



Powering Up

THE VIDEO GAME INDUSTRY

By Thunder Battle Bots

Alex, Jonathan, Kyle, Matthew, Vincent

Team 95129B, Cupertino, California



Matthew

INTRODUCTION

We love playing video games because they are fun and challenging. In 2023, the video game market was worth about \$95.45 billion in the US. It is predicted to be \$304.7 billion with 2.8 billion gamers by 2027. We are interested to learn how to be ready for a career in this industry that delivers joy to many people and has potential to make a good living too.

For the career readiness challenge, we focused on designing video games at Nintendo. They make our favorite game, Super Mario Bros. We researched video interviews of the original designers at Nintendo and read articles on game design and development.



MEET THE MAKERS OF SUPER MARIO BROS



SHIGERU MIYAMOTO
NINTENDO

TAKASHI TEZUKA
NINTENDO

Shigeru Miyamoto and Takashi Tezuka have been designing games at Nintendo for their entire career. They created Super Mario Bros which was released in 1985. They made other famous games like the Legend of Zelda. These games are still popular today and have many follow-up versions.

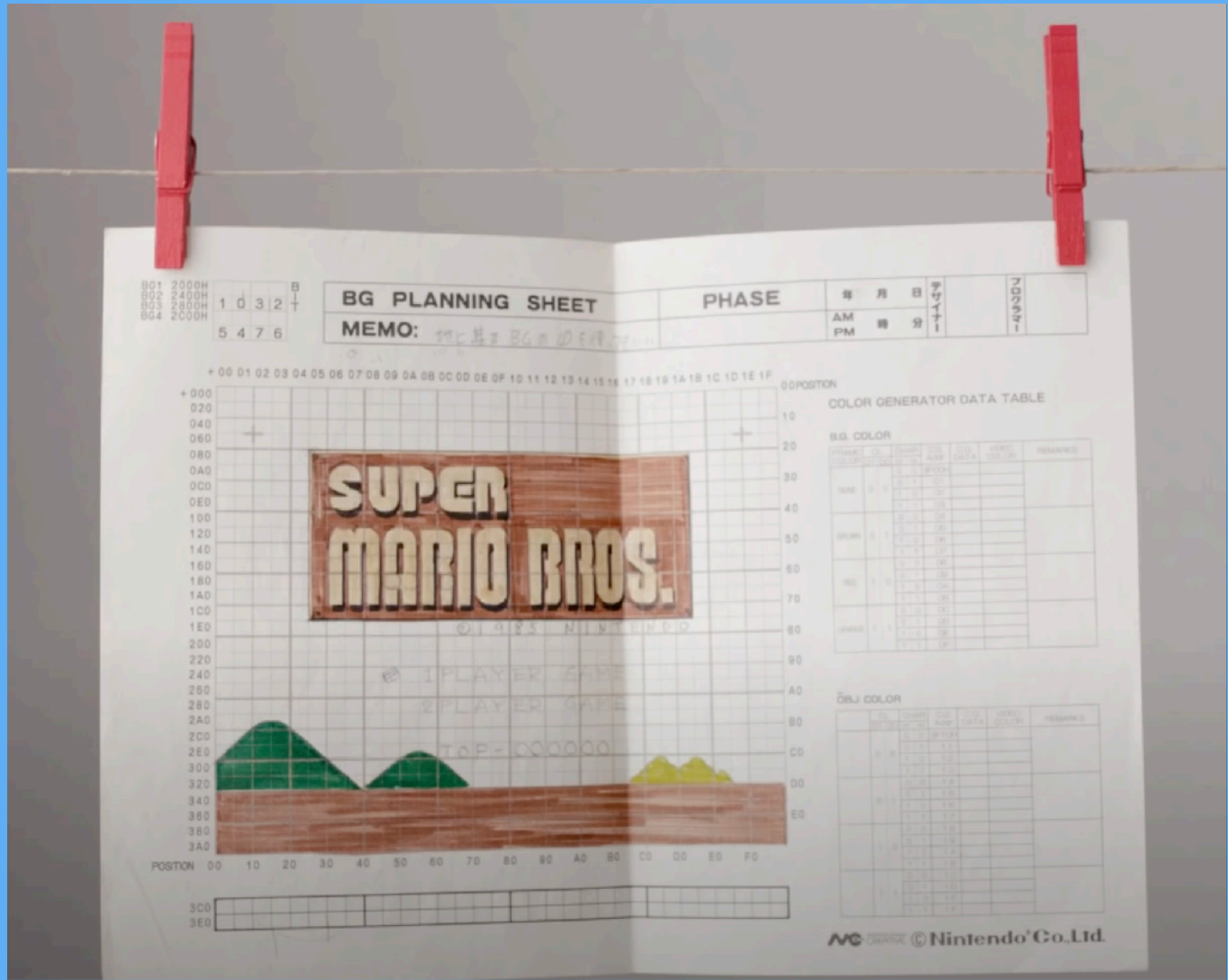
NINTENDO DESIGN PROCESS: 1. COME UP WITH AN IDEA



