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Game Play

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MaKey MaKey Play

The way we interact with videogames has long been through the use of a controller or gamepad of some sort. These gamepads have been hand-held ever since early home entertainment systems in the mid-seventies. Over time different consoles, games, and accessories have allowed for different types of interactions to be experienced by players. Dating back to the Nintendo Entertainment System there were accessories such as the Power Pad or Power Glove that embedded the circuitry that existed in a controller within a pad one could stomp on or a glove one could wear. With Microsofts Kenect these different physical manifestations of controllers have even morphed into camera based sensing of a body's movement, translating limb gestures into ingame movements that were formerly controlled by a button press. Customization of these interactions has been limited primarily to software based modification of button presses. Unless one had experience with electronics they were forced to use a platforms controller and its softwares key or button configuration. To this day this has been the status-quo, however a little invention called the MaKey MaKey, invented in 2010 and released in 2012, has broken these conventions.

The MaKey MaKey which came out of the Lifelong Kindergarten group at MIT is

marketed as “An Invention Kit for Everyone!” is a circuit board that acts as a usb keyboard. It allows for conductive objects to be used as switches to control keyboard keys or mouse clicks. This allows for one to create their own interactions between the physical world and software through modified “hardware”. This hardware is no longer just buttons or keys on a plastic controller it can be an apple, a screw, a glass of water, or even a high-five. All of this is done with the aid of simple alligator clips and wire, the only assembly required is the gathering of materials and tinkering with a circuit.

In particular I will be studying the different types of exploration and play that occurs when kids are free to tinker with this type of technology. I have been imbedded as a Maker Mentor at the Kensington Free Library Branch through a youth programming initiative I helped build named Maker Jawn. At Kensington we run arts and digital media programming daily to youth ages 4-22. I am focused primarily on kids aged 7-13 and what kind of things they create with the MaKey MaKey. As my observations continue I will be implementing my own derivative of the MaKey MaKey, tentatively titled jawnWare, to see what sort of exploration and play occurs with it. In the mean time I’d like to start with a quote and state again why I’m studying this.

> “I want gaming to be something that everybody does, because they understand that games can be a real solution to problems and a real source of happiness. I want games to be something everybody learns how to design and develop, because they understand that games are a real platform for change and getting things done. And I want families, schools, companies, industries, cities, countries, and the whole world to come together to play them, because we’re

finally making games that tackle real dilemmas and improve real lives."

— Jane McGonigal, *Reality Is Broken: Why Games Make Us Better and How They Can Change the World*, 60

Jane McGonigal is focusing on many different types of genres and games and their application in creating good social and economic change. What I like to think Eric Rosenbaum and Jay Silver up at MIT created is a physical manifestation of these values in a tangible kit. Tinkering around, playing, and gaming can all be synonymous, what the MaKey MaKey is allowing is for that energy to change the way games are experienced. It's a tool to make fun interactives, break the norms of interactivity with computers and games, and allow for one to be creative and explore.

At Kensington I began to implement programming with the MaKey MaKey initially as a guide to the participants who were coming in after school. Initially I worked with two of our near peer volunteers and instructed them on how the MaKey MaKey worked. After an initial exploration of how the it works with simple games on the computer I took a back seat. Paul(14) and Judas(15) are both homeschooled and have graduated from patroning to volunteering at the library. They are the one of the ways we are able to get the kids interested in tinkering, crafting, or playing with things. Initially when I began working with them to demonstrate the MaKey MaKey Paul was fairly disinterested, he was just "hanging out" as Mimi Ito would say. Mimi Ito is a humanities researcher who studied youth and their use of new media technology. She broke interest in said technology into three distinct levels of interest: Hanging out, Messing Around, and Geeking Out. Judas on the other hand was curious about what he was seeing and

about to experience. The game changer for both of them is what I like to call the high-five moment as I mentioned earlier. In this instance Judas and I set up the MaKey MaKey and held opposing wires, when we high-fived we made the character on screen jump to avoid obstacles. This moment caught Peter's attention and you could visibly see them both elevating their participation into a form of messing around. I had set up a scenario in which their interest was guided by myself, but they quickly began their own investigation of what was possible. They began to assemble everything in the back room that they thought conducted electricity and set to work on tinkering for the day. This form of self driven engagement, exploration, and play and its byproducts are clearly defined from this quote from McGonigal:

"During this kind of highly structured, self-motivated hard work, Csikszentmihalyi wrote, we regularly achieve the greatest form of happiness available to human beings: intense, optimistic engagement with the world around us. We feel fully alive, full of potential and purpose--in other words, we are completely activated as human beings."

— Jane McGonigal, *Reality Is Broken: Why Games Make Us Better and How They Can Change the World*, 153

The tinkering and interaction with both the digital and physical realms it the high-five moment is the spark for an even more enlightened sensation than what Jane explains in about the effect of working in games. It brings the satisfying work we find off of plastic keys or screens and into thought provoking interactions with objects not associated with computing or gaming. Paul and Judas because of this moment were excited to share this magical experience with other kids who came to the library.

The initial tinkering that ensued was largely based off of other peoples work. Primarily the how-to guide for that is on the MaKey MaKey's website. Judas and Paul were able to get a group of four other kids interested in what they were doing. The common element that solidified this group experimentation was the fact that they were using play-doh to create their game controllers. The medium in which they worked made entry into the project easy as there was very little technical skill required as all of them had experience with play-doh. The other kids aged 7-9 were excited by this newly found means of playing games. They immediately applied this new form of tinkering to creating controllers for their favorite games on nick.com and other hubs for childrens games.

The ability to morph the inputs and grow the play space larger than a keyboard and mouse made for some interesting "controllers" that required human to human contact. This allowed for interaction between two players in games that are designed for one player. An example of this type of interaction was seen in a Spongebob game played by a boy and girl aged 8. They created a controller that required them to grab each other at certain points to make Spongebob move out of the way of his opponent. To me this Huizinga quote (pg 49) applies to this form of play and interaction:

"Let my playing be my learning, and my learning be my playing."

The kids through playing this game and making this controller were not only learning about new forms of interaction, technology, and crafting, they were learning how to be social. In the act of moving Spongebob together they were teaming up and sharing a once solitary experience. They created a participant player out of what would

formerly be a player. In the brief moments that they were actually able to play before the library had to close they were learning through play and creating a solution to a problem that they had faced prior.

Before getting into other creations and observed interactions I'd like to use Huizinga again to wrap my mind around why the MaKey MaKey is a successful tool that encourages tinkering and play. After explaining the tight knit bonds between play and performing arts Huizinga begins to talk about the break between play and the plastic arts. He refers to the plastic artists or designers by listing them as follows:

"architect, the sculptor, the painter, draughtsman, ceramist, and decorative artist" He states that play is not fully apparent in their work as they are "always subjected to the skill and proficiency of the forming hand." The MaKey MaKey plays the fine line between performing art and plastic art with its ability to be combined with various materials. Not only that, one interacts with their creation with movement that exceeds a simple button press in most cases. As noted in the Spongebob example, there was a choreographed move that allowed them to accomplish a task in game. This is only one instance in which the MaKey MaKey can be seen as a performing art.

The creators of the MaKey MaKey have have a deep seated interest in tools or instruments for making music. It is no surprise that many of the examples for the it are indeed instruments of various materials. A natural progression past making simple pianos out of a series of objects or a drum kit out of an arrangement of fruit is rhythm based games. I've had kids create drum kits with mounds of play-doh to beatbox with and crazy instruments based on instruments they find online. In particular Dance

Dance Revolution became one of the kids interests as was observed during my second session of MaKey MaKey observation.

