

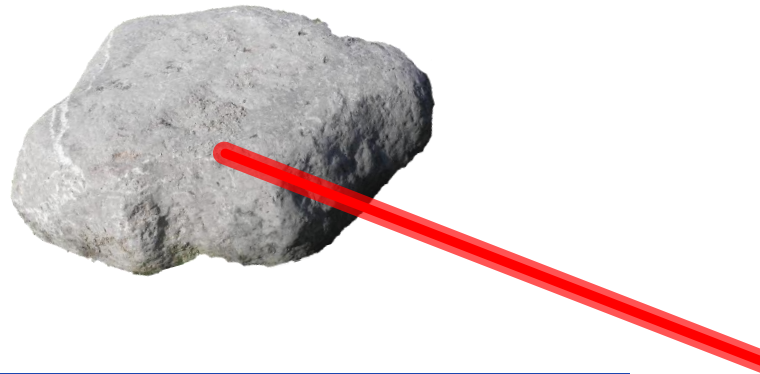
# EPPro8 Challenge

Engineer Problem Solve Innovate

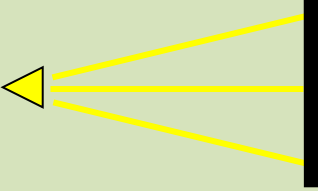
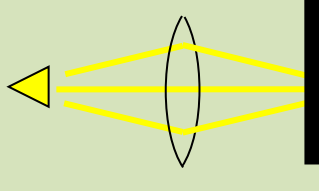
## Laser Tracking

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.



### 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.	
Hint	<p>This is not actually a laser but a spot light. Use a red joiner to mount the magnifying glass.</p> <p>The beams from the light all go in different angles creating a large "spot" on the roof.</p> 	<p>Use a rubber bands to mount the torch.</p> <p>The lens of the magnifying glass bends the beams of light so they focus on the wall.</p> 
	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.

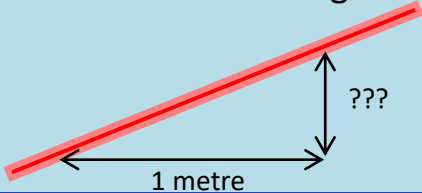
## Two Dimensional Tracking

Criteria	<p>The stand now has two crank handles:</p> <ul style="list-style-type: none"><li>- one that drives the beam side to side</li><li>- one that drives the beam forward and back.</li></ul> <p>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).</p>
Hint	<p>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.</p>

## Motorised Tracker

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

Criteria	<p>With the beam pointing at the meteor measure how steep the beam is:</p> <p>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.</p> <p>Measure the height of the magnifying glass and the height where the beam hits the piece of paper.</p>

## Meteor Height

Criteria	<p>Your teacher will tell you how far away the meteor is.</p> <p>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](http://www.EPro8Challenge.co.nz/Tutorial) and enter the Challenge Code **LSTR**