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| **Paper house** |
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| An activity to make a four-room paper house |
| **Subject(s):** Design & Technology**Approx. time:** 60 - 90 minutes |  | **Key words / Topics:** * Folding
* House
* Interior/exterior
* Layout
* Structure
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| **Suggested Learning Outcomes**  |  |  |
| * To know how paper can be shaped into folding structure stronger than the original material.
* To understand how to design for living and a client.
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| **Introduction** |  |  |
| This is one of a set of resources designed to allow learners to use seasonal themes to support the delivery of key topics within design & technology and engineering. This resource is part of a group for the Summer that could be carried out either in school or at home. It involves the interior design of a four-room house, modelled in the form of a pop-up book. It is targeted at Year7 (S1 in Scotland) but would be suitable for other year groups. |
| **Purpose of this activity**In this activity learners will design, make and assemble a fold out pop-up structure that shows a self-contained, four room dwelling. This activity could be used as a main lesson activity to teach learners about the design of folding structures using graphic materials; alternatively, it could be used as an introduction to designing for a client, where the learners could be given a target group such as wheelchair users or a young family. This could also be used as one of several activities within a wider scheme of learning focussing on structures and Design for Living. |
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| **Activity** |  | **Teacher notes** |
| **Introduction (5 minutes)**Teacher to explain that learners are going to design and make a folding paper house that has four rooms. **What is required? (10-15 minutes)**Class to discuss what four rooms they would like in their ideal house, what content would be in each room and develop individual specifications for their houses.**Demonstration of making the house (10-20 minutes)**Teacher to demonstrate the steps shown in the presentation:* Step 1 – Cut out the 4 rooms of the house, carefully cutting paper or card into squares and folding each square into quarters.
* Step 2 – Cut along one line of fold into the middle of the square, then fold two squares into triangles as shown in the presentation, then fold back out flat.
* Repeat steps 1 and 2 a total of 4 times.
* Step 3 – Design the house. Choose which rooms are wanted. Draw the doors in first, followed by any features and furniture. Draw the floor on one of the bottom squares only.
* Step 4 – Make the house front. Cut a square the same size as step 1, then cut in half. Draw on the features that can be seen from outside - a front door, windows, roof etc. and add colour if desired.
* Step 5 – Construct the house. Fold the floor area of each room over the blank square and glue carefully in place. When glue is dry, gently fold each room flat by pushing up the fold in the floor as shown in the presentation. Once folded, stick the rooms together by gluing three sets of walls to each other. Fold the whole house flat (like a book) then glue the house front in place.

**Making the house (30-60 minutes)**Teacher to hand out resources required for the task to learners. Learners to complete each step for themselves. The teacher presentation could be left on the whiteboard as a supporting guide as they do this.**Plenary (5-10 minutes)**Learners to self-assess their house against their specifications.Alternatively, learners could write a set of instructions on how to do this for the next class, highlighting what works well and what could be improved. |  | This activity could be carried out individually or in pairs.Ideally a pre-made folding house should be shown to assist with understanding of the task.The ‘specification’ could be a simple written list of the rooms and contents. This could be extended to include justifications or additional detail on the features. Learners may need reminding of the rooms required for functional existence!For the demonstration, it greatly assists time if three ‘pre-made’ rooms are available. The teacher then only needs to make 1 room and to show the assembly, which removes duplication of activity.At step 1, if A4 paper is used, it could be how to create a square from a rectangular piece.At step 2, each piece should be able to stand up as shown in the presentation. It should be demonstrated how to produce sharp and accurate folds and how these contribute to a good result.At step 3, it should be pointed out that the doors in different rooms should line up if they are to open – this opens opportunities to introduce maths/measuring and the use of a ruler.At step 4, show that the shape needs folding. This part could be made from card to add additional reinforcement. Step 4 could be carried out until after step 5 if additional time is needed for the glue to dry at step 5.When constructing the house, a paper clip can be used to hold the two end faces (non-glued surfaces) together.The time for making could be split into up to 5 segments for classroom management purposes; each could be carried out immediately after the relevant part of the teacher demonstration.  |
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| **Differentiation** |  |  |
| **Basic** |  | **Extension** |
| * Provide learners with pre-cut squares and possible pre-folded pieces.
* Pre-made exemplar house for inspiration.
 |  | Using the extension slides in the presentation:* Add colour to the rooms
* Add opening doors to allow movement between rooms.
* Add pop-up furniture, such as beds, wardrobes and sofas.
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| **Resources** |  | **Required files** icon-docicon-pdficon-ppt |
| * Scissors
* Paper or Card
* Glue
* Rulers
* Pens, coloured pencils or paint
* paperclips
* Optional: three pre-made rooms
* Optional: a pre-made assembled example
 |  | icon-ppt Teacher presentation – paper house |
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| **Additional websites** |  |  |
| * **Alternative example of a four-room paper house:**  <http://four-earedbunny.blogspot.com/2014/10/pop-up-nukkekoti.html?spref=pi&m=1>, and with additional detail added <http://lylymetlamainalapatte.fr/personnaliser-maison-pop-up/>
* **Alternative method to make the four-room paper house** (in French, but can be translated by google chrome)**:** http://lylymetlamainalapatte.fr/la-maison-pop-up/
* **Examples of pop-up rooms interiors:** http://krokotak.com/2017/03/paper-pop-up-interior/
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| **Related activities (to build a full lesson)** |  |  |
| **Starters** (Options) * Discuss the features that learners would like to have in their ideal house. Use this to develop individual specifications for the house.
 | **Extension** (Options)* Using the extension slides in the presentation, add colour to the rooms, doors and/or pop-up furniture.

**Plenary*** Learners could self-assess against their specification. They could also write a set of instructions on how to do this for the next class, highlighting what works well and what could be improved.
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| **The Engineering Context** film |
| * Architects use scale models made from paper and card to evaluate what their designs look like and identify areas for improvement.
* The ability to make three dimensional items from paper and card is used by engineers to create packaging for food products.
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| **Curriculum links** |
| **England: National Curriculum**Design & Technology * KS3 1a, b, 2a
 | **Northern Ireland Curriculum**Technology & Design* KS3 Knowledge, understanding and skills: Manufacturing – selecting and using materials fit for purpose; safe use of a range of tools and processes appropriate to materials, demonstrating accuracy and quality of outcome.
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| **Scotland: Curriculum for Excellence**Technologies* TCH 3-09a, TCH 3-10a, TCH 4-09a
 | **Wales: National Curriculum** Design and Technology* KS3 Skills: Designing 3: Making 1, 2, 3, 4
* Extension to include development of Specification would add Designing: 1 and 9.
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| **Assessment opportunities** |
| * Informal teacher assessment of practical skills through observation of learners.
* Formal teacher assessment of the produced houses.
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