



**Fairchild Challenge 2009-2010**  
**How to Guide for Teachers**  
**Option 8C: Solar Inventions**

- I. Overview**
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**I. Overview**

In a world surrounded by global climate change, concepts such as alternative and renewable energy become an important field of study. A common form of alternative energy is solar power (energy created by the light and heat of the sun). In this challenge option, students will research applications of solar power, design and construct a solar powered invention, and articulate how the solar power invention can be used in an emergency situation. The goal of this option is to interest students in alternative energy, specifically solar energy, and become actively engaged in the development of solar technology.

**II. Incorporate Your Class**

1. Math.

- Students should ensure the invention is within the correct dimensions and to made scale
- Students can measure energy captured through the invention
- They can calculate the amount of energy needed to power the invention
- Students can document and measure the material needed to construct the invention
- Have students determine the amount of potential energy savings by using the solar invention
- Students can calculate their carbon footprint or the amount of potential reduction in carbon emission through the use of the solar invention

2. Science

- Have the students study how sunlight creates energy and incorporate that into the project
- The students can use science classes to design the solar invention

- Use the scientific method to investigate which materials and which design will work best
  - Students can investigate how large-scale solar energy is related to climate change.
3. English
    - Have students write the 450 word narrative
    - Prepare their oral presentation
    - Prepare for questions from the judges
    - Practice asking and answering questions concerning the solar invention
  4. History
    - Study the history of solar powered devices that may or may not be used in an emergency situation

### **III. Approaching the Option**

1. The Solar invention
  - The solar invention cannot exceed 3' x 3' x 3' in size
  - It must run completely on sunlight – no batteries or energy storage devices may be used
  - If there are any mirrors or energy enhancing devices, they must be included in the dimensions
  - Fairchild will loan one solar panel and one electric motor to schools by request, if they have not received one in the past
  - If using the solar panel provided by Fairchild, the solar panel and motor must be used without dismantling.
2. The Presentation
  - Students must type a narrative of no more than 450 words explaining the most important features of the invention
  - Their presentation must include how it can be used in an emergency situation. Remind students to articulate what type of emergency situation
  - Bring several copies of this narrative for the judges
  - Students must prepare a 2 - minute explanation of the invention for the judges and be prepared for any questions that judges may ask

### **IV. Sunshine State Benchmarks**

1. Language Arts  
 A.1.4.1, A.1.4.2, A.1.4.3, A.1.4.4, A.2.4.1, A.2.4.2, A.2.4.4, A.2.4.5, A.2.4.6, A.2.4.7, A.2.4.8, B.1.4.1, B.1.4.2, B.1.4.3, B.2.4.1, B.2.4.2, B.2.4.3, B.2.4.4, C.1.4.1, C.1.4.3, C.3.4.1, C.3.4.2, C.3.4.3, C.3.4.4, C.3.4.5, D.1.4.2, D.2.4.2, D.2.4.3, D.2.4.4, E.2.4.4
2. Math

A.1.4.1, A.1.4.2, A.1.4.3, A.1.4.4, A.3.4.1, A.3.4.3, A.4.4.1, B.1.4.1, B.1.4.2, B.2.4.1, B.2.4.2, B.3.4.1, B.4.4.1, B.4.4.2, D.2.4.1, E.1.4.1, E.1.4.2, E.1.4.3, E.3.4.1

3. Science

B.1.4.1, B.1.4.5, B.1.4.7, D.2.4.1, G.2.4.6, H.1.4.1, H.1.4.7, H.2.4.2, H.3.4.1, H.

4. Social Studies

B.1.4.1, B.2.4.1, B.2.4.7, C.2.4.2, C.2.4.7

5. The Arts

VA.A.1.4.1, VA.A.1.4.2, VA.A.1.4.3, VA.A.1.4.4, VA.B.1.4.2, VA.B.1.4.4, VA.E.1.4.2

**V. Checklist**

- The solar invention is useful in an emergency situation
- The solar invention is within the designated dimensions of 3' x 3' x 3' In size
- There are no batteries or energy storage devices incorporated into the invention
- The solar panel and electric motor are being used as is (i.e. do not dismantle the solar panel or motor to their parts)
- The narrative is no longer than 450 words
- There are several copies of the narrative
- The student has prepared a 2 - minute explanation of his or her solar invention and how to use it in an emergency situation
- The invention is run entirely by solar power
- If using a solar panel and/or motor that is not provided by Fairchild, the solar panel is rated 3 volts at 3 watts and the motor must be appropriate for the panel