One of the older girls that comes by Kensington decided to make a small controller for DDR out of play-doh. After having a lot of fun tinkering with it and playing games I nudged her in the direction of creating a larger gamepad. She was at a loss initially as how to make it, however once Paul and Judas showed up later in the afternoon we all began tinkering with supplies available to make a working prototype of a directional arrow you could step on. After one direction pad was working I again stepped back from the situation to let them create and take ownership of their remaining individual directionals. After about an hour of working away as a group of three making this dance dance revolution pad from cardboard, force sensors, and conductive tape they began to wire it to the MaKey MaKey. It was interesting to see how intensely focused they had become on a collaborative venture as they all knew the potential reward. All of their work was unfortunately met by failure in the end. Their attempt to make the dance pad was overcome by many technical errors which they tried to troubleshoot, however gave into because there was no simple solution to their problems. This situation reminded me of McGonigal's statement:

"*Life is hard, and games make it better*."

This inventing, tinkering, and failure may not be the happiest experience for them in the end. However, while they were in the moment and creating together they were having fun, conversing, joking, and smiling. Also, in the end they were still able to play the game, just with a modified version of the girls earlier play-doh controller. This act of

creating a controller for the game links into McGonigal's bridging of gamer ideals into the “real-world”.

> “What if we started to live our real lives like gamers, lead our real businesses and communities like game designers, and think about solving real-world problems like computer and video game theorists?”
>
> — Jane McGonigal, *Reality Is Broken*, 6

After observing these two primary examples of making at Kensington I began to bring in and implement my own simpler version of the MaKey MaKey to see what would happen. After guiding around four interested kids out of ten total through the making of what I’ve tentatively dubbed the MaKey MaKey MaKey, I let them explore whatever they’d like with it. Mind you the majority of the kids who tinkered with my exploration had not worked with a MaKey MaKey before. They were actually more interested in tinkering with the physical hardware after making it than using it in conjunction with a game on the computer. It became more of a game to see what would happen if things were remixed on the new hardware. LEDs from older projects were tested to see if they’d light as well as the addition of new components or wires. This lead to the computer we were using to sense a problem on the USB connection and shut down. Unprompted by me or any of the other mentors it became an objective to see what exactly caused the shutdown. Recreating the shutdown and lighting up more LEDs with the MaKey MaKey overpowered the desire to tinker directly with a game on the computer. This may be partially because of the ownership and knowledge of what is happening in the

hardware, whereas all that is known with the original MaKey MaKey is its intended function and correct use.

