

<b>ES</b>	<b>TECHNOLOGY</b>	<b>Knowledge &amp; understanding</b>	<b>Needs</b>	<b>Resources</b>	<b>Processes</b>
	<b>TECHNOLOGY</b>	<b>Skills in designing &amp; making</b>	<b>Preparing</b>	<b>Carrying out</b>	<b>Reviewing</b>
	<b>SCIENCE</b>	<b>K &amp; U - Energy and forces</b>	<b>Properties of energy</b>	<b>Conversion of energy</b>	<b>Forces</b> <i>push/pull, gravity friction, air resistance</i>
	<b>SCIENCE</b>	<b>K &amp; U - Earth &amp; space</b>	<b>Materials from Earth</b>	<b>Changing materials</b>	

If you operate the wind hoist when there is enough wind to do real work, you are likely to find that the load winds up so quickly that it's thrown into the air! Damage to the hoist is possible. What is needed is some form of friction brake that will absorb the excess energy. You need to be able to raise the load under control at all times, and be able to stop the load rising if necessary. As shown, the hoist has to be hand held at all times. Can you design a stand that will enable the hoist to be operated without having to be hand held? Objects get blown away when it's windy - how about anchor points? Weighted base?

**STAGE ONE**

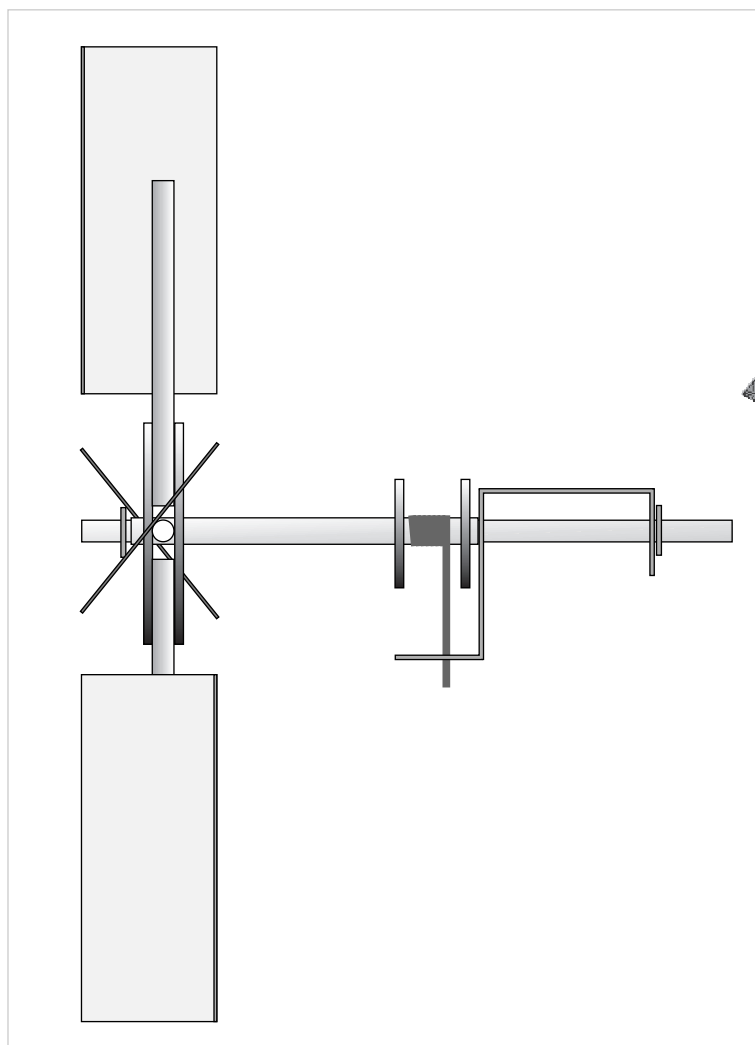
Build several windmills with different sized sails - vary the 'tilt' of the sails - does that make any difference to performance? Use a fan to provide a constant wind speed for fair testing (a two-speed fan would be ideal). Would designing a windmill with variable 'pitch' (tilt angle) be too difficult? Does turning the whole hoist away from the wind help? **FRICITION** - Perhaps something is needed to rub against the revolving shaft to slow it down. How could you vary the pressure? (What happens to the 'spare' energy?)

**STAGE TWO**

Design and build a prototype hoist using the knowledge you have gained from your investigations. Make changes as you meet new problems or find new solutions.

**STAGE THREE**

Test your design with the fan and then make field trials in real wind. Need any modifications? If yes, then make changes and test again.



Don't forget that the load doesn't have to be immediately below the hoist. Strategically positioned pulleys could mean that the load being lifted may be some way from the hoist - possibly higher. In fact, the hoist might be outside in the wind and the load inside in the warm! (See page 28)

