

# **Energy Curriculum Grades 4-6 Part 3: The Environment Depends on You!**

## **Teacher's Guide**



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This teacher' guide coincides with an interactive SMART board presentation on Motion & Position: The Basics of Energy for 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> grade. The teacher's guide contains information to coincide with the content of the SMART board lesson, additional resources, and lesson extensions. The teacher's guide is designed to serve as a stand-alone resource, or can be used along with the SMART board presentation and/or student guide. Additional energy lessons and resources can be found at [www.cceoneida.com](http://www.cceoneida.com).

*Made possible with funding from the United States Department of Agriculture*

Objectives – Students will be able to:	Assessments
<ul style="list-style-type: none"> <li>Recognize the cause and effect relationship between choices in their life and the Earth</li> </ul>	<ul style="list-style-type: none"> <li>Students will record ideas of choices they made in their life and how they knew they affected others</li> <li>Students will share recorded (and other) ideas during class discussion, with ideas documented on the board to help further identify a choice's potential cause and effect.</li> </ul>
<ul style="list-style-type: none"> <li>Determine the main idea of the book</li> </ul>	<ul style="list-style-type: none"> <li>Students will record the main idea in their science journal and discuss through a Think-Pair-Share.</li> </ul>
<ul style="list-style-type: none"> <li>Develop an understanding of the multiple and diverse ways individuals can be stewards of the environment</li> </ul>	<ul style="list-style-type: none"> <li>Interactive workshop stations; Whole class discussion</li> </ul>

### **Lesson Content –**

#### Concepts

- Group work
- stewardship

#### Generalizations

- There are many ways individuals can positively affect the environment

#### Terminology with Definitions

- Steward – a person who cares for others' property or items

#### Key or focus questions

- How do you determine important information?
- How do you present important information?

- Though diverse, why are multiple ways of affecting the environment important?

### **NYS Learning Standards**

Science within Standard 4 The Living Environment, Key Idea 7

- 7.1e the environment may contain dangerous levels of substances that are harmful to organisms. Therefore, the good health of environments and individuals requires the monitoring of soil, air and water, and taking steps to keep them safe.
- 7.2d Since the Industrial Revolution, human activities have resulted in major pollution of air, water, and soil. Pollution has cumulative ecological effects such as acid rain, global warming, or ozone depletion. The survival of living things on our planet depends on the conservation and protection of Earth's resources.

English within Standard 1--Students will read, write, listen, and speak for information and understanding.

- Listening and reading. Students:
  - interpret and analyze information from textbooks and nonfiction books for young adults,
  - compare and synthesize information from different sources
  - distinguish between relevant and irrelevant information and between fact and opinion
  - relate new information to prior knowledge and experience

Speaking and writing. Students:

- produce oral and written reports on topics related to all school subjects
- organize information according to an identifiable structure, such as compare/contrast or general to specific

- develop information with appropriate supporting material, such as facts, details, illustrative examples or anecdotes, and exclude extraneous material

### Preparation & Materials

- Van Allsburg, C. (1990). *Just a Dream*. Houghton Mifflin Company: New York.
- Blank graphic organizers
- Blank rubrics

### Station One: Clean and Green

Teacher prep:

1. You will need:
  - a. Baking soda
  - b. White vinegar
  - c. Lemon juice
  - d. Cornstarch
  - e. Water
  - f. Measuring spoons and cups
  - g. Small mixing bowls and spoons
  - h. Spray bottles
  - i. Dirty desk top
  - j. Dirty window
  - k. Swatch of stained carpet
2. Using the Station worksheet, students will create and test “green” cleaning products and rate their effectiveness.
3. Students should discover that the correct mixture of items is effective in cleaning items.

### Station Two: Watch Your Water

Teacher prep:

1. You will need:
  - a. a tooth brush for each student
  - b. A plastic basin/pan
  - c. A large measuring cup
  - d. Worksheet for each student
2. Using the Station worksheet, students will measure how much water they use

when they do and do not turn off the tap when brushing their teeth.

3. Students should discover that they save a significant amount of water when turning off the tap while brushing.

### Station Three: Track Your Stuff

Teacher prep:

1. You will need:
2. Using the Station worksheet, students map the distance five of their belongings have to travel before reaching them.
3. Students should discover that the further an item has to travel before it reaches them, the more significant the impact to the environment.

