Water Manipulation with Waves

Fall 2013 Intro to Physical Science

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EMPACTS Team: Alicia Ericksen and Miranda Kent
Introduction

In our EMPACTS Project we are experimenting with the way water curves when sound is applied to the factor. We also experimented with the way light, from a strobe, shows the rate water falls. This project when shown to children will help them understand the effects one object or force has on another. We will use a speaker, tubing, water pump, and strobe light as our main materials. Technology that will be used is at hertz generator for 23–25 hertz being put out. We also used a phone or stereo for the sound output.
Project Overview

We demonstrated the various ways outside forces can have an effect on water. Our two projects were manipulation through light and through sound. When we started working on the project we were seeing a lot of flaws in our design. The speakers we had found to demonstrate the sound manipulation did not give out enough bass to make the speaker actually move. So the hertz generator would not give an effect in our project. The manipulation through light worked great. We used both a strobe light and a black light to see the waters reaction. The water seemed to be dropping in individual circles or even falling backwards towards the water source. So even though we could not get the sound working from our speakers we were still able to understand the concept through the online research.


Curriculum

Learning Objectives Met:
We learned how to demonstrate the scientific method and principles by conducting experiments, collecting and analyzing data, and interpreting the results.

We identified unifying Principles and repeatable patterns in the physical world and applied them to problems and issues of a scientific nature.

Education Standards used for project:
Arkansas Frameworks: Grade 8
PS.7.8.6
Explain how energy is transferred through waves:
- Seismic waves
- Sound waves
- Water waves
- Electromagnetic waves

PS.7.8.7
Describe how waves travel through different kinds of media
Technology Used

- Power point
- Microsoft Word
- Youtube
- Internet
- Smart Phone (to pipe the sound into the speakers)
- Digital Phone (video, pictures)
Methodology

Brain Storming Day .... Week of October 1
Miranda and I chose each other for this project and decided we would manipulate water with sound and light waves. We had a rough understanding of the materials we would need for the project.

Team Building/Research Day ... Week of October 29
Miranda and Alicia researched online to refine their projects goals. They decided what they would build and how they would build it. They talked about their use of the project in the classroom for educational purposes.

Planning/Division of Labor ... Week of Nov 4
We decided that Alicia would be responsible for the lesson plan and curriculum research since she is an education major. Miranda would be responsible for making the informational powerpoint since she needed more practice with that program. Also, since Miranda is an engineer major she would oversee the building of the project with Alicia’s assistance.

Project Work ... Week of Nov 11
Miranda and Alicia began collecting materials to build their project. Alicia went on an errand leaving the school and collected the tubing, pump, bucket, box speaker and light for the project while Miranda located materials within the school that we could use such as the strobe light, glow for the water, and she researched more online how to build the project.

Project Work .... Friday Nov 15
Miranda and Alicia spent the day at NWACC building their project and enjoyed some fresh Pizza for lunch that Ms. Phillips ordered.

Project Work ... Week of Nov 18
Miranda and Alicia spent this week trying to work out the kinks in their project. We were able to get the light portion of the project to work but had difficulty with manipulating the water with sound. Both of us came to the school on off hours to try to work with the project. Alicia brought a device to control the water flow which helped with the light portion of the project.

Individual Work… Week of Nov 25
Miranda spent individual time at home working on the Powerpoint, Project Overview, references, and Introduction for the project. Alicia spent individual time at home working on the lesson plan, methodology, title page, curriculum, project results, and acknowledgement page for the project.

Individual Work … Week of Dec 2nd
Miranda and Alicia finished up and tweaked their project for the webpage.

Web page … Monday Dec 9th
Alicia met with Ms. Phillips to create the web page for the project.

Presentation … Tuesday Dec 10th
Miranda and Alicia presented the project to the class.
Project Results

Alicia: I gained a deeper appreciation for science in taking on this project. I learned something new about how water can be manipulated and I found it fascinating. I honed my team building skills by working with someone much younger than me on this project. Also, I gained an appreciation for Miranda’s skills and expertise about engineering and developed a trust with her. I have never been good at building and had the opportunity to develop a confidence in myself that I can achieve complicated project construction.

Miranda: In this project I have experienced working with a partner and building a structure. When building the structure I learned that even when the project does not work the first time then I must try again until I see some improvement. I may not get the results that I wanted but I still gained the knowledge of what could have happened through research. I gained the knowledge of how a hertz generator worked and the effect it has on water as well as the effect that a strobe light has on water. When putting together the speaker to a head phone jack I learned the proper way to connect the wires with the help of a work study guide next door. All in all I enjoyed the experience and would definitely do it again.
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References

http://ga.water.usgs.gov/edu/adhesion.html
http://ga.water.usgs.gov/edu/capillaryaction.html
http://ga.water.usgs.gov/edu/meniscus.html
http://www.youtube.com/watch?v=OtxlQTmx1LE
http://www.youtube.com/watch?v=uENITuiS_jU