Metadata

Teacher's Notes

Lesson Plan

Length	60 mins	Specification Link	214/lm	
Learning objective		Candidates should be able to: (l) explain the need for metadata to be included in the file such as height, width and colour depth (m) discuss the effect of colour depth and resolution on the size of an image file		

Time (min)	Activity	Further Notes
10	Using a projector display the **Starter Activity**. 'Pause' and 'Proceed' buttons are available to stop the activity at any time to discuss the images shown. Explain that digital images are like digital sound recordings – they are 'samples' (of light instead of sound) and that the view is represented by millions of coloured dots called pixels. The higher the density of pixels, the clearer and sharper the image will be. Show students the link to the specification. Explain the purpose and objectives of the lesson.	
15	Watch the **Videos**.	
5	Ask some questions about the video to assess learning. E.g. • What are pixels? • How is the resolution of an image measured? • Give examples of image formats. • How many bits are used to store the information in each pixel? • What is metadata?	Answers: Picture elements. The small packets of image data that make up the image. Pixels or dots per inch. TIFF, JPEG, GIF, RAW, BMP, PNG. 24. Eight for each of the colours; red, green and blue. An information file that is stored with the image. It contains information such as date, geographical coordinates, camera speed and aperture setting.
10	Students to complete **Interactive Activity 1**.	Answer: The hexadecimal values for the colours are: 62F185 7C93F6 FF8EDB
15	Students to complete **Worksheet 1** either on paper or on a computer. To complete the worksheet, the students will need to access **Interactive Activity 2**. Ask individual students for their answers and discuss with the class so that all students will have the correct answers entered on their worksheets.	Answers provided

Time (min)	Activity	Further Notes
	Extension Challenge/Homework • The students should complete and submit **Worksheet 2**.	
5	**Plenary** **Final questions:** • Which image format would be most suitable for a professional photographer? Why? • Why aren't images in this format on mobile telephones? • What is the difference between lossy and lossless file compression?	Answers: RAW. Uncompressed images and so will contain all of the original image data. Very large file sizes (usually about 50 to 100MB). With lossless compression, the original file can be reconstituted from the compressed data but with lossy compression it cannot. Some of the original data is lost.

WORKSHEET 1 ANSWERS

1 **Raw images taken by a digital camera or scanner are very large and are usually compressed to save storage space.**

(a) Explain the difference between 'lossless' compression and 'lossy' compression.

Lossless compression is when a file that has been compressed can be decoded back into its original form with no loss of information. It works by looking for redundancy – looking for areas with the same information.

If, after compression, the original file cannot be brought back to its original form, then the compression is said to be lossy. It works by looking for areas where the colours are similar but not identical and then rewrites the file with the same information for both areas.

(b) List three lossless image formats.

RAW, TIFF, BMP, PNG

(c) Name a lossy image format.

JPEG or GIF

2 **Images produced by digital cameras contain metadata.**

(a) What is meant by metadata?

Metadata is a term for the descriptive information embedded inside an image or other type of file.

The metadata captured by your camera is called Exif data, which stands for **E**xchangeable **i**mage **f**ile **f**ormat.

(b) List three items of information which may be stored in the metadata.

Date, geographical coordinates, camera name and model, camera speed, aperture setting, file size.

