**Representing Pictures Worksheet - Harder**

**Objectives: ALL students using this sheet (Confident & Exceptional Pathways) must complete Task 2 and most of Tasks 3 to 5. SOME students may progress on to the extension work.**

**Task 1) Watch the short video clip about Picture Representation (in the video clips sub folder) a couple of times.**

**Task 2) Explain what these key terms mean:**

1. **Pixel**
2. **Bitmap**
3. **Colour depth**

**Task 3) Answer the following questions about the video:**

1. **The example picture was 10 pixels wide and 16 pixels high. How many pixels is this altogether?**
2. **Why does the computer also need to know the width and height of the picture, as well as the colour of each pixel?**
3. **If each pixel stored is a 2-bit binary number, how many bits are needed to store the whole picture? (What is this in bytes?)**

**Task 4) If you enlarge a bitmap picture or zoom in on one, it becomes *pixelated*. Use the internet to find out what this means. In your own words, describe how this looks.**

**Task 5) Read the following description of the RGB system of colour coding:**

***When watching TV or looking at a computer screen, all the colours that we see are made from mixing red, green and blue light together in different amounts. The RGB (Red, Green, Blue) system works by using numbers to show how much red, how much green and how much blue light make up any colour. The amount of red, green or blue light can be a number from 0 to 255 (00000000 to 11111111 in binary).***

***So for example, this colour is made from 255 dollops of red, 0 dollops of green and 102 dollops of blue. Of course, computers use binary numbers (11111111 00000000 1100110).***

***Pure white light is made by mixing a maximum amount of red, green and blue (255, 255, 255). Black is an absence of all light, so its RGB is 0, 0, 0.***

 **Now answer these questions:**

1. **What does RGB stand for?**
2. **How are all the different colours we see made using this system?**
3. **How is pure white light made?**
4. **What colour is made when there is no red, green or blue light?**
5. **What would be the RGB numbers for pure green?**

**EXTENSION 1:**

**Now watch all the videos about colour (in the video clips folder). There are 6 more!**

**Task 6) A different colour system is used when printing called CMYK. These are the colours of the 4 different inks used. Which 4 colours are used?**

**EXTENSION 2:**

Sound is also represented as binary numbers by computers. Sound is measured several thousand times each second, this is known as ***sampling***. The higher the number of samples taken each second (***sample rate***), the better the quality of the sound measured. The accuracy of each sample is also important; this is called the ***bit depth***. Each sample is a binary number. This whole process, of turning sound into a series of binary numbers is called ***digitisation***.

**Now watch the two videos about how computers work with sound. Start with “sound representation” (Parts 1,2 and 5) and then watch “sound wave examples”**

**Task 7)**

1. **Explain what sample rate means**
2. **Explain what bit-depth means**
3. **What is the most commonly used sample rate?**