UNIT 9.1 — DIGITAL IMAGING

Unit Overview

Target year group: Year 9
Projected Duration: 8 lessons
This scheme of work will give learners an understanding of how digital images are made up, addressing pixels, resolution and pixel depth. Learners will then move on to gain an understanding of some of the key tools in Photoshop to produce a portfolio of images from which they will gather feedback and produce an evaluation.

Relevant Prior Knowledge

Learners may be familiar with some basic image manipulation tools. They should have an understanding of basic binary.

New Language for Learning

- Bitmap
- Pixel
- Pixelated
- Resolution
- Pixels per inch (ppi)
- Megapixel
- RGB Value
- Pixel depth
- Truecolour
- Spot healing tool
- Dodge tool
- Burn tool
- Background eraser
- Layers
- Magnetic lasso
- Copyright
- Clone stamp
- Success criteria

Resources

- ✓ Teacher's PowerPoint
- ✓ Lesson 1 – Pixel Drawing (spreadsheet)
- ✓ Lesson 2 – Monkey Selfie in Pixels
- ✓ Sample images for lessons 3 and 4
- ✓ Images of the computing teachers
- ✓ Homework Project

Homework

An investigation into the use of Photoshop in the media and writing a script to argue for and against the use of Photoshop.

Cross-Curricular Links

Literacy:
- Answering questions using full sentences.
- Writing a spoof news story.
- Use of PEE when writing the evaluation.
- Script-writing within homework project.

Numeracy:
- Learners will calculate the amount of storage space required for images when given the size and pixel depth.

Assessment

Assessment is based on the Progression Pathways Assessment Framework from Computing at School.

Pathway: Data & Data Representation

Level 5	☑ Knows that computers use binary to represent all data.
	☑ Understands how bit patterns represent numbers and images.
	☑ Understands the relationship between binary and file size.
Level 6	☑ Understands the relationship between resolution and colour depth, including the effect on file size.

Pathway: Information Technology

Level 5	☑ Evaluates the appropriateness of application software to achieve given goals.
	☑ Recognises ethical issues surrounding IT beyond school.
	☑ Designs criteria to critically evaluate the quality of solutions and uses the criteria to identify and make improvements.
Level 6	☑ Designs criteria for users to evaluate the quality of solutions.
	☑ Uses the feedback from users to identify improvements.

Support and Extension

Less able learners should still be able to access all lessons although the rate of progress may be slower than that of other learners. Teachers may exceed the projected duration if they feel this would be more suitable for the classes they are teaching.

Extension activities have been embedded, where appropriate, to enable **more able learners** to be pushed within their skills and knowledge. Many of the Photoshop activities require practice to achieve adequate results so in this case learners should be given additional activities to complete, perhaps following online tutorials.

Lesson 1

Activities:

- ↘ Introduce learning objective.
- ↘ Briefly explain the two types of image and that we're focussing on bitmap images.
- ↘ Explain (while questioning learners) how images are made up.
- ↘ Learners should open the Pixel Drawing spreadsheet and complete the activity, drawing the image using 1s and 0s on an 8x8 grid. Discuss the results as a class.
- ↘ Learners should attempt the task again using the 16x16 grid instead. Discuss why this is better.
- ↘ Discuss what is meant by resolution and how to compare these (using the mobile phones as examples).
- ↘ Learners write up the answers to the three questions in a Word document.
- ↘ **Plenary:** Go through the answers to the questions as a class.

Extension:

- ★ Learners should stretch a small image from the Internet so that it becomes pixelated and explain what is happening (in relation to what they have learnt this lesson).

Learning Objective:
Understand how a digital image is made up and be able to recognise the affect changing the resolution has on an image.

Learning Outcomes:

- ✓ GOOD: Reproduce pixel versions of the images and explain which phone has the best display and why.
- ✓ BETTER: Explain what is meant by PPI and the term 'Megapixel'.
- ✓ BEST: Explain what it means when an image becomes pixelated.

Lesson 2

Activities:

- ↘ Introduce learning objective.
- ↘ Recap on last lesson and explain that this was using a pixel depth of just one bit per pixel. Discuss what would happen if we used more bits per pixel.
- ↘ Explain how Truecolour is made up of 24 bits per pixel and use animation on slide to explain how this works.
- ↘ Learners should open the colour editor in Paint and look at the affect selecting different colours has on the Red, Green and Blue values. Discuss this briefly. (May need to explain the difference between additive and subtractive colour mixing)
- ↘ Look at the zoomed-in image with learners attempting to guess the image, explain how images are displayed on the screen with red, green and blue LEDs. Learners can take a photo of the screen with their phone to see the individual LEDs.
- ↘ Learners write up the answers to the five questions in a Word document.
- ↘ **Plenary:** Go through the answer to the extension question, then the answers to the other questions as a class.

Extension:

- ★ Learners should calculate the storage space required for the given image example.

Learning Objective:
Understand how a computer displays coloured images using binary and RGB values.