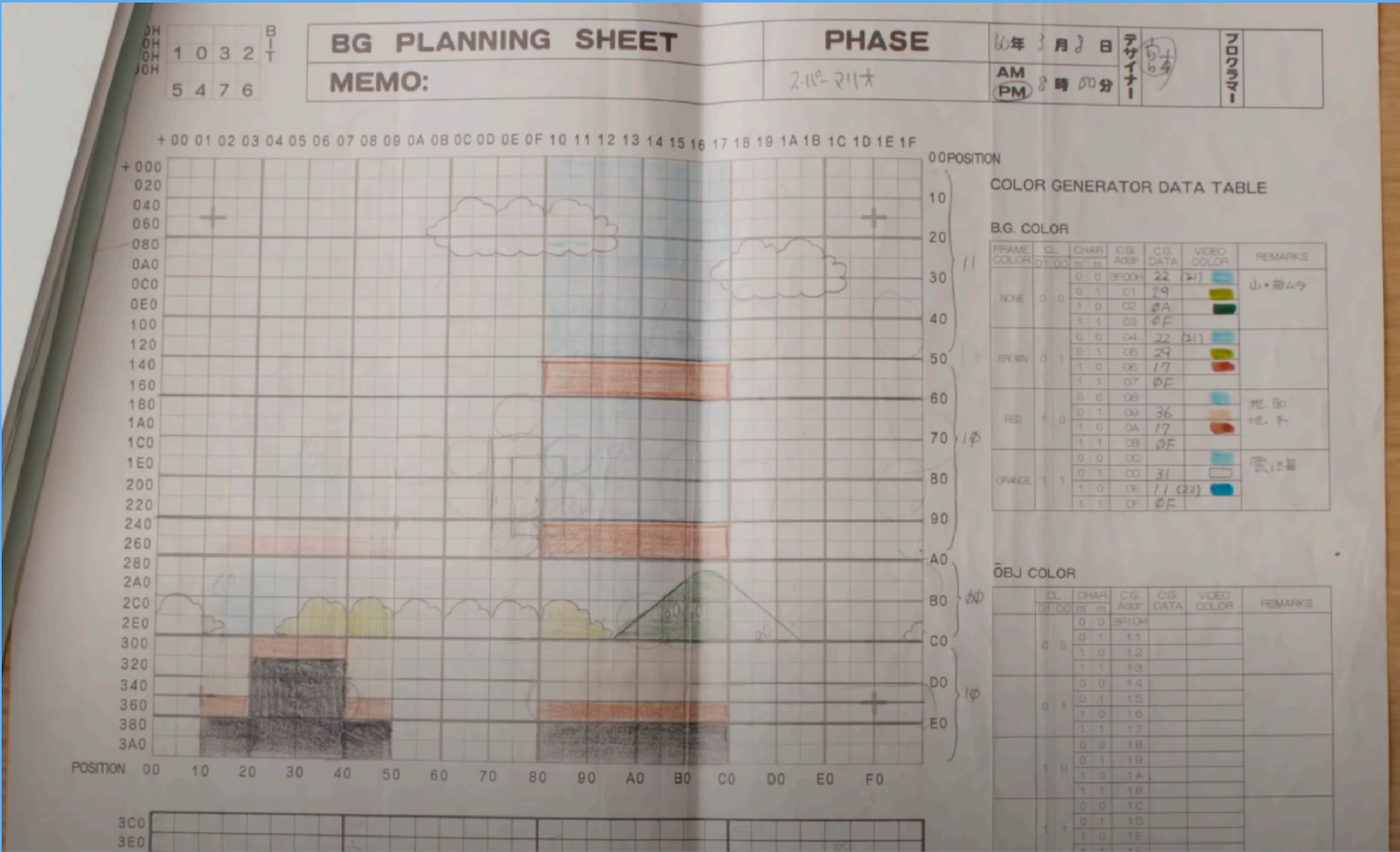
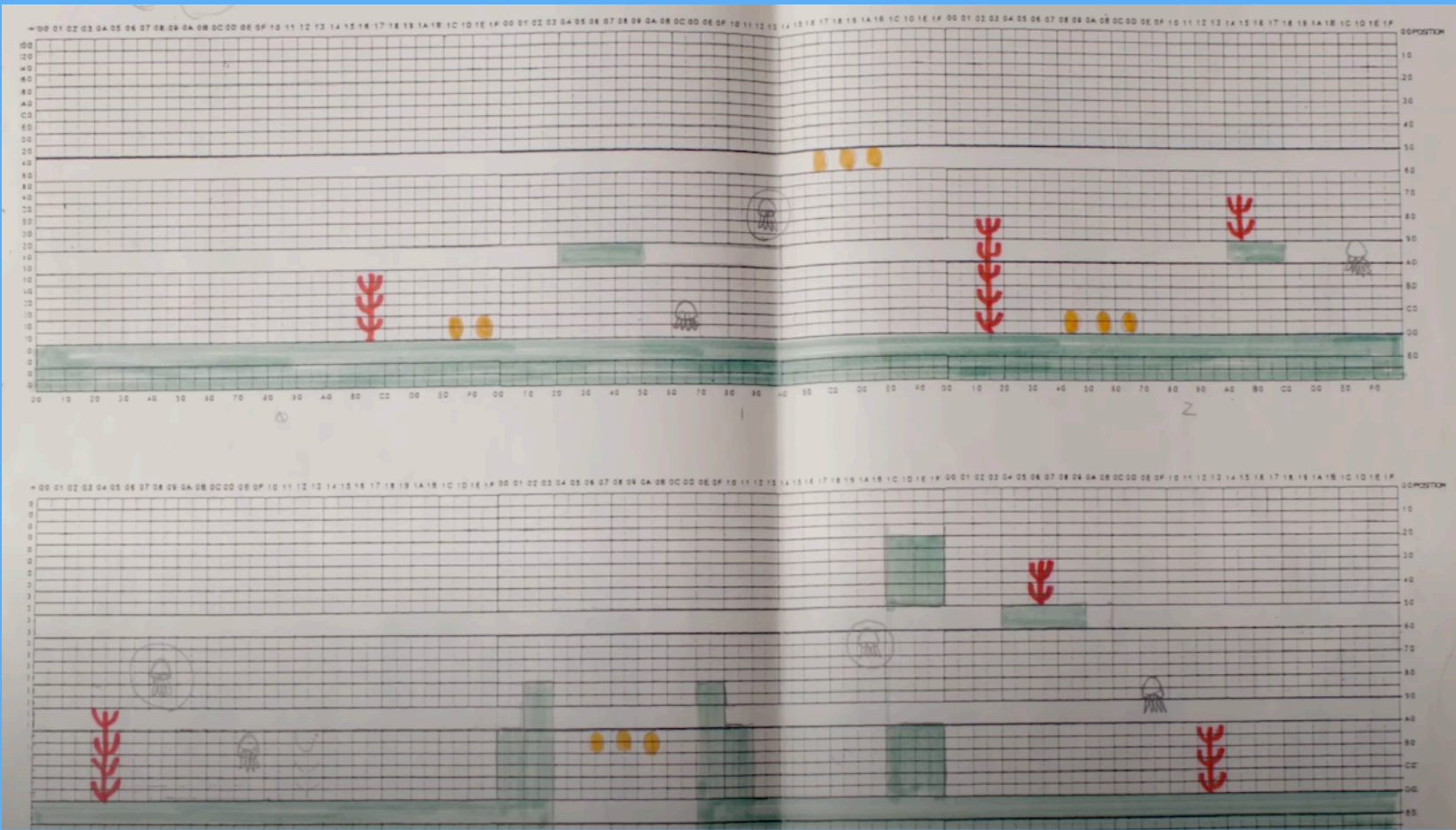
A video game starts with an idea. Nintendo is great at coming up with fun and awesome ones, like jumping on top of enemies to beat them and throwing items while racing cars. Game designers often get inspiration from their daily lives and surroundings, just like how we got inspiration for our robot from the machines and vehicles we see. Do you know the character Boo was inspired by Tezuka's wife? She was often very quiet, but suddenly she exploded one day because she was unhappy with her husband's long hours at work.

Super Mario Bros was designed around two main ideas: the jumping action and the side scrolling game play.

NINTENDO DESIGN PROCESS: 2. SKETCH OUT THE IDEA/BRAINSTORM



Then game designers sketch out their ideas and write down the story of the game. They brainstorm how the different levels of the game would look like. Back in the days, they had to draw everything by hand on graph paper.



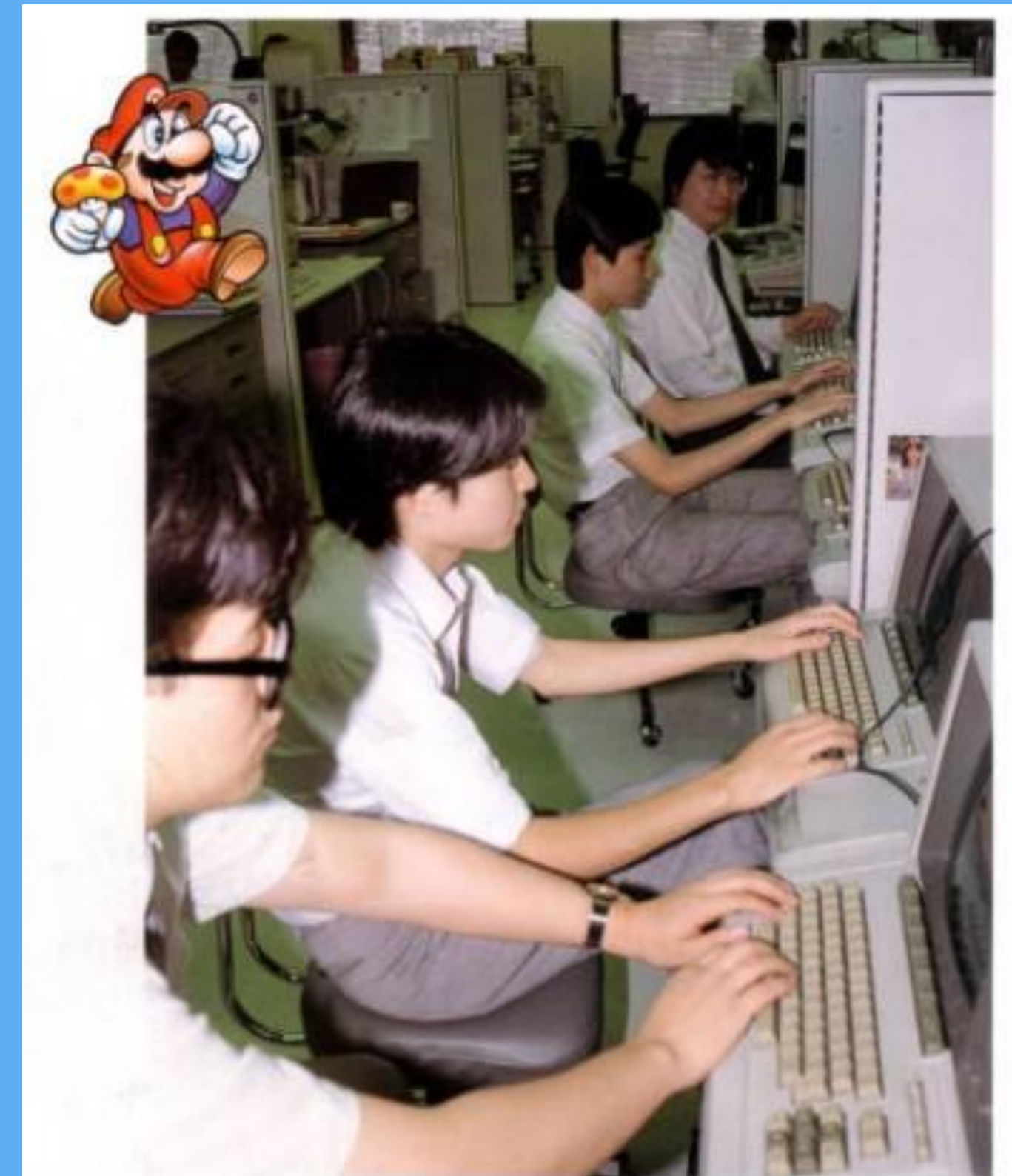
NINTENDO DESIGN PROCESS: 3. PROGRAM THE GAME



アイデアがひらめき、あたらしいキャラクターができた。かならずテレビ画面で動かしてみる

Next, they get engineers to program the game by following the graphs from the designers. First, they make simple prototypes to test things out. For example, an early prototype just showed Mario as a red square jumping around on a black screen.

