Name(s)_____ Period _____ Date _____

Activity Guide - Binary Practice

Directions
Using your Flippy Do or the binary odometer widget fill in the following charts and answer the following questions.

All 4-bit numbers
It's useful and handy to have a sense of the sixteen 4-bit numbers. Fill in all of the 4-bit numbers in the table below along with their decimal equivalents, in order. We've started the first three for you.

Binary: 4-bit number	Decimal
0000	0
0001	1
0010	2

Binary: 4-bit number	Decimal

8-bit numbers with exactly one *1*
The table below contains *every* 8-bit number that has exactly one *1* in it. Write down the decimal equivalent next to each one. Do you notice a pattern?

Binary: 8-bit number (with exactly one *1*)	Decimal
0000 0001	1
0000 0010	2
0000 0100	
0000 1000	

Binary: 8-bit number (with exactly one *1*)	Decimal
0001 0000	
0010 0000	
0100 0000	
1000 0000	

Conversion Practice!

Using your own binary skills (aided by the flippy do or binary odometer) fill in the decimal and binary equivalents below.

What's the Decimal Number?

Binary	Decimal
100	
101	
1101	
0001 1111	
0010 0000	
1010 1010	
1111 1111	

NOTE: a short binary number like **101** is assumed to have leading 0s for all the other bits, like: **00000101.** Typically large binary numbers are grouped in 4-bit chunks to improve readability, for example: **0110 0101 1010**

What's the Binary Number?

Binary	Decimal
	5
	17
	63
	64
	127
	256*
	513*

*NOTE: 256 and 513 exceed the capacity of the flippy-do but you can work it logically following what you know about patterns with binary numbers.

Questions:

1. There is a simple pattern for determining if a binary number is odd. What is it and why does this pattern occur?

2. How many bits would you need if you wanted to have the ability to count up to 1000?

3. How high could you count in binary if you used all 10 of your fingers as bits? (finger up means 1, finger down means 0)