



ALTERNATIVE ENERGY

e Series "GRADING SHEET"

Name: _____
Partner: _____
Period: _____
Rotation: _____

MODULE GRADE: WORKBOOK _____
POST TEST _____ **MODULE AVERAGE=** _____

ALTERNATIVE ENERGY "WORKSHEET" **TOTAL=** _____

DAILY LAB PERFORMANCE: _____
 (If you are absent, write ABS on the line for the day you miss and **DISCUSS** what you need to make up with the teacher)
LAB PERFORMANCE TOTAL= _____

Extra Credit—Discuss this with the instructor before beginning!!!

WORD SEARCH	_____ (5)	CHALLENGES	_____ (5)
MODULE REPORT	_____ (5)	COOK FOOD IN SOLAR OVEN	_____ (5)
RESEARCH REPORT	_____ (5)	MODULE NOTES	_____ (0-10)
		TOTAL EXTRA CREDIT=	_____
		BONUS POINTS ***	= _____

ALTERNATIVE ENERGY "WORKSHEET"

LESSON 1- ELECTROSCOPE ACTIVITY--Explain the activity to the instructor. **T.I.:** _____ (10)
 FOLLOW THE DIRECTIONS THAT ARE POSTED AT YOUR MODULE. Do the activity over at the table by the front door. You will need to explain which rods affected the electroscope the most and which cloths affected it the most.

LESSON 2- Impacts Video #1: Coal Mining (put all three Impacts on same paper). **Impacts Paper:** _____ (5)
Impacts Video #2: Renewable Energy Sources **Impacts Paper:** _____ (5)
Impacts Video #3: Pro's and Con's of Nuclear Energy **Impacts Paper:** _____ (5)

LESSON 4-
LESSON 4: "USING THE LIGHT ADAPTER" DATA SHEET **Completed Worksheet:** _____ (10)

LESSON 5
LESSON 5: "SOLAR CELL ACTIVITY" DATA SHEET **Completed Worksheet:** _____ (10)

LESSON 6: "HEAT TRANSFER DATA WORKSHEET" **Completed Worksheet:** _____ (10)
HEAT TRANSFER ACTIVITY- Explain the experiment to the instructor. **T.I.:** _____ (10)

LESSON 7: WIND ENERGY ACTIVITY—Fill out the "Wind Energy Worksheet". **Worksheet:** _____ (10)

LESSON 12-CAREER ACTIVITY **CAREER PAPER:** _____ (10)
Study Guide Turned In **Study Guide:** _____ (10)

Worksheet Total: _____

LESSON 4– “USING THE LIGHT ADAPTER DATA SHEET”

Set the meter to 200 mVdc !!!!!

Use the space to the right of the table to convert the Light intensity into LUX

Location of Light Adapter/ Meter	Room Light Intensity (mV),	Room Light Intensity Converted to LUX
Sun Lamp “ OFF ”	Step #4	Step #5
1.Hold Light Adapter in your hand and Point it Straight UP		
2. Hold the Light Adapter in your hand and Point it DOWN		
3. Put Light Adapter in front and to the left of the “Collector” on the Trainer		
4. Put the Light Adapter in the center of the “Collector”		
5. Put the Light Adapter behind the heater coil (right side).		
Sun Lamp “ ON ”	Step #7	Step #8
1.Hold Light Adapter in your hand and Point it Straight UP (set to 2,000)		
2.Hold Light Adapter in Your hand and Point it DOWN (set to 2,000)		
3. Put Light Adapter in front and to the Left of the “Collector”. Set the meter to 50,000.		
4. Put the Light Adapter in the center of the “Collector”. Set the meter to 50,000.		
5. Put the Light Adapter behind the heater coil (right side). Set the meter to 50,000.		

LESSON 5- SOLAR CELL DATA SHEET

You need to use the Solar Panel (from the drawer) and the DC Motor for the experiment.

Set the meter to 20 Vdc !!!!!

Location of <u>Solar Panel</u>	LESSON 5 Solar Panel (Solar Cell) measured in Volts,	LESSON 5 DC Motor on the Trainer record the speed of the motor (none, slow, medium, or fast ,
<u>Sun Lamp OFF</u>	Step #7	Step #15
1.Hold <u>Solar Panel</u> in Your Hand and Point it Straight UP		
2. Hold the <u>Solar Panel</u> in your hand and Point it DOWN		
3. <u>Solar Panel</u> in front and to the left of the "Collector"		
4. <u>Solar Panel</u> in the center of the "Collector"		
5. Solar Panel behind and to the right of the collector.		
<u>Sun Lamp ON</u>	Step #14	Step # 15
1.Hold <u>Solar Panel</u> in your hand and Point it Straight UP		
2.Hold <u>Solar Panel</u> in your hand and Point it DOWN		
3. <u>Solar Panel</u> in front and to the Left of the "Collector".		
4. <u>Solar Panel</u> in the center of the "Collector".		
5. Solar Panel behind and to the right of the collector.		

(10 Points)

LESSON 6- "ACTIVE SOLAR SYSTEMS ACTIVITY" SHEET

Do not adjust the flow meter so the ball floats to the top. You might pull it out and get water all over. It's a big mess to clean up.

You will need at least 12 minutes of class time to do this activity. Take readings every two minutes for all four items on the chart below.

Take your initial readings for:



Collector In from Reservoir and Pump,

Collector Out & Heater Coil In,

Heater Coil Out
and the Water Tank.

Set the meter to 200 mVdc !

Selection	Temperature Readings						
	TIMED INTERVALS (MINUTES)						
	Initial Reading	2	4	6	8	10	12
COLLECTOR IN							
COLLECTOR OUT/ HEATER IN							
HEATER OUT							
WATER TANK							

Write a paragraph below that describes what was happening in the **Entire Water "System"** of the trainer. Refer to lesson 3 for an explanation of the items on the trainer.

LESSON 7- WIND ENERGY ACTIVITY DATA SHEET

In the first column set the box fan to the low speed, then use the Anemometer to measure the wind speed. Do the same for 2, medium and 3, high speed on the fan. Next, set the wind turbine on the floor about 1 & ½ feet in front of the box fan (use the piece of wood to measure with).

Part 1: Using the Wind Meter, use the 200 mVdc setting on the multimeter.

Part 2: Using the Wind Turbine, use the 20 Vdc setting.

FAN SPEED	WIND SPEED	WIND TURBINE OUTPUT						
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	Using wind meter	0 (using Wind Turbine)	15	30	45	60	75	90
LOW (1)								
MEDIUM (2)								
HIGH (3)								

What angle do you get the most voltage or power: _____.

Why do you think that the angle listed above as giving the most voltage is the highest?

Do you think there is another angle in between 60-75 or 75-90 would give you more voltage than 75°? What angle and why?



Alternative Energy Study Guide for Post Test

1. _____ energy is energy that is said to travel in a wave motion.
Light Thermal Chemical Electrical

2. _____ energy is the movement of atoms or molecules of a substance.
Light Thermal Chemical Electrical

3. There is/are _____ type(s) of energy.
one two three four

4. Fossil fuels contain stored energy because when the plants and animals died, the _____ energy became locked up in their cells.
solar chemical thermal hydroelectric

5. Nuclear Energy _____ was once thought to be an economical, environmentally clean and safe alternative to fossil fuels. _____ provides less than 1% of electricity generated in the United States. _____ produces waste that can be safely recycled. _____ None of the above is correct.

6. A(n) _____ solar system uses _____ mechanical devices to distribute heat.
passive active thermal nuclear

7. With a solar thermal technique, _____ are used to catch the sunlight and reflect it onto a special collector.
heat exchangers pumps mirrors fans

8. A(n) _____ solar system has no moving parts.
passive active thermal nuclear

9. _____ is a material that offers some resistance to electrical current and is used in solar cells.
Conductor Metal Semiconductor Partial Conductor

10. A(n) _____ is a material added to silicon to form an operational semiconductor.
dopant photon energen converter

11. The _____ rating of a solar cell varies according to its size and whether or not it is connected to other cells.
energy efficiency conductivity connectivity

12. _____ is a method of energy conversion in which the energy is used after only one energy conversion.
Indirect conversion Direct conversion Solar conversion Thermal conversion

13. An example of _____ is the light energy needed to light a room in a house.
indirect conversion direct conversion solar conversion thermal conversion

