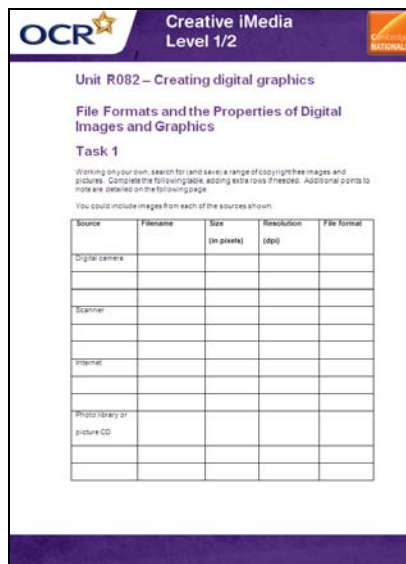


Unit R082 – Creating digital graphics

File Formats and the Properties of Digital Images and Graphics

Instructions and answers for Teachers

These instructions should accompany the OCR resource ‘File Formats and the Properties of Digital Images and Graphics Activity’, which supports Cambridge Nationals in Creative iMedia Level 1/2 Unit R082 – Creating digital graphics.



OCR Creative iMedia Level 1/2 Cambridge Nationals

Unit R082 – Creating digital graphics

File Formats and the Properties of Digital Images and Graphics

Task 1

Working on your own, search for (and save) a range of copying three images and pictures. Complete the following table, adding extra rows if needed. Additional points to note are detailed on the following page.

You could include images from each of the sources shown:

Source	Filename	Size (in pixels)	Resolution (dpi)	File format
Digital camera				
Scanner				
Internet				
Photo library or picture CD				

Associated Files:
File Formats and the Properties of Digital Images and Graphics Activity

Expected Duration:
Task 1 – 45 minutes
Task 2 – 30 minutes
Task 3 – 15 minutes
Task 4 – 15 minutes
Task 5 – 15 minutes



This activity offers an opportunity for maths skills development.

Learners could investigate the properties of images sourced from digital cameras, scanners, the internet and photo libraries. This should include pixel dimensions, resolutions and suitability for use ie 200-300dpi for print use and 72dpi for web use.

Teachers could illustrate examples of both bitmap/raster images and vector based graphics to show the impact of magnification and scalability.

Task 1

Working on your own, search for (and save) a range of copyright free images and pictures (images could be sourced from the OCR Resources Image Library, located in the Support Materials section of the Creative iMedia Qualifications page <http://www.ocr.org.uk/qualifications/creative-imedia-level-1-2-award-certificate-j807-j817/>).

Complete the following table, adding extra rows if needed. You could include images from each of the sources shown:

Sample answers are shown below.

Source	Filename	Size (in pixels)	Resolution (dpi)	File format
Digital camera	IMG_0541	3648 x 2736	180	jpg
	DSCN1957	4000 x 3000	300	jpg
	DSC_2195	3872 x 2592	300	RAW
Scanner	Scan_0234	2552 x 3508	300	tiff
	Car-3	1800 x 1200	300	jpg
Internet	London_eye	1024 x 768	72	jpg
	Banner_1	600 x 120	72	png
	Turtle	320 x 200	72	jpg
Photo library or picture CD	10038174	3000 x 2000	300	jpg
	P_403689	1024 x 768	72	jpg

Points to note:

1. The size of an image from a digital camera will be made up of two numbers. When multiplied together, this gives you the number of megapixels. When looking at camera specifications, they always quote the total number of megapixels (or Mp).
2. The scanner can be set up to scan using different resolutions. There are usually some options to select this (you may need to look at the advanced options in the scan menu).
3. The internet generally only uses images that are 72dpi even if they have a large number of pixels. However, using image editing software this can be changed.

Task 2a

The table below lists a range of images and their sizes. Add a tick to the Print use column or the Web/Multimedia use column to indicate what purpose you think each image would be used for.

Image	Size in pixels	Resolution	Print use	Web/Multimedia use
10342859.jpg	1024 x 768	72 dpi		✓
Scan_1.tif	3508 x 2480	300 dpi	✓	
Forest.jpg	600 x 400	72 dpi		✓
Dsc_1024.jpg	4928 x 3280	300 dpi	✓	

Task 2b

Using the Forest.jpg file properties from the table above, what would be the print size if converted to 200dpi?

