



Software Basics Guide

Rasters & Vectors



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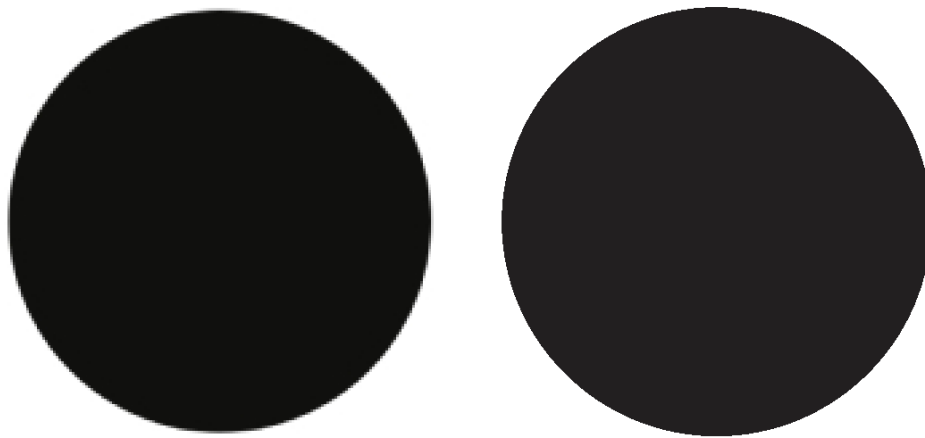
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Before You Start

What is this guide about?

This guide explains the difference between the two main types of digital image files: rasters and vectors. In some cases, rasters and vectors can look the same. Understanding this difference is important because the MakerSpace machines treat these file types differently.

Often times rasters and vectors will appear the same: knowing whether your design is a raster or a vector will help you prepare the right file for the right machine and avoid unexpected results.



An image of two circles. The left image is a raster, the right image is a vector.

When will you need this?

You will encounter rasters and vectors any time you work with a MakerSpace machine that uses digital designs, including:

Laser Cutter: Uses vectors for cutting and rasters for engraving.

Vinyl Printer: Uses rasters for printing and vectors for contour cutting.

Vinyl Cutter: Uses vectors only (cutting along lines).

Embroidery Machine: Raster images can be auto-digitized into stitch patterns.

Large Format Printer: Uses rasters for printing.

Key Concepts

What Is a Raster Image?

A raster image is made up of a grid of tiny, coloured squares called **pixels**. Think of it like a mosaic or a Lite-Brite — each pixel holds one colour, and together they form a picture.

Common raster file formats include .JPG, .PNG, .BMP, and .GIF.

Strengths: Rasters are great for photographs and detailed images with complex colour, texture, and shading. Digital cameras and phones produce raster images.

Weakness: Rasters do not scale well. If you enlarge a raster image, it becomes blurry or pixelated because the pixels get stretched.

What Is a Vector Image?

A vector image is made up of mathematical lines and shapes (points, curves, and paths) rather than pixels. Think of it as a set of instructions that the computer follows to draw the image, rather than a grid of coloured dots.

Common vector file formats include .SVG, .AI, .CDR, .DXF, and vector-based .PDF files.

Strengths: Vectors can be scaled to any size without losing quality. They also define precise edges, which is essential for machines that need to follow a path (like a cutting blade or laser).

Weakness: Vectors are not ideal for photographic detail. They work best for shapes, logos, text, and line-based designs.



A close-up image of two circles. The left image is a raster, the right image is a vector.

Raster vs. Vector At a Glance

	Raster	Vector
Made of	Pixels (coloured dots)	Mathematical paths and shapes
Scales well?	No – becomes blurry when enlarged	Yes – stays sharp at any size
Best for	Photos, detailed images, textures	Logos, shapes, text, cut lines
Common formats	.JPG, .PNG, .BMP, .GIF	.SVG, .AI, .CDR, .DXF, .PDF (vector)
Machine use	Printing, engraving	Cutting, tool paths

How MakerSpace Machines Use Each Type

Machine	Raster (printing/engraving)	Vector (cutting/paths)
Laser Cutter	Engraves images and filled areas	Cuts along hairline paths
Vinyl Printer	Prints the full-colour design	Cuts the contour (CutContour lines)
Vinyl Cutter	Not used	Cuts shapes and lettering
Large Format Printer	Prints the image	Not used
Embroidery Machine	Source image for auto-digitizing	Not directly used

Tip: If your project requires both printing and cutting (like vinyl stickers), your file will contain both raster and vector elements.

Tips for Success

- **Check your file type before you arrive.** If you need cutting, make sure your design contains vector lines. If you only have a .JPG or .PNG, it will need to be traced or redrawn as a vector in CorelDRAW.
- **Use high-resolution rasters.** For printing or engraving, use images that are at least 300 DPI (dots per inch). Low-resolution images will look blurry or pixelated in the final product.
- **Don't assume a .PDF is a vector.** PDF files can contain either raster or vector data (or both). A .PDF exported from a phone photo is still a raster. A .PDF exported from CorelDRAW with drawn shapes is a vector.

Common Issues & Quick Fixes

Problem	What to Do
My image looks blurry when enlarged	This is a raster image. It cannot be enlarged without quality loss. Use a higher-resolution source image or convert it to a vector using Image Trace in CorelDRAW.
The laser/vinyl cutter won't cut my design	Your file likely contains only raster data. Cutting requires vector paths. Use Image Trace or redraw the design as vector shapes in CorelDRAW.
I traced my image but the cut lines look messy	Image Trace can produce extra detail or rough edges. Use the Virtual Segment Delete tool in CorelDRAW to clean up unwanted segments.
My design has both printed and cut elements, but only one works	Make sure printed elements are raster/filled objects and cut lines are set to the correct vector format (e.g., CutContour for the vinyl printer, hairline for the laser).

Need More Help?

If you need additional support:

- Check the MakerSpace guide for CorelDRAW Basics to learn how to create and edit vector files.
- Refer to the machine-specific guides for detailed instructions on file preparation for each device.
- Ask MakerSpace staff for assistance at All Levels Access hours.