

STEM ACTIVITY Lesson Plan Template

Teacher: Mr. Hengstenberg
 Course: Environmental Science
 Unit: Renewable Energy
 Date:

Building: FHS

STEM Standards_ (CCSS/NGSS)	Student Language	How Demonstrated (Assessment)	Real World Connection
<p>HS ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.</p> <p>HS PS3-3 Design, build, and refine a</p>	<p>I CAN: Construct a passive solar house. Research a design of a passive solar house.</p>	<p>🕒 A 3-D model of a passive solar house.</p>	<p>To be able to research, plan, construct and tweak is essential for any project in the real world.</p>

<p>device that works within given constraints to convert one form of energy into another form of energy. HS ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on natural system.</p>			
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Lesson:

I. Background Information: See Real World Connection (above)

This lesson focuses on how the sun’s energy is used to heat and cool houses. Students construct passive solar houses made of everyday materials.

II. Technology/Engineering Standards: See Standards (above)

HS-ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

III. Critical Key Vocabulary Term:

Engineering

Passive Solar
Energy
Renewable Energy

IV. State the Challenge/Problem:

To construct a passive solar house that retains heat in colder months or prevents an increase of heat in warmer months.

V. Materials

____Oak Tag, construction paper, cardboard boxes, plastic wrap, scissors, tape, glue, hot glue guns, thermometers, Insulation materials.

VI. Procedure:

1. Research passive solar house designs. Generate ideas and images of different types of passive solar houses.
2. Give students the same materials. Students may bring in additional materials.
3. Students must design a passive solar house. The goal during colder months is to increase the temperature inside the house, while the goal in warmer months is to limit temperature increase as much as possible.
4. The house must have 4 walls, at least 4 windows, two doors, at least 15cm high, have an area of at least 30cm, a roof, and room inside for a thermometer.

VII. Design Process Steps:

VIII. Extension(s)

Research energy usage of passive solar houses compared to traditional houses.

IX. Scaling the Lesson Up and/or Down

How can the lesson be adapted to accommodate different grade span students (elementary, middle, high school)?

S.T.E.M. Connections include:

Science-Energy, solar, heat transfer,
Technology- Passive solar houses designs, research different models
Engineering- construction, problem solving, designing and tweaking
Math- Measurements, volume and area, recording temperatures.

REFLECTIONS: