How Our DT Curriculum is Organised

Substantive Knowledge and Core Concepts

Knowledge

'Knowing about'

Cooking & Nutrition
Structure
Mechanisms/Mechanical Systems
Textiles
Electrical Systems (KS2 Only)
Digital World (KS2 Only)

Understanding

Understand the functional and aesthetic properties of a range of materials and resources.

Understand how to use and combine tools to carry out different processes for shaping, decorating, and manufacturing products.

Skills

Build and apply a repertoire of skills, to produce high quality, innovative outcomes, including models, prototypes, CAD, and products to fulfil the needs of users, clients, and scenarios.

Disciplinary Knowledge and Skills – Thinking and Working Like a Designer

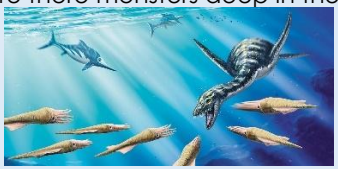
- Make
- Design
- Evaluate
- Technical Knowledge

Rationale

It is important for children to learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. We teach a spiral curriculum, with key areas revisited again and again with increasing complexity, allowing pupils to revisit and build on their previous learning and meet the needs of our small, mixed-age cohorts. Pupil numbers and classing structures change year-on-year, requiring a rigorous structure of knowledge building, but with enough flexibility to adapt as cohorts change. Most years, our EYFS are in the same classroom as KS1 and follow the same topics within 'Understanding of the World'. KS1 work on a two-year rolling programme of disciplinary concepts, knowledge and skills,

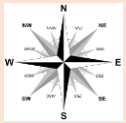
Design & Technology Four-Year Rolling Plan

EYFS/KS1 Topics and Conceptual Overview

	Autumn	Spring	Summer
Year A	**Transportation**	**Great Big Britain**	**Amazing Rain Forests**
	LQ: What can we use to get around? Wheels & Axels - Mechanisms	LQ: What would you pack for a picnic at the seaside? Balanced Diet – Food & Nutrition	LQ: What animals like wet places? Make a moving monster/animal - Mechanisms
Year B	**Materials**	**Let's Explore London**	**Puppets**
	LQ: What materials would be best to make a chair? Structures	LQ: Have you been on the London Eye? Fairground Wheel – Mechanisms	LQ: How can you make an astronaut or alien puppet? Puppets - Textiles
Year C	**Structures Around Us**	**At the Seaside**	**Deep Sea Animals**
	LQ: What do windmills do? Constructing a Windmill - Structure	LQ: What could we use to hold our flower? Creating a stable pot - Structures	LQ: Are there monsters deep in the sea?  Make a moving monster/animal - Mechanisms
Year D	**Story Books**	**Healthy Drinks**	**Africa**
	LQ: How do you make a moving story book? Mechanisms	LQ: What fruit or vegetable are growing in Spring? Smoothie – Cooking & Nutrition	LQ: Can you make a pouch ? Pouches - Textiles

Design & Technology Four-Year Rolling Plan

KS2 Topics and Conceptual Overview

	Autumn	Spring	Summer
Year A	**Local Architecture**	**Victorians**	**Energy**
	LQ: Constructing a castle: What shapes will you use? Structures	LQ: What makes the perfect bolognese? Cooking and Nutrition	LQ: Can you harness energy? Mechanisms
Year B	**Our Home**	**Navigating the World**	**Electronic Aids**
	LQ: A cushion with cross stitching: How is it done? Textiles	LQ: Can you design a navigational tool?  Digital World	LQ: What would help us see in a dark environment? Electrical Systems
Year C	**Mindful Moments**	**Future Engineers**	**World Cuisine**
	LQ: Can you be mindful in a technologically advanced society? Digital World	LQ: Can you make a sling shot car? Mechanisms	LQ: Come Dine with me – in France! What will we eat? Cooking and Nutrition
Year D	**Solving Problems**	**Electronic Aids**	**Africa**
	LQ: Can you build a weight bearing structure? Structures	LQ: Can you create an electric poster? Electrical Systems	LQ: Can you design and make an Egyptian Collar? Textiles

