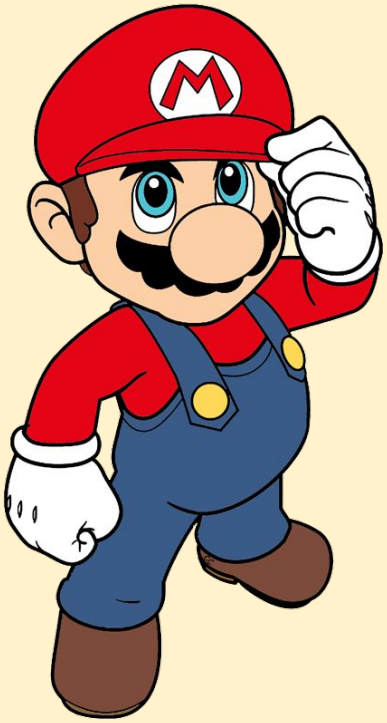
CSF
BRIGHT HORIZON ACADEMY
Scholarship. Character. Leadership. Service.

STEM

MARIO DAY



Science and Engineering Activities with a Mario Twist

1. Mario World Marble Run

Classic Super Mario Bros. is a side-scroller game, but when he and Luigi jump into a warp pipe, they are transported to a new location. With the Build A Wall Marble Run activity, kids can build their own network of "tubes," "tunnels," and "warp pipes" to create a Mario World of their own—on the wall! Pro Tip! Be sure to add in some fun lightweight obstacles (like Koopas) for your marble run object to push through. Add in a few power-ups, too, for extra fun!

2-Windflower Air Blasts

Mushroom Kingdom isn't all about mushrooms! There are numerous power-ups in Mario World. When Mario eats a Wind Flower, he can blow gusts of wind at enemies, and eating an Ice Flower lets Mario throw ice balls that freeze things. With the Build A Vortex Cannon! activity, kids can master the physics of wind gusts using balloons to build their own vortex cannons, no flower-eating required!

3-Cotton Ball Launcher

Eat a Fire Flower, and Mario gains the ability to throw fireballs as he moves through Mario World. "Taste disgusting, but if I eat them, I can shoot Fireballs," says Mario. With a homemade cotton ball launcher, kids won't need to eat anything disgusting to shoot soft cotton balls and pretend they have Mario-like power-ups. *Bonus!* This simple launcher is made from a recycled cardboard tube.

4. Cape Mario Parachute

Once you get a cape feather in Super Mario, you can use Mario's cape to fly. Take a running start and jump (holding down the correct button, of course), to make Cape Mario take off. Using the cape requires some maneuvering with the controller to stay in the air, but this power-up gives Mario a new way to reach coins up high. When Cape Mario lands, the cape functions like a parachute and helps drop him safely to the ground. In the Make a Parachute activity, kids can experiment with cape-like parachutes to explore how forces like gravity and air resistance make them work. These forces are invisible, but you can see them in action when dropping toy figurines (with parachutes attached!) from high distances. Bonus tie-in! Mario Kart fans can connect parachute science with the parachute glider

5-8-bit Mario

Computer graphics have come a long way since Mario first appeared in 8-bit form. The "look" of 8-bit images has remained popular thanks to contemporary games like Minecraft, which isn't 8-bit but features a pixelated, block-like image style. Mario is a good bit more detailed today than in the 80s, and most gamers are happy that advances in technology have brought much more detail to game images. 8-bit Mario characters are still fun for kids to draw. With graph paper and markers or crayons, kids can use the Seeing Science: Why do Video Game Characters Look Better Today? activity to see how the number of pixels relates to the amount of detail you see in a character. (*Power-up!* Interested students can also do a version of this exploration as a science fair project.)

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6. Catapult Launcher

In Super Mario Galaxy, jumping on a Launch Star is a way to transport Mario to another planet or world. We think a **popsicle stick catapult** is a great way to bring the Launch Star sensation to your home Mario World. Kids can envision their Mario jumping onto the catapult's base (the lid) and then being catapulted to another location. Challenge kids to experiment with launching to be able to accurately launch Mario to another part of your homemade Mario World! Launching mini Koopas? We can see that happening, too! (*Tip!* They might want to build in a soft landing area.)

7-Wind-powered Kart

In Mario Kart, there are a bunch of different gliders you can use, depending on the kart. If you look at the lineup of gliders from a STEM perspective, you might notice that the different shapes and designs would probably play a significant role in how well they work! In the game, the physics of the glider may not matter, but for a fun STEM tie-in, kids can experiment with **wind-powered cars** to explore how different design features would change the speed and functionality of a glider in the real world.

8-Walking Mario

Mario doesn't appear to be very tall, even in relation to other characters in Mushroom Kingdom. While height doesn't matter in terms of how much ground he covers as he runs and jumps through Mario World, in real life, height and stride go together! With the **Stepping Science: Estimating Somebody's Height from Their Walk** get-moving STEM activity, kids can experiment to correlate stride length with height. How might the difference in someone's height change how much time it takes to walk a certain distance? (*Bonus!* You can find lots of speculation online for exactly how tall Mario and other characters are!)

9. A Mario-inspired Rube Goldberg Machine

With the pipe- and tunnel-like network central to many Mario World stories, it is easy to think about taking things a step further with a clever **Rube Goldberg machine**. For a real challenge, challenge kids to start with a wall marble run (see above) and have that connect as part of a DIY Rube Goldberg machine's chain of events. What will the final "task" be that the machine accomplishes?

10-Bumper Karts

Mario Kart features all kinds of different "kart" models, including ways you can customize your kart with different wheels or gliders. Specs for your kart include speed, acceleration, weight, handling, and traction. In the game, durability isn't a key concern, but in the real world, designing cars that can withstand crashes is important! The **Engineering Car Crash Safety with Newton's Third Law** lesson is a great way to have kids use engineering design to think about ways to make cars better able to withstand crashes. A good bumper system is a power-up every cart or kart can use!

BHA CSF Chapter Represents

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APRIL 9TH

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Cape Mario Parachute

8-bit Mario

Catapult Launcher

Wind-powered Kart

A Mario-inspired Rube Goldberg Machine

Bumper Karts