Candy Wave Generator

WHAT: Students were posed with the question: Can a wave on a string move an object? Using bamboo skewers, packing or duct tape, and gum drops, Tobin students created a simulator to explore transverse waves.

YOUR CHALLENGE: Create a disturbance in the wave machine by lightly tapping one of the gum drops. Do you notice any pattern of movement?

https://www.youtube.com/watch?v=G1NLOqHYcaE

Chladni Plates

WHAT: Ernst Chladni, an 18th century German scientist and musician, was a pioneer in the field of acoustics, the science of sound. In a famous experiment, he showed how moving a violin bow against a metal plate covered with sand could visually display the movement of sound. The places where the sand *did not* collect show how far sound waves moved the sand. The places where the sand *did* collect represent nodes between waves. A node is the point of zero amplitude, meaning the particles at those points were not moved by waves. Chladni was the first scientist to clearly demonstrate the connection between sound and waves, paving the way for the acoustical theory of waves.*

YOUR CHALLENGE: Use the Chrome Music Lab app "Oscillators" to test Chladni's experiment. Can you find a frequency that creates a pattern in the sound?


OSCILLATORS

```
oscillator.type = 'sawtooth';
oscillator.frequency.value = 1034;
```
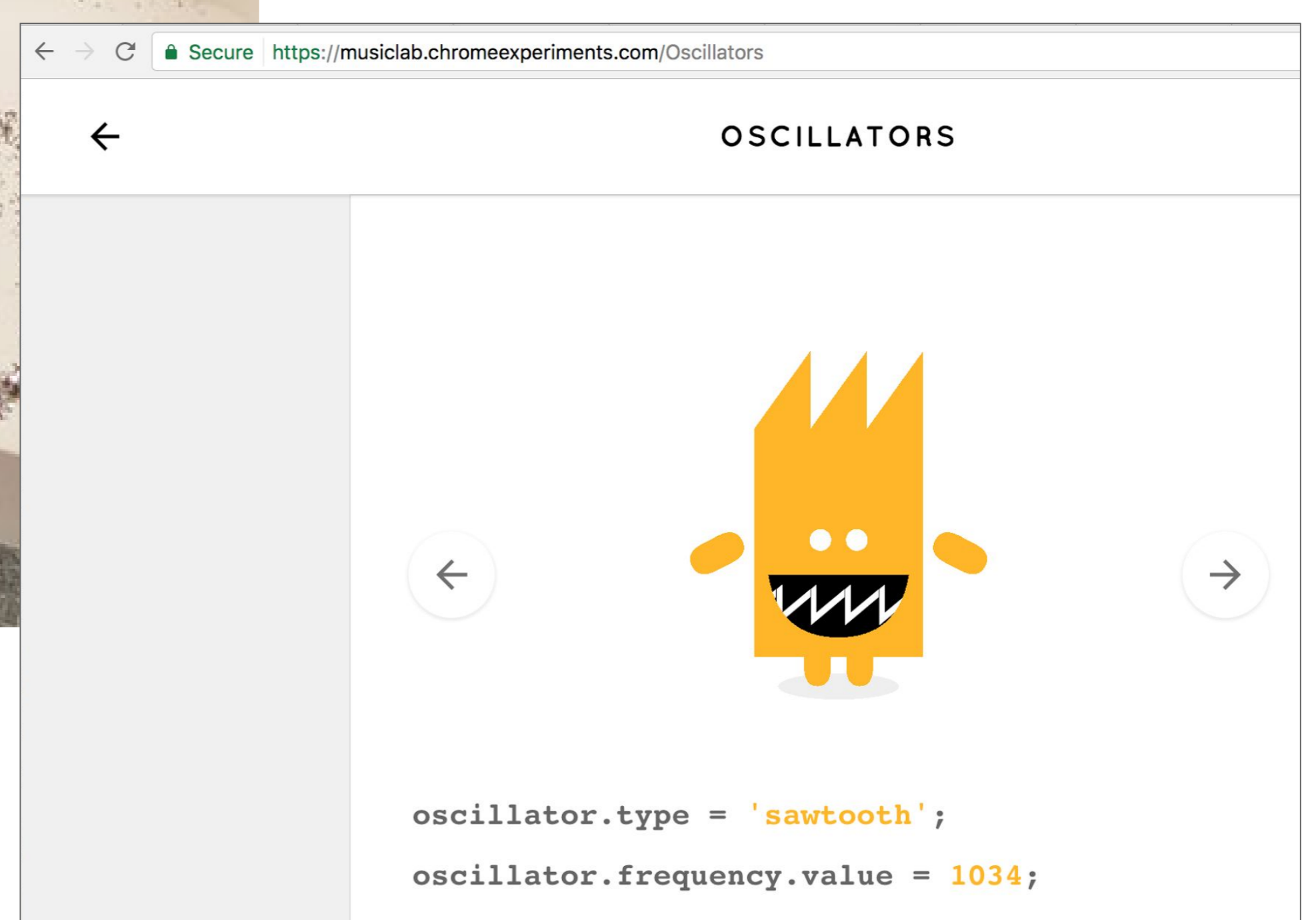
littleBits telegraph

