School Sustainability Report Card

School Sustainability Assessment

Overview:	Students will assess the sustainability efforts of their school by making and recording observations pertaining to energy use, water use, waste, and transportation. After calculating the sustainability score for their school students will analyze how the students, teachers, and administrators can improve the school sustainability score.
Lesson Characteristics:	Use the table below for lesson planning purposes:

Time Required	2-3 hours
Key Concepts/Terms	Renewable Nonrenewable
Setting	Classroom/Cafeteria/Parking Area/Bathroom
Materials	• Printed Scorecards for Energy/Waste/Water/Transportation • Pencils

Standards:	ETS1.B: Developing Possible Solutions • When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.
Learning Objectives:	Students will… …identify sustainable actions taken by administrations, teachers, and students. …advocate for strategies and technologies that produce less pollution and waste.
Preparation:	Students may need to be escorted to make observations in cafeteria, schoolyard, and bathroom. Activity should not be performed during lunch hours, if possible.
Background Information:	"School buildings have an enormous impact on people and the environment. Globally, 1 in 8 individuals sets foot in a school every day. Today, there are nearly 100,000 public schools in the U.S. with

more on the horizon.

Schools manage a staggering 2 million acres of land and the equivalent of half the square footage of the entire commercial building sector. Standard building practices use and waste millions of tons of materials each year; green building uses fewer resources and minimizes waste. Green schools save energy and water to reduce utility costs for schools, and they protect the health and well-being of students and teachers."

Sustainable products are an investment that may be more expensive to produce or purchase up front but can save money in the long run and reduce the consumption of non-renewable resources. For example, compostable lunch trays cost $0.049 apiece compared with $.04 apiece for the plastic trays. However, when composting is done right, it can save cities a lot of money. Sending trash to a landfill generally costs between $50 and $100 per ton on average. Composting, meanwhile, costs about $20 per ton on average. Also, trash may involve an additional transportation cost when it is transported to landfills across state borders.

Even without large amounts of capital to invest in supplies and projects, students can make a positive impact by simply making changes in behavior. Some schools have been successful in reducing energy use 20-37% through behavior strategies alone.

Source: http://centerforgreenschools.org/sites/default/files/resource-files/schools-info-sheet.pdf

http://www.npr.org/sections/thesalt/2015/06/06/411986584/schools-say-ciao-to-plastic-lunch-trays-hello-to-compostable-plates

Vocabulary:

Terms	Definitions
Biofuel	Biofuel is a renewable, biodegradable fuel manufactured domestically from vegetable oils, animal fats, or recycled restaurant grease.
CFL	(Compact Fluorescent Lamp) In CFL bulbs an electric current flows between electrodes at each end of a tube containing gases. This reaction produces ultraviolet (UV) light which is transformed into visible light when it strikes a

	phosphor coating on the inside of the bulb.
Energy Star	Energy Star qualified appliances incorporate advanced technologies and use 10 to 50 percent less energy than standard appliances.
Geothermal	Geothermal energy is heat derived below the earth's surface which can be harnessed to generate renewable energy. Small underground pathways conduct fluids through the hot rocks, carrying energy in the form of heat through wells to Earth's surface, driving turbines and generating electricity. (from U.S. Dept. Energy)
High Reflectance Roof	Made of light-colored materials, these roofs reflect a majority of sunlight away from the building as compared to traditional black roofs that absorb heat resulting in a reduction in energy needed to cool the building.
Hydropower	Hydropower technologies generate power by using a dam or diversion structure to alter the natural flow of a river or other body of water. (from U.S. Dept. Energy)
Incandescent	Incandescent bulbs produce light using electricity to heat a metal filament until it becomes "white" hot or is said to incandesce. As a result, incandescent bulbs release 90% of their energy as heat.
LED	(Light Emitting Diode) An electrical current passes through semiconductor material, which illuminates the tiny light sources we call LEDs.
Rain Barrel	A water tank used to collect and store rain water runoff, typically from rooftops via rain gutters.
Single Stream Recycling	A system in which all paper fibers, plastics, metals, and other containers are mixed in a collection truck, instead of being sorted by the

	depositor into separate categories.

