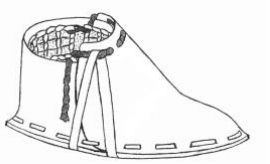
Design and Technology Curriculum Overview

Words in **BOLD** are taken from the National Curriculum pg 180- 183. (See link below).

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/239041/PRIMARY_national_curriculum_-_Design_and_technology.pdf

https://www.data.org.uk/media/1462/clickable-progression-framework-ks1-2.pdf (Detailed exploration of N.C. with examples in practice).

		Design Projects Purpose of Design	Link to designer	Design	Make	Technical Knowledge	Evaluate
Year Three	Term 1	**Product:** Hands free bag. Design and make a bag to collect and hold gathered materials **Context:** Using the Skara-Brae community as inspiration- design a practical bag for collecting while keeping hands free. The bag needs to close securely. **User:** adult or child Extension- to use skills to make a shoe for Otzi 	Orla Keiley- see art plan Create a bag for carrying objects in.	**Use research & develop design criteria to inform the design of functional & appealing products that are fit for purpose & aimed at particular individuals.** Develop design criteria. The bag must: - close - Be a hands free accessories - be able to hold small objects - Include sewing **Generate & communicate ideas through discussion & annotated sketches & prototypes.** - Make annotated sketch to explain features (how it is held/ fastened/ how things are stored) - Paper Prototype	**Select from a wider range of tools & equipment to perform practical tasks accurately**. - Use tools for purpose- scissors for cutting to size shape, hole punch for sewing/ threading, shaping fabric etc.) - Paper prototype on squared paper, cut out shapes & use to measure fabric. **Select from a wider range of materials (textiles) according to their functional properties**. (Waterproof, strength, absorbent etc.)	**Apply their understanding of how to strengthen, stiffen and reinforce** more complex **structures.** (e.g. double stitch for the handle attachment/ drawstring/ seams/ doubled material for the handle/ sewed triangle line at corners. etc.) Running Stitch https://www.youtube.com/watch?v=i1-B01FB56s Back Stitch https://www.youtube.com/watch?v=sjHm8CL9WDA	**Investigate and analyse a range of existing products.** Look at a range of existing bag designs by Orla K. What features do they all have? Why do they work? How do they fasten? How do you carry them? Why are they appealing? How do they retain their shape? **Evaluate their ideas and products against their own design criteria.** Does your bag meet the design criteria? What would you do differently next time? Why?
	Term 2	**Product: Mummified Fish House (**skeletal frames). Investigating joins &	Ancient Egyptian Society Buildings- Structural Skeletons (Steel/	**Generate, develop, model & communicate ideas through discussion & annotated sketches & prototypes.**	**Select from a wide range of tools and equipment to perform practical tasks (cutting, and joining) accurately.**	**Apply their understanding of how to strengthen, stiffen and reinforce more complex**	**Evaluate their ideas and products against their own design criteria and consider the views of others to improve their**

