

EPPro8 Challenge

Engineer Problem Solve Innovate

Conveyor Belt

We have had lots of orders for the EPro8 Equipment and the factory needs to be modernised.

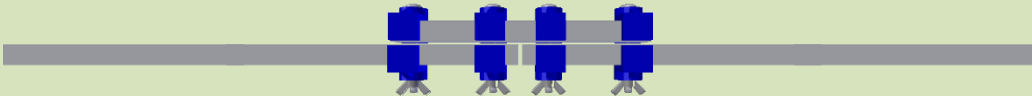
Build a conveyor belt that can transport the EPro8 parts so that they drop into a box for dispatch.



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



Mounting Frame

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| Criteria | Construct the frame of a table exactly 1.4m long, approximately 200mm deep and 200mm tall |
| Hint | Make 1.4m long rods by joining two 700mm rods as shown:  |

Conveyor Belt

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| Criteria | Mount the conveyor belt between two axles. Evenly space 10 blue joiners on the conveyor belt. Turning the crank handle causes the conveyor belt to move and the blue joiners to fall into a box. |
| Hint | The conveyor belt is made from a bike inner tube. Mount it inside out so the grey surface is on the outside and the black is on the inside. This will create a slight lip on the outside of the conveyor belt. Experiment with the tension of the conveyor belt. |



Motorised Conveyor Belt

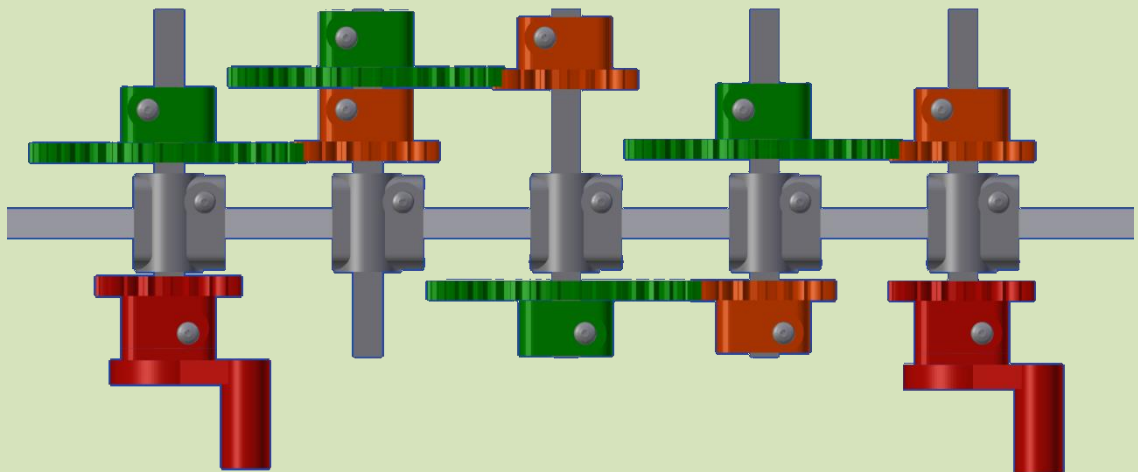
| | |
|----------|---|
| Criteria | The conveyor belt is motorised. When push button is pushed the conveyor belt to moves and the blue joiners to fall into a box. |
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High Speed Conveyor

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| Criteria | Mount a gearbox between the crank handle and the conveyor belt. Every time the crank handle is turned once the axle on the conveyor belt turns eight times. |
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Hint **There is a separate “Gearbox” activity that describes how to build a gearbox. You should do this activity now.**

This is the gearbox build described in that activity:



You will need one less big gear / small gear combination for this challenge.

Fully Loaded Conveyor Belt

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| Criteria | Spread 50 blue joiners out along the surface of the conveyor belt. Turning the crank handle transports all the joiners into the box. |
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Hint This weight of joiners will cause the conveyor belt to sag. You will need to add extra supports under the conveyor belt.

Throughput Calculation

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| Criteria | Spread 50 blue joiners out along the surface of the conveyor belt. Time how long it takes for all 50 joiners to be transported along the conveyor belt and into the box. |
| | Calculate how many joiners fell into the box every second. |
| | If the conveyor belt was continuously fully loaded, how many joiners would fall into the box every minute? |
| | How many joiners would fall into the box every hour? |

Delivery Vehicle

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| Criteria | The box is mounted on the back of a three wheeled delivery vehicle. A crank handle drives one of the wheels. When the blue joiners are all in the box the delivery vehicle can be driven away from the conveyor belt. |
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Motorised Conveyor Belt (Simulator)

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| Criteria | Use the online electronics simulator, code CNVR . The conveyor belt is motorised. One button turns the conveyor belt ON. A second button turns the conveyor belt OFF. |
| Hint | Use the ON/OFF box to control the conveyor belt. |

Joiner Counter

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| Criteria | A laser beam is broken every time a joiner falls into the box. A counter counts how many joiners have fallen into the container. |
| Hint | Connect the output from the laser sensor to the counter. |

| Full Box – Stop | |
|-----------------|---|
| Criteria | A push button starts the conveyor belt which is loaded with blue joiners. When ten joiners have fallen into the container the conveyor belt automatically stops. |
| Hint | Use the COUNTER box to turn OFF the ON/OFF box. |

| Full Box – Delivery | |
|---------------------|---|
| Criteria | When ten joiners have fallen into the container the conveyor belt automatically stops AND the delivery vehicle automatically starts moving. |
| Hint | Use the COUNTER box to turn OFF the ON/OFF box. Use a second ON/OFF box to control the vehicle. |

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