

POWER OF THE SUN

Subject Area: Vocational Skills/Science

Grade Level: Special Day Class/Special Education 7th/8th grade
Stonegate K-8

Teacher Contact: Nancy Erikson/Stonegate K-8
(916) 375-0960 - Ext 6028
nerikson@wusd.k12.ca.us

Length of Lesson: 10 days

Lesson Overview:

Students will use their knowledge of the sun to help understand solar energy technology, which is being used in our daily lives. After learning the power of the sun's heat. Students will record the positions of the sun during different times of the day, as well as positions of the sun during different seasons. After examining the data, students will determine the correct positions on a home to install solar panels

Materials needed for final lesson:

Wood for house (pre cut)

Scissor

Glue

Grass

nails

Trees

Lettering

Paint/brushes

Pipe cleaners

tape

Construction paper

Solar panels

Skills students will learn

- Understand the rotation of the earth around the sun
- Understand the vital facts about the sun
- Understand how the sun can produce energy by installing solar panels
- How to follow/read specific directions to gain desired outcome

Student Deliverables

- Solar Oven
- Solar Paneled House
- Completed interactive notebooks
- Final Reflections: What the Sun Can Do For Me?

Daily Lesson Plans

Day 1

Introduction of project

KWL - The sun

Make classroom chart

Materials:

KWL worksheet

Day 2

Why are there periods of light and dark?

Write reflection/participating partners

Discuss results

Materials

Rotation worksheet

Globes

Flashlights/camera

Day 3

Watch video on the power of the sun

Take notes/interactive notebook

Discussion with participating partners/complete sun diagram worksheet

Materials

Facts/video note worksheet

Sun diagram worksheet/colored pencils

Video

Day 4

Experiment #1

Using sunscreen to protect against the sun

Predict best sunscreen

Materials

Sun paper/blue

Sunscreen

Camera

Day 5

Discuss results

Write reflections in notebook

Experiment #2

Determining hottest time of day

Materials

Thermometers Timer

Compass Camera

Notebooks/worksheets

Day 6

Discuss results

Write reflection in notebook

Make graph

Model

Materials

Computer lab

Day 7

Discuss graphing results

Experiment #3

Construction of solar ovens

Model making of an oven

Pick teams -using playing cards

Material Experiment #3

Playing cards

Pizza boxes

Scissors

Tape/glue

Transparency

Saran wrap

Newspaper

Construction paper

Oven mitts

Camera

Day 8

Complete solar ovens

Write Reflection: How we made our oven

Day 9

Discuss recipes

Discuss safety/Sponge bob

Materials

Safety worksheet

Day 10

Cook

Write prediction of how long it will take to cook the food

Which oven will cook the fastest food?

Materials

Recipes

Cinnamon apples

oven mitts

English muffin pizza

camera

Smores

Day 11

Discuss solar oven results

Write reflection

Experiment #4 - heating water

Write prediction

Materials

2 bowls

Salt

Rubber bands

Saran wrap

Day 12

Discuss results

Write reflection

Day 13

KWL - How can the sun help us in our daily living?

Producing energy

Introduction to solar energy

Experiment #4 - Solar Race Car

Materials

PowerPoint of project

Solar car kit

Day 14

Write reflection: Which car will win the race?

Racecar

Material

Camera

Day 15

Discuss all data

Graphing

Hottest time of day

Seasons

How can the sun help us produce energy in our homes?

Day 16

Begin construction of a solar home.

Day 17

Continue construction of a solar home.

Day 18

Complete solar home

Enrichment Suggestions

- When visiting SMUD, they indicated that during a classroom contest with SMUD, students developed a program and check list to help with home inspections. SMUD then trained these students on how to inspect homes. Students would go door-to-door offering their assistance in inspecting their home and suggest helpful tips to improve their energy costs. As an enrichment program, have the student's team with SMUD and students to learn the inspection procedure. This would include the spreadsheets and equipment used for the home inspection. Each student must spend eight hours doing community service, what a wonderful community project to have students moving about the community, inspecting home, giving energy tips and suggestions that can save energy and reduce a persons energy costs.

Student Resources

- Online searches
- Worksheet
- Pens/Pencils
- Science notebooks

Foundation Academic Standards

Special Education (Basic Goals)

Comply with requests and directions

V 5.9.1) the student will practice, following directions and requests.