### Station Four: Reduce, Reuse and Recycle

Teacher prep:

1. You will need:
  - a. A scale
  - b. Latex gloves
  - c. Prepare a 30 pound bag of “garbage” which should be reflective of a typical week’s worth of garbage by including:

Paper products (take out containers, newspapers, junk mail, napkins, etc)	40.4%
Lawn trimmings	17.6%
Metal (soup cans, soda cans, etc)	8.5%
Plastic (containers, bags, toy, etc)	8%
Food scraps	7.4%
Glass	7%
Other (rubber, leather, textiles, etc.) include a clothing item or two that are in good condition	11.6%

2. Students will separate the garbage to determine what’s really garbage, and what can be reused or recycled.
3. Students should discover that proper recycling and thoughtful reuse will significantly limit the amount of garbage they produce.

*Note: For safety’s sake, food scraps can either be faux or contained in small baggies. In addition, items like facial tissues should not really be used!*

## **Rationale & Time Frame**

This lesson can be used on its own or as the culminating lesson in a series of lessons about energy. We have moved from learning some of the basics of energy, to energy sources. While earlier lessons have touched on the idea of their being diverse levels of change, but this lesson will allow students to truly realize that discussion in a meaningful, first-hand way.

The first half of this lesson utilizes an ELA stance by introducing the idea of environmental stewardship through the reading and discussing of the children's book *Just a Dream* by Chris Van Allsburg. The book is about a young boy who doesn't have the ambition to care for the environment until his dream of the future is totally different than how he imagined it.

Students will be able to relate their own experiences relating to care of the environment with those of the main character of the book. Students will also begin to explore how they see the future of the environment.

This lesson will then encourage students to explore some of the diverse variety of ways individuals of all ages can be stewards of the environment.

Small Cooperative Learning Groups will be used in part of this lesson as groups of 4-5 students will visit four different learning stations to explore simple, yet meaningful ways they can contribute to environmental stewardship.

Groups should be pre-selected by the teacher. (Johnson & Johnson, 2009).

Learners with a variety of learning styles including interpersonal, logical, verbal-linguistic, and naturalist, will benefit from this lesson: Interpersonal learners will benefit from this lesson through different methods of

interacting with their peers in a large and small group setting (Berk, 2008).

Time frame: This lesson will take approx. 2 hours to complete.

## **Lesson Plans**

### **Page 3—The Choices You Make: Cause and Effect**

Begin a class discussion about the longevity of choices. Ask the students if they can think of a time when they made a choice that they thought wasn't important, but really was. How did they know it was important? Encourage students to share a few ideas to assist students in developing their own ideas.

If needed, prompt student thinking by offering an example of your own.

Instruct all students to think about their own idea, and how they knew it was important. Give them 5 minutes to write a response in their science journal and share with a partner.

You may set the interactive timer on the SMART board to keep time.

### **Page 4—Share Ideas**

Allow the class to share their ideas and write them on the SMART board.

### **Page 5—Cause and Effect**

The relationship between the choices we make and the way they affect others is called cause and effect. Cause and effect is the relationship between a choice I make and the impact it has on the world around me.

Invite students to illustrate the cause and effect of their examples.

- How did students know that a simple choice they made affected people other than just them—both negatively or positively?

We make choices every day that we don't even think about doing, and sometimes those choices have a bigger impact than we realize. Today, we are going to read a story where the main character, Walter, has exactly that experience.

### Page 6—Just a Dream

Today we are going to read a book that will help to get us thinking about the impact the choices we make—even the small ones—have on the world around us.

While reading the book, students should consider the following questions and write responses in their science notebook:

- Identify two things that people's choices have done to harm the Earth in this story
- How do the illustrations portray cause and effect?
- What is the main idea of this story?

Invite the class to sit on the floor or pull their chairs in a cluster (depending on the set-up of the classroom). They should bring their science journal and a pen or pencil with them.

Read the book. Throughout the reading of the book, pause to allow students time to study illustrations.

### Page 7—Let's find out how!

Watch the video at <http://www.youtube.com/watch?v=IwJ7eAALpEY&feature=fvw>.

Problems that occur in the environment seem so big--can one person really make a difference?

### Page 8—Let's find out!

Today, we are going to visit four stations that will help us see how many different ways we can make a positive impact on the environment. Our stations are:

- Clean and Green—"green" cleaners
- Watch your water—water conservation
- Map your stuff—buying local
- Reduce, reuse and recycle

You'll have 15 minutes at each station.

Allow groups to rotate among the stations. When groups have visited all of the stations, return to the SMARTboard to discuss the findings from each station.

### Page 9—Clean and Green

*At the "Clean and Green" station, students explore how "green" household items can be great cleaners. They do this by mixing their own cleaning solutions and trying them out.*

Discuss groups' "recipes" for cleaners and rate effectiveness.

Talk about differences and similarities in recipes and their affect on effectiveness.

### Page 10—Watch Your Water

*Using the Station worksheet, students will measure how much water they use when they do and do not turn off the tap when brushing their teeth.*

*Students should discover that they save a significant amount of water when turning off the tap while brushing.*

On the SMARTboard, complete the water savings chart by group.

Discuss other ways you can conserve water at home and/or school.

## Page 11—Map Your Stuff

Using the Station worksheet, students map the distance five of their belongings have to travel before reaching them.

Students should discover that the further an item has to travel before it reaches them, the more significant the impact to the environment.

Using the map on the SMARTboard, map the items and their locations.

Discuss the following questions:

- What’s the furthest distance an item had to travel to get to you?
- What’s the shortest distance an item had to travel to get to you?
- Explain three disadvantages of using items that are made far from home.

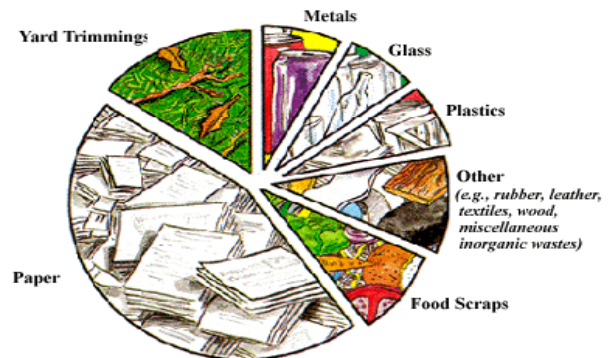
## Page 12—Reduce, Reuse and Recycle

Students will separate the garbage to determine what’s really garbage, and what can be reused or recycled.

Students should discover that proper recycling and thoughtful reuse will significantly limit the amount of garbage they produce.

The average American produces about 4 ½ pounds of garbage each day, which amounts to about 1638 pounds of garbage a year! The following chart gives you an idea of what is in our garbage:

Paper	40.4%
Yard trimmings	17.6%
Metal	8.5%
Plastic	8%
Food scraps	7.4%
Glass	7%
Other (rubber, leather, textiles, etc.)	11.6%



Source:

<http://www.epa.gov/osw/wycd/catbook/what.htm>

We can often reduce the amount of true garbage we produce by following the “reduce, reuse and recycle” message.

Here’s what it means:

- Reduce: to make something smaller or use less, resulting in a smaller amount of waste.
- Reuse: reuse materials in their original form instead of throwing them away, or pass those materials on to others who could use them too
- Recycle: save and take reusable materials to places where they can be remade into either the same product or new products.

Complete the chart on the SMARTboard to see how groups divided the bag of garbage.

Discuss the worksheet questions:

After you have separated your garbage, weigh the garbage that remains. How many pounds of garbage did you save in one week? What would that amount to in one year?

Take another look at the garbage that remains. Rather than send these items to the landfill, is there anything else you can do with them? *Talk about giving away or donating items that are still in good condition, repurposing old items, composting food scraps, etc.*

Now take a look at some of the items on your recycle pile. Are there any alternatives that will help REDUCE the amount of recyclables we produce?

*Don't buy individual serving portions, get a reusable water bottle, plant a garden, etc.*

Discuss ways you can make reducing the amount of garbage your family or class produces easier.

## Page 16—What did we learn?

We have spent a lot of time working on ways we can be good stewards of the environment and trying out ways that we can make a difference.

Lead a class discussion relating student's experiences back to *Just a Dream*. Is it just a fictional book? Can Walter make a difference? Can we? Why?

## References

Amsel, S. (2009). *365 Ways to Live Green for Kids: Saving the Environment at Home, School, or at Play--Every Day!* Adams Media.