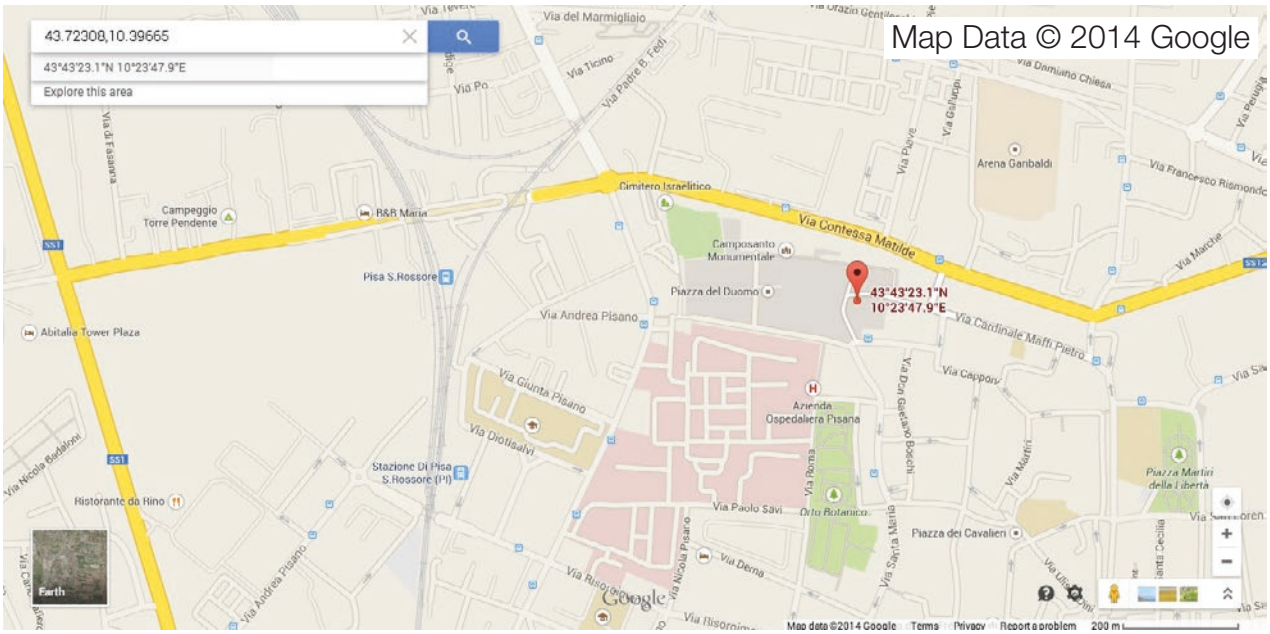
3 Open **Interactive Activity 2** and watch the presentation.

Using the GPS co-ordinates given, find the cities where the four photographs were taken – use mapping software or Google Earth to do this.

State the names of the cities, and print out or paste a screen print of each into your answers.

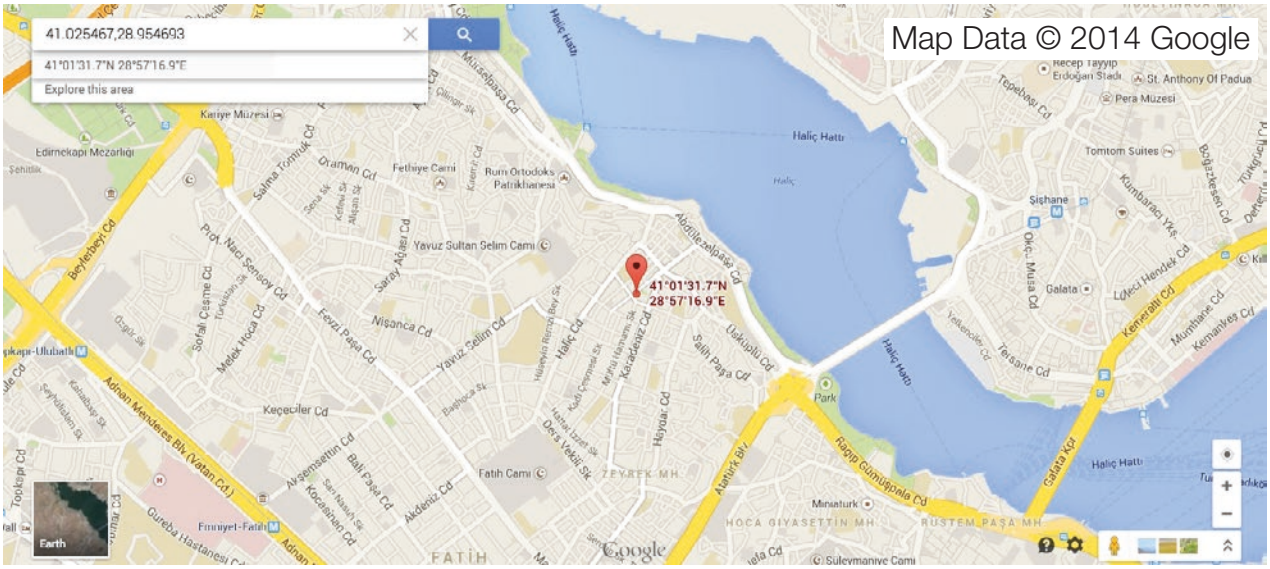
(a)

