



# Design and Technology Curriculum

Autumn Term

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## Year 1

Learning Sequence		
1.	Exploring Playground Equipment	What is a structure? A structure is something that has been formed or made from parts, for example a large building, a bridge or a chair. Where might we have seen a structure before? Provide opportunity for children to explore a range of structures (walk around local area to include local park) for children to investigate and evaluate what they like, what they think works well and the functions of each structure. What are the structures called and what is their purpose? Who might use them? What materials have been used? Why have they been chosen? How have the parts been joined together? How have the structures been made strong enough? How have they been made stable? Introduce the council's dilemma and design criteria. Explain that each child will design and make a piece of playground equipment.
2.	Exploring Stability	Recap the council's dilemma and design criteria. What does the word stable mean? Explain that when something is firmly fixed or not likely to change or move it is stable. Using a variety of construction kits model building and exploring a variety of freestanding structures. Working in small groups, children to make models of playground structures, exploring stability. How can you stop your structure from falling over? How can they be made stronger and stiffer?
3.	Exploring Strength	Recap what the word stable means. What does the word strength mean? Explain that strength is someone that is strong or something that is strong and not easily broken for e.g. wood, brick etc. What does the word stiff mean? A material or object that does not bend easily, for example, metal/a metal pole/climbing frame. Why are these properties important for structures? (so that the structure is stable and does not fall over, get wet, bend or break when used). Model folding paper/card in different ways to make freestanding structures (e.g. tubes). Working in small groups, children to make models of playground structures, exploring strength and stability. Encourage children to experiment with folding materials and how this can make them stronger, stiffer, stand up and be more stable. Can they support the weight of an object on the top without falling over/breaking? Can you increase the load? Etc.
4.	Designing	Recap the council's dilemma and design criteria. Model the design process for children. Discuss and create non-negotiables together as a class i.e. what the design must have and the materials and equipment that we will need to make them. Model using knowledge from the exploration stage to create their playground structure using card and paper.
5.	Making and Evaluating	Children to use their design to make their product. Model following their design to ensure the product made looks like the one that they designed. Throughout the making process children should be encouraged to evaluate their product as they are developing it and identify strengths and possible changes they might make. Model how to use simple finishing techniques to improve the appearance of a product. Once children's products are finished model how to evaluate them by discussing how well it works in relation to the purpose and by asking questions about what they have made and how they have gone about it.

# Autumn Term

## Year 2

Learning Sequence		
1.	Exploring Bunting	Provide a range of bunting and images of bunting and ask the children to discuss the theme of each one/what each is showing. Do you know what these types of flags are called? Have you ever seen or used bunting? Where did you see it? How did you see it? What is bunting? Bunting is a type of decoration often made out of fabric, but can sometimes be made out of plastic, paper or card. Look at an example of counting bunting. What do you like about the design? What would you improve? What mark would you give it out of 10? Explain that they have just completed a simple evaluation of the bunting. Explain that it is important to evaluate existing products to see what has already been made, and what people like and need. Emphasise that they must think about what the product will be used for when evaluating. Provide children with a few examples of counting bunting and repeat. Introduce Miss Allison's dilemma and her design criteria. Explain that each child will design and make a flag. The completed flags will then be joined together to make a line of bunting.
2.	Designing	Recap Miss Allison's dilemma and her design criteria. Explain that this is our starting point and we will need to keep referring back to this to make sure our design reflects what she wants/needs. Discuss what kinds of colours, pictures, words etc. would be relevant and would reflect our school and values (e.g., school colours, values, mottos etc.). Encourage children to keep their pictures quite simple as they will be making them out of fabric. Children discuss with a partner what their individual bunting could look like. Take feedback. Children sketch out some ideas on their design proforma. Introduce a simple computer graphics/paint program. A blank bunting template should be on the screen. <i>(It is important to leave the flap on the top of the template as this will be used later on.)</i> Show the children how to draw an outline of a shape onto the template and then fill the outline in. Explain how to duplicate the image by copying and repeating. Children develop their designs. Encourage the children to experiment with different patterns by copying and repeating images. Once the children have finished designing, their work can be saved, printed and enlarged to use as a paper template.
3.	Exploring Templates	Show a good example of a design template and explain that these will now be used as a paper template to help the children cut out their fabric bunting. Define template/pattern. Demonstrate how to use scissors correctly to accurately cut around the solid black line on their paper template. Why is it important to cut along the line accurately? Children accurately cut around their paper template. Explain that next they will be cutting a piece of fabric which will be a little trickier so it is important that they have mastered their cutting skills. Were there any parts to cutting they found difficult? Invite other children to offer advice to help. Show children the different coloured felt that will be available to make their bunting from. Pass the felt around and ask children for words to describe the felt. Explain that felt is a useful fabric as it is easier than other fabrics to cut and doesn't fray. Children choose which coloured felt they want to use. Show the children how to place their template to ensure minimum wastage. Demonstrate how to trace around the template using chalk and then cut it out.
4.	Exploring Running Stitch	Look at the top flap of the bunting shape and demonstrate how this will be folded over to create a place for the ribbon or string to run through so the bunting can hang. Explain that running stitch will be used to secure this fold over. Show a picture of running stitch. Does anyone know anything about this stitch? Explain that there are two layers of fabric that they are trying to hold together. The thread is going to hold the two layers of fabric together, by going in and out between the fabric. This is just like gluing or stapling two pieces of paper together. Each time they go in and out, from the front to the back of the fabric, they have created a stitch. Explain that the children can decide how tightly the fabric is sewn together by altering the length of their stitch. Small stitches make a very tight seam <i>(a seam is the line the thread makes as you stitch in and out)</i> . Wider or longer stitches make a looser seam and your fabric is more likely to pull apart. Demonstrate how to secure the top in place.

