Year 8 - Half-Term 2 – Introduction to Binary – Knowledge Organiser

Lesson 1 – The Binary System

The Binary System:
- Computers use electrical signals that are on or off
- This data is represented as a sequence of 1s and 0s (on and off).
- All data that we want a computer to process needs to be converted into this binary format so that I can be stored.
- The binary system is known as a 'base 2' system because there are only two digits to select from (1 and 0)
- Our number system is referred to as decimal, this system is 'base 10' as there are 10 different digits that can be used (0-9).
- The term 'bit' is short for binary digit, the bigger the file, the more bits it will have.
- The binary number 1110 has 4 bits or is also referred to as a nibble, this is half the size of byte which has 8 binary digits.

Lesson 2 – Binary Conversion

Binary Conversion:
- Converting a binary number to a decimal number
- Completed using a binary conversion table with bit place values that double each time, starting at one
- Place the binary digit in the conversion table and then add up all the numbers that contain a '1' (on) in it.
- Example below: 1101 = 8 + 4 + 1 = 13

8	4	2	1
1	1	0	1

Lesson 3 – Binary De-Conversion

Binary de-conversion:
- The process of converting a decimal number into a binary number.
- When converting a binary number to a decimal number, start by drawing your conversion table, the highest place value that you need should be the place value that is the same as or the next lowest than the value of the denary number you are trying to convert, for example if we are converting the decimal number 14 to binary, the highest place value that you would need would be 8.

8	4	2	1
1	1	1	0

8 + 4 + 2 = 14

Lesson 4 – Adding Binary

There are four rules that need to be followed when adding two binary numbers. These are:

$$0 + 0 = 0 \qquad 1 + 0 = 1 \qquad 1 + 1 = 10 \qquad 1 + 1 + 1 = 11$$

Use a conversion table to identify what the binary numbers represent and to add up the correct columns, starting from the left. If a column when added together equals 10 or 11 based on the four rules above, the first number is carried over, the second goes underneath the column. Look at the completed binary addition below:

16	8	4	2	1	
+	1	1	1		
	1	0	1	1	11
	0	1	1	1	7
1	0	0	1	0	= 18

= 18

Lesson 5 – E-Safety: Inappropriate Content & Fake News

Digital platforms have made it easier for anyone to share information online, and it can be difficult to determine whether something is real or false. What a young person sees online can shape how they view the world and impact their overall wellbeing.

- **Misinformation** is where false information is shared by accident without the intent to cause harm. For example, sharing inaccurate photos, quotes or dates online because you believe them to be true.

- **Disinformation** is false information shared deliberately to mislead and cause harm. For example, fabricated news stories and political propaganda.