Hardwick - Design and Technology

National Curriculum

Early Years Foundation Stage

The principal focus of Expressive Arts and Design in EYFS: The development of children's artistic and cultural awareness supports their imagination and creativity. It is important that children have regular opportunities to engage with the arts, enabling them to explore and play with a wide range of media and materials. The quality and variety of what children see, hear and participate in is crucial for developing their understanding, self-expression, vocabulary and ability to communicate through the arts. The frequency, repetition and depth of their experiences are fundamental to their progress in interpreting and appreciating what they hear, respond to and observe.

Pupils should be taught to:

- Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.
- Share their creations, explaining the process they have used.

The national curriculum for design and technology aims to ensure that all pupils:

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook.

Key Stage 1

When designing and making, pupils should be taught to:

Design

- Design purposeful, functional, appealing products for themselves and other users based on design criteria
- Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology

Make

- Select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing]
- Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics

Evaluate

- Explore and evaluate a range of existing products
- Evaluate their ideas and products against design criteria

Technical knowledge

- Build structures, exploring how they can be made stronger, stiffer and more stable
- Explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.

Cooking and Nutrition

- Use the basic principles of a healthy and varied diet to prepare dishes
- Understand where food comes from.

Key Stage 2

When designing and making, pupils should be taught to:

Design

- 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
- Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design

Make

- Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately
- 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

Evaluate

- Investigate and analyse a range of existing products
- Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work
- Understand how key events and individuals in design and technology have helped shape the world

Technical knowledge

- Apply their understanding of how to strengthen, stiffen and reinforce more complex structures
- Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]
- Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]
- Apply their understanding of computing to program, monitor and control their products.

Cooking and Nutrition

- Understand and apply the principles of a healthy and varied diet
- Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques
- Understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.

