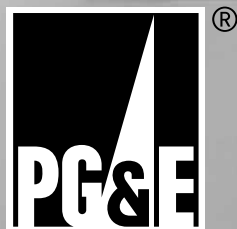


Energenius® Out-of-School Time Program

Activity Guide 4

Become an Energenius

Activities on Taking Actions to
Promote Energy Efficiency



Introduction

Become an Energenius; Activities on Taking Actions to Promote Energy Efficiency is a series of exercises for children and youth who attend out-of-school time (OST) programs. It is designed to engage participants in learning how they can save energy, recycle, reduce, reuse, and also encourage behaviors that will promote energy efficiency in their homes, schools, and community.

The exercises in this guide focus on energy-efficient behaviors that can help reduce energy use. Activities also focus on ways to influence others to become an Energenius or someone who does not waste energy and water.

Guide to Activities

The three activities in *Become an Energenius* can be used as a stand-alone unit or as part of a larger study of energy and the environment. These activities are designed to be completed in three to six sessions. Overviews of activities are provided along with information pertaining to objectives, preparation, materials needed, and vocabulary.

Written materials that can be taken home to parents, guardians, and other caregivers are also included in the *Become an Energenius* program. This includes the Home Energy Information Packet that should be distributed to all participants in the program.

Training

Become an Energenius is provided as a resource for OST programs and is offered along with training by the California School-Age Consortium for OST staffs to implement these activities.

The four Energenius Out-of-School Time Program guides and training were developed by the California School-Age Consortium with funding from Pacific Gas and Electric Company.



Contents

Activity 1: Light Bulbs: Making Good Energy Choices.....	1
Activity Procedure.....	2
Energy-Saving Songs.....	5
Handout 1: Light Bulbs	7
Handout 2: Home Energy-Saving Tips	8
Activity 2: Recycle, Reduce, and Reuse	9
Activity Procedure.....	10
Handout 3: What Can I Do?	11
Handout 4: 3Rs at Home	12
Activity 3: Saving Energy and Water: A Community Effort.....	13
Activity Procedure.....	14
Handout 5: TV Commercial and Storyboard	15-16
Handout 6: I am an Energenius	17

Activity 1:

Light Bulbs: Making Good Energy Choices

Overview:

This activity asks children and youths to identify ways to save energy in their homes by thinking again about their own behaviors. The group learns about energy-efficient products that can help save energy. They focus on various light bulbs, as examples of products that can save energy. They also use songs and rhymes to present energy-saving tips to others.

This activity is intended to help make the connection between everyday actions and becoming more energy-efficient. The children and youths will be able to share energy-saving tips with their parents and guardians and help their own families become more energy-efficient.

Objectives:

- Children and youths will be able to describe simple ways to reduce their own energy use.
- Children and youths will be able to identify some energy-efficient products (or technologies) that can save energy.
- Children and youths will be able to describe the pros and cons of various types of light bulbs.

Materials:

- Markers, colored pencils, or crayons
- Chart paper
- **Light Bulbs** (Handout 1)
- **Home Energy-Saving Tips** (Handout 2)
- One lamp
- Four light bulbs (See **Preparation** section on this page for types of bulbs)
- Samples of light bulb packages showing required lighting facts

Preparation:

- Read through the entire activity, making adjustments as necessary for the age(s) of the children and youths group size, and session time.
- Make copies of **Light Bulbs** [Handout 1] and **Home Energy-Saving Tips** [Handout 2] for each child or youth.
- Select samples of nursery rhymes or music for use in creating songs with energy-saving tips.
- Set up a lamp with various types of light bulbs. The bulbs should include:
 - > A compact fluorescent light bulb (CFL)
 - > A light-emitting diode (LED) light bulb
 - > An energy efficient incandescent light bulb (e.g. halogen incandescent bulb)*
 - > A traditional incandescent light bulb**

*There are government guidelines that indicate these energy efficient incandescent bulbs must at present be at least 25 percent more efficient than the old, traditional, incandescent light bulbs.

**Traditional incandescent bulbs use a lot of energy to produce light and are no longer manufactured in the U.S. About 90% of the electricity used to power these bulbs is given off as heat.