Width 600 pixels and 200 pixels used per inch:

$$600 \div 200 = 3 \text{ inches}$$

Height 400 pixels and 200 pixels used per inch:

$$400 \div 200 = 2 \text{ inches}$$

Task 2c

Using the Scan_1.tif file properties from the table above, calculate the print size.

$$\text{Width: } 3508 \div 300 = 11.69 \text{ inches}$$

$$\text{Height: } 2480 \div 300 = 8.27 \text{ inches}$$

Task 2d

Convert the size (from Task 2c) from inches to millimetres (mm). Compare this with the size of A4 paper (297mm x 210mm).

The conversion is calculated using 25.4mm per inch.

Width: $11.69 \times 25.4 = 296.92$

Height: $8.27 \times 25.4 = 210.05$

Therefore

11.69×8.27 inches = 297 x 210 mm. This is the same as A4 size.

Task 3

The following table lists common file format/extensions. Tick the Print use or Web/Multimedia use column to indicate where each of these file format/extensions would typically be used.

File format/extension	Print use	Web or multimedia use
.jpg	✓	✓
.png		✓
.tif	✓	
.pdf	✓	✓
.bmp	✓	
.gif		✓

Task 4

When working with images, you need to be aware of the difference between vector and raster graphics. Look at the example below. It shows what happens when you zoom in on a raster graphic:



The pixels become visible as tiny squares, and the overall effect is rather blurred. Vector graphics store the image information as a series of coordinates or vectors, and when resizing by zooming, the pixellation effect does not occur.

Complete the table below, entering examples of file types and advantages and disadvantages for both bitmap or raster graphics and vector graphics. You should comment on the following factors in the advantages/disadvantages columns:

- Making the graphic much larger by scaling
- Software that is used to edit or create
- Whether used for print products or web pages

	File Types	Advantages	Disadvantages
Bitmap or raster graphics	.bmp .jpg .tiff	Supported by all image editing software Used for both print and web	Cannot be scaled much larger without pixellation
Vector graphics	.eps .ai .svg	Can be scaled to any size since uses mathematical expressions for lines and curves. Edges stay smooth.	Not always supported by basic image editing software More limited use

Task 5

Teacher guidance

It is likely that the digital graphics work in unit R082 would be most appropriately done at high resolution, and conversion done at the end of the task to acquire the low-resolution 72dpi image/s required in the final product, rather than working at low resolution and upscaling.

Teachers may wish to explain to learners that altering dpi from 72 to 300 will produce graphics which are very small in physical size, and that learners should avoid converting images to 72dpi and then stretching and enlarging them to achieve the desired physical appearance.

Furthermore, if quality is important in the final print image then it would be better to work with an original image which is of higher resolution than eventually required wherever possible, and resample downwards.

Background information

Whilst you may sometimes want to convert a file from 72dpi to 300dpi to create a version for printing, you may also sometimes need to do the reverse, and generate a low-resolution version of a graphics file for use on the internet.

Many digital cameras will now happily capture images at more than 10 Megapixels, storing them as RAW, TIFF or JPG format. An original high quality image would be unsuitable for web use – even with high speed broadband connections it would take time to download or show on screen, the screen cannot physically show the resolution the image contains, and file size would be considerable.

A practical example where a low-resolution file might be used would be selling an item on an auction website. The 72dpi image would be suitable to show the item as a thumbnail or small image when users are scrolling through many listings, and a link could be provided to a higher resolution, larger image if the user wants to see it.

Task 5a

Take the example of a high-resolution image located in the OCR Resources Image Library 'Lesson Element File Formats' folder (image 'guitar_high_res_01') and open it in your graphics software.

If you look at the image properties you will see that it is saved at 300dpi, and has a file size of 7,396kb, (or over 7Mb).

Alter the graphic to make it 72dpi, and save it as a jpg.

Record the new file size here _____.

The image guitar_high_res_01.tif when repurposed as a jpg will be significantly smaller in size. The actual file size will depend on the software and specific settings used.

Task 5b

Now repeat this process of resizing and resaving for some of the images in the high_res_images folder of the OCR Resources Image Library, located in the Support Materials section of the Creative iMedia Qualifications page <http://www.ocr.org.uk/qualifications/creative-imedia-level-1-2-award-certificate-i807-i817/>

Each time, try to achieve a final file which is smaller than 300kb.

File size can be altered by more than just a change to the image resolution. When saving a file as a jpg you can also alter the amount by which the file is compressed. Increasing the file compression will reduce the final file size. Try changing the file compression size on some of your jpg files as you save them and see what impact it has on the file size.

Complete the tables on the following page as you work.

Properties	Original file	Repurposed file
File name		
File type / format		
File size		
Physical dimensions		
dpi		
Screenshot of image properties or image size dialogue box		

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