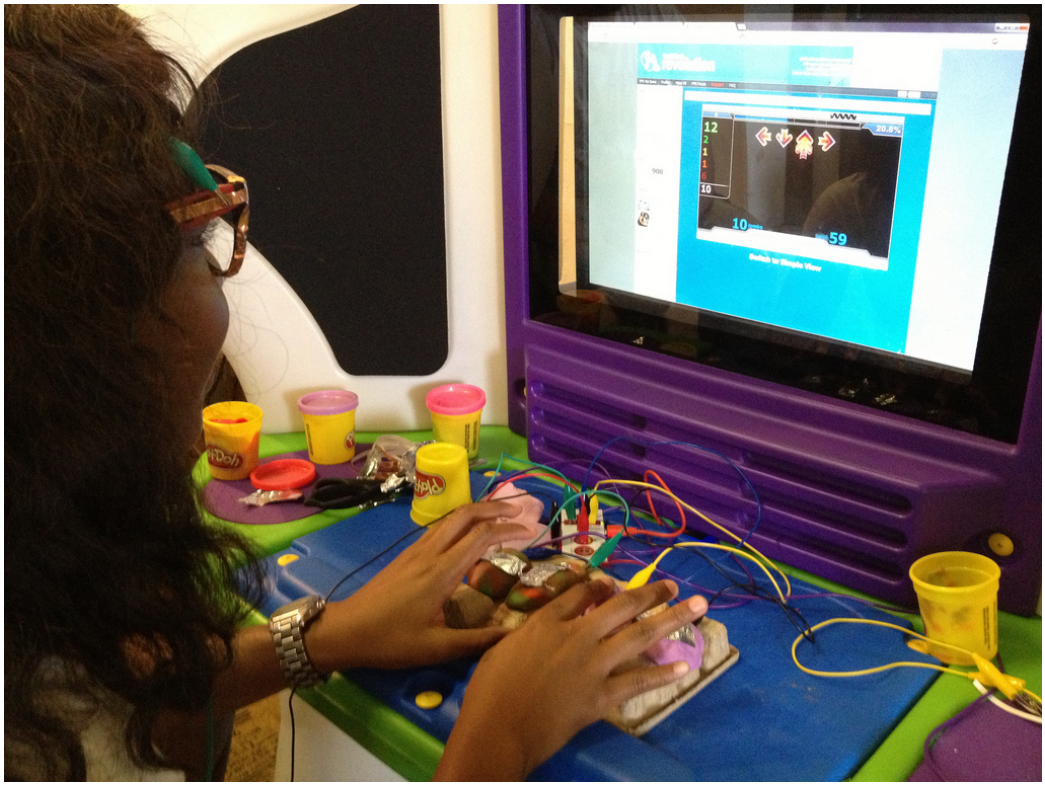
After a few weeks of implementing the MaKey MaKey MaKey, now dubbed the oneKey because it only has one input, I began collecting what the kids were saying and doing with it. There was one kid at the Kensington branch who geeked out over the oneKey and its possibilities. Victor is 7 years old and goes to a school around the corner with a few of the other kids who come to the library after school. Victor was part of the group that hardware hacked the oneKey with LEDs and he has since moved on to tinkering with using it with games or making more oneKeys. When originally asked what he wanted to do with his oneKey his response was “I want to make another!” This of course was hard to say yes to at the time, but he was able to spin his want to something attainable by exclaiming “I want to help other people make more MaKey MaKey!” This to me was the start of a very awesome collaboration. Victor was proficient with the tools needed to create a oneKey: soldering iron, wire snips, and pliers. Also his age and proximity to the other kids that come to the library made him an ally in gaining interest. He was able to get a group of four other kids interested in creating games or interactives with his or their own oneKeys or have them want to create their own. The one thing that intrigued me was the fact that he had little knowledge of the components or how the oneKey worked after creating a couple of them. In explaining how it worked he used playful language and none of the actual terms for the components. Solder became “MaKey MaKey hot sauce” and all the components became “wires”. I believe Victor does this for two reasons related to play, interest, and the magic of electronics.

For one, if he were to know what all the components names were we would be having a more serious conversation about the tools and games we tinker with. On top of that if he were to know or think he knew how the circuit worked the magic that makes the MaKey MaKey so interesting would be dissolved and the product demystified. This has been a topic of discussion in trying to develop a way for kids to also program the oneKey and see what is under the hood. As this goal has not been reached within the current scope of the project only assumptions can be made. Currently it's thought that to someone who is at a level of less engagement when exposed to the code or inner workings of the oneKey will become less interested as there is no magic involved and they will be less likely to tinker with it.

