Walhalla High School STEM Action Plan

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1. Big Idea -
   - The students will use the design process to solve problems.

2. Goals & Objectives -
   a. Students will compete in in-class tournaments with students building catapults and/or ballistic devices to shoot a projectile.
   b. Students must meet certain criteria including: defined distance and height, limited height and weight of unit, and goal of optimum distance and accuracy.

3. Timeline -
   a. Students will have class time to brainstorm, design, and build their catapults.
   b. In-class tournaments will be held at by October 21 to determine winning teams that will compete in school-wide event to be held October 31.

4. Assessments -
   a. Students will first determine the size of a scale model based on actual catapult size used in medieval times.
   b. Students must keep a journal requiring them to state the problem, brainstorm to show at least three possible solutions, develop one idea with detailed sketches that includes measurements, build a prototype with notes showing completed steps each day, and finally show a picture of final product with evaluation of success and failure (Use PLTW guidelines for design process).
   c. Rubric will be developed commonly amongst Geometry, Calculus, Physics, Industrial Tech, and PLTW for final product.

5. Resources -
   a. Materials will be provided through donations from local hardware stores and teacher/parent involvement.
   b. Students will utilize the following resources:
      - Websites with background information
      - WebQuest for catapults
      - Medieval story
• Materials for building catapult (wood, glue, nails, saws, bolts, nuts, hammers, pvc pipe, elastic bands, screws, etc.)
• Projectiles (yet to be determined)

6. Learning Experiences
   a. Students will problem solve using the design process to create the optimum device to toss a projectile a certain distance, location, and height.
   b. Students must use the following skills: measurement, data collection, graphing, calculations (statistical and scientific), scale factors, technical writing, estimation and approximation, teamwork, communication, meeting time constraints, and individual responsibility.

7. Example
   • Students will be given a description of an early weapon and its construction and elements. Students will take specifications and scale down the size to fit our class needs. Students must scale down the weapon measurements, as well as the projectile. We will make educated guesses on optimum distance, accuracy percentages, and average speed.