14. Active Solar Systems use _____ to distribute heat.
mechanical devices chemicals water semiconductors

LESSON 4- Light Intensity Experiment and Solar Activity Data Sheet

Location of Light Adapter or the Solar Cell	Room Light Intensity (mV)	Room Light Intensity Converted to LUX	Solar Panel/Solar Cell measured in Volts	DC Motor on the Trainer. Record the speed (none, slow, medium, or fast)
Sun Lamp "OFF"				
1. Hold the Solar Panel In your hand and Point it Straight Up				
2. Hold the Item in your hand and Point it straight down				
3. Put the Item to the front left of the collector on the trainer				
4. Put the Item in the center of the collector				
5. Put the Item in the back left of the collector				
Sun Lamp "ON"				
1. Hold the Solar Panel In your hand and Point it Straight Up				
2. Hold the Item in your hand and Point it straight down				
3. Put the Item to the front left of the collector on the trainer				
4. Put the Item in the center of the collector				
5. Put the Item in the back left of the collector				

Alternative Energy

6.0 Study Guide

Circle the correct answers to these questions as you come upon them during your next seven lessons. This study guide can then be used as a resource for your final test!

1. There are Lesson 1-(Types of Energy) types of energy.
two - three - four - five
2. Energy that travels as a wave motion is Lesson 1-(Light Energy) energy.
chemical - mechanical - potential - radiant
3. Lesson 1-(Heat Energy) energy causes the atoms of a substance to vibrate or move about.
Chemical - Light - Kinetic - Heat
4. Lesson 1-(Chemical Energy) energy is locked up in the molecules of certain substances.
Chemical - Nuclear - Electrical - Light
5. When certain kinds of atoms are split, Lesson 1-(Nuclear Energy) energy is released.
electrical - nuclear - mechanical - heat
6. Coal, oil and gas are Lesson 2-(Nonrenewable Energy) .
renewable energy. - fossil fuels. - indirect solar energy. - none of the above sources.
7. Over 2-(Petroleum) of the energy used today comes from oil and natural gas.
40% - 20% - 60% - 70
8. Energy from the wind, sun, water, plants, and earth are all examples of 3-(Renewable Energy Sources) .
nonrenewable energy - renewable energy sources - fossil fuels - geothermal energy
9. When 3-(Renewable Energy Sources) are burned, they release carbon dioxide (CO₂) into the atmosphere.
chemical energies - fossil fuels - renewable energies - alternative energies
10. 3-(Collect, Concentrate, & Convert Sunlight) systems depend on trapping and holding the energy in matter for some period of time.
Chemical energy - Mechanical energy - Solar energy - Nuclear energy
11. 3-(Passive Solar Heating) heating provides heat for the inside of buildings without using mechanical parts such as fans or motors.
Passive solar - Active solar - Solar cell - Solar thermal

12. 3-(Active Solar & Solar Thermal Heating) heating systems use mechanical devices to distribute the heat.
Passive solar - Active solar - Solar cell - Solar thermal
13. 3-(Active Solar & Solar Thermal Heating) are designed to trap the heat energy from the sun and use it to heat water or air.
Solar systems - Solar cells - Solar collectors - Heat collectors
14. Mirrors are used to catch the sunlight and reflect it into a special collector for high temperature solar collection. This technique is known as 3-(Active Solar & Solar Thermal Heating) heating.
solar thermal - indirect solar - solar cell - active solar
15. The inside of a house can be heated by direct sunlight streaming through windows facing the sun by using the 3-(Passive Solar Heating) heating technique.
active solar - solar thermal - passive solar - solar cell
16. A solar (or photovoltaic) cell turns energy from the sun into 4-(Photovoltaic Cell).
mechanical energy - chemical energy - solar energy - electricity
17. Producing 5-(Wind Energy) is one of the most important uses of wind energy.
mechanical energy - electricity - solar energy - chemical energy
18. Energy from the wind turns the shaft of a 5-(Wind Machines), which is attached to a generator
turbine - motor - wind mill - not a, b, or c
19. There are 5-(Wind Speed) classes to describe wind speed.
seven - four - five - six
20. The water in rivers and streams can be captured and turned into 6-(Hydropower).
solar power - kinetic energy - hydropower - biomass energy
21. The pressure of water causes a turbine to spin like a pinwheel, which rotates a generator to produce 6-(Hydropower).
electricity - hydropower - kinetic energy - potential energy
22. The amount of energy available to the turbines in a 6-(Hydropower) power station depends on the distance (height) between the surface of the water and the turbines and on the rate at which the water flows through the turbines.
hydroelectric - solar - wind - nuclear
23. 7-(Biomass) is living or dead plant or animal matter.
Geothermal - Biomass - Tidal energy - Photosynthesis
24. There are 7-(How is Biomass Used?) ways to use biomass.
five - two - unlimited - three
25. A gas called 7-(Energy From Your Trash) is produced when food scraps and wastes decay.
ethanol - diesel fuel - methane - gasoline
26. In power plants, municipal wastes can be burned to generate 7-(Energy From Your Trash).
electric power - nuclear power - solar power - none of the above
27. Heat energy that comes from the earth is called 7-(Geothermal Energy) energy.
geothermal - solar - hydroelectric - biomass
28. Geothermal sites are often identified by the steam rising through cracks or by the presence of 7-(Geothermal Energy).

