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The Cyber Spinner

A proper education is arguably one of the most important things that a child can obtain in their youthful years. Although, specifically for the subject of math; it is hard to get kids practicing learning in a fun and exciting way. Some of the hardest subjects in the world (such as aerospace engineering, statistics, architecture, astrophysics, etc.) have heavy applications of math (15 Hardest). So, to advance these subjects and fields, we must give children the educational background to do so. Our toy, the *Cyber Spinner*, is a portable toy and game that will have kids practicing simple addition and subtraction for fun.

Oftentimes, it is hard to get kids to focus and grasp the intangible concept of addition and subtraction. This educational struggle starts for children as early as kindergarten, and usually ends no later than fourth grade (Drinks). Giving kids more adding and subtracting exposure in the earliest stage of this development (around kindergarten) will allow them to hopefully understand the basics of math earlier on in life. Unfortunately, many of the math toys for children in this age range (ages 5-7) have recurring flaws. For one, the pieces are way too small. According to the Nemours Kids Health, pieces should be larger than 3cm in diameter and 6cm in length to prevent choking (Cronan). In figure 1., it is clear that many marketed math games have pieces that are too small for children starting math. Another issue with these toys is that the math is too complex for kids of that age giving rise to double digit numbers or negative numbers. Not being able to solve problems that are too advanced will discourage kids from enjoying math. Again referring to figure 1, the toy on the right gives solutions as high as 17,18, and 19. Also, the wooden dial toy in the middle can also give negative numbers by rotating to the subtraction symbol. This is not realistic for kindergarten as they can only typically add and subtract from 0 to 10 (Great SChools).

To solve all those issues, the perfect adding and subtraction game for children 5-7 is the *Cyber Spinner*. This toy is a fun way for kids ages 5 to 7 to master simple adding and subtracting. The laptop

and computer theme is meant to enhance the excitement by making kids feel as though they are solving a code of sorts. Figure 2 depicts the *Cyber Spinner* in its fully assembled form. To use the *Cyber Spinner*, a child starts by spinning the dials on the side of the laptop to turn the dice turners. The clear plastic casings each hold a tetrahedral dice. To keep the adding and subtracting from 0 to 10, the left dice has the four numbers 3,4,5,6 and the right dice has the numbers 0,1,2,3. Once the child turns each dial and allows them to settle, each dice will be displaying a number. In the middle of the screen, the child gets to choose if they are adding or subtracting by rotating the tile. That creates the equation that they need to solve. To help them solve the problem, there is an abacus on the keyboard part of the laptop. The mouse pointer pieces can be counted out one by one to help them if they need it. Additionally, the screen displays a “code” that depicts how many pointer pieces each number represents, giving them feedback on their answer which is indicated by the lower right spinner. So, without being too hard or having small loose pieces, this toy helps kindergarten aged children get more exposure to computing simple equations.

In designing this toy, the parts were all created on a baseline of wanting the laptop to fit into the mold of a 12in x 11in. x 6in. rectangular prism. We also created all of our parts such that it could be realistically manufactured and assembled. The parts are designed such that they are locked in by face panels (one for the screen of the laptop and one for the keyboard). Observe in Figure 3, that each piece has an extruded cut that fits its geometry. In assembly, those pieces are fastened into the toy by screwing in the face panels. Then, taking advantage of the elasticity of the plastic, the laptop screen and keyboard are snapped together with the cylinder and hole fastener. In designing this product, it was initially difficult to come up with a toy that was all connected and allowed kids to practice math. Our ideas changed a lot from the initial plan detailed in Figure 4. Math is very commonly taught with pieces, which is why most of those toys market small pieces. So, overcoming this challenge took plenty of brainstorming but the idea of having numbered dice encapsulated in the computer solved this issue and also allowed us to control the equations the kids could create which solved the other issue as well. With the specified die numbers, the kids can create multiple equations while always staying in their level of difficulty.

