



Calabrese Barton & Tan, DRL #1502755

Youth as Engineers for Sustainable Communities

Samuel and the Light-up Football

Samuel, a local 12-year-old African American, prototyped a solar-powered light-up football as an engineering project to address a need he saw in his community:

Interviewer: Samuel, why did you decide to make a light-up football?

Samuel: Well, when little kids are playing outside football and it's getting too dark, and they still keep playing and somebody might get hit in the head or something cause they can't see the ball really, so I'm going to light up the football so you can see where it's going.

Samuel's football is made up of LED tube lights that wrap around the ball to provide maximum lighting with minimal added weight, friction, or power expenditures. Because the lighting was so efficient, it would also keep hands from getting burnt. The lights are powered with rechargeable batteries that can be recharged at a solar docking station, limiting environmental impact and saving money. The football, itself, is constructed from nerf material to further minimize added weight and to reduce the possibility for injury if one were to be hit in the head. The batteries are stored in a pocket at the center of the ball, accessible by a small door, to keep it weighted properly and to minimize their potential contact with rain water and sweat.

He decided to design a light up football to help keep young people in his community safe, as he explains: "I really care about people". Samuel faced many design challenges, both technical and social. He needed to understand how parallel circuits worked, how to determine the load of his circuit and its power requirements, along side ballistics and functionality as he sought to maximize the trade-offs required.

Through an iterative process, involving cycles of community feedback, he engineered a football that met multiple needs – a process which Samuel also experienced as deeply meaningful and empowering.



Getting Feedback from a Local Football Expert



Samuel Tests Whether His Light-up Football Is Waterproof