	Autumn		Spring		Summer	
Year A EYFS and KS1 Topic	**Topic** LQ: What can we use to get around?		**Topic** LQ: What would you pack for a picnic at the seaside?		**Topic** LQ:	
EYFS Knowledge Blocks	**Age 3/4**	**EYFS** I know what an axle is and how it can be fixed I know how to draw a picture of a design and label it. I know a variety of techniques to join materials	**Age 3/4**	**EYFS** I know scales are used to weigh ingredients. I know that I need to wash fruit and vegetables to wash off germs I know a sieve removes lumps from a mixture I know a pestle and mortar grind ingredient**s**	**Age 3/4**	**EYFS** I know how toy car moves by studying a toy car I know how a level helps make a job easier
Core Concept	**Substantive Concept:** To understand how wheels move		**Substantive Concept:** To know what foods for a balanced diet		**Substantive Concept:** To create a moving object	
KS1 Vocabulary	Axle; axle holder; diagram; mechanism; wheel; equipment; chassis; dowel		Appearance, balanced, carbohydrates, chopping board, combination, cut, dairy, design, design brief, diet, evaluate, feel, fruit, grate, grater, ingredients, menu, oils, proteins, review, scissors, smell, snip, spread, spreads, table knife, taste, vegetables		Axel, design criteria, input, linkage, mechanical, output, pivot, wheel	
Rationale	To investigate how wheels move and create a simple version of a wheel mechanism, including an axle, wheels and axle holder		To learn about the importance of a balanced diet and use that knowledge to create a tasty wrap		To create a moving object using levers, linkages and pivots	
KS1 Key Learning	**Substantive Knowledge** **I can identify what mechanism makes a toy or vehicle roll forward.** **I can recall that in order for a wheel to move it must be attached to an axel.** **I can draw and label a diagram of an axel, wheel and axel holder.** I can fix a design so that the wheel can move. **I can use appropriate vocabulary to describe which parts are moving or not and to label my design.** I can design a moving vehicle. **I can make a wheel and axel mechanism.** I can evaluate my design to make it even better.		**Substantive Knowledge** I know what makes a balanced diet. I know that the five main food groups are: carbohydrates, fruits and vegetables, protein, dairy and oils and spreads. I know that I should eat a range of different foods from each food group, and roughly how much of each food group. I know that 'ingredients' means the items in a mixture or recipe. I know how to cut, grate, snip and spread to prepare foods. Year 2 DT Lesson & Videos | Balanced Diet		**Substantive Knowledge** I know that mechanisms are a collection of moving parts that work together as a machine to produce movement. I know that there is always an input and an output in a mechanism. I know that an input is the energy that is used to start something working. I know that an output is the movement that happens as a result of the input. I know that a lever is something that turns on a pivot.	

	Year 1 DT Unit: Mechanisms: Wheels and axles		I know that a linkage mechanism is made up of a series of levers. Moving Monsters Lesson Plans | KS1 DT
Year A KS2 Topic	**Topic** LQ: Constructing a castle: What shapes will you use?	**Topic** LQ: What makes the perfect bolognese?	**Topic** LQ: Can you harness energy?
Core Concept	**Substantive Concept:** Design a structure using key features	**Substantive Concept:** Developing recipe	**Substantive Concept:** How to harness energy
KS2 Vocabulary	2D, 3D, castle, design, key features, net, scoring, shape, stable, stiff, strong, structure, tab	Abattoir, adaption, balanced, beef, brand, cook, cross-contamination, cut, design, enhance, equipment, evaluate, farm, grate, hygiene, ingredients, label, measure, nutrient, nutrition, nutritional value, preference, press, process, recipe, safety, theme	Annotate, axle, force, gear, gear system, input, machine, machine research, market research, mechanism, output, problem statement, pulley, pulley system, renewable energy, research, sustainability, teeth
Rationale	To identify and learn about the key features of a castle, before designing and making a recycled-material castle (structure)	To learn a simple bolognese recipe and adapt it to improve nutritional content. To develop food preparation skills.	Making and designing gear and pulley systems and exploring their uses
KS2 Learning	**I can draw and label a simple castle that includes the most common features.** **I can recognise that a castle is made up of multiple 3D shapes.** I can design a castle with key features which satisfy a given purpose. **I can score or cut along lines on the net of a 2D shape**. I can use glue to securely assemble geometric shapes. **I can utilise skills to build a complex structure from simple geometric shapes**. I can evaluate my work by answering simple questions.	I know the process of beef production. I know what is in a traditional Bolognese recipe and can suggest changes to it. I know that you can add nutritional value to a recipe by selecting ingredients. I know how to prepare ingredients and cook a version of bolognese sauce.	I know the names of mechanical systems that use gears in everyday objects (e.g. bicycle, clock, etc.). I know gears and pulleys allow us to transfer movement and force from one part of a mechanical system to another. I know gears allow us to increase the output of a mechanism. I know hot glue creates a strong bond quickly. I know that sustainability means thinking about the materials that were used to make a product and how the product was made.
Year B KS1 and EYFS Topic	**Topic** LQ: What materials would be best to make a chair?	**Topic** LQ: Have you been on the London Eye?	**Topic** LQ: How can you make an astronaut or alien puppet?

