# CALIFORNIA STATE SCIENCE FAIR
# 2006 PROJECT SUMMARY

**Name(s)**
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**Project Number**
**S1602**

**Project Title**
## Parameters Affecting the Conversion of Solar Energy to Grass Biomass

**Abstract**

**Objectives/Goals**
In our world today, due to global warming from burning fossil fuels and the rapid decrease in the supply of fossil fuels, it is necessary that we begin to turn to renewable energy sources. The objective of my experiment was to understand how sunlight exposure conditions affect the grass growth process in order to gain insights for achieving the best efficiency for converting solar energy into grass biomass energy.

**Methods/Materials**
The general procedure of the experiment was that 150 grass seeds were planted in each of various pots. After germinating outdoors, the grasses were grown indoors under controlled illumination conditions under an incandescent SoLux lamp with a spectrum similar to that of sunlight. A light meter was used to monitor the light intensities. The grasses were dried with a dehydrator, and the biomasses were weighed with an accurate scale.

**Results**
The dried biomasses were used to calculate production rates and conversion efficiencies. Preliminary tests were done with a variety of common lawn grasses to compare growth rates. Rye grass was found to have the fastest growth rate. As a result, it was used for the remaining tests, in which various trials with different daily durations of light exposure, light intensities, or growth durations were conducted to see the effect of the variables on grass growth. The results were plotted to observe trends.

**Conclusions/Discussion**
Significant grass growth was observed even in the absence of any light. After taking into account the dark growth, the grass biomass production was found to be proportional to light exposure up to moderate light levels and then saturated at high light intensities. This saturation led to a reduction in the efficiency of converting solar energy to biomass energy as the light intensity increased to high levels. The biomass production rates also increased as the growth duration increased. Understanding these processes and optimizing growth conditions for this application can lead to making grass a viable renewable energy source.

**Summary Statement**
This project studies how parameters such as light exposure, light intensities, and growth duration affect conversion of solar energy to grass biomass energy.

**Help Received**
Parents purchased material and equipment for this project.