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	Nursery Designer	Reception Designer	Year 1 Designer	Year 2 Designer
	'Hammers and nails' – pumpkins Toast and toppings Make an obstacle course	***Gingerbread men Make a building Make bug hotels***	***Sock puppets Healthy sandwiches Moon buggy***	***Bridges Healthy omelette Castles with moving parts***
Progression and Assessment Criteria	***Expressive Arts and Design*** ***Independent Learning*** ***1. Explore different materials freely, in order to develop their ideas about how to use them and what to make.*** ***2. Develop their own ideas and then decide which materials to use to express them.*** ***3. Join different materials and explore different textures.*** • *Offer opportunities to explore scale. Suggestions: long strips of wallpaper, child size boxes, different surfaces to work on e.g., paving, floor, tabletop or easel* • *Listen and understand what children want to create before offering suggestions.* • *Joining suggestions: glue and masking tape for sticking pieces of scrap materials onto old cardboard boxes, hammers and nails, glue guns, paperclips and fasteners.* ***4. Develop modelmaking.*** • *Help children to develop their modelmaking.* • *Encourage them to develop their own creative ideas.* • *Spend sustained time alongside them. Show interest in the meanings children give to their models. Talk together about these meanings.* ***Structures: 'Hammers and nails' (pumpkin)*** *5. Safely use tools to hammer tees into e.g. pumpkins.* ***Structures: Make an obstacle course*** *6. Offer opportunities to explore scale.* *7. Listen and understand what children want to create before offering suggestions.* ***Cooking and Nutrition: Toast and toppings*** *8. Wash hands before eating/making food.* *9. Choose ingredients to put onto toast e.g. beans, jam, marmalade.* *10. Use a spoon or table knife to spread chosen ingredients onto toast.* *11. Use a knife and fork to eat their dish.*	***Expressive Arts and Design*** ***Independent Learning*** ***1. Return to and build on their previous learning, refining ideas and developing their ability to represent them.*** ***2. Create collaboratively sharing ideas, resources and skills.*** • *Provide opportunities to work together to develop and realise creative ideas.* • *Provide children with a range of materials for children to construct with.* • *Encourage them to think about and discuss what they want to make.* • *Discuss problems and how they might be solved as they arise. Reflect with children on how they have achieved their aims.* • *Teach children different techniques for joining materials, such as how to use adhesive tape and different sorts of glue.* • *Provide a range of materials and tools and teach children to use them with care and precision. Promote independence, taking care not to introduce too many new things at once* • *Safely use hammers to hammer nails into specified locations with increasing precision.* ***Structures: Make a building/Make bug hotels*** ***3. Cut, join and finish materials to create a building/bug hotel.*** ***Cooking and Nutrition: Gingerbread men*** *4. Know we should wash hands before eating/baking.* *5. Pour ingredients into a bowl.* *6. Mix and stir dry and wet ingredients.* *7. Use hands to form a dough.* *8. Roll dough and use a cutter.* ***ELGs: Expressive Arts and Design*** ***9. Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.*** ***10. Share their creations, explaining the process they have used.***	***Design, Make and Evaluate*** *1. Design a product following instructions.* *2. Use my own ideas to design something that works.* *3. Explain ideas to others using talking and drawing.* *4. Make a simple plan, including drawings, before making.* *5. Choose appropriate resources and tools.* *6. Explain to someone else how I want to make my product.* *7. Explain what well with my work.* ***Structures/Textiles: Sock puppets*** *8. Know that sewing is a way to join fabric together.* *9. Cut fabric with scissors.* *10. With support, thread a needle and tie a knot.* *11. Use running stitch to join fabric.* ***Mechanisms: Moon buggy*** *12. Understand how wheels and axles create movement.* *13. Create a simple wheel and axles system to move part of a product.* *14. Cut and join materials. .* ***Cooking and Nutrition: Healthy sandwiches*** *15. Know the difference between healthy and unhealthy food.* *16. Know that food comes from plants or animals.* *17. Understand basic food hygiene: tie back long hair, wash and dry hands.* *18. Taste different healthy food combinations to design an end product.* *19. Use the bridge hold and claw grip to cut soft and firmer foods using a serrated vegetable knife.* *20. Use a small table knife for spreading soft spreads on to bread.* *21. Assemble and arrange cold ingredients (to make a sandwich).*	***Design, Make and Evaluate*** *1. Explore a range of products to help with ideas.* *2. Think of an idea and explain to others using talking, drawing and mock ups.* *3. Choose tools and materials and explain why I have chosen them.* *4. Explain why I have chosen specific materials.* *5. Measure materials to build a model or structure.* *6. Explain what went well and what I would improve.* ***Structures: Bridges*** *7. Understand that some structures are freestanding structures (bridges).* *8. Explore how a structure (bridge) can be made stronger, stiffer and more stable.* *9. Identify triangles as strong shapes.* *10. Create a strong stable structure (bridge).* *11. Join materials and components in different ways.* ***Mechanisms: Castles with moving parts*** *12. Understand how pulleys and sliders create movement* *13. Create a simple pulley and simple slider system to move part of a product* *14. Cut, shape and join materials.* ***Cooking and Nutrition: Healthy omelette*** *15. Understand a healthy varied diet (eat well image).* *16. Know that all food comes from plants or animals and identify some foods from each group* *17. Talk about and explain the reason for the ingredients used (linked to healthy/varied diet).* *18. Understand basic food hygiene: Tie back long hair, put on a clean apron, wash and dry hands, clean surfaces.* *19. Use the bridge hold and claw grip to independently cut soft and firmer foods using a serrated vegetable knife.* *20. Cut food (including harder food) into evenly sized largish pieces.* *21. Crack an egg and beat together using a fork.*
Vocab	• cut, shape, plan, make, build, twist, push, stick, knife, fork, spoon, spread	• build, join, construction, materials, wood, plastic, glass, fabric, metal, fix, pour, mix, stir	• design, create, cut, join, strength, tools, product, method • Sock puppets: running stitch, sew • Mechanisms: levers, wheels, axles, mechanisms • Sandwiches: unhealthy/heathy, ingredients, food, hygiene, combination, soft/firm	• materials, components, measure, create, product, cut, shape, join • Bridges: structure, strong, stable, stiff • Mechanisms: pulleys, sliders, movement, system • Food: healthy/unhealthy, varied diet, ingredients, hygiene, soft/firm, beat, claw grip, bridge hold

