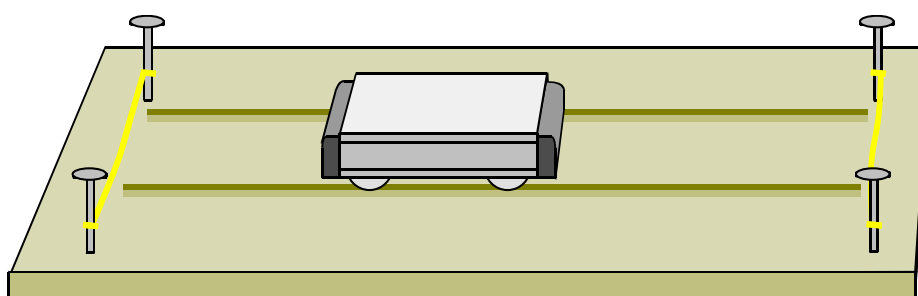


TAP 301- 2: Mass oscillating between elastic barriers

This oscillator is an air-track vehicle or low-friction dynamics trolley bouncing between elastic bands mounted at either end of the track.

You will need

- ✓ two trolley catapults
- ✓ dynamics trolley, low friction
- ✓ trolley board
- ✓ stopwatch



What to do

Set the oscillation going by gently pushing the vehicle towards one of the catapults.

1. Measure the time it takes for the vehicle to move along the track for a number of consecutive runs and enter the results into the table.

Run along track	Time taken / s
1	
2	
3	
4	
5	
6	

Is the oscillation isochronous?

2. Draw a displacement–time graph and a velocity–time graph of two full oscillations. Take zero displacement to be in the middle of the track and consider displacements to the right of the middle point as positive.

You have seen

1. This oscillation is not isochronous.
2. The velocity does not substantially change during a single run of the trolley, but does fall each consecutive run.

Practical advice

This gives an example of a rather different 'oscillator'. The major point to stress here is that the velocity does not change except at the ends of the oscillation, because that is the only place a force acts on the trolley (other than friction, which we are doing our best to reduce to zero).

Alternative approaches

Students may suggest other interesting oscillators.

External reference

This activity is taken from Advancing Physics chapter 10, 230P