		strength of materials to form skeletal frames of 3D Shapes including pyramids. **Context:** Create a pyramid the right length/ size to house the mummified fish. **User:** People & the Mummified Fish!	timber- joists/ joins/ strength) Power of the TRIANGLE	Explore different ways of creating skeletal shapes & pyramids. Create prototypes of pyramids & communicate ideas through discussion. **Develop design criteria to inform the design of functional products that are fit for purpose.** The pyramid must: - Be large enough to contain the mummified fish - Be mathematically accurate (3D/ faces/ angles) - Be strong enough to stand up by itself.	e.g. scissors, glue, blue tac, masking tape, rolled up paper, art straws, lolly sticks, marshmallows **Select from a wider range of materials including construction materials according to their functional properties**. strength/ stickiness/ flexibility	**structures.** (3D shapes- skeletal structures, material properties & joins- triangulation). Triangles to strengthen & stiffen structures. https://www.youtube.com/watch?v=mBHJtWbsiaA	**work.** Evaluate their ideas against the design criteria- think how to improve work. - Is it accurate (mathematical properties)? - Does it fit over the fish? - Is it strong? - Does it stand up by itself?
	Term 3	**Product:** Shadow Puppet Create a shadow puppet with moving parts and cut out shapes for the class Puppet Theatre. **Context:** Sharing a familiar story by presenting it in an interesting way. Link to 'Do Stories Make us Better People?" **User:** Retell the story of Helen of Troy & share with families & chn in Y2. (Website Blog/ invitation to the puppet show).	**Traditional Art Form** across the globe (China/ Java/ Europe): Shadow Play https://en.wikipedia.org/wiki/Shadow_play **Karagiozis**: a famous shadow puppet character from Greek Folktales Puppet Theatre Norwich https://puppettheatre.co.uk/shadow-puppetry/	**Use research & develop design criteria to inform the design of functional & appealing products that are fit for purpose & aimed at particular individuals or groups.** Mechanical- Modelling linkages- Shadow puppets with moving parts Develop design criteria together. The puppet must: - have at least one moving part. - have cut out shapes for light to shine through. - have supports to hold the shape - be used to tell a familiar story. **Generate & communicate ideas through discussion & annotated sketches** - Design a shadow	**Select from a wider range of tools & equipment to perform practical tasks accurately**. **Select from and use a wider range of construction materials …. according to their functional properties & aesthetic qualities.** Selecting tools and equipment for: Purpose: Scissors, card vs paper, tape vs blue tac etc, tissue paper vs coloured card, split pins vs cable ties etc. Design: Shape/ Colour/ Size/ moveable Parts - Cut Out Shapes- size/ shape for eyes/ scales etc. Colour: tissue paper to shine light through.	**Apply their knowledge of how to strengthen, stiffen and reinforce more complex structures.** **Understand & use mechanical systems in their products (linkages).** e.g. - Coloured tissue paper to shine light through. - Cut Out shapes to add detail to the design without losing strength - Using card and rods to strengthen & stiffen. - Choosing linkages for manoeuvrable parts.	**Investigate and analyse a range of existing products.** Look at a range of shadow puppets- how do they work? (light/ colours/ shadow/ moveable parts) Which ones do you like best? Why? **Evaluate their ideas and products against their own design criteria.** Did your shadow puppet meet the design criteria? Did your puppet: - Move? - Cast a shadow on the screen? - Have cut out shapes to let light show through? Improvement: Would you keep your design the same next time? Why/

				puppet.			Why not?
		Design Projects Purpose of Design	**Link to designer**	**Design**	**Make**	**Technical Knowledge**	**Evaluate**
Year Four	Term 1	**Product:** A series circuit with a light, buzzer & switch. **Context:** Use knowledge of circuits and Romans to create a quiz board which lights up and buzzes. **User:** Other Y4 Class or invite families in to trial the quiz boards. https://www.instructables.com/Making-an-Electronic-Quiz-Board-for-Kids/ https://cms.scouts.org.uk/media/3608/make-do-share-spring-2016-make-a-quiz-game.pdf	**Alessandro Volta** (inventor of the first electric circuit- series circuit) Alessandro Volta Encyclopaedia Video Ideas of circuits	**Use research and develop a design criteria to inform the design of innovative, functional, appealing products that are fit for purpose.** The Quiz Board Must include: - an electrical circuit - A light - A buzzer - A switch - Questions about Romans And Be: - eye catching - fit for purpose **Generate, develop, model and communicate their ideas through discussion…. cross-sectional and exploded diagrams…...and computer-aided design.** - Design in pairs - Cross sectional drawing to show parts and components - Use CAD (TinkerCad- Circuits) to document final circuit design.	**Select from a wider range of materials and components according to their functional & aesthetic qualities.** Design: Aesthetics What will it look like? Is it eye-catching? Purpose: Create a quiz board with switches, buzzers & lights. **Select from a wider range of tools & equipment to perform practical tasks accurately**. - Attaching components (crocodile clips/ paper clips/ PVA/ Glue Gun). - preparing materials (wire strippers, circuit components) - finishing the product	**Understand and use electrical systems in their products (series circuits, incorporating switches, bulbs and buzzers).** E.g. purpose vs appearance Refer to the class success criteria.	**Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.** Annotate original design to show what went well & what improvements or changes were being made. Offer positive reviews & improvements to others. **Understand how key events and individuals in design and technology have helped shape the world** - Allesandro Volta
	Term 2	**Product:**Crank Shaft- Mechanical- Flying Dragon **Context**:Create a 'Flying Dragon' (Linked to Merlin Myths) with a crank in small groups. **User:** Children to display	STEM-flying dragon Crank Shaft https://www.youtube.com/watch?v=JF--mvZpQ2k	**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** The mechanical dragon must	**Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately.** **-** Bending & cutting metal/	**Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]** - Crankshaft - Linkages	**Investigate and analyse a range of existing products.** Look at products with cranks. How do they move/ work? What do they do?

