Physics Lesson: Electricity Unit

For Summer Teacher Externship

**Key concepts:**

* The stuff we are learning in class really relates to the real world

**Objective:**

Build your own electric generator

**Career Technical Skills & Knowledge:**

* “SCANS” skills-Thinking Skills A-F
* “SCANS” skills-Resources A,C,D
* “SCANS” skills-Interpersonal A,B,D,E,F

**Academic Knowledge & Skills:**

**HS-PS2-5. Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.** [Assessment Boundary: Assessment is limited to designing and conducting investigations with provided materials and tools.]

In class, we will be learning about electricity and magnetism. This project will allow students to gain first-hand knowledge of these concepts and share this information with others.

**Integration Opportunities:**

Language Arts: Write letters to local businesses

**Motivational Opener:**

Unit Project: build your own electric generator

In class: watch utube videos showing some examples of simple generator projects

<https://www.youtube.com/watch?v=k7Sz8oT8ou0>

<https://www.youtube.com/watch?v=osZ49tzKmks>

<https://www.youtube.com/watch?v=jiAhiu6UqXQ>

I will assign students into teams. Each team needs to do a little bit more research and decide on the design of their electric generator. There are more complicated designs if anyone is feeling ambitious.

Rules:

* The finished project must power a minimum of one LED light bulb. No maximum.
* The materials used cannot cost you any money, only salvaged and donated materials allowed.
* Finished project must include a presentation that will awe your principal, parents, and non-physics students. This presentation should include a poster that explains the physics behind your design as well as a 3-5 minute speech.

**Learning Activities:**

Timeline:

**Week 1:**

Research with your group and decide on the design of your generator. Submit to your teacher a proposal including a sketch of your generator, the materials you will need, and ideas for who to ask for donations of materials.

**Week 2:**

Write letters to businesses or individuals that may donate materials needed for your project. We will discuss in class how to do this.

**Week 3:**

Make phone calls to follow-up with your requests for materials, find alternative sources if necessary, schedule pick-up/delivery of materials.

**Weeks 4-7:**

Coordinate with your group to get together to build your generator.

Coordinate with your group to put together your presentation.

Some class time will be allotted, see schedule. Depending on the complexity of your design, you may need to plan to work outside of the classroom.

**Week 8:**

Present your project to the class and some special guests. What do I do if my design doesn’t work? Your presentation would need to include discussion of the trouble-shooting process and a good, scientific explanation of why it didn’t work and what would need to change to improve the design.

**Week 9:**

Project self-evaluation

**Assessment:**

Project equally weighted to mid-term exam

Project grade:

15% maintaining schedule

35% finished generator

35% poster/ presentation

15% self-evaluation