Job Expectations and outcomes

(V 5.6.2) The student will discuss and role-play, practice job skills.

CTE STANDARDS

8 th Grade - Science Standards

Earth in the Solar System (Earth Sciences)

4. The structure and composition of the universe can be learned from studying stars and galaxies and their evolution. As a basis for understanding this concept:

d. Students know that stars are the source of light for all bright objects in outer space and that the Moon and planets shine by reflected sunlight, not by their own light.

e. Students know the appearance, general composition, relative position and size, and motion of objects in the solar system, including planets, planetary satellites, comets, and asteroids.

Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

- a. Plan and conduct a scientific investigation to test a hypothesis.
- b. Evaluate the accuracy and reproducibility of data.
- c. Distinguish between variable and controlled parameters in a test.

7th Grade - Math Standards

Number Sense

1.0 Students know the properties of, and compute with, rational numbers expressed in a variety of forms:

- 1.6 Calculate the percentage of increases and decreases of a quantity.

Algebra and Functions

1.0 Students express quantitative relationships by using algebraic terminology, expressions, equations, inequalities, and graphs:

- 1.5 Represent quantitative relationships graphically and interpret the Meaning of a specific part of a graph in the situation represented by the graph

7th Grade - Writing

Organization and Focus

- 1.3 Use strategies of notetaking, outlining, and summarizing to impose structure on composition drafts.

CTE Pathway Standards

Energy and Utilities Industry Sector

1.0 Academics

Students understand the academic content required for entry into postsecondary education and employment in the Energy and Utilities sector.

1.2 Science

Specific applications of Investigation and Experimentation standards (grades nine through twelve):

- (1.a) Select and use appropriate tools and technology (such as computer-linked probes, spreadsheets, and graphing calculators) to perform tests, collect data, analyze relationships, and display data.

1.1 Mathematics

(2.2) Apply strategies and results from simpler problems to more complex problems

2.4 Listening and Speaking

(2.4) Deliver multimedia presentations:

3.0 Career Planning and Management

Students understand how to make effective decisions, use career information, and manage personal career plans:

3.1 Know the personal qualifications, interests, aptitudes, knowledge, and skills necessary to succeed in careers.

Teacher Resources

Peterson Dean - Roofing and Solar Systems - www.needarooof.com

How to build a Pizza box solar oven - www.hometrainingtools.com

How to construct a model solar house - <http://www.ehow.com>

SMUD

PG & E

Science spot - www.sciencespot.com

www.enchantedlearning.com

Lesson Plan Relevance To Externship

- Students will learn that being responsible, trustworthy employees can earn the respect of their employer. They also learn that following directions are essential for an employer and for their advancement in the company. The roofing business as well as other construction businesses needs to have labors that can follow directions. The students will learn they can obtain jobs in the construction business by having the attitude and the willingness to learn.
- Students will learn they can obtain a job in the construction field, make a good living and be a productive member of society.
- Students will learn the power of the sun.
- Students will learn the various ways the sun can provide energy in everyday living.
- Students will learn how homes/businesses can produce their own energy to heat their homes/business and save money.

Rubric for:

THE POWER OF THE SUN

Student Deliverables	1 Exceeds Expectations	2 Meets Expectations	3 Approaches Expectations	4 Fails to meet Expectations
Solar Ovens	Complete the solar oven with 100% accuracy. Student was an active participant and helpful. Followed directions.	Completed solar oven assignment with 80% accuracy, was an active participant	Attended class and was an active participant but failed to complete solar oven successfully.	Attended class but did not produce a solar oven. Was disruptive to the class.
Solar House	Student worked with group in a co-operative fashion to complete the solar house activity with 100% accuracy. Student was present at BIA dinner	Completed solar house assignment with 80% accuracy, was an active participant in the group.	Attended class and was an active participant but failed to contribute to the completion of the solar car.	Attended class but did not participate in the construction of the house. Student was disruptive.
Project Board	Student will complete their portion of the project board with 100% accuracy. Presented project board to class.	Completed their portion of the project board with 80% accuracy, was an active participant. Did not participate in oral presentation.	Attended class and was an active participant but failed to complete assignment successfully.	Attended class but did not turn in assignments. Was disruptive.

