Asombro Institute
FOR SCIENCE EDUCATION

P.O. Box 891 Las Cruces, NM 88004-0891
575.524.3334
www.asombro.org

Agrivoltaics Scenarios

The Pros and Cons of Using Land for Agricultural and Energy Production

6th - 8th Grade Classroom Program

Program Summary

Students will be introduced to agrivoltaics, the dual use of land for agricultural and energy production. They will analyze the pros and cons of adding solar panels to farms and ranches in different locations and with different agricultural products.

Phenomenon

Agrivoltaics is a potential solution for producing both agricultural products and energy on the same land. However, there are pros and cons of agrivoltaics that vary depending on the farm/ranch context.

Next Generation Science Standards

MS- ETS1-1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

Asombro lessons are aligned with the three-dimensional learning model of the Next Generation Science Standards.

Science and Engineering Practices	Disciplinary Core Ideas	Cross Cutting Concepts
Asking Questions and Defining Problems	ETS1.A Defining and Delimiting Engineering Problems	Cause and Effect Influence of Science, Engineering and Technology on Society and the Natural World

Common Core State Standards

ELA-LITERACY.WHST.6-8.1.b Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.

ELA-LITERACY.WHST.6-8.2.d. Use precise language and domain-specific vocabulary to inform about or explain the topic.

ELA-LITERACY.WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research.

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Made in the Shade

The Effects of Agrivoltaics on Crops
6th - 8th Grade Classroom Program

Program Summary

Agrivoltaics is the dual use of land for agriculture and solar energy production. One potential benefit of agrivoltaics is that it can increase shade over crops, thereby reducing the negative effects of high temperatures and reduced rainfall. In this lesson, students will use a model solar panel and spinach leaves to test the effects of shading from a solar panel on plant transpiration. They will use solar beads and a flashlight to investigate the potential effects of solar panels on photosynthesis.

Phenomenon

In an agrivoltaics system, how do solar panels affect crop transpiration and photosynthesis?

Next Generation Science Standards

MS-ETS1-2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

Asombro lessons are aligned with the three-dimensional learning model of the Next Generation Science Standards.

Science and Engineering Practices	Disciplinary Core Ideas	Cross Cutting Concepts
Engaging in Argument from Evidence Developing and Using Models Constructing Explanations and Designing Solutions Planning and Carrying Out Investigations	ETS1.B Developing Possible Solutions	Systems and Models Cause and Effect

Common Core State Standards

ELA-LITERACY.RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

ELA-LITERACY.RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

ELA-LITERACY.WHST.6-8.2.D Use precise language and domain-specific vocabulary to inform about or explain the topic.

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Solar Energy

Examining How Angle and Temperature Affect Solar Panels
6th - 8th Grade Classroom Program

Program Summary

Students play the role of solar engineers as they test two factors that can affect solar panel efficiency: air temperature and angle of sunlight.

Phenomenon

In an agrivoltaics system, how do the angle and temperature of the solar panels affect their efficiency?

Next Generation Science Standards

MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

Asombro lessons are aligned with the three-dimensional learning model of the Next Generation Science Standards.

Science and Engineering Practices	Disciplinary Core Ideas	Cross Cutting Concepts
Asking Questions and Defining Problems Developing and Using Models Planning and Carrying Out Investigations Analyzing and Interpreting Data Constructing Explanations and Designing Solutions Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information	ESS3.C Human Impact on Earth Systems ESS3.D Global Climate Change	Cause and Effect Systems and System Models Energy and Matter

Common Core State Standards

ELA-LITERACY. RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

ELA-LITERACY. RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

MATH. 6.SP.B.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

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