

# Lesson Plan: Energy Solutions Projects

## Concepts

1. We can make personal decisions in our homes, schools, and communities that affect the current energy situation.
2. All the energy concepts we have learned throughout the semester can be used and applied to a real-life problem.
3. Solving a problem is faster, easier, and has better results if a problem solving procedure is used.
4. If an idea is never clearly communicated, it is useless.

## Key Questions

1. What is a personal decision you can make in your life to affect the current energy situation?
2. What concepts that you learned in science class did you apply in your project?
3. How did you apply the problem solving method in your project?

| <b>Student Learning Objectives</b>   |
|--|
| Students will be able to identify a personal decision they can make to affect the current energy situation |
| Students will apply the problem solving method to a real life problem                                      |
| Students will identify the key concepts they need to investigate to complete their project                 |
| Students will apply the energy and math knowledge they learned in class to a real life problem             |
| Students will communicate their ideas and new knowledge to their class or community                        |

## Educational Standards

- NSES Science: A1.1, A1.6, E1.1-1.4, E2.1, E2.4, E2.6, E2.7, F5.3;
- ITEA Technology: 8, 9, 11, 16

## Anticipatory Set

- At this point the students have learned all the energy concepts of the curriculum.
- They have learned ways to conserve energy and use alternative energy sources.

- They have been introduced to the Problem Solving Method and should have seen their problem statement.
- In this lesson the students will decide on and complete a project. This should enable students to show that they understand the impacts of energy production and consumption on the *societal, environmental, or economical* scale.
- It will also serve as a way for students to strengthen their communication skills by presenting their projects at the *class, school, or community* level.

## Teaching Plan

- Depending on the partner teacher and the size of the class you may be completing this lesson throughout the course of the other lessons, or at the end of the curriculum.
- There is no real outline of how this should be done. The students brainstorm ideas, make a decision about a specific solution, and then get to work.
- The time needed to complete the projects will depend on what projects they select.
- There are a few homework assignments that can be assigned throughout the curriculum or in the beginning of the project development to assist the students in brainstorming.
  - Energy Decisions
    - This homework is specifically outlined in the Problem Solving lesson.
    - This guides the students through the problem solving method with their problem statement
  - Project Ideas
    - This homework asks the students to write down their several ideas and how they want to communicate the idea
  - Project Handout
    - This homework asks the students to describe their project and list the materials they will need.
- Time spent on projects in-class versus at home at the discretion of the teacher.

## Resources

*Energy Decisions Homework General*

*Energy Decisions Homework Home*

Energy project description (two different versions included below)

*Project Ideas Homework*

*Project Handouts*

*Science Project Rubric*

## **URL**

All lesson plans in this unit are included at  
<http://www.clarkson.edu/highschool/k12/project/energysystems.html>

This URL has been included in the Engineering Pathways web site  
(<http://www.engineeringpathway.com/ep/index.jhtml>) and can be found with a search on  
“energy choices.”

## **Owner**

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## **Contributors**

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## Project Idea Homework

It is time to start thinking about a culminating project for this energy unit. Remember. Write down one project idea that you like the most, and two alternatives in case you cannot follow through with the first.

**Examples:** (Do not write down these as your project ideas unless you are serious about following through)

- *A poster describing the positive effects of wind power in the North Country*
- *A public service announcement about how to save energy in your home*

1. \_\_\_\_\_  
\_\_\_\_\_

2. \_\_\_\_\_  
\_\_\_\_\_

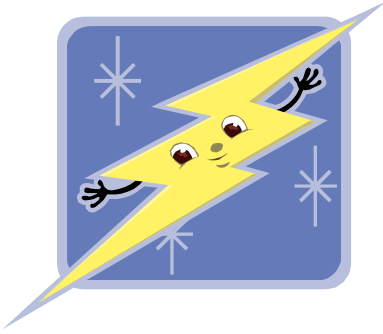
3. \_\_\_\_\_  
\_\_\_\_\_



## Problem Statement

Even as an individual person, you possess the power to change the future of the energy situation on our planet by making energy-conscious decisions in your home now as well as in your future homes. Your goal for the semester is to research a way to limit the amount of fossil fuels used in your home and to communicate your solution to the rest of your class.

