

# NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

## Conservationist Magazine

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## ***Conservationist for Kids***

### Supplement for Classroom Teachers – Green Chemistry

#### **What is Green Chemistry?**

Green chemistry is chemistry in sync with nature. Green chemists strive to provide chemistry's benefits in a sustainable way that does not harm the planet. They're constantly searching for safer alternatives to toxic chemicals when designing experiments or products.

*What happens when no benign chemical alternative exists?* Green chemists invent them, ensuring from the beginning that the next generation of products is sustainable.

*How does green chemistry fit with school science curricula?* Green chemistry fits well as part of science, technology, engineering and math (STEM) curricula, and also conforms to the NYS Regents examination in Physical Setting/Chemistry Core Curriculum.

*What is the difference between environmental science and green chemistry?* Environmental science identifies existing pollution sources, quantifies them, and explains how they affect Earth's environment. Green chemistry identifies probable pollution sources during the design stage of a product, preventing pollution. One complements the other.

*Is green chemistry more expensive than traditional chemistry?* No. It saves money. You pay twice for hazardous materials used in traditional chemistry: once to buy them and once to get rid of them. Green chemistry begins with less hazardous materials, so the bottom line benefits are obvious.

#### **DEC's Green Chemistry and Chemical Management Program**

Schools often lack space and money to properly manage chemicals. The solution? Green chemistry! Over the years, chemicals, including explosives, carcinogens, alkali metals and other highly hazardous substances, have accumulated in school storerooms. Since 2005, DEC has been reducing toxic chemicals found in NYS schools through chemical cleanouts and educational outreach. Through the Green Chemistry Program, DEC offers NYS schools:

- Reduced liability and costs as a result of adopting green chemistry
- Increased laboratory safety as a result of using less hazardous chemicals
- Chemical inventory assistance
- Green chemistry teacher-training opportunities—the Green Chemistry Summer Institute (GCSI), an in-depth green chemistry training program for high school chemistry teachers, held at Siena College in the Capital District. For more information, visit DEC's website at [www.dec.ny.gov/education/77750.html](http://www.dec.ny.gov/education/77750.html) or e-mail [greenchemistryinschools@dec.ny.gov](mailto:greenchemistryinschools@dec.ny.gov).

***Conservationist for Kids* and an accompanying teacher supplement are distributed to public school fourth-grade classes in New York State three times each school year (fall, winter and spring).** If you would like to be added to or removed from the distribution list, if your contact information should be changed, or if you have questions or comments, please e-mail the editor at [KidsConservationist@dec.ny.gov](mailto:KidsConservationist@dec.ny.gov) or call 518-402-8047.



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## Supplemental Activities and Information for the Classroom

### Grow It Yourself

Interested in the idea of growing your own Earth-friendly materials? As a class, you can do just that! Ecovative (featured on page 4 of this issue) sells kits that enable interested customers to grow Mushroom Materials. There are many more things that can be done with the materials than Ecovative can focus on, and Grow It Yourself kits enable people to experiment with the product to see what new ideas come to mind, or custom make products to fit their needs. Bags of the material are available for \$10, and an education kit (which includes gloves, flour, and a mold to grow the material in) costs \$17. Education kits are a great way to teach students about fungi, composting and the importance of renewable materials! Learn more about this by visiting their website at <http://givy.ecovativedesign.com/>. Teachers should contact Melissa Jacobsen ([melissa@ecovativedesign.com](mailto:melissa@ecovativedesign.com)) to discuss education kits.

### Are Mushrooms the New Plastic?

Ecovative co-founder Eben Bayer asks “Are mushrooms the new plastic?” and discusses the work that Ecovative does on a TED Talk found online at [www.ted.com/talks/eben\\_bayer\\_are\\_mushrooms\\_the\\_new\\_plastic](http://www.ted.com/talks/eben_bayer_are_mushrooms_the_new_plastic).

### Online Resources

DEC Green Schools [www.dec.ny.gov/education/41746.html](http://www.dec.ny.gov/education/41746.html)

DEC Inspired by Nature [Conservationist magazine article] [www.dec.ny.gov/pubs/56478.html](http://www.dec.ny.gov/pubs/56478.html)

DEC Sustainability [Conservationist magazine article] [www.dec.ny.gov/pubs/44635.html](http://www.dec.ny.gov/pubs/44635.html)

American Chemical Society Green Chemistry Institute

[www.acs.org/content/acs/en/greenchemistry.html](http://www.acs.org/content/acs/en/greenchemistry.html)

Ask Nature [www.asknature.org](http://www.asknature.org)

A World of Solutions [video]

[www.takepart.com/video/2014/09/30/world-solutions-un-climate-summit-closing-film](http://www.takepart.com/video/2014/09/30/world-solutions-un-climate-summit-closing-film)

Beyond Benign: green chemistry [www.beyondbenign.org/](http://www.beyondbenign.org/)

Biomimicry Institute <http://biomimicry.org/>

Carnegie Mellon University Institute for Green Science <http://igs.chem.cmu.edu/>

GCedNet-Green Chemistry Education <http://cmetim.ning.com/>

Greener Educational Materials (GEMS) database <http://greenchem.uoregon.edu/gems.html>

Green Schools Initiative [www.greenschools.net/](http://www.greenschools.net/)

Siena College [www.sienagreenchemistry.org](http://www.sienagreenchemistry.org)

Sustainable Schools Project <http://sustainableschoolsproject.org/>

University of Scranton Greening Across the Chemistry Curriculum

[www.scranton.edu/faculty/cannm/green-chemistry/english/drefusmodules.shtml](http://www.scranton.edu/faculty/cannm/green-chemistry/english/drefusmodules.shtml)

US EPA Green Chemistry <http://www2.epa.gov/green-chemistry>

US EPA Healthy Schools, Healthy Kids <http://www2.epa.gov/schools>

### Books

*The Environment Challenge: Bridging the Energy Gap* by Andrew Langley (Raintree, 2012)

*The Environment Challenge: Reducing Pollution and Waste* by Jen Green (Raintree, 2011)

*The Environment Challenge: Sustaining Our Natural Resources* by Jen Green (Raintree, 2011)

**Limited quantities of *Conservationist for Kids* magazine back issues are available upon request.** Go to [www.dec.ny.gov/education/40248.html](http://www.dec.ny.gov/education/40248.html) to preview back issues online before requesting printed copies. From each issue's lead page, use the link “read the entire issue, cover to cover” to access an eight-page PDF of the print version. To request printed copies (individual or bulk), e-mail the editor at [KidsConservationist@dec.ny.gov](mailto:KidsConservationist@dec.ny.gov) or call 518-402-8047.