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Harmony School of Ingenuity
Harmony Public Schools
Introduction to Engineering
9th-12th grade
6 Instructional Days
07/16/2018

End of Summer Report

Students will create an automata box for one of the classroom engineering design projects. The automata box project really brings the true engineering feeling to the classroom. Paper handouts and lecturing can be very boring after a while. With the automata box project students will have a hands on experience by using basic building tools and what have you. There will be multiple parts in the project that will be separated throughout 6 instructional days. Students will create a design process and hand sketch their objects in their engineering journals. Students will use Autodesk Fusion 360 to design parts of the automata box with proper dimensions. Students will then use a proper 3D printer and print out the parts created in Fusion 360. They will then assemble the box using proper building tools and implementing the parts, that will be 3D printed, into their project. Using Fusion 360 software and a basic 3D printer, students will be exposed to a small portion of my research experience here at Texas A&M.

“Students study the engineering design process, applying math, science, and engineering standards to identify and design solutions to a variety of real problems. They work both individually and in collaborative teams to identify, research, test, refine, develop, and communicate design solutions using industry practices, standards, and tools.” (TEKS/TEA, 2018)

The class objectives are the following :

- Learn how to create a well thought of engineering design process.
- Learn how to use 3D modeling software to design objects that will later be manufactured using a 3D printer.
- Have a hands on experience with basic building tools.
- Learn how to assemble an object using correct measurements.

The project will be done in “project days” and will have a unique lay out. Project day will be every Friday and I will choose 6 Fridays throughout the months of March and April. Teacher lectures will be done throughout the week. Group discussions and hands on activities will be done on the selected Fridays. Students will create their own parts in

Autodesk software for their automata box project since this will be an independent project. Students may talk and share ideas within themselves during the engineering design process development day. Students will be involved in the stages of the design process by first finding out a problem from an outside source and implementing that problem into our automata box project. Students will then start creating their automata box project using 3D manufactured parts and later on deliver results of how efficient the box is. Students will compare their results within themselves and with the digital animation they will create of the box in Autodesk Fusion 360. Support from internal and external sources may be needed. The use of a Stereolithography printers, dial calipers, and micrometers will be very helpful to our project. These materials can be purchased by the school.

This project will give students a brief understanding of what engineering is all about. It will be organized into a beginning, middle, and end format. Students will learn 3D modeling software techniques, building and drilling skills, and using a 3D printer. Students will be exposed to these lessons to better prepare them for the introductory level engineering courses in college.

Pre-test :

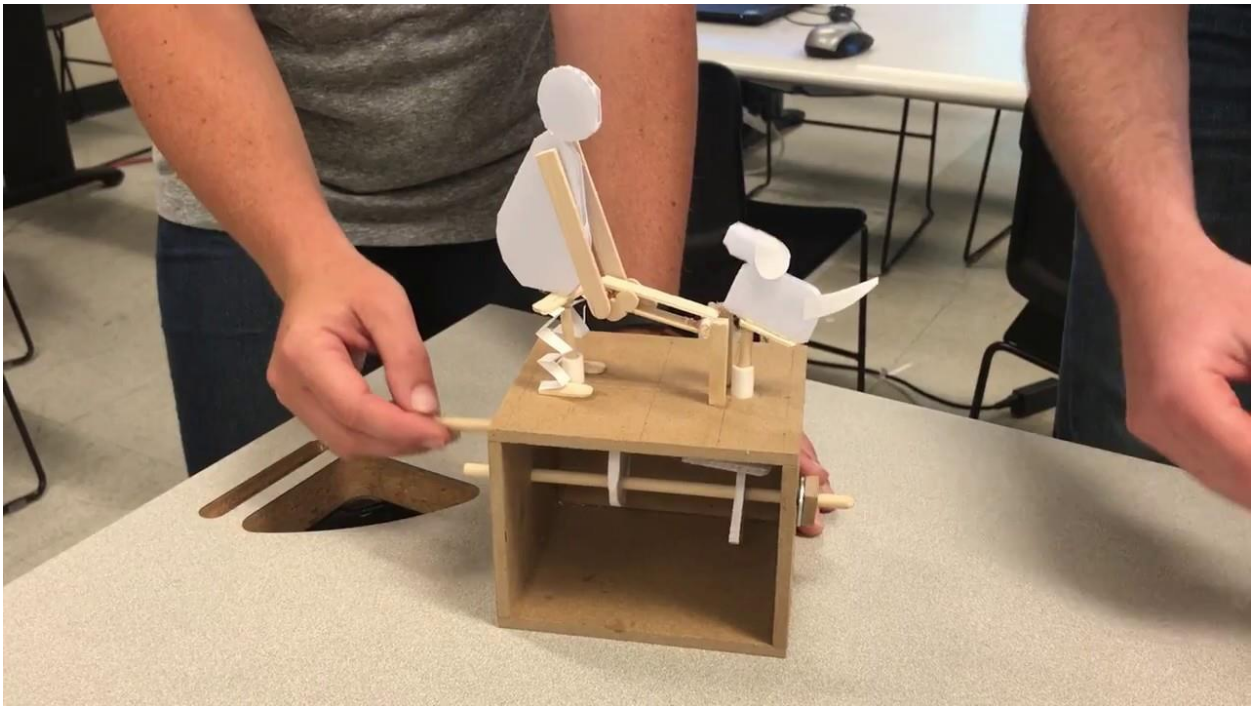
- Students will use their engineering journals to create a well thought of engineering design process, organize ideas, notes, etc., and hand sketch objects. This will later be used for their automata box project.

Post-test:

- Students will be given a quiz at the end of the project section. They will also be graded depending on how well the automata box looks and works. There will be measuring, neatness, and creative expectations for the project. Students will have to base off of a rubric in order to obtain a passing grade.

Depending on student's results, we will determine which automata box was the best. We will compare and contrast projects and talk about solutions that can help enhance the automata box project in the future.

The RET program here at Texas A&M has been very helpful to me. I found the lessons and experiences with all of the machinery here very valuable to me. Being a first year teacher, this experience has really opened my eyes and helped me understand what engineering professors here at A&M, and other universities, are expecting from graduating high school students. I will share this experience with my engineering students, administration, and other staff. I will talk about the importance of attending programs such as the RET program and how I personally benefited from it.



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