# “Playing Games” with Physics

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## PROJECT GOAL/OBJECTIVE

This project will be a multi-disciplinary Capstone experience where students from a physics class and a computer programming class will collaborate. Students will be given a problem to solve using the EDP. The task is to design/create a working XBOX game or puzzle that demonstrates various physics concepts.

## PROJECT DEFINITION/ PLAN

Students will design and create an XNA game or puzzle that will demonstrate one or more physics concepts such as 1D motion, 2D motion, Forces, Energy Conservation, Momentum Conservation, Static Electricity, Circuits, Magnetism, Electromagnetism, Wave Behavior, Sound, Light, or Optics. Physics and Game Development students are given a physics concept or principal they must demonstrate using a digital interactive game or puzzle.

•Student groups containing two or more Game Development students and two or more Physics students.
•Game Development students research their content area required for the interactive experience.
•Both Physics and Game Development students research existing digital and non-digital demonstrations of their assigned Physics concept
•A record of this brainstorming in the form of a digital journal is required and to be delivered to the teacher.
•Students could utilize online forums, document sharing, or email to communicate remotely.
•Each student will be required some minimum ideas to contribute to the brain storm.
•Ideally all of the students in the group meet in person to determine the best solution. Students could utilize online forums, document sharing, or email to communicate remotely and determine the best solution.
•Physics and GD students will have alternating deadlines towards Designing/Constructing a model.
•Most work and communication will be completed outside school.

## PROJECT PLAN, CONT.

•Some class time will be scheduled for the students to work with their partner(s) in class and consult the teacher for guidance and help.
•GD students will act as the technical experts, and will be responsible for the programming and game design.
•Physics students will act as the content experts, and will be responsible for correctness of physics principals utilized.
•All students will be responsible to contribute creativity, designing an intuitive interface, and giving the game/puzzle personality.
•Test and evaluate model Students will test their game/challenge for bugs and errors.

•OPTIONALLY student groups could share evaluate.
•Students will present their final product in their classrooms to their peers.
•The audience/users will contribute constructive feedback.
•Reevaluate and revise model.
• Students will revise their game/puzzle utilizing the constructive feedback.
• Students will submit their game, along with evidence of utilizing all steps of EDP, to the teacher as a final product.

## ACTION PLANS

### 1. PHYSICS COMPONENT

Egg Drop Activity-This lesson will reinforce the EBD process using a physics model.

### 2. GAME DEVELOPMENT

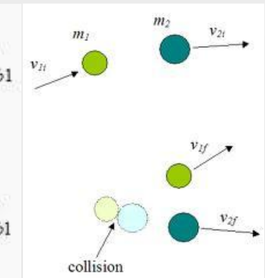
Software design activity- Design a soda machine.
This lesson will reinforce the EBD process.

### 3. COMBINED

Both classes are given Game design project description /rubric
Students assigned teams and begin assignment as described previously.

$$V_{a2} = \left(\frac{m_a - m_b}{m_a + m_b}\right)V_{a1} + \left(\frac{2m_b}{m_a + m_b}\right)V_{b1}$$

$$V_{b2} = \left(\frac{2m_a}{m_a + m_b}\right)V_{a1} + \left(\frac{m_b - m_a}{m_a + m_b}\right)V_{b1}$$




## TEAM MEMBERSHIP

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