Vocabulary:

compact fluorescent light bulb (CFL) – A bulb that produces light by passing electricity through a gas.

Energenius – Someone who knows a lot about energy. An Energenius is someone who does not waste energy or water.

energy efficiency – The use of energy without waste; work done using the least amount of energy needed.

incandescent light bulb – A bulb that produces light from the glow of a wire heated by electricity.

light bulb – A glass bulb that emits light when supplied with electricity.

light emitting diode (LED) – A bulb that contains a semiconductor diode that emits light when conducting current.

lumens – A measure of the total light produced by a light bulb.

Activity Procedure

1. Ask children and youths to share with the group what they've done recently to save energy at home or at school. Saving energy can mean simple behaviors like shutting off lights, unplugging chargers, or turning televisions off when no one is watching.
2. Discuss that some ways to save energy requires the help of a parent or guardian and are not things that children can do. Ask for examples from the group. The examples could include adjusting the heater, buying energy-efficient light bulbs, washing only full loads of clothes, and asking landlords to install lighting sensors in halls.
3. Review the energy savings tips on the **Home Energy-Saving Tips** [Handout 2]. After each tip, ask if it is something they can do on their own, or one that needs an adult. Discuss other things families can do to save energy such as purchasing or asking landlords to buy energy-efficient appliances.
4. Set up a table with a lamp (without a shade), light bulbs, and some of the packaging with lighting facts. Distribute a copy of **Light Bulbs** (Handout 1) to each child or youth. They should use this handout to either write or draw what they see during the light bulb demonstrations.
5. Hold up the various lights bulbs one-by-one and ask students if they know the names or anything else about these light bulbs. As you go through information on the various bulbs place that bulb in the lamp and turn it on. Record their responses on chart paper and provide other information about each of the light bulbs.



Continued from page 2

- Explain that although all of these bulbs provide light, some are not energy-efficient. Place a traditional incandescent light bulb and tell them that these bulbs are not efficient as they use a great deal of electricity that is given off as heat. About 90% of the electricity to power these bulbs is used for heat. They are considered energy wasters and are no longer manufactured in the United States.
- Have some students come up to the table and put a hand above the traditional incandescent bulb and tell others what they are feeling. **Note:** This demonstration should be conducted in a safe manner by establishing the amount of inches between the bulb and where a hand is placed above the bulb. Children and youths should not handle any of the light bulbs used in this demonstration.
- Ask the group to write or draw on their handouts, what they learned from this demonstration of a traditional incandescent light bulb.
- Ask the group if they ever read or heard about Thomas Edison (1817-1931) and if they knew one of his inventions was the incandescent light bulb? The number of light bulbs there are now would surprise Edison. Today, we have many choices of bulbs that are energy-efficient. They not only save energy, save money on electricity bills, but are also good for the environment.
- Pass around the packaging from a CFL, a LED, and if available, a halogen incandescent. Have students tell what type of information they can find out from these light bulb packages. Ask them why they think that someone would want this information. Answers could include that people want to know the lumens (or how bright the light is), and how many hours the bulbs would last,
- Have students complete their handouts by writing down any questions they have about light bulbs. These questions and answers can be covered at another afterschool session.

Lighting Facts Per Bulb	
Brightness	820 lumens
Estimated Yearly Energy Cost	\$7.23
Based on 3 hrs/day, 11¢/kWh Cost depends on rates and use	
Life	1.4 years
Based on 3 hrs/day	
Light Appearance	
Warm Cool	
2700 K	
Energy Used	60 watts

Traditional Incandescent
Light Bulb Facts

OR

Lighting Facts Per Bulb	
Brightness	870 lumens
Estimated Yearly Energy Cost	\$1.57
Based on 3 hrs/day, 11¢/kWh Cost depends on rates and use	
Life	5.5 years
Based on 3 hrs/day	
Light Appearance	
Warm Cool	
2700 K	
Energy Used	13 watts
Contains Mercury For more on clean up and safe disposal, visit epa.gov/cfl .	

CFL Light Bulb Facts

Debrief Questions:

- What did you feel when you placed hands over the traditional incandescent light bulb?
- Why is it important for families to use energy-efficient lighting?
- Why should schools purchase and use energy-efficient lighting?
- How can people find out lighting facts about various light bulbs? (Lighting facts labels on light bulb packages)
- What are other energy-efficient products that can help save energy?

