



## Activity 4.3: Personal Choices and the Planet

### Grades 10 – 12

**Description:** This lesson focuses on positive steps the school community can take to reduce their ecological footprint. Students extend what they have learned in Activity 4.2 to their public life and complete a sustainability audit of their school and make recommendations to the principal or Parent Council on how the school can use resources more sustainably.

**Time:** One to five class periods, plus additional out-of-class time (if you choose to have students complete a school sustainability audit)

#### Materials:

- Computers with Internet access
- Sustainability audit checklists (adapted from the England EcoSchools Environmental Review [http://www.keepbritaintidy.org/ecoschools/AssetLibraryFiles/Template%20Environmental%20Review\\_287.doc](http://www.keepbritaintidy.org/ecoschools/AssetLibraryFiles/Template%20Environmental%20Review_287.doc))
- Clipboards

#### National Science Education Standards:

**F3.b** Human activities can also introduce hazards through resource acquisition, urban growth, land-use decisions, and waste disposal.

**F4.d** Important personal and social decisions are made based on perceptions of benefits and risks.

#### AAAS Benchmarks:

**3C/M7** Societies influence what aspects of technology are developed and how these are used. People control technology (as well as science) and are responsible for its effects.

**4B/H9** Although the Earth has a great capacity to absorb and recycle materials naturally, ecosystems have only a finite capacity to withstand change without experiencing major ecological alterations that may also have adverse effects on human activities.

**4B/H6** ...The burning of fossil fuels in the last century has increased the amount of greenhouse gases in the atmosphere, which has contributed to Earth's warming.

**5D/H3** Human beings are part of the Earth's ecosystems. Human activities can, deliberately or inadvertently, alter the equilibrium in ecosystems.

#### Guiding Questions:

- What steps can I take to reduce my impact on the planet?

#### Procedure:

1. Open the lesson with a quick review. Tell the students that we will be looking at ways to reduce their carbon/ecological footprints. Ask students what they might do to reduce their carbon footprint.
2. Students will say things like “turn off the lights,” etc. Make sure students explain their reasoning as far back as the carbon cycle and how these simple changes will mitigate climate change. Less energy means less fossil fuel use, which will result in less CO<sub>2</sub> in the atmosphere and less warming of the atmosphere.



3. Tell students that while individual actions can make big differences, collective actions can have exponential impacts. They are going to conduct a sustainability audit of their school, identify areas for improvement, and develop a plan that they can present to school staff, parents, and teachers that suggest changes that will increase the efficiency of their school's use of resources. Brainstorm other areas that the class wants to audit. This can include school or household practices.
4. Once you have decided on the categories, divide students into groups and assign each group a different area to audit (paper waste, food waste, energy, water, etc.). You may have more than one student group per category depending on the size of your class.
5. Hand out the audit checklists and then give students time in class (or for homework) to research their category and prepare for the audit. They should research both traditional and environmentally sustainable ways of using their resource category (e.g. traditional fixtures vs. water-saving fixtures, etc.).

**Day 2-3 (depending on how you structure the assignment):**

1. Students should talk with the person in the school who is responsible for maintaining their audit area (this may be facilities managers, landscape companies, custodial staff, or accounting staff, since they pay the bills for the schools water/energy use). You may want to invite this staff to your classroom to discuss their jobs, or provide students with time to talk with staff during class periods.
2. Once students have completed the audit, they should discuss and analyze their results.
  - If you have multiple groups auditing the same area, are their results the same? What were the differences in their methods?
  - Do these results make sense?
  - What was the range of results?
  - Describe some of the most surprising results. Why?
  - How would you re-do the procedure next time?
  - What do these results tell you?
  - What recommendations would you make to the school principal to make the school more sustainable?
3. Have students present their results in a PowerPoint presentation to the whole class. Use all of the results to guide the discussion of what to do next.
4. As an extension, you can have students do a cost-benefit analysis of their proposed changes: How much would their changes cost? Would there be any cost savings over the long term? What is the difference in carbon emissions, water usage, etc., by making the changes?



**Useful websites:**

- <http://www.energy.ca.gov/2007publications/CEC-180-2007-002/CEC-180-2007-002.PDF>  
energy audit
- <http://www.mde.state.md.us/assets/document/resaudit.pdf> water audit
- <http://www.up2meforkids.com.au/pdfs/Performing%20a%20School%20Waste%20Audit.pdf>  
waste audit



**SUSTAINABILITY AUDIT CHECKLIST: ENERGY**

Use the following checklist to assess the state of energy use in your school. After researching the question, circle the answer, and fill in any information.

- 1. Is there someone in your school who has special responsibility for monitoring the consumption of energy (electricity, heating, etc.) in the school? YES NO

If so, who is it? \_\_\_\_\_

- 2. Are the energy meters (e.g. electricity meters) easily visible to students? YES NO

- 3. Has your school taken any of the following low-cost steps to reduce heat loss through windows?

Sealed drafty windows YES NO

Solar reflecting film YES NO

Responsible class window monitors YES NO

- 4. Do the school windows have double glazing, triple glazing, or energy-saving glass? YES NO

If YES, then in how many rooms? (If all, write ALL) \_\_\_\_\_

- 5. Are any external (outside) doors self-closing? YES NO

If YES, then how many doors are self-closing? (If all, write ALL) \_\_\_\_\_

- 6. Are low-energy light bulbs and fluorescent tubes used in school? YES NO

If NO, then in how many rooms? (If all, write ALL) \_\_\_\_\_

- 7. Does each classroom have its own heating thermostat? YES NO

If NO, then how many rooms have a thermostat? (If none, write NONE) \_\_\_\_\_

- 8. Are lights and electrical items turned off when not in use? YES NO SOMETIMES

- 9. Does the school have any of the following sources of renewable energy?

Wind generator: YES NO Solar water PV heating panels: YES NO

Wood fuel boiler: YES NO Ground source heat pump: YES NO

**ACTION ITEMS:**



**SUSTAINABILITY AUDIT CHECKLIST: LITTER**

Use the following checklist to assess the state of energy use in your school. After researching the question, circle or check the answer, and fill in any information.

1. How serious is the problem of rubbish/litter on the school grounds? (Choose one)
  - Very serious, the place is a mess most of the time
  - Not too bad, but could be improved
  - The grounds are more or less litter free
  
2. Does your school have a clear anti-litter policy? YES NO
  
3. Are there garbage cans inside the school buildings? YES NO  
 How many of these are full / overflowing? \_\_\_\_\_  
 How many are about half full? \_\_\_\_\_  
 How many are less than a quarter full? \_\_\_\_\_
  
4. Are there any littered areas inside the school buildings where there are no garbage cans? YES NO
  
5. Are there enough garbage cans in the school's grounds? YES NO  
 How many of these are full / overflowing? \_\_\_\_\_  
 How many are about half full? \_\_\_\_\_  
 How many are less than a quarter full? \_\_\_\_\_
  
6. Are the garbage cans generally: YES NO  
 Big enough? YES NO  
 Correct design (holding trash in wind)? YES NO  
 Clean YES NO
  
7. Does each classroom have its own garbage can? YES NO

**ACTION ITEMS:**



**SUSTAINABILITY AUDIT CHECKLIST: WASTE/RECYCLING**

Use the following checklist to assess the state of energy use in your school. After researching the question, circle or check the answer, and fill in any information.

1. Does the school carefully control the use of resources such as paper, pencils, ink cartridges, pens, envelopes, etc? (Choose one)
  - No, there seems to be little control
  - Yes, but control is not very tight
  - Yes, control of these materials is very strict
  
2. Does the school buy stationery products (paper, pencils, pens, etc.) made from recycled content? YES NO SOMETIMES
  
3. Are hand towels and other disposable paper products purchased with recycled content? YES NO SOMETIMES

List which products are and which aren't:

4. Does the school recycle any of the following items of school waste:
 

<input type="checkbox"/> Paper	<input type="checkbox"/> Soda cans
<input type="checkbox"/> Inkjet cartridges	<input type="checkbox"/> Plastic bottles
<input type="checkbox"/> Plastic	<input type="checkbox"/> Glass bottles
<input type="checkbox"/> Cardboard	<input type="checkbox"/> Other

Describe the "other" materials if there are any:

5. How much school food waste is composted? 
 None  
 1-25%  
 26-50%  
 51-75%  
 76-100%
  
6. Do you run any other recycling programs to raise money for the school and/or involve the local community? YES NO
  
7. Does the school encourage reuse of materials, such as water bottles? YES NO
  
8. Does the school have any policies to reduce waste? YES NO

ACTION ITEMS:



**SUSTAINABILITY AUDIT CHECKLIST: WATER**

Use the following checklist to assess the state of energy use in your school. After researching the question, circle or check the answer, and fill in any information.

- 1. Does your school have a water meter to record water use? YES NO
- 2. Is the meter easily accessible to students? YES NO
- 3. Are students involved in taking water readings? YES NO
- 4. Are the toilets designed to reduce water loss (e.g. low-volume flush, flush on demand urinals etc.)? YES NO  
If yes, then how many are fitted with such devices (If all, write ALL) \_\_\_\_\_
- 5. Are hand-basin taps of the push-on or self-stopping type? YES NO  
If yes, then how many are fitted with such devices (If all, write ALL) \_\_\_\_\_
- 6. Are faucets left running? YES NO SOMETIMES
- 7. Are dripping faucets fixed quickly? YES NO  
If no, then how long approximately do repairs take?  
\_\_\_\_\_ 2-3 Days    \_\_\_\_\_ 4-7 Days    \_\_\_\_\_ more than 7 days
- 8. How often does the school run water-saving campaigns?  
\_\_\_\_\_ 2-3 Days    \_\_\_\_\_ 4-7 Days    \_\_\_\_\_ more than 7 days

**ACTION ITEMS:**



**SUSTAINABILITY AUDIT CHECKLIST: TRAVEL/TRANSPORT**

Use the following checklist to assess the state of energy use in your school. After researching the question, circle or check the answer, and fill in any information.

- 1. Do you monitor how pupils travel to school? YES NO  
 If yes, how many pupils use the following transport to or from school:  
 Note total count of students: \_\_\_\_\_  

_____ Walk	_____ Taxi
_____ Bike	_____ Carpool
_____ Bus	_____ Drive
_____ "L"	
  
- 2. Does your school have bike racks? YES NO  
 Is there space for everyone? YES NO  
 Are there bike lanes on the roads near the school? YES NO
  
- 3. Does the school have a network of safe routes to walk or cycle? YES NO
  
- 4. Do any of the school transport vehicles (buses, taxis, etc.) run on alternative fuels such as electricity, landfill gas, or vegetable-derived oils? YES NO
  
- 5. Does the school have a school travel plan? YES NO
  
- 6. Does the school hold regular 'walk to school' or 'cycle to school' events? YES NO SOMETIMES
  
- 7. Does the school have a pedestrian and cycle entrance that is separate from vehicle access? YES NO

**ACTION ITEMS:**





CHICAGO BOTANIC GARDEN

**SUSTAINABILITY AUDIT CHECKLIST: BIODIVERSITY/ENVIRONMENT**

Use the following checklist to assess the state of energy use in your school. After researching the question, circle or check the answer, and fill in any information.

- 1. Do the staff in charge of school grounds use chemical pesticides and herbicides?  
YES NO OCCASIONALLY
- 2. Does the school have any plants in containers, pots, or beds in the school grounds?  
NO A FEW YES MANY
- 3. Does the school have a wildlife or conservation area? YES NO  
If yes, is the area protected by fences or school rules, or both? YES NO
- 4. Does the school have any of the following:
 

<input type="checkbox"/> Bat boxes	<input type="checkbox"/> Squirrel feeders
<input type="checkbox"/> Bird boxes	<input type="checkbox"/> Species record
<input type="checkbox"/> Birdbaths	<input type="checkbox"/> Log piles for invertebrates
<input type="checkbox"/> Bird feeders	<input type="checkbox"/> Woodland areas
<input type="checkbox"/> Pond	<input type="checkbox"/> Butterfly garden/plants

If any of the above are checked, are students involved in looking after them? YES NO

- 5. What percentage of the school's grounds are:
 

<input type="checkbox"/> Grass/playing field	<input type="checkbox"/> Flower/vegetable gardens
<input type="checkbox"/> Long grass	<input type="checkbox"/> Play areas
<input type="checkbox"/> Conservation area	<input type="checkbox"/> Woodlands
<input type="checkbox"/> Path/roads	<input type="checkbox"/> Seating areas
<input type="checkbox"/> Blacktop/concrete	<input type="checkbox"/> Other (explain below)

- 6. Does the school have links with any local or national environmental organizations?  
YES NO

If yes, then with whom? (List)

**ACTION ITEMS:**



## Sample Sustainability Audit for Teacher Use

Modified from Sierra Club Sustainable Consumption Committee, January 1, 2005

Adapted from Susan E. Waller's *Walk the Walk* for the Australian Department of Premier & Cabinet. The checklist below is a sample of a professionally developed sustainability audit. **The student audit will focus on categories that they are familiar with and will not address staff issues.**

### Institutional Sustainability Audit

#### Paper

GOAL: Minimize use, encourage recycling, and minimize disposal

- Paper recycling containers in each room and in cafeteria
- Central receptacles at copiers and printers
- Regular practice of printing on both sides of paper
- Use recycled-content paper-towels and toilet paper
- Avoid printing documents when an electronic copy is sufficient (turn in homework electronically if possible, send messages to staff via e-mails)

#### Energy

GOAL: Reduce energy consumption, procure from renewable sources, and undertake initiatives to reduce the harmful effects of energy production

- Use of energy-efficient appliances and equipment (copiers, lighting, dishwashers, etc.)
- Use timers for appliances and equipment
- Energy awareness program for staff, students, and parents
- Easy stair access, discouraging elevator use when appropriate
- Discourage staff working from working overtime (saves energy)
- Purchase renewable energy
- Offer HVAC alternatives: open windows/doors for cross-ventilation, blinds/curtains/awnings, turn off appliances and lights when not in use
- Use natural light when possible

#### Water

GOAL: Minimize water use and recycle and pre-treat before disposal where possible

- Use of low-flow sinks
- Use of dual flush toilets or other low-water models
- Water-wise landscaping and use of native species
- Use of non-phosphorous soaps
- Use of gray water (from sinks and rain) for landscape, toilets, and other appropriate applications
- Capture rooftop runoff for garden use if feasible (test runoff for chemical content)
- Hire plumbers that understand water conservation
- Water HVAC system operating at optimal temperature level



## CHICAGO BOTANIC GARDEN

### **Waste**

GOAL: Focus on avoiding and minimizing waste; and reusing and recycling before final treatment and disposal

- Recycling of cardboard, aluminum, glass, plastics, and beverage cartons
- Return toner cartridges to manufacturer
- Recycle/compost organic waste
- Donate or recycle office furniture, computers, computer disks, telephones, and other items
- Offer reusable plates, utensils, mugs, and glasses in break rooms and in cafeteria

### **Purchasing**

GOAL: Environmentally, socially, and economically sustainable purchase of goods and services

- Lifecycle impact assessment for purchased goods
- Recycled content products receive preference to virgin material products
- Recycled content (80 percent or higher) in copy paper, letterhead, and envelopes
- Support local suppliers
- Consider transportation costs from manufacturer to destination when selecting suppliers
- Purchase in bulk to reduce packaging and delivery vehicle emissions
- Develop a list of preferred environmentally friendly products
- Regular maintenance and inspection of equipment to maximize life
- Use of environmentally friendly cleaning agents
- Low-VOC carpeting, paints, etc.
- Rent equipment that is used infrequently

### **Travel**

GOAL: Encourage utilization of alternative transportation and mitigate negative impacts of transportation use

- Choose fuel-efficient or low-emission vehicles
- Encourage students, parents, and staff to use public transit/walking/cycling
- Support public transit pass programs
- Easy access to bus/train timetables or other transit information
- Provision of facilities for bicyclists: racks, lock-up areas, showers, and changing rooms
- Organize a carpool program

### **Staff**

GOAL: Increase staff understanding and awareness of environmental and social issues, and increase their ability to sustain productive effort

- Promote environmental understanding via meetings, surveys, information postings
- Established method (message board, meetings, e-mail) for disseminating information on recycling
- Wellness or stress reduction programs
- Ergonomic workspace (also plants and artwork)
- Teambuilding and social activities



## Why Perform a Sustainability Audit?

### Environmental Benefits

- Improved environmental performance and responsibility
- Reduce greenhouse gas emissions and global warming
- Improve air quality
- Reduce waste sent to landfill
- Reduce air and water pollution
- Reduce resource consumption

### Social Benefits

- Improve employee health (physical and psychological)
- Improve personal responsibility and workplace health
- Expansion of sustainable practices to personal life
- Increase employee productivity and efficiency
- Improve indoor air quality

### Economic Benefits

- Reduce water, energy, disposal, and materials purchasing costs
- Possible grant funding for sustainability program
- Support local business through purchasing locally
- Support of sustainable businesses – renewable energy, organic agriculture, sustainable products

### Economic Costs

- Higher prices for some sustainable products and services
- Cost of end-of-use facilities (disposal)