WHAT: littleBits are small electronic components that snap together with magnets to create a circuit. littleBits kits include components such as power, sensors (inputs), sound/lights/numbers (outputs) and a whole bunch more. Students at the Tobin created telegraph machines with a power bit, an input bit like a button switch, light sensor, or pressure switch coupled with a light outputs or a buzzer.

YOUR CHALLENGE: Use the littleBits telegraph to send a message to someone across the room.
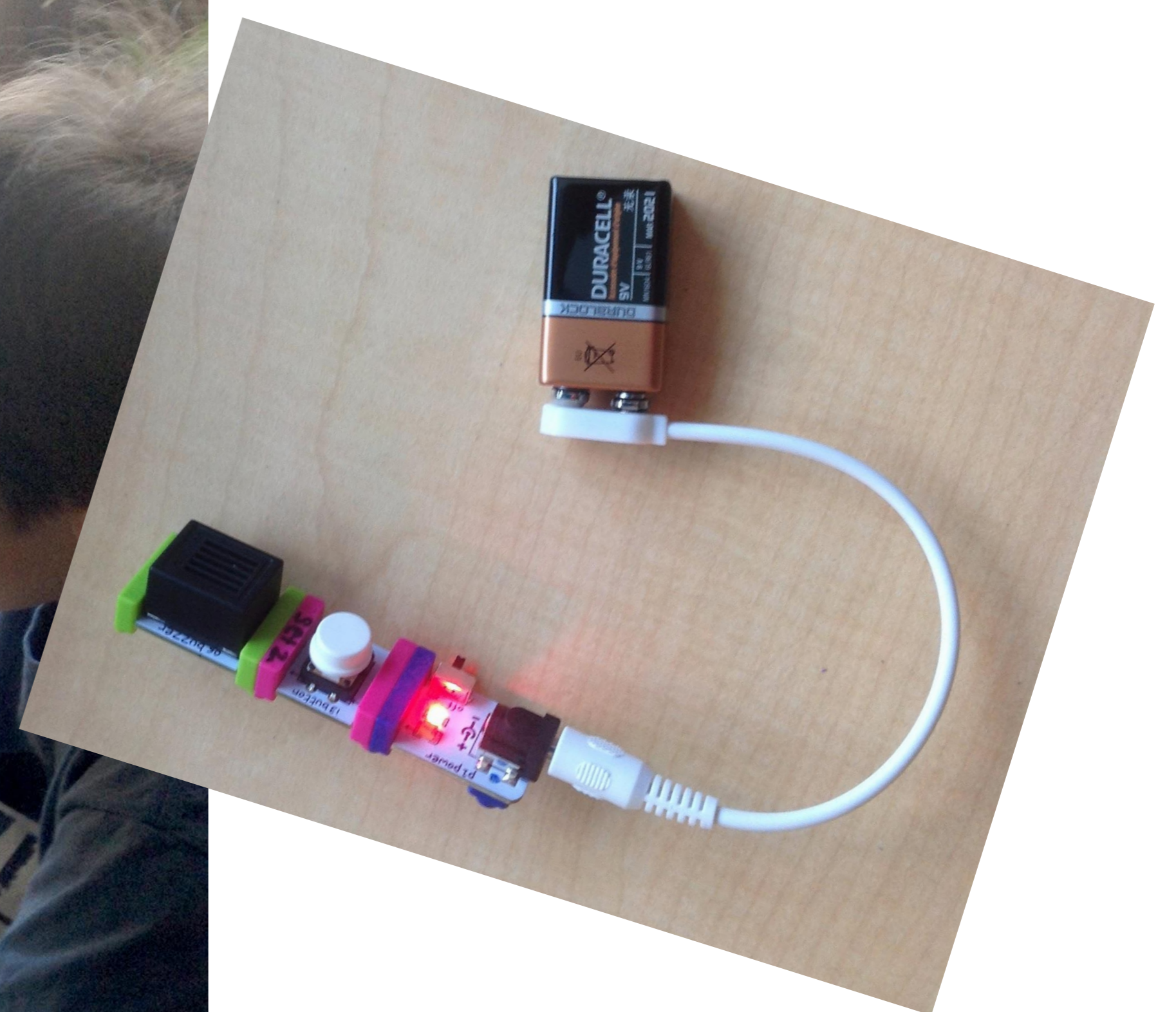
MaKey MaKey Morse Code Maker

WHAT: MaKey MaKey works by creating simple circuits connected to an input (space key, up arrow key). Control the computer by turning conductive objects like fruit, tin foil, and water into a touch pad, mouse or keyboard. Tobin students created their own MaKey MaKey morse code machine using Scratch and/or the MaKey MaKey piano. They chose two input keys on the keyboard, each to represent a dot or line.

