

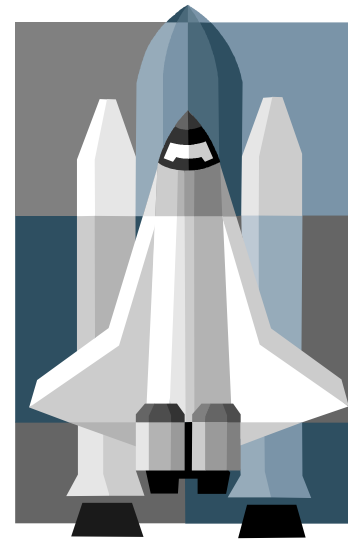
Newton's Laws Revised

Aron Anderson

Science Teacher

Larsen Middle School

School District U-46



This learning activity was developed as part of the requirements for the Aurora University / District U-46 graduate credit course Tech: Improve Student Learning OEDS 6044 Spring 2006, under the guidance of instructor Richard Levine

Learning Activity/Student Product

Student groups will:

- Research Newton's three laws using classroom resources.
- Create a concept map of each of Newton's three laws using *Inspiration*.
- Revise Newton's Laws by creating a poster with a new name, a pasted hard copy of their Inspiration concept map and example linked to the name for each law.

Learning Activity/Student Product Cont.

- Create a mini-lab station depicting one of Newton's Laws.
- Lab Practical:
 1. Students will complete each of the student generated lab stations.
 2. At each station, students will have to explain which law is depicted using specific examples from the station.

Goals and Curriculum Fit

- **12.C.3a** Explain interactions of energy with matter including changes of state and conservation of mass and energy.
- **12.D.3a** Explain and demonstrate how forces affect motion (e.g., action/reaction, equilibrium conditions, free-falling objects).
- **12.D.3b** Explain the factors that affect the gravitational forces on objects (e.g., changes in mass, distance).

Bloom's Taxonomy

- Synthesis- rearrange and integrate each of Newton's laws into a new name which is linked to a student-generated example.
- Evaluation- assess information and explain the law using their own words in a poster format and through creating a physical lab station exemplifying one of Newton's Laws.

Essential Questions

- What is the key idea in each of Newton's Laws?
- What is a real-life example for each of Newton's Laws?
- How would each of Newton's Laws be demonstrated in a mini-lab station?

Rubrics

- A rubric will be created on Rubistar for the creation of the student's posters.
- A specific rubric will be created for each period depending on student feedback and classroom discussion.

- Example Rubric that may be generated:

http://rubistar.4teachers.org/index.php?screen=ShowRubric&rubric_id=1270509&

Student's conceptual readiness

- Students will be trained on Inspiration prior to the unit.
- Real-life examples and mini-lab stations of Newton's Laws will be discussed before students must generate their own.

Student's technical skill level

- Student will be empowered with the skills to use the program Inspiration to organize their research findings in an enhanced graphical format.

Adapting and Transforming Levels of Technology

- Using Inspiration moves this lesson to an adapting level of technology.
- Specifically, students are creating a concept map within Inspiration compared to writing a concept map.

Details of the Learning Activity/Student Products

- **Concept map of Newton's three laws using *Inspiration*.**
 - Example:* Students will break each of Newton's Laws into key ideas and create a concept map.

Details of the Learning Activity/Student Products

- **Concept Map Continued...**

A student's concept map may contain these main ideas: Newton's Third Law ► Action ► Reaction ► Equal ► Opposite ...while using the program Inspiration to create added features.

Details of the Learning Activity/Student Products

- Revise Newton's Laws by creating a poster.
 - Example: Students could call Newton's Third Law, "The Skateboard Wipeout Law." The example would be a drawing of someone falling off of a skateboard with the person falling backwards and the skateboard rolling forward.*

Details of the Learning Activity/Student Products

- **Mini-lab station depicting one of Newton's Laws.**

Example: Each group will be assigned one of Newton's Laws. For example, students with Newton's Third Law, could set-up a lab station that instructed two students to sit down on two rolling office chair facing each other.

Details of the Learning Activity/Student Products

Mini-lab Cont...

Then, students would be instructed to gently push against each others hands.

Each student would roll backwards as they are pushing forward, which demonstrates Newton's Third Law.