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| **Design and Technology Curriculum Intent**  In Portobello Primary we believe that Design and Technology is an inspiring subject, encouraging children to think, solve problems and be resourceful. We intend for all children to acquire appropriate subject knowledge, skills and understanding as set out in the National Curriculum. Our school is a place where everyone is given an education that builds on their strengths and addresses their individual needs to ensure progression. We believe that all children should be able to achieve their full potential academically, socially, emotionally and physically. Children design and make products that solve real and relevant problems, enabling them to identify needs and respond by developing ideas, and making products. We organise the curriculum, so the children are provided with purposeful opportunities to learn as individuals or as part of a group to be creative problem solvers and thinkers. We aim to, where appropriate, make links with other curriculum areas such as Mathematics, Science, Computing and Art and Design. We are passionate about building upon children’s cultural capital and believe Design and Technology prepares children to deal with our rapidly changing world by equipping them with the skills to become creative problem solvers. We enrich our curriculum with opportunities to learn about designing and creating for a purpose, including cooking, sewing and making structures. Through nurturing their creativity this has a positive impact on our children’s emotional well-being. Design and Technology also develops the children physically, progressing both their fine and gross motor skills.  **Design and Technology Curriculum Implementation**  In Portobello Primary we facilitate the best possible outcomes for all our children. We have an inclusive approach when delivering our diverse, broad and balanced curriculum and recognise the needs and strengths of all our individual children. All children will succeed in this curriculum area because of our bespoke approach to their learning requirements. Teachers are trained to use formative assessment accurately within lessons to ensure the provision of targeted support and challenge effectively. Where appropriate, adaptations are made to the curriculum in response to individual or groups of children. In lessons children are supported in a number of appropriate ways until they no longer require the scaffolded support and are then encouraged to progress their independence, to embed skills and fully develop their own potential and to ensure independent excellence is achieved. We ensure we promote, teach and celebrate diversity and equality though the delivery of the curriculum. We recognise the importance of retrieval and the impact that this has on learning for all our children to be able to remember and do more. Therefore, we ensure that sufficient time for high quality retrieval practise is firmly embedded into the teaching sequence. To strengthen their understanding and consolidate knowledge and skills we ask that retrieval practise takes place not just during the lesson but over time. Children actively participate in high quality rehearsal, summarising, analysing or application activities.  Appropriate knowledge, skills and understanding as set out in the National Curriculum Design and Technology Programmes of study is focussed upon. This ensures that knowledge and skills are built on year by year and sequenced appropriately to maximise learning for all children. Design and Technology is taught every two weeks, in blocks and all teaching follows the design, make and evaluate cycle. Each stage has technical knowledge firmly embedded, and we prioritise the teaching of health and safety. The children design and create products that consider function and purpose. We focus the teaching and learning of our Design and Technology Curriculum on Food, Structures and Mechanisms.  **National Curriculum for Key Stage 1**  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.   **National Curriculum for Key Stage 2**  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.   **Design and Technology Curriculum Impact**  By the time our children are ready to leave us in Key Stage Two, they have secured the skills, knowledge and expertise to be able to act as responsible designers and makers and are able to use range of materials and tools carefully to work safely. Our curriculum develops children’s confidence to show initiative and ask questions. It is crucial they are equipped with the necessary appropriate skills to help them progress further in their next stage of life. Therefore, through our Design and Technology curriculum we secure the creative and practical skills needed to perform everyday tasks confidently in order to participate competently in an increasingly technological world.  **Supporting the development of Spiritual Moral Social Cultural Development**  Design and Technology inspires children to further develop their creative and innovative talents, which in turn develops their self-confidence. It provides them with the opportunity to use imagination and take risks whilst analysing, designing and manufacturing a range of products. Children experience a sense of awe and wonder when learning about the natural world and the achievement of people in it. The subject encourages children to value the environment and the natural resources within it. We teach the children to consider the impact everyday products have. It is then expected they begin to consider the materials they choose to use during the designing and making stage. Socially our children are encouraged to positively take responsibility for their own behaviour and the safety of others around them. We promote conversations about learning where children are required to reflect and evaluate in a constructive manner. We develop cultural awareness through learning which has connections with our past heritage and how our industry has shaped our nation. In Portobello Primary we have a growth mindset approach firmly embedded in everything we do. Children understand that learning takes place over time and that they are required to make the most of all learning opportunities, mistakes are one part of this.  **Design and Technology Curriculum Assessment and Monitoring**  Design and Technology is monitored by the subject leaders throughout all year groups using a number of strategies including learning outcomes moderations and discussions with teaching staff and children. Subject Leaders also discuss Design and Technology with the Senior Leadership Team once termly and they complete a written report to Governors in Summer Term Two. Teaching staff are encouraged to provide evidence where appropriate to support judgements of attainment and progress of children against the National Curriculum objectives. Throughout lessons children are provided with reflection time for them to self and peer assess against the learning objectives. At the end of each half term teaching staff assess the children against the essential knowledge learning objectives as set in the progression documents. They make accurate and informed assessments using the language of ‘all/most/some children’. Specific children who required further support or who excelled at their learning are identified. Comments refer to taught vocabulary and if this is embedded or requires further consolidation. Next steps in learning are identified for the next half term or the next teacher so gaps in learning are effectively and immediately taught and children make progress. |
| **Year 1** |
| **Autumn 1 –** Food: Fruit and Vegetables. |
| **New Words We Will Use and Understand**  fruit, vegetable, seed, leaf, root, stem, smoothie, healthy, carton, design, flavour, peel, slice |
| **What We Will Remember**  - How to describe fruits and vegetables and explain why they are a fruit or a vegetable.  - Name a range of places that fruits and vegetables grow.  - Describe basic characteristics of fruit and vegetables.  - Know how to prepare fruits and vegetables to make a smoothie.  - Know the importance of food hygiene. |
| **Additional Learning Opportunities**  Visitor – Chef/Smoothie Company  Young enterprise |
| **Autumn 2 –** Mechanisms: A moving story book |
| **New Words We Will Use and Understand**  sliders, mechanism, adapt, design criteria, design, input, model, template, assemble, test |
| **What We Will Remember**   * Identify whether a mechanism is a side-to-side slider or an up-and-down slider and determine what movement the mechanism will make. * How to clearly label drawings to show which parts of their design will move and in which direction. * How to make a picture, which meets the design criteria, with parts that move purposefully as planned. * How to evaluate the main strengths of their design and suggest alterations. * How to evaluate the main weaknesses of their design and suggest alterations. |
| **Additional Learning Opportunities**  Trip – Local library or story telling centre  Visitor – Author |
| **Spring 1 and 2 –** Structures: Constructing a windmill |
| **New Words We Will Use and Understand**  axle, bridge, design, design criteria, model, net, packaging, structure, template, unstable, stable, strong, weak |
| **What We Will Remember**   * Identify some features that would appeal to the client (a mouse) and create a suitable design. * Explain how their design appeals to the client (mouse). * Make stable structures, which will eventually support the turbine, out of card, tape and glue. * Make functioning turbines and axles that are assembled into the main supporting structure. * Say what is good about their windmill and what they could do better. |
| **Additional Learning Opportunities**  Trip – Local working wind mill  Research project wind farms and environment friendly impacts |
| **Summer 1 and 2 -** Mechanisms: Wheels and axles |
| **New Words We Will Use and Understand**  axle, axle holder, chassis, diagram, dowel, equipment, mechanism, wheel |
| **What We Will Remember**   * Explain that wheels move because they are attached to an axle. * Recognise that wheels and axles are used in everyday life, not just in cars. * Design a vehicle that includes functioning wheels, axles and axle holders. * Make a moving vehicle with working wheels and axles. * Explain what must be changed if there are any operational issues. |
| **Additional Learning Opportunities**  Visit – Nissan  Class Competition – Design, build and race model cars. |
| **Year 2** |
| **Autumn 1 –** Food: A balanced diet. |
| **New Words We Will Use and Understand**  balanced diet, balance, carbohydrate, dairy, fruit, ingredients, oils, sugar, protein, vegetable, design criteria. |
| **What We Will Remember**   * How to name the main food groups. * How to identify foods that belong to each group. * How to describe the taste, texture and smell of a given food. * To think of four different wrap ideas, considering flavour combinations. * To construct a wrap that meets the design brief and their plan. |
| **Additional Learning Opportunities**  Visitor – Chef/ Sports Dietitian  Class project – School meals.  Trip – Contact with local restaurant |
| **Autumn 2 –** Mechanisms: Fairground wheel. |
| **New Words We Will Use and Understand**  Design, design criteria, wheel, Ferris wheel, pods, axle, axle holder, frame, mechanism |