Amsel, S. (2007). *Everything Kids' Environment Book: Learn how You Can Help the Environment-By Getting Involved at School, at Home, or at Play.* Adams Media.

Berk, Laura E. (2008). *Infants, Children, and Adolescents, sixth edition.* Pearson Education, Inc.

Javna, S. (2009). [\*The New 50 Simple Things Kids Can Do to Save the Earth.\*](#) McMeel Publishing Co.

Johnson, R. and Johnson D. An Overview of Cooperative Learning. Downloaded on October 11, 2009. <http://www.co-operation.org/pages/overviewpaper.html>.

Llewellyn, D. (2007). *Inquire Within, second edition.* Corwin Press.

O'Sullivan, J. (2009). *101 Ways You Can Help Save the Planet Before You're 12!* Sterling Publishing Co.

Schwartz, J. (1990). *Earth Book for Kids: Activities to Help Heal the Environment.* Learning Works Co.

Weiss, I. & Pasley, J. (2004). *What Is High-Quality Instruction?* Educational Leadership.

## Station One: Clean and Green

*Yuck! No one likes a dirty house, but some of the cleaners you use to clean your house might be even more harmful than the dirty house itself! The chemicals in some cleaners have been found to harm people and the environment, in ways that include causing allergies, bring on asthma attacks, and releasing toxins in the air, ground and water. Luckily, there are natural substances that together can make inexpensive, good cleaners. Here are some cleaning alternatives:*

All-purpose cleaner	Baking soda mixed with warm water in a spray bottle
Dishwashing liquid	Lemon juice diluted with water
Window cleaner	White vinegar diluted with water
Carpet stain remover	Cornstarch mixed with water, into a paste
bathroom cleaner	Pure white vinegar

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Create your own cleaning mixtures and then test them out on the dirty samples before answering the following questions.

What needs to be cleaned:	Recipe for green cleaning solution	Did the solution work?	Modify the solution? How?
Dirty desk top			
Dirty window			
Stained carpet			

## Station Two: Watch Your Water

*Did you know that less than 1% of the water on Earth is usable for human purposes, including drinking, bathing and cooking. In many places throughout the world, there is not enough water for people and animals to survive. The average person in the United States uses 100 gallons of water each day!*

*How can you conserve the amount of water you use?*

What to do

1. Place a dish pan on one side of the sink.
2. Prepare to brush your teeth. Turn the water on when you typically would, and do NOT shut it off as you brush your teeth.
3. Take your time brushing your teeth, as you typically would at home.
4. When you are done, spit in the sink, not the dish pan.
5. Do NOT turn off the water until you typically would.
6. Measure the amount of water you have collected in the dish pan.
7. Record the amount on this worksheet.
8. Now, repeat steps 2—7, but this time, shut the water off as you are brushing, and use as little water as possible to rinse your toothbrush, etc.
9. If time allows, each person in the group should complete the teeth brushing activity.

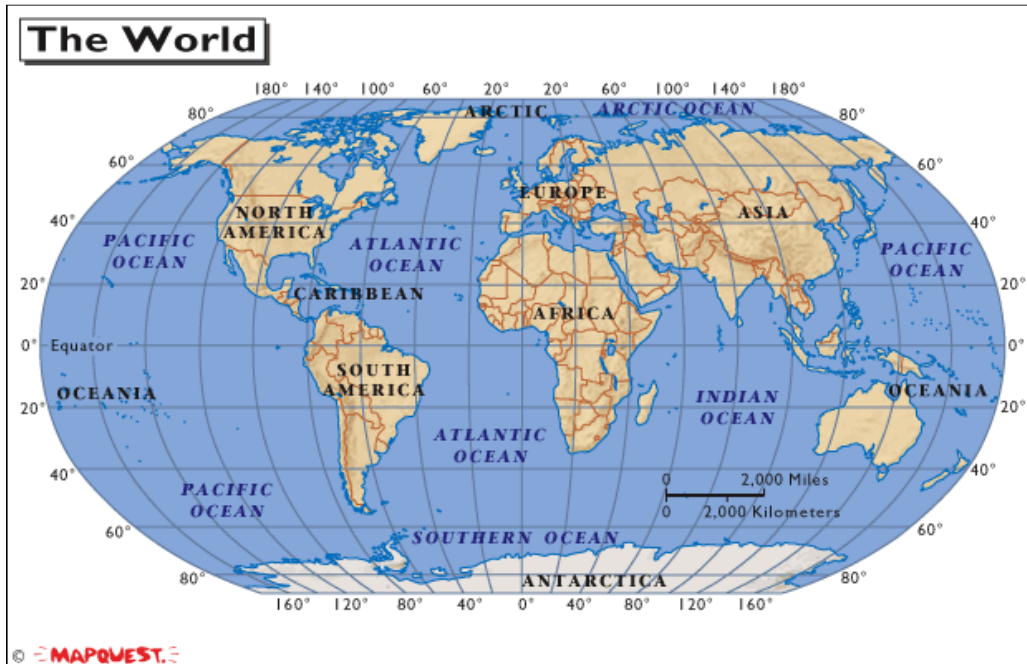
Group Member	Amount of water used on first teeth brush	Amount of water used on second tooth brush	Amount of water saved
Average amounts:			

