

EPPro8 Challenge

Engineer Problem Solve Innovate

Fire Engine

Fire, Flame, Explosions.

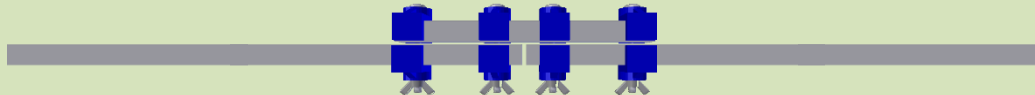
To help put out the fires we need a motorised fire engine complete with a hinged ladder that can be raised or lowered using buttons.



Ladder Construction

Criteria	Construct a ladder exactly 1.4m long. The gap between each rung must be less than 250mm.
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Hint	This challenge is all about measurements. Check your measurements very carefully. Make 1.4m long rods by joining two 700mm rods as shown:
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Fire Engine

Criteria	The body of a fire engine is approximately 700mm long and 400mm wide.
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Ladder Mounting

Criteria	The ladder is attached to a fire engine and can be raised by hand. The fire engine can be pulled, but no part of the ladder may touch the ground or any of the wheels.
Hint	Attach the ladder to axles using red joiners.

Raising the Ladder

Criteria	Turning the crank handle raises and lowers the ladder. In the raised position the top of the ladder is at least 1.2m above the ground.
Hint	Because the ladder is long it has a lot of leverage acting on it. You will not be able to turn this by directly turning the axle it is attached to. Use the reel and a rope (mounted above the fire engine) to lift the ladder.

Flat Platform

Criteria	A platform is at the end of the ladder. The platform will be horizontal, regardless of what angle the ladder is at.
Hint	You could hinge a suspended basket to the ladder using an axle. Attach a weight under the basket so that is always flat.

Flashing Lights and Sirens

Criteria	Use the online electronics simulator, code FRNG . Two lights on the fire engine flash alternately and the buzzer pulses.
Hint	Use a SEQUENCE box to create a loop, with the following: <ul style="list-style-type: none">• a push button to TRIGGER 1• STEP 1 is connected to TRIGGER 2• STEP 2 is connected to TRIGGER 3• STEP 3 is connected to TRIGGER 4• STEP 4 is connected to TRIGGER 1 Connect lights and buzzers up to the outputs.

Motorised Fire Engine

Criteria	The fire engine is motorised. Two push buttons can be used to drive it forwards and backwards.
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Motorised Ladder

Criteria	Push buttons at the top of the ladder raise and lower the ladder.
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Ladder Safety

Criteria	The fire engine is motorised. A push button will drive it forward, but only if the ladder is down.
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Hint	Use the limit switch to detect if the ladder is down. To drive forward the push button must be pushed AND the ladder must be down.
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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 **FRNG**.