**Binary Reference Sheet:** Complete the binary numbers column below. (Print double-sided to use converter tool below).

|  |  |  |
| --- | --- | --- |
| **Base 10 (Decimal)** | **Base 2 (Binary)** | **Base 16 (hexadecimal)** |
| 0 | 0000 | 0 |
| 1 | 0001 | 1 |
| 2 | 0010 | 2 |
| 3 | 0011 | 3 |
| 4 | 0100 | 4 |
| 5 | 0101 | 5 |
| 6 | 0110 | 6 |
| 7 | 0111 | 7 |
| 8 | 1000 | 8 |
| 9 | 1001 | 9 |
| 10 | 1010 | A |
| 11 | 1011 | B |
| 12 | 1100 | C |
| 13 | 1101 | D |
| 14 | 1110 | E |
| 15 | 1111 | F |

**Binary Converter Tool:** Print these two pages double sided and cut along the dotted lines so that you can flip the 1 tabs over backwards to cover the 0’s and figure out the base 10 number.

([video instructions](https://www.youtube.com/watch?v=geK3_3o1lx4&t=9s))

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |

**Binary/Hex Conversion:** Complete the following table converting between base 10, 2, and 16.

Hexa: 1 16 256 4096

|  |  |  |
| --- | --- | --- |
| **Base 10 (Decimal)** | **Base 2**  **(Binary)** | **Base 16 (hexadecimal)** |
| 0 | 0 | 0 |
| 2 | 10 | 2 |
| 4 | 0100 | 4 |
| 7 | 0111 | 7 |
| 8 | 1000 | 8 |
| 9 | 1001 | 9 |
| 15 | 1110 | 15 |
| 16 | 1 0000 | 10 |
| 17 | 0001 0001 | 11 |
| 31 | 0001 1111 | 1F |
| 32 | 100000 | 20 |
| 33 | 100001 | 21 |
| 61 | 111101 | 3D |
| 64 | 1000000 | 40 |
| 127 | 0111 1111 | 7F |
| 128 | 10000000 | 8 |

**Binary Converter Tool:** Print these two pages double sided and cut along the dotted lines so that you can flip the 1 tabs over backwards to cover the 0’s and figure out the base 10 number.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 |
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |