Physics 30 – Alternative Energy Sources and Digital Commerce Lesson

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Physics 30 - Curriculum Connections
PH30-FI1 – Investigate Gravitational Fields and their interactions with matter
PH30-FI2 – Investigate electric and magnetic field and their interactions with matter
PH30-CO1 – Investigate the nature of mechanical energy and efficiency in mechanical systems, including the law of conservation of energy

Summary of Artifact

Students will examine and understand the potential of online collective fundraising (e.g. Kickstarter, GoFundMe, IdieGoGo) and it's potential impact on alternative sources of energy (Gravity, Electricity, Wind Energy). The example that I will show them is called the Gravity Light. It uses the principle of conservation of energy to convert gravitational potential energy into kinetic energy and then into electrical energy. Students will then do some research on Kickstarter, Indiegogo, and/or GoFundMe to find an alternative source of energy that is in development and awaiting funding.
Students will look at areas including potential impact to the environment, potential impact to the economy, barriers to success, alternative ideas that they have thought of because of doing this research, amount of money that can be made from this project, etc.

Lesson Plan

1. Introduce Kickstarter, IndieGoGo, GoFundMe. Talk about the theory behind such websites and some positives/negatives about them.
2. Read through the Gravity Light article and discuss it. We will talk about how IndieGoGo was instrumental in getting this project up and running.
3. Look into Gravity Light now. See where it has went since starting in 2013.
4. Students will then research an alternative energy source via Kickstarter, IndieGoGo or GoFundMe and submit a short report connecting the project they found to the Laws of Conservation of Energy and/or gravitational energy and/or nuclear technology.
5. Students will create a project on alternative energy and online fundraising (see guidelines and rubric below)

For New Lamps, An Unlikely Energy Source: Gravity

As long as you reset a weight every 30 minutes, you can have a continuous, battery-free light source.

By

Colin Lecher

Kerosene lamps used in off-grid, rural areas are a major problem. They're **bad for people's health** and the environment's. One startup's solution is to tap another, greener resource, something we all have in abundance: gravity.

The invention, GravityLight, does exactly what the name suggests: It keeps a light going through the power of gravity. As an attached weight falls, it pulls a cord through the center of the light, powering a dynamo. That dynamo converts the energy from the falling weight into power for the light. (It's the same idea as a hand-cranked device, just more vertical.) The weight can be set in a few seconds, and as it slowly reaches Earth, enough energy is generated to keep a light working for 30 minutes. As long as it's set every 30 minutes, it makes for a green, battery-free, continuous stream of light. Other, similar devices like battery chargers could be used through the same process, too.

The inventors say the gadgets can be sold now for less than $10, which would make a return on investment for owners three months after dumping kerosene lighting. And speaking of investments, the group has already shattered the goal for **its Indiegogo campaign**, meaning we'll hopefully see these in action soon.

Links for Gravity Light – Where is it at now?

http://gravitylight.org/

https://www.indiegogo.com/projects/gravitylight-2-made-in-africa#/story

Questions for Discussion:

1) How does Gravity light work? (relate to conservation of energy)
2) Why is it important to have an alternative light source in impoverished areas such as many countries in Africa?
3) How would Gravity Light affect the economy in the area?
4) How would Gravity Light affect the environment in the area?
5) Can you think of any applications of the Gravity Light in **your** daily life?

Optional Project Guidelines

1) Research an alternative energy source that is currently (or has just recently finished) being funded by IndieGoGo, GoFundMe, Kickstarter, or some other online fundraising platform.
2) Connect this project to the Law of Conservation of Energy, Nuclear Technology, Electric and Magnetic Fields, etc.
3) Connect this project to other areas:
    a. potential impact to the environment
    b. potential amount of money that can be made from this project
    c. potential impact to the economy (ie. Job creation)
    d. potential barriers to success
    e. how would this technology impact **your** life?
    f. alternative energy ideas that you have thought of because of doing this research
    g. any other connections you have come up with
4) Create a presentation to deliver your research (ie. Word document, powerpoint, prezi, viedeo, song, poem, etc.)

Rubric

(Not all categories will be assessed. Only if they are applicable)

	5	4	3	2	1
Connection made to Conservation of Energy Laws	Excellent connection	Strong connection	Good Connection	Weak Connection	Very Weak Connection
Connection to Nuclear Technology	Excellent connection	Strong connection	Good Connection	Weak Connection	Very Weak Connection
Understanding of how Mechanical Efficiency relates to product design, cost, profit, etc.	Excellent understanding	Strong understanding	Good understanding	Weak understanding	Very Weak understanding
Understanding of relationship between electric and magnetic fields	Excellent understanding	Strong understanding	Good understanding	Weak understanding	Very Weak understanding
Connections to: Environment, Profit, Economy, Potential Barriers	Excellent connection	Strong connection	Good Connection	Weak Connection	Very Weak Connection
Impact on your life and Other Ideas you may have come up with as a result of this research	Excellent connection	Strong connection	Good Connection	Weak Connection	Very Weak Connection
Any other connections you have determined as a result of this project	Excellent connection	Strong connection	Good Connection	Weak Connection	Very Weak Connection