You will present a poster explaining the problem and your solution during the last week of this unit.



# Energy Project



## **Problem Statement:**

Energy is a huge part of our everyday life. In the United States alone we use nearly a million dollars worth each minute, 24 hours a day, every day of the year. That amounts to the energy that is in approximately seven gallons of gasoline a day for each person. Our Abundant use of energy and the energy choices we make each day affect our economy, environment, and society.

**Identify, defend and carry out a personal energy solution that positively affects your future and that of others.**

## **Project Description:**

Students must make a choice concerning their daily practices that will reduce the amount of energy that is consumed in their practice. This must be clearly illustrated in a poster, including the energy solution, types of energy conserved, approximate amount of energy conserved, and how they are going to implement their solution (including materials required to do so). Keep in mind all of the requirements of the project when making your choice, as well as what you have learned in class about energy and its uses. Students should strive to come up with ideas that are unique to their lifestyles and more in depth than just turning off the lights.

## **Project Requirements:**

There are four parts to this project:

1. Project Ideas Homework
2. Project Paragraph Homework
3. A poster or brochure that describes what choice you made to reduce the amount of energy that you use in your life.
4. A short presentation to the class on your energy saving solution.

## Energy Decisions Homework

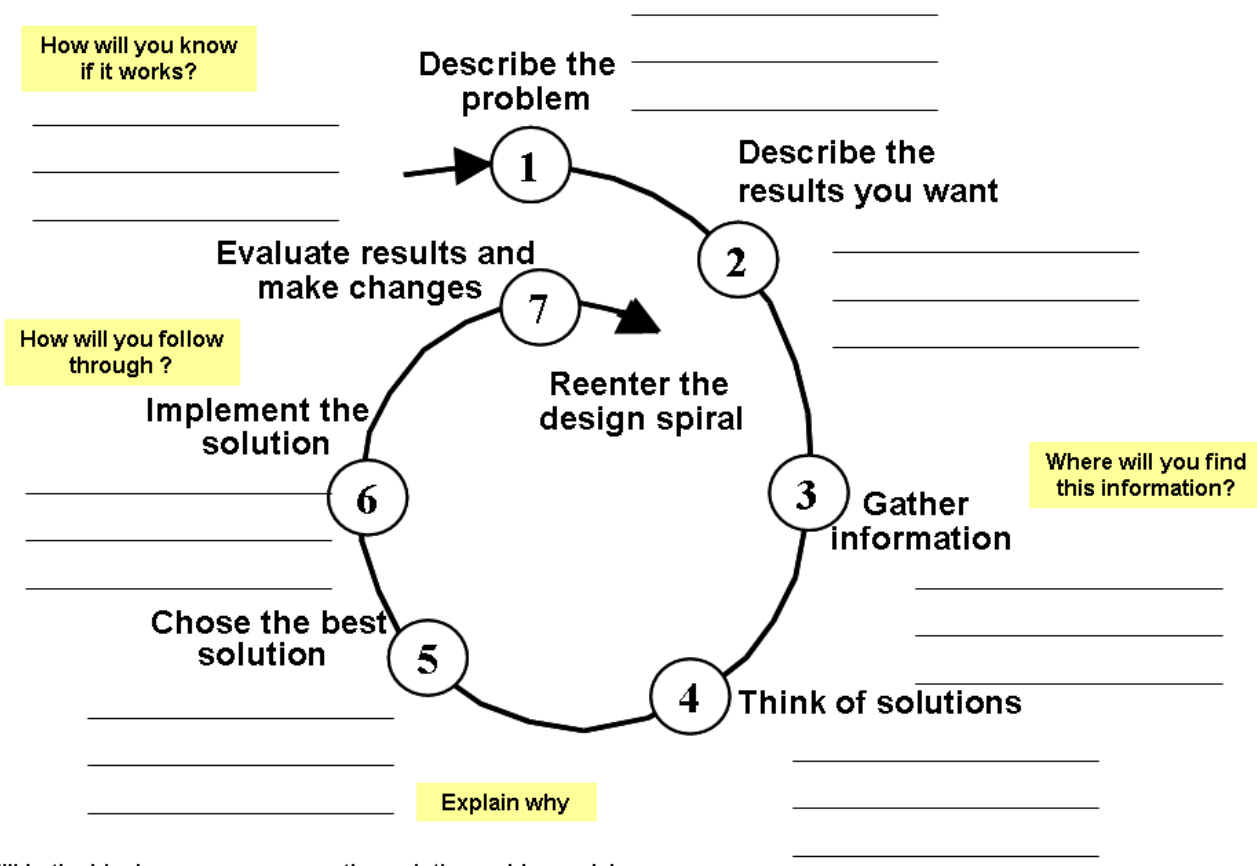
Name: \_\_\_\_\_

Date: \_\_\_\_\_

It is now time for you to make some decisions about how you will make a difference in the current energy situation. Remember the problem statement: Identify, defend, and carry out a personal energy decision that affects your future and that of others.

Fill in the problem solving spiral below using the problem statement. Use this spiral as you complete your project.

### Technological Method of Problem Solving



Fill in the blanks as you progress through the problem solving process



# Energy Project Rubric

| Process  | Unsatisfactory | Satisfactory / Good | Excellent | Score |
|--|----------------|---------------------|-----------|-------|
| 1. Has clear vision of final product             | 1, 2, 3, 4     | 5, 6, 7             | 8, 9      |       |
