

**GED 2002 Teachers' Handbook of Lesson Plans**

<b>Content Area</b> Science	<b>Lesson Title</b> <i>To Conserve or Not to Conserve</i>	<b>Correlation to Framework</b> 03.01/03.05/03.06	<b>Lesson Number</b> 39
<b>Objectives/Learner Outcomes</b>  At the end of this lesson, the learner will be able to: <ul style="list-style-type: none"> <li>• Present ideas on how energy is wasted at home and at work</li> <li>• Analyze information on ways to conserve energy</li> <li>• Implement a personal energy conservation plan</li> </ul>		<b>Materials/Resources/Internet Sites/Handouts/Worksheets</b> <ul style="list-style-type: none"> <li>• Handout – <i>Test Your Energy IQ</i></li> <li>• Handout – <i>Making Choices – Necessities Versus Luxuries</i></li> <li>• Handout – <i>My Personal Conservation Effort</i></li> <li>• White board/chart paper/markers</li> <li>• Paper and pens/pencils</li> </ul>	
<b>Pre-Requisite Knowledge</b>  The learner should be able to: <ul style="list-style-type: none"> <li>• Read GED-level materials with comprehension</li> <li>• Understand cause and effect</li> <li>• Create basic graphs to depict information</li> <li>• Write a short essay</li> </ul>		<b>Key Words</b> <ul style="list-style-type: none"> <li>• Conservation</li> <li>• Energy</li> <li>• Wattage</li> <li>• Energy efficiency</li> </ul>	
<b>Anticipatory Set/Introduction</b>  <b>Ask:</b> How many of you think that energy is limitless in today's world? Why or why not? <b>Ask:</b> Why is it important to practice energy conservation? <b>Ask:</b> Do you practice energy conservation? How? List the students' ways of conserving energy on the board. <b>Say:</b> There is a limit to the amount of usable energy that is available to us. The most sensible approach to today's energy problem is practicing energy conservation. This means being a good consumer. Today, we are going to talk about energy and how each of us can have a major impact on conserving energy for ourselves and for the future.			
<b>Preview Questions for Lesson</b> <ol style="list-style-type: none"> <li>1. What types of energy do you use in your daily life?</li> <li>2. How can people practice energy conservation?</li> <li>3. Why is it important to practice energy conservation?</li> <li>4. What do you think would happen to our world if people do not conserve energy in their daily lives?</li> </ol>			

### **Instructional Outline**

**Say:** Experience has shown that the most cost-effective and sensible approach to today's energy situation is energy conservation. Each of us must realize that we cannot continue consuming energy at the present rate. We must look for ways to decrease our use of energy.

Heating and cooling our homes accounts for most of our residential energy costs. Today, we are going to complete some activities to discover some important ways to decrease the consumption of energy in our homes.

### **Process/Activities**

Have the students complete the Handout – **Test Your Energy IQ** questionnaire. Have the students report their answers. Provide the correct answers and the rationale. Have the students discuss whether they agree or disagree with the rationale for the answers. Have them also discuss ways to conserve energy in their daily lives based on the answers.

Provide students with the Handout – **Making Choices**. Have the students complete the activity and share their results with the class. Write the students choices on the board, indicating those choices that had multiple responses. Discuss the reasons that students made certain choices. Have students predict how their lives would change based on using only these choices in their homes. You may wish to have students graph the results from the activity. Make sure that appropriate graph formats and labels are used by the students. Have the students share their graphs with the class.

After providing the students with basic information on energy conservation, have them brainstorm ways that they can personally conserve energy. Have students select two ways in which they will try to conserve energy in the upcoming month. Students should implement the methods and document the results. As a culminating activity, have the students write a short essay describing their conservation methods and the results of implementing these methods.

### **Product/Evaluation/Summary**

When students have completed this lesson, they will provide the teacher with a:

- copy of their **Making Choices – Necessities Versus Luxuries** selections;
- list of energy conservation ideas; and
- a short essay describing two conservation methods that they implemented and the result of implementing the methods.

<b>Teaching to Different Types of Learners</b>			
	<b>Visual</b>	<b>Auditory</b>	<b>Kinesthetic/Tactile</b>
<b>Learning Activity</b>	Have students write a short report on how to conserve energy at work and in the home environment.	Have students report to the class the different ways in which energy can be conserved at work and in the home environment.	Have students make posters of ways in which they can conserve energy at work and in their home environments.
<b>Special Differentiation Strategies</b>	Provide students with lists of conservation ideas and the answers to the <b>Test Your Energy IQ</b> questionnaire in written format.	Have students provide their answers orally to the class. Auditory learners generally prefer discussing what they have learned, rather than writing the information in report-format.	Provide additional hands-on types of experiences with conservation, such as determining the effect of using hot versus cold water when washing clothes, the difference in an electric bill through simple conservation techniques, such as changing the thermostat by a couple of degrees, etc.
<b>Evaluation</b>	Have students write their results and draw a chart or graph to visually depict what they found.	Have students orally report the findings of their energy conservation efforts.	Have students make charts or posters of their energy conservation efforts.
<b>The Family and Adult Literacy Connection</b>		<b>ESE/ESOL Accommodations</b>	
<p>Conservation of energy is a family affair. Have students involve their children and other family members in the conserving energy activity. This may include such things as: reminding children to turn off the lights in rooms as they leave, turning off the television when they are not watching it, closing the door upon entering the house, etc.</p> <p>Have parents share the reasons for conserving energy with their children and report to the class the results of conservation – a family affair.</p>		<ul style="list-style-type: none"> <li>• Pair stronger readers with those who may have more limited reading skills to assist in reading directions and completing the activities.</li> <li>• Provide only one step of an activity at a time to students.</li> <li>• Have the <b>Test Your Energy IQ</b> questionnaire on tape so that students can follow along as the questions are being read aloud.</li> <li>• Allow students to orally report their answers or to create posters that provide the information learned.</li> </ul>	

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### TEST YOUR ENERGY I.Q.

Answer each question below (True or False) and rate yourself on your knowledge of energy use and abuse in the home and on the road.

50 to 45 correct answers = High Energy I.Q.

44 to 40 correct answers = Above-average Energy I.Q.

39 to 35 correct answers = Average; you need to learn more about energy conservation.

Fewer than 35 correct answers = Take the test again and study the answers, you're probably throwing money away needlessly.

Circle the letter of the correct answer.

- T F 1. The United States uses more energy per person than any other nation in the world.
- T F 2. The United States produces 2/3 of the oil we consume.
- T F 3. R-value means the resistance a material has to the flow of heat
- T F 4. On cold winter days, a roaring fire in the fireplace saves energy.
- T F 5. In the afternoon, you should keep the draperies closed on all west-facing windows to block out the hot sun
- T F 6. Thermal-lined draperies and outdoor awnings can significantly reduce the energy required for air conditioning.
- T F 7. A home that is dry during the winter must be kept warmer to be comfortable than one with a higher humidity level.
- T F 8. Landscaping is important to home energy conservation.
- T F 9. You can warm up your house faster by turning the thermostat higher than the desired temperature
- T F 10. Weather-stripping doors and caulking windows can save up to 10 percent of home energy costs.
- T F 11. There is no reason to ventilate the attic in the summer if it is well insulated.
- T F 12. The furnace/air conditioner will run for longer periods of time when the air filter is dirty.
- T F 13. The lower the temperature setting on your water heater, the less energy you will use.
- T F 14. A frosty refrigerator uses less energy because frost acts as an insulator
- T F 15. Food cooks faster in a covered pan.
- T F 16. You don't have to preheat an oven for broiling or roasting
- T F 17. On especially cold days, it is a good idea to get a little extra heat into the kitchen by turning on the oven and opening the oven door.
- T F 18. It is usually less expensive to take a bath than a shower.
- T F 19. It does not matter where the water heater is located in your home as long as it is in proper working order.
- T F 20. The home heating and cooling system is the major residential user of energy.
- T F 21. Refrigerators operate best at **380** to **420** Fahrenheit.
- T F 22. The home freezer operates most efficiently when it is 1/2 to 2/3 full.
- T F 23. Refrigerators are designed to accept frequent and lengthy door openings without increased operating costs.
- T F 24. Small appliances such as toasters, electric skillet, and popcorn poppers generally use less energy for specific jobs than a range.

- T F 25. If the flame on your gas range is blue, it is not operating properly.
- T F 26. Fluorescent and incandescent lights of the same wattage produce the same amount of light.
- T F 27. Clean surfaces on reflector pans increase the energy efficiency of a range.
- T F 28. Put frozen foods directly into the oven. There is no reason to defrost them beforehand
- T F 29. By using cold and warm—rather than hot—water in your washing machine, you will save energy and money.
- T F 30. You will save energy by doing several small loads of wash rather than one large one.
- T F 31. Dry as many clothes as possible in each load.
- T F 32. Permanent press garments save energy.
- T F 33. A clean dryer filter saves energy by allowing the dryer to operate at a higher temperature.
- T F 34. You can save up to 1/3 of your dishwasher operating costs by allowing the dishes to air dry rather than go through the dry cycle.
- T F 35. Trash compactors and waste disposers use a great deal of energy and are not economically feasible
- T F 36. Always remember to use warm water when running the garbage disposal.
- T F 37. An iron consumes little energy.
- T F 38. About 1/3 of all private automobile mileage is for commuting to and from work.
- T F 39 Driving faster uses less energy because operating time is reduced.
- T F 40. Always top off your gas tank when filling up your car.
- T F 41. On cold days, it saves gas to warm up your car for 5 to 10 minutes before driving.
- T F 42. It takes less gas to restart an engine than to idle it for more than one minute.
- T F 43. The less air in the tires, the less gasoline you will burn.
- T F 44. There is no difference between steel-belted radials and other tires when it comes to gas mileage.
- T F 45. The heavier the car, the more gas it uses.
- T F 46. Keeping your car tuned up will increase gas mileage.
- T F 47. An air-starved engine wastes gasoline.
- T F 48. The old 55-mph national speed limit was imposed during the oil embargo to help conserve fuel; higher speeds use significantly more fuel.
- T F 49. The most efficient way mobile home owners can reduce heating/cooling costs is to install underpinning.
- T F 50. Insulating your electric water heater will reduce your utility bill.

## **ANSWERS**

1. TRUE The U S uses more energy per person than any other nation in the world. Although we comprise only about 6 percent of the world's population, we use 36 percent of all energy consumed in the world, and that figure continues to rise.
2. FALSE. The U S does not produce 2/3 of the oil we consume. We must import about half of the oil we use.
3. TRUE. R-value does mean the resistance a material has to the flow of heat. The higher the R-value is, the better the insulating capability of the material.
4. FALSE A fireplace can cost you energy, as fireplaces are often sources of heat loss. When the heating system is on, a considerable amount of heated air goes up the chimney.
5. TRUE and FALSE The energy savings gained by keeping the draperies closed on the west-facing windows depends on the time of year. This is true in the summer, but false in the winter. In summer, keep the draperies closed to block out the hot sun. In winter, keep them open and let the sun into the room for extra heat.
6. TRUE. Thermal-lined draperies and outdoor awnings block the hot sun and keep your home cooler.
7. TRUE A home will seem more comfortable if the humidity level is higher. A humidifying device not only increases comfort but helps save energy as well.
8. TRUE. Landscaping can affect home energy consumption. A lawn reduces reflective heat in summer. Trees that shed their leaves can provide shade in summer and allow warming sunlight to reach the house in winter.
9. FALSE. Your house will not warm up faster by setting the thermostat higher than the desired temperature. Set it at the proper temperature, and it will heat (or cool) your home just as quickly without wasting energy.
10. TRUE. Weather-stripping and caulking can save up to 10 percent of home energy costs.
11. FALSE Insulation can trap hot air in the attic. Ventilating the trapped air will make the house stay cooler, and you'll use less energy.
12. TRUE. A dirty air filter will cause your furnace/air conditioner to run for longer periods of time. Check the air filter about once a month because a dirty filter restricts the flow of air.
13. TRUE. The lower the temperature on your water heater, the less energy you will use. You can regulate the temperature of your water heater with the thermostat. The higher the setting, the higher your energy bill will be. Check the setting on your water heater.
14. FALSE A frosty refrigerator uses more energy than a defrosted refrigerator. Frost makes the refrigerator work harder to remove warm air. Never let frost accumulate to more than 1/4 of an inch.

15. TRUE. Food cooks faster in a covered pan. The kitchen will stay cooler as well. Turn the heat off a few minutes before the food is completely cooked. Retained heat will complete the cooking.

16. TRUE. You do not have to preheat an oven for broiling or roasting. In addition, any food that cooks for more than one hour does not require a preheated oven.

17. FALSE. Using your oven is a very costly way to heat your kitchen.

18. FALSE. It takes twice as much hot water for a deep bath than for the average shower. This can increase your energy bill because heating water accounts for as much as 20 percent of home energy expenses.

19. FALSE. Place the water heater as close as possible to areas where hot water is needed. The longer the pipes, the greater the heat loss. If hot water pipes are exposed, it is a good idea to insulate them. Insulated pipes keep the water warmer.

20. TRUE. Heating and cooling systems are the major residential users of energy, home heating and cooling can represent as much as 70 percent of your home energy bill.

21. TRUE. Refrigerators operate best at 38~ to 42 Fahrenheit, while freezers operate best at 0 Fahrenheit. Lower settings are unnecessary and waste energy.

22. FALSE. The home freezer is most efficient when filled to capacity.

23. FALSE. It costs money and energy every time a refrigerator door is opened.

24. TRUE. Small appliances often use less energy than a range. They are designed to do specific jobs, making cooking easier and usually quicker.

25. FALSE. If the flame on your gas range is blue, it is operating correctly. If the flame has traces of yellow, the burners have become clogged and should be cleaned.

26. FALSE. Fluorescent and incandescent bulbs of the same wattage do not produce the same amount of light. Fluorescent lights produce 3-1/2 times more light than incandescent bulbs of the same wattage.

27. TRUE. Clean, reflective surfaces increase efficiency. Also, if your oven is self-cleaning, wait until after you have used the oven and less energy will be required for the cleaning process.

28. FALSE. Putting frozen food directly into the oven means the food will require more cooking time. Plan ahead and thaw frozen food in your refrigerator before cooking it.

29. TRUE. Much of the energy used in doing your family wash goes to heat the water. Using cold water as often as possible should decrease your energy bill.

30. FALSE. A large-capacity washer saves energy by handling in one load what a small washer must do in two loads.

31. FALSE. Do not dry as many clothes as possible in each load. You should sort the

clothes by thickness before you place them in the dryer. It takes a longer cycle for slow-drying items.

32. TRUE. Be sure to take permanent press garments out of the dryer as soon as the cycle is complete. You probably will not have to spend energy ironing them.

33. FALSE A clean filter saves energy and money by allowing a high rate of flow of clean hot air and reducing drying time.

34. TRUE Turning off the dishwasher after the rinse cycle is complete or using the overnight dry setting can save you 1/3 of dishwasher operating costs.

35. FALSE Trash compactors and waste disposers consume relatively small amounts of energy.

36. FALSE. Use cold water when running the garbage disposal. It is designed to work with cold water, and since hot water is a prime user (20 percent) of residential energy, this will save energy and money.