Pisa



(b)

Istanbul

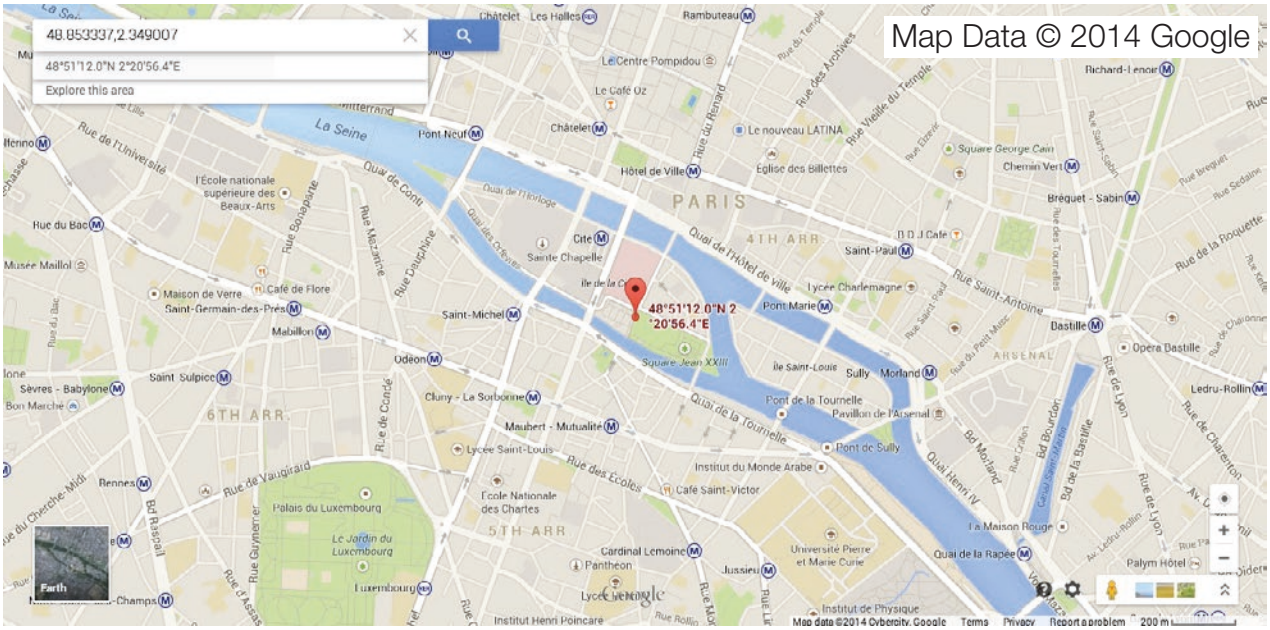


(c)

Venice

(d)

Paris



WORKSHEET 2 ANSWERS

1 **(a) When image files are transferred on the Internet, they are usually compressed. Explain why this is done.**

It reduces the size of the file which needs to be transmitted.

It shortens download time.

It reduces Internet traffic (and hence probability of lost packets). **(2)**

(b) Describe the difference between lossy and lossless compression and state an image format of each type.

Lossy – when uncompressed it is not exactly the same as the original. **(1)**

JPEG, GIF. **(1)**

Lossless compression – when the data is uncompressed it is restored completely to the original file **(1)**

RAW, TIF, BMP, PNG. **(1)**

(c) When a digital camera takes a picture, it stores information about the image.

(i) State what this stored information is called.

Metadata **(1)**

(ii) List two items of information which are often stored.

Date, geographical coordinates, camera name and model, camera speed, aperture setting, file size. **(2)**