| 2. Properly organized to complete project        | 1, 2, 3, 4     | 5, 6, 7             | 8, 9      |       |
| 3. Managed time wisely                           | 1, 2, 3, 4     | 5, 6, 7             | 8, 9      |       |
| 4. Acquired needed knowledge base                | 1, 2, 3, 4     | 5, 6, 7             | 8, 9      |       |
| 5. Communicated efforts with teacher             | 1, 2, 3, 4     | 5, 6, 7             | 8, 9      |       |
| <b>Product (Project)</b>                         |                |                     |           |       |
| 1. Format  | 1, 2, 3, 4     | 5, 6, 7             | 8, 9      |       |
| 2. Mechanics of speaking/writing                 | 1, 2, 3, 4     | 5, 6, 7             | 8, 9      |       |
| 3. Organization and structure                    | 1, 2, 3, 4     | 5, 6, 7             | 8, 9      |       |
| 4. Creativity                                    | 1, 2, 3, 4     | 5, 6, 7             | 8, 9      |       |
| 5. Demonstrates knowledge                        | 1, 2, 3, 4     | 5, 6, 7             | 8, 9, 10  |       |
| 6. Applies knowledge gained through unit         | 1, 2, 3, 4     | 5, 6, 7             | 8, 9, 10  |       |
| 7. Communicated effectively to intended audience | 1, 2, 3, 4     | 5, 6, 7             | 8, 9, 10  |       |
| 8. Effectively answered the Problem Statement    | 1, 2, 3, 4     | 5, 6, 7             | 8, 9      |       |

|                       |
|-----------------------|
| Excellent = 96-120    |
| Good = 75-96          |
| Satisfactory = 52-75  |
| Unsatisfactory = 0-52 |

|                     |  |               |
|---------------------|--|---------------|
| <b>Total Score:</b> |  | (120 maximum) |
| <b>Comments:</b>    |  |               |
|                     |  |               |

Name: \_\_\_\_\_

## **Energy Project Fair Peer Review:**

**Directions:** Answer the following questions about your peers' Energy Projects. Select at least 3 project posters and interview its creator. Full sentences are expected, so take your time and answer the questions completely. (complete copies of this sheet for at least three projects)

Name of poster presenter: \_\_\_\_\_

Title of Project Poster: \_\_\_\_\_

### **Questions:**

1. Is this solution similar to yours? Why or why not?
2. Do you think this solution can/does work? Why or why not? Is there any supporting data (Charts, photos, graphs, etc.) provided?
3. Do you think this is a solution which you could implement in your life? Why or why not?
4. Do you have any suggestions as to how to better implement or improve upon this idea?