Learning Sequence		
5.	Selecting Fabrics	<p>Show the children a selection of different fabrics. Invite a child to select one. Can you describe the fabric? Take feedback. Explain that next they will be completing an activity that will help them to select fabrics that they want to use to add the decoration to their bunting. Children will select a fabric that they would like to use on their bunting. They should then cut off a small piece and glue it down onto their design proforma. Finally, they write a few words to say how they will use the fabric that they have chosen to decorate their bunting flag. Demonstrate how the different types of fabric can be used to create the words, images, shapes included on the children's designs. Show how to draw the outline shape in chalk first and then cut the shape out, to create minimum wastage. Pin the fabric shapes to the bunting to show how they will fit and be arranged. Children draw the outline of their designs, cut them out and pin the shapes to the felt bunting flag. Recap the design criteria. Explain that the children should evaluate their design against design criteria. Children work in partners to look at their product so far. They should discuss two points they think their partner has done well. On a sticky label write down one area for improvement. The sticky label will be placed on the bunting ready for the start of the next lesson.</p>
6.	Making and Evaluating	<p>Ask the children to reread the improvement their partner suggested last lesson. Give the children some time to work on the suggested improvement. Explain that they will start to join the decoration to their bunting flag. Show the children different techniques for joining fabrics and attaching others materials e.g. glue, a running stitch and by using a stapler. Whilst modelling, question the children. Has anyone used these techniques before? Why would you choose this technique? For each technique discuss the difficulty, amount of time taken and appearance. Children join the fabric decoration to the individual bunting flags. Look at the design criteria. Model how to evaluate their product thinking about how well it has met the design criteria. Children work in pairs to evaluate each other's product.</p>