Modification Tip:

Photos from the Internet or print advertisements could be used if you are unable to secure the various light bulbs suggested for this demonstration.

LED Package



NOTES:

Energy-Saving Songs

1. Ask the group if they would say that saving energy is easy as 1-2-3. Discuss how that since they have learned energy-savings tips from previous activities, they can now create songs or rhymes to help them remember these tips.
2. Divide children and youths into groups of four or five and have each group select an energy-saving tip from the **Home Energy-Saving Tips** [Handout 2]. Each group should pick a nursery rhyme or song as a way to remember the tip. Children and youths should work together to add the words to explain the energy-saving tip they have selected.
3. Provide time for the groups to work on their songs or rhymes and to practice a way to present their “tip” to the rest of the group. Some groups might need suggestions of rhymes or songs they might use to complete this activity.
4. Have each group make their presentations and also if time “teach” the song or rhyme to the whole group.

Debrief Questions:

- a. What do you think about using songs and rhymes as a way to remember energy-saving tips?
- b. Which energy-saving tips presented today are you already following at home?
- c. How could we use these rhymes and songs to help others learn how to be energy-savers and not energy-wasters?

Take-Home Activity:

1. Distribute the **Home Energy-Saving Tips** handout. This handout can be used as a way for children and youths to discuss things their families could do to save energy.
2. Tell the group that for families that rent, there are tips that would need to be done by the owner of the property.



Handout 1: Light Bulbs

Directions: Use this handout to record or draw what you see during the demonstration of various light bulbs.

<p>CFL (Compact Fluorescent Light)</p> 	
<p>Halogen Incandescent</p> 	
<p>LED (Light-Emitting Diode)</p> 	
<p>Traditional Incandescent</p> 	

Light it Right! Do you have more questions about these light bulbs? Write your questions on the other side of this handout.

Handout 2: Home Energy-Saving Tips



✓ Set the furnace thermostat at 68 degrees or lower, and the air-conditioner thermostat at 78 degrees or higher, health permitting.

✓ Replace old air conditioners with ENERGY STAR® labeled energy-efficient model.

✓ Use compact fluorescent light bulbs or LED lights.



✓ Wash clothes in cold water and try to do full loads.

✓ Replace your old windows with new high-performance dual pane windows.

✓ Clean or replace all furnace and air-conditioner filters regularly, following the manufacturer's instructions.



✓ Unplug appliances that are on "stand-by" mode.

✓ Set the water heater thermostat at 140 degrees or "normal," if you have a dishwasher. Otherwise, set it at 120 degrees or "low." Check your dishwasher to see if you can use 120 degree waters. Follow the manufacturer's direction on yearly maintenance to extend the life of your unit.



✓ Fix dripping faucets.

✓ Wash only full loads in a dishwasher and use the shortest cycle that will get your dishes clean.

✓ Defrost refrigerators and freezers before ice buildup becomes 1/4-inch thick.

✓ Install shades, awnings or sunscreens on windows facing south and/or west to block summer light. In winter, open shades on sunny days to help warm rooms.



✓ Turn the lights and TV off when you leave the room.

✓ Put clothes out to dry on a sunny day, if you have a place to hang them.



Activity 2: Recycle, Reduce, and Reuse

Overview:

This activity encourages children and youths to practice recycling, reducing, and reusing in their everyday lives. In addition, it provides an opportunity for the group to share ideas with others about good recycling practices.

This activity includes a hands-on session where recycled material is used for art projects.

Objectives:

- Children and youths will be able to provide examples of how they can recycle, reduce, and reuse.
- Children and youths will be able to explain the importance of recycling, reducing, and reusing.
- Children and youths will be able to work with peers to create art using recycled materials.

Preparation:

- Read through the entire activity, making adjustments as necessary for the age(s) of the children and youth, group size, and session time.
- Make copies of **What Can I Do?** and **3Rs at Home** (Handouts 3 and 4) for each child or youth.
- Use the Internet to find and print photos of recycled art pieces.
- Collect and prepare recyclable materials for use as art materials.