YOUR CHALLENGE: Use the Morse Code Maker to sound out a phrase. Test a friend to translate the phrase.

Scratch Morse Code Machine

WHAT: Scratch is a free, web-based programing site developed by the Lifelong Kindergarten Group at the MIT Media Lab. It offers students the opportunity to engage in block-based coding to create interactive games, animations, and videos. A student at the Tobin created this Morse Code Machine Remix by programming each alphabet key to generate its Morse Code equivalent.
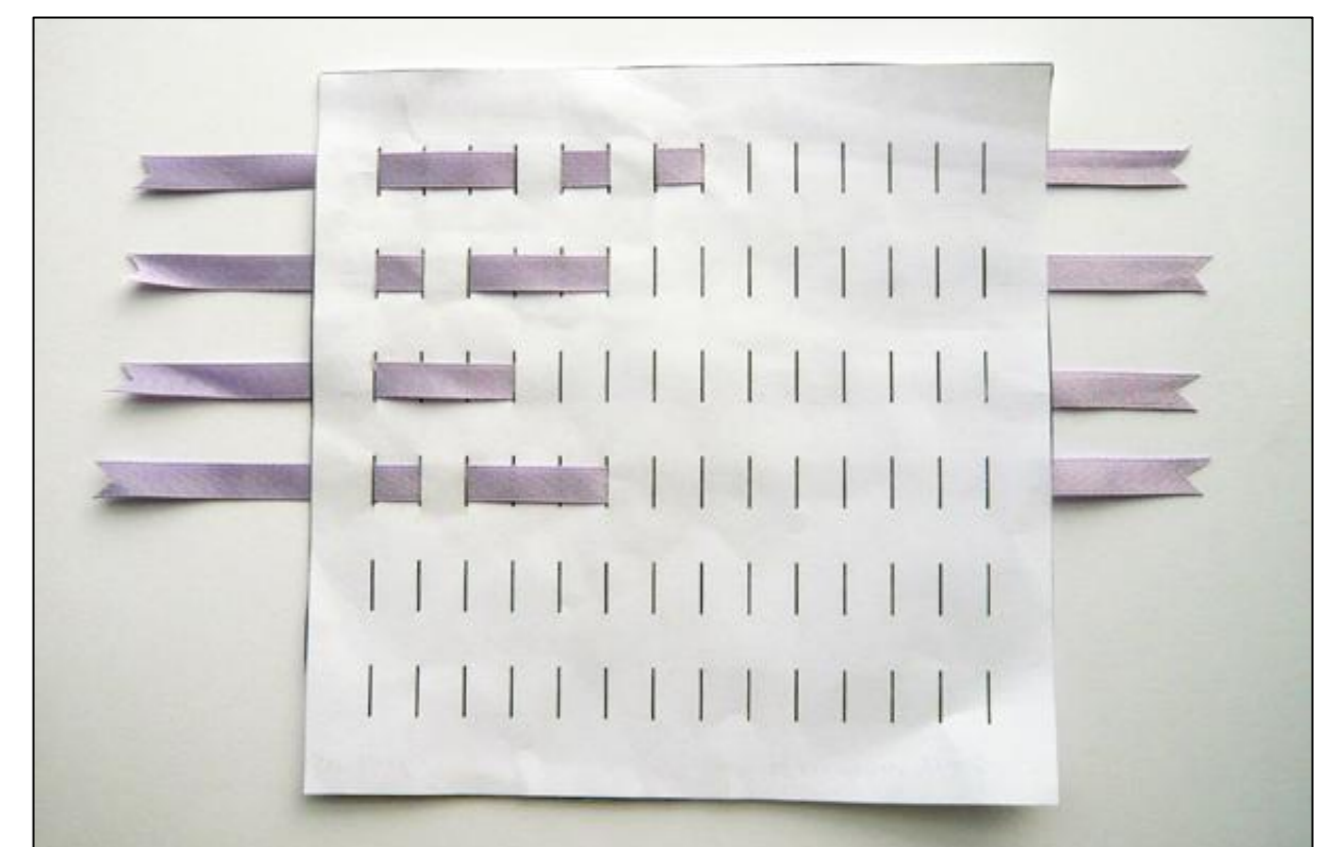
YOUR CHALLENGE:

Can you use this student generated Morse Code Machine to sound out your name in Morse Code?
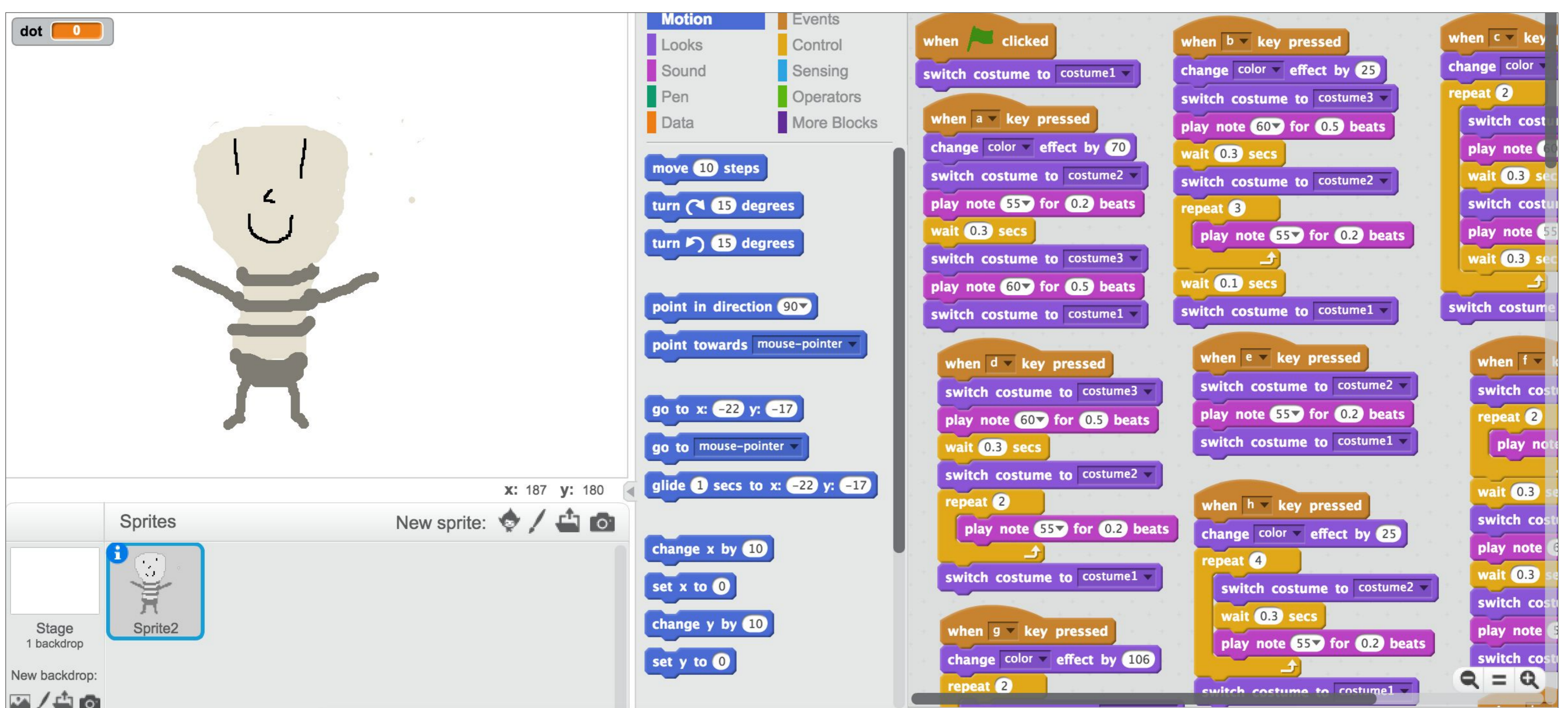
Morse Code Art & Patterns

WHAT: Using a variety of beads, ribbon, and natural/found objects, students can create works of art that communicate using the patterns of Morse Code.

YOUR CHALLENGE:
Use the materials provided and write a word or phrase using the Morse Code alphabet.

Morse Code Alphabet

A ●—
B —●●●
C —●—●
D —●●
E ●
F ●●—●
G ——●
H ●●●●
I ●●

J ●———
K —●—
L ●—●●
M ——
N —●
O ———
P ●——●
Q ——●—
R ●—●

S ●●●
T —
U ●●—
V ●●●—
W ●——
X —●●—
Y —●——
Z ——●●