EYFS Knowledge Blocks	Age 3/4	EYFS Construct with a purpose in mind, using a variety of resources and tools. **Use simple tools and techniques appropriately.** Join materials using a variety of resources. Use pieces of sandpaper and wood, a hammer and pegs.	Age 3/4	EYFS **Show skills in making toys work by pressing parts to achieve effects such as sounds, movements or new images.** Manipulate materials to achieve a planned effect. Construct with a purpose in mind, using a variety of resources and tools. Use simple tools and techniques appropriately.	Age 3/4	EYFS **Describe the way fabrics feel.** J**oin fabrics with glue.** Use stitches to add a pattern to a piece of fabric.
Core Concept	**Substantive Concept:** Different types of structures		**Substantive Concept:** Simplified wheel design		**Substantive Concept:** To use a template to create a puppet	
KS1 Vocabulary	Design criteria, man-made, natural, properties, structure, stable, shape, model, test		Design brief, design criteria, evaluate, frame, model, opinion, rotate, survey		Decorate, design, fabric, glue, model, hand puppet, safety pin, staple, stencil, template	
Rationale	To learn about different types of structures found in the natural world and in everyday objects		To understand how axles help wheels to move a vehicle		To learn about different joining methods	
KS1 Key Learning	**Substantive Knowledge** **I can explore the concept and features of structures and the stability of different shapes.** **I can understand that the shape of the structure affects its strength.** I can make a structure according to design criteria. **I can produce a finished structure and evaluate its strength, stiffness and stability**. Baby Bear's Chair Lesson Plans | KS1 DT Structures		**Substantive Knowledge** I can explore wheel mechanisms and design a fairground wheel. **I can select materials with appropriate properties.** **I can build and test a moving wheel** I can conduct a simple survey to gather opinions. I can finish and evaluate a structure with a rotating wheel. KS1 DT Lesson Plans | Fairground Wheel Mechanisms		**Substantive Knowledge** **I can use different techniques to join fabrics for different purposes.** **I can use a template to create my design.** I can embellish my design using joining methods. **I can evaluate my own and others work.** KS1 DT Lesson Plan | Textiles | Making Puppets
Year B KS2 Topic	**Topic** LQ: A cushion with cross stitching: How is it done?		**Topic** LQ: Can you design a navigational tool?		**Topic** LQ: What would help us see in a dark environment?	
Core Concept	**Substantive Concept:** To learn and apply two sewing techniques		**Substantive Concept:** To use CAD 3D modelling software		**Substantive Concept:** Electrical Systems	
KS2 Vocabulary	Accurate, applique, cross-stitch, cushion, design, embellish, fabric, patch, running stitch, seam, stuffing, template, thread		application (apps), biodegradable, boolean, cardinal compass, client, corrode, design brief, design criteria, duplicate, environmentally friendly, equipment, function, GPS tracker, if statement, lightweight, loop, moudable,		Battery, bulb, buzzer, circuit diagram, component, conductor, electrical item, electricity, electronic item, insulator, series circuit, switch, target audience, test, torch, wire,	