As the game becomes better, they put in more characters, colors, and sounds to make the game even more awesome.



Scan by Chris Cavell <http://www.chriscavell.com>

NINTENDO DESIGN PROCESS: 4. TEST

Then Nintendo tries out the game to make sure it is fun and works well. Sometimes they test with family and friends and get their feedback. They check to see if certain parts of the game are confusing.

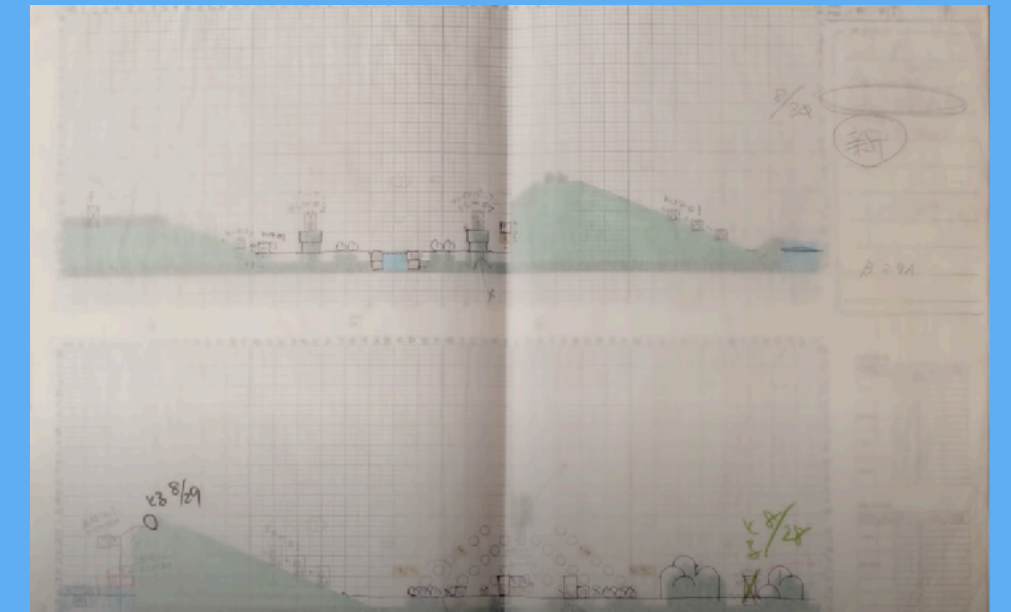
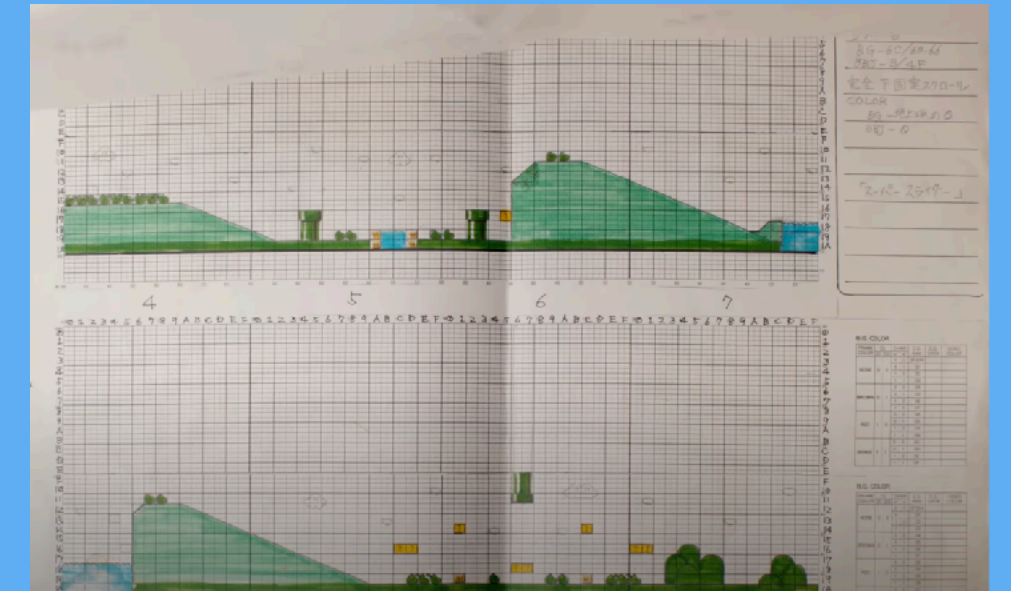
They also need to test whether they can fit everything they need such as sounds and graphics onto the game cartridge.



NINTENDO DESIGN PROCESS: 5. ANALYZE AND IMPROVE

Next, they need to analyze the data and figure out what to improve.

They would put tracing paper over levels that were designed on graph paper to make corrections faster. They must be happy they can edit the game on the computer now.



For improving memory usage, they look for ways to reuse parts like graphics and sounds. For example, that's how they end up using the same part to draw the grass and the cloud.