		the dragon on their blog		have: - Wings, tail, head, scales - A working, hidden crank - All body parts linked **Generate, develop, model and communicate their ideas through discussion, annotated sketches…. and exploded diagrams.** - Group discussion - Set roles (design jobs) - Make annotated sketch from different perspectives (front/ side/ above) - Create an exploded diagram to show mechanical parts (crank) and order of assembly.	card - linkages -cable ties/ string/ treasury tags **Select from and use a wider range of materials according to their aesthetic qualities.** Dragon - colour/ shape (tail/ wings/ eyes/ scale)	Research cranks as a mechanical system. Create a success criteria for a crank- What makes a good crank?	What Makes a Good Crank? **Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.** Evaluate work against the design & WMAG Crank criteria.
	Term 3	**Product:** Instrument Exploring different ways to make sounds (pitch/ volume) **Context**:.Make an instrument **User:** Design an instrument to play a Samba Rhythm using different instruments & present to Y3's & on blog.	**Tagelharpa** https://www.youtube.com/watch?v=muRr8WqrU48 Historical instrument (Viking) Science Links - sound (Vibrations & Pitch) https://www.stem.org.uk/resources/community/collection/12746/year-4-sound	**Generate, develop, model and communicate their ideas through discussion, annotated sketches …. and prototypes.** - Create prototypes of different designs. - Communicate thoughts with each other - Annotated sketches to explain various features e.g.cut tubes to change the pitch, pull elastic out further to create large vibrations and a loud sound. https://www.bbcgoodfood.com/howto/guide/5-instruments-kids-can-make	**Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately.** - Independent selection of resources to make different instruments which are structurally sound & are strong enough to withstand being played.	**Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.** - Apply knowledge of structures into final designs so that reinforcement is included e.g where the lid is fixed on a shaker, where the handle is fixed to the structure etc.	**Investigate and analyse a range of existing products.** Sort & organise instruments by how: - They work (hit/ blow/ shake/ strum) - Sound changes (What factors affect the pitch & volume of sound?) https://www.stem.org.uk/resources/elibrary/resource/315610/what-factors-affect-pitch-and-volume-sound **Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.**

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Year Five	Term 1	Use mechanical systems in products- gears, levers, pulleys. **Product:** As a group, create a structure with a mechanical device to move goods from one place to the other. (Link to cranes). **Context:** To understand that technology and mechanical systems (in the past and present) can positively impact global communities. (Mechanical Advantage) **User:** Nepalese Farmer (Squashed Tomato, whole day challenge). https://practicalaction.org/schools/squashed-tomato-challenge/ Upload videos of their designs being used onto the blog,	**Archimedes:** Compound Pulley How can the past inform current technology? (Building Norwich Cathedral- no cranes etc. so what mechanical systems would work best? Apply this technological advantage to the Nepalese Challenge. Use of levers, gears & pulleys now & in the past. https://woodbridgetidemill.org.uk/learning-resources/ Homework: Build a crane https://sciencing.com/build-crane-school-project-5993565.html	**Generate, develop, model and communicate their ideas through discussion, annotated sketches, exploded diagrams and prototypes.** **-** Create prototypes of levers,pulleys & gear. Discuss how they work/ move etc. - annotate exploded diagrams of mechanisms to show the mechanics & structural parts. https://nustem.uk/activity/levers-pulleys-and-gears-key-stages-1-2/ - Communicate in groups to complete the squashed tomato challenge. https://www.youtube.com/watch?v=v5L5Gp849Q0 - Create an annotated sketch as a group to explain how each part works e.g. yoghurt pot to hold tomatoes, holes to thread string through etc.	**Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately.** - Independently cut, measure and join items whilst choosing the best tools and materials to support the design purpose and function. - Use knowledge of materials, mechanics and tools to inform design choices. Pulleys https://nustem.uk/activity/levers-pulleys-and-gears-key-stages-1-2/	**Understand & use mechanical systems in their products [gears, pulleys & levers]** - Big and small items e.g. cranes/ scissors. - use knowledge to meet the design brief & complete the whole day challenge! **Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.** Making structures stronger - triangles - Independently apply knowledge to construction and mechanical design features.	**Investigate and analyse a range of existing products.** **-** observe a range of past/ present items & identify the mechanical device. **Understand how key events and individuals in design and technology have helped shape the world** - Archimedes: Compound Pulley https://classroom.synonym.com/ancient-greek-invention-pulley-9468.html - Trial making a simple pulley, lever and gear. Note/ communicate how the mechanical system works. Consider the mechanical advantage of the system. **Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.** Present the group design to the class.Trial design & Evaluate as a class.
	Term 2	**Product:** A mechanical book **Context:** Present non-	Make a pop up book mechanism.	**Use research and develop a design criteria to inform the design of innovative, functional, appealing**	**Select from and use a wider range of tools and equipment to perform practical tasks [for**	**Apply their understanding of how to strengthen, stiffen and reinforce**	**Investigate and analyse a range of existing products.**