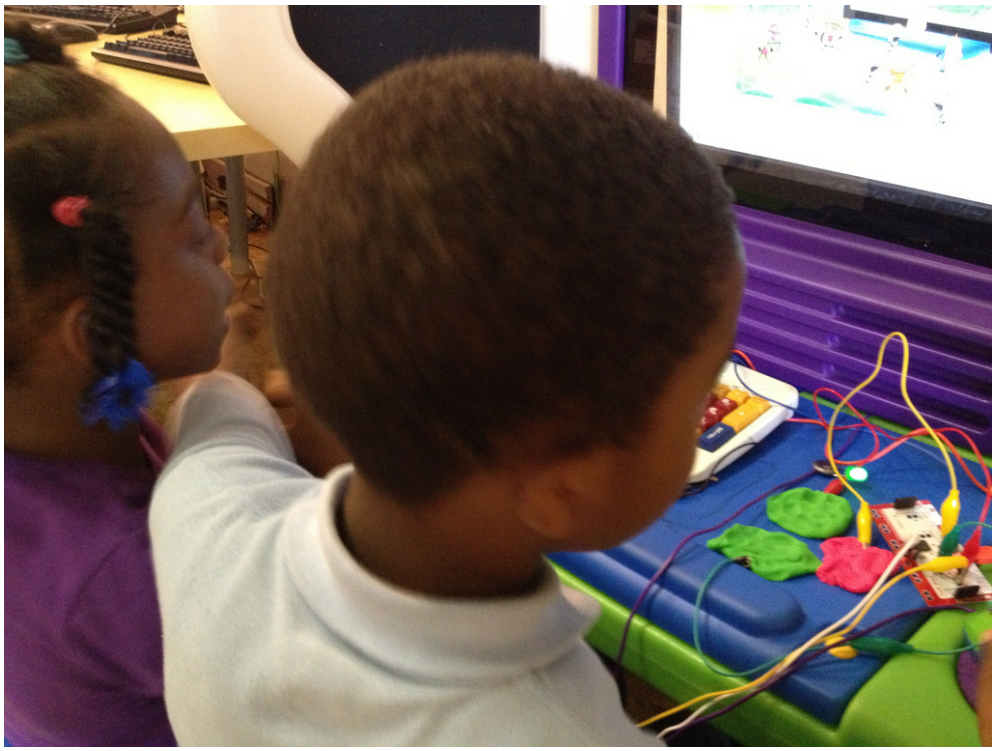
Currently the oneKey is at a point where it is ready to be deployed at other branches by folks with non technical backgrounds. These mentors are the most curious about how the actual device and its components work. This is primarily because if asked they feel obligated to know the answers. In my documentation I have supplied simple analogies to explain the function of each component. So at the end of the day when a oneKey is created a participant chooses to learn as much about or demystify the oneKey as much as they like. There is a similar parallel to the way that JoyLabz markets the MaKey MaKey. Joy Labz tends to leave the technical to a very long paragraph at the end of a webpage. They mask it in a barrage of fun, noisy, colorful, and playful videos and imagery. This leads to a romantic interpretation of the technology and processes at hand. Personally I agree with this model of masking the electronics and processes as a toy. For my own work I see the act of creating it only as a means for

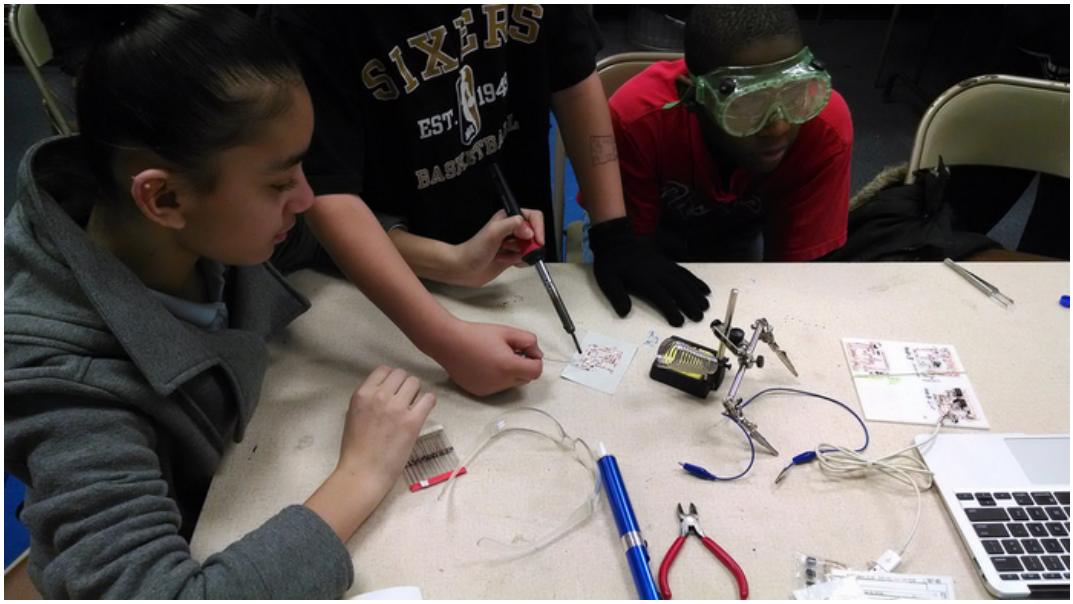
one to take ownership of it. I am in no way trying to force a participant to learn exactly how the oneKey works and what each component does. It would ruin the fun and not allow for the creative exploration that makes its workshops so impactful. This is similar to how McGonigal sheds a light onto playing games. The simple act of playing and doing work allows us to be constructive in an alternate play space. In McGonigals case she tells us that one of the reasons people play games is to fix what is broken in reality. What I like to think is that my project and the MaKey MaKey itself begin to bridge the physical play space and the digital play realm. This creates a blending of the two and allows for new experiences and learning moments all seen through the lenses of play and exploration.

