

Project Title: Design, make and evaluate a bread-based product for a school child to eat for lunch.

Length of unit – 2 afternoon sessions and 1 deep learning day

	Disciplinary and Substantive Knowledge	Vocabulary	Learning Sequence
Pre-learning	- Know some ways to prepare ingredients safely and hygienically. - Have some basic knowledge and understanding about healthy eating and <i>The eatwell plate</i>. - Have used some equipment and utensils and prepared and combined ingredients to make a product.	- Hygienic - Edible - Grown - Reared - Caught - Healthy - Diet	<u>Technical Knowledge</u> - Launch unit by telling children they are going to make a fruit crumble. Use utensils (peelers and knives) and a range of techniques (bridge and claw, peeling) to prepare fruit – apples, plums, rhubarb, berries. - Discuss basic food hygiene practices when handling food to control risk - tie long hair back, wear aprons, cover cuts with blue plasters and wash hands thoroughly with soap and dry with a paper towel. - Bake crumble and eat at the end of the lesson. - Find out how a variety of foods used in wraps or sandwiches are grown and harvested, reared or caught - where and when are the ingredients grown? Where do different meats/fish/cheese/eggs come from? - Link to the principles of a varied and healthy diet using <i>The Eatwell Plate</i> e.g. What ingredients have been used? Which food groups do they belong to?
Learning in this unit	To know that: <u>Technical Knowledge</u> - There are a range of fresh and processed ingredients appropriate for their product, and whether they are grown, reared or caught. To know how to: <u>Technical Knowledge</u> - Know how to use appropriate equipment and utensils to prepare and combine food. - Carry out sensory evaluations of a variety of ingredients and products. <u>Designing</u> - Develop own design criteria including appearance, taste and texture for an appealing product. - Generate develop, model and communicate realistic ideas through annotated sketches focusing on the needs of the user and the functional and aesthetic purposes of the product. - Plan the order of the main stages of making, listing ingredients, utensils and equipment as appropriate. <u>Making</u> - Select from a range of resources and materials to make appropriate products. - Select and use appropriate tools, utensils and equipment to measure, cut, and join materials accurately. - Choose finishing techniques suitable for the product they are creating. <u>Evaluating</u> - Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work.		<u>Designing</u> - Introduce Jamie Oliver and explain how he changed school lunches to make them healthier. - Explain to children that they will be making a bread-based product (wrap, sandwich or roll) for a school child to eat for lunch. - Introduce guidelines to create a design criteria as a class. This should include criteria relating to healthy eating. Ask children to generate a range of ideas encouraging realistic responses. Children select from these ideas to form their own design criteria. - Carry out sensory evaluations on the contents of a range of wraps or sandwiches. Children to try different flavour combinations by combining one of each food group together and evaluating. Record results. Use appropriate words to describe the taste/smell/texture/appearance. - Children to communicate their ideas for their bread-based product through discussion. Ask children to consider which fillings and bread they would like to use. Children to write this as a list of ingredients. - Discuss types of utensils needed and the jobs each utensil could do (eg – knife could spread butter, chop ingredients, slice bread etc). Children to write the utensils they'll need as a list of utensils. <u>Making and Evaluating</u> - Model the importance of an accurate recipe by asking children to give a teacher instruction to make a jam sandwich. Model what happens when instructions are not precise or accurate. - Children to write a step-by-step recipe to make their product. - Children to follow their plans to make their bread-based product. Staff to have raw ingredients available to children – children to prepare the ingredients themselves using the techniques taught in session 1. - Ensure children follow correct hygiene as taught in session 1. - Evaluate the final product against the design criteria previously agreed. Identify the strengths and areas for improvement in their work.
Resources	- information about foods from around the world, basic recipes - range of relevant example foods to taste and evaluate - suitable equipment and utensils such as: knives, chopping board, weighing scales, measuring jugs, bowls, baking trays, spoons – various sizes, parchment paper, plastic film		

Project Title: Design, make and evaluate a night light for younger children for safety and reassurance.

