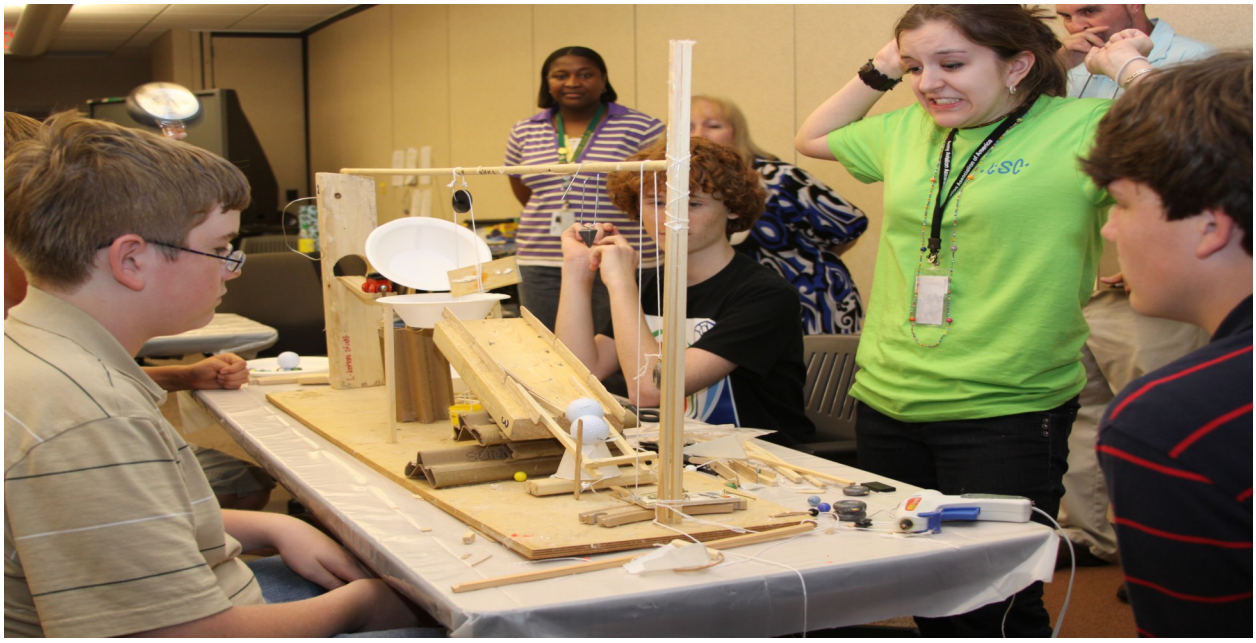

YIKES!-- Student Melanie Berry, standing at right, reacts while watching her team's Rube Goldberg machine.

Students Exert Maximum Effort for Minimal Results

Rube Goldberg machines take complex teamwork

By Randy Siniard, AMRDEC Public Affairs

REDSTONE ARSENAL, Ala. (Jun. 25, 2010) — Have you ever heard of the Rube Goldberg machine? No? Well, neither had most of the Gains in the Mathematics and Science I students. That is until they started their weeklong class at the Aviation and Missile Research Development and Engineering Center.

According to the Wikipedia online encyclopedia, "A Rube Goldberg machine is a deliberately over-engineered machine that performs a very simple task in a very complex fashion, usually including a chain reaction."

So, these students were given the task to design, engineer, build and execute a Rube Goldberg machine with the intention being to pop a balloon. The way they got there was totally up to them.

"The only restrictions they have are the machine must have at least 13 steps and it must be self-sustaining, not being interrupted or needing to be restarted once it's began," Bonnie Garrett, the GEMS instructor leading the Rube Goldberg module for the GEMS class, said.

Students used tools that are in a tool bag that were provided to them and "parts" that are located in the room. Parts included, but were not limited to, toy cars and locomotives, wooden rods, string, paper clips, dominos, golf balls, Styrofoam bowls, mousetraps, skillets and weights.

These young men and women, age 14 to 16, brainstormed, designed, built and executed their machines within one week. Remember though they were doing this while also building bridges, robots and rockets. Oh and let's not forget the tours they went on and the contests they played to win "special parts" for their robots and Rube Goldberg machines.

The students got about one to one-and-a-half hours a day to work on their machines. They were constantly resetting the machines, attempting to get them to work the way they intended. Melanie Berry, a student, said "the building was way more involved than you would've thought from the drawing."

Berry's comments echoed those of the machine's inventor, Reuben "Rube" Goldberg (1883-1970). An inventor, author, sculptor, engineer and cartoonist, Goldberg said his machines were "a symbol of man's capacity for exerting maximum effort to achieve minimal results."

Watching the students work on their machines, it seemed like they were walking in Goldberg's footsteps.

When they looked at the machine after a failed attempt, you could see they were really contemplating why it didn't work and trying to figure out how to fix it. There was discussion on the team and they tried different ways to fix the problem.

After having tried three different ways to fix their problem, they reset the process then started the machine. When it came to the step that had failed the first time, Berry grimaced, the golf ball rolled like it was supposed to this time and struck a clothes pin which released a string attached to a weight that dropped onto a mousetrap that had a spike attached to it which burst the balloon. It was a success!