



# EP8 Challenge

Engineer Problem Solve Innovate

## Wind-Powered Crane

You live in the middle of nowhere. Your house is on top of a very windy cliff and has no source of electricity.

It is hard work climbing the 276 steps – especially when carrying your groceries.

You have an idea. You could use wind power to lift things up to your house at the top of the cliff.



### The Tower

Criteria	A basic frame is approximately 1m tall, 400mm wide and 400mm long. No bracing is required for the tower.
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### Lifting an Envelope

Criteria	A wind turbine is connected to the top of the tower. The fan blowing on the turbine causes the turbine to rotate which lifts the envelope (made from a piece of paper).
Hint	A wind turbine works by having blades shaped to capture the wind. They are like mini sails or wings. Use the reel and rope to lift the envelope.

### Brainstorm

Criteria	Test how much weight your crane can currently lift. Make a list of all the things you could adjust on your wind turbine that might make it be able to lift a heavier object.
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## Number of Blades

Criteria	<p>Adjust the number of blades on the wind turbine.</p> <p>Does the number of blades affect how much weight can be lifted? What is the maximum weight you can lift by adjusting the number of blades?</p>
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## Angle of Blades

Criteria	<p>Move the blades forward or back in the slot on the wind turbine hub. This will change the angle that the blade points towards the wind.</p> <p>Does the angle of the blades affect how much weight can be lifted? What is the maximum weight you can lift by adjusting the angle of the blades?</p>
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## Size of the Blades

Criteria	<p>Adjust the size of blades on the wind turbine.</p> <p>Does the size of the blades affect how much weight can be lifted? What is the maximum weight you can lift by adjusting the size of the blades?</p>
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2kg Lift	
Criteria	A gearbox converts the relatively small lift so that the wind turbine can now lift a 2kg weight.
Hint	<p>Use a gearbox to increase the strength of the turbine.</p> <p><b>There is a separate “Gearbox” activity that describes how to build a gearbox. You should do this activity now.</b></p> <p>This is the gearbox build described in that activity:</p>

After you have attempted this challenge watch the tutorial to see our solution at [www.EPro8Challenge.co.nz/Tutorial](http://www.EPro8Challenge.co.nz/Tutorial) and enter the Challenge Code **WIND**.