



EPPro8 Challenge

Engineer Problem Solve Innovate

Pinball Machine

Last weekend you visited your auntie. Her house is full of 1950s memorabilia.

You spent half the weekend playing on her pinball machine and had so much fun that you have decided to build your own.

Build a pinball machine complete with flashing lights, levers, buzzers and a scoring system.



Pinball Table

Criteria	<p>A table frame is approximately 700mm wide and 1200mm long. The frame is approximately 700mm tall at the front and 900mm tall at the rear.</p> <p>The pegboard is attached to the frame.</p> <p>A ball can run down the surface of the table.</p>
Hint	<p>Mount the pegboard to the structure by putting blue joiners on the structure and inserting a bolt through the pegboard.</p>

Launch Track

Criteria	<p>Two parallel aluminium rods form a track up the right hand side of the pinball surface.</p> <p>The ball can be flicked by hand up the track. It bounces off a barrier at the top of the pinball surface and rolls down the main play area.</p>
Hint	<p>Attach the aluminium rods at the bottom only. Then there is nothing to block the ball as it rolls up the track.</p> <p>Attach the blue joiners under the aluminium.</p> <p>This will hold the aluminium higher so the ball is less likely to jump over the aluminium.</p>

Five Ramps

Criteria	At least five aluminium ramps are attached to the pinball surface. The ball rolls along all of these ramps as it descends the play area.
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10 Second Descent

Criteria	The ramps are modified so that the ball takes between 10 and 15 seconds to roll from the top to the bottom.
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Hint	Experiment with the number of ramps and how steep each ramp is.
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Launch Mechanism

Criteria	A spring-loaded launching mechanism sends the ball up the launch track from the bottom to the top of the pinball machine's platform.
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Hint	Use rubber bands to spring load a sliding mechanism
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Two Paddles

Criteria	Paddles (short aluminium rods) are attached to axles and mounted above the play surface. One crank handle controls one paddle. The other handle controls the other paddle.
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One Crank Handle – Two Paddle

Criteria	One crank handle controls both
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Hint	Link the two crank handles using a chain of gears.
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Solenoid Paddles

Criteria	<p>Use the online electronics simulator, code PNBL.</p> <p>Solenoids are like electronic springs. They work using an electronic magnet. When electricity is applied solenoids extend very quickly.</p> <p>A button is placed on each side of the pinball machine. Pushing a button fires the corresponding solenoid. This triggers the paddle.</p>
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Flashing Lights and Sirens

Criteria	<p>A number of limit switches are placed on the pinball play surface. When the ball hits the limit switches the lights flash or the buzzer sound.</p>
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Lives Lost

Criteria	<p>A laser beam senses when the ball drops below the paddles. This is one "life" lost.</p> <p>A counter counts the number of lost lives.</p>
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After you have attempted this challenge watch the tutorial to see our solution at www.EPro8Challenge.co.nz/Tutorial and enter the Challenge Code **PNBL**.