



## Unit 10: BIG Feet

### Lesson 2: Small Foot—Big Foot

#### Contributor

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#### Unit Objective

Through a variety of activities students will increase awareness and get a better understanding of how their actions (or inactions) may have a much greater affect on the larger world. Only through our awareness of the microsystem (ourselves) can we begin to positively affect the macrosystem (world).

Note: This unit should be introduced near the beginning of the school year so students have an opportunity to affect change and share acquired knowledge with others over an extended period.

#### 🕒 Unit Time

This unit will take approximately two weeks to complete

### Lesson 2: Small Foot—Big Foot

#### Lesson Objective

Students will graph their personal results from the *Ecological Footprint* Quiz so that they can begin to set goals and make a plan to ‘step lightly’.

🕒 **Lesson Time** approximately 2 class periods

#### ✂️ Materials

- Graph paper
- Felts
- Ruler
- Pencil

## Getting Started

### Knowledge Now

Students will review their results from the Ecological Footprint Quiz

### Learning Activities

#### Activity: Graphing Personal Results:

*X-axis*:—for each area being compared, there should be three spaces: Today; 1 month; 3 months (Or these can be depicted using different colours; eg: **today, 1 month, 3 months**)

- Food (**today, 1 month, 3 months**)
- Mobility (**today, 1 month, 3 months**)
- Transportation (**today, 1 month, 3 months**)
- Goods/Services (**today, 1 month, 3 months**)

*Y-axis*—Students decide on the increments of this fixed scale

#### Activity: Planning and Organizing

- What can I do to create a *smaller shoe size*?
- Small groups: Students will brainstorm various actions they can take to change their ecological footprint—*What can we do?* Brainstorm
- share with whole class

#### Jigsaw Activity: *Climate Change Solutions: What you can do right now!*

Student Handout 1 (attached);

- Give a copy of Student Handout 1 to each student (attached)
- Divide students into groups with five students in each group (the number of groups will vary depending on the class size). This will be their **HOME Group**.
  - Each person in the HOME group is ultimately responsible for learning and teaching a different topic to other members of that group.
  - Each member of the HOME group is numbered 1, 2, 3, 4, or 5.

Note: The overall topic to be studied is divided into as many sections as there are members in the HOME group. There is not one right way of doing this—it is up to the teacher and the class dynamics.

- The **EXPERT group** is comprised of three to four students who are responsible for the same topic (eg: all number 1 students etc.)

#### Step One

- Students become **individually familiar** with their own "expert" topic (see attached Student Handout)

Topic 1—*Project Switch and Your house—not too hot, not too cold!*

Topic 2—*Drive your car differently—or drive a different car altogether!* and *Tame the refrigerator monster!*

Topic 3—*Twist the knobs on your other household appliances!* and *Green plants with less water, more trees to provide shade*

Topic 4—*Go organic* and *Buy recycled*

Topic 5—*Be a minimalist*

#### Step Two

- Students meet with the EXPERT group (all ones; all twos etc.) to double-check their understandings and to *create a plan* for teaching their own HOME groups.
- After meeting and planning with the expert group, students return to their HOME group to take turns teaching each other the material.
- All "expert" input is required to successfully complete the group project.

## Assessment/Analysis

- Students will refer back to their graphs at 1 month and 3 months
- Students will track their progress weekly—chart/graph. Each month they will review their goals and decide whether any changes need to be made (review).
- Students might want to use the [Take Action calculator](#). Enter some simple goals for your life—such as a pledge to eat less meat—and find out how many acres of land that you could save just by implementing that goal!
- Ongoing—students will track and record their daily activities according to their self-directed goal setting using the list they brainstormed as a class. Logbook

## Application

- Students will become ‘observers’ in their own homes. Students will list 3 to 5 factors to look for. Examples from the Jigsaw Activity may be ideal factors to observe. Recording observations of family members may take multiple forms including tally marks; personal reflections, drawings etc.

## Activities for Extension and/or Integration

- Students can ask family members to log onto the Earth Day website (see under Supplementary Resources) and take the quiz. Entire families can ‘challenge’ each other to make changes in their lifestyles thus affecting their ecological footprint (and becoming healthier at the same time)
- [Visit Turn the Tide: 9 Actions for the Planet](#), where you can get nine quick tips for reducing your footprint, plus, use calculators that tally and track your impact—instantly!

## Subject and Level Learner Outcomes for Subject and Level

Go to [http://www.learning.gov.ab.ca/k\\_12/curriculum/bySubject/](http://www.learning.gov.ab.ca/k_12/curriculum/bySubject/) Click on this lesson’s subject and level.

