Subject: Computing	Year: 6 – Summer 1 – **Creating Media 2 – 3-D Modelling**

National Curriculum objectives
- Select, use, and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems, and content that accomplish given goals, including collecting, analysing, evaluating, and presenting data and information;
- Use technology safely, respectfully, and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

Art and design
- To improve their mastery of art and design techniques, including drawing, painting, and sculpture with a range of materials.

Design and technology
- Generate, develop, model, and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.

Mathematics
- Recognise, describe, and build simple 3-D shapes, including making nets.

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Strand
- I can describe strategies for keeping my personal information private, depending on context.

To begin this unit, the children should have already learnt:	The learning in this unit will prepare the children to learn these things in the future:
Digital Painting – Year 1 Digital devices – and specific programs – can be used to draw and create media: we can draw in different ways and use various tools to create unique effects. Digital writing – Year 1 Word processors (e.g. Microsoft Word) allow digital writing. The user can change the look of text and easily edit and make changes to bodies of text. Digital Photography – Year 2 Digital devices can be used to take photographs and edit them after capture; this means that not all images children see are real and they will begin to recognise what features might be changed in photographs they encounter. Year 3 Digital publishing is when we create documents (like newsletters, brochures, magazines and newspapers) using page layout software.	National Curriculum Objectives at KS3: • Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users; • Create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability; • Understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct and know how to report concerns.

<u>Year 4</u> Digital devices help us to take and edit photographs. To edit a photo we could use cropping, rotating, flipping, and changing colours and styles. It is important to recognise not every photo we see is real and could have been edited. <u>Year 5</u> Vector drawings are created using shapes and lines, and each individual element in the drawing is called an object. Vector drawings can be enlarged and the quality of the drawing will not change.	
<u>Key Enquiry Question</u> Can you name all of the 3-D shapes on your screen? Why is it helpful to view 3-D shapes from different perspectives? What digital tools can help you modify a 3-D object? What are the potential benefits and pitfalls of 3-D printing a design? Which objects could you use to make a 3-D model and why are they are good choice? How is your 3-D model successful and how could it be improved?	**<u>The Big Idea:</u>** 3-D modelling involves using computer software to create 3-D shapes, in order to produce models of real-world objects. It allows us to view designs from different angles and experiment with various designs. 3-D modelling is used in many industries, e.g. in interior design, architecture and making video games.

To achieve ARE, pupils will need to be secure in the following knowledge:

By the end of this unit, children will know:	**Vocabulary:**
3-D models can be created on a computer; - A 3-D environment can be viewed from multiple perspectives; - Digital tools can be used to manipulate 3-D objects; - Placeholders can create holes in 3-D objects; - Artefacts can be broken down into a selection of 3-D objects.	Word processor; text; font; keyboard; text cursor; enter; spacebar; toolbar; icon (introducing in Y1 *Digital Writing* unit). Photography; editing; digital; portrait; software; landscape; scene; subject; lighting (introduced in Y2 *Digital Photography* unit). Rotate; enlarge; reduce (introduced in Y4). Vector; handles; layering; alignment; grouping; gradient; zoom (introduced in Y5). **Modelling; three-dimensional; workspaces; vertices; edges; faces; duplicate; holes; artefacts.**

| **By the end of this unit, children will be able to do:**	**Useful Resources:**
• Position 3-D shapes relative to one another; • Use digital tools to modify 3-D objects; • Combine objects to create a 3-D digital artefact; • Use digital tools to accurately size 3-D objects; • Construct a 3-D model which reflects a real-world object.	**Online, live remote and Face-to-face courses** **National Centre for Computing Education face-to-face training courses** *Tinkercad* (https://www.tinkercad.com), a web-based 3-D modelling application. For a teacher account - https://www.tinkercad.com/join, which enables learner accounts to be created and the website accessed with a class code. For guidance on setting up your class - https://www.tinkercad.com/teach.