(above) makey makey pizza game
(below) DDR dancepad attempt

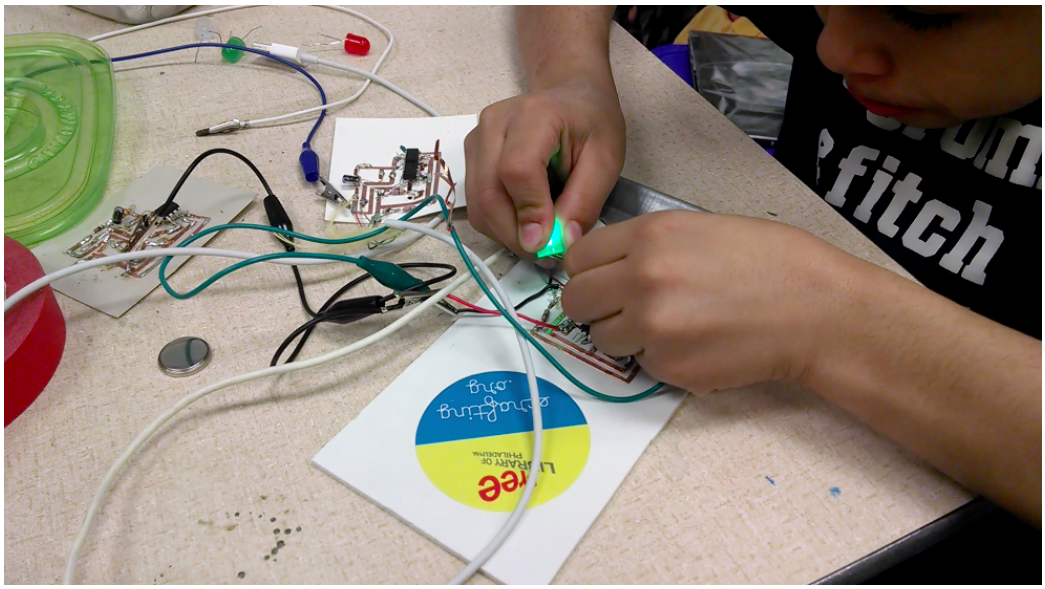


(above)Original DDR Playdoh controller
(below)Spongebob controller

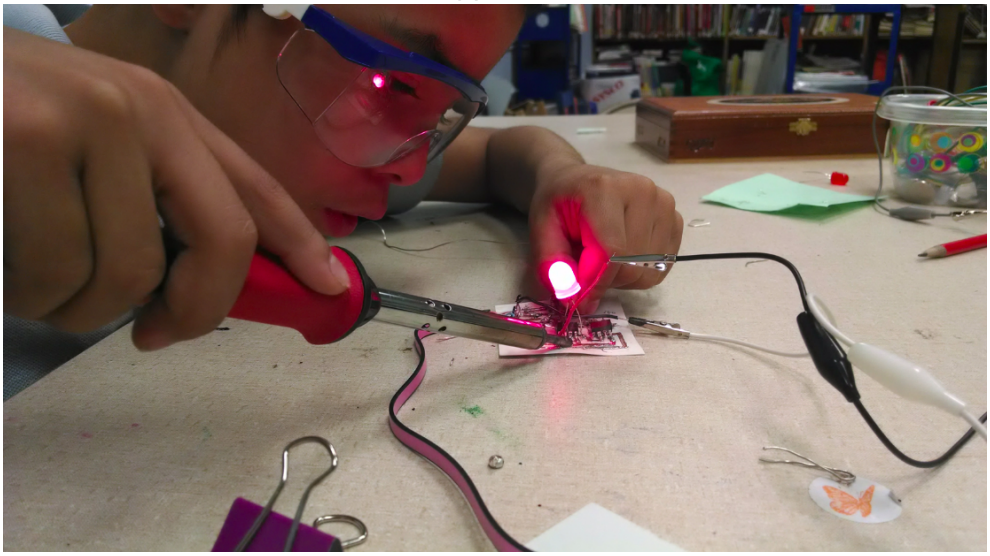




(above) MaKey MaKey MaKey creation
(below) playing with LEDs and computer crashing instead of games



An example from an other workshop not at Kensington where the “high-five” moment happened.



Victor, 7 hacking his oneKey.

Interviews:

Victor, age 9, a participant in my workshops at the Kensington Branch.

B So, What did we make?
V A MaKey MaKey, wooh!
B Cool right?
V Look at this, nobody knows how to do this..
B What did we put in it?
V Wires and wires, and wires .. And MaKey MaKey hot sauce(solder).
B And then what did we use?
V A light. And then a long wire that plugs it into the computer. Ta DA!
Showing off the MaKey MaKey MaKey
B So what's going on here?
V When you touch the play-doh it does stuff on the computer.
B Do you remember what it's doing?
V Being a keyboard!
**With minecraft the game on screen, he breaking down blocks of sand and digging a ditch.
V The MaKey MaKey, it cuts!
V I am so happy to take this home and break my computer!
V Can we make another?
B No, you already have one dude!
V I want to make more, can I help other kids make them here? I should get my friends from school to come to make more MaKey MaKeys!

After playing a Canabalt with Ice cream where you lick your ice cream to interact with the game on screen.(using the MaKey MaKey)

B So what do you think?
O That's pretty weird.
B What is weird about it?
