

	When designing and making, pupils should be taught to:	Knowledge / Context	Links to prior and future learning
Core Task	design and make a lifting machine for feeding the iron man. Include a lever and a magnet.	The lifting machine should be set as a challenge when they reach the chapter about the metal scrap yard. Collect items to use as scrap metal for feeding to the iron man e.g bottle caps Ideally the children should work in pairs or small groups	Builds on refining designs and cutting, measuring and drilling from Y1/2.  Links to current Science work on magnetism  Leads to Y5/6 unit on levers and pulleys
Design Skills	use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups	Use construction kits such as Knex to: <ul style="list-style-type: none"><li>investigate making tall stable structures.</li><li>investigate how levers work</li></ul> Devise a WAGOLL list to show <ul style="list-style-type: none"><li>presentation criteria</li><li>Structural criteria including<ul style="list-style-type: none"><li>Stability</li><li>Lever mechanism</li><li>Lifting design</li><li>Use of a magnet</li></ul></li></ul>	
	generate, develop, model and communicate their ideas through discussion, annotated sketches and prototypes	Draw sketches of ideas for making the lifting machine. Annotate to show the moving parts & how the lever is pivoted. Annotate to show the materials to be used. Make a prototype in cardboard	
Making Skills	select from and use a wider range of equipment to perform practical tasks [for example, joining and finishing], accurately	Use a range of tools E.g. saws, bench hooks, metal rulers, drills, glue gun, scissors, PVA glue	
	select from and use a wider range of materials and components, including construction materials, according to their	Use a range of materials E.g. Square section wood with dowel rods for the pivot Cardboard triangles for joining	

	functional properties and aesthetic qualities.	Cardboard boxes	
<b>Evaluation Skills</b>	investigate and analyse a range of existing products	As a class, decide upon success criteria for the lifting machine	
	evaluate their ideas and products against their own design criteria and consider the views of others to improve their work	Peer assessment of each other's designs at sketch stage before making final product	
<b>Technical Knowledge</b>	apply their understanding of how to strengthen, stiffen and reinforce more complex structures	Consider the area of the base and how it affects stability. Consider using triangle structures to improve rigidity	
	understand and use mechanical systems in their products	Understand how levers work to make lifting easier	

	When designing and making, pupils should be taught to:	Knowledge / Context	Links with prior and future learning
<b>Core Task</b>	Make a working model to exhibit in the European capital city exhibition to promote tourism. Either – design and make a ‘London Eye’ Ferris wheel with a circuit to drive a motor. Or – design and make a model of a European Capital Monument (e.g. Big Ben) and add a series of circuits to enable it to be lit up.	The unit will include making a stable structure. It should be accurate enough to show visitors some key features of the monument chosen.	Builds on prior work on: <ul style="list-style-type: none"> <li>measuring and cutting</li> <li>Making nets for pyramids and cuboids</li> <li>Make design criteria and using them to evaluate</li> </ul> Links to current science unit on electricity
<b>Design Skills</b>	Use research and develop design criteria to inform the design of shelters that are fit for a given purpose	Devise a WAGOLL list to show <ul style="list-style-type: none"> <li>Stability</li> <li>Presentation criteria</li> <li>Electric circuit components</li> <li>Mechanism criteria if applicable</li> </ul>	
	Generate, develop, model and communicate their ideas through discussion, cross-sectional and exploded diagrams,	Use construction kits such as Knex to: investigate making a motorised ferris wheel <b>or</b> Use paper nets to investigate using 3D geometric shapes and combining them to make the chosen monument Decide on a scale factor for the full size version	
<b>Making Skills</b>	select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately	Use craft knives, steel rulers and cutting mats for cardboard structures PVA glue and low melt glue guns Use screwdrivers, crocodile clips or soldering irons for electrical circuits. Ensure accurate measuring and cutting	
	select from and use a wider range of materials and components, including construction materials, textiles	Construction kits for prototypes Card boxes and card sheets	

	and ingredients, according to their functional properties and aesthetic qualities.	Modroc Electrical components, - switches, wire, battery cases, batteries or solar panels	
<b>Evaluation Skills</b>	investigate and analyse a range of existing products	Draw and annotate construction kit models	
	evaluate their ideas and products against their own design criteria and consider the views of others to improve their work	Use the WAGOLL list to evaluate success	
	understand how key events and individuals in design and technology have helped shape the world.		
<b>Technical Knowledge</b>	understand and use electrical systems in their products	Show understanding of how to wire electrical circuits including switches. Choose appropriate power sources As an extension, include parallel series circuits	

Ferris Wheel <https://www.youtube.com/watch?v=gnW9doFq2Pc>