		fiction information in a varied and interesting way. (Animals of Africa/ Benin: could be linked to **Written Task 3**- Non-Chronological Fact Files) **User:** Parents	Investigate & analyse a range of existing products.	**products that are fit for purpose.** - Explore & analyse 'pop- up' features. - Use product research to inform design (mechanics, function, appeal & aesthetics). - Create a design criteria. **Generate, develop, model and communicate their ideas through discussion, annotated sketches, exploded diagrams and prototypes.** - make paper prototypes of different mechanical system (slide out/ wheel/ fold/ linkage) - Create an annotated sketch of the page for the book.	**example, cutting, shaping, joining and finishing], accurately.** - rulers- measuring - scissors/ knives- cutting - joining- split pins, glue - finishing- stiff card/ paper **Select from and use a wider range of materials according to their aesthetic qualities.** - Pop Up Mechanism Choice- wheel/ slide/ lift up/ fold/ linkage. - Colours- paper/ paint/ pencils etc.	**more complex structures** - stiffen areas that pop-up/ mechanical elements. **Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]** - levers/ gears/ linkages	- Explore how books 'pop-up' (slide/ wheel/ linkage/ lift-up) - Discuss & record how the moving (mechanical) parts work. - Use evaluations and product analysis to inform designs.(Appeal/ purpose & function) **Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.** Present the book to parents & collect parent feedback.
	Term 3	Design a buzzer game based on the Norwich skyline. **Product:** An electrical game with a buzzer. **Context:** Create a game for the Y4's to trial on transition. **User:** Peers & Y4 Children.	Operation Game Making a Buzzer Game	**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.** - Look at a range of buzzer games & circuits - Create a design criteria **Generate, develop, model and communicate their ideas through discussion, annotated sketches and exploded diagrams** - Create an exploded diagram to show the electrical components. - Annotated Sketch of Norwich Skyline- explain how the design	**Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities** - use tools to shape wire to look like the Norwich skyline. - use tools to strip wire - choose a secure base. - choose appropriate components to make a simple circuit (wire, electrical components - buzzers, bulb holders, batteries, crocodile leads).	**Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]** - apply scientific knowledge of materials, circuits and electricity.	**Investigate and analyse a range of existing products.** - Operation- how does it work? What makes games appealing to users? **Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work** - present their work to Y4's & invite them to trial and evaluate the game.