Once they have identified the problems, they go back to brainstorming to work out what to try next to fix them.

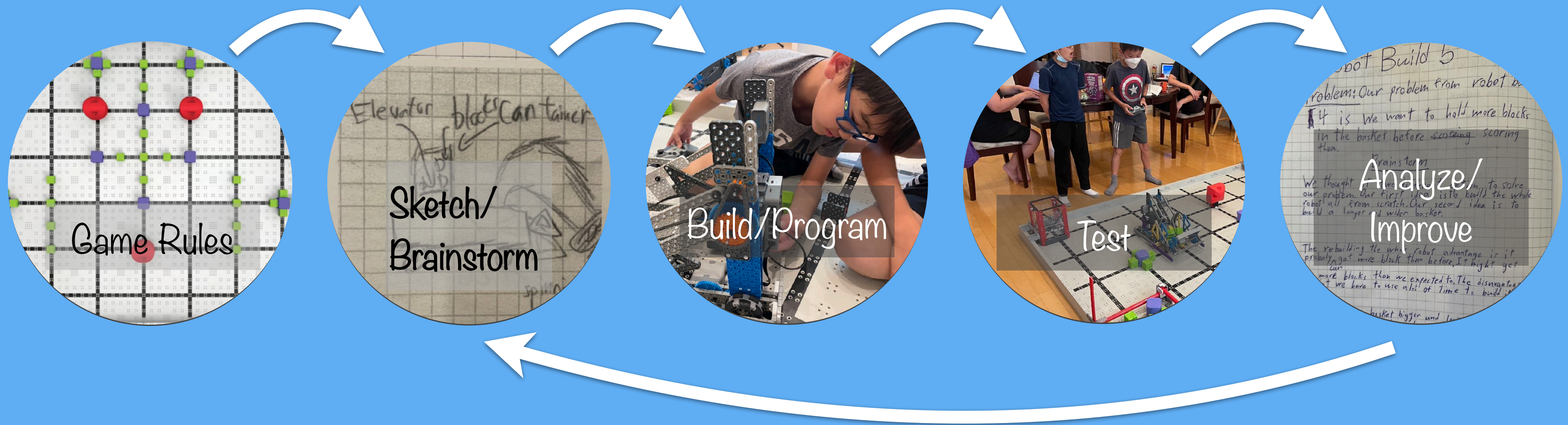
VIDEO GAME ENGINEERING DESIGN PROCESS



Goal: Maximize the fun in the game

VEX ENGINEERING DESIGN PROCESS

In VEX, we use a very similar engineering design process:



Goal: Build/Program a robot that gets a high score

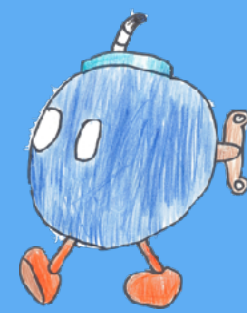
COMPARISON BETWEEN VIDEO GAME DESIGN AND VEX DESIGN PROCESSES



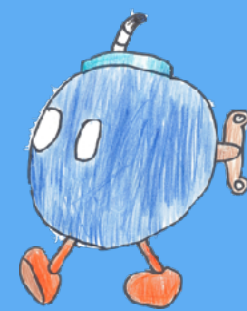
Both processes go through the same cycle across idea/problem → brainstorm → build → test → analyze stages. It takes many iterations to make a good product.



In both processes, teams do a lot of sketching and brainstorming of ideas.



In VEX, we work in a small team and do every stage ourselves. In video game design, there are big teams with many people and each may specialize in just one stage of the process.



In VEX, there are clear scoring rules we can use to test and analyze our robot. In video game design, they need to guess whether their customers will find the video game fun.

