**`Science – Grade 6**

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| **Name: “The Art of Hurling” – 90 minute activity** | **Date: to be done Sept 2011****Submitted on 7/20/11** |
| **Content Area: Science**  | **Grade Level(s): 6** | **Topic(s): Science Inquiry****Simple Machines ( Intro. Unit )** |

**Standards (SOL)**

SOL 6.1 The student will plan and conduct investigations in which :

 b – a classification system is developed based on multiple attributes

 c – precise and approximate measures are recorded

i – data are organized and communicated through graphical representations ( graphs, charts and diagrams )

 k – an understanding of the nature of science is developed and reinforced.

SOL 6.2 The student will investigate and understand basic sources of energy, their origins, transformations, and uses. Key concepts include :

 a – potential and kinetic energy

**Objectives**

The students will design, test and improve a catapult to throw a marshmallow for distance and accuracy.

The students will be active, productive members of a collaborative group.

**Materials & Resources**

Each lab station should be equipped with :

* Plastic spoon
* Rubber band
* Meter tape
* Marshmallow ( large )
* Assorted objects ranging in size from washers to rulers

Teacher Lab Station should be prepped with :

* Target
* Chart paper
* Colored pencils or markers

**Safety Considerations**

Review relevant safety rules from Safety Contract on Day # 1, including use of goggles, UV sanitizer, proper behavior and clean / neat organization of station.

**Engage – Time Estimate \_\_\_10 min.\_\_\_**

*Ask students prompt questions from Daily Start Up format ( Bell Ringer ). Display flipchart pages of numerous catapults from historical times. Video clip from “Pumpkin Chuckin” annual competition from Delaware ( Mythbusters link ).*

**Explore – Time Estimate \_\_30 min.\_\_\_\_**

“Design and conduct your own investigation to determine how you can use a plastic spoon, rubber band and three other objects to build a catapult that will throw a marshmallow.”

After 7 – 8 minutes, distribute WS ( Data Sheet ) to each group. If after 15 minutes a group is still struggling, offer assistance to the group leader by asking questions.

**Explain -- Time Estimate \_\_10 min.\_\_\_\_**

Ask each group to report back to the class the procedure and their results.

**Extend -- Time Estimate \_\_15 min.\_\_\_**

Rotate to a new group ( “leaders” and “data hounds” stay, “supply guys” move clockwise, and “graphic designers” moves counter-clockwise ). Share prepared flipchart on Promethean Board for key concepts :

* Vocabulary : catapult, inertia, tension, pulley, simple machine

Task each new group with modifying the leaders existing design for two final competitions – accuracy and distance. Reward the winning teams with trophies ( on loan until the next lab activity ).

**Evaluate -- Time Estimate \_\_25 min. \_\_**

Distribute WS ( Connecting Learning ). Have “Data Hounds” and “Graphic Designers” report to class the averages.

**Plans for Diversity**

Four “Honors Science 6” classes will perform work in pre-arranged groups of 4 with strong & weak math students paired. Two “Academic Science 6” classes will also be in groups of 4 but will have guided key questions as prompts throughout the “Explore” phase written out on 3” x 5” cards and distributed by teachers aide to the leader of each group. The Academic classes will NOT switch partners during the “Extend” phase as there are many special needs students who would have difficulty re-gaining focus. Rounding and use of calculators can be used to aide in math computation.

**Connections**

Loudoun County Public Schools lays out a detailed curriculum that closely aligns with the VA State SOL’s. One of the first key concepts is science inquiry, so the first few weeks of the year I use an introductory skill unit focused on “How to think like a scientist”. This lesson will be completed during the first few days of September and aide students on their SOL benchmark assessments later in November.

A Real-World connection of technology and design concepts is presented with a summary of how catapults were refined throughout history based on improved designs, better materials and specific purposes. An extension activity as a HW assignment can be to have students compare and contrast ( using a Venn diagram ) how the winning catapult designs for accuracy and distance.

Math connections to measurement and averages is reinforced.

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