Materials:

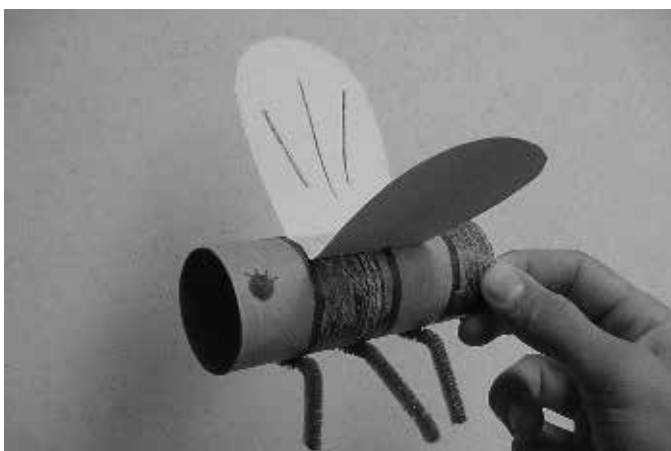
- Markers, pens, colored pencils, crayons glue sticks or glue guns
- **What Can I Do?** (Handout 3)
- **3Rs at Home** (Handout 4)
- Photos of recycled art pieces
- Cardboard or foam board
- Cartons, broken crayons, paper towel rolls, and other recyclable materials

Vocabulary:

recycle – To collect and process materials that can be reused to make new products.

reduce – To use less.

reuse – To use something again instead of throwing it away.



Activity Procedure

1. Ask the group to raise their hands if they've recycled something today. Have those raising their hands to share what they recycled.
2. Ask the group if they know what the word recycle means. Their responses should include that to recycle means to collect and process materials that can be used to make new products.
3. Distribute the **What Can I Do?** (Handout 3) and organize the group into pairs to share and write actions they can take to recycle at school. Actions might include: recycling cans, plastic bottles or making a classroom recycle bin and posters about recycling.
4. Ask the group if they know what it means to reduce. Discuss that the word reduce means to use less of something.
5. Direct participants to share and write ways they can reduce waste at school on their **What Can I Do?** handouts. They should list both things they can do during the regular school day and in the afterschool program. Responses could include reducing waste by using both sides of sheets of paper or by bringing lunch or snacks in a reusable bag or container.
6. Ask the group what they think of when they hear the word reuse. They should know that reusing means saving things that are usually thrown out and using them again. Direct participants to share and list actions on their **What Can I Do?** handout they can take to reuse at school and in the afterschool program.
7. Discuss how many things can be reused or recycled by creating various art projects. Show photos of various art pieces that include items that have been recycled. Explain that there are many materials that can be used to create recycled art.
8. Tell the group that they have the opportunity to create mosaics using recycled materials. Explain that a mosaic is a picture or pattern using small pieces of stone, beads, and other materials.
9. Divide into groups of four or five and explain how each group will make a mosaic that reminds others to recycle, reduce, and reuse. As part of these mosaics they can use words and/or images to get their messages across to the viewers.
10. Provide pieces of cardboard or foam board to each group and give them time to brainstorm ways their mosaic will remind others to recycle, reduce, and reuse.
11. Hand out materials collected for the mosaic project after the groups have finished their brainstorming, for this activity.
12. Once they have taken their materials to a workspace and laid out their mosaic patterns, help them glue the pieces down on the pieces of cardboard or foam board. Display the finished art pieces around your program area. **Safety note:** Glue guns always require adult supervision.

Modification Tips:

- To modify this activity for older youth have them make two different mosaics. The first would display non-recyclable trash and the other products that are recyclable. The mosaics could then be displayed above disposal bins to show what goes in each.
- To modify this mosaic activity for younger children (grades K-2) they could do a project where they reuse an item or materials to make something new. For example, they can use milk cartons as bird feeders or to plant seeds.

Take-Home Activity:

1. Remind everyone that it's important to recycle, reduce, and reuse at home, too.
2. Distribute the **3Rs at Home** (Handout 4). Explain that they can use this handout to write the ways their family practices the 3Rs. Encourage them to discuss more ways that they could recycle, reduce, and reuse.

Handout 3: What Can I Do?

Directions: Work with a partner to complete this chart. You should list things that you can do during the regular school day and at the afterschool program.

Recycle	Reuse	Reduce
Example: Scrap construction paper	Example: Cut into small pieces and make a mosaic.	Example: Less new paper used for art projects.

Handout 4: 3Rs at Home

Directions: Complete this 3Rs chart by listing ways you already recycle, reduce, or reuse at home.

Recycle	Reuse	Reduce
Example: Soda cans	Example: Paper bags can be reused for shopping.	Example: Number of paper towels used for spills.

Activity 3:

Saving Energy and Water: A Community Effort

Overview:

This activity asks children and youths to share with others in their school and community what they have learned about saving energy and water. They will create “TV commercials” that reflect what they have learned in this OST program.

This activity is intended as a review of what the group has learned through the previous three guides. As part of this review children and youths will create commercials that show what it takes to become an Energenius.

Objectives:

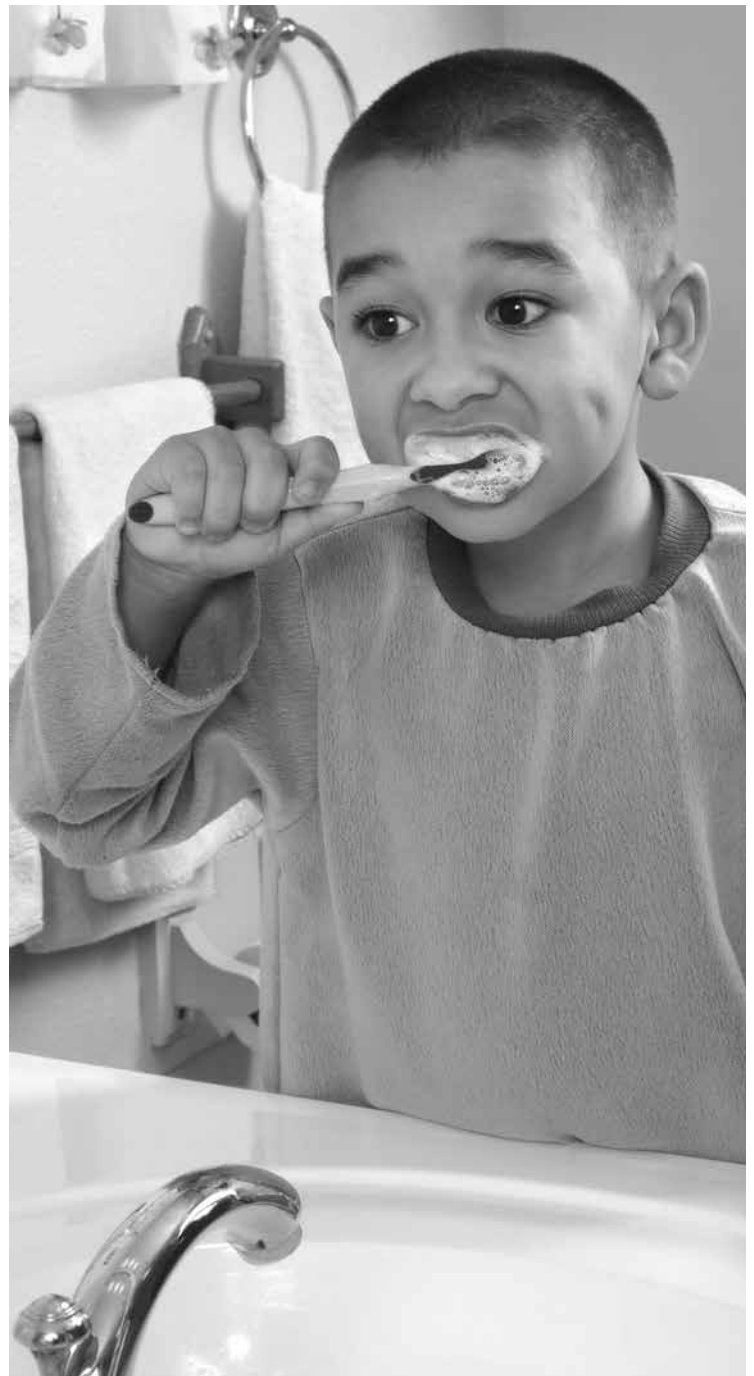
- Children and youths will identify and discuss ways to influence others around them to save energy and water.
- Children and youths will create commercials that promote energy and water-saving tips.

Preparation:

- Read through the entire activity, making adjustments as necessary for the age(s) of the children and youth, group size, and session time.
- Make copies of **TV Commercial and Storyboard** and **I am an Energenius** [Handouts 5 and 6] for each child or youth.
- Review the different energy and water-saving tips from the other three Energenius Out-of-School Time program activity guides.

Materials:

- Markers, pens, colored pencils, crayons
- **TV Commercial and Storyboard** (Handout 5)
- **I am an Energenius** (Handout 6)
- Optional: Video recording equipment to record commercials



Activity Procedure

1. Engage the entire group in the following discussion by asking these questions:
 - a. Have you seen a commercial on TV that you really liked?
 - b. What did you like about it? (Chart their answers using simple phrases or words such as funny, animals that speak, seemed real, dancing, happy music, etc.)
 - c. Why do you think the commercial you liked worked so well?
2. Explain how the group will be discussing ways to convince others to save energy and water by using some of the same techniques used in TV commercials.
3. Look back and review the energy and water saving tips that the group learned in the other three activity guides. (Note: If you haven't gone through all of the activities at this point, take time to review the tips that have been covered.) Brainstorm other topics related to protecting the environment that could be included in a commercial.
4. Divide children and youths into four or five groups to create a commercial. These groups should be small enough for everyone to have a role. Distribute **TV Commercial and Storyboard**, and give the groups time to complete page 15 of this handout.
5. Once the groups have completed page 15, provide time for them to create their commercials and complete the storyboard on page 16. Allow time for them to practice how they will present their commercial to the whole group.
6. After each commercial is presented have the group as a whole discuss and answer questions such as:
 - a. What was the main message in this commercial?
 - b. What were things that made this an effective commercial?
 - c. What other tips did the presenters think could be presented in a commercial?
7. (Optional) Create the commercials on video if you have access to recording equipment.

Modification Tip:

To modify this activity for younger children (grades K -2), have them make a billboard poster on a tip instead of a TV commercial. They should also talk about what billboards are and where they have seen them.

Take-Home Activity:

1. Distribute the **I am an Energenius** (Handout 6) to everyone in the group.
2. Explain that they should write or draw on the handout the commitments they're making to save water and energy.
3. Remind them that being a friend to the environment is something they should practice every day.





Handout 5: TV Commercial and Storyboard

Direction: Answer the questions below to create a script or outline before you draw or storyboard your commercial. Use the storyboard handout for your script and scenes.

1. Who is the audience for the commercial? (young children, teenagers, sports fans, parents, etc.)

2. What energy or water-saving topic will the commercial highlight?

3. What behaviors or wasteful practices are you trying to change?

4. What is your message? What are you trying to “say” with your commercial?

5. Do you have a slogan? A slogan is a short phrase that rhymes or is “catchy.”

6. Draw or “storyboard” your commercial in the frames provided (page 16). Add or create any logo or images you’d like to include in your commercial.