References

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Figures



Figure 1. Common market toys typically sell math toys that are not fitting for children in the kindergarten age as they are too hard or the pieces are too small.

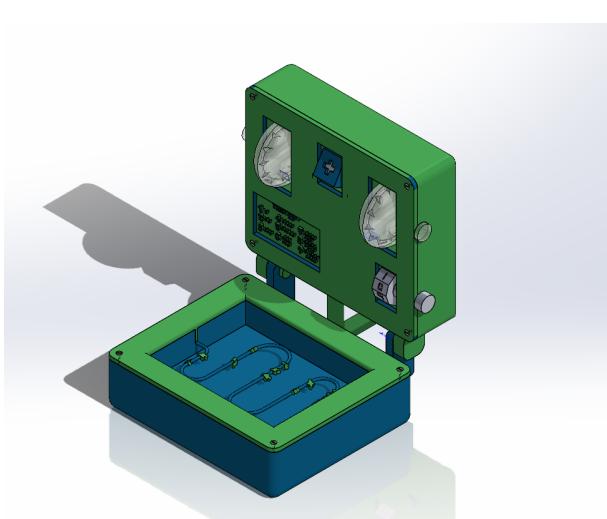


Figure 2. Fully assembled isometric view of toy.

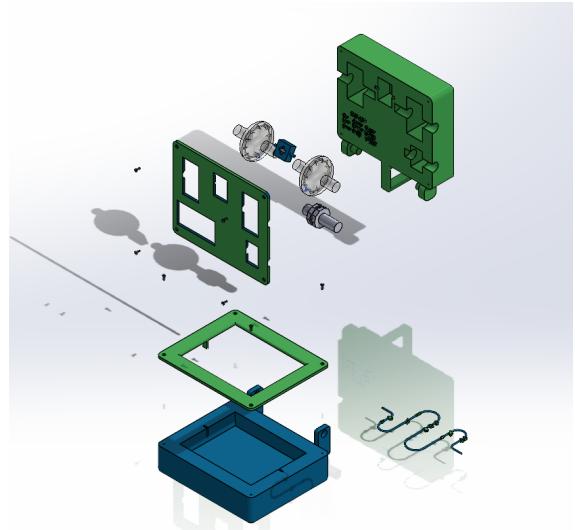


Figure 3. Exploded view of the toy.

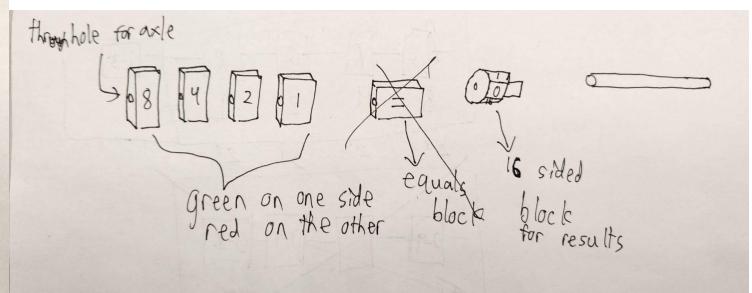
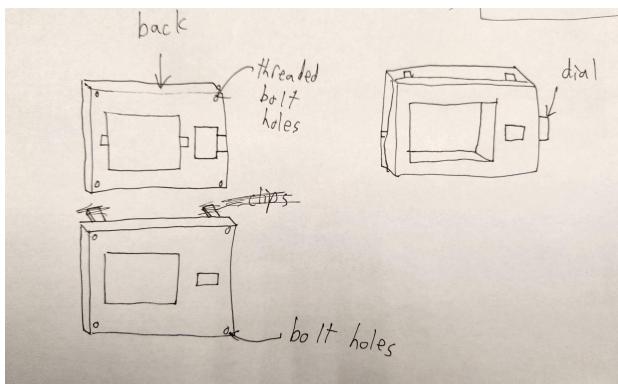


Figure 4. Initial Sketches