Learning Outcomes(over two lessons):

- ✓ GOOD: Identify the RGB values in a specific colour, explain what is meant by pixel depth and how many bits per pixel are required for a monochrome image.
- ✓ BETTER: Identify which three colours are used to make other colours and explain how a computer displays an image on the screen.
- ✓ BEST: Calculate the storage space required for a given image stored at 24 bits per pixel.

Lesson 3

Activities:

- ↘ Introduce learning objective.
- ↘ Show Dove Evolution video and discuss. Was Photoshop really needed?
- ↘ Demonstrate how to touch-up a picture (of yourself) by using the spot healing, burn and dodge tools.
- ↘ Learners should use the tools shown to make improvements to a picture of their teacher.
- ↘ **Plenary:** If time, show examples of work on the board, learners can describe techniques used.

Extension:

- ★ Learners should add their teacher's head onto one of the sample bodies to "dress them up". They will need to be shown how to use the background eraser.

Learning Objective:
Understand how to combine the dodge and burn tools along with spot removal in Photoshop.

Learning Outcomes(over two lessons):

- ✓ GOOD: Some editing applied to image of teacher's face, there may be little attention to detail.
- ✓ BETTER: A subtly, well-edited image that shows improvements on the original.
- ✓ BEST: Teacher's head added to a different body.

Lesson 4 *(This may take two lessons)*

Activities:
- ↘ *Introduce learning objective.*
- ↘ *Demonstrate two methods of combining images (using both the magnetic lasso and the background eraser).*
- ↘ *Learners experiment with the two methods then decided on one to use to produce their spoof story image.*
- ↘ *Learners should create a mock-up of a newspaper front page using Publisher then add their photo and write a spoof news story relating to this.*

Learning Objective:
Understand how to combine layers and remove backgrounds to create new images.

Learning Outcomes:
- ✓ *GOOD: Animal picture added to one of the backgrounds to produce a new image.*
- ✓ *BETTER: Realistic new image created along with a suitable news story.*
- ✓ *BEST: A convincing new image with a detailed story and newspaper front cover.*

Lesson 5

Activities:
- ↘ *Introduce learning objective.*
- ↘ *Discuss what is meant by Copyright and how to use images legally.*
- ↘ *Demonstrate how to combine parts of animals together to create a new animal by using the Clone Stamp to also copy the skin/hair texture.*
- ↘ *Learners should label their new animal using the text tool.*
- ↘ **Plenary:** *Go around the class to hear the types of unusual animals that have been "created".*

Learning Objective:
Know how to responsibly use online pictures and be able to merge them together using the clone tool in Photoshop.

Learning Outcomes:
- ✓ *GOOD: Combine two different animals together to recreate a new animal.*
- ✓ *BETTER: Use of the clone tool to merge some of the textures of the animals together.*
- ✓ *BEST: Accurate and precise use of the clone tool to produce a realistic new image that is labelled.*

Lesson 6

Activities:
- ↘ *Introduce learning objective.*
- ↘ *Explain how the presentation should be laid out.*
- ↘ *Learners should create a presentation to display their images as a portfolio.*

Extension:
- ★ *Learners should add a slide to explain how they have adhered to Copyright when they collected any online images and what is meant by Copyright.*

Learning Objective:
Understand how to effectively collate a selection of images into a suitable portfolio.

Learning Outcomes:
- ✓ *GOOD: Presentation combining all images together.*
- ✓ *BETTER: Detailed explanation of purpose and tools used to accompany each picture.*
- ✓ *BEST: Additional slide explaining Copyright and how it has been adhered to.*

Lesson 7

Activities:
- ↘ *Introduce learning objective.*
- ↘ *Discuss and question learners on what kind of questions would be needed in a questionnaire to gather feedback about the portfolio. Write responses on the board.*
- ↘ *Learners should put together a questionnaire to gather useful and suitable feedback about their portfolios, then ask the person next to them to complete this.*

Learning Objective:
Know how to put together a questionnaire to collect suitable feedback for a portfolio of images.

Learning Outcomes:
- ✓ *GOOD: Basic questionnaire used to collect some feedback.*
- ✓ *BETTER: Questionnaire containing at least 10 questions used to collect suitable feedback. Feedback given to a peer.*
- ✓ *BEST: Questionnaire containing more than 10 appropriate questions used to collect useful feedback. Constructive feedback given to a peer.*

Lesson 8

Activities:
- ↘ *Introduce learning objective.*
- ↘ *Explain how to use PEE to write a suitable evaluation.*
- ↘ *Learners should write an evaluation of the portfolio of work produced and include both user feedback and an evaluation of the software used.*
- ↘ ***Plenary:*** *Discuss points made in evaluations. What did learners enjoy in this topic? What did they find easy? Difficult?*

Learning Objective:
Know how to combine own ideas with peer feedback to produce a detailed evaluation.

Learning Outcomes:
- ✓ *GOOD: Basic evaluation summarising what has been done and the feedback received.*
- ✓ *BETTER: Detailed self-evaluation with WWW and EBI also identified.*
- ✓ *BEST: Detailed evaluation of Photoshop as an application.*