			navigation, pedometer, product lifecycle, product lifespan, program, recyclable, replica, smart, smartphone, sustainable design, value, variable,			
Rationale	To learn and apply two sewing techniques and utilise these skills to make a cushion with cross stitching.		To design and program a navigational tood to produce a multifunctional device for trekkers using CAD 3D modelling software. Pitch and explain the product to a guest model		Identify the difference between electrical and electronic products. Evaluate a range of existing torches and their features, then develop a new functional torch design.	
KS2 Key Learning	**Substantive Knowledge** **I can use a cross-stitch to join two pieces of fabric together.** I can design and cut the template for a cushion. I can use cross-stitch and appliqué to decorate a cushion face. **I can make a cushion that includes appliqué and cross-stitch.**		**Substantive Knowledge** I can incorporate key information from a client's design request such as 'multifunctional' and 'compact' in their design brief. **I can write a program that displays an arrow to indicate cardinal compass directions with an 'On start' loading screen.** **I can identify errors (bugs) in the code and suggest ways to fix (debug) them.** I can self and peer evaluate a product concept against a list of design criteria with basic statements. I can identify key industries that use 3D CAD modelling and why. **I can recall and describe the name and use of key tools used in Tinkercad (CAD) software.** **I can combine more than one object to develop a finished 3D CAD model in Tinkercad.** I can complete a product pitch plan that includes key information.		**Substantive Knowledge** **I can identify electrical products and explain why they are useful.** I can help to make a working switch. **I can identify the features of a torch and how it works.** I can describe what makes a torch successful. I can create suitable designs that fit the success criteria and their own design criteria. **I can create a functioning torch with a switch according to their design criteria.**	
Year C KS1 and EYFS Topic	**Topic** LQ: What do windmills do?		**Topic** LQ: What could we find at the seaside?		**Topic** LQ: Are there monsters deep in the sea?	
EYFS Knowledge Blocks	**Age 3 / 4**	**EYFS** Construct with a purpose in mind, using a variety of resources and tools. Use simple tools and techniques appropriately. Join materials using a variety of resources. Use pieces of sandpaper and wood, a hammer and pegs.	**Age 3 /4**	**EYFS** I know that a drawing shows people my ideas I know that some structures stand better than others I know how to use tools safely	**Age 3 /4**	**EYFS** **Show skills in making toys work by pressing parts to achieve effects such as sounds, movements or new images.** Manipulate materials to achieve a planned effect. Construct with a purpose in mind, using a variety of resources and tools. Use simple tools and techniques appropriately.
Core Concept	**Substantive Concept:** To explore and create a windmill		**Substantive Concept:** To create a stable pot for holding flowers		**Substantive Concept:** To create a moving object	

KS1 Vocabulary	base, centre, design, equal, evaluate, middle, rotate, rotor, rotor blades, sails, same, stable, strong, structure, test, weak, wind, windmill	Freestanding, stable, structure	Axel, design criteria, input, linkage, mechanical, output, pivot, wheel
Rationale	To explore windmills, identifying their key features and construct a windmill	To build a flower holder (vase)	To create a moving object using levers, linkages and pivots
KS1 Key Learning	**Substantive Knowledge** I can follow design criteria to meet the needs of a user. **I can make a stable structure.** **I can make functioning sails/blades that attach to the supporting structure.** I can improve my structure. Making a Windmill - KS1 DT Lesson Plans	**Substantive Knowledge** I know that who I am designing for makes a difference to my design I know drawings are a way to explain ideas I know different equipment does different things I know some tools like knives and scissors are sharp I know that shapes and structures with wide, flat bases or legs are the most stable Adding weight to the bade of a structure can make it more stable *New* Structures: Stable structures	**Substantive Knowledge** **I can look at an object and understand how it moves.** I can explore different design options. **I know that mechanisms are a collection of moving parts that work together as a machine to produce movement.** I know there is always an input and an output in a mechanism. I know that a lever is something that turns on a pivot. **I know that a linkage mechanism is made up of a series of levers** Moving Monsters Lesson Plans | KS1 DT
Year C KS2 Topic	**Topic** LQ: Can you be mindful in a technologically advanced society?	**Topic** LQ: Can you make a sling shot car?	**Topic** LQ: Come Dine with me – in France! What will we eat?
Core Concept	**Substantive Concept:** Mindfulness vs Technology	**Substantive Concept:** Designing a working mechanism	**Substantive Concept:** Explore basic tastes and complementary flavours
Vocabulary	Advantage, aesthetic, annotate, assemble, block, brand, brand identity, bug, clipart, coding, computer-aided design (CAD), criteria, debug, design, develop, disadvantage, display, ergonomic, evaluate, exhibition, feedback, form, function, join, logo, loop, mindfulness, model, net, program, prototype, research, script, sketchpad, test, timer, user, variable	Chassis, energy, kinetic, mechanism, air resistance, design, structure, graphics, research, model, template,	Balance, bitter, bridge method, complement, cookbook, cross-contamination, enhance, equipment, farm to fork, flavours, ingredients, method, pairing, preparation, recipe, research, salty, sour, storyboard, sweet, umami,
Rationale	Exploring the concept of mindfulness and writing design criteria to develop a programmed product for timing a mindful moment,	Designing and making a car with a working slingshot mechanism and housing the mechanism using a range of nets.	To select three recipes to create a three course meal
KS2	**Substantive Knowledge**	**Substantive Knowledge**	**Substantive Knowledge**

