

Design and Technology at West Ashton – knowledge and skills progression document

		EYFS (Early Learning Goals)	Y1/2	Y3/4	Y5/6
Design	Structures		• Learning the importance of a clear design criteria • Including individual preferences and requirements in a design • Generating and communicating ideas using sketching and modelling • Learning about different types of structures, found in the natural world and in everyday objects	• Designing a castle with key features to appeal to a specific person/purpose • Drawing and labelling a castle design using 2D shapes, labelling: -the 3D shapes that will create the features - materials need and colours • Designing and/or decorating a castle tower on CAD software • Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect • Building frame structures designed to support weight	• Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs
	Mechanisms/ Mechanical Systems		• Explaining how to adapt mechanisms, using bridges or guides to control the movement • Designing a moving story book for a given audience • Designing a vehicle that includes wheels, axles and axle holders, which will allow the wheels to move • Creating clearly labelled drawings which illustrate movement • Creating a class design criteria for a moving monster • Designing a moving monster for a specific audience in	• Designing a shape that reduces air resistance • Drawing a net to create a structure from • Choosing shapes that increase or decrease speed as a result of air resistance • Personalising a design	• Designing a pop-up book which uses a mixture of structures and mechanisms • Naming each mechanism, input and output accurately • Storyboarding ideas for a book

			accordance with a design criteria • Selecting a suitable linkage system to produce the desired motions • Designing a wheel selecting appropriate materials based on their properties		
	Electrical Systems (KS2 only)			• Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas	• Designing an electronic greetings card with a copper track circuit and components • Creating a labelled circuit diagram showing positive and negative parts in relation to the LED and the battery • Writing design criteria for an electronic greeting card • Compiling a moodboard relevant to my chosen theme, purpose and recipient
	Cooking and Nutrition		• Designing smoothie carton packaging by-hand or on ICT software	• Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish	• Writing a recipe, explaining the key steps, method and ingredients • Including facts and drawings from research undertaken
	Textiles		• Using a template to create a design for a puppet		• Designing a stuffed toy considering the main component shapes required and creating an appropriate template • Considering the proportions of individual components
	Digital World (KS2 only)			• Problem solving by suggesting which features on a micro:bit might be useful and justifying my ideas.	• Writing a design brief from information submitted by a client

				• Drawing and manipulating 2D shapes, using computer-aided design, to produce a point of sale badge. • Developing design ideas through annotated sketches to create a product concept. • Developing design criteria to respond to a design brief.	• Developing design criteria to fulfil the client's request • Considering and suggesting additional functions for my navigation tool • Developing a product idea through annotated sketches • Placing and manoeuvring 3D objects, using CAD • Changing the properties of, or combine one or more 3D objects, using CAD
Make	Structures	Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. Use a range of small tools, including scissors, paint brushes and cutlery.	• Making stable structures from card, tape and glue • Following instructions to cut and assemble the supporting structure of a windmill • Making functioning turbines and axles which are assembled into a main supporting structure • Making a structure according to design criteria • Creating joints and structures from paper/card and tape	• Constructing a range of 3D geometric shapes using nets • Creating special features for individual designs • Making facades from a range of recycled materials • Creating a range of different shaped frame structures • Making a variety of free standing frame structures of different shapes and sizes • Selecting appropriate materials to build a strong structure and for the cladding • Reinforcing corners to strengthen a structure • Creating a design in accordance with a plan • Learning to create different textural effects with materials	• Building a range of play apparatus structures drawing upon new and prior knowledge of structures • Measuring, marking and cutting wood to create a range of structures • Using a range of materials to reinforce and add decoration to structures
	Mechanisms/ Mechanical Systems		• Following a design to create moving models that use levers and sliders • Adapting mechanisms	• Measuring, marking, cutting and assembling with increasing accuracy • Making a model based on a chosen design	• Following a design brief to make a pop up book, neatly and with focus on accuracy • Making mechanisms and/or structures using sliders, pivots