HOW VEX PREPARES US FOR OUR FUTURE CAREERS

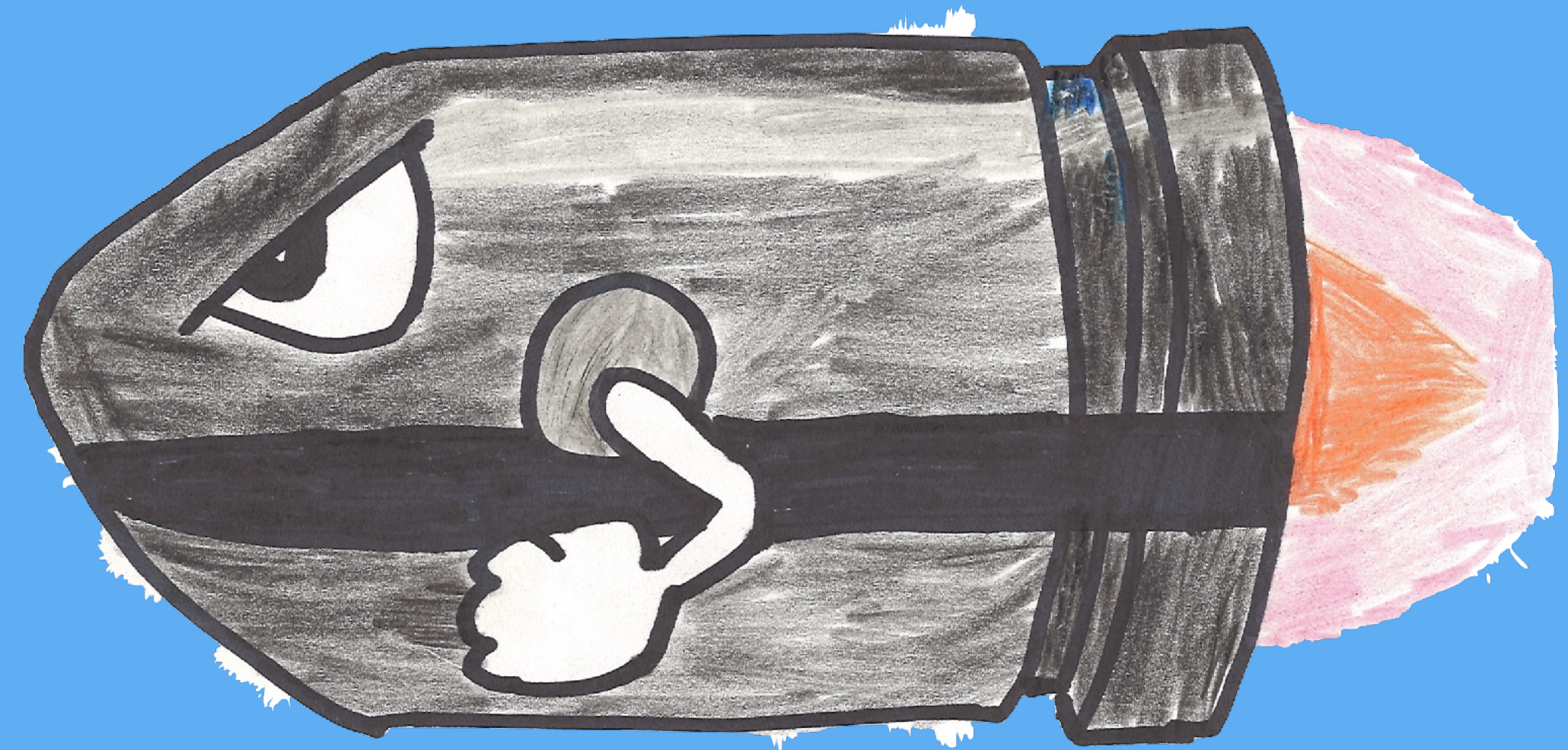
We learned a lot from our VEX experience. First, we learned to apply the engineering design process when we build our robot. Second, we learned to test and document our ideas and results. Third, we learned to program and organize our code better with functions and variables. These skills will build a good foundation for any STEM career.

We also learned a lot from our experiences in VEX tournaments. We learned to not give up easily. When we face unexpected challenges, we must stay calm and focus on solving the problems. We also learned to work as a team, and work with other teams during the alliance competitions. We learned to document our work and explain our design to judges. All these skills will be useful for our future careers.