Key Learning	I can state and/or describe the advantages and disadvantages of existing products (timers). **I can understand how virtual micro:bit features could be used as part of a design idea.** I can use research to inform design criteria. **I can write a program that displays a timer on the virtual micro:bit based on their chosen seconds/minutes.** I can suggest where the errors are, if testing is unsuccessful, by comparing the correct code to their own. **I can state key functions in the program editor (e.g. loops).** **I can evaluate the immediate appeal of the virtual micro:bit timer and how it might function.** I can express which stages of the project they enjoyed or found more challenging. I can explain the need for a company to stand out against competition and/or state the importance of logos in business. **I can recall and describe the name and use of key tools used in Sketchpad (CAD) software.** I can fulfil the design requirements of the logo. **I can evaluate the product** using feedback from the user.		**I can work independently to produce an accurate, functioning car chassis.** I can design a shape that is suitable for the project. I can attempt to reduce air resistance through the design of the shape. I can produce panels that will fit the chassis and can be assembled effectively using the tabs they have designed. **I can construct a car body effectively.** **I can conduct a trial accurately and draw conclusions and improvements from the results.**		I can find a suitable recipe for their course. **I can record the relevant ingredients and equipment needed.** **I can follow a recipe, including using the correct quantities of each ingredient.** I can write a recipe, explaining the process taken. **I can explain where certain key foods come from before they appear on the supermarket.**	
Year D KS1 and EYFS Topic	**Topic** LQ: How do you make a moving story book?		**Topic** LQ: What fruit or vegetable are growing in Spring?		**Topic** LQ: Can you make a pouch	
EYFS Knowledge Blocks	**Age 3/4**	**EYFS** I know some books have moving parts and enjoy playing with these I know how to explain how and why some things move I know how to manipulate materials to achieve a planned effect. I know how to construct with a purpose in mind, using a variety of resources and tools.	**Age 3/4**	**EYFS** I know how to weigh, pour and spoon ingredients into scales/using measuring spoons. I know its important to wash fruit and vegetables. I know how to cut soft ingredients using a strong plastic knife. I know how to mix using a spoon or hands, and tear and squash herbs or fruit. I know how to sieve ingredients. I know how to use a pestle and mortar. I know how to knead, roll, shape and cut dough. Spread.	**Age 3/4**	**EYFS** Describe the way fabrics feel. Join fabrics with glue. Use stitches to add a pattern to a piece of fabric.