# Autumn Term Year 3

Learning Sequence		
1.	Exploring Air Pressure	Provide children with a range of familiar objects which use air to make them work (recorder, whistle, bicycle pump, balloon, inflatable swimming aids, foot pump, coiled party blowers). Discuss as a group how do these things work? (Children need to understand that it is the flow of air that makes them work). One object on each table, children investigate each object by discussing how it works and record any observations made. Encourage children to focus on air source and direction of flow. Questions to ask: What types of forces were used? What happens to the air? Which objects work in the same/a different way? How? How does the air stay inside/escape? Children to describe how the objects use air to make them work and suggest alternative uses for these familiar objects. Recap what a mechanism is (A mechanism is the parts of an object that move together as part of a machine) Introduce pneumatic system and define (a mechanism that runs on air or compressed gas). Introduce Receptions dilemma and their design criteria. Explain that each child will design and make a moving monster which uses a pneumatic system to make it move. The completed monsters will then go into Reception for children to play with.
2.	Exploring Simple Pneumatic Systems	Recap Receptions dilemma and their design criteria. Recap definitions of a mechanism and pneumatic system. Explain that today children will be exploring a simple pneumatic system. Place a plastic bag or balloon underneath a book. Ask the children what they think will happen if air is blown into the bag or balloon. Show the children what happens when the bag or balloon is inflated and then deflated. Discuss. Questions to ask: What happens to the air when you squeeze the bottle? What happens when you let go? What happens if you put fabric over the balloon then squeeze the bottle? Can you lift a book with the balloon? Use a hinged box, a balloon and some tape. Children discuss how they could make the toy/lid move in a controlled way using the balloon. The children show how to attach the tube to the balloon. The children place the toy on top of the balloon (or lid) of the box and blow air into it to make the toy rise and fall. Children to work in small groups to construct their own pneumatic system and investigate how it works. Children to record any observations made. Can you explain what is happening?
3.	Exploring Simple Pneumatic Systems	Recap definitions of a mechanism and pneumatic system. Explain that today children will be exploring a simple pneumatic system. Recap pneumatic system made in previous lesson and how it used air to make it work. Explain that today children will be exploring another simple pneumatic system that works differently. Model constructing another simple pneumatic system by joining two syringes with plastic tubing. Demonstrate what happens when one plunger is pushed in. Discuss. What will happen when one plunger is pushed in? Which system is more efficient? Why? Which is more accurate/controlled? Why? Children to work in small groups to construct their own pneumatic system and investigate how it works. Children to record any observations made. Model adapting joining two syringes with plastic tubing to include a larger syringe and a connector (please see diagram). Demonstrate what happens when the larger plunger is pushed in. Discuss. What will happen when the larger plunger is pushed in? Which system is more efficient? Why? Which is more accurate/controlled? Why? Children to work in small groups to construct their own pneumatic system and investigate how it works. Children to record any observations made.
4.	Exploring Different Materials	Recap Reception's dilemma and their design criteria. Explain that today children will be exploring ways of using pneumatic systems with other materials (reclaimed, junk modelling type materials) to control movement. Recap all three pneumatic systems with children's help to construct. Show model. Discuss the mechanism needed to move it and how it could work. Discuss the materials that would be needed. Model taking one of the pneumatic systems and begin to develop ideas practically (using reclaimed materials) about the use of pneumatic systems in a moving monster toy (provide pictorial ideas for children to use as a base). Remind children of different techniques to join and fix components. Children to work in small groups to construct their chosen pneumatic system and practically begin to explore and develop their own ideas about the use of pneumatic systems in a moving monster toy (ensure pictorial examples are visible to give children a starting point to explore and develop from). Children to test out all three pneumatic systems to establish which one works best in relation to their idea.

## Learning Sequence

5.	Designing	Recap Receptions dilemma and their design criteria. Explain that this is our starting point and we will need to keep referring back to this to make sure our design reflects what they want/need. Discuss familiar monsters (from books, films, tv etc.). Refer back to the design criteria and discuss the need to remember that our target audience is quite a bit younger than us, so the monsters need to be friendly rather than scary (as stated in design criteria). Children to discuss what their individual monster could look like. Take feedback. Children to sketch out some ideas on their design proforma. Model how to discuss ideas and how much they fulfil the design criteria. Have they designed a monster and considered how it will move, and what materials they will need? Children develop their designs and choose one to move forward with as their final design. Children annotate their design features and pneumatic system.
6.	Making and Evaluating	Recap Receptions dilemma and their design criteria. Discuss and model safe use of any tools children may need to use. During the making process encourage children to evaluate their product as it is developed, identifying strengths and possible changes they might make. Explain that certain parts may need to be altered as the construction progresses and problems are encountered e.g. one material may not be strong enough so an alternative may need to be sought and that this should be recorded on their final design. Discuss problems encountered and how children solved them. Have you had to alter you design at all? In what way? Why? How does your alteration make it better? Look at the design criteria. Model how to evaluate their product thinking about how well it has met its intended purpose. Children work in pairs to evaluate each other's product and record any observations made.