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Overview

3D Modelling
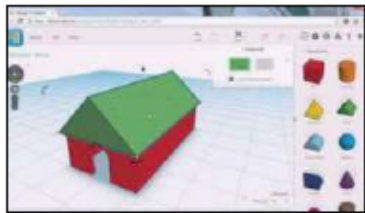
-3D means three-dimensional, or having 3 dimensions. For example, a box is a 3D shape, whereas a square is a 2D shape.

-3D modelling involves using computer software to create 3D shapes, in order to produce models of real-world objects.

-3D modelling allows us to view designs from different angles and experiment with various designs.

-3D modelling is used in many industries, e.g. in interior design, architecture and making video games.

The Basics of 3D Modelling

'Tinkercad' is one example of software that we can use to create 3D Models. Other examples include 'CAD for Kids' and 'Sketchup 3D.'

-The ViewCube Allows us to switch the view of the model e.g. from the front angle, top angle, or spin around to show the sides.

-Zoom in and zoom out.

-The workspace, where you can work on your model. The square panes help us to distances and dimensions accurately.

-Objects can be resized by dragging the handles (white squares).

-When you move multiple objects into the same space, they merge.

-Change the colour/ shading of your model, and make them solid or 'hole.'

-3D objects that can be dragged into the workspace and remodelled.

-Alter the dimensions of your model, for example the length, height, width and shape.
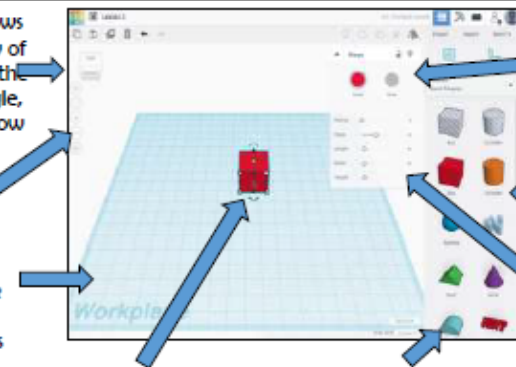
More Advanced Techniques

Duplicating: Click and drag around an object to ensure that it is selected. Then, click on the duplicate icon (see left) to create a copy.
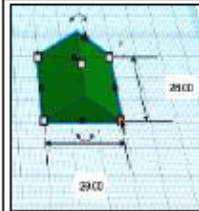
Resizing: Objects can be manually resized by clicking and dragging on the handles around them. The dimensions are labelled.

Lifting: Use the ViewCube to change the viewing angle of the model to the front/ side. Then, use the cone handle in order to lift the object from the workspace.
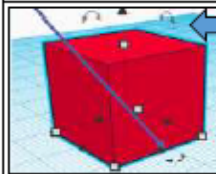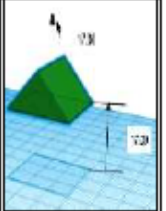
Rotating: Selecting these handles allows us to rotate shapes. Drag the object to rotate it in different ways.

Combining Shapes Many complex shapes are made up of a number of 3D shapes – we can position and merge them together.

Text: You can add block text by selecting 'text' in the shapes. This can help you to enhance other shapes.

Making Holes

Holes: Sometimes we need to create objects that are not solid – they have space inside/ within them.

-To achieve this, begin by adding a 3D shape onto the workspace. Then drag one of the 'holes' shapes onto the workspace. Adjust dimensions accordingly.

-Drag the 'holes' shape over the 3D shape as desired.

-Click and drag a box around the shapes to select them.
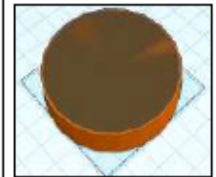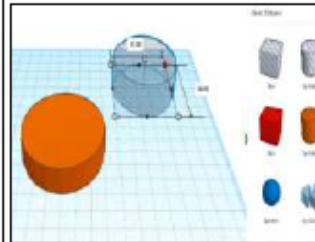
-Click the 'group' button to combine the shapes and create the hole.

Important Vocabulary

| Modelling | Three-dimensional | Workspace | Faces | Vertices | Edges | Handles | Duplicate | Holes |