

# Green Teacher

SPRING 2020 | ISSUE 123 | \$7.95

## Youth Transforming Transit



**PLUS**

Fighting COVID-19 in schools | Nature's Power to Transform Habits | Sustainability Passion Projects |  
Real Change from Students | The Walking Curriculum | Action First, Knowledge Last | Developing a  
Culture of Change | Healthy Schools, Bright Futures | Come into the Garden, Maude | and more...

# Green Teacher

## Upcoming Webinars

### **Staying the Same, Yet, Totally Different**

An interactive webinar

with *Matthew Broda and Trevor Dunlap*

Date and time: Wednesday, April 22nd,

1:00–2:30 p.m. EST

Cost: FREE



### **Connecting STEM to Indigenous Science**

with *Michelle Cloud and Cheryl Bauer-Armstrong*

Date and time: Wednesday, April 29th,

7:30–8:30 p.m. EST

Cost: FREE

### **Creative Solutions in Our Time of Crisis**

with *Dave Bauer and a team of experts*

Date and time: Wednesday, May 20th,

1:00–2:00 p.m. EST

Cost: Donation-based and FREE for Green Teacher subscribers and book buyers.



To register, donate and for more information please visit:

[www.greenteacher.com](http://www.greenteacher.com)

# Green Teacher

ISSUE 123, SPRING 2020



Page 11



Page 19



Page 35

## FEATURES

**Youth Transforming Transit**  
*by Dan Hendry* ...../3

**Fighting COVID-19 in Schools**  
*by Robert Kravitz* ...../7

**Nature's Power to Transform Habits**  
*by Juliana Fujii* ...../11

**Sustainability Passion Projects**  
*by Shakira Provasoli* ...../14

**Real Change from Students**  
*by Melanie P. Master* ...../19

**The Walking Curriculum**  
*by Gillian Judson* ...../23

**Action First, Knowledge Last**  
*by Brian William Ogle* ...../29

**Developing a Culture of Change**  
*by Taylor Shryne* ...../32

**Healthy Schools, Bright Futures**  
*by Helen Doyle and Erica Phipps, with contributions from Lella Blumer* /35

**Come into the Garden, Maude**  
*by John Paull* ...../40

## DEPARTMENTS

**Resources** ...../43

Green Teacher is published quarterly in September, December, March and June.

Subscriptions: digital \$32.00 CAD/USD

ISSN 1192-1285; GST Registration No. 124125337; Canada Post Publications Mail Agreement No. 40069238

US Postmaster: Send address changes to Green Teacher, PO Box 452, Niagara Falls, NY 14304-0452.

Canada Post: Send address changes to Green Teacher, 81 Cortland Way, Brighton, ON K0K 1H0. Return postage guaranteed.

Published in Canada.

# Green Teacher

Issue 123, Spring 2020

## General Editor

Ian Shanahan

## Editorial Assistant

Sofia Vargas Nessi

## Editing this issue

Ian Shanahan

## Proofing this issue

Ian Shanahan

Devin Therien

## Publisher

Tim Grant

## Regional Editors

### Canada

Gareth Thomson

Alberta (403) 678-0079

Laurelei Primeau

British Columbia (604) 942-0267

Bob Adamson

Manitoba (204) 261-7795

Raissa Marks

New Brunswick (506) 855-4144

Craig White

Newfoundland (709) 834-9806

Janet Barlow

Nova Scotia (902) 494-7644

Remy Rodden

Yukon (867) 667-3675

### United States

Karen Schedler

Arizona (480) 828-4981

Helen de la Maza

S. California (714) 838-8990

Mary Lou Smith

Connecticut (860) 465-2610

Dean Goodwin

Delaware (302) 998-2292

Cathy Meyer

Indiana (812) 349-2805

Shelene Codner

Iowa (319) 404-1942

Laura Downey-Skochodopole

Kansas (785) 532-3322

Jeanine Huss

Kentucky (270) 745-2293

Christine Voyer

Maine (207) 228-1624

Sandra Ryack-Bell

Massachusetts (508) 993-6420

John Guyton

Mississippi (228) 324-4233

Bob Coulter

Missouri (314) 442-6737

Lauren Madden

New Jersey (609) 771-3319

Kary Schumpert

New Mexico (505) 710-5632

Lois Nixon

North Carolina (919) 467-6474

Sara Ivey

Oklahoma (405) 702-7122

Anne DiMonti

Rhode Island (401) 245-7500

Tim Brown

Utah (801) 596-8500

Jen Cirillo

Vermont (802) 985-0331

### New Zealand

Patricia Hoffmann (South Island)

(03) 211 5242

### Nigeria

Dauda Muideen Lanre

Green Teacher is a nonprofit organization incorporated in Canada. We are grateful for the financial support of the Ontario Media Development Corporation.



### Design and Production

Layout by Sofia Vargas Nessi

### Cover Picture: Dan Hendry

### Contact Us

81 Cortland Way, Brighton, ON K0K1H0, Canada

95 Robert Street, Toronto, ON M5S 2K5, Canada

Toll-free: (888) 804-1486



## EDITORIAL

**H**APPY EARTH DAY! It has now been 50 years since this movement began, giving us extra incentive to reflect back on past initiatives to assess their impacts and efficacy. There's been a lot of reflecting going on these days in light of the slow-down (or outright halt) of normal operations due to the outbreak of COVID-19. While this provides a unique opportunity that would not likely have been available otherwise, this not a situation anyone would have opted for if given a choice. As we are still very much "in the fight," it's far too early to draw any conclusions about this pandemic's affects on us as individuals or as a global community. Still, it is natural for us to focus on the positives, and one need not look too far to find countless examples of collective problem-solving, innovative adaptations, and genuine acts of kindness. It is in this spirit of optimism that I present to you our Earth Day 2020 issue of Green Teacher.



Shakira Provasoli's K-5 students are keen to solve climate change, but they understandably don't know how to go about it. Using passion projects as an entry point, her students have found a way to make tangible changes in their own lives. These small successes are crucial in giving young people realistic hope about the daunting challenges that climate change presents. As described by Helen Doyle, Erica Phipps, and Lella Blumer, "there is substantial evidence

that focusing on efforts that are having a positive impact on climate change and taking action... can alleviate [eco-]anxiety."

When it comes to getting people to make lasting changes to their lifestyles, Brian Ogle hypothesizes that "action first, knowledge last" is an effective approach. This allows people to experience the short-terms rewards that are so critical to reinforcing behavior. Melanie Master writes that a path to this reinforcement is getting students actively involved in community-based social marketing, a method by which a community's collective mindset is influenced to the point of encouraging behavior change for the benefit of the collective.

Community outreach is an essential component of Dan Hendry's cover story about a collaborative effort to increase student ridership of public transit in Kingston, Ontario. The success of the initiative speaks for itself; how they got there is both fascinating and empowering.

As we continue to patiently wait for the coronavirus storm to pass, I invite you to share your stories of innovation and creative solutions in the face of major disruption. This is the theme of our upcoming webinar on May 20th where educators from various settings share their insights. If you or someone in your circle has an invigorating story to tell, let us know so that we can continue spreading the word about how environmental educators are breaking barriers and keeping us moving forward during a time of great struggle.

-Ian Shanahan

A handwritten signature of Ian Shanahan in black ink.

# Youth Transforming Transit

*The benefits public transit can have on our youth, schools, and the community*



Images by Dan Hendry

---

By **Dan Hendry**

---

**I**N KINGSTON, ONTARIO, we have developed a simple but powerful model to transform public transportation, and it starts with training our youth.

We are doing this from two systemic changes: 1) educating high school students on how to ride the bus with “on-bus” orientation, and 2) subsidizing free transit for student riders until the end of their Grade 12 year.

For our youth, these programs have helped develop independence, responsibility, and confidence; removed transportation as a barrier; and enabled students the flexibility to travel to various activities, including off-site learning, volunteering, work, sports and recreation, and extra-curricular activities.

For our schools, increased transit usage contributes to less congestion around school sites and increases opportunities for schools to involve their students in our community, while reducing the cost and environmental impact of field trips.

For our community, increasing ridership on public transit reduces the number of single-occupant vehicles on the road, and helps normalize transit as an efficient, green, and reliable mode of transportation. It has been proven that our program leads to a higher likelihood of young people taking public transit in the future.

## The “Kingston Model”

Our story began in 2012 when, recognizing the benefits of young people using public transportation, Kingston City Council voted to allow Grade 9s free access to Kingston Transit. At the time, we didn’t realize how truly transformational this would be for our youth, our schools, and our community.

Through this program, students may collect their bus passes from city hall or a kiosk at the local mall. Many, however, obtain their passes at their school on an orientation day in early September. During this orientation session, Kingston Transit schedules school visits to distribute passes, and Limestone District School Board (LDSB) staff conduct an orientation session on a chartered city bus that includes the opportunity to try out the rack-and-roll bike system, experience the use of the stop request system, learn about bus safety, and discuss appropriate bus etiquette and citizenship.

In the first year of the Kingston Transit High School Pilot, Grade 9 students took about 28,000 rides. Each year after the pilot, an additional grade level was added and granted a free year-long bus pass. In 2016 (by which time all grades had bus passes), there were 600,000 rides by secondary students, and every year since 2016, Kingston high school students in grades 9, 10, 11, and 12 took over half a million trips. In addition to the increase in student trips, public transit ridership in



Kingston has increased by more than 87 per cent since 2012, the highest ridership growth in the country.

It is estimated that the cost to provide high school students with free transit compared to collecting fares from students who would have to pay to ride would be about \$250,000 per year. The difference between the foregone revenue and the contributions from the school boards and the provincial gas tax leaves a gap in the range of \$65,000–\$90,000 annually that requires ongoing funding from other sources.

Our underlying philosophy in the development of this project has been to encourage a mastery of transit tools, thus providing students with authentic life experience and the opportunity to gain independence and confidence.

In 2018, our transit orientation project was recognized nationally with the Sustainable Communities Award (Transportation) at the Federation of Canadian Municipalities' (FCM) Sustainable Communities Conference. The initiative also received the inaugural Inspire Award for the project that best demonstrates creativity and innovation, as decided through a live vote by conference delegates.

This program has produced so much robust data that a student from the University of Waterloo, Veronica Sullivan, used it as the basis for her master's thesis. She found that Grade 12 students, on average, use the transit pass three times more frequently than Grade 9 students. This shows that as students become older and gain more experience with transit, they become more frequent transit users.

Student feedback tells us that free transit passes facilitate more independent trips and help students participate in more extra-curricular activities they would not otherwise have been able to access.

The research study concludes that the transit pass is an important stimulant for travel independence for high school students and the program could be applied in other mid-sized North American municipalities.

### Our newest innovation

The success of this partnership between the city and school board has also altered Kingston Transit's fare structure. Realizing it receives minimal revenue from those aged 14 and under, in January 1, 2017, Kingston Transit eliminated fares for the 0–14 age cohort in an effort to encourage young families to use transit. This then allowed for the creation of our newest program, the teacher field trip pass.

This program is available for all students and educators from Kindergarten to Grade 12, and provides free access to Kingston Transit for school field trips. The purpose of the program is to reduce the cost of field trips, encourage experiential learning, and grow future transit ridership.

Prior to the introduction of the teacher field trip pass, there was little to no use of Kingston Transit for elementary school field trips within the Kingston area. In its first year there were 600 field trips on public transit. Last year there were 900 field trips. This pass opens up the community to our schools, as usually one of the most expensive — sometimes prohibitively so — parts of the field trip is the cost of the yellow school bus.

The field trip pass gets classes to public libraries, parks, sporting events, farmers markets, theatre, and countless other community resources.

### The benefits of transit use

Now, more than ever, we need to take a look at the environmental impact of our transportation systems. Transportation is harmful because it is a major user of energy and burns most of the world's petroleum. This creates air pollution, including nitrous oxides and particulates, and is a significant contributor to global warming. Riding public transit, when you can, is beneficial in many ways. It goes a long way towards helping our environment — it conserves natural resources, while reducing air pollution and harmful ozone

levels. You can fit up to 75 people on a bus, allowing for a reduction in single-occupancy vehicles on roads.

Financially speaking, did you know that the average car in Canada costs between \$8,600 and \$13,000 per year to operate? These costs can include licencing and registration fees, maintenance, tire changing, parking, depreciation, gas, insurance, and car payments. Economically, promoting transit is cost-effective, especially amid soaring gas prices.

Building transit confidence at a young age is important. Giving travel freedom to a Grade 9 student before they are able to get their driver's licence is an important step in proving that public transportation is a viable method of transportation. Teaching students how to use public transit allows access to more opportunities in their community.

Using transit also has social and health benefits. According to a study by Statistics Canada through 2015 and 2016, only 17 per cent of adults met the Canadian Physical Activity Guidelines of getting at least 150 minutes of "moderate-to-vigorous physical activity."<sup>2</sup> Walking, cycling, and using transit to get all, or part, of the way to work are effective ways of integrating physical activity into the day. Taking public transit also reduces stress compared to that of drivers.

Overall, transit has many benefits for students. We have also seen it increase students' cognitive, social, and emotional maturity by giving them the tools, skills, and confidence to explore the public transportation system and their community. By allowing youth to partake in active transportation at an earlier age, it has also been shown to improve healthy behaviours, attitudes, social skills, confidence, and decision-making.

## The "how to's" of youth ridership education

Grade 9 is commonly referred to as a transition year for many students across Canada, as this is the first year of secondary school. Grade 9 largely symbolizes the start of a young person's independence in both their academic and social worlds. They need to develop the ability to communicate their workload and schedule to parents, and learn to manage time among extra-curriculars, part-time jobs, and homework. To support the development of this independence, the Kingston region's LDSB provides an authentic busing experience for Grade 9 students during early September each school year.

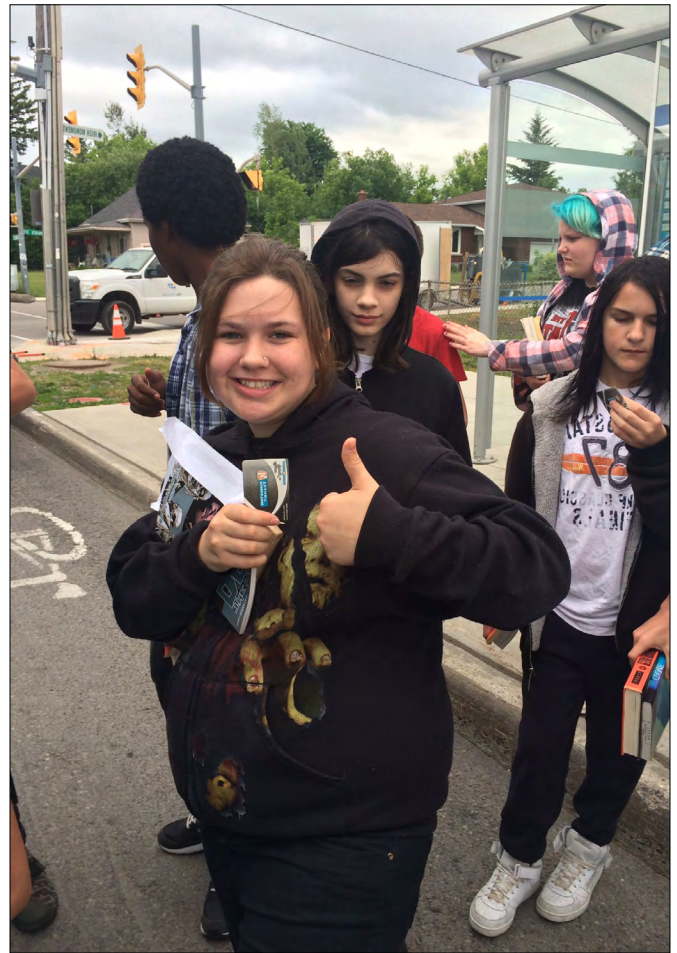
During the on-bus transit orientation, the focus is on the benefits of using transit (economic, environmental, health, and social) and how to use the bus. It is important students learn the proper etiquette, courtesy, and safety tips to keep in mind when bus-riding. Specifically, students need the opportunity to learn the following:

### *Courtesy seating*

- ◇ This ensures that riders keep the front seats open for those who need them the most. The Courtesy Seating Area is intended for passengers with mobility limitations and disabilities as well as for seniors.

### *Music devices and earphones*

- ◇ Keep the volume down at an acceptable level to not disturb other riders or the bus operator. You should always be able to hear what's happening around you in the event of



an accident or if there is a passenger in distress.

### *Flagging the bus*

- ◇ To ensure the bus operator sees you while waiting for the bus at a bus stop, signal or wave at the operator that you are waiting for the bus. When it's dark, consider using your cell phone display or flashlight to signal the bus operator.

### *Baggage*

- ◇ If you carry a backpack or tote, please remove it from your back/shoulder so that when you turn around, you don't injure another rider. To allow more riders to board the bus, when standing, place your backpack/tote on the floor or in front of you; when seated, place your backpack/tote on your lap.

### *Cell phones*

- ◇ The use of mobile devices is permitted, as long as the user's volume is at an acceptable level and does not disturb other riders or the bus operator.

### *Food and litter*

- ◇ Light snacks are permitted; however, all food and beverages must be properly contained. Please take all litter off the bus and dispose responsibly or use the litter bins on the bus.

## Replicating the model

Using transit is an important skill for youth to learn. It is transferable and requires confidence, understanding, and responsibility — and this all starts with someone taking the

time to show them. Even if your community (school board, municipality, or transit authority) hasn't yet developed more collaborative youth transit programming, taking your students on transit and showing them how to use it will prove to be invaluable.

In Kingston 30%<sup>3</sup> of our GHG emissions come from transportation, and we know that 71%<sup>3</sup> of commuters drive to work alone. Transit programs are helping alter these numbers. One city councillor said that in his time on council, this was the biggest initiative he has contributed to in regard to social equity. These programs have helped increase our total ridership by 87% over the past eight years. They don't require significantly more money or more technology; they require strong partnerships and the will to work with local school boards and students.

Our community has been unique in giving high school students free access to transit and in providing schools with field trip passes. This has created so much good for our community, specifically with regards to youth engagement, social equity, and climate action, and it is transferable to other communities.

---

**Dan Hendry** strives toward promoting sustainable initiatives for the Limestone District School Board. His concern for the environment is what drives him to take initiative in promoting sustainable solutions within the Kingston community. In October 2019, he gave a TEDx talk in Ottawa entitled *Throwing Our Car Culture Under the Bus*, and the video can be found on YouTube. He has also collaborated with the Federation of Canadian Municipalities to create a guide for using city-school partnership to inspire youth to choose sustainable transportation. This program has turned into an international success, with other jurisdictions inquiring about how it is influencing their current and future ridership.

**Resources:**

**TEDx Ottawa:** [https://www.ted.com/talks/dan\\_hendry\\_throwing\\_our\\_car\\_culture\\_under\\_the\\_bus](https://www.ted.com/talks/dan_hendry_throwing_our_car_culture_under_the_bus)

**FCM Guidebook:** <https://fcm.ca/sites/default/files/documents/resources/guide/guidebook-engaging-students-to-increase-public-transit-ridership-gmf.pdf>



**Endnotes:**

1. Alini, E. (2017, November 9). *Own a car? You won't believe how much that's costing you every year.* Global News. <https://globalnews.ca/news/3832649/car-ownership-costs-public-transit-canada/>
2. Abedi, M. (2018, December 20). *Canadians aren't nearly as active as they think they are: survey.* Global News. <https://globalnews.ca/news/4777241/canadians-physical-activity-survey/>
3. *Kingston Climate Action Plan.* (2014). The Municipality of Kingston. <https://www.cityofkingston.ca/documents/10180/2304312/Kingston+Climate+Action+Plan-web.pdf/fd0ac4d5-7c12-4ae7-b5db-1a48a9ed4dc7>

## 5 reasons to advertise with **Green Teacher**

Your ad will be seen by a specific niche of 4000+ hard working, passionate, environmentally conscious readers.

1. Educators from around the world depend on our magazine for learning ways to educate young people about environmental awareness.
2. Our ad rates are extremely affordable compared to magazines with a similar distribution.
3. We're constantly launching new programs, features, and resources that our advertising partners are welcome to be a part of.
4. With two decades of trailblazing environmental teaching in our past, we are looking ahead towards a sustainable future.

**Advertising with us could change the world.**

For more information please contact us at:  
888-804-1486 or [info@greenteacher.com](mailto:info@greenteacher.com)





# Fighting COVID-19 in Schools

*Insights from various studies on infectious diseases*



Images by Robert Kravitz

---

By **Robert Kravitz**

---

**M**ANY SCHOOL ADMINISTRATORS are facing several difficult challenges now that novel coronavirus COVID-19 is disrupting entire school systems around North America.

Some public health officials are comparing the spread of COVID-19 to SARS (Severe Acute Respiratory Syndrome) or MERS (Middle Eastern Respiratory Syndrome). However, that may be misleading. A more suitable comparison might be how certain hospitals around the world are dealing with nosocomial infections.

These healthcare-acquired infections, many of which are life-threatening, have been a concern for decades. A study on how one Australian hospital system has been addressing this issue successfully may provide some answers for school administrators. These answers might help us “flatten the curve,” so to speak, in the fight against COVID-19, as well as address many of the other concerns we are all now facing as a result of this virus.

## Pathogen lifespans

Before we examine what these hospitals have accomplished, however, we need to know a bit more about the lifespans of pathogens. This is because the pathogens causing COVID-19 can be transmitted in two ways:

1. Inhaling the pathogens — According to the Centers for Disease Control and Prevention (CDC) in the United States, the virus can spread between individuals who are within six feet of each other.<sup>1</sup>
2. Touching contaminated surfaces — The virus can survive on several different types of surfaces for up to three days according to a recent study published by the *New England Journal of Medicine*.<sup>2</sup> (*See CDC Sidebar for more information*)

So, we know that COVID-19 germs can be inhaled after someone coughs or sneezes. These same pathogens can also land on surfaces where they can be touched. If these surfaces are touched, and we then touch our mouths, eyes, nose, or food (which we later consume), cross-contamination occurs, with high potential that the disease will be spread.

The lifespan of the pathogen can determine if cross-contamination occurs and how many people may be at risk. For instance, after someone who has a cold sneezes or coughs, those pathogens usually have a relatively short lifespan. Some viruses that can trigger a cold typically last only a few hours when airborne. However, numerous pathogens can last for prolonged periods when they land on surfaces. A perfect example of this is norovirus.

After a vomiting incident in a school, norovirus pathogens become airborne and can spread as far as 25 feet away from the incident. These pathogens can live on surfaces for as



## CDC reverses directive

Initially, the CDC downplayed the fact that COVID-19 could be transmitted by touching contaminated surfaces. Due to new research, they are re-evaluating this advice.

long as two weeks. This is one of the reasons noroviruses in a school environment are such a cause for concern. Even once the immediate area has been cleaned after a norovirus incident, distant pathogens may still be present that can spread the disease.<sup>3</sup>

The situation is even worse when it comes to nosocomial infections. According to the CDC, the three most common pathogens causing nosocomial infections and their survival rates are the following:

- ◇ *E. coli* — 1.5 hours to 16 months
- ◇ *Staphylococcus aureus* (MRSA) — seven days to seven months
- ◇ *Pseudomonas aeruginosa*, six hours to 16 months; on a dry floor, 5 weeks

In one 2006 study,<sup>4</sup> it was reported that colder temperatures enhance the survival capabilities of these bacteria. It was found that while the type of surface in which the bacteria

are found had minimal impact on survival rates, bacteria on plastic and steel tend to live longer.