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	Year 3 Designer	Year 4 Designer	Year 5 Designer	Year 6 Designer
	Make an earthquake proof tower **Moving arms – Iron Man** **Vegetable soup**	**Cheesy garlic bread** **Automata toys** **Create a game using electronics**	**Space buggy 1** **Space buggy 2** **Savoury muffins**	**Textiles – Make a stuffed toy** **Pasta dishes** **Computer programming product**
Progression and Assessment Criteria	***Design, Make and Evaluate*** ***Design*** 1. Create a design that meets a set of design criteria. 2. Design a product that is purposeful and functional. 3. Communicate designs using discussion and annotated sketches/diagrams. ***Make*** 4. Select the most appropriate tools and materials for a given task. 5. Use a range of tools and equipment with accuracy. 6. With support, measure, mark out, join and assemble materials. ***Evaluate*** 7. Identify how a product could be improved (against design criteria). ***Structures: Make an earthquake proof tower*** 8. Identify features of a structure e.g. an earthquake proof tower. 9. Identify suitable materials to use for a structure, considering weight/compression/tension. 10. Extend knowledge of wide and flat based objects being more stable. 11. Know how to strengthen, stiffen and reinforce structures. ***Mechanisms: Moving parts of a figure – Iron Man*** 12. Understand how levers and linkages create movement. 13. Explore how levers and linkages can create different movement effects. 14. Create a simple lever/linkage system to make a desired motion. 15. Use simple lever/linkages system to create a simple moving part of a figure. 16. Select materials due to their functional and aesthetic characteristics.	***Design, Make and Evaluate*** ***Design*** 1. Gather information (from others or from looking at similar products) to generate more than 1 idea. 2. Design a product and explain how it is purposeful and functional. 3. Communicate designs using discussion, annotated sketches/diagrams and prototypes. ***Make*** 4. Use a range of tools and equipment with increasing accuracy. 5. Measure, mark out, join and assemble materials. 6. Adapt my work if original ideas do not work. ***Evaluate*** 7. Evaluate products (against design criteria) and suggest simple improvements for my designs. ***Mechanisms: Automata toys (cams)*** 9. Understand how cams work to create movement in a product 10. Measure accurately and join materials to create a frame. 11. Use cams and levers to create desired movement ***Mechanisms: Create a game using electronics*** 12. Measure, drill and saw wood to create a wooden base. 13. Use an electrical circuit (including a buzzer and switch). 14. Use layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result.	***Design, Make and Evaluate*** ***Design*** 1. Use information from different sources to generate a range of ideas. 2. Explain how a design meets a set of criteria and is designed for a particular audience. 3. Communicate designs in a range of ways including prototypes and cross-sectional diagrams. ***Make*** 4. Select and use a range of tools and equipment competently. 5. Select materials according to function and aesthetics. 6. Modify plans throughout the process. ***Evaluate*** 7. Evaluate products (against design criteria), taking views of others into account. ***Structures: Space buggy 1*** 8. Create a wooden frame structure to support electrical components. 9. Understand the terms compression and tension. 10. Measure and mark wood accurately. 11. Use the correct techniques to saw safely. 12. Identify where a structure needs reinforcement and use card corners for support. ***Mechanisms: Space buggy 2*** 13. Make a product using both electrical and mechanical components. 14. Use a motor to turn an axis and create movement. 15. Describe mechanisms that can be used to change one kind of motion into another. 16. Use a hand drill safely to drill holes accurately in the project piece.	***Design, Make and Evaluate*** ***Design*** 1. Use market research to develop design criteria and inform my plans and ideas. 2. Justify my plans (in reference to design criteria and audience). 3. Create a detailed step by step plan, including diagrams (cross-section or exploded), prototypes, pattern pieces or CAD. ***Make*** 4. Select and use a range of tools accurately and with increasing independence. 5. Consider appearance and functionality of product, refining as necessary. ***Evaluate*** 6. Evaluate ideas and products (against design criteria), taking views of others into account. ***Structures/Textiles: Make a stuffed toy*** 7. Use a template when cutting fabric to achieve the correct shape. 8. Mark and cut fabric accurately. 9. Sew a strong running stitch to join edges. 10. Use stuffing to create a 3D piece. 11. Attach features using thread. ***Mechanisms: Computer programming product*** 12. Use simple gears to create movement in different directions. 13. With increasing independence use a computer to programme, monitor and control movement.