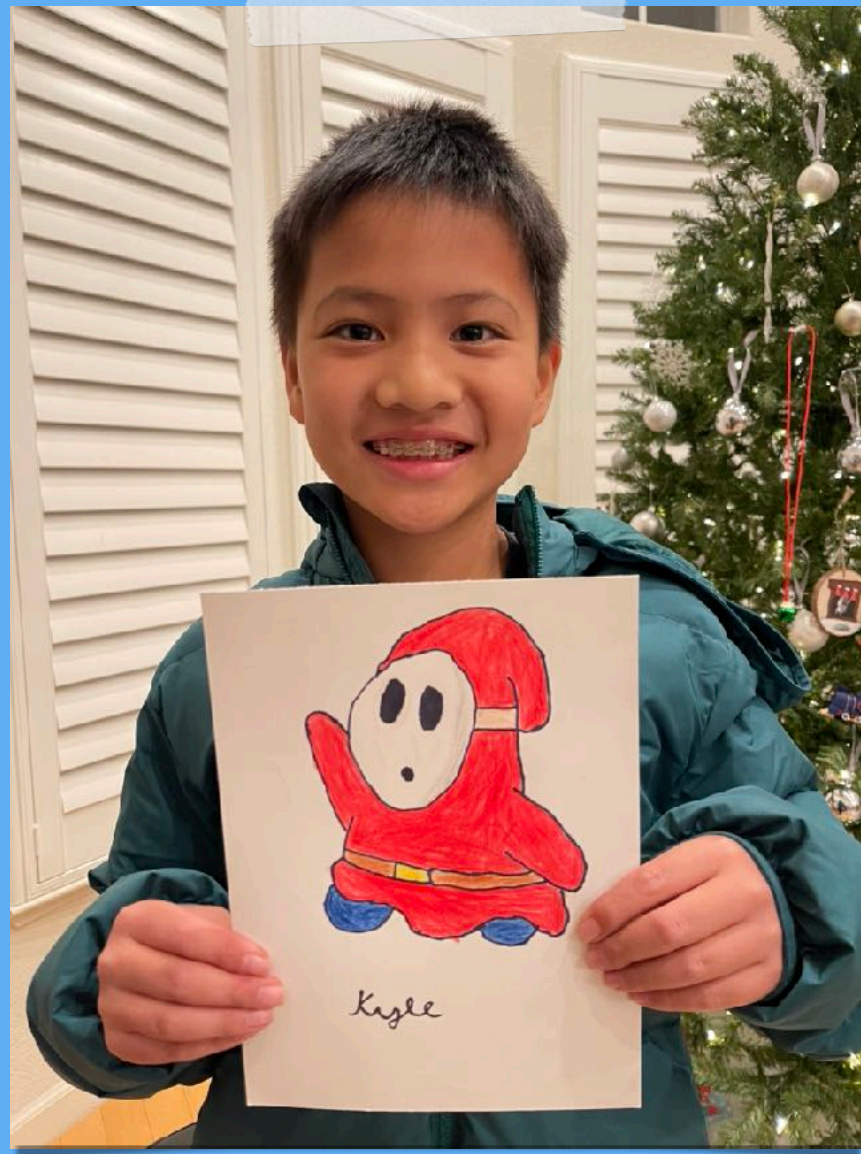


CONCLUSION

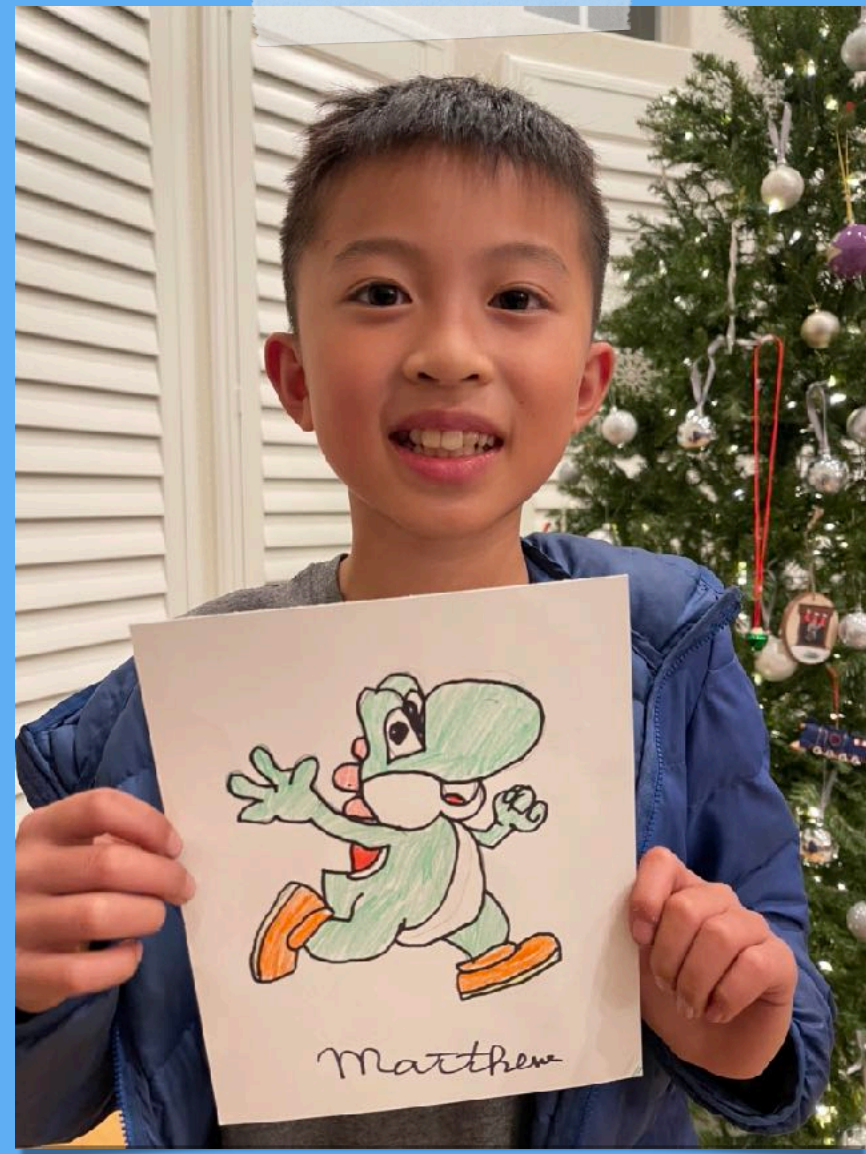
Before, we just played the games without thinking about it much. But after learning about how games like Super Mario Bros are made, we pay attention to every part of a game. It's cool to know that games start as ideas, then get sketched out, built, and tested by amazing designers like Miyamoto and Tezuka. Understanding this process makes us appreciate the games even more. It helps us realize that it takes many iterations to make something good, just like what we need to do to make a good robot in VEX.