The researchers concluded that “the most common nosocomial pathogens may survive or persist on surfaces for months and can thereby be a continuous source of transmission if no regular preventive surface disinfection is performed.”

As to the researchers’ suggestion that “regular preventive surface disinfection” can help address this problem, one method that has proven highly effective involves so-called bundled cleaning. This is the cleaning process used at select hospitals in Australia, and it reduces nosocomial infections. As such, it is what may help us deal with COVID-19.

## The cleaning bundle

A cleaning bundle includes two, three, or more cleaning systems, technologies, procedures, and methods used together — as a system — to help clean and disinfect surfaces. The impact of bundled cleaning in the Australian hospitals was reported in a March 2019 study published in *The Lancet*



## Should we use green cleaning solutions to fight COVID-19?

What we need to know is that most green cleaning solutions are now proven to be as effective, or more effective, than traditional cleaning products. However, there are no green disinfectants in the U.S. Disinfectants in the U.S. are certified as effective by the Environmental Protection Agency (EPA). Only select an EPA-certified disinfectant.



*Infectious Diseases*.<sup>3</sup> This study involved eleven acute care hospitals having more than 200 inpatient beds. The duration of the program was 50 weeks in most of the hospitals. The cleaning bundle included the following:

1. Proper use and dilution of cleaning solutions
2. Improving cleaning techniques
3. Enhancing housekeeper training
4. Auditing the cleaning
5. Improving communication between staff and cleaning professionals

As to the cleaning technologies employed, the cleaning bundle involved the following three systems:

1. Microfiber cleaning cloths for wiping surfaces — These were selected because they have proven to be more effective at removing contaminants.

2. Spray-and-vac (no-touch) cleaning machines to remove soils from floors and surfaces — The no-touch systems replaced mops and cleaning cloths.

Mops, we know from earlier hospital studies, spread infections that can cause nosocomial infections. Further, independent tests have shown spray-and-vac cleaning to be more effective in removing contaminants than mopping and comparable to the use of costly automatic scrubbers.

3. Disinfection systems that spray an electrical charge mist over surfaces to kill pathogens — This is the last step in the process, and it is most effective once soils have already been removed from surfaces, either by using the cleaning cloth or the no-touch cleaning systems.

Here are the results:

- ◇ Before the bundled cleaning program was put into place, the eleven hospitals reported 968 healthcare-acquired infections from May 9, 2016 to July 30, 2017.
- ◇ After the 50-week bundled cleaning program was put into place, the same hospitals reported 387 healthcare-acquired infections.

This represents a 60 percent decrease in healthcare-acquired infections.

### Cleaning bundles in schools

A similar cleaning bundle approach was tested in the LDSB in Ontario, Canada. This 2019 study<sup>5</sup> involved five schools,

three different locations in each school, and 40 different surfaces. The goal was to determine if this methodology could reduce student absenteeism. The same three cleaning technologies were used. Among the findings were the following:

- ◇ The number of live bacteria on the test surfaces decreased by 93 percent, indicating cleaning effectiveness improved significantly.
- ◇ The cleaning bundle reduced cleaning times.
- ◇ The spray-and-vac cleaning proved more effective at removing soils from surfaces and floors when compared to traditional floor mopping.

Regarding student absenteeism, comparing the 2017/18 school year to the 2018/19 school year, during which the three bundled cleaning technologies were used, there was a 15 percent reduction in overall school absenteeism.

It appears a bundled approach to cleaning may have merits, like helping to reduce absenteeism, and with that, the possibility of improving student performance. This approach is something some school administrators have been considering for a while; however, with COVID-19 spreading fast, it appears this is the time to put bundled cleaning into action.

Proper and effective cleaning is going to play a crucial role in keeping not only our schools but also businesses and organizations of all types operating during this crisis. School administrators are urged to work with their local janitorial distributors as well as cleaning staff, emphasizing that for the duration of this challenging situation, they are our champions. Their work will help keep schools operating and students learning. To assist in this endeavor, here are some very prac-

### ATP

One way that school administrators and cleaning professionals can evaluate cleaning effectiveness is with the use of ATP monitors. ATP (adenosine triphosphate) monitors measure the concentration of light units of organic material or living cells on a surface. A specially designed swab is rubbed on a surface and then placed into the monitor. Within seconds, a readout appears. A high number indicates that a large volume of organic material or living cells is present. This is typically a warning sign that contaminants are present. A low reading indicates the opposite.

tical tips and suggestions that school administrators and their cleaning staff can employ:

- ◇ Place signs in all public areas reminding building users to wash their hands frequently and use hand sanitizers. Studies have found that this messaging pays off and is useful
- ◇ Instruct students and staff that sanitizers are not a substitute for effective handwashing; sanitizers kill pathogens on the surface of the hand, proper handwashing removes them from the hand and the folds of the skin.
- ◇ Students and staff should wash their hands as soon as they enter the building, and after returning from lunch or recess. This helps remove any pathogens from being brought into the facility.
- ◇ To prevent hand dryness, install hand lotions.
- ◇ Conduct a high-touch audit to make sure all high-touch surfaces are cleaned daily. The audit will typically uncover commonly touched surfaces not recognized previously.
- ◇ The two-step process is needed to clean and disinfect if manual cleaning is utilized. First the surface must be cleaned, then it can be disinfected. This is not necessary if using the spray-and-vac method.
- ◇ Use only "broad ranged" disinfectants. A broad ranged disinfectant is designed to kill many types of pathogens.
- ◇ Remember all disinfectants must "dwell" on surfaces and remain wet before wiping. The dwell time ensures that the disinfectant works effectively.

- ◇ Avoid mopping floors because the mopping process spreads germs. Look into other floor cleaning alternatives such as those mentioned earlier that do not spread germs.

**Robert Kravitz** owned and operated three contract cleaning companies and was web content manager for ISSA, the worldwide cleaning association. Today, he is a frequent writer for the professional cleaning industry. He may be reached at robert.kravitz@outlook.com.

**References:**

1. *How Coronavirus Spreads.* (2020). Centers for Disease Control and Prevention. Retrieved March 2020, from [https://www.cdc.gov/coronavirus/2019-ncov/prepare/transmission.html?CDC\\_AA\\_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fabout%2Ftransmission.html](https://www.cdc.gov/coronavirus/2019-ncov/prepare/transmission.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fabout%2Ftransmission.html)
2. Van Doremalen, N., Bushmaker, T., et al. (2020). Aerosol and surface stability of HCoV-19 (SARS-CoV-2) compared to SARS-CoV-1. *The New England Journal of Medicine*, 382(16), 1564–1567. <https://doi.org/10.1056/NEJMc2004973>
3. Otter, J. (2019). Can cleaning REACH further in reducing hospital infections? *The Lancet Infectious Diseases*, 19(4), 345–347. [https://doi.org/10.1016/S1473-3099\(18\)30795-3](https://doi.org/10.1016/S1473-3099(18)30795-3)
4. Kramer, A., Schwebke, I., & Kampf, G. (2006). How long do nosocomial pathogens persist on inanimate surfaces? A systematic review. *BMC Infectious Diseases*, 6(130). <https://doi.org/10.1186/1471-2334-6-130>
5. *Evaluation of Microfibre, No Touch Cleaning, and Electrostatic Disinfection System in Schools: The impact on Absenteeism at Southview Public School, Limestone District School Board* (study results not yet published; available on request)

**For the classroom**

Acorn Naturalists Wildlife Discovery Kit

Monarch

Owls & Owl Pellet Dissection Resource Guide

Nature Circles

**For the schoolyard**

Acorn Naturalists FIELD PRESS

100% Cotton

Nature Circles

**For the pond and field**

Journaling at the Water's Edge

POND LIFE

Latex Nitrile

## New Resources for the Trail and Classroom

Acorn Naturalists' catalog features hundreds of new tools for educators, naturalists, and interpreters. Call for a free copy of our latest catalog or visit our website.

14742 Plaza Drive  
Suite 100  
Tustin, CA 92780  
(800) 422-8886  
(800) 452-2802 FAX  
[acornnaturalists.com](http://acornnaturalists.com)

# ACORN NATURALISTS®

RESOURCES FOR THE TRAIL AND CLASSROOM

# Nature's Power to Transform Habits

*A college student's perspective*



Images by Juliana Fujii

---

By **Juliana Fujii**

---

**C**REATIVE LESSON PLANS LAY the necessary groundwork for educating students about the natural world, the threats it faces, and how they can be part of the solution. A solid understanding of these concepts is now more important than ever, but the age-old question remains: how do we impart this information in a way that sparks action? Ideally, our lessons motivate our students to take action to protect the environment, but it's difficult to do that within the confines of a classroom and the semester's limited hours.

Recent years have seen the teaching community move toward a more holistic approach — one that incorporates experiential, hands-on activities. Teachers are expanding student experiences of nature to all five senses, moving beyond dusty textbooks and eye-numbing SmartBoards to solar panels and local lake-water samples. This kinesthetic learning is not just more engaging; it's the core of environmental science: it shows students how lessons apply in the “real world.”

But the link between the classroom and the home needs to be fortified. While fun class activities ignite smiles and spark epiphanies, many students simply move on to other pursuits when the school year finishes. Transitioning to a more eco-

friendly lifestyle often slides to the bottom of the to-do list. There must be a way to capitalize on all the school year's hard work, to crystallize the knowledge gained into lifestyle habits that endure.

One way is to continually prioritize outdoor experiences in our curriculum. In addition to informing students about the problems that plague our planet, we must remember the formative role that affections play in a student's education. As we are acutely aware, our strongest motivation to act for a cause comes from personal experience with it — and when it comes to forests, birds, and bodies of water, that personal experience is often lacking. An increasing number of people lead a tech-saturated lifestyle that doesn't involve much time outside. In my experience, many people either refuse to believe in climate change or couldn't care less about it, simply because they don't think it affects them. If we want to kindle a lifelong affection for the earth in our students, we need to make them keenly aware of their reliance upon the environment. Accordingly, leaving behind the fluorescent lighting and brick walls every so often is a worthwhile investment of class time.

I've had multiple encounters with environmentalism during my past three years in college. I took one official environmental science class, but remarkably, it was a summer



camping trip that actually motivated me to revamp my lifestyle. This experience has taught me that taking learning outside the classroom is the best way to inspire behavior change. The time outdoors both rejuvenated my love for nature and reminded me that my everyday choices do have tangible consequences.

My environmental science class did arm me with indispensable knowledge. I learned about how various ecosystems are designed to work, how human actions disrupt those natural processes, and what measures can reduce the damage: from deforestation to ocean acidification, extinction to ecotourism. Learning about the global-scale damage we were inflicting broke my heart, but made me glad to be informed. The most compelling lessons were visual and hands-on. Though the Powerpoint-pixelated mountains and oceans were enchanting, our hands-on assignments outdoors were far more transformative. Working in our school's organic garden and spending undistracted time in nature, for instance, drew us out of our air-conditioned dorm rooms and library cubicles. Our glazed-over, screen-accustomed eyes were drenched in warm sunlight and our chilled fingertips met dewy grass. In these stolen moments outdoors, I found a precious escape from stress and work. This made me want to preserve unadulterated nature more than any test we took in the classroom.