			• Making linkages using card for levers and split pins for pivots • Experimenting with linkages adjusting the widths, lengths and thicknesses of card used • Cutting and assembling components neatly • Selecting materials according to their characteristics • Following a design brief		and folds to produce movement • Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result
	Electrical Systems (KS2 only)			• Making a torch with a working electrical circuit and switch • Using appropriate equipment to cut and attach materials • Assembling a torch according to the design and success criteria	• Making a functional series circuit • Creating an electronics greeting card, referring to a design criteria • Mapping out where different components of the circuit will go • Constructing a stable base for a game • Accurately cutting, folding and assembling a net • Decorating the base of the game to a high quality finish • Making and testing a circuit Incorporating a circuit into a base
	Cooking and Nutrition		• Chopping fruit and vegetables safely to make a smoothie • Identifying if a food is a fruit or a vegetable • Learning where and how fruits and vegetables grow	• Knowing how to prepare themselves and a work space to cook safely in, learning the basic rules to avoid food contamination • Following the instructions within a recipe • Following a baking recipe • Cooking safely, following basic hygiene rules	• Following a recipe, including using the correct quantities of each ingredient • Adapting a recipe based on research • Working to a given timescale • Working safely and hygienically with independence

				• Adapting a recipe	
	Textiles		• Cutting fabric neatly with scissors • Using joining methods to decorate a puppet • Sequencing steps for construction • Selecting and cutting fabrics for sewing • Decorating a pouch using fabric glue or running stitch		• Creating a 3D stuffed toy from a 2D design • Measuring, marking and cutting fabric accurately and independently • Creating strong and secure blanket stitches when joining fabric • Using applique to attach pieces of fabric decoration
	Digital World (KS2 only)			• Following a list of design requirements. • Writing a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm.	• Considering materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo) • Explaining material choices and why they were chosen as part of a product concept
Evaluation	Structures	Share their creations, explaining the process they have used.	• Evaluating a windmill according to the design criteria, testing whether the structure is strong and stable and altering it if it isn't • Suggest points for improvements • Exploring the features of structures • Comparing the stability of different shapes • Testing the strength of own structures • Identifying the weakest part of a structure • Evaluating the strength, stiffness and stability of own structure	• Evaluating own work and the work of others based on the aesthetic of the finished product and in comparison to the original design • Suggesting points for modification of the individual designs • Evaluating structures made by the class • Describing what characteristics of a design and construction made it the most effective • Considering effective and ineffective designs	• Improving a design plan based on peer evaluation • Testing and adapting a design to improve it as it is developed • Identifying what makes a successful structure

	Mechanisms/ Mechanical Systems		• Testing a finished product, seeing whether it moves as planned and if not, explaining why and how it can be fixed • Reviewing the success of a product by testing it with its intended audience • Testing mechanisms, identifying what stops wheels from turning, knowing that a wheel needs an axle in order to move • Evaluating own designs against design criteria • Using peer feedback to modify a final design • Evaluating different designs • Testing and adapting a design	• Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance	• Evaluating the work of others and receiving feedback on own work • Suggesting points for improvement
	Electrical Systems (KS2 only)			• Evaluating electrical products • Testing and evaluating the success of a final product and taking inspiration from the work of peers	• Evaluating a peer's product against design criteria and suggesting modifications that could be made to improve the reliability or aesthetics of it or to incorporate another type of circuit component • Stating what Sir Rowland Hill invented and why it was important for greeting cards
	Cooking and Nutrition		• Tasting and evaluating different food combinations • Describing appearance, smell and taste • Suggesting information to be included on packaging	• Establishing and using design criteria to help test and review dishes • Describing the benefits of seasonal fruits and vegetables and the impact on the environment • Suggesting points for improvement when making a seasonal tart	• Evaluating a recipe, considering: taste, smell, texture and origin of the food group • Taste testing and scoring final products • Suggesting and writing up points of improvements in productions

