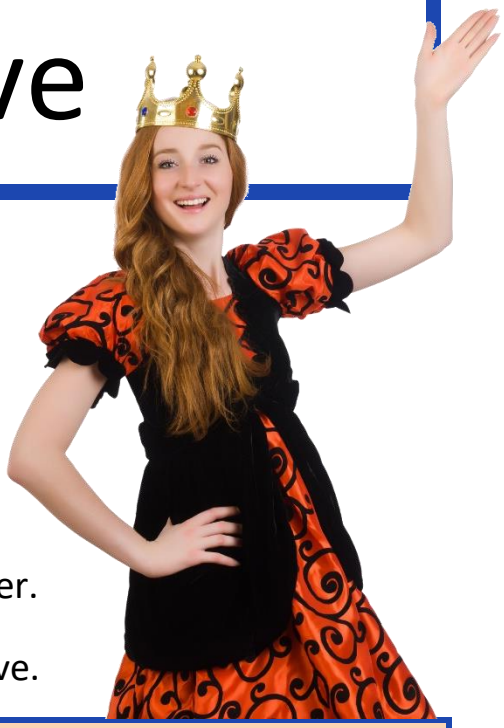
EPro8 Challenge

Engineer Problem Solve Innovate

Royal Wave



When the Queen drives through town people line the street to see her give a royal wave.

The problem is – the Queen broke her arm last week in a snowboarding accident.

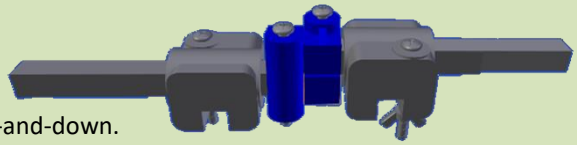
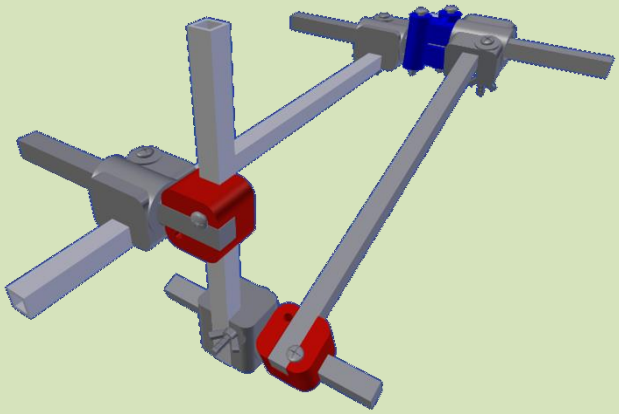
To keep her subjects happy she wants you to invent a waving machine that can do the waving for her.

Design and build a contraption that will do a royal wave.

Bentley State Limousine	
Criteria	A vehicle is at least 1.2m long and 700mm tall. The vehicle can be pulled along the ground.

Pendulum Wave	
Criteria	A 700mm arm has a cardboard hand on the end. The arm is attached to the limousine and points upwards. A weight is attached below the arm so it swings like a pendulum. The arm will wave for at least 10 waves.
Hint	Attach the arm to the limousine with an axle so some of the arm extends below the axle. Attach a weight to the bottom of the arm. Then it will act as a pendulum (a swing).

Crank Handle Waving

Criteria	A crank handle is turned continuously in a clockwise direction. This causes the arm to wave from side-to-side.
Hint	The crank handle provides a rotating motion (as does a motor). Machines convert this motion into a range of other motions. Connect two axles so they are offset. Turning the first axle will make the second one to move side-to-side and up-and-down.  Link this motion to your arm as shown: 

Push Start

Criteria	The limousine is pushed along the ground. This causes the arm to automatically wave side-to-side
Hint	Replace the crank handle with a gear. Attach a second gear to one of the wheels.

Motorised Waving

Criteria	Use the online electronics simulator, code **RYWV** The limousine is motorised. When a switch is turned on the limousine moves forward. The arm is motorised. When a second switch is triggered the arm waves continuously from side-to-side.

Wave When Stopped	
Criteria	The limousine is motorised. When a switch is turned on the limousine moves forward. The arm waves whenever the limousine is NOT moving.
Hint	Connect the switch to the NOT box. The output from the NOT will be on whenever the switch is NOT on.

Wave When there is a Crowd	
Criteria	Laser beams detect when the limousine is beside the crowd. Whenever the limousine is beside the crowd the arm automatically waves.
Hint	Use the laser beam being broken to trigger the waving mechanism.

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