Pickens County School District 6th grade
PLANNED TIMELINE

August- Inquiry

September-
  - Introduce the Project idea, notify students of symbolic icon that will be used to identify
  - Teach Technological Design process
    - Marble Madness
    - Spaghetti Towers
    - Foil Boats
  - Begin Weather Unit
    - Weather instruments (sling psychrometer)

October- Mid November
  - Continue Weather unit
  - Begin Energy Unit
    - Batteries and circuits
    - Magnets and motors
    - Generators

Mid November-first of December
  - Continue Energy Unit
    - Batteries and circuits
    - Motors and magnets
    - Generators

December
  - Culminating STEM project
  - Introduce Idea of Invention Convention before they leave for Christmas break

January
  - Technological Design Begin discussing Invention Convention
  - Plants

February
  - Continue Plants
  - Invention Convention is FEB 28 and FEB 29

March
  - Finish Plants
  - Writing PASS
April - May
  • Animals

May after Pass
  • Health and Sex Ed
Name of problem: Use wind energy to produce energy for your home during the power outage

Name of Authors: Chris Brewington and Melissa Riddle

Content Area: Science

Course: 6th

Unit: Technological Design, Energy, and Weather

Standards

- 6-1.4 Use a technological design process to plan and produce a solution to a problem or a product (including identifying a problem, designing a solution or a product, implementing the design, and evaluating the solution or the product).
- 6-4.5 Use appropriate instruments and tools to collect weather data (including wind speed and direction, air temperature, humidity, and air pressure)
- 6-4.8 Explain how convection affects weather patterns and climate.
- 6-4.9 Explain the influence of global winds and the jet stream on weather and climatic conditions.
- 6-5.2 Explain how energy can be transformed from one form to another (including the two types of mechanical energy, potential and kinetic, as well as chemical and electrical energy) in accordance with the law of conservation of energy.
- 6-5.4 Illustrate energy transformations (including the production of light, sound, heat, and mechanical motion) in electrical circuits.

“Big Ideas”

- Students should understand how to follow the technological design process.
- Students will be able to create a solution to solve the proposed problem.
- Students will demonstrate the ability to evaluate and identify modifications that need to be made.

Essential Question: How would you use the Technological Design process to build a turbine to power your house during a power outage?

Scenario: Imagine there is a massive power outage in your town. Everything is dark and nothing that normally occupies our time is working. There is no Television, no video games, no cold refrigerator just moldy food, no air conditioning in the dead heat of summer. There are not even any lights in your home. But, you have been chosen to be the town’s engineering heroes.
Materials and Resources:
- Pinwheels
- Paper plates
- Plastic bottles
- Boxes
- Cardboard tubes
- Plastic spoons
- Duct tape
- Masking tape
- Thumbtacks
- Paperclips
- Wire
- Motors/generator
- Magnets
- Light bulbs
- Light weight metal rods
- Toothpicks
- Thread spools
- Box Fan
- Aluminum foil
- Sturdy plastic sheets

Content Information:
- Unit notes for Energy
- Unit notes for Weather
- Watch various Youtube videos on how to build a wind turbine.
- Science explorations textbook
  - http://solarnavigator.net/wind_turbines.htm

Deliverables:
- Students will create a working wind turbine that generates power to a small light bulb in a model home.

Parameters:
- No constrains on the diameter or height of the turbine.
- Wind turbine should be secured to the platform.
- Platform should be constructed from cardboard.
- Only one turbine and one generator may be used to generate the electricity for the bulb.
- Students will be given a budget to purchase materials.
- You must create a working wind turbine that generates power to light a small light bulb in your model home.
- Your final project must fit in a 2’x 2’ perimeter
Assessment:

- Rubric for finished project - created to match parameters
- Summative Test - Application questions focused on unit material
- Writing - Engineering Reflective Journal with 7 entries
  - Entry 1: Identify the problem in your words.
  - Entry 2: What are your possible solutions
  - Entry 3: What are your limitations and tradeoffs
  - Entry 4: Solution Design illustrated and described (must have more than one option)
  - Entry 5: Implementation: Step by step explanation of how you built your solution
  - Entry 6: Evaluation: Pros and cons…Did it work? How well did it work? What you could do to improve?
  - Entry 7: What did you like the most about this project? What did you learn? What did this project make you think about? How could you adapt this lesson? Using prior knowledge of different climate zones and weather patterns, where do you think these wind turbines would be the most successful? If there is no wind, what other alternate energy source could we use?