| **What We Will Remember**   * How to design and label a wheel. * To consider the designs of others, materials, shape, construction and mechanisms of their wheel. * How to build a stable structure with a rotating wheel. * How to test and adapt their designs as necessary. * To follow a design plan to make a completed model of the wheel. |
| **Additional Learning Opportunities**  Celebration of learning in the hall: Children present their designs and learning.  Locate famous Ferris wheels such as Santa Monica Pier |
| **Spring 1 and 2 –** Structures: Baby Bear’s chair |
| **New Words We Will Use and Understand**  design criteria, man-made, natural, properties, structures, table, shape, model, test |
| **What We Will Remember**   * How to identify man-made and natural structures. * Identify stable and unstable structural shapes. * Work independently to make a stable structure, following a demonstration. * Produce a model that supports a teddy, using the appropriate materials and construction techniques. * Explain how they made their model strong, stiff and stable. |
| **Additional Learning Opportunities**  Celebration of learning in the hall: Pupils present their designs and learning to the rest of school  Link to English story telling |
| **Summer 1 and 2 –** Mechanisms: Making a moving monster |
| **New Words We Will Use and Understand**  Axle, design criteria, input, linkage, mechanical, output, pivot, wheel |
| **What We Will Remember**   * Create functional linkages that produce the desired input and output motions. * Design monsters suitable for children, which satisfy most of the design criteria. * Evaluate their two designs against the design criteria, using this information and the feedback of their peers to choose their best design. * Select and assemble materials to create their planned monster features. * Assemble the monster to their linkages without affecting their functionality. |
| **Additional Learning Opportunities**  Celebration of learning in the hall: Pupils present their designs and learning to the rest of school. |
| **Year 3** |
| **Autumn –** Food: Eating seasonally. |
| **New Words We Will Use and Understand**  climate, diet, imported, ingredients, natural, processed, reared, recipe, seasonal, seasons, sugar |
| **What We Will Remember**   * To explain that fruits and vegetables grow in different countries based on their climates. * To know that eating seasonal fruit and vegetables has a positive effect on the environment. * How to design their own tart recipe using seasonal ingredients. * To understand the basic rules of food hygiene and safety. * How to follow the instructions within a recipe. |
| **Additional Learning Opportunities**  Visitor – Chef  Parent/child cooking workshop |
| **Spring –** Mechanical Systems: Pneumatic toys. |
| **New Words We Will Use and Understand**  mechanism, lever, pivot, linkage system, pneumatic system, input, output, component, thumbnail sketch, research, adapt, properties, reinforce, motion |
| **What We Will Remember**   * Draw accurate diagrams with correct labels, arrows and explanations. * Communicate and develop one idea using an exploded diagram. * Select appropriate equipment and materials to build a working pneumatic system. * Assemble their pneumatic system within the housing to create the desired motion. * Create a finished pneumatic toy that fulfils the design brief. |
| **Additional Learning Opportunities**  Celebration of learning in the hall: Children present their designs and learning |
| **Summer –** Structures: Constructing a castle. |
| **New Words We Will Use and Understand**  2D, 3D, castle, design, key features, net, scoring, shape, stable, stiff, strong, structure, tab |
| **What We Will Remember**   * Draw and label a simple castle that includes the most common features. * Recognise that a castle is made up of multiple 3D shapes. * Design a castle with key features which satisfy a given purpose. * Utilise skills to build a complex structure from simple geometric shapes. * Evaluate their learning by answering simple questions. |
| **Additional Learning Opportunities**  Visit – Local castle/fort. |
| **Year 4** |
| **Autumn –** Food: Adapting a recipe. |
| **New Words We Will Use and Understand**  design criteria, research, texture, innovative, aesthetic, measure, cross-contamination, diet, processed, packaging |
| **What We Will Remember**   * Follow a recipe, with some support. * Describe some of the features of a biscuit based on taste, smell, texture and appearance. * Adapt a recipe by adding extra ingredients to it. * Plan a biscuit recipe within a budget. * Know the importance of food hygiene. |
| **Additional Learning Opportunities**  Visitor – Chef  Parent/child cooking workshop |
| **Spring –** Mechanical systems: Making a slingshot car. |
| **New Words We Will Use and Understand**  chassis, energy, kinetic, mechanism, air resistance, design, structure, graphics, research, model, template |
| **What We Will Remember**   * How to work independently to produce an accurate, functioning car chassis. * How to attempt to reduce air resistance through the design of the shape. * How to produce panels that will fit the chassis and can be assembled effectively using the tabs they have designed. * How to construct car bodies effectively. * How to conduct a trial accurately and draw conclusions and improvements from the results. |
| **Additional Learning Opportunities**  Visit – Nissan  Class Competition – Design, build and race model slingshot cars. |
| **Summer –** Structures: Pavilions. |
| **New Words We Will Use and Understand**  3d shapes, cladding, design criteria, innovative, natural, reinforce, structure |
