**Student Activity Guide: Converting Hexadecimal**  Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Unit 1 Lesson 10

**1. Warm-up. Complete the chart.**

The first row is binary. The second row is decimal. The third row is hexadecimal.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **0** | **01** | **10** | **11** | **100** |  |  |  |  |  |  |  |  |  |  |  |
| **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| **0** | **1** | **2** | **3** | **4** | **5** | **6** | **6** | **8** | **9** | **A** |  |  |  |  |  |

**2. Convert hexadecimal to binary**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Example: Convert Hexadecimal (103A) to Binary:  Look up each Hexadecimal digit equivalent in binary.  Add leading zeros to make 4 total digits   |  |  |  |  | | --- | --- | --- | --- | | 1 | 0 | 3 | A | | 0001 | 0000 | 0010 | 1010 |   Answer: **0001 0000 0010 1010** | Practice: Convert hexadecimal to binary  a. D3  b. E040  c. ABCD |

**3. Convert binary to hexadecimal**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Example: Convert binary 1001 1101 1110 0100 to hexadecimal  Do the reverse of the process in step 2.   |  |  |  |  | | --- | --- | --- | --- | | 1001 | 1101 | 1110 | 0100 | | 9 | D | E | 8 |   Answer: 9DE8 | Practice: Convert binary to hexadecimal  a. 0010 1111 0010 0001  b. |

**4. Convert hexadecimal to decimal**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Example: Convert hexadecimal (5A) to decimal  Think about the place values:   |  |  |  | | --- | --- | --- | | 256’s | 16’s | 1’s | | 0 | 5 | A | | 0 | 80 | 10 |   0 + 80 + 10 = **90** | Practice: Convert hexadecimal to decimal  a. 3B  b. 10A |

**5. Convert Decimal to Hexadecimal**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Example: Convert decimal 98 to hexadecimal  First Method: Convert to Binary, then Convert to Hexadecimal   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | 64 | 32 | 16 | 8 | 4 | 2 | 1 | | 1 | 1 | 0 | 0 | 0 | 1 | 0 |   Write the binary digits in groups of 4, then change to hexadecimal:  Binary: 0110 0010  Hexadecimal ex: 6 2  Second Method: Group by powers of 16  98 divided by 16 is 6, with 2 left over  hexadecimal: 62 | Practice: Convert decimal to hexadecimal  a. decimal 100  b. decimal 266 |