Length of unit – 2 afternoon sessions and 1 deep learning day

	Disciplinary and Substantive Knowledge	Vocabulary	Learning Sequence
Pre-learning	- Constructed a simple series electrical circuit in science, using bulbs, switches and buzzers. - Cut and joined a variety of construction materials, such as wood, card, plastic, reclaimed materials and glue.	- series circuit - fault - connection - control - program - system - device - input - output - process - Crumble	- Discuss, investigate and, where practical and safe, disassemble different examples of relevant battery-powered products - - Xmas lights, torch, toothbrush, toys, remote control etc. Discuss - Where and why the products are used? How do they work? What are the key features and components? How does the switch work? Is the product manually controlled or controlled by a computer? If it is controlled by a computer how does that improve the way the product works? What materials have been used and why? - Recap with the children how to make manually controlled, simple series circuits with batteries and different types of switches, bulbs, motors and buzzers. Discuss which of the components in the circuit are input devices e.g. switches, and which are output devices e.g. bulbs, motors and buzzers. - Show children how to make a variety of switches by using simple classroom materials e.g. card, corrugated plastic, aluminium foil, paper fasteners and paper clips. Make switches that operate in different ways e.g. when you press them, when you turn them, when you push them from side to side. Test switches in a simple series circuit. - Show children how to use a Crumble kit to physically control output devices e.g. bulbs and buzzers, following the guidance on the POAP planner. - Use https://redfernelectronics.co.uk/projects/sparkle-nightlight-project/ to demonstrate how to create a simple nightlight housing.
Learning in this unit	To know that: <u>Technical Knowledge</u> - There are a range of existing battery-powered products, including pre-programmed and programmable products. To know how to: <u>Technical Knowledge</u> - Apply their understanding of computing to program and control a product. <u>Designing</u> - Develop own design criteria including appearance, taste and texture for an appealing product. - Generate develop, model and communicate realistic ideas through annotated sketches focusing on the needs of the user and the functional and aesthetic purposes of the product. - Plan the order of the main stages of making, listing ingredients, utensils and equipment as appropriate. <u>Making</u> - Select from a range of resources and materials to make appropriate products. - Select and use appropriate tools, utensils and equipment to measure, cut, and join materials accurately. - Choose finishing techniques suitable for the product they are creating. <u>Evaluating</u> - Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work.		- Explain to children that they will be making a nightlight for a younger child. The children will need to program an electrical circuit with a switch for their product, but also program and control a crumble kit. They will work more effectively for the intended user than those that are battery controlled (change colour, turn off after a period of time, etc). - Introduce guidelines to create a design criteria as a class. This should include criteria relating to one element of the product being Crumble controlled. Ask children to generate a range of ideas encouraging realistic responses. Children select from these ideas to form their own design criteria. - Children to consider the finishing of the product – what design would a child like? How can they incorporate this into their product? (eg – children may like cars, the nightlight may be in the shape of a car or have pictures of cars on it). - Using annotated sketches, ask the children to develop, model and communicate their ideas for their nightlight. Children to write a list of resources and tools that they will need for the task. - Have the children write, test and debug programs that will control the electrical product they have made for a clearly defined purpose e.g. bulb on a nightlight switching off after a period of time when the user has gone to sleep, or the lights changing colours. - Children to write a step-by-step list of things they will need to do to make their product. - Children to follow their plans to make their product. Each product should contain at least one crumble-controlled LED sparkle. Children to consider how to make their product so it is functional and also will look appealing to a small child. Children carefully consider how to hide their crumble controller and any wires. - Evaluate the final product against the design criteria previously agreed. Identify the strengths and areas for improvement in their work.
Resources	- battery-powered manually controlled and programmable electrical products - buzzers, bulbs, bulb holders, batteries, battery holders, wire, switches including toggle, push-to-make and push-to-break - aluminium foil, paper fasteners, paper clips, card, plastic packaging, corrugated plastic, reclaimed materials, finishing materials and media - Crumble kits - right/left-handed scissors, PVA glue, cutting mats		

Project Title: Design, make and evaluate a pneumatic toy for a child to play with.

Length of unit – 2 afternoon sessions and 1 deep learning day

	Disciplinary and Substantive Knowledge	Vocabulary	Learning Sequence
Pre-learning	- Explored simple mechanisms, such as sliders and levers, and simple structures. - Know how materials can be joined to allow movement. - Joined and combined materials using simple tools and techniques.	- pneumatic system - input - process - output - control, - compression - pressure - inflate - deflate - pump - seal - air-tight	- Children investigate, analyse and evaluate familiar objects that use air to make them work e.g. bicycle pump, balloon, inflatable swimming aids, foot pump for inflating an air bed. What does the air do? How has it been used in the design of these products? How can air be used to move heavy objects? - Introduce John Boyd Dunlop and discuss the invention of the pneumatic tyre and the impact it had on our lives. - Explore objects that use hydraulic systems to make them work e.g. dump truck, bulldozers, theme park rides - Construct a simple pneumatic system by joining a balloon to 5mm tubing and then to a washing-up liquid bottle. What happens to the air when you squeeze the bottle? What happens when you let go? Can you lift a soft toy or a note pad using a balloon? - Demonstrate a range of pneumatic mechanisms using prepared teaching aids including two syringes joined by plastic tubing; three syringes connected using a T-connector and using different sized syringes. - Provide the materials and ask the children to try out and draw the three systems they have been shown: a) Balloon connected to a washing-up liquid bottle b) Two syringes of the same size connected together. c) Two syringes of different sizes connected together. Demonstrate how to assemble the systems using syringes, tubing, balloons and plastic bottles.
Learning in this unit	To know how to: <u>Technical Knowledge</u> - Investigate, understand and use pneumatic mechanisms. <u>Designing</u> - Develop own design criteria including appearance, taste and texture for an appealing product. - Generate develop, model and communicate realistic ideas through annotated sketches focusing on the needs of the user and the functional and aesthetic purposes of the product. - Plan the order of the main stages of making, listing ingredients, utensils and equipment as appropriate. <u>Making</u> - Select from a range of resources and materials to make appropriate products. - Select and use appropriate tools, utensils and equipment to measure, cut, and join materials accurately. - Choose finishing techniques suitable for the product they are creating. <u>Evaluating</u> - Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work.		- Explain to children that they will be making a pneumatic toy for a younger child to play with. The pneumatic mechanism will make a part of the toy move, such as a mouth opening and closing or a tail moving up and down. - Introduce guidelines to create a design criteria as a class. This should include a pneumatic mechanism making a moving part. Ask children to generate a range of ideas encouraging realistic responses. Children select from these ideas to form their own design criteria. - Using annotated sketches. ask the children to develop, model and communicate their design for their product. Children to write a list of resources and tools that they will need for the task. - Children to write a step-by-step list of things they will need to do to make their product. - Children to follow designs to choose appropriate resources and tools to create a moving creature using a pneumatic system. - Children should first make a prototype to ensure that their mechanism is functional and moves as expected – if this is not the case, children to make adjustments until they are happy with their product. - Children will accurately measure, mark out, score, cut, shape and join their mechanical systems using card, PVA glue, glue sticks, elastic bands and scissors - Children will use finishing and decorative techniques suitable for the product they are designing and making in order to make it appealing - Evaluate the final product against the design criteria previously agreed. Identify the strengths and areas for improvement in their work.
Resources	- examples of products and books, photos and videos showing pneumatic systems - washing-up liquid bottles, 5mm plastic tubing, sterile syringes, T-connectors, balloons - card, plastic sheet, PVA glue, masking tape, parcel tape, sticky pads, pipe cleaners, elastic bands, syringe clips, - left/right handed scissors, snips, card drills, cutting mats, hole punches, finishing media and materials		