Year 8 – Vector graphics

Unit introduction

This unit offers students the opportunity to design graphics using vector graphic editing software. The lessons are tailored to Inkscape (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, students 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.

One of the most interesting and challenging aspects of creating vector graphics is their unlikely link to computational thinking. Creating a complex design is a multi-step process that starts with elementary shapes and involves combining them into more intricate ones using operations such as union, difference, and intersection. There are usually multiple paths to achieving the goal and the process involves decomposition, evaluation, and plenty of inventiveness!

Overview of lessons

Lesson	Brief overview	Learning objectives
1 Get into shapes	Students are provided with examples of vector graphics, such as logos, icons, and illustrations, to get a sense of what they will be developing throughout the course of this unit. Through a sequence of guided steps, students are acquainted with the basics of using software to draw geometrical shapes and manipulate them. These elementary shapes will form the building blocks of the more complex designs they will be creating in the lessons to come.	• Draw basic shapes (rectangle, ellipse, polygon, star) with different properties (fill and stroke, shape-specific attributes) • Manipulate individual objects (select, move, resize, rotate, duplicate, flip, z-order)

2 Paths united	Using path operations such as union, difference, and intersection, students are able to combine simple shapes into more complex ones. The purpose here is simply to familiarise them with these operations and what they can do, so the tasks they perform are scaffolded and they never need to perform more than one or two operations in order to create the target shapes.	• Manipulate groups of objects (select, group/ungroup, align, distribute) • Combine paths by applying operations (union, difference, intersection)
3 Icon challenges	Students are presented with a set of monochrome icons and are challenged to create some of them from scratch, starting from elementary shapes and combining them with path operations. The icons are carefully selected to range from simple ones that are straightforward to produce to more complex ones that require some creative thinking. At this stage, students have to actively think about the process they will follow in order to produce each of the designs. They know the ingredients they can use (the elementary shapes) and how to combine them (the operations) but they need to work out the steps that will lead them from start to finish. In many cases there will be alternative paths to the same goal.	• Convert objects to paths • Draw paths • Edit path nodes
4 What will you make?	Students undertake a short, open-ended project out of a range of suggestions and work in pairs to complete it.	• Combine multiple tools and techniques to create a vector graphic design
5 Under the hood	It is time to investigate what vector images are really made of. Students take a look at and modify an .svg file to grasp how it is essentially a structured **description** of an image and how that image is **rendered** when we need to view it. With this knowledge in mind, students will explore cases where vector graphics are (or aren't) useful.	• Explain what vector graphics are • Provide examples where using vector graphics would be appropriate

6 Showcase	The unit is wrapped up with students concluding, showcasing, and peer assessing their projects.	- Peer assess another pair's project work - Improve your own project work based on feedback - Complete a summative assessment

Progression

This unit progresses students' knowledge and understanding of designing vector graphics.

Curriculum links

National curriculum links
- 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