					• Evaluating health and safety in production to minimise cross contamination
	Textiles		• Reflecting on a finished product, explaining likes and dislikes		• Testing and evaluating an end product and giving point for further improvements
	Digital World (KS2 only)			• Analysing and evaluating wearable technology. • Using feedback from peers to improve design.	• Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool • Developing an awareness of sustainable design • Identifying key industries that utilise 3D CAD modelling and explain why • Describing how the product concept fits the client's request and how it will benefit the customers
Technical Knowledge	Structures		• Describing the purpose of structures, including windmills • Learning how to turn 2D nets into 3D structures • Learning that the shape of materials can be changed to improve the strength and stiffness of structures • Understanding that cylinders are a strong type of structure that are often used for windmills and lighthouses • Understanding that windmill turbines use wind to turn and make the machines inside work • Understanding that axles are used in structures and mechanisms to make	• Identifying features of a castle • Identifying suitable materials to be selected and used for a castle, considering weight, compression, tension • Extending the knowledge of wide and flat based objects are more stable • Understanding the terminology of strut, tie, span, beam • Understanding the difference between frame and shell structure • Learning what pavilions are and their purpose	• Knowing that structures can be strengthened by manipulating materials and shapes • Identifying the shell structure in everyday life (cars, aeroplanes, tins, cans) • Understanding man made and natural structures

			parts turn in a circle • Developing awareness of different structures for different purposes • Identifying natural and man-made structures • Identifying when a structure is more or less stable than another • Knowing that shapes and structures with wide, flat bases or legs are the most stable • Understanding that the shape of a structure affects its strength • Using the vocabulary: strength, stiffness and stability • Knowing that materials can be manipulated to improve strength and stiffness • Building a strong and stiff structure by folding paper	• Building on prior knowledge of net structures and broadening knowledge of frame structures • Learning that architects consider light, shadow and patterns when designing • Implementing frame and shell structure knowledge • Considering effective and ineffective designs	
	Mechanisms/ Mechanical Systems		• Learning that levers and sliders are mechanisms and can make things move • Identifying whether a mechanism is a lever or slider and determining what movement the mechanism will make • Using the vocabulary: up, down, left, right, vertical and horizontal to describe movement • Identifying what mechanism makes a toy or vehicle roll forwards	• Learning that products change and evolve over time • Learning that all moving things have kinetic energy • Understanding that kinetic energy is the energy that something (object person) has by being in motion	• Knowing that an input is the motion used to start a mechanism • Knowing that output is the motion that happens as a result of starting the input • Knowing that mechanisms control movement • Describing mechanisms that can be used to change one kind of motion into another

			• Learning that for a wheel to move it must be attached to an axle • Learning that mechanisms are a collection of moving parts that work together in a machine • Learning that there is an input and output in a mechanism • Identifying mechanisms in everyday objects • Learning that a lever is something that turns on a pivot • Learning that a linkage is a system of levers that are connected by pivots • Exploring wheel mechanisms • Learning how axels help wheels to move a vehicle		
	Electrical Systems (KS2 only)			• Learning how electrical items work • Identifying electrical products • Learning what electrical conductors and insulators are • Understanding that a battery contains stored electricity and can be used to power products • Identifying the features of a torch • Understanding how a torch works • Articulating the positives and negatives about different torches	• Learning the key components used to create a functioning circuit • Learning that copper is a conductor and can be used as part of a circuit • Understanding that breaks in a circuit will stop it from working • Explaining how a series circuit will work in my card • Identifying the negative and positive leg of an LED • Drawing a series circuit diagram and symbols
	Cooking and Nutrition		• Understanding the difference between fruits and vegetables	• Learning that climate affects food growth	• Learning how to research a recipe by ingredient

			• Describing and grouping fruits by texture and taste	• Working with cooking equipment safely and hygienically • Learning that imported foods travel from far away and this can negatively impact the environment • Learning that vegetables and fruit grow in certain seasons • Learning that each fruit and vegetable gives us nutritional benefits • Learning to use, store and clean a knife safely	• Recording the relevant ingredients and equipment needed for a recipe • Understanding the combinations of food that will complement one another • Understanding where food comes from, describing the process of 'Farm to Fork' for a given ingredient
	Textiles		• Learning different ways in which to join fabrics together: pinning, stapling, gluing		• Learning to sew blanket stitch to join fabric • Applying blanket stitch so the space between the stitches are even and regular • Threading needles independently
	Digital World (KS2 only)			• To understand that, in programming, a 'loop' is code that repeats something again and again until stopped. • To know that a micro:bit is a pocket-sized, codeable computer. • To know that a simulator is able to replicate the functions of an existing piece of technology.	• Programming an N,E, S,W cardinal compass • Explaining the key functions in my program, including any additions • Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool • Explaining the key functions and features of my navigation tool to the client as part of a product concept pitch • Demonstrating a functional program as part of a product concept