



# Students design toys for development research

By Sarah Campbell  
Published Wednesday, November 17, 2010 11:00 PM

scampbell@salisburypost.com

KANNAPOLIS — Students at A.L. Brown High School are putting their engineering skills to work, designing toys for Dr. Carol Cheatham's cognitive development research at the North Carolina Research Campus. Jordan Baker's introduction to engineering design classes have been tasked with creating three-step toys for babies between the ages of 14 and 24 months.

Cheatham, a child psychologist and neuroscientist at the Nutrition Research Institute, will use the toys to test memory in pre-verbal infants. She said the toys will be given to babies first to measure how much they can figure out on their own. Next, researchers will show the babies how the toy works and they'll measure their ability to imitate the researchers.

The students took a trip to Cheatham's lab on Nov. 2 to find out what kind of constraints they needed to consider when designing the toys. Students were told the toys must be safe for children with no toxic glues or paints, no pinching hazards and no risk of choking. They were also instructed to be made of material appropriate for daily sanitation, small and light enough for babies to lift and sturdy enough to withstand abuse. Researchers also told students to consider using contrasting colors to differentiate between pieces.

After receiving their assignment from Cheatham, students went to work brainstorming ideas for their toys. They created a preliminary design, sketched a draft and used Autodesk Inventor to make their work 3-D. Baker said students used their knowledge of proportions, scale and measurements to understand size and how the different pieces of the toy would fit together.

"My hope is that students will gain an idea of how to complete a project start to finish, taking the requirements from a client," he said. "It's all about going from an idea to a physical project." The students presented their designs to Cheatham and her team Wednesday at the Kannapolis City Schools' Central Office. Ten groups of students explained how their toys will work and the thought process behind each step. Students got creative, making toys that resemble a paddle ball and foosball machine.

"Today was just over-the-top impressive," Cheatham, said. "The (toys) they designed are extremely good and I look forward to putting them into action." The team gave the students feedback about the feasibility of each toy, noting many of them, which stood 8 inches tall, are actually too large for babies. She suggested shrinking designs to between 4 and 6 inches tall.

Baker said they will modify their designs to fit the needs indicated by the researchers and present them again before building the physical projects. The students will use a 3-D printer to print each plastic piece. "We'll just send that file to the printer just as you would hit print on a word document," Baker said. Baker said the plastic pieces will print in layers and could take about 28 hours to print each piece.

Cheatham said the partnership was born when she visited Baker's class as a parent. "My daughter is taking an engineering class and (she) took me to meet Mr. Baker," she said. "I saw that they had a 3-D printer and I immediately knew what we needed to do.

"Mr. Baker was very open to the idea. For a teacher to change his lesson plan for the semester at the last minute on the whim of some random researcher is a testament for his teaching abilities." Cheatham said she hopes to continue the partnership with A.L. Brown. "It is my hope that Mr. Baker will make this project a permanent part of his syllabus," she said. "Our goal is to connect the two campuses.

"That project serves that purpose, students learn about some of the research being conducted ... and get to be part of it. More importantly, they are able to apply engineering principles to a real world problem."

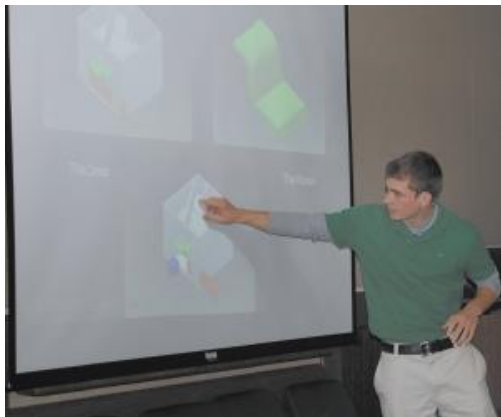
Baker began teaching engineering classes at A.L. Brown about three years ago with the implementation of Project Lead the Way. He said the curriculum allows students to participate in "relevant" classwork that prepares them to pursue engineering in college. "It's also a great class for design and problem solving, which is applicable in almost any career field," Baker said.

Baker said the goal of Project Lead the Way is to help increase the number of engineers in society and the honors classes are taught at a rigorous pace.

"They can earn college credit for these classes," he said. "They can replace some entry level engineering classes." Baker said when he began teaching the engineering classes there were empty seats, but, today, all sections of the course are full.

"It's definitely grown in popularity," he said.

Contact Sarah Campbell at 704-797-7683.



Sarah Campbell / Salisbury Post

A.L. Brown sophomore Luke Hill explains his group's toy called the 'Kicker.' Students in Jordan Baker's introduction to engineering design class are creating three-step toys for children between the ages of 14 and 24 months for cognitive development research at the North Carolina Research Campus.

Students in Jordan Baker's engineering design class at A.L. Brown are designing three-step toys for cognitive development research at the North Carolina Research Campus. After completing their designs, they send them to the 3-D printer, which creates plastic pieces that are put together



Sarah Campbell / Salisbury Post