# Year 8 – Vector graphics

## Unit introduction

This unit offers learners the opportunity to design graphics using vector graphic editing software. By the end of the unit learners will have produced an illustration, a logo, or some icons using vector graphics. The lessons are tailored to [Inkscape](http://inkscape.org) (inkscape.org), which is open source and cross-platform, but the resources should be readily adaptable to any vector graphics editor.

Vector graphics can be used to design anything from logos and icons to posters, board games, and complex illustrations. Through this unit, learners will be able to better understand the processes involved in creating such graphics and will be provided with the knowledge and tools to create their own.

**Note 1:** In this unit there are opportunities to show an animated screen recording or model processes in Inkscape. It is easier for learners to understand what they are seeing if you are modelling and talking through it. Learners are given the chance to ask questions without getting behind on the animation. We recommend that you use the screen recording to see what to model, but show the learners with a live demonstration. However, screen recordings are provided if you wish to use them instead. You may wish to leave the animated screen recordings looping on the screen whilst learners are working. You may also choose to give learners access to the slide deck so they can review steps.

**Note 2:** The slides and lesson plans don’t identify where and when learners should save their work. This has been left so that schools can follow their usual practice.

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## Overview of lessons

| **Lesson** | **Brief overview** | **Learning objectives** |
| --- | --- | --- |
| 1 Get into shapes | In this lesson learners are introduced to using Inkscape (or equivalent software) to create vector graphics. Learners start by simply looking at using shapes to create an image. They will spend time drawing and modifying shapes using shape tools. The idea of z-order (sometimes called layers) is introduced to learners, who will then change the x, y, and z position of shapes they have created. | * Use tools to draw and modify shapes * Change the position and rotation shapes * Explain how z-order determines what is visible |
| 2 Working with multiple objects | During this lesson learners will work with multiple objects. They will use tools to align, distribute, group, and combine objects. In this lesson the term object and shape is used interchangeably. In vector drawing every item added to a drawing is seen as an object by the program. Later in the unit learners will also work with lines, which can also be described as objects. | * Use tools to align and distribute objects to create uniformity * Explain how grouping can be used to work with several objects at once * Combine two shapes using union, intersection, and difference |
| 3 Paths | During this lesson students learn that vector graphics are made up of paths and that these paths include nodes at the start, end, and at changes of path direction. Learners see how the shapes, which they have already learned how to create, can be converted to paths and then edited. Learners will create superhero faces using a combination of paths and shapes that they have converted to paths. | * Explain that vector graphics are made up of paths * Create and modify straight and curved paths * Change shapes to paths and edit them |
| 4 What will you make? | Learners start an open-ended project from a range of suggestions and work in pairs. Learners are given the opportunity to review and develop their work further in Lessons 5 and 6. | * Choose a project and plan a design * Combine tools and techniques to create a vector image * Evaluate the project against its given purpose |
| 5 Behind the scenes | During this lesson learners investigate how vector images are stored. They look at svg markup and modify markup values in Inkscape.  Learners are also given time to review and develop their projects further. | * Explain how markup defines what a vector graphic looks like * Change an object by modifying its markup * Plan improvements and implement them to develop a project |
| 6 Showcase | In this lesson learners compare vector images with bitmaps images. They consider which image type best suits which situation.  Learners are given a final chance to make small changes to their project before they review it and share it with the rest of the class. The lesson ends with a multiple choice quiz. | * Explain key differences between vector and bitmap images * Outline which image type best suits which uses * Evaluate their image against a rubric |

## Progression

This unit progresses learners’ knowledge and understanding of creating vector graphics. Learners may have previously been introduced to vector graphics in the Year 5 ‘Vector drawing’ unit of work. The Year 5 unit introduces learners to working with objects, layers, and grouping.

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

## Curriculum links

[**National curriculum links**](https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study/national-curriculum-in-england-computing-programmes-of-study)

* 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, reuse, revise, and repurpose digital artefacts for a given audience, with attention to trustworthiness, design, and usability

## Assessment

### Summative assessment

* There is a set of multiple choice questions for learners to complete at the end of the unit. Mainly, the questions are designed to assess learners’ understanding of the concepts introduced in this unit.

**Assessment rubric**

* After learners have completed their vector graphics project, they will self assess against a rubric. You can use this to assess their practical application of the skills they have learned in this unit.

## Subject knowledge

This unit focuses on planning and creating vector graphics. Key ideas of layering, grouping, and combining objects are introduced. You should be familiar with how markup is used to describe and store vector images and the key reasons why vector images can be scaled without loss of image quality.

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

### Online training courses

* [Raspberry Pi Foundation online training courses](https://www.futurelearn.com/partners/raspberry-pi)

### Face-to-face courses

* [National Centre for Computing Education face-to-face training courses](https://teachcomputing.org/courses)

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

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