

KNEX Renewable Energy Lesson Plan

Context (InTASC 1,2,3)**Lesson Plan Created By:** Alyssa Horpedahl**Created:****Lesson Topic:** Solar Energy & Energy Changing Forms**Grade Level:** Grade 4-Grade 5**Duration:** 1 – 50 minute class**Kit Contents:** http://odin-primo.hosted.exlibrisgroup.com/nmy:nmy_all:ODIN_ALEPH007803343**Desired Results** (InTASC 4)**Purpose:** The student will understand solar energy and how energy changes forms.**North Dakota English Language Arts & Literacy Content Standards:**

- Writing Standards: Research to Build and Present Knowledge
 - W.8 (Grade 4) Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.

North Dakota Science Content Standards

- Science Standards: Energy
 - PS.3.2 (Grade 4) Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

Objectives:

The student will be able to explain the change of energy from the form of light through a solar panel.

Assessment Evidence (InTASC 6)**Evidence of meeting desired results:** The student will present their KNEX model to the class and properly explain the change of energy as it works.**Learning Plan** (InTASC 4,5,7,8)**Instructional Strategy: (Check all that apply)** Direct Indirect Independent Experiential Interactive**Technology Use(s): (Check all that apply)** Student Interaction Align Goals Differentiate Instruction Enhance Lesson Collect Data N/A**Hook and Hold:**

- Show the BrainPop video “Solar Energy”
<https://www.brainpop.com/science/energy/solarenergy/> to get the class thinking about energy and how light from the sun can be used for power.

Materials:

*Solar Panel Crank Man Kit

*ActiveBoard

*Projector with Sound

- *Worksheet to review energy (optional – can be done on ActiveBoard instead)

Procedures:

Review the definition of “energy” and the 7 main forms of energy with the students.

Watch the BrainPop Video “Forms of Energy” then fill in the worksheet below.

<https://www.brainpop.com/science/energy/formsofenergy/>

Energy Definition:

Types of Energy:

M _____
E _____
L _____
T _____
S _____
C _____
N _____

*Energy cannot be _____ or _____.

*Energy simply _____ from one form to another.

2. Place students in small groups – each with a solar panel KNEX kit.

3. Students will connect a solar cell to the motor on the Crank Man and shine a light on the solar cell. As they observe the model in operation they will trace the flow of energy in this model starting with the light source. This will be in the form of a flow chart of the students’ own design. As the students move the light closer and further away from the solar cell, they will gather useful information that will allow them to complete the following:

1. Describe how the speed of the Crank Man changes?

2. What is the relationship between the light’s distance from the solar panel and the speed of the model?

3. How far from the solar cell can a 100 watt bulb be placed and still provide enough energy to turn the crank?

Summary: Have students present to the class their findings for the “Crank Man” solar panel activity – students must explain how energy changes to other forms from light through the process of the crank man working.

Reflection (InTASC 9)

Reflect On:

- Preparation
- Planning

- *Teaching*
- *Student Engagement and Participation*
- *Evidence of Student Learning*

Standards

Council of Chief School Officers. (2011, April) *Interstate Teacher Assessment and Support Consortium (InTASC) model core teaching standards: a resource for state dialogue*. Washington DC. Retrieved from

http://www.ccsso.org/documents/2011/intasc_model_core_teaching_standards_2011.pdf

North Dakota Department of Public Instruction. (2011) *North Dakota English language arts & literacy content standards*. Bismarck, ND. Retrieved from https://www.nd.gov/dpi/uploads/87/ELA_JUN0811.pdf

North Dakota Department of Public Instruction. (2011) *North Dakota Science content standards*. Bismarck, ND. Retrieved from

https://www.nd.gov/dpi/uploads/132/NDScienceStandardsDraftFormat2_FourthGrade.pdf

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