



PRESENTED BY:



# Binary Bracelets

01001100 01100101 01100001 01110010 01101110 00100000 01100010 01101001 01101110  
 01100001 01110010 01111001 00100000 01100011 01101111 01100100 01100101 00100001

What do all those numbers mean? It is binary code, or a special language that only uses two digits. Learn to decode these zeroes and ones as you make your own binary code bracelet!

## TEKS:

TECH 6/7/8.6 A: The student is expected to define and use current technology terminology appropriately.

TECH 6/7/8.6 H: The student is expected to discuss, explain, and evaluate how changes in technology throughout history have impacted various areas of study.

## Materials:

- Pencil or pen
- Small beads (at least 3 different colors)
- Yarn or string

## How To:

1. Read the STEM Explanation below before you begin this activity!
2. Decide what you would like to "write" in binary code with your beads. This could be your initials or a shortened version of your name. Each letter that you select will require eight beads, so choose your bracelet letters wisely!
3. Now, use the attached Binary Code Translation Table (in STEM Explanation below) and a pencil or pen to translate your chosen letters into binary code.
4. Assign one of your bead colors to represent "0," another color to represent "1," and the final color to represent a "space."
5. Cut a length of yarn or string that is approximately 4-5 inches longer than you need to wrap around your wrist.
6. Tie a knot (or multiple knots!) at one end of the string so the beads will not fall off.

31 Days of STEM FUN!

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7. Add one "space" bead first. Then, use the "0" and "1" beads to string your first letter! Add another "space" bead, then repeat this process for the remaining letters. Tie a knot after the final bead so the beads stay in place.
8. Tie your bracelet around your wrist when you are done!



### STEM Explanation:

How many different numerical digits can you name? Probably 10! All numbers, from 0 to infinity, are made up of the following 10 digits: 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. This is called the base-10, or decimal system. A different type of number system, called binary code, uses only two numerical digits: 0 and 1. Zeroes and ones are put together in different combinations, typically in a string of eight "spots." These spots are also known as bits, and a string of eight zeroes and ones is called 8-bit binary code. The most commonly used version of binary code today is called UTF-8, which stands for "Unicode Transformation Format 8-bit." Check out the Binary Code Translation Table below to discover how to use zeroes and ones to write out letters, numbers, and symbols.

Binary Code Translation Table									
Character	Binary Code	Character	Binary Code	Character	Binary Code	Character	Binary Code	Character	Binary Code
A	01000001	Q	01010001	g	01100111	w	01110111	,	00101100
B	01000010	R	01010010	h	01101000	x	01111000	-	00101101
C	01000011	S	01010011	i	01101001	y	01111001	.	00101110
D	01000100	T	01010100	j	01101010	z	01111010	/	00101111
E	01000101	U	01010101	k	01101011	space	00100000	0	00110000
F	01000110	V	01010110	l	01101100	!	00100001	1	00110001
G	01000111	W	01010111	m	01101101	"	00100010	2	00110010
H	01001000	X	01011000	n	01101110	#	00100011	3	00110011
I	01001001	Y	01011001	o	01101111	\$	00100100	4	00110100
J	01001010	Z	01011010	p	01110000	%	00100101	5	00110101
K	01001100	a	01100001	q	01110001	&	00100110	6	00110110
L	01001011	b	01100010	r	01110010	'	00100111	7	00110111
M	01001101	c	01100011	s	01110011	(	00101000	8	00111000
N	01001110	d	01100100	t	01110100	)	00101001	9	00111001
O	01001111	e	01100101	u	01110101	*	00101010	?	00111111
P	01010000	f	01100110	v	01110110	+	00101011	@	01000000

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Why do we need binary code? Computers and other devices like calculators, printers, or microwaves use binary code to communicate information. Computers cannot understand words or numbers the way that humans do, so we need to communicate with them using electrical signals. Binary code is a very useful language for communicating with electronic/computerized devices because it only requires two electrical positions: on or off. A one corresponds to "on," and a zero corresponds to "off"; this makes it easy and efficient for electronic devices to receive, store, and transmit information. Any code that uses only two symbols to transmit information is called binary code. Can you think of any other examples of binary code systems? Morse code, which uses long and short sounds to represent letters, and Braille, which uses raised and flat dots so that individuals can use their sense of touch to read, are both examples of binary code systems.

Can you decode the string of zeros and ones from the beginning of this lesson using the Binary Code Translation Table? Converting longer words can be a bit time-consuming, so you can also go to [convertbinary.com](http://convertbinary.com) to quickly translate messages into and out of binary code.

### **Career Connection:**

*Software engineers* design, implement, and modify software computer programs, or the instructions that tell computers how to work. The programs that software engineers create must be dependable, easy to understand, useful, and efficient.

### **Resources:**

[https://chandra.harvard.edu/resources/handouts/lithos/binary\\_bracelets.pdf](https://chandra.harvard.edu/resources/handouts/lithos/binary_bracelets.pdf)

<https://www.sciencefriday.com/educational-resources/write-your-name-in-binary-code/>

<https://onlypassionatecuriosity.com/binary-code-for-kids/>

<https://computer.howstuffworks.com/bytes1.htm>

<http://wskg.org/science/write-your-name-in-binary-code/?c=science>

<https://www.ConvertBinary.com>

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