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| **Magic trick** | | | |
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| A project that makes a magic trick where a pack of cards disappear  **Stay safe**  Whether you are a scientist researching a new medicine or an engineer solving climate change, safety always comes first. An adult must always be around and supervising when doing this activity. You are responsible for:    • ensuring that any equipment used for this activity is in good working condition  • behaving sensibly and following any safety instructions so as not to hurt or injure yourself or others    Please note that in the absence of any negligence or other breach of duty by us, this activity is carried out at your own risk. It is important to take extra care at the stages marked with this symbol: ⚠ | | | |
| **Subject(s):** Design & Technology  **Approx. time:** 40 - 50 minutes |  | | **Key words / Topics:**   * Christmas * Fold * Graphics * Magic * Net * Score * Templates |
| **Suggested Learning Outcomes** |  | |  |
| * To be able to make a complex graphic product using nets. * To know that templates are used in industry to produce batches of the same product. | | | |
| **Introduction** |  | |  |
| This is one of a series of resources designed to allow learners to use Christmas themes to develop their knowledge and skills in Design & Technology and Engineering. This resource focusses on the making a magic trick which makes a pack of cards disappear, using complex graphic products made from nets.  Magic tricks use design and mathematics to make them work effectively and this trick uses boxes that must fit together snugly to deceive the audience. This trick could be used to amaze relatives and friends during the Christmas holiday! | | | |
| **Purpose of this activity**  In this activity, learners will use nets of boxes that will fit inside one another and must operate smoothly. Therefore, care must be taken to ensure that the cutting out, scoring and folding of the boxes are accurately done. Learners will understand that templates are commonly used in industry to allow large production runs of the same product. | | | |
| **Activity** |  | | **Teacher notes** |
| **1. Magic Tricks and how to present them (5-10 mins)**  Show and discuss the video on how to carry out a version of the vanishing playing card trick.  How to do the vanishing card trick.  <https://www.youtube.com/watch?v=dI_rk6ewikk>  **2. Making the vanishing cards magic trick (30 minutes)**  Teacher to demonstrate the steps shown in the teacher presentation and listed below.  > Step 1 – Hand out the magic trick - handout 1 highlighting the tabs, solid and dotted lines. ⚠Learners to safely cut out the template being careful not to cut off the tabs. Cut out the window using a craft knife, cutting mat and a safety ruler.  > Step 2 – Learners to score the dotted lines using a ruler and scissors. Then fold the dotted lines using a ruler if required. Use glue or sticky tape to stick the box together using the tabs.  > Step 3 – Glue the side and base tabs into place and fold the top tab into the box to complete the outer box.  > Step 4 – Hand out the magic trick handout 2. Glue a card back from magic trick handout 3 onto the template (an actual playing card could be stuck on as an alternative).  > Step 5 – Repeat steps 1-3 to complete the inside box. Ensure the inside box fits smoothly inside the outer box.  > Step 6 – Practice and carry out the magic trick to amaze your friends.  **3. Plenary (10 mins)**  Discuss using nets and templates and how effective they are to produce batches of the same product. Practice and try out the magic trick on their peers. |  | | **Notes and annotations**  To motivate the learners, they should discuss the starter video and understand the mechanics of the vanishing card trick.  This is an excellent graphics project to show relatives after dinner on Christmas day.  Ensure that the templates are cut out accurately and the fit of the inner box into the outer box must be precise. |
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| **Differentiation** |  | |  |
| **Basic** |  | | **Extension** |
| Have pre-cut nets available, if required. This could be complete nets or nets with the window cut-outs only prepared in advance. |  | | Learners could investigate other playing card box designs.  Leaners could use black card, as described in the starter video, to make the playing card box. |
| **Resources** |  | | **Required files** icon-docicon-pdficon-ppt |
| * Scissors * Glue sticks * Craft knifes and cutting mats * Safety rulers * Playing cards (optional) |  | | icon-ppt Magic trick presentation  icon-pdf  Magic trick handout 1  icon-pdf  Magic trick handout 2  icon-pdf  Magic trick handout 3 |
| **Additional websites** |  | |  |
| The following websites can be used for additional background information or to aid with the activity:   * **YouTube – Vanishing cards trick** [**https://www.youtube.com/watch?v=dI\_rk6ewikk**](https://www.youtube.com/watch?v=dI_rk6ewikk)**:** demonstration ofa similar trick. * **GCSE Bitesize – Nets-** [**https://www.bbc.co.uk/bitesize/guides/zj76fg8/revision/4**](https://www.bbc.co.uk/bitesize/guides/zj76fg8/revision/4): outline of the uses of nets for 2D and 3D shapes. | | | |
| **Related activities (to build a full lesson)** |  | |  |
| **Starters**   * ACTIVITY: How the vanishing card trick works.   **Main**   * ACTIVITY: Making the vanishing card trick using net templates | | **Plenary**   * Test out the magic trick on a friendly audience. | |

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| **The Engineering Context** film |
| The application of mathematical theory in the design of 2D nets to make 3D objects is an important part of the GCSE courses in Design and Technology and Engineering.  The knowledge gained can also be used when making 3D shapes for graphics projects such as, packaging, booklets and structural work. |

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| **Curriculum links** | |
| **England: National Curriculum**  Design & Technology   * KS3 1a, 1b, 1d, 1e, 3c, 3d | **Northern Ireland: Curriculum**  Technology & Design   * KS3 Knowledge, understanding and skills: Design – identifying problems; investigating, generating, developing, modelling and evaluating design proposals; giving consideration to form, function and safety. * Communication – use of free-hand sketching and formal drawing techniques and ICT tools (including 3D modelling).   Learning Outcomes:   * Demonstrate creativity and initiative when developing ideas and following them through. |
| **Scotland: Curriculum for Excellence**  Technologies   * TCH 3-05a, 4-09a, 3-11a | **Wales: National Curriculum**  Design and Technology   * KS3 Skills: Designing 1, 2, 3, 6, 8 |
| **GCSE D&T**  AQA D&T   * 3.1.1, 3.3.4, 3.3.5, 3.3.6   Edexcel D&T   * 1.1.4, 1.2.2 c, 1.15.1, 1.17   Eduqas D&T   * 2.1 Core: 1 * 2.2 Core: 1, 5, 8, 10   OCR D&T  1.1a, 1.2a iv, 2.1a vii, 2.2a, 3.1a ii, 4.1a | **GCSE Engineering**  AQA Engineering  3.6 |
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| **Assessment opportunities** | | |
| Regular questioning throughout the activity, formal teacher assessment of completed work, peer review of how effective the magic tricks were performed. | | |
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| **Personal, learning & thinking skills (PLTS)** | | |
| * Self-manager * Effective participator * Reflective learner * Creative thinker | | |
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