				works.			
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Year Six	Term 1	**Product:** Make a paper prototype of a wooden 'Keepsake' box. **Context:**Make a modern day 'Keepsake' box like the boxes that were taken to Virginia by Sir WR's crew. **User:** You https://www.stem.org.uk/system/files/elibrary-resources/legacy_files_migrated/2742-box_col-1827.pdf https://www.bbc.co.uk/teach/class-clips-video/design-and-technology-ks2-hinges/z4qxt39	Past & Present - why do people like memory/ keepsake boxes?	**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.** - Create design criteria - Use research & analysis to inform design. **Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.** - Annotated Sketch- construction/ organisation/ open & close/ items/ size/ shape etc. - Paper Prototype - Use TinkerCad - 3D design to map out the 3D design.	**Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately.** - measure shapes, cut patterns with scissors, join parts with glue, scoring bends etc. **Select from and use a wider range of materials … including construction materials… according to their functional properties and aesthetic qualities.** - colour/ shape/ strength/ material	**Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.** - Investigate 3D shape nets to create a complex paper prototype. - layering paper to reinforce structure. - strengthen joins - stiffen lid	**Investigate and analyse a range of existing products.** - Past vs Present- what is the same/ different? - What shape/ size/ material/ colour is the box? - How does it open/ close? (Lift Lid/ Hinge Lid/ Clasp) - What - What's the box used for? - Are there extra compartments? **Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work** - peer to peer evaluation.
	Term 2	Design an Emblem for West Earlham **Product**:Textile Emblem Design **Context**:People moved to a new area of Norwich. Design an emblem to	Wartime influence 'Make Do and Mend' campaign prior to West Earlham Redevelopment https://www.iwm.org.uk/history/10-top-tips-for-winning-at-	**Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.**	**Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities.**	**Apply their understanding of computing to program, monitor and control their products.** Use TinkerCad/ Purple Mash to make the	**Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.** - Look at emblems of clubs e.g. NCFC/ Scouts/

		represent West Earlham. **User:** People of West Earlham. Pitch logo design to School Council/ Governors to win a prize?	make-do-and-mend Link to Present Day: Sustainable Fashion Reduce, recycle, reuse- pre- loved/ upcycled use of cloth/ materials etc. rebranded to make our own. (Logo design).	- Create an annotated sketch to explain colour, stitch & design choices. - Create a pattern on the computer. - Scale up emblem designs using CAD. How much fabric would they need for a badge? Small flag? Large Flag? What would the emblem look like as a repeated/ reflected/ translated design? etc.	- Different Threads for different functions/ aesthetics.Lace stitch https://www.youtube.com/watch?v=_xnbSc51pGw - Practise different stitches on a range of recyclable material to inform design choices. Beginner Stitches https://www.youtube.com/watch?v=OWv6Ypzn9dg blankethttps://www.youtube.com/watch?v=S9zegUYdPmg	outline: move/ control/ repeat/ resize.	National (Welsh Dragon/ English Rose etc.) - Analyse Emblems & Use data to inform design. (Eye-catching/ colourful/ symbol/ words etc.) - Survey people to find out what people want in an emblem.
	Term 3	Product 1 **Product:** Solar powered battery/ bulb/ buzzer/ motor. **Context:**Create solar powered items for Antarctic exploration. **User:** Modern Day environmental scientist. Product 2 **Product:** Sound Monitor (computer coding) **Context:** Sound monitor to find out if the library is the quietest room.. **User:**Everyone	**Maria Telkes** 'The Sun Queen' https://en.wikipedia.org/wiki/M%C3%A1ria_Telkes **Thomas Edison** **Lewis Latimer** - Periscopes - Solar Torch - Sound Monitoring	**Use research and develop a design criteria to inform the design of innovative, functional, appealing products that are fit for purpose.** - create a design criteria - work to the brief - use analysis to inform your design. **Generate, develop, model and communicate their ideas through discussion…. cross-sectional and exploded diagrams…...and computer-aided design.** - Cross sectional drawing to show parts and components - Use CAD (TinkerCad- Circuits) to document final circuit design. - Create exploded diagrams to show the mechanical components and structural parts of the prototypes.	**Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately.** - circuit building - torch exterior design - choose tools suitable for: stripping wires/ joining the torch components/ measuring wire length etc. - Choose equipment for a handmade switch.	**Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]** Torch: Input- Process- Output **Apply their understanding of computing to program, monitor and control their products.** - Sound Monitor: Control- inputs- outputs- programming - Programming Sound monitors using Scratch https://paperzz.com/doc/9048924/ks2-classroom-sound-monitor	**Understand how key events and individuals in design and technology have helped shape the world** - Maria Telkes - Solar Panels - Thomas Edison - Light bulb/ Torch - Lewis Latimer - Periscopes - Sound Monitor **Investigate and analyse a range of existing products.** - how do the products work? (switch) - mechanical/ electrical? (Input- process- output) - environmentally friendly? - purpose/ function/ aesthetic

https://classroom.thenational.academy/subjects-by-key-stage/key-stage-2