1. Assuming you brush your teeth twice a day, how much water could you save in:
  - a. One day?
  - b. One week?
  - c. One month?
  - d. One year?
2. List some other ways you can conserve water at home or school?

### Station Three: Track Your Stuff!

Think about all of the stuff you have—toys, clothes, school supplies—where did it come from to get to you? Chances are, your stuff comes from all over the world. And, the further something has to travel to get to a store near you, the bigger the effect it has on the environment.

Select five—ten items that belong to your group (or the classroom). Locate the country they were made in on the map, then answer the following questions.



1. Our five items are:

ITEM	COUNTRY OF ORIGIN	MILES TRAVELED
a. _____	_____	_____
b. _____	_____	_____
c. _____	_____	_____
d. _____	_____	_____
e. _____	_____	_____

2. What's the furthest distance an item had to travel to get to you? \_\_\_\_\_

3. What's the shortest distance an item had to travel to get to you? \_\_\_\_\_

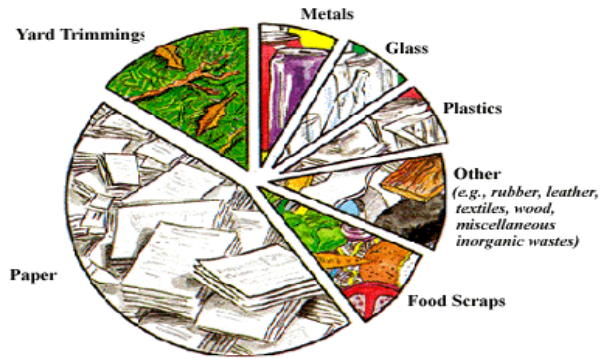
4. List and explain three disadvantages of using items that are made far from home.

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

## Station Four: Reduce, Reuse and Recycle!

Did you know the average American produces about 4 ½ pounds of garbage each day? That's over 31 pounds of garbage a week or 1638 pounds of garbage a year!

The following chart gives you an idea of what is in our garbage:



Paper	40.4%
Yard trimmings	17.6%
Metal	8.5%
Plastic	8%
Food scraps	7.4%
Glass	7%
Other (rubber, leather, textiles, etc.)	11.6%

Source: <http://www.epa.gov/osw/wycd/catbook/what.htm>

But is everything that we throw in the garbage really garbage?

We can often reduce the amount of true garbage we produce by following the “reduce, reuse and recycle” message. Here’s what it means:

- *Reduce: to make something smaller or use less, resulting in a smaller amount of waste.*
- *Reuse: reuse materials in their original form instead of throwing them away, or pass those materials on to others who could use them too*
- *Recycle: save and take reusable materials to places where they can be remade into either the same product or new products.*

**What to do:**

Look through the bag of garbage and determine what's really garbage and what's not. Using your knowledge of reduce, reuse and recycle to separate items into categories, and see how much you can reduce your garbage use by!

1. Separate the 30 pound bag of garbage into the following categories:

Reuse	Recycle
Garbage	Other

2. After you have separated your garbage, weigh the garbage that remains. How many pounds of garbage did you save in one week? What would that amount to in one year?

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3. Take another look at the garbage that remains. Rather than send these items to the landfill, is there anything else you can do with them?

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4. Now take a look at some of the items on your recycle pile. Are there any alternatives that will help REDUCE the amount of recyclables we produce?

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5. Give three ways you do to make reducing the amount of garbage your family or class produces easier?

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