

Climate Change and Energy Efficiency

12 Steps to a Sustainable High School



12 Steps to Sustainability is an assessment and analysis tool that can be used by classrooms to promote understanding of how the complex current issues of energy, pollution, supply and consumption, and climate change are not just global, but also local. 12 Steps can empower students to make local changes that may effect how their school is run, the quality of life within the school, and even reduce the town’s spending.



Using this lesson in your classroom



12 Steps to a Sustainable High School provides a focus for teachers to use to “Think Globally, Act Locally.” The 12 Steps assessment of your school may be used as an example of creating a scientific experiment using elements of the 12 Steps for variables by different groups. Students can act to create changes in energy use, school purchasing, waste reduction, food choices, transportation policies and land use practices, all issues that are tied to global concepts discussed in class.

Using this lesson will allow students to:

* Assess the status of sustainable actions in your school
* Demonstrate how many environmental issues are interconnected
* Explore the social, governing, and personal priorities systems which create both barriers and opportunities for change

Materials Included:

* **Teacher guide**
* **[Power Point Presentation](C:\\Users\\ianuser\\Lessons\\12 Steps\\Twelve Steps HS.ppt)**
* **Assessment worksheets**

Grades 7-12

Standards:

CT Science

* 9.2 D5 (electric use)
* 9.6 D18 (waste)
* 9.8 D22, 23, 24 (heating, land use, transportation)
* 9.9 D25, 26

(land use, transportation, materials/purchasing)

* 10.6 D43, D45
* D INQ 1-10

Feedback: Share your suggestions to enrich, expand and improve this lesson. How did you use this lesson in the classroom?

[KOHLL@easternct.edu](mailto:KOHLL@easternct.edu)

**12 Steps to Sustainability**

**Teacher’s Guide**

**12 Steps to a Sustainable High School** was used by the Connecticut Envirothon as their Climate Change Challenge in 2006. Using the model, students from 19 schools’ assessed their school’s transportation, energy use, land use and food services, along with recycling campaigns, setting into place action plans to improve these services.

**Challenge Your Students**

Energy, transportation, purchasing, land use, and waste removal all have consequences to the users of the school. Health is effected by many of these actions. Budgets are also affected. Each action effects carbon dioxide production, adding to climate change and pollution. So how can your students make changes?

The following lesson plan uses the 12 Steps to a Sustainable High School (paper or power point formats) along with individual, classroom group and stakeholder group assessments of your school. Worksheets for the assessment are attached. Discuss the categories of sustainable actions in the 12 Steps to a Sustainable High School. Can you identify areas where your school is making progress? Not making progress?

**Work With Stakeholders**

Many individuals use and are affected by your school—students, teachers, administrators and staff, school board members, town government, parents, families and community members. Each is a “stakeholder” in the school. The 12 Steps process can be expanded to a conversation with these “stakeholders.” Students may be surprised about how the school is viewed by different people.

**Directions for your students:**

1. Review the **12 Steps to a Sustainable High School** in groups. Have each member of the group complete the worksheet **Step 1: 12 Steps to Sustainability at Your High School**. Have the group compare answers and share their findings with the class.

2. Using the **Step 2:** **High School Sustainability Evaluation “Where are we NOW?”** complete the assessment of sustainability at your school. This exercise is divided into three parts: curriculum, operations, and outreach and service. Small groups could examine different parts.

3. After completing Step 2 in class, have your students invite a group of stakeholders from your school to a meeting. Stakeholders include everyone who uses or has a say in your school: Administrators and teachers, facilities staff, Board of Education members, town government, community members, students, parents/family. Who you invite will determine the kinds of answers you will get. A diverse group will give you more and different information than a small/similar views group.

If you want to make changes in your school, it is easier if your administration understands your views and supports your project!

4. Review the input of your group and your stakeholders. Write a **Summary** of your checklist exercise experience—What worked and what did not? Who was invited and who else should you have invited? What did you find out? What might you have done differently?

**Develop the Plan**

4. Have your students write a list of 10-15 possible **Sustainable Actions** the school could take to become more sustainable.

5. Prioritize the **Sustainable Actions** list and pick one or two as your focus. Your focus could be a part of one of the 12 Steps, or even a project that combines elements of several Steps. Be prepared to explain why your group chose a particular action as your focus.

6. Create an **Action Plan** for your focus activity and put that plan to work.

Elements of your Action Plan:

1. Explain your focus and a brief explanation of the problem you are addressing at your school
2. Provide background information including from the steps above: #3-- Summary, #4—Your 10-15 Possible Actions, and #5—Your prioritized list
3. Show the steps and timeline for addressing the problem
4. Evaluate actions taken and explain how those results and changes you may have made to your original plan have helped your group to succeed
5. Explain the future steps for the focus activity to maintain success or to continue on the path to success
6. Describe how your Action Plan affects the CO2 produced by students at your school and quantify emissions savings if possible

(Use the CO2 Coefficient Resource Sheet)

Twelve Steps to a Sustainable High School



1. **Teaching**

Through education and training, schools can prepare students for a lifetime of sustainable living.

***“It’s not easy being green!”***

***Kermit T. Frog***

* *Strengthen and prioritize environmental studies in your school*
* *Teach energy and environmental literacy to all students*
* *Increase opportunities for using the school physical plant and administrative operations as a "learning lab" for students*
* *Develop community energy and environmental education programs, include families in curriculum exercises, and facilitate dialogue about energy and environmental issues at home and the community*

j0351780

1. **Purchasing and Administrative Services**

School systems are large-scale consumers and can use their buying power to encourage demand for environmentally responsible products.

* *Implement an environmentally-friendly products purchasing policy, i.e., buy only products that are durable, reusable, recyclable, made of recycled materials, non-hazardous , energy efficient, harvested in a sustainable manner, and produced using environmentally sound methods*
* *Investigate how your school can utilize state contracting and purchasing to buy “green” products.*

1. **Solid Waste Reduction and Recycling**

j0185457

School systems generate large amounts of solid waste, which is disposed of in costly and environmentally irresponsible ways. By implementing a comprehensive recycling and waste reduction programs, schools can minimize their waste stream.

* *Establish a waste reduction ethic in all areas by carrying out waste stream analyses that determine recycling potential*
* *Implement a recycling program that starts with paper and cardboard and expands to metal, plastic and glass*
* *Isolate and recycle tires, batteries, oil, electronics, and scrap metal*
* *Compost organic waste*
* *Isolate and recycle hazardous waste-containing products, such as fluorescent lamps and ballasts, anti-freeze, solvents, batteries, computer monitors, and TVs*
* *Establish programs recycling computer printer cartridges*
* *Seek to recycle at least 50% of school waste stream*

1. **Energy Conservation**

Energy budgets constitute a large portion of the operation costs of many school systems. Many new technologies can allow schools to control and mange these costs more effectively.



* *Create databases that document energy use and cost*
* *Benchmark buildings against ENERGY STAR ® standards*
* *Identify and complete energy conservation projects*
* *Promote programs to install “energy miser” power savers on school vending machines*
* *Promote the linkage of energy conservation efforts to programs that reduce greenhouse gas emissions and identify how such programs have eased global warming*

1. **Energy Purchasing**

School systems are large-scale electric consumers and can minimize their environmental impact by implementing power saving technologies and utilizing renewable energy sources.

j0242115

* *Structure energy purchases to enhance your conservation program*
* *Consider buying the school’s electric energy from a provider who uses renewable sources such as solar, wind, hydro and biofuel*
* *Use energy efficient measures and cost management technology to flatten the campus load profile, improve the load factor and lower overall electric rates*
* *Phase out the use of high-emission fuels and transition to a power plan that includes renewable energy sources*

1. **Water and Waste Water**

School systems consume large amounts of water on a daily basis. By adopting “green” practices, schools can reduce their intake of water and outflow of pollutants.

j0287612

* *Implement water conservation programs to repair leaks and replace or retrofit inefficient plumbing fixtures*
* *Protect ground water and storm run-off by minimizing use of salt for ice-melting*
* *Use drought-resistant plantings and minimize irrigation unless using captured rainwater*
* *Promote the use of the school grounds as a learning laboratory for environmental and biology classes to investigate indigenous species and habitat patterns*

1. **Hazardous Materials**

School systems produce and use many toxic substances, and are obligated by governmental regulations to dispose of and handle these substances properly. By implementing environmentally friendly products, schools can reduce costs and limit environmental impact on and off campus.

* *Meet or exceed legal "hazardous material" handling, collection, disposal and tracking requirements*
* *Educate campus hazardous waste generators about minimization and proper disposal techniques*
* *Develop a hazardous chemical tracking or inventory database*
* *Implement a "chemical swapping" program for classroom chemicals*
* *Switch to non/least toxic paints, solvents and cleaning agents*
* *In print shop, switch to soy-based inks*
* *Use integrated pest management techniques to minimize or eliminate use of pesticides*
* *Recycle and recover ozone-depleting CFCs*
* *Avoid chlorine-based products and incineration of plastics*

1. **Transportation**

New technologies give school systems many options when addressing their transportation needs. They can reduce greenhouse gas emissions by reducing the number of bus trips on campus and by buying “green” vehicles when upgrading their vehicle fleet.

j0094771

* *Encourage travel by carpooling, public transportation, bicycling, and walking*
* *Convert bus fleets to hybrid or alternative fuels such as natural gas, electric, or biodiesel*
* *Implement “no idling” programs in bus and car wait zones*

1. **Food and Food Services**

fd00723_

Large quantities of food are consumed in school cafeterias. Schools should use healthy environmental practices when developing their food service plans.

* *Buy regional produce in season*
* *Support local organic farms*
* *Advocate the health and environmental benefits of less meat consumption and eating "low on the food chain"*
* *Promote healthy snacks in school vending machines*
* *Minimize the use of disposable dinnerware*

1. **Campus Grounds and Land Use**

Many school systems have different school campuses that encompass numerous acres and ecosystems. The concepts of sustainable development should be incorporated into campus designs to preserve and study these diverse ecosystems.

* *Redefine campus beauty*

j0215961

* *Reduce lawn areas and grass cutting*
* *Promote "natural succession" for extraneous lawn areas*
* *Protect woodland, wetland, watershed, and wildlife areas*
* *Implement a tree protection policy*
* *Plant native species*

1. **New Construction**

Many school systems are frequently upgrading and expanding their facilities. They can save money and diminish their environmental impact by using new energy efficiency and waste management technologies during these upgrades.

* *Utilize sustainable or green design principles for all new construction and renovations*
* *Strive for high performance standards such as Leadership in Energy and Environmental Design (LEED) or Collaborative for High Performance Design (CHPs) in new buildings*
* *Design for state-of-the-art energy efficiency and exceed energy codes*
* *Incorporate renewable energy technologies, including daylighting and passive solar*
* *Include a suitable recycling collection space in building design programs*
* *Specify environmentally friendly building materials and products*
* *Evaluate options based on life cycle analyses and building commissioning*

j0331673

1. **Campus Planning and Design**

School systems need to develop long-term plans that incorporate sustainable principles. By doing this they can save money and reduce environmental impact.

* *Develop school master plans that minimize negative impacts and disruption of natural ecosystems and surroundings*
* *Preserve and enhance green spaces*
* *Protect natural areas from development*
* *Concentrate buildings and arrange campus walkways and roads to minimize driving and create a campus that is convenient for pedestrians and bicycles*
* *Use water-efficient, indigenous plantings for energy efficiency and aesthetics*

*[http://mirrors.creativecommons.org/presskit/buttons/88x31/png/by.png](http://creativecommons.org/licenses/by/4.0/) CT Energy Education, 2016. This work is licensed under the Creative Commons Attribution 4.0 International License. To view a copy of this license, visit* [*http://creativecommons.org/licenses/by/4.0/*](http://creativecommons.org/licenses/by/4.0/)*.*