### Grade 4 Science

Specific Learner Expectations

*Students will* ask questions that lead to exploration and investigation

- Reflect and Interpret
  - communicate with group members, showing ability to contribute and receive ideas
  - record observations and measurements accurately, using captioned pictures and charts, with guidance in the construction of charts
  - state an inference, based on observations
  - identify possible applications of what was learned
  - identify new questions that arise from what was learned.

- communicate with group members, showing ability to contribute and receive ideas

*Students will show growth in acquiring and applying the following traits:*

- a willingness to work with others in shared activities and in sharing of experiences
- appreciation of the benefits gained from shared effort and cooperation
- a sense of responsibility for personal and group actions
- respect for living things and environments, and commitment for their care.

#### **Topic A—Waste and Our World**

- Recognize that human activity can lead to the production of wastes, and identify alternatives for the responsible use and disposal of materials.

### **Grade 4 Social Studies**

Core concepts of citizenship and identity

*The goal of social studies is to provide learning opportunities for students to:*

- individual and collective rights
- understand the commitment required to ensure the vitality and sustainability of their changing communities at the local, provincial, national and global levels

### **Grade 4 Mathematics**

Strand: Statistics and Probability (Data Analysis)

*Students will collect, display and analyze data to make predictions about a population.*

General Outcome

- Collect first- and second-hand data, assess and validate the collection process, and graph the data.
- Construct a bar graph and a pictograph, using many-to-one correspondence, and justify the choice of intervals and correspondence used.
- Discuss the process by which the data was collected.

### **Grade 4 English Language Arts**

General Outcome 1

*Students will listen, speak, read, write, view and represent to explore thoughts, ideas, feelings and experiences.*

#### 1.1 Discover and Explore

- compare new ideas, information and experiences to prior knowledge and experiences
- ask questions, paraphrase and discuss to explore ideas and understand new concepts

#### 1.2 Clarify and Extend

- use talk, notes, personal writing and representing to record and reflect on ideas, information and experiences
- explore ways to find additional ideas and information to extend understanding

General Outcome 2

*Students will listen, speak, read, write, view and represent to comprehend and respond personally and critically to oral, print and other media texts.*

#### 2.1 Use Strategies and Cues

- use ideas and concepts, developed through personal interests, experiences and discussion, to understand new ideas and information
- comprehend new ideas and information by responding personally and discussing ideas with others

#### 2.2 Respond to Texts

- develop own opinions based on ideas encountered in oral, print and other media texts
- 2.4 Create Original Text
- use a variety of strategies for generating and organizing ideas and experiences in oral, print and other media texts

### General Outcome 3

*Students will listen, speak, read, write, view and represent to manage ideas and information.*

#### 3.1 Plan and Focus

- focus topics appropriately for particular audiences

#### 3.4 Share and Review

- communicate ideas and information in a variety of oral, print and other media texts, such as short reports, talks and posters
- select visuals, print and/or other media to add interest and to engage the audience

### General Outcome 4

*Students will listen, speak, read, write, view and represent to enhance the clarity and artistry of communication.*

- experiment with combining detail, voice-over, music and dialogue with sequence of events

#### 4.3 Present and Share

- present to peers ideas and information on a topic of interest, in a well-organized form
- add interest to presentations through the use of props, such as pictures, overheads and artifacts
- adjust volume, tone of voice and gestures appropriately, to suit a variety of social and classroom activities
- connect own ideas, opinions and experiences to those communicated in oral and visual presentations

### General Outcome 5

*Students will listen, speak, read, write, view and represent to respect, support and collaborate with others.*

#### 5.2 Work within a Group

- take responsibility for collaborating with others to achieve group goals
- use brainstorming, summarizing and reporting to organize and carry out group projects

## Safe and Caring Topics and Concepts

Go to < <http://www.sacsc.ca/lessons/lessonplans/>

### 1. Living Respectfully

- Examining methods that help us deal with conflicts and problem-solving
- Working cooperatively in groups
- Helping others learn or attain a goal
- Developing positive interdependence and relying on each other to complete tasks
- Giving and receiving help
- Respecting and appreciating others' ideas, insights, solutions and contributions

### 2. Developing Self-Esteem

- Striving for competency builds self-esteem
- Taking responsibility for our actions
- Communicating thoughts and feelings

## Teaching Strategies

Go to <http://www.sacsc.ca/lessons/introduction/default.asp> Click on **Strategies** and select those that apply to this lesson or unit plan. List each under the appropriate heading.