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	Year 3 Designer	Year 4 Designer	Year 5 Designer	Year 6 Designer
	Cooking and Nutrition: Vegetable soup *17. Use knowledge of the eat well plate to describe a healthy balanced diet.* *18. Know where and how food is grown (including seasonality).* *19. Prepare for cooking/show understanding of hygiene.* *With moderate supervision:* *20. Use both the bridge hold and claw grip to cut food using a serrated vegetable knife (e.g. onion, carrot).* *21. Grate harder food using a grater (e.g. apples, carrots). Use a blender to blend ingredients.* *Independently:* *22. Begin to peel harder food (e.g. apple, potato).* *23. Adapt and follow a recipe.*	***Cooking and Nutrition: Cheesy garlic bread*** *15. Begin to read and understand food labels.* *16. Understand that food is caught or farmed and changed to make it safe and palatable/tasty to eat.* *17. Prepare for cooking/show understanding of hygiene.* *18. Grate food using a grater (e.g. cheese) and crush garlic using a garlic press.* *With moderate supervision:* *19. Measure and weigh ingredients.* *20. Mix, stir and combine wet and dry ingredients uniformly (e.g. to form a dough).* *21. Sieve flour, raising agents together into a bowl.* *22. Knead and shape dough into evenly sized shapes.* *23. Assemble and arrange ingredients for simple dishes.*	***Cooking and Nutrition: Savoury muffins*** *17. Know the main food groups and the different nutrients that are important for health.* *18. Use information on food labels to inform choice.* *19. Understand some of the basic processes to get food from farm to plate (reared, caught, processed).* *20. Prepare for cooking/show understanding of hygiene.* *With moderate supervision;* *21. Finely grate food, dice foods and cut foods into evenly sized, fine pieces (e.g. garlic, vegetable batons, herbs).* *22. Confidently use both the bridge hold and claw grip to cut the same food using a serrated vegetable knife.* *23. Measure and weigh ingredients accurately.* *24. Confidently crack an egg and beat.* *25. Handle hot food safely once adults have removed food from the hob or oven.*	***Cooking and Nutrition: Pasta dishes*** *14. Use knowledge of healthy diets, portion sizes and food labels to design a healthy balanced dish.* *15. Understand some of the ethical dilemmas associated with the food people choose to buy.* *16. Prepare for cooking/show understanding of hygiene.* *17. Create and follow a recipe.* *18. Use cooking skills to create own pasta dish (e.g. cutting/slicing/grating/garlic press/cracking eggs/blend).*
Vocab	• materials • Structure: features, structure, suitable materials, weight, tension, wide, flat, stable, strengthen, reinforce • Mechanisms: mechanical, levers, linkages, movement, system, motion, functional, aesthetic • Food (soup): balanced diet, seasonality, serrated, grate, peel, adapt, recipe	• product, create, measure accurately, join, materials • Mechanisms: cams, lever • Food (bread): farmed, grate, crush, combine, dough, sieve, knead, arrange, nutrition • Mechanisms: drill, electrical, circuit, buzzer, switch, layers, mechanical	• product, audience, prototype • structures: electrical components, compression, tension, reinforcement • mechanisms: mechanical components, motor, axis, mechanism, motion • Food: food groups, nutrients, reared, caught, processed, finely grate	• Textiles: template, attach, features • Mechanisms: gears, computer programme, monitor, control • Food (pasta): balanced diets, portions, ethical, blend