				I know how to begin to prepare a simple dish safely without a heat source		
Core Concept	**Substantive Concept:** To understand how sliders, pivots and levers work		**Substantive Concept:** To learn how to chop fruits and vegetables safely		**Substantive Concept:** To learn how to sew a running stitch	
KS1 vocabulary	adapt, assemble, design, design criteria, input, mechanism, model, sliders, test		Blend, blender, chopping board, compare, cut, design, evaluate, flavour, fork, fruit, healthy ingredients, juice, juicer, leaf, plant, recipe, root, seed, select, smoothie, table knife, taste, tree, vegetable, vine		decorate, fabric, fabric glue, knot, needle, needle threader, running stitch, sew, template, thread	
Rationale	To explore slider mechanisms and the movement they output to design, make and evaluate a moving story book.		To develop food preparation skills with a focus on ingredient choice and taste testing		To learn how to sew a running stitch ready to design, make and decorate a pouch using a template	
KS1 Learning	**Substantive Knowledge** **I can identify whether a mechanism is a side-to-side slider or an up-and-down slider and determine what movement the mechanism will make.** **I can clearly label drawings to show which parts of their design will move and in which direction.** I can make a picture that meets the design criteria, with parts that move purposefully as planned. I can evaluate the main strengths and weaknesses of their design and suggest alterations. Moving Story Book Lesson Plans | KS1 DT		**Substantive Knowledge** **I can describe fruits and vegetables and explain how to identify fruits.** I can name a range of places that fruits and vegetables grow. **I can describe basic characteristics of fruit and vegetables.** I can prepare fruits and vegetables to make a smoothie. KS1 DT Lesson Plans & Demo Videos | Cooking & Nutrition		**Substantive Knowledge** **I can sew a running stitch with regular-sized stitches and understand that both ends must be knotted.** I can prepare and cut fabric to make a pouch from a template. **I can use a running stitch to join the two pieces of fabric together.** I can decorate my pouch using the materials provided. DT Lesson Plan | Textiles | Pouches	
Year D KS2 Topic	**Topic** LQ: Can you build a weight bearing structure?		**Topic** LQ: Can you create an electrical poster?		**Topic** LQ: Can you design and make an Egyptian Collar?	
Core Concept	**Substantive Concept:** Load bearing structures		**Substantive Concept:** Knowledge and skills of electrical systems		**Substantive Concept:** To learn and apply two sewing techniques	

KS2 Vocabulary	Accuracy, aesthetics, arch bridge, assemble, beam bridge, bench hook/vice, corrugation, evaluate, factors, hardwood, joints, lamination, mark out, material properties, quality of finish, reinforce, rigid, sandpaper/glasspaper, softwood, stability, stiffness, strength, technique, tenon saw/coping saw, truss bridge, visual appeal, wood file/rasp, wood sourcing,	Battery, bulb, circuit, circuit component, crocodile wire, design, design criteria, develop, electric product, electrical system, feedback, final design, information design, initial ideas, peer-assessment, public, research, self-assessment, sketch	Asymmetrical, appliqué, cotton, cross-stitch, embellish, fabric, patch, pinking, polyester, running stitch, silk, symmetrical, template, thread, unique,
Rationale	Test and analyse various types of bridge to determine their strength and stability. Explore material properties and sources, before marking, sawing and assembling a wooden truss bridge.	Introducing information design and developing an electric museum display based on topic of choice, this unit strengthens the progression of knowledge and skills across the Electrical systems strand.	To learn and apply two sewing techniques and utilise these skills to make a cushion with cross stitching. an Egyptian collar
KS2 Learning	**Substantive Knowledge** **Identify stronger and weaker shapes.** **Recognise that supporting shapes can help increase the strength of a bridge, allowing it to hold more weight.** **Identify beam, arch and truss bridges and describe their differences.** **Use triangles to create simple truss bridges that support a load (weight).** Cut beams to the correct size, using a cutting mat. Smooth down any rough cut edges with sandpaper. Follow each stage of the truss bridge creation as instructed by their teacher. **Complete a bridge, with varying ranges of accuracy and finish, supported by the teacher.** **Identify some areas for improvement, reinforcing their bridges as necessary.**	**Substantive Knowledge** **I can explain what information design is and understand its impact,** considering what could happen if we had no signage, posters or written communication in public places of interest. I can research and choose a specific Ancient Roman topic on which to base their initial poster ideas. **I can complete design criteria based on a client's request.** **I can roughly sketch four initial poster ideas, indicating where a bulb will be located for each.** I can review my initial ideas against the design criteria and peer feedback, developing a final design. I **can assemble an electric poster, including a functional, simple circuit with a bulb, following a demonstration.** I can acknowledge, with a brief explanation, the need to mount the poster using corrugated card. **I can test that the simple circuit works by adding a battery.** **I can evaluate my electric posters** in a letter to a client.	**Substantive Knowledge** **I can demonstrate their ability to use cross-stitch as a decorative feature or to join two pieces of fabric together.** **I can design, cut and shape their template** for an usekh or wesekh collar **with increasing accuracy.** I can decorate their Egyptian collar using a variety of techniques, such as appliqué, cross-stitch, beads, buttons and pinking. **I can measure and attach a ribbon with a running stitch.** **I can recognise different types and qualities of fabrics.** **I can explain the aesthetic and functional properties of some of their material choices**.