Go to <a href="http://www.sacsc.ca/Resources_Strategies.htm">http://www.sacsc.ca/Resources_Strategies.htm</a>	Cooperative Learning	Inquiry Learning	Direct Instruction
	<ul style="list-style-type: none"> <li>• Small group brainstorming</li> <li>• Sharing with whole class</li> <li>• Jigsaw</li> </ul>	<ul style="list-style-type: none"> <li>• Observing and recording actions of family members</li> </ul>	<ul style="list-style-type: none"> <li>• Graphing review</li> </ul>

Generalization and Transfer	Peer Teaching	Empathy/Affective Education	General Teaching Activities/Ideas
<ul style="list-style-type: none"> <li>• Creating personal graphs to track result of Ecological quiz</li> <li>• Challenging family members to take the Ecological quiz</li> </ul>	<ul style="list-style-type: none"> <li>• Jigsaw Activity: Climate Change Solutions</li> </ul>		<ul style="list-style-type: none"> <li>• Brainstorming</li> </ul>

## Supplementary Resources

List texts (provide complete bibliography), websites and other sources that support this lesson or unit plan.

- <http://ecofoot.org/> Earth day Network—Ecological Footprint Quiz
- [http://www.newdream.org/cnad/user/turn\\_the\\_tide.php](http://www.newdream.org/cnad/user/turn_the_tide.php) Turn the Tide

## Climate Change Solutions: What *you* can do right now

### **Project Switch: Change your light bulbs!**

Many consumers don't know this, but there are now highly efficient *compact fluorescent light bulbs* (CFLs) that last for years, use a quarter of the energy of regular bulbs and actually produce more light. Look for the government's ENERGY STAR label, which means the bulb has been tested for quality and efficiency. While each ENERGY STAR qualified bulb will cost more initially—anywhere from \$3 to \$9 a piece—remember that there are two price tags: what you pay at the register and what you pay in energy costs to over the bulb's lifetime. So you may pay more up front, but you will actually save hundreds of dollars in your household budget over the long term because of their long life.

While CFLs were harder to find a few years ago, they are now widely available and much more affordable. You will find them at major home improvement and hardware stores—even grocery and some convenience stores.

Here is the impact. If every household in the U.S. replaced a burned-out bulb with an energy-efficient, ENERGY STAR qualified compact fluorescent bulb, the cumulative effect is enormous. It would prevent more than 13 billion pounds of CO<sub>2</sub> from entering the atmosphere—which is like taking more than a million cars off the road for an entire year.

Other simple things you can do to conserve energy: turn off unneeded lights, dim lights when you can, and bring natural sunlight into your home when it is feasible. Changing those old light bulbs and replacing them with ENERGY STAR qualified compact fluorescents that can last for a decade or more is by far the best thing you can do.

### **Drive your car differently—or drive a different car altogether!**

The sad truth is that your car emits as much CO<sub>2</sub> as your entire house. That is the bad news. The good news is that anything you can do to improve the fuel efficiency of your car will have an enormous impact on climate change. In fact, experts say that paying attention to fuel efficiency in your car may be the single biggest thing you can do to prevent global warming.

Buying a fuel-efficient car (like a Hybrid) is wonderful. In fact, replacing your gas-guzzling car with a fuel-efficient one is by far the best thing you can do, out of all your choices. But not all of us can do that—at least, not right now. Carmakers have not sold enough hybrids in the U.S. yet to make them as affordable as they should be. That will change, but not for a few years.

In the interim, there are things you can do with the car you drive now to conserve energy and be more fuel-efficient.

Drive less. Every year, Americans as a whole drive more miles than they did the year before. We must stop this trend. Telecommuting and public transportation are great options—once a week saves a ton of CO<sub>2</sub> a year—but even piling multiple errands into one trip helps. If you can walk instead of drive—even better.

Get your car tuned up. Just a simple tune-up often improves fuel efficiency by half. If 100,000 of us went out and got a tune up, we save 124,000 tons of CO<sub>2</sub>.

Slow down, do not race your car's engine, and watch your idling. All of these save on gas (saving you money) and have a big impact on burning gasoline.

Horribly inefficient SUVs, minivans and pickup trucks now make up more than half of the cars on American roads. The real tragedy is that automakers could double the current average fuel efficiency of SUVs if they wanted to, which would save 70 tons of CO<sub>2</sub> per car. The technology exists. Unfortunately, consumer demand does not.

### **Your house—not too hot, not too cold!**

The bad news is that half of your household energy costs go towards just two things—heating and cooling. The good news is that means you have lots of room for improvement, and even small changes make dramatic improvements in household fuel efficiency.

Older heating and cooling systems are a third less efficient than the new systems. So replacing the old with the new is a wonderful idea, but not very practical for most of us. Things you can do right now to make sure you are setting the right temperature in your house include:

- Tune up your heating system. This one thing every couple of years can reduce your heating costs by 10 percent a year.
- Clean vents, close unused vents, and change filters in the vents. Again, just these simple things will save you 10 percent.
- Buy a programmable thermostat, which can regulate different temperatures at different times of the day. And if you have one, use it! Right now, three-quarters of people who have programmable thermostats do not use them at all.
- Make sure windows and doors are sealed. Again, this will dramatically improve your household fuel efficiency.