37. FALSE A hand iron consumes as much energy as ten 100-watt light bulbs  
Permanent press items save ironing time Iron large batches of clothing at one time to avoid wasting energy reheating the iron.

38. TRUE. Join a carpool.

39. FALSE The faster you drive, the more gasoline you burn.

40. FALSE. When filling your car, remove the nozzle as soon as it cuts off and avoid possible spillage.

41. FALSE. The best way to warm up a car is to drive slowly until the engine reaches proper operating temperature.

42. TRUE Safety and theft considerations aside, it takes less fuel to restart than to let a car idle for a minute or more.

43. FALSE Check air pressure in your tires regularly Under-inflated tires increase gas consumption.

44. FALSE. Properly inflated steel-belted radials give better mileage and last longer.

45. TRUE The lighter the car, the less gas it uses Always remove unnecessary weight from the car.

46. TRUE. A car that is properly tuned will get better mileage The more smoothly your engine runs, the less energy it will require to operate.

47. TRUE. An air-starved engine will waste gasoline Keep the air filter clean and your mileage should increase.

48. TRUE. The 55-mph national speed limit was imposed to conserve gasoline.

Developed by Bonnie Vondracek  
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49. TRUE. Underpinning, or a “skirt,” is the most accessible and practical method of reducing heat flow for mobile homes.

50. TRUE. An investment of about \$15 to insulate your electric water heater probably will pay you back in about 12 months.

The Alliance to Save Energy. Washington, DC. Founded and co-chaired by Senators Charles H. Percy (R-IL) and Hubert H. Humphrey (D-MN) in 1977, the Alliance was established to promote energy efficiency worldwide to achieve a healthier economy, a cleaner environment, and energy security.

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### Making Choices – Necessities Versus Luxuries

Pretend that the government has announced that, because of an energy crisis, electricity will be rationed. According to a new regulation, homeowners will be permitted to own and use no more than twelve electrical items, other than lighting and heating/air conditioning systems. Listed below are a variety of items, which use electricity and are often found in homes. Choose the twelve items that you feel would be most essential to you and rank them from 1 to 12 (1 being the most important, 12 the least). Be prepared to defend your choices.

- |                                   |                           |
|-----------------------------------|---------------------------|
| _____ Television                  | _____ Electric can opener |
| _____ Automatic coffee pot        | _____ Makeup mirror       |
| _____ Dishwasher                  | _____ Waffle iron         |
| _____ Blender                     | _____ Vacuum cleaner      |
| _____ Electric mixer              | _____ Fan                 |
| _____ Electric shaver             | _____ Sewing machine      |
| _____ Electric clock              | _____ Water heater        |
| _____ Curlers/curling iron        | _____ Stereo              |
| _____ Electric typewriter         | _____ Electric stove      |
| _____ Microwave oven              | _____ Toaster oven        |
| _____ Telephone answering machine | _____ Freezer             |
| _____ Electric blanket            | _____ Computer            |
| _____ Garbage disposal            | _____ VCR                 |
| _____ Refrigerator                | _____ Iron                |
| _____ Washer/dryer                | _____ Griddle             |
| _____ Food processor              | _____ DVD player          |
| _____ Electric knife              | _____ Power tools         |
| _____ Toaster                     | _____ Hair dryer          |

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### My Personal Conservation Effort

Describe two different energy conservation methods that you will implement in your personal life in the upcoming month. This may include such things as: closing doors in unoccupied rooms, washing dishes in warm versus hot water, checking for leaking faucets, taking showers versus baths, washing clothes in cold versus hot water, using smaller wattage light bulbs, car pooling, etc.

1. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  
2. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Write a summary of the results of your energy conservation for the last month. Identify the methods that you used, how you implemented your plan, the results of your energy conservation, whether or not you will continue your plan, and how you plan to be a better energy consumer.