Our teacher also gave us various week-long challenges like eating only with our hands, going vegan, or walking instead of driving. These fun activities broke down the intimidating mission of reducing our carbon footprint and waste into manageable and tangible steps. For a time, these challenges inspired me to make better choices: I ate less animal protein, opted for home-brewed tea over Starbucks, and cut down my shower time. Yet for all this, my motivation to change — and my efforts — lasted only for the rest of the semester. As other classes picked up and planning-ahead time mysteriously disappeared, other concerns staked out more

real estate in my mind and slip-ups spiraled into relapsed bad habits. I had lost my motivation, and my new habits had failed to become lifestyle changes.

After about a year of choking down a vague sense of shame with every store-bought chai latte, I was confronted again with my responsibility to nature — but this time, it wasn't in a classroom. I signed up for a two-week summer camping trip across three National Parks in the U.S. I received no environmental science credit for it, but I did gain a revived passion for being surrounded by trees and soaked in sunlight. We slept in tents, hiked through meadows and mountain-tunnels, and showered once every three days, all of which showed that it was possible — though perhaps a little stinky — to still live fulfillingly with less fuel, water, and waste. I experienced again that unique sense of rest that came with being far from concrete structures and amongst organic life. I realized that we need nature to flourish.

Our extended time outdoors re-sparked my love for nature and my drive to protect it. This moved me to re-embrace lifestyle choices that had a lower impact on the environment. I invested in a couple of reusable tumblers, started to buy less processed food, and chose vegetarian proteins for more of my meals. I'm still working to replace Ziplocs with reusable containers, and I still order the odd chai latte from Starbucks once in a while, but I am back on track, working toward sustainability. Being immersed in nature revived the knowledge that had laid dusty and dormant in my mind: all the facts and figures that I'd learned became personal to me again. Once that happened, it was easier to take action.

My experience enables me to affirm what the teaching community already knows: students need regular time in nature to translate classroom knowledge into behavior change. If someone were to ask me why climate change matters, I wouldn't be able to explain the process of eutrophication or list all the commercial sources of greenhouse gases, but I could gush about the breathtaking

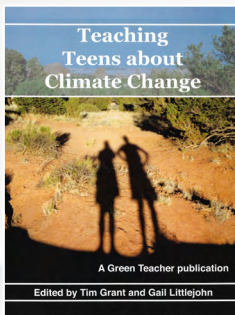


views of Glacier National Park and the ancient volcano under Yellowstone. I am only able to do so, however, because I've seen it and breathed it and trekked it. Once students have been armed with knowledge, appealing to their hearts through their senses can be one of the best strategies to influence their lifestyles. While a two-week camping trip may not be practical, taking class out into the local park for a day or offering the occasional weekend hike are realistic ways to encourage students' own environmentally-conscious behaviors. The options are many, and each small effort will

make a difference. Mindful stewards of the earth won't be made through tests and PowerPoints alone, but through those in tandem with adventures in the outdoors.

**Juliana Fujii** is a junior studying English writing at Biola University in Southern California. As an aspiring educator herself, she is passionate about the role teachers play in shaping students' values and habits. She hopes her own experience with environmental education will help teachers optimize their efforts to equip students.

## OUR BOOKS ABOUT **CLIMATE CHANGE**



Provide young people with opportunities to engage with hands-on, minds-on activities that allow them to explore the complex issue of climate change.

Each of our books contains 20 age-appropriate activities that can be undertaken at home, in the classroom, and in the community.

**Print: \$14.95**  
**eBook: \$10.99**

\*Bulk prices are also available.



To order and for more information, visit us at [greenteacher.com](http://greenteacher.com) or please contact us at 1-888-804-1486 or [info@greenteacher.com](mailto:info@greenteacher.com).



# Sustainability Passion Projects

*Students at PS 333 tap in to their talents to teach their school community to change their wasteful ways.*



Images by Shakira Provasoli

By **Shakira Provasoli**

**H**AVE YOU NOTICED HOW CHILDREN just want to save the world? Students at Manhattan School for Children, a public school in New York City (PS 333), want to dive in and solve climate change, but they do not know how to do so. My job as their K–5 environmental science teacher is to help students find feasible eco-issues with simple solutions. This does not imply that I am teaching children to oversimplify; rather, I am teaching them how to view a large problem as a puzzle made up of smaller, bite-sized projects. For this reason, I require that students select an environmental dilemma on school grounds, specifically one which does not overwhelm them in their research or in their presentations. Tackling tiny issues builds confidence and lessens eco-anxiety.

## Passion Projects

Passion Projects are modeled after Google’s practice of allowing their employees to work on ideas they truly love 20% of the time. Many schools have brought this concept into the classroom with success. I have modified the idea to help students discover environmental topics that make them so mad that they are motivated to create change. Teaching young children that anger can lead to action is a concept overlooked in education. Students who feel strongly are more apt to put

effort into a project, yet they usually have little control over topics of study. There is no stopping their determination once students discover what they truly care about in terms of protecting the planet. Many students who are swept up in a topic will discuss it with everyone. I love to hear from parents that a dinner conversation centered around an environmental topic initiated by their children.

When students complete their education, they will go out into the world and (hopefully) attempt to make it a better place. Teachers must provide tools for success, including teaching how to listen to one’s own passions. Unfortunately, many students in our country are not engaged in their own learning. They have learned to tune out if they do not find instant gratification in a lesson. Learning how to listen to oneself and find one’s passion offers students the opportunity to tune in to their education.

## How to zoom in on a topic

Every September I set the stage with a focus on ways that environmental activists improve the world, emphasizing that change can and should start small. Perusing ecology books and video links allows students to discover their interests in energy, recycling, air quality, composting, and water. Older students independently complete a simple form to select projects. Younger students vote on a broad class topic, thus allowing me to assist them in researching it.



## Examples of sustainability projects

Problem observed at school	Solutions by students
Lights left on by classes	Hanging fact cards near light switches
Contaminated compost in cafeteria	Distributing comic and activity books
Indoor air pollution from permanent markers	Hosting a talk show with a “giveaway” of an air-purifying house plant
Students not bringing their reusable water bottles to the cafeteria and instead taking disposable cups for water at lunch	Holding a water bottle carrier design challenge to encourage students to bring their reusable water bottles to the cafeteria
Smartboards turned off but still sucking energy	Writing a grant to purchase power strips to make it easier to completely turn off Smartboards
Single-use plastics	Giving out “not so fun facts” about single-use plastics during a school bake sale
Classes not sorting waste properly in classrooms	Creating an interactive lesson to teach younger students in their classrooms
Not all Terracycle (a company that upcycles waste) items getting collected	Making Terracycle bins for each classroom decorated with images of the items that can be collected

Students who cling to a larger topic such as global warming must conference with me in order to make a list of reasons why our world is heating up. After coming up with major causes, such as increasing levels of carbon dioxide and methane in the air, we break these down further to find the small subject that the student finds most appalling. For example, a student who selects increasing release of methane may list that cows and food waste are major contributors. If s/he wants to focus on cattle, I remind the student that the problem must be found on school property, helping the student realize that the amount of meat eaten in the cafeteria is actually contributing to global warming. This realization, in turn, might be the spark for a plant-based nutrition campaign. If the student chooses to focus on food waste, he or she may consider the contamination in our organics recycling bins or focus on the amount of fresh food that is thrown out by students every day.

### Collaboration

Collaboration is a core concept in bringing sustainability to action. Students must learn how to work with others to share resources and create artistic projects. It is essential to teach students how to respond when a conflict arises and how to build empathy. I weave in lessons on group work, and each class creates a collaboration rubric to use for this project as well as for the rest of the year.

After selecting a sustainability problem, students form study groups to share research materials. Some of them decide to collaborate on a final project with their tablemates,

while others find ways to partner up with friends, studying related topics. I do not force students into groups for this project, and I do not discourage friends from working together if they have similar interests.

### How to research

It is essential to the integrity of these projects that they include new and relevant information, and students must be taught how to read or watch a resource and extract information. I require that first- and second-grade students each include one new fact about their topic, while third-graders are expected as a group to bring in three new facts. In fourth-grade, each student in a group is responsible for taking notes on three facts, but the project only needs to include a total of three new tidbits of information. In fifth-grade, the final product must include three unique facts per person in each group. Although I bring in website links later, I begin by offering printed materials as an independent choice, for too often students believe that computers hold all information. Students peruse books with titled tabs, articles that I have copied, or information that I have typed and printed myself. I want to make the research process as painless as possible so that students can dive in quickly. Each group maintains a folder with the rubric, their brainstorming sheets, and printed materials that they feel will help them. While this does appear to encourage paper waste, I reuse the folders and printed sheets from year to year. After students have exhausted the printed resources, if they still need more specific information, I allow them to go on to our class webpage and click on links that I provide.

## Remote learning

Can sustainability projects still occur in our current situation of remote learning? Although students are at home, they are able to still find a passion within the realms of waste, water, and energy, while finding a way to improve the world. Teachers can suggest that students conduct an audit while at home, which will open their eyes to their own wasteful ways. Students can then select a way to educate an audience.

Chloë Saffire-Klein, a fifth-grader at Manhattan School for Children, decided to collect all the plastic her family used from March 1st–March 31st in order to assess the amount of plastic containers, packaging, bottles, etc. that a typical family uses over the course of a month. At first Chloë assumed that her family didn't use much plastic, but when she went shopping with her mom, she saw how every aisle was just brimming with plastic, and she wanted to attempt the waste audit. Chloë soon became even more interested when she saw how quickly they filled up paper grocery bags with every piece of plastic that came in to their home. Soon, seven bags were filled. The final task was to sort the plastic. Chloë suggests that anyone who wants to try this project themselves create a chart and make tally marks every night to indicate the types of plastic collected.

For the month of April, Chloë and her parents are trying to find ways to use less plastic and go zero waste. For example, instead of liquid laundry soap, they purchased soap strips in paper packaging. In addition, they have started making their own yogurt in order to cut down on the plastic tubs. Finally, Chloë says she plans to write to companies and ask why they insist on using plastic. After all she says, "they are all billionaires and I know they can do something better than use plastic to package their products."

Chloë is excited to share her project with the school, but more importantly, she hopes that other kids will be inspired to look around and see how the world is filling up with plastic, and be motivated to conduct an audit of their plastic use. Plus, she adds, "this project is also good because you don't need the help of a parent to do it."

## Standards

Many teachers are probably wondering how I can possibly devote an entire month (or more) to a project that does not directly align with curriculum standards, but it is important to be flexible. I keep a copy of the NYC Science Scope and Sequence near me at all times and I view the adopted Next Generation Science Standards (NGSS), including the Disciplinary Core Ideas (DCI's), Science and Engineering Practices (SEP's) and Cross Cutting Concepts (CCC's). I file projects away by topic and refer to them throughout the year. I highlight what is important at each grade level and I either begin the class with a lesson or I end with a scaffolded share of a group's project focusing on the required standards. In this way, I introduce the required elements for every grade level.

## Students with disabilities

It is integral to my teaching philosophy that all students can find an entry point and feel successful. These sustainability projects are student-driven, which allows for differentiation on a natural scale. 24% of the pupils at Manhattan School for Children are students with disabilities, and everyone is expected to perform at grade level. I collaborate with the speech teachers and occupational therapists in order to offer extended time for researching topics, and I work with the physical therapists to ensure that students with mobility issues can access our materials. For students with communication devices, I work with their teachers to create buttons for discussing sustainability. All students are passionate, and all of them have the right to make their voices heard.





## Types of projects

Often, students assume the real fun in a unit comes months later when they may show what they have learned in an artistic manner. The wonderful part of these sustainability projects is that students begin the year engaged in an enjoyable activity. Every year I hear students marvel that they get to start off with an art project. I encourage students to call on their talents as they select an appropriate medium, and students ask themselves if they are cartoonists, artists, sculptors, writers, actors, singers, etc. Every student should feel successful, especially early in the year, and students in third-through fifth-grade may create any type of project they want, as long as it hits the criteria in the rubric. Since some direct teaching is essential for younger children, students in first-grade are taught how to design an informational poster, while second-graders learn how to make board games that teach players about their topics. Eventually, when those students are in third-grade, they can also have a choice of a song, a puppet show or news show script, a diorama or sculpture with labels, a newspaper, a comic strip, a hands-on experiment to demonstrate, etc. The project itself is enticing enough to students that they are eager to come to class. This is important to note, for motivation is often lacking early in the year. Since these projects are of their own choosing, students are excited to immediately begin working. Many choose to bring their projects home or ask to come work on them during recess.

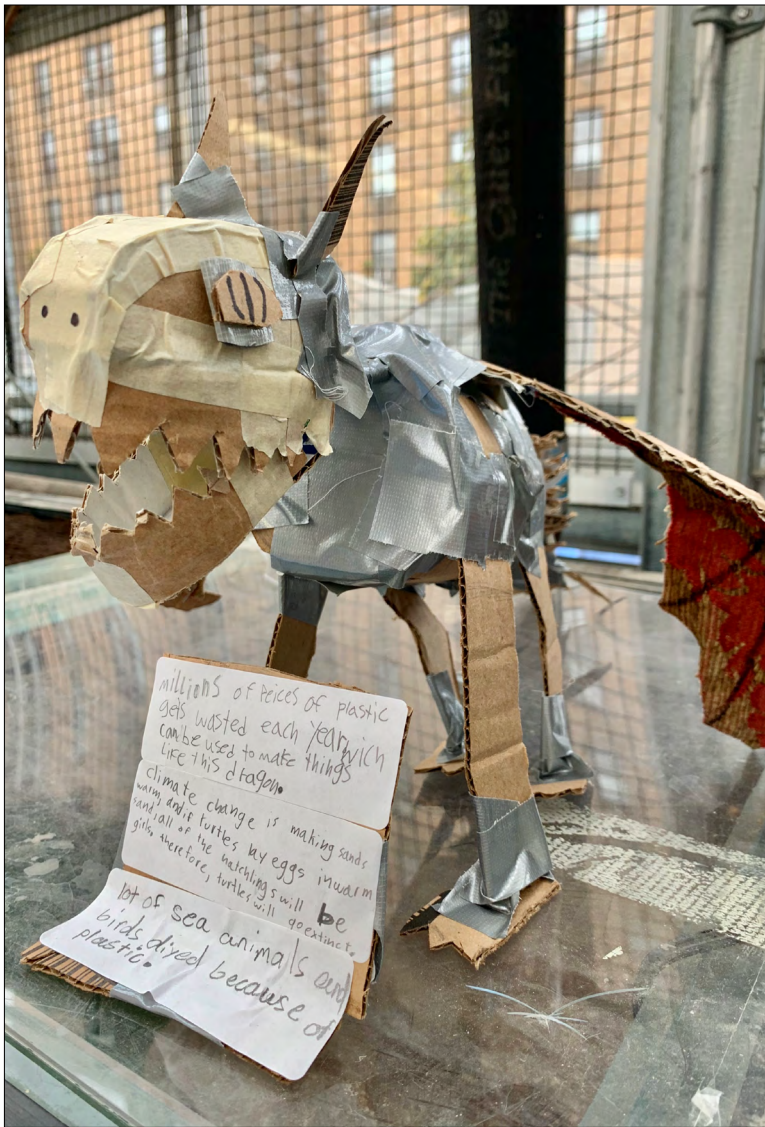
## Sharing with an audience

Students are expected to select an audience and ensure that the project aligns to the group. Sometimes the audience is a

large one, such as two grades that eat lunch together in the cafeteria, or everyone who uses the recess yard after school. At times the audience might be a smaller one, such as a Kindergarten class that needs to learn how to recycle properly or teachers who have refrigerators and microwaves in their rooms. Students must consider the audience when designing a project. I explain that if students are worried about parents bringing in and leaving disposable coffee cups, they might send an email, but they probably wouldn't write and perform a puppet show. I try to have students select a smaller audience to make it easier to present, receive feedback, and eventually assess the success of their project. However, sometimes it is necessary to address the entire school, and for this, we use the venue of our town halls or the school newsletter. Whatever the audience, it is important to reach out to help people at our school change their wasteful ways.

## How to assess

Students receive a grading rubric and brainstorming sheet at the beginning of the project. When they submit their projects, students grade themselves using this rubric and a self-assessment sheet before conferencing with me for a final grade. In January when students return from vacation, we re-assess the efficacy of their projects. Students reflect on how to measure success, whether it involves looking in recycling bins or conducting a survey. I do not grade students on the ability to alter people's wasteful behaviors, but rather on the attempt. Although students often want to continue to work on their projects, I have to stress that class time has ended, but they are welcome to work on them in their own spare time (and they often do).



complex as you prefer. The following are basic steps to follow:

Step 1: Brainstorm — Give students time to look through resources on water, energy, recycling, composting, and air quality.

Step 2: Pick a passion — Encourage students to look for environmental problems they see at school.

Step 3: Research — Offer multiple resources for students to discover new information to share in their projects.

Step 4: Collaborate on a project — Encourage puppet shows, posters, game boards, skits, emails, video games, announcements, talk shows, songs, comics, activity books, etc.

Step 5: Share — Allow groups to perform/show their projects to selected audiences and hopefully receive feedback.

Step 6: Assess — Distribute self-reflection sheets and conference with groups.

## Conclusions

With their ease of implementation, these sustainability projects have helped us immensely at PS 333 as we strive to go zero waste. Starting off the year with an exciting environmental endeavor increases student interest and participation in waste, water, and energy reduction. Learning how to listen to one's passions and tap in to existing talents will serve students well as they continue to teach people how to alter their wasteful eco-behaviors. Sharing with an audience is integral for the social-emotional learning of forming relationships, building empathy, and caring enough to change the world. Learning how to listen is a crucial component of collaboration, and when students learn from each other in a fun manner, it lessens the eco-anxiety that many teachers worry about when introducing topics connected

to climate change. When I created this unit nine years ago, I envisioned students studying environmental topics that would motivate them to participate from the beginning of the school year, and every year I am more inspired by the care woven into their work. What I didn't realize then was how these sustainability projects would bring our entire school community closer as students become experts who share their passions for protecting the planet.

---

**Shakira Provasoli** is a K–5 environmental science teacher at PS 333 in New York City. Ms. Provasoli began teaching 21 years ago as an early childhood teacher before following her passion for the natural world to become an educator of the environment. Ms. Provasoli teaches a course on Sustainability for teachers, and she has written curriculum for New York Sun Works' Greenhouse Project. Ms. Provasoli received a B.A. and an M.S.Ed. from Sarah Lawrence College and STEM certification from Teachers College. She was also honored at the White House, receiving the Presidential Innovation Award for Environmental Education. Ms. Provasoli is currently a Math for America fellow and a member of the New York City Elementary Science Leadership Team.

## Extending the projects

Given that I am the Sustainability Coordinator for my school of 700 students and 90 staff members, I must look for unique ways to introduce information about waste, water, and energy that does not overwhelm anyone or contribute to eco-anxiety. Teaching small groups of students about their selected topics and allowing them to share with the school helps us as we strive to go zero waste. Throughout the year I refer to students' projects when I introduce a lesson that has a connection. Starting off the year with these projects also highlights who are the most dedicated to the environment, for these are the students who opt to join the green teams. Whether they extend an initial sustainability topic or discover a new interest, these students continue to listen to their passions.

## Try it yourself

If you are looking for ways to increase sustainability efforts, you might consider these passion projects at your school. If early in the school year doesn't fit your curriculum, why not try them out in April around Earth Day, or at the end of your school year when you are seeking ways to motivate students? Offering students the opportunity to tap in to their talents encourages all to participate. The projects can be as simple or

# Real Change from Students

*Promoting pro-environmental behaviors using Community-based Social Marketing*



Images by Melanie P. Master

By **Melanie P. Master**

**N**OW MORE THAN EVER, teachers are in a position to empower students to solve pressing environmental issues that threaten the health of our planet. Standard ESS3-3 of the Next Generation Science Standards (NGSS) for K–12 classes in the United States calls on students to design a solution to an environmental problem, but why stop at just designing a solution? This standard can be leveraged to actually have students change environmental behaviors in their community through a process known as Community-Based Social Marketing (CBSM). CBSM is a research-based method created by social psychologist Dr. McKenzie-Mohr that creates behavior changes within a community by combining social psychology and environmental science principles.<sup>1</sup> In essence, CBSM influences the collective mindset of a community to condition them into changing their behaviors.

Before using evidence-based CBSM to solve behavioral problems, my students' environmental solutions were often based on best guesses for which strategies would change behaviors of students, such as implementing informational poster campaigns about the effects of litter or installing basketball hoops over trash cans to encourage the throwing away of trash. These types of solutions that 'feel right' often don't work, and students know it. But once my students began

using CBSM to solve environmental issues, there was a rise in their feelings of competence, a key factor that increases the likelihood environmental problems will actually be solved.<sup>2</sup>

A student-driven CBSM campaign consists of five sequential steps: 1) selecting the target behavior; 2) determining barriers and benefits of doing the behavior; 3) choosing strategies to encourage the behavior; 4) collecting stakeholder feedback on strategies, piloting; and finally, 5) broadscale implementation. To carry out a successful CBSM campaign from start to finish is an ambitious challenge for both the teacher and students, and it can take multiple months to complete depending on the depth and complexity of the campaign. The process was originally designed to be carried out by professionals, so it requires some tweaking to be executed with middle school students.

## Behavior change steps

### *Step 1: Choose a target behavior*

To narrow down and select one target behavior to promote, students first choose an overarching goal such as reducing waste on campus. Then, students brainstorm all the different ways waste could be reduced (increasing recycling, increasing use of reusable water bottles, increasing the amount of trash that actually makes it in a receptacle, etc.). From there, students use observational evidence to argue which behaviors



students would be likely to do and would also make a large environmental impact. A target behavior that is appropriate for one school may not be appropriate for another based on unique school situations. For example, if students want to increase recycling but the school doesn't already have a recycling program, that would be too hefty of a goal. But if the school already has recycling infrastructure in place and the goal is to increase the number of people who choose to recycle, that would be appropriate because it only requires a change in behavior, not infrastructure. For a school that wants to reduce waste but doesn't have a recycling program and also suffers from littering, the most appropriate target behavior might be for students to always throw trash in cans rather than the ground.

### Step 2: Determine barriers and benefits

Once the target behavior is selected, the second step is to determine the student community's perception of the barriers and benefits to doing the behavior. For example, if the target behavior is to always throw trash in a trash can rather than the ground, students should ask student community members about their perceived barriers and benefits to doing the behavior. In order to formulate barrier questions in a non-accusatory tone, CBSM researcher Jennifer Tabanico from Action Research Inc. suggests wording the barrier question in a hypothetical sense such as, "If there ever were a time when you didn't throw trash in a trash can, what would the reason be?" Due to the hypothetical nature of this question, the interviewee is less likely to feel accused and therefore more likely to give an honest response.

After students survey the student body about the barriers and benefits to the behavior, they discard extraneous answers and identify patterns which help with grouping responses into common themes. Students may find that people don't throw trash in the trash can because they are too lazy and that trash cans are too far away. They may also find the perceived benefits of throwing trash away to be that the environment would be protected or that their campus would be cleaner and more beautiful. These barrier and benefit data are crucial to inform the next step: developing strategies to encourage the behavior.

### Step 3: Develop strategies

The goal of developing strategies is to lower the perceived barriers while leveraging the benefits. In developing these strategies, students are designing a solution to minimize a human impact on the environment, as required in MS-ESS-3 of the NGSS. For each potential barrier there is a specific, evidence-based strategy that can be utilized to overcome the barrier. For example, if a barrier to throwing away trash is that people are too lazy, one could implement the strategies of commitment, norming, or convenience to get people to change behavior. See Table 1 for a complete list of strategies used to overcome specific barriers.

Each strategy serves its own purpose. For example, the commitment strategy should be utilized if the barrier to carrying out a behavior is lack of motivation. If people commit to doing a behavior, they are more statistically likely to do the behavior.<sup>3</sup>

Barriers	Strategies
Lack of motivation	Commitment Norms Incentives
Forget to act	Prompts
Lack of social pressure	Norms
Lack of knowledge	Communication
Structural barriers	Convenience

If the barrier to enacting a behavior change is that people forget to do it, the best strategy is to use a prompt which has been proven to help people remember.<sup>4</sup> The purpose of a prompt isn't to change attitudes; it's simply to help people remember to do something they already believe is worthwhile by putting a reminder in a prominent place.<sup>1</sup>

The convenience strategy works when the barrier is laziness, because the more convenient the target behavior is, the more likely people are to engage in it. If there are physical barriers to carrying out the behavior, these barriers need to be lowered or taken away to make it more convenient.<sup>1</sup>

Social norming is a powerful strategy because people subconsciously want to conform to what the group is doing.<sup>5</sup> Social norming is done by diffusing the norm throughout the community to make it seem like everybody does a behavior. This can be done by prominently posting how many individuals do the target action, such as in a large visual display on campus.

Students first learn about and then teach each other the different strategies in order to select a strategy or multiple strategies that could be used to overcome the barriers while leveraging the benefits. If the strategies chosen to combat laziness are commitment, norming, and convenience, examples of specific strategies could be to...

1. Create a mural to act as a commitment to throw trash in a trash can as well as to create the social perception of a norm. Students can commit to throwing trash in the can by signing it with a handprint, and it acts as a norm because it shows that many students do this behavior. If the perceived benefits are that throwing trash would help protect the environment, a picture and phrase about protecting the environment should be included.
2. To overcome the laziness barrier, increase the number of trash cans available to students to make throwing away trash more convenient.
3. Add a norming phrase to the morning announcements to encourage the social belief that everyone put their trash in a proper receptacle. For example, "Our planet thanks all students on our campus for always putting trash where it belongs."

#### **Step 4: Stakeholder feedback and pilot test**

After the strategies are developed, students meet with stakeholders to provide feedback on the strategies. For example, the principal and custodians would need to be met with, as well as a small group of students outside the focus group. Gaining this feedback is valuable for two reasons: to make sure that the logistics of the project can actually be carried out and to gain support of the people involved.

Once stakeholders support the strategies, a pilot test needs to be planned and carried out in order to know if the strategies will be successful for broad implementation. For example, if students want to increase the number of trash cans, a pilot test would need to be conducted in a small area to measure whether adding more trash cans really does increase the amount of trash that ends up in a trash can rather than the ground. This test relies on data collection and needs to include a control group to which results can be compared.



If pilot tests on all strategies are deemed successful, the last step is broadscale implementation.

#### **Step 5: Broadscale implementation**

Before tested strategies are implemented on a broad scale, another evaluation tool needs to be created to determine if the implementation has been effective.<sup>1</sup> This evaluation is not only crucial to know if the strategies have worked; it ensures that students are monitoring environmental impacts, as required in MS-ESS3-3. Finally, the strategies are broadly implemented, and effectiveness is evaluated. If the strategies are deemed effective, then they should continue to be implemented, meaning positive behavior change has been accomplished.

#### **Your turn!**

This process could either be completed with a small group of students in an environmental club or adapted for whole classes. Regardless, a detailed lesson plan can be found in the resources list below. If this were conducted with an environmental club, the whole would work together as one cohesive unit and only break into subgroups to collect data and brainstorm strategies. If this were done in a traditional classroom setting, it would be ideal to break the class into smaller groups of 4–5 and then have them conduct the steps on their own to develop strategies, but stop before pilot testing. After

the groups create strategies based on their barrier/benefit data, each group presents its strategies to the class and the class votes on which strategy to pilot together. Voting serves as a form of community feedback and it also ensures that there is at least a classroom full of students who largely support the pilot test strategies. Together, the class would implement the pilot test as well as broadscale implementation.

If funding for materials isn't readily available, asking the community is a great way to find what you need. For example, if the school needs more trash cans, teachers and parents can donate them. If materials for a mural are needed, ask the art department if they have supplies. An alternative is to apply for an environment-related grant such as Planet Stewards Education Project by NOAA.

The hard work from both the teacher and students is worth it in the end; the success gives everyone a sense of competence in solving environmental issues that they may carry throughout their lives.

---

**Melanie P. Master** is a middle school science teacher at Rancho Minerva Middle School in Vista, California, USA and a Master's of Biology degree candidate through the University of Miami's Advanced Inquiry Program.

#### Resources:

CBSM Lesson Sequence: <https://docs.google.com/document/d/1gt4XjAK3Lm-LdFDzWXD0tzyTbREwDJaWZJtM9xu8Scm4/edit?usp=sharing>

Environmental Education Grant List: <https://www.ceai.net/additional-grant-opportunities.html>

Information on CBSM: <https://www.cbsm.com/>

#### Endnotes:

1. McKenzie-Mohr, D. (2011). Fostering sustainable behavior: An introduction to community-based social marketing. Gabriola Island, BC. *New Society Publishers*.
2. Chawla, L., & Cushing, D. F. (2007). Education for strategic environmental behavior. *Environmental Education Research*, 13, 437-452. Retrieved from <https://eprints.qut.edu.au/50908/>
3. Werner, C. M., Turner, J., Shipman, K., Twitchell, F. S. (1995). Commitment, behavior, and attitude change: An analysis of voluntary recycling. Special Issue: Green psychology. *Journal of Environmental Psychology*, 15, 197-208.
4. Kurz, T., Donaghue, N., & Walker, I. (2005). Utilizing a social-ecological framework to promote water and energy conservation: A field experiment. *Journal of Applied Social Psychology*, 35(6): 1281-1300. <http://dx.doi.org/10.1111/j.1559-1816.2005.tb02171.x>
5. Asch, S. E., & Guetzkow, H. (1951). Effects of group pressure upon the modification and distortion of judgments. *Groups, Leadership and Men*, Pittsburgh, PA, *Carnegie Press*, 177-190.

# Become a **Green Teacher** Supporter

Help us continue to provide environmental ideas, lessons plans, and inspiration.

Only by adding:

\$10 to your one-year suscription OR  
\$20 to your two-year subscription

You will be a Green Teacher supporter and get a mention by name in our magazine.

To order and for more information, please contact us at:

888-804-1486 or [info@greenteacher.com](mailto:info@greenteacher.com)





# The Walking Curriculum

*Cultivating ecological relationships through art and place-based, imaginative educational walks*



Image by Kyla Cameron

---

By Gillian Judson

---

*[Originally published in the  
BC Art Teachers' Association Journal, Vol 61(2), 2020]*

**WE LEARN A PLACE** and how to visualize spatial relationships, as children, on foot and with imagination. Place and the scale of place must be measured against our bodies and their capabilities.<sup>1</sup>

Engaging with nature ignites the imagination and fuels human curiosity. There is an openness and a complexity in nature that engages our sense of wonder. There is a sensuousness that engages the somatic imagination — the body's main senses, yes, but also our sense of the musical, our awareness of incongruity, our identification of patterns, rhythms. As many artists know deeply, nature inspires.

Add the revolutionary act of walking to the mix, and one fuels the imagination further, opening up possibilities for wider implications for learning and being. Dan Rubinstein, author of *Born To Walk: The Transformative Power Of A Pedestrian Act*, describes walking as “a tonic for body, mind, and soul.”<sup>2</sup> Walking, he says, not only benefits our bodies but also our communities:

*[Walking] can restore health and inspire hope in places where there is not much of either. Because it can help re-plant the seeds of independence and interdependence, two things we cannot bloom without. Michael Pollan distilled his receipt for a healthy diet into seven simple words. Eat food. Not too much. Mostly plants. My manifesto fits into three. Walk more. Anywhere.<sup>2</sup>*

Indeed, walking has been called the “magic pill” for wellness as it can positively impact so many aspects of our physical and mental health. Walking out in nature — engaging in nature more routinely is, I believe, also required to save the planet. The idea within this seemingly naive claim is simple: we need to have opportunities to connect and to form relationships with the natural world if we are going to fight to save it. Research shows that meaningful experiences in nature as children can impact the development of a conservation ethic.<sup>3, 4, 5, 6, 7</sup>

Shifting the ways in which we understand our relationship with nature — moving from a sense of separation to one of interconnection — requires us to form emotional connections with nature. This challenge to develop a different worldview is, in part, a relational one and, importantly, an educational one.



This chapter explores an imaginative and ecological approach to teaching called the *Walking Curriculum*<sup>10</sup> and the different ways in which teachers practicing this outdoor learning are using art to facilitate and enrich learning. Throughout the chapter you'll find quotes from the imaginative ecological teachers I know who frequently encourage art (formal projects) and artistry (aesthetic expression) inspired by nature in their teaching. I hope to bring attention to the important role art / artistry play in pedagogy that supports our ecological relationships, those emotional connections with nature that many consider to be at the heart of a conservation ethic and, ultimately, a desire to live in harmony with the Earth. What emerges from their voices and their examples is that art is an affective mode for learners to express their growing relationships with Place.

*I do a lot of picture taking to show their in-the-moment art, because it is fleeting... it isn't something we can dig up and take home. But it is very powerful and an expression of that moment in time. A stick or shovel drawing in the dirt or snow. Sidewalk chalk that washes away.*

@PittMeadowsDayc

## A Walking Curriculum

weave |wēv|

- ◇ to make (basketwork or a wreath) by interlacing rods or flowers;
- ◇ to make (a complex story or pattern) from a number of interconnected elements;
- ◇ (weave something into) to include an element in (such as a story or pattern): interpretative comments are woven into the narrative

*We were inspired by the cherry blossoms.*

@karveena23

Unfortunately, not all outdoor learning experiences are created equal. Practices that neglect emotional and imaginative engagement in the learning process do little to cultivate the heart of a conservation ethic.<sup>8,9</sup> With the aim of developing students' ecological understanding — an awareness of the interconnectedness of all things and a sense of care/concern for the natural world — we can teach in ways that afford our students emotional connections with their local natural and cultural contexts. We can also support our students in developing a certain depth of knowledge about it. My work on Imaginative Ecological Education (IEE) has been based on this premise: we need to provide emotionally and imaginatively engaging learning opportunities if we are to support ecological understanding, that sense of connection and embeddedness to a living world and a desire to live differently.



Imaginative ecological educators are weavers. They weave relationships that connect knowledge, the body, and natural and cultural contexts. They also weave wonder into the everyday experience of students in schools. Thinking about teaching as weaving can contribute to understanding what is distinctive about Imaginative Ecological Education (IEE) as a pedagogical approach. Imaginative and ecological teaching requires mindfulness in interconnecting students with knowledge and place. Weaving also requires artistry; each cloth is a work of art that reflects the diversity of the context in which it was created. There is

a degree of artistry in good teaching that we tend to forget amidst ongoing drives to standardize curricula and universalize the educational experience of students. Weaving, as metaphor, reminds us of some of the often-forgotten dimensions of teaching.

*I use art (drawing, painting, collage, writing, clay, etc.) as a way for my students to transform their outdoor experiences into story. Art is powerful way to make... sense of feelings, experiences and new learning.*  
@MelanieASidney

IEE is a cross-curricular approach to teaching that combines three elements in learning: Feeling (engagement of emotion and imagination), Activeness (involvement of the body), and Place (a focus on the natural, local world). Like all ecological educators, IEE educators strive to develop students' sense of participation in human and natural communities and to encourage their students to be thoughtful about their impact on the planet. But in IEE, much more pedagogical attention is focused on cultivating students' emotional and imaginative relationships with knowledge and with Place. (For more information on IEE visit imaginED [www.educationthatinspires.ca](http://www.educationthatinspires.ca) or the [IEE website](#).)

The *Walking Curriculum*<sup>10</sup> is an example of imagination- and inquiry-focused pedagogy based on the IEE approach. The resource is designed for educators K–12 who want to take student learning outside school walls. *Walking Curriculum* activities can be used in any context to develop students' sense of Place and to enrich their understanding of curricular topics. The 60 easy-to-use walking-focused activities in this resource are designed to engage students' emotions and imaginations with their local natural and cultural communi-



Image by Melanie Sidney

ties, to broaden their awareness of the particularities of Place, and to evoke their sense of wonder in learning.

*Outdoor learning fosters observation and teamwork, students gain new perspectives. Nature acts as a point of inspiration for writing and also allows students to respond to stories. Being outdoors allows students to see that there is art all around us.*  
@KylaLCameron

The premise: Through walking, educators can enrich their students' sense-making abilities, they can enhance their very being and, as they go, they can seed with meaning the contexts in which they spend so many hours learning. The walks described in the *Walking Curriculum* resource are designed to engage the body, emotions, and imagination in ways that can increase students' familiarity with the local natural context in which they go to school; increase students' attention to detail and their attunement with Place; connect Place-based learning activities with cross-curricular goals; and serve as examples for your own, Place-inspired teaching ideas.

My hope with the *Walking Curriculum* is that images and knowledge of the local natural world will become etched in students' minds — they will come to know each Place in great(er) detail and will develop emotional connections and a sense of ethical responsibility. Each walk can provide deeper understanding, clarity, richness, and detail to an understanding of Place. Like a holographic image, each walk can bring some aspect of the natural world and related curricular knowledge into focus. With increasing clarity, they can also begin to see the wonder in the “ordinary” world around them. (Learn more about the *Walking Curriculum* and get links to sample activities here on *imagined*.)



*Art provides an entry point for all learners to express themselves through oral language and storytelling.*  
@karveena23

Over the past 15 years I've tried to bring attention to imagination and add tools for engaging imagination to the toolkits employed by outdoor, ecological learning. (Read more here on imagined.) This article is my first contribution to an Art Journal — this terrain is new for me! I'm pleased to contribute, however, as I have seen so many examples of eco-art (using natural materials) and art inspired by outdoor learning over the past 15 years and very recently, as educators across North America (and also around the world) have taken the 30-day Walking Curriculum challenge. In preparing to write this article, I specifically asked these educators: How does outdoor learning inspire and/or support art in your teaching? How do students demonstrate understanding through art? What do students create?

*Students made a replica of the Fraser river (outdoors in the gravel/mud) through art after going on a field trip to the Fraser River discovery Centre.*  
@karveena23

### Teachers' Perspectives

Educators describe art inspired by nature or art that uses natural materials as a highly personal way for students to engage in learning and to demonstrate their understanding. They feel it is a democratic process that can bring students of diverse backgrounds and abilities together in creation. Students often feel pride in their aesthetic creations and, when given freedom to express themselves, they tend to really enjoy the



**Found objects story table**

process. Teachers also felt that the freedom and openness of art allowed students a self-expression that other activities do not. Art is a medium for which students can express meaning that is difficult to convey in words. In this way, art offers an ultra-linguistic means of expression.

*[We take] time to use senses to observe nature, in detail, over & over again. Scent, vibrancy, changes daily/seasonally, blending of colour, variances between similar things... pause in the moment and just be in the space. It comes out in descriptive language, art, knowledge.*  
@PittMeadowsDayc



**This is how I feel when I am in the forest.**



Images by Melanie Sidney

Exactly how educators develop artistry outdoors is diverse. Sometimes students have complete control to decide what they make and how. Teachers leave the parameters of the activity wide open for students. For example, in loose parts art or “found objects art” (pictured below), students may simply be asked to make something beautiful or to create a pattern. Or they might be asked to use found/natural objects to express how they feel about an experience. (Note the image below from Stella Fleming, “This is how I feel in the forest.”) Found objects might be employed to make a craft indoors or outdoors or to be the basis for story-telling. These forms of art are often process-oriented and highly individualized; there is no right or wrong “result”, students’ experiences are unique, students set their own pace and outcome. What matters most in these sometimes “temporary” art projects (that may stay outside) is the students’ experience of creation and self-expression.

*We found “nature treasures” with nice textures to make imprints in clay. We made them into necklaces for our environmental exchange box buddy class.*  
@mmedare

Many students have the opportunity to sit still — perhaps in their special “sit spots”—and to sketch or doodle. How are they feeling? What are they grateful for? What do they notice? These outdoor artistic representations very often inspire learning in other areas, becoming the basis for creative writing or science inquiry.

Teachers also describe more formalized product-focused projects inspired by nature such as the cherry-blossom art project (pictured earlier) or the Mandala project pictured below. In this project, Karveena Atwal encouraged her students to create inspiring mandalas that incorporated a natural element in the design. In this example, students took a nature



Images by Karveena Atwal

*On one of our walks we did a colour search, then we collected leaves and flowers to see what colours would come out when we pounded them with rocks. After we figured out what worked well, we selected our fave leaves and flowers to decorate a card for Mother’s Day.*  
@mmedare

walk and were asked to find something detached or dead that caught their attention — something that resonated with them. (Note: Karveena Atwal frequently takes her students outside and incorporates many curriculum topics into outdoor experiences, so her students were very receptive to this task.) This item (e.g., a leaf, stick, or stone) then became the basis for a mandala the students created using watercolor paints. The final mandala also included an inspiring message.



*These are thank-yous the kids came up with for City-Workers who gave them TreeCookies that reflect learning of huckleberries, work boot discussions, individual preferences, etc. They conceptualized, found materials, and put everything together.*  
@PittMeadowsDayc

## Final Thoughts

Art, and any learning, that comes from the child will always be a true reflection of their knowledge and self. @PittMeadowsDayc

The arts have long been a mode of the imagination. In the context of education that aims to support ecological understanding, we see how the arts nurture the imagination. We see the diverse ways in which art and artistry support students in forming emotional connections with nature and also provide them unique space for expressing the affective meaning they gain from learning outdoors. I am hopeful that education of a certain kind — education that develops students' imaginations and engages emotion with knowledge of Place — will lead to humans who have a deep awareness of the interconnectedness of all things. Taking on this perspective is an imaginative act — it requires us to re-imagine our place in the living world. I think this must begin in childhood and I believe arts can support the work.

**Gillian Judson** is Executive Director of the Centre For Imagination In Research, Culture, & Education (CIRCE) ([www.circesu.ca](http://www.circesu.ca)). Her research is concerned with the role of imagination in educational leadership and in pedagogy (pre-K through graduate school). She explores the imagination's role in Ecological Education, assessment for learning (post-secondary), Museum Education, and STEAM.

## Acknowledgements

Thanks also to the following imaginative eco-educators for sharing their experiences, insights and images: Lisa Wild, Melanie Sidney, Kyla Cameron, Stella Fleming, Karveena Atwal, and Amelia Dare.

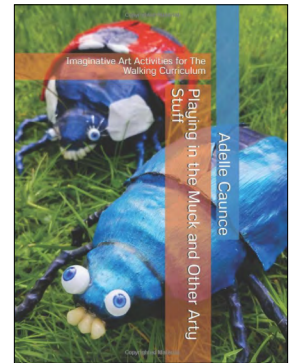
## Supplementary Art Resource

Playing in the Muck and other Arty Stuff: Imaginative Art Activities for the Walking Curriculum By Adelle Caunce (2018)

I was thrilled when Adelle Caunce agreed to create imaginative art-based activities to correspond with 30 of the exploratory activities in the Walking Curriculum. Many adults lose their sense of wonder; they see the world as ordinary and mundane as opposed to overflowing with uniqueness and surprise. Adelle Caunce is one adult who has not lost her sense of wonder. Adelle's walking-focused art activities are unique and playful.

They can extend and enrich your students' walking explorations by adding a whole other layer of engagement. Employ these art activities

with the Walking Curriculum to teach your students valuable skills for sketching, drawing, painting, building, and playing in the mud. Get it on Amazon here.



### Endnotes:

1. Snyder, G. (1990). *The practice of the wild*. San Francisco: North Point Press, 98–99.
2. Rubinstein, D. (2015). *Born to walk: The transformative power of a pedestrian act*. Toronto: ECW Press, 251.
3. de Brito Miranda, A.C., Jófili, Z., dos Anjos Carneiro-Leão, A.M., (2017). Ecological literacy - Preparing children for the twenty-first century. *Early Child Development and Care*, 187(2), 192–205.
4. Fisher-Maltese, C., (2016). "We won't hurt you butterfly!" Second-graders become environmental stewards from experiences in a school garden. *International Journal of Early Childhood Environmental Education*, 4(1), 54–69.
5. McClain, C., Vandermaas-Peeler, M., (2016). Outdoor explorations with preschoolers: An observational study of young children's developing relationship with the natural world. *International Journal of Early Childhood Environmental Education*, 4(1).
6. Selby, D., (2017). Education for sustainable development, nature, and vernacular learning. *CEPS Journal*, 7(1), 9–27.
7. Wells, N. M., Lekies, K. S., (2006). Nature and the life course: Pathways from childhood nature experiences to adult environmentalism. *Children, Youth and Environments*, 16(1), 1–24.
8. Judson, G. (2010). *A New approach to ecological education: Engaging students' imaginations in their world*. New York: Peter Lang.
9. Judson, G. (2015). *Engaging imagination in ecological education: Practical strategies for teaching*. Vancouver, B.C.: UBC Press.
10. Judson, G. (2018). *A Walking Curriculum: Evoking wonder and developing sense of place (K-12)*. (KDP) \*Also Available in French & Spanish

### Additional References:

imaginED: [www.educationthatinspires.ca](http://www.educationthatinspires.ca)

Imaginative Ecological Education: [www.iereg.ca/IEE](http://www.iereg.ca/IEE)

# Action First, Knowledge Last

*Using psychology to increase green behaviors in our learners*



By **Brian William Ogle**

**A** S I WAS DRIVING HOME one afternoon, an interview on NPR got me really thinking. This interview was with a psychologist, B.G. Fogg (author of *Tiny Habits*), who was discussing human behavior and why it is so difficult for humans to alter behaviors or habits. She went into the basic theory of dopamine release, which serves as a short-term reward mechanism. Much of what she was discussing was nothing I had not already learned in my educational psychology courses. However, what really caught my attention was the concept of friction.

From my reading on the subject, I cannot accurately define this concept as there are so many different definitions that have been presented. What these articles share in common is a notion that a change in mental state prevents an action from being continued. This could be distractibility, environment, etc. Yet, what all of the readings, and this NPR interview, had in common was the application: it disrupts the reward cycle in behavior change, thus eliminating the new behavior.

My mind instantly shifted to the application as an educator and my attempts to increase sustainable, or green, behav-

iors in my learners. I have heard similar frustrations from my colleagues about the inability to create sustained change in learners as it relates to adopting green behaviors. My hypothesis is that friction is at play here.