# Autumn Term

## Year 4

Learning Sequence		
1.	The Design Criteria	<p>Define design criteria. Explain that analysing products often involves asking three main questions: does the product work? Does it meet the needs of the target market? How well is it designed and made? When the children are creating a design criteria they should think about how the product will achieve these three key points. Look at an example of a messenger style bag. What do you think would have been the design criteria for this? Children work with a partner to write down their ideas. Take feedback and record. Repeat this for a different messenger style bag. The children should see some similarities between each design criteria. Introduce three different children's dilemmas and their individual design criteria. Explain that each child will design and make a messenger style bag for one of the three children using their specific design criteria. Explain that by the end of the project children will have created a messenger style bag out of felt. Explain that they will be given choices about most other aspects of their designs, such as the aesthetics (how the product looks), functionality and fastenings etc. based on which child they choose to make it for. Children to look at each child and their design criteria and choose who they want to make their bag for and why.</p>
2.	Designing	<p>Recap the three different children's dilemmas and their individual design criteria. Explain that the children are going to generate some initial ideas for their felt messenger bag. These ideas will be developed further throughout the project. Briefly explain what the design process includes. Explain that the children should design their messenger bag using their chosen design criteria. Model how to draw a few initial ideas. How well have these designs met the design criteria? Children use a plain piece of paper to sketch their initial ideas, creating their designs with their target audience in mind. After they have completed their sketches they will discuss their ideas with their peers, thinking about which design they prefer and why. Explain that they will now need to choose which design they want to develop further. Children should be challenged to create original and innovative designs. They need to evaluate their designs against the design criteria before choosing their final design. Explain that it is important to draw each side of the product so you can think about the design on all sides of the product. This will allow the children to include all of the features that the messenger bag must include, for example, a front pocket for extra space. If our sketches are detailed then why do we need annotations? Explain that annotations are notes that develop, record and help communicate your thinking. For example, your sketch could show that you intended to leave a hole at the bottom of the bag but your annotation is required to explain that the purpose of that hole is for a charging lead to come out of and plug in.</p>
3.	Making a Template	<p>Does anyone know what templates are used for? Has anyone used them before? What were you making? Define the word template and explain the advantages of using one. Explain that children will make a template because it is easier to mark measurements on paper rather than fabric and also it is easier to correct mistakes if they are drawing on paper. Recap the measurements on the design criteria (all children want the same size messenger bag). Model how to use cm (10mm) squared paper to create a paper templates. Children use the given measurements to draw their template onto squared paper.</p> <p>Explain that a seam allowance is the area between the line of stitching and the edge of the fabric. (The children's measurements templates do not include a seam allowance at the moment.) Demonstrate how to draw an outer line (cutting line) on to the paper template, approximately 10mm away from the sewing line. Children should demonstrate accuracy when measuring and cutting. Now we have a template what do you think is the next stage in the making process? Assess the children's understanding of how the template will be used to make the product.</p>

Learning Sequence

4.	Exploring different Stitches	<p>Children have two minutes to write down or tell a partner everything they know about sewing and stitches. Take feedback. Introduce different stitches (backstitch, over sew stitch, blanket stitch). Explain that they will each get a piece of scrap fabric, which they will practise sewing a range of different stitches on, before making their final product. At the end of the lesson they will choose which stitch is the most appropriate to use on their final felt messenger bag. Remind children of running stitch and cross stitch. Children independently sew one edge of their scrap fabric using a running stitch and a cross stitch. Demonstrate backstitch. Children sew one edge of their scrap fabric using a backstitch. Demonstrate over sew stitch. Children sew one edge of their scrap fabric using a over sew stitch. Demonstrate blanket stitch. Explain it is a decorative stitch and also gives the edges of fabric added strength. Children sew a blanket stitch down one edge of their scrap fabric. Discuss which type of stitch they liked the best and which they will use on their final design. Which stitch do you think would be most appropriate for sewing together the edges of your phone case? Why? The children add these stitches to their design ideas.</p>
5.	Evaluating the Design Criteria	<p>Show children the felt. Explain that felt is a costly fabric so children need to ensure they work accurately. Demonstrate how to place and pin the paper template onto the felt, avoiding unnecessary waste. Now, demonstrate how to draw around the template with a piece of chalk. Children then pin the template to the felt, draw around it and then remove the pins and template. Demonstrate how to cut out the felt shape following the cutting line. Explain how to hold the scissors when cutting and remind the children to be accurate. Children cut out the felt independently. What do you think will be the next stage for making your messenger bag? Take feedback. Refer back to the design criteria. Do our designs meet the requirements in the design criteria? Explain that children should be evaluating their ideas and products throughout the designing process. They may have had some further thoughts about their designs which would help their product to fulfil the design criteria; this new action should be included on their design proforma. Discuss the importance of planning our ideas to help organise new thoughts, save time and to ultimately help create a quality end product.</p>
6.	Making and Evaluating	<p>Explain that when selecting materials and stitches children should consider both the functional properties and aesthetic qualities. Explain how different threads and stitches can be used to give the project style. Children follow their designs to add decoration and fastenings. Children should be encouraged to add more complex decorative detail to their designs using a combination of stitching techniques. They should experiment with fastenings according to how functional they are. Children use their chosen stitch to join the pieces of felt together to create the main shape for their messenger bag. They then follow their plans to create a high quality finished product. Explain that the design criteria has been used throughout the project to evaluate their ideas and product. Use the design criteria to demonstrate how to evaluate the messenger bags. Children to evaluate their bag based on their chosen design criteria.</p>