



Backyard Engineers: A Case Study

BACKGROUND

*In order to bring the advantages of game-based learning into the classroom, **Backyard Engineers** was incorporated into an interdisciplinary unit tied to Next Generation Science Standards. Not only did the students enjoy participating in the game, results showed an increase in test scores between a pre- and post test.*

Implementing game-based learning in the classroom creates opportunities for students to further their knowledge by exploring content in a meaningful and engaging way. Not only do learning games inspire and engage students — they help build critical thinking, creative problem-solving, and teamwork skills.

Learning games can be used in the classroom to teach new content, reinforce previously taught content, and measure student learning. Learning games are at their most beneficial when integrated with additional instructional activities. A well-designed learning game can be seamlessly integrated into classroom experiences to create a richer, more dynamic learning ecosystem.

Michele Huppert, seventh grade STREAM teacher, incorporated **Backyard Engineers into her classroom activities and did just that.**

STUDY DESIGN

KEY COMPONENTS:

-  **Pre- and post test data: Gained through testing using Google Forms**
-  **Designated in-class game play time**
-  **Integration of digital and physical activities to reinforce classroom content**
-  **Post experience reflective writing activities**

Google Forms were utilized to create both pre- and post tests for the 63 students in this case study. All of the students received access to *Backyard Engineers* and played the game on designated lab days. The game reinforced concepts that the students were learning during their classroom lessons and activities. Concepts included catapult criteria and constraints, structural design, forces, velocity and acceleration, and work and energy.

In addition to playing *Backyard Engineers*, the students also participated in a culminating event in which they were asked to design, build, and test catapults, towers, and heraldic banners. The students were then able to physically play a game similar to that of *Backyard Engineers*.

KEY RESULTS



17.42%

AVERAGE INCREASE IN SCORES ACROSS ALL STUDENTS



20.09%

AVERAGE INCREASE IN GENERAL STUDENT SCORES BETWEEN PRE- AND POST TEST



9.56%

AVERAGE INCREASE IN SCORES FOR STUDENTS WITH IDENTIFIED SPECIAL NEEDS



ABOUT BACKYARD ENGINEERS

Backyard Engineers is an engineering learning game aligned to several middle school science standards. In order to successfully complete the game, students must customize different catapult elements in order to manipulate movement, accuracy, and range.

ADDITIONAL OBSERVATIONS

- Students played Backyard Engineers outside of class
- When working in teams, students developed social and collaborative skills by selecting leaders to fill team positions

“ Digital learning games are a powerful tool to incorporate into any classroom. While labs and hands-on activities help solidify learning concepts, game-based learning brings an element of engagement that allows students to truly understand and encode concepts. ”

- MICHELE HUPPERT

ADDITIONAL INFORMATION

This case study evaluated the progress of 63 seventh grade students at Spring Valley Middle School in Wisconsin. Of those 63 students, 16 of them had identified special needs.

Backyard Engineers features dashboard capabilities that allow teachers to check in on progress and assess which learning objectives students have encountered. This function is available in real-time, allowing just-in-time intervention when students need it most! Integrated free curriculum is also available to enhance student learning and provide additional classroom activities.



Go to www.filamentlearning.com to learn more about implementing game-based learning and schedule a demo!