STEM Event Module:
Binary Beaded Bracelets

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UAA College of Engineering
UNIVERSITY of ALASKA ANCHORAGE

Grade: All

Volunteers: 1-2

Space: 1-2 tables for materials and building

Time Commitment:
- 30 min-1 hour prep
- 5-10 minutes for students to complete activity

Objective:
Students use the binary alphabet and beads to code their name in the form of a bracelet.

Materials Needed:
- String/pipe cleaners
- At least three different colors of beads
- Scissors
- Paper
- Pencils
- Binary Code sheets

Available Resources:
- Power Point Presentation-for use in whole-group instruction settings, includes background information about Binary.
- Poster display-for use at booth-based events such as STEM Days, where students come and go as they please
- Instruction Handout- beneficial in whole group instruction or STEM days, giving students direct access to instructions.

Activity Instructions:

Step 1
Write out your name on a piece of paper. Use the Binary alphabet sheet to translate the letters in your name into the binary alphabet. Create a key to remember which colored beads you will use.

Step 2
Choose three different colors. Choose one color for the white boxes, one color for the black boxes, and one color to separate the letters (delimiter).

Step 3
Tie a knot at one end of your string. Begin stringing the beads following the binary alphabet starting with the first letter. Continue with each letter, making sure to put a separate-colored bead between each letter. If there are too many bits, you may convert your bracelet into a necklace.

Step 4
When you have finished putting the beads on, tie both ends to make a loop. You now have your binary bracelet!

Safety/Organizational Tips:
- Use paper plates to keep small portions of beads contained as students work on their bracelets. Refill bead supply as needed.
- Younger students benefit from use of pipe cleaners instead of string. Bend the end of the pipe cleaner as they make the bracelet to prevent beads from slipping off.
- If using string with beads, tie a pencil to the end while beading. This prevents beads from slipping off during construction.

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Follow Up:

If facilitating this activity in a classroom, or in an event structure that allows follow up to the activity, use these discussion questions to guide students through reflection and learning:

- What was the hardest part of this project? Why was it hard?
- Why do you think it is important that the bits are in the correct order?
- What other computerized devices use this type of binary code?

Classroom Extensions:

- Writing coded messages using binary
- Decoding whole-class messages in binary
- Creating your own code

Letter	Binary		Letter	Binary	
A	■□■■	■■■■□	N	■□■■	□□□■
B	■□■■	■■□■	O	■□■■	□□□□
C	■□■■	■■□□	P	■□■□	■■■■
D	■□■■	■□■■	Q	■□■□	■■■□
E	■□■■	■□■□	R	■□■□	■■□■
F	■□■■	■□□■	S	■□■□	■■□□
G	■□■■	■□□□	T	■□■□	■□■■
H	■□■■	□■■■	U	■□■□	■□■□
I	■□■■	□■■□	V	■□■□	■□□■
J	■□■■	□■□■	W	■□■□	■□□□
K	■□■■	□■□□	X	■□■□	□■■■
L	■□■■	□□■■	Y	■□■□	□■■□
M	■□■■	□□■□	Z	■□■□	□■□■

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