Procedure: Students will work in four groups to make observations and collect data in four focus areas of the school (Bathroom, Cafeteria, Schoolyard/Parking, and Classroom). Assign students to one of the groups and provide them with the corresponding focus area worksheet. They will answer the questions only for their focus area by circling the correct response.

When students assemble back in the classroom they will share their numbered responses from their focus area with the class. The class will fill out one score page to create an overall sustainability score for the school.

Students will identify areas for improvement (water/waste/transportation/energy) and offer solutions to increase sustainability score.

Follow the steps in the table below to conduct the activity. **Sentences in bold are suggestions for what an educator might say to students.** *Items in italics are possible student answers to questions.*

Step	Action
	Engage
1	**Today you will work in four groups to make observations and collect data in four focus areas of the school (Bathroom, Cafeteria, Schoolyard/Parking, and Classroom).** **We will be using the resource usage categories that you learned about at the field study at the National Park: waste, water, energy, and transportation.**
	Explore/Explain
2	Students will fill out their focus area worksheets. Now students will compile their data from the four categories to create a sustainability score. **What was the sustainability score?**
	Evaluate

3	**What are areas where the school can make to improve its sustainability score?** *Answers will vary.* **Think back to the field study what were some of the reasons the National Park Rangers mentioned for changing to sustainable technology? (Or why do you think the parks changed to sustainable technology?)** *To reduce greenhouse gases. To improve visit experience. To create jobs. To save money. To set a positive example.* **Would any of these be applicable to our school?**
	Elaborate
4	**What are the behavioral changes that can be made (in other words if no money was available to invest in new technology what could you do to improve sustainability score)?** *Turning off the lights when not in use. Riding bicycle to school. Creating club and signs to spread awareness.* **How can investment in new technology be justified?** Create an argument for new technology. *After initial investment, the technology overall in the long-term provides cost-saving benefits for the school.*
	Extensions
5	Have students create an argument and presentation for administrators for using renewable energy or new sustainable technology at their school.

Focus Area Worksheet: Bathroom

In the bathroom, how do students dry their hands? (Waste 1)
(1) Air dryer
(0) Environmentally friendly paper products (100% post-consumer recycled content)
(-1) Paper towels

Are there any leaking water fountains or sinks? (Water 1)
(1) No
(-1) Yes

What kinds of sinks are available? (Water 2)
(1) Sensor or timed setting
(-1) Manual

Do the toilets have a dual flush option (a user pulls the handle up to flush liquid waste and pulls the handle down to flush solid waste)? (Water 3)
(1) Yes
(-1) No

What types of urinals are available? (Water 4)
(1) Waterless urinals
(-1) Flushing urinals

What types of light bulbs are used? (Energy 1)
(1) LED
(0) CFL
(-1) Incandescent or unknown

Does the bathroom have motion-sensor lights? (Energy 2)
(1) Yes
(-1) No

Does your school have any initiatives that encourage students/teachers to reduce water use (for example: rewards/incentives or signs reminding individuals to turn off faucets)? (Water 5)
(1) Yes
(-1) No

Focus Area Worksheet: Cafeteria

Count the number of appliances/electronics (for example: commercial oven, dishwasher, freezer, air conditioner, refrigerator, etc.). How many are Energy Star products? (Energy 3)
(1) 50% or more of the products carry the energy star label
(0) 25% - 50% of the products carry the energy star label
(-1) Less than 25% carry the energy star label

Where does produce served at lunch come from? (Transportation 1)
(1) School garden
(0) Locally grown (grown within 100 miles of school)
(-1) Not local/unknown

What does your school do with food waste? (Waste 2)
(1) Compost
(-1) Garbage

What are cafeteria cups/flatware/plates made of? (Waste 3)
(1) They are re-usable items
(0) One time use items that are biodegradable
(-1) One time use items made of plastic or Styrofoam

What are cafeteria trays made of? (Waste 4)
(1) They are re-usable items
(0) One time use items that are biodegradable
(-1) One time use items made of plastic or Styrofoam

Are recycling bins present? If yes, pre-sorted or single-stream recycling? (Waste 5)
(1) Yes, recycling is collected for three or more categories (paper, plastic, cans, etc.)
(0) Yes, for one or two categories only
(-1) No