Storyboard

1 Visual: _____

1 Copy: _____

2 Visual: _____

2 Copy: _____

3 Visual: _____

3 Copy: _____

4 Visual: _____

4 Copy: _____

5 Visual: _____

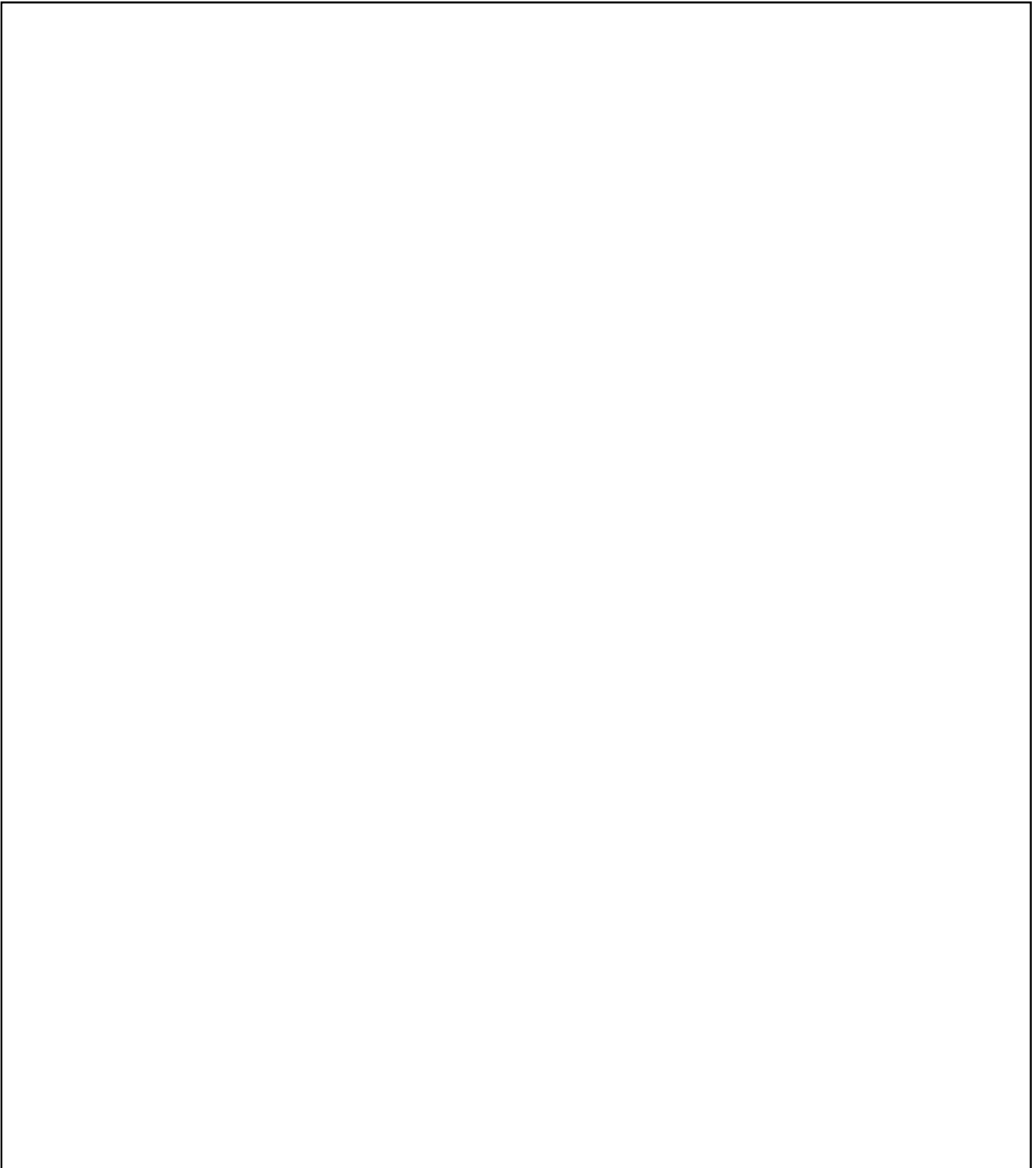
5 Copy: _____

6 Visual: _____

6 Copy: _____

Handout 6: I am an Energenius

Directions: Write or draw how you are planning to save energy, water, and conserve natural resources. Remember an Energenius is someone who is “smart” about not wasting energy and water.



The Energenius Out-of-School Time (OST) activity guides were written by California School-Age Consortium (CaSAC) for use with children and youths in OST programs. This offering is funded by California utility customers and administered by Pacific Gas and Electric Company under the auspices of the California Public Utilities Commission. Content and images in these materials have been modified and adapted by CaSAC with permission from the PG&E Energenius Educational Program series. The lessons have been edited and modified to work with various student ages within an after-school setting. Energenius is a registered trademark of Pacific Gas and Electric Company. Energenius materials cannot be used in any form without prior expressed permission from Pacific Gas and Electric Company.

PG&E refers to Pacific Gas and Electric Company, a subsidiary of PG&E Corporation. © 2015 Pacific Gas and Electric Company. All rights reserved.



PG&E prints its materials with soy-based inks ♻️ on recycled paper. ♻️

November 2015 CCA-1015-4818