### **Tame the refrigerator monster!**

Did you know that your friendly refrigerator has a voracious energy appetite? It is, by far, the single biggest consumer of electricity in the average household, responsible for 10-15 percent of the electricity you use each month.

Older refrigerators, as a rule, are far less efficient than the newest ones—as much as 50 percent more efficient in many cases. But buying a brand-new, energy-efficient refrigerator is almost certainly not in the cards for most of us. Fortunately, other things will help.

- Do not set the thermostat too high. Even 1 degree will make a big difference.
- If your refrigerator is near a heating vent, or always in the sun, then change the location, cover up the heat vent near it or drape the window.
- Turn on your "energy saver" switch near the thermostat.
- Clean the condenser coil. This one, very simple thing can improve the efficiency of your refrigerator by a third!
- Get rid of your second refrigerator. If you do not need it, do not waste the energy.
- Make sure the doors seal properly, and keep the cool in.



## **Twist the knobs on your other household appliances!**

The other big users of energy in your household are your hot water heater, your washer and dryer, and your dishwasher. Each, in its own way, can be inefficient. Here are some things to try:

- Either turn the hot water heater down a couple of degrees, or turn on the "energy conservation" setting.
- Buy insulation for your hot water heater at a local store and insulate the pipes as well.
- Install a timer on your water heater to turn off at night and just before you wake up in the morning.
- When possible, wash a few dishes by hand. Over time, that will save a few loads in the dishwasher, conserving energy.
- Do not pre-rinse dishes. Today's detergents are powerful enough to do the job.
- Wait until you have a full load to run the dishwasher.
- Wash clothes in warm water, not hot. The clothes will be just as clean, and you'll cut energy use by 50 percent.
- Do not over-dry your clothes. That will save 15 percent.

## **Green plants with less water, more trees to provide shade**

While it is true that planting more trees will help in the short term because they essentially soak up carbon, they also release carbon dioxide when they die—so it just postpones the problem. There are other reasons to plant trees—as windbreaks to save energy, and as shade to lower cooling costs. Even the short-term help while we become organized is a good thing.

As for plants, do everything you can in your yard and garden to create ways in which plants use less water. Choose hardier plants, plant things in groups that need more water and put in mulch to help keep moisture in. When you mow your grass, make sure you do it smartly—with sharp blades, and only when the grass needs cutting. Finally, make sure you water your lawn sparingly. All of these will conserve energy.

## **Go organic**

Even with our vast reservoir of scientific knowledge about farming, most farmers still spray a billion pounds of pesticides to protect crops each year.

When chemical pesticides are used to kill pests, they also kill off microorganisms that keep carbon contained in the soil. When the microorganisms are gone, the carbon is released into the atmosphere as CO<sub>2</sub>. And when those organisms are gone, the soil is no longer naturally fertile and chemical fertilizers become a necessity, not a luxury.

But besides going organic—thereby saving the carbon release from soil—there are other simple things you can do with food that will also make a difference:

- Eat locally grown food. If the food does not have to travel far, there is less CO<sub>2</sub> from the trucks that ship it.
- Eat fruits and vegetables in season. Again, that saves the enormous transportation costs.
- Plant your own vegetable garden. It's not as hard as you might think.

## **Buy recycled**

This may sound simple, but it takes less energy to manufacture a recycled product than a brand new one. If you and other consumers buy recycled, you will help create a market, and conserve energy along the way.

Because many manufacturers do not go out of their way to tout their recycled products, you should know that aluminium and tin cans, glass containers, and pulp cardboard have a fair amount of recycled content. So buy away!

Recycled is often considerably cheaper than non-recycled, so it's cost-effective as well as conservation-minded. For instance, recycled paper can be as much as a third cheaper than non-recycled paper.

Finally, before you buy, check to see if the product or its packaging can be recycled. The recyclable logo (three arrows forming a triangle) is fairly common now.

## **Be a minimalist**

We know it is difficult, but in today's consumer economy, an easy way to conserve energy is to simply use—and buy—less. Every time you buy something, energy has gone into getting that product to you. So the less you buy, the more you save energy-wise. It is a simple equation. This last item on our Top 10 list may, in fact, be the single biggest way to make a dent in the global warming problem. Again, we know it sounds obvious, but buying less things—some of which you just don't need—changes the energy equation across the board, on every single consumer product. If everyone used less, the impact would be large indeed.

- Buy in bulk. In short, bulk items use less packaging, which translates into less energy.
- Buy one of something, not 21 of something. You do not need 21 pairs of shoes if one pair works just as well.
- Go through your closet. Donate or recycle what you really do not need, then make a pledge not to replace everything you just got rid of.
- Buy quality products that will last longer. Over time, you will obviously buy fewer products that way.
- Be creative in what you use for work, play and leisure. You don't always have to buy new products for activities. Re-use in creative ways.