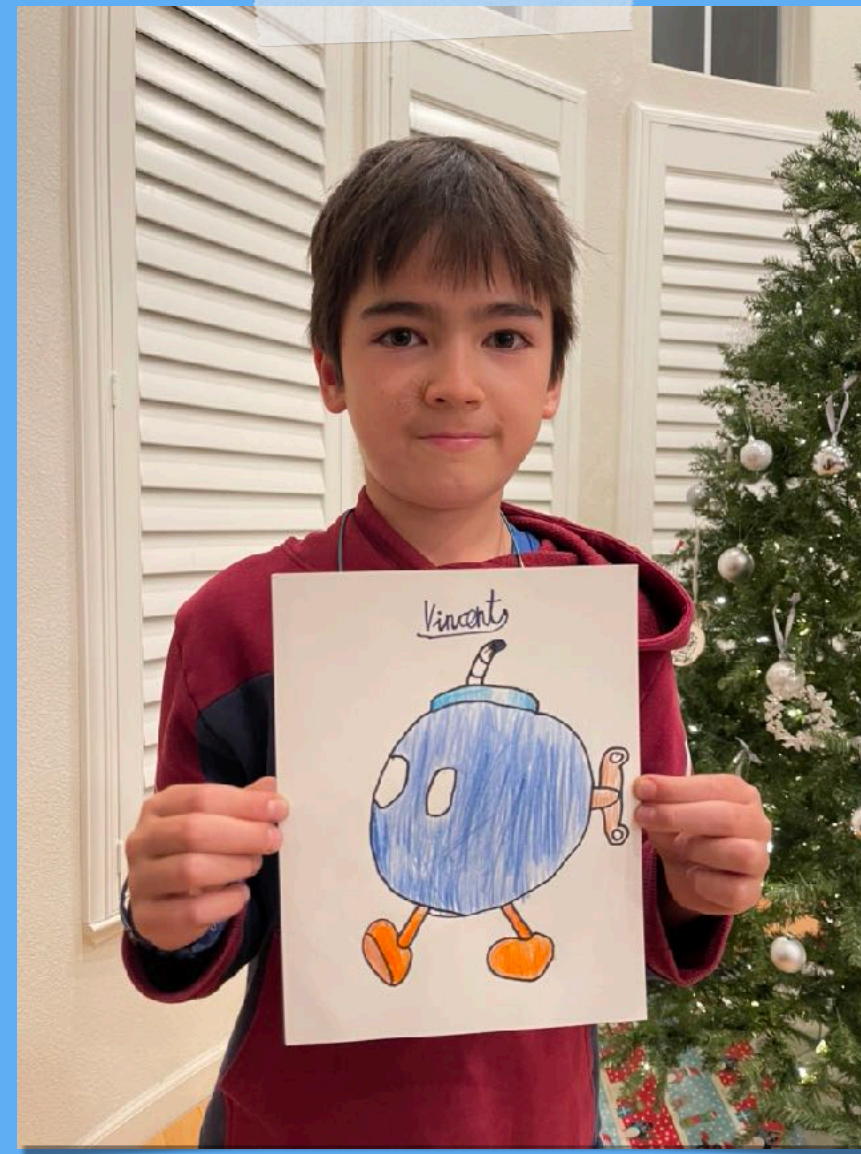
THUNDER BATTLE BOTS TEAM MEMBERS



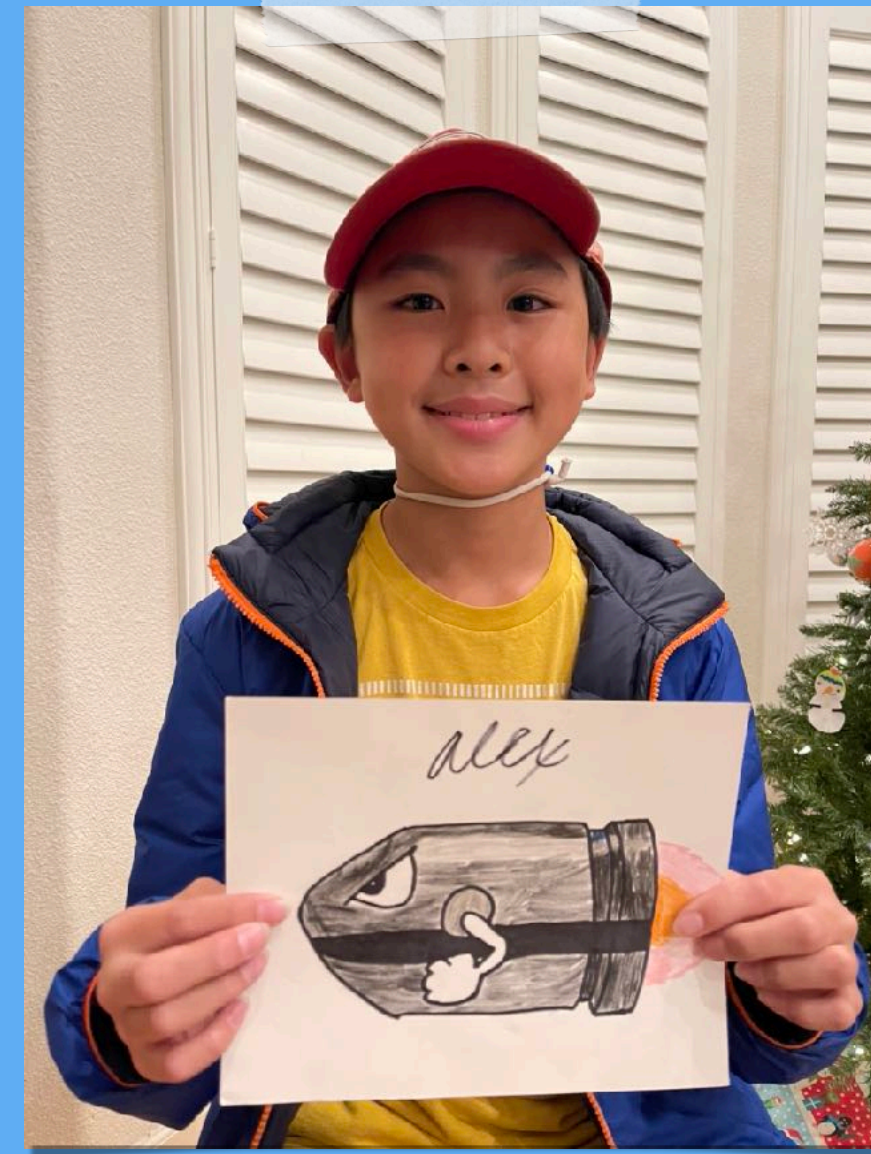
Kyle



Matthew



Vincent



Alex



Jonathan

RESOURCES



How to Create Your Own Video Game

<https://www.upwork.com/resources/create-your-own-video-game>

Interview with Super Mario Bros Creators

https://www.youtube.com/watch?v=DLoRd6_aICI

The Development History of Super Mario Bros

<https://www.youtube.com/watch?v=5aYiXbxgT30>

The Making of Super Mario Bros 3

<https://www.levelup.com/foros/247003/The-Making-Of-Super-Mario-Bros-3-1989>

See the Adorable Early Sketches Used to Create Mario

<https://time.com/3923399/nintendo-mario-sketches/>

Articles on the Super Mario creators

https://en.wikipedia.org/wiki/Shigeru_Miyamoto

https://en.wikipedia.org/wiki/Takashi_Tezuka

thegamer.com: Mario's Boos Are Based On A Super Mario Designer's Wife

<https://www.thegamer.com/mario-boo-designer-wife/>