Focus Area Worksheet: Classroom

Has your school developed programs or clubs addressing the issue of sustainability? (Energy 4)
(1) Yes
(-1) No

Where does your school get its energy? (Energy 5)
(1) Biofuel, solar, geothermal, hydropower, or wind
(-1) Coal, oil, or natural gas

Count the number of appliances/electronics (for example: computer, air conditioner, television, projector, etc.). How many are Energy Star products? (Energy 6)
(1) 50% or more of the products carry the energy star label
(0) 25% - 50% of the products carry the energy star label
(-1) Less than 25% carry the energy star label

Does your school have any initiatives that encourage students/teachers to reduce energy (for example: rewards/incentives or signs reminding individuals to turn off lights and appliances)? (Energy 7)
(1) Yes
(-1) No

What type of office paper is used at your school? (Waste 6)
(1) At a minimum, 30% recycled content paper
(-1) Standard office paper or unknown

Does your school turn off heating/air conditioning when not in use (at night/weekends)? (Energy 8)
(1) Yes
(-1) No

What type of light bulbs are used? (Energy 9)
(1) LED
(0) CFL
(-1) Incandescent or unknown

Does your school have a high reflectance roof or green roof (use satellite imagery to determine)? (Energy 10)
(1) Yes
(-1) No or unknown

How are school/classroom newsletters, announcements, field trip information, meeting information, etc. disseminated to parents? (Waste 7)
(1) Mostly e-mail/website
(0) Some electronic, some paper
(-1) Printed paper

Is a recycling bin present? If yes, pre-sorted or single-stream recycling? (Waste 8)
(1) Yes, for three or more categories (paper, plastic, cans, etc.)
(0) Yes, for one or two categories only
(-1) No

Focus Area Worksheet: Schoolyard/Parking area

How many people are employed at your school (teachers, cafeteria staff, administrators, etc.)?
Count the number of vehicles in the parking lot. (Transportation 2)
(1) There are 50% fewer cars in the parking lot than employees
(0) There are 25% fewer cars in the parking lot than employees
(-1) There is about one car per employee

Is there a vehicle charging station on site? (Transportation 3)
(1) Yes
(-1) No

Does your school have bike racks? Are they used? (Transportation 4)
(1) There are bike racks and they are 50% - 100% full of bikes
(0) There are bike racks and they are 0% - 50% full of bikes
(-1) There are no bike racks

Are there any rewards or incentives for teachers/students who walk to school, carpool, bicycle, or use public transportation? (Transportation 5)
(1) Yes
(-1) No

Does your school have a no-idle policy for school buses? (Transportation 6)
(1) Yes, and there are signs for reminding drivers
(0) Yes, but there are no signs for reminding drivers
(-1) No

How much of the landscaped school area includes rain gardens, pollinator gardens, or water-efficient native plants? (Water 6)
(1) More than 50%
(0) 25% - 50%
(-1) Less than 25%

Where does landscaping water come from? (Water 7)
(1) Rain barrel
(-1) Other

Deciduous trees block solar heat in the warmer months and cut air conditioning costs. Is shade from trees utilized to reduce solar heat gain? (Energy 11)

(1) Yes, trees have been planted in strategic locations around the building (shade majority of windows and part of the building's roof) or they shade pavement in parking lots

(0) Trees have been planted but they are not planted in strategic locations

(-1) No, there are very few trees present

How much of the landscaped school grounds area is turf? (Water 8)

(1) Less than 25%

(0) 25% - 50%

(-1) More than 50%

Score Sheet on Following Page

Score Page

Energy Score

1	2	3	4	5	6	7	8	9	10	11	Energy Total ____

Transportation Score

1	2	3	4	5	6	Trans Total ____

Water Score

1	2	3	4	5	6	7	8	Water Total ____

Waste Score

1	2	3	4	5	6	7	8	Waste Total ____

Energy + Transportation + Water + Waste = Total Score

Energy	Transportation	Water	Waste	Total
_____	_____	_____	_____	_____

Heavy Impact			Average Impact		Minimal Impact			Mildly Sustainable		Highly Sustainable		
-33	-27	-21	-16	-10	-5	0	5	10	16	21	27	33