| **What We Will Remember**   * How to produce a range of free-standing frame structures of different shapes and sizes. * How to design a pavilion that is strong, stable and aesthetically pleasing. * How to select appropriate materials and construction techniques to create a stable, free-standing frame structure. * How to select appropriate materials and techniques to add cladding to their pavilion. * How to conduct a trial accurately and draw conclusions and improvements from the results. |
| **Additional Learning Opportunities**  Celebration of learning in the hall: children present their designs and learning |
| **Year 5** |
| **Autumn –** Food: What could be healthier? |
| **New Words We Will Use and Understand**  beef, reared, processed, ethical, diet, ingredients, supermarket, farm, balanced |
| **What We Will Remember**   * To understand how beef gets from the farm to our plates. * How to notice the nutritional differences between different products and recipes. * How to recognise nutritional differences between two similar recipes and give some justification as to why this is. * How to follow a recipe to produce a healthy bolognese sauce. * How to design packaging that promotes the ingredients of the bolognese. |
| **Additional Learning Opportunities**  Visitor – Chef  Parent/child cooking workshop |
| **Spring –** Mechanical systems: Making a pop-up book. |
| **New Words We Will Use and Understand**  design, input, motion, mechanism, criteria, research, reinforce, model |
| **What We Will Remember**   * How to produce a suitable structure of the book. * How to assemble the components necessary for all their structures/mechanisms. * To hide the mechanical elements with more layers using spacers where needed. * How to use a range of mechanisms and structures to illustrate their story and make it interactive for the users. * How to use appropriate materials and captions to illustrate the story. |
| **Additional Learning Opportunities**  Trip – Local library or story telling centre.  Reading pop uo stories from other cultures  Reading French pop up books  Visitor – Author |
| **Summer 1 –** Structures: Bridges. |
| **New Words We Will Use and Understand**  beam bridge, arch bridge, truss bridge, strength, technique, corrugation, lamination, stiffness, rigid, factors, stability, visual appeal, aesthetics, joints, mark out, hardwood, softwood, wood file/rasp, sandpaper/glasspaper, bench hook/vice, tenon saw/coping saw, assemble, material properties, reinforce, wood, sourcing, evaluate, quality of finish, accuracy |
| **What We Will Remember**   * How to recognise that supporting shapes can help increase the strength of a bridge, allowing it to hold more weight. * How to identify beam, arch and truss bridges and describe their differences. * To use triangles to create simple truss bridges that support a load (weight). * To complete a bridge, with varying ranges of accuracy and finish, supported by the teacher. * How to identify some areas for improvement, reinforcing their bridges as necessary. |
| **Additional Learning Opportunities**  Celebration of learning in the hall: children present their designs and learning.  Visit – Local bridges along Gateshead/Newcastle Quayside.  Locate famous bridges from around the world e.g. The Golden Gate Bridge |
| **Year 6** |
| **Autumn –** Food: Come dine with me. |
| **New Words We Will Use and Understand**  equipment, flavours, ingredients, method, research, recipe, bridge method, cookbook, cross-contamination, farm to fork, preparation, storyboard |
| **What We Will Remember**   * Find a suitable recipe for their course. * Record the relevant ingredients and equipment needed. * Follow a recipe, including using the correct quantities of each ingredient. * Write a recipe, explaining the process taken. * Explain where certain key foods come from before they appear on the supermarket shelf. |
| **Additional Learning Opportunities**  Visitor – Chef  Parent/child cooking workshop |
| **Spring –** Mechanical systems: Automata toys. |
| **New Words We Will Use and Understand**  accurate, assembly-diagram, automata, axle, bench hook, cam, clamp, component, cutting list, diagram, dowel, drill bits, exploded-diagram, finish, follower, frame, function, hand drill, jelutong, linkage, mark out, measure, mechanism, model, research, right-angle, set square, tenon saw |
| **What We Will Remember**   * How to mark, saw and cut out the components and supports of their toy with a varying degree of accuracy to the intended measurements. * How to explore different cam profiles and choose three for their follower toppers with an explanation of their choices. * How to measure and cut panels that fit with some inaccuracies to conceal the inner workings of the automata. * How to decorate and finish the automata to meet the design criteria and brief. * How to evaluate their finished product, making descriptive and reflective points on function and form. |
| **Additional Learning Opportunities**  Celebration of learning in the hall: children present their designs and learning.  Link to toys from the past and how they moved.  Vexco Club |
| **Summer –** Structures: Playgrounds. |
| **New Words We Will Use and Understand**  apparatus, design criteria, equipment, playground, landscape features, cladding |
| **What We Will Remember**   * Create five apparatus designs, applying the design criteria to their learning. * Make suitable changes to their learning after peer evaluation. * Complete their structures, improving the quality of their rough versions and applying some cladding to a few areas. * Secure their apparatus to a base. * Make a range of landscape features using a variety of materials which will enhance their apparatus. |
| **Additional Learning Opportunities**  Young enterprise |