounting it at the centre.

Two Dimensional Tracking

Criteria	The stand now has two crank handles: <ul style="list-style-type: none">- one that drives the beam side to side- one that drives the beam forward and back. By turning only the crank handles you have 30 seconds to direct the beam to hit the meteor (or any other object in the room).
Hint	Start with constructing a nice big frame to mount your axles to. One axle will turn the shaft that the other axle is mounted on.



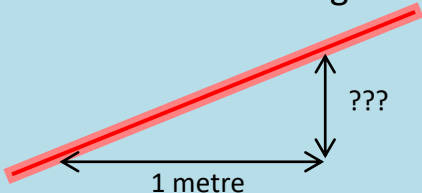
Motorised Tracking

Criteria	Two push buttons control the up and down movement. The crank handle controls the side-to-side movement. <i>Note: You will need to use the button previously used for the light. For this challenge you can break the rule by wiring the blue wire from the light straight into the red socket of the battery.</i>
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Motorised Tracker (Simulator)

Criteria	Use the online electronics simulator, code LSTR The tracker contains four buttons. Using these the beam can be driven in all directions, and can track the meteor.
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Beam Angle

Criteria	<p>With the beam pointing at the meteor measure how steep the beam is: At one metre in front of the light how much higher is the beam?</p> 
Hint	<p>Mount a piece of paper on a stand exactly 1m in front of the magnifying glass. Measure the height of the magnifying glass and the height where the beam hits the piece of paper.</p>

<h2>Meteor Height</h2>	
Criteria	<p>Your teacher will tell you how far away the meteor is. Without leaving your tracker, calculate how high above the ground the asteroid is.</p>
Hint	<p>If it is 6m to the asteroid the height will be 6 times what you worked out in the previous step.</p>

After you have attempted this challenge, watch the Tutorial to see our solution at www.EPro8Challenge.co.nz/Tutorial and enter the Challenge Code **LSTR**