



Raspberry Pi

## Year 6 – 3D modelling

### Unit introduction

Learners will develop their knowledge and understanding of using a computer to produce 3D models. Learners will initially familiarise themselves with working in a 3D space, moving, resizing, and duplicating objects. They will then create hollow objects using placeholders and combine multiple objects to create a model of a desk tidy. Finally, learners will examine the benefits of grouping and ungrouping 3D objects, then go on to plan, develop, and evaluate their own 3D model of a building.

For this sequence of lessons, learners will be using Tinkercad (<https://www.tinkercad.com>), a web-based 3D modelling application. Learners will need accounts to save their work and access the resources. We recommend signing up for a teacher account at <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, please visit <https://www.tinkercad.com/teach>. Please ensure your school's online safety policy is considered when creating accounts.

### Overview of lessons

Lesson	Brief overview	Learning objectives
1 Introduction to 3D modelling	Learners will be introduced to the concept of 3D modelling by creating a range of 3D shapes that they select and move. Learners also examine shapes from a variety of views within the 3D space.	To recognise that you can work in three dimensions on a computer

		<ul style="list-style-type: none"> <li>• I can add 3D shapes to a project</li> <li>• I can view 3D shapes from different perspectives</li> <li>• I can move 3D shapes relative to one another</li> </ul>
2 Modifying 3D objects	Learners will manipulate 3D objects digitally. They will resize objects in one, two, and three dimensions. They will also lift and lower 3D objects relative to the workplane, and combine two 3D objects to make a new shape. Finally learners will recolour 3D objects.	<p>To identify that digital 3D objects can be modified</p> <ul style="list-style-type: none"> <li>• I can resize an object in three dimensions</li> <li>• I can lift/lower 3D objects</li> <li>• I can recolour a 3D object</li> </ul>
3 Make your own name badge	Learners will develop their understanding of manipulating digital 3D objects. They will rotate objects in three dimensions, duplicate objects, and then use grouping and ungrouping to manipulate many objects at once. They will combine these skills to create their own 3D name badge. Finally, learners will consider the practicality of 3D printing the objects they have made.	<p>To recognise that objects can be combined in a 3D model</p> <ul style="list-style-type: none"> <li>• I can rotate objects in three dimensions</li> <li>• I can duplicate 3D objects</li> <li>• I can group 3D objects</li> </ul>
4 Making a desk tidy	Learners will be introduced to the dimensions of shapes in Tinkercad which will enable them to accurately resize and move shapes. Learners will then be introduced to placeholders which can be used to create holes in objects. Finally learners will duplicate, then resize multiple objects to create a meaningful 3D object.	<p>To create a 3D model for a given purpose</p> <ul style="list-style-type: none"> <li>• I can accurately size 3D objects</li> <li>• I can show that placeholders can create holes in 3D objects</li> <li>• I can combine a number of 3D objects</li> </ul>

5 Planning a 3D model	Learners will see how computer-based 3D design is used in architecture to plan buildings. They will explode 3D models of buildings to see what shapes they comprise of. Learners will then look at real world structures and identify the shapes that they include. They will then plan their own 3D building design.	To plan my own 3D model <ul style="list-style-type: none"> <li>● I can analyse a 3D model</li> <li>● I can choose objects to use in a 3D model</li> <li>● I can combine objects in a design</li> </ul>
6 Make your own 3D model	Learners will create a computer 3D model based on their design. They will then evaluate their model and that of another learner, before modifying their own model to improve it.	To create my own digital 3D model <ul style="list-style-type: none"> <li>● I can construct a 3D model based on a design</li> <li>● I can explain how my 3D model could be improved</li> <li>● I can modify my 3D model to improve it</li> </ul>

## Progression

This unit progresses students' knowledge and understanding of creating 3D graphics using a computer. Prior to undertaking this unit, learners should have worked with 2D graphics applications.

Please see the learning graph for this unit for more information about progression.

## Curriculum links

### [National curriculum links](#)

#### Computing – KS2

- 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 – KS2

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

#### Design and technology – KS2

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

#### Mathematics – KS2 (Y6)

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

### [Education for a Connected World links](#)

#### Strand

- Lesson 1 and Lesson 3 – Privacy and Security (Y4) – I can describe strategies for keeping my personal information private, depending on context

## Assessment

### Formative assessment

Assessment opportunities are detailed in each lesson plan. The learning objectives and success criteria are introduced in the slide decks at the beginning of each lesson and then reviewed at the end. Learners are invited to assess how well they feel they have met the learning objective using thumbs up, thumbs sideways, or thumbs down.

### Summative assessment

Please see the assessment rubric document for this unit. The rubric can be used to assess student's work from lessons 5 and 6.

## Subject knowledge

Teachers will need to be familiar with the main concepts associated with 3D modelling. During the unit the following skills and concepts are introduced:

- Working with and viewing shapes in three dimensions
- Adding, resizing, and moving (including lifting and lowering) 3D shapes
- Rotating 3D shapes
- Combining 3D shapes
- Grouping and ungrouping objects

Enhance your subject knowledge to teach this unit through the following training opportunities:

### Online training courses

If you are a teacher in England, you should access our online courses via the Teach Computing website:

- [Get Started Teaching Computing in Primary Schools: Preparing to teach 5 - 11 year olds](#) - this course provides a general introduction to teaching computing to 5-11 year olds and is suitable for teachers who are new to teaching computing or would like to refresh their subject or pedagogical knowledge

If you are not a teacher in England, you can still access our online courses via the FutureLearn platform:

- [Get Started Teaching Computing in Primary Schools: Preparing to teach 5 - 11 year olds](#)

### Face-to-face courses

- [National Centre for Computing Education face-to-face training courses](#) (filter by face-to-face or live remote)

Resources are updated regularly — the latest version is available at: [ncce.io/tcc](https://ncce.io/tcc).

This resource is licensed under the Open Government Licence, version 3. For more information on this licence, see [ncce.io/ogl](https://ncce.io/ogl).