O it's kinds weird because you're licking the ice cream...
B How did you control it?
O You moved it with your tongue. Your tongue is the controller.
B What did you think about the game?
O It's like Mario, but faster.

This is a video interview about a magnetic maze prototype we made at the Village of Arts and Humanites. Donnie filmed and helped correct or as questions of Mykal who was demonstrating his creation.

M Hi I'm Mike
B How old are you?
M I'm 8.
B Where do you live?
M On the north side of the street.
B And what do we have here?
M We have a Magnetic Maze.
B Sweet.
M Now look, it might come off, but don't be mad.
B Ok?
M Ya see, if I come to this play-doh here with the magnet, this light comes on and off?
B So Mykal, can you explain the circuit to me, the positive and the negative?
M The yellow is the postitive.
D Pos-it-tive Mykal
M Yellow is pos-it-tive and red is negative.
B And what about the batter and LEDs?
M This is my LED (points to battery).
D No no!
M This is my LED and this is my battery.(correctly identifies)
B And what about your glasses?
M This is them! (points) They light up when you hit the maze.
D Basically its an LED light, and we have a Maze. So when you're playing the maze and you've hit a wall or something will glow of to signify you and notificate you that you've hit the wall. So we've made a sample and soon we'll be able to make something like this, but huge.
M Soon we'll be able to make something else, like this!
B Cool!
D Yeah, what's your name?
M I'm Mykal
B I'm bk.
D and I'm Donnie, we out!