hot water - hot springs - hot ground - cold springs

29. Beneath the 7-(Geothermal Energy) is a layer that is made up of molten rock.

lithosphere - mantle - magma - not a, b, or c

30. Temperatures in the 7-(Geothermal Energy) range from 2000 F to around 6700 F.

lithosphere - mantle - magma - not a, b, or c

ALTERNATIVE ENERGY

L	P	X	E	D	R	R	C	T	T	R	U	H	C	G
A	P	E	Z	V	N	E	N	Z	E	A	Y	Y	H	F
M	C	Q	T	O	I	A	T	T	A	D	E	I	E	O
R	D	T	Z	R	I	S	E	E	R	L	S	H	M	S
E	N	D	I	D	O	M	S	O	M	U	G	S	I	S
H	I	D	A	V	I	L	E	A	N	O	T	A	C	I
T	W	R	A	T	E	L	E	L	P	U	M	Q	A	L
O	I	M	L	N	E	J	I	U	Z	D	N	E	L	S
E	Z	U	E	C	L	G	E	L	M	M	D	P	N	S
G	M	R	T	S	H	R	A	E	L	C	U	N	X	A
G	G	R	A	T	X	T	U	R	B	I	N	E	M	M
Y	I	G	Z	V	U	E	D	D	X	X	V	S	K	O
C	R	E	N	E	W	A	B	L	E	V	V	J	S	I
I	N	Y	T	I	C	I	R	T	C	E	L	E	Z	B
R	A	L	O	S	A	G	P	O	D	S	Y	N	M	D

ACTIVE

ANEMOMETER

BIOMASS

CHEMICAL

ELECTRICITY

ENERGY

FOSSIL

GAS

GEOHERMAL

HEAT

HYDROELECTRIC

MULTIMETER

NUCLEAR

PASSIVE

PETROLEUM

RADIANT

RENEWABLE

SOLAR

SUNLIGHT

TURBINE

WIND

Directions for the Electroscope Activity



teacher.

1. Take the two boxes behind you, the shoebox and the white box. Go to the front of the room by the bulletin board to do this experiment.
2. If the balloon at the module is somewhat flat, get a new balloon from the



3. Rub the balloon against your clothing or against the wool.
4. Place the balloon near the pith balls. Does the balloon attract the pith balls? Why?
5. Rub the balloon with the wool and see if it will stick to the wall or the front door.



6. Take the electroscope and check to see if the silver “leaves” are hanging straight down. If they don't hang straight down, touch the metal ball at the top of the rod. If they don't hang down, try gently shaking the beaker a bit. If that doesn't work, see the teacher.
7. Rub the balloon and place it near the top of the electroscope.
8. What happens to the metal leaves.
9. This link will show you the next experiment using wool and some of the rods in the box.
http://www.metacafe.com/watch/419633/rubber_wool_experiment/
10. Next you will use all of the rods and all of the cloth materials to test for the amount of static electricity it produces.
11. Take one of the cloths and one of the rods from the shoe box. Rub the cloth on the rod. Place the rod near the top of the electroscope. Do the metal leaves move? Do they move a lot or a little.
12. Take the **same rod** and rub it with a different cloth. Is there a change.
13. Continue with this rod until you have used all of the cloths.
14. Now take a **different rod** and try it with all of the cloths.



15. Do this for each of the four rods.

16. **You will need to explain this experiment to the teacher now to get the stamp. You will need to tell which of the rods and which cloths affected the electroscope leaves the most and the least.**