## Changing behaviors

When we examine the actions we are asking of our learners, it is not hard to see that many of these actions all share one common trait: the lack of a short-term reward. Without this reward in place, the likelihood to continue a behavior diminishes over time. If we want to change behavior or replace existing behaviors with a new one, the short-term reward is a crucial element in this cycle. For any behavior to be sustained, varied reinforcement needs to occur at all stages of the behavior cycle.

This presents a particular problem for green behaviors. Many of these behaviors do not demonstrate an immediate result. As such, they are not as reinforcing as the old habit or routine. It requires cognitive thought and practice to fully integrate these behaviors in our daily lives.

If this is the case, is it realistic for us as educators to even approach behavior change? Does our informal programming also meet the requirements to begin the concept of behavior



to actually complete the behavior on their own. We also need to recognize that the behavior would need to be taught and may not be innate to most individuals. Using the “I do, we do, you do” approach would not only increase the repetition of the behavior, but would also serve as a way to start the short-term reward cycle.

If we could get the participant completing an action, it is believed that curiosity about the action would be ignited. Why are they completing the action? What is the benefit in doing this action? This is where we deliver our educational messaging. Using the findings from our behavior change and instruction design colleagues, we can see a clear need to target our messaging. The content should be presented such that the action and information would be explicitly linked. If there is not a direct correlation between the action and the information provided, the information would compete for space in the working memory. As a result, neither would be successfully stored in long-term memory.

Creating an emotional reaction would also aid in the reward cycle. Arcury & Christianson believe the most important thing we can do as environmental / conservation educators is to create an emotional

change? The answer is ‘not currently.’ Part of this is due to the current approach we take as educators.<sup>1</sup> A fair number of us still hold on to the old model of “get them to care and they learn, which leads to them doing.” If we examine the psychology behind behavior change, we can already see holes in this model as it does not align with current behavior change theory.

As a community, we have struggled to move beyond the idea that increasing knowledge of an individual will cause them to care or act. Research over the past decade has demonstrated that we need to adopt a different approach to increasing behavior change in our learners.<sup>2</sup> So, what model should we be using?

Based on the review of the literature related to behavior change and education, I propose this new model: action first, knowledge last. If our goal is to increase the likelihood that someone will engage in green behaviors, we need to work with a short-term reward cycle to establish the behavior.

If our programs were to lead off with learners engaging in the desired behavior first, we could reward the individual and provide immediate feedback. This action would prime the reward cycle, causing our participants to release dopamine, a required element of the reward cycle. Once they start feeling good about the action, we may increase the likelihood of their repeating the behavior. Frequent feedback on the behavior is critical for the reward cycle. The more repetitions an individual completes, the more likely the information is retained in long-term memory rather than the working memory. Merely learning about the behavior is not enough. A person needs

reaction. This would sustain the behavior and establish the needed motivation to support the adoption of new behavior.<sup>3</sup> While emotion is important to create a change in behavior and retain new knowledge, engagement during the exposure to the emotion leads to far greater and lasting knowledge gains. It also suggests that engagement is more likely to help sustain the behavior after the emotional experience has occurred.<sup>4</sup>

### Long-term success guaranteed?

Alright, so we have created the now-perfect program geared towards creating behavior change in our learners. It is action-oriented with the action occurring at the start of the program. All of our participants have completed the action multiple times and have received feedback on their progress. We have created an emotional response in the learners as they are completing the action, which has primed them to retain the information that we will provide. Our information has been presented using active learning strategies and is developmentally appropriate information, which has been designed with brain-based learning in mind.

Now, what happens? Our learners will leave the time with us and implement the behavior for a couple of weeks. Will this behavior continue or be sustained? No. We have yet to eliminate the friction. Think back to the number of resolutions you have made to change a habit of yours. How successful were you at changing the behavior?

Without addressing the friction of adopting the new replacement behavior, old behaviors will return quickly.



As educators, we have introduced friction unintentionally through our approach. We have created a short-term reward system, but we have not added a long-term reward. The cycle will ultimately terminate without continually reinforcing rewards. The act of doing the behavior alone is not reinforcing. Noticeable results or changes are reinforcing, but these are not always apparent or immediate with the behaviors we are trying to instill.

This means we need to find creative ways to remain in contact with our participants to reinforce their new behaviors. We need to find ways to break the cycle of friction in their environment. Unfortunately, I do not have an answer for this. I am struggling to find the solution to this problem myself and with my learners. However, I do have a few ideas.

We can connect with our learners virtually through multiple platforms. It is possible to remain in contact with a collective group of individuals without interacting with them in-person. We can create custom emails with specialized content and videos to reinforce the behaviors from their time with us. Social media has the potential to create a community of individuals who assist in reinforcing the behavior collectively. Ultimately, we should realize that we will face a different form of friction in this electronic world: guaranteeing the individual will engage with the material.

The power of resources and training our learners on where to find reinforcing content is paramount. Simple handouts designed to promote and sustain the behavior should be provided during the session. Part of our instruction should include how to engage with this easy-to-use material, which has been designed to address common breakdowns in adopting the behavior.

### Can it all be put into practice?

A great example of this technique can be found in Orange County, Florida, where waste management services have been working to educate the local community on proper recycling. Educational workshops in the city have emphasized learning through action. The individuals who are charged with collecting the recyclables at the curbside are equipped with specific tags that they can place on receptacles. These tags are designed to provide reinforcement through positive messages and offering of feedback on people's recycling progress. These tags also allow collectors to state why they may not be able to include a particular container in the collection process and that the homeowner is allowed to try again. If they succeed in correcting the recycling mistake, they are provided a new tag on the container praising them for fixing the issue. The tags also communicate the contributions they are making to the local community by recycling.

A more complex example can be found in the pilot program *Sharing Space: Living with Coyote*. This program was designed to place the participant in the middle of the experience. It used behavior change theory to change the perception of co-existing with Coyotes. One year after the program, results showed that the participants not only maintained more positive attitudes of the animals, but these participants were practicing the proper skills to decrease conflict with Coyotes.<sup>5</sup>

Our challenge as a collective community of educators is to find ways to sustain behavior. Applying the principles of behavior change is our best bet to ensure that we are creating a community that is actively engaged in sustainable actions. We need to give our learners the benefit of the doubt. They want to do better. Everyone wants to feel like they are making a difference in the world. Our goal is to find ways to encourage and teach them how — not just in a brief interaction, but long-term.

---

**Brian W. Ogle** is an assistant professor of anthrozoology and the department chair of humanities and general education at Beacon College in Leesburg, Florida. In his research he examines instructional issues related to science teaching, trends in environmental education, and various topics related to zoo visitor studies, including guest education.

#### Endnotes:

1. Clayton, S., & Brook, A. (2005). Can psychology help save the world? A model for conservation psychology. *Analyses of Social Issues and Public Policy*, 5(1), 87-102.
2. Schultz, P. W. (2011). Conservation means behavior. *Conservation Biology*, 25(6), 1080-1083.
3. Pooley, J. A., & O'Connor, M. (2000). Environmental education and attitudes: Emotions and beliefs are what is needed. *Environment and Behavior*, 32(5), 711-723.
4. Chittaro, L., & Buttussi, F. (2015). Assessing knowledge retention of an immersive serious game vs. a traditional education method in aviation safety. *IEEE Transactions on Visualization and Computer Graphics*, 21(4), 529-538.
5. Sponarski, C. C., Vaske, J. J., Bath, A. J., & Loeffler, T. A. (2019). Retaining change in attitudes and emotions toward coyotes using experiential education. *Wildlife Research*, 46(2), 97-103.



# Developing a Culture of Change

*Engaging immigrant girls in environmental activism*



Images by Taylor Shryne

---

By Taylor Shryne

---

**A**S ENVIRONMENTAL ISSUES continue to become more catastrophic and prevalent throughout the planet, more of us are beginning to understand our own impacts and the roles that we as individuals play in the collective deterioration of our earth. More now than ever, it is important for us to understand the power we have to act, and to make a difference. In the City of Calgary, a local settlement agency has been working over the past three years to teach the importance of environmental stewardship to a group of young immigrant girls between the ages of nine and 13. As organizers approach their final year of the four-year project, efforts have been narrowed to focus on one major environmental theme: native pollinator health.

Calgary Immigrant Women's Association (CIWA) is a non-profit organization which offers a range of settlement services to immigrant and refugee women, girls, and their families. CIWA applies a culturally-sensitive and gender-specific approach to services and aims to address and respond to the diverse needs of the clients they serve. Among the youth services offered at CIWA is an initiative called Project Footprint – Wilderness Club. This four-year project aims to empower

its participants through themed activities related to protecting the environment and preserving ecosystems.

CIWA's Wilderness Club is offered as an afterschool program at two locations: a local elementary school and a low-income community housing space provided by the City of Calgary. A bi-monthly mentorship component is also offered to Wilderness Club participants who would like to build on and further engage in programming through active learning and group-based projects. Facilitators aim to create a safe and inclusive space where girls can build friendships and develop a sense of social inclusion in their new country while learning about very real concepts. Immigrating is not easy for youth; many young newcomers experience isolation as they try to navigate the many language and cultural barriers at such a formative and vulnerable period in their lives. Through working together to create impactful environmental projects, newcomer girls are given the chance to build self-confidence as well as teamwork and leadership skills while fostering a sense of belonging. These moments are essential components of a secure and successful settlement process.

As program staff enter into their last year of the four-year initiative, they can reflect on the many impactful projects that

these girls have designed and implemented. To date, Wilderness Club participants have taught community families how to make reusable food wraps using beeswax and newspaper; they have created a large art installation representing the impact of single-use plastics on marine life; they have planted and maintained a community garden; they have educated their peers about landfill waste through a visual project; and they have organized an upcycled fashion show to teach people the importance of reusing and upcycling clothes. The club has seen great success in using an arts-based and interactive approach to activate learning — the girls get to be creative, have fun, and raise awareness about the issues that they are passionate about. When given the opportunity to spearhead these environmental projects, newcomer girls have found purpose and meaning through youth activism.

In the final year of the project, the participants of CIWA's Wilderness Club have decided to focus on native pollinator health — a growing, worldwide environmental concern. The first step in tackling this topic was to take advantage of the expertise and knowledge of the many community members within the City of Calgary. The club sought local bee keepers, foresters, and pollinator experts to educate on the many different facets of pollinator health. Obtaining these different community connections started with a simple Google search: 'Native bees Calgary.' From there, project staff were introduced to organizations like the Alberta Native Bee Council and Bee City Canada as well as local beekeepers and different community members who are actively taking part in protecting our native bee population. By reaching out and connecting with a few of these community members, project staff were then connected with other people who wanted to help. Beekeepers came in to teach the girls about the differences between native bees and Honey Bees. Local bee activist Dave

## Threats to pollinator health

There are many different factors that threaten pollinator health, the most impactful being loss of habitat. As communities increasingly move towards manicured lawns, landscaped areas with very few native plants, and large paved areas with no greenery, native bees are finding it more and more difficult to forage for nectar and pollen. Going hand-in-hand with manicured landscaping, pollinators are also facing threats from increased use of pesticides and insecticides. These chemicals can kill the bees directly or cause confusion and disorientation, hindering them from being able to find their way back to their nests. Additionally, problems like climate change and lack of plant diversity have proven to be issues for many native bees. The combination of these factors has resulted in native bee populations declining worldwide.

Misfeldt came in to discuss his own pollinator garden, which was constructed in collaboration with the City of Calgary. He spoke of different ways in which we can protect our native pollinators and what a pollinator habitat has to include in order for it to be successful. The girls then spread that knowledge to their peers and other community members through art and community outreach. Most importantly, that base of knowledge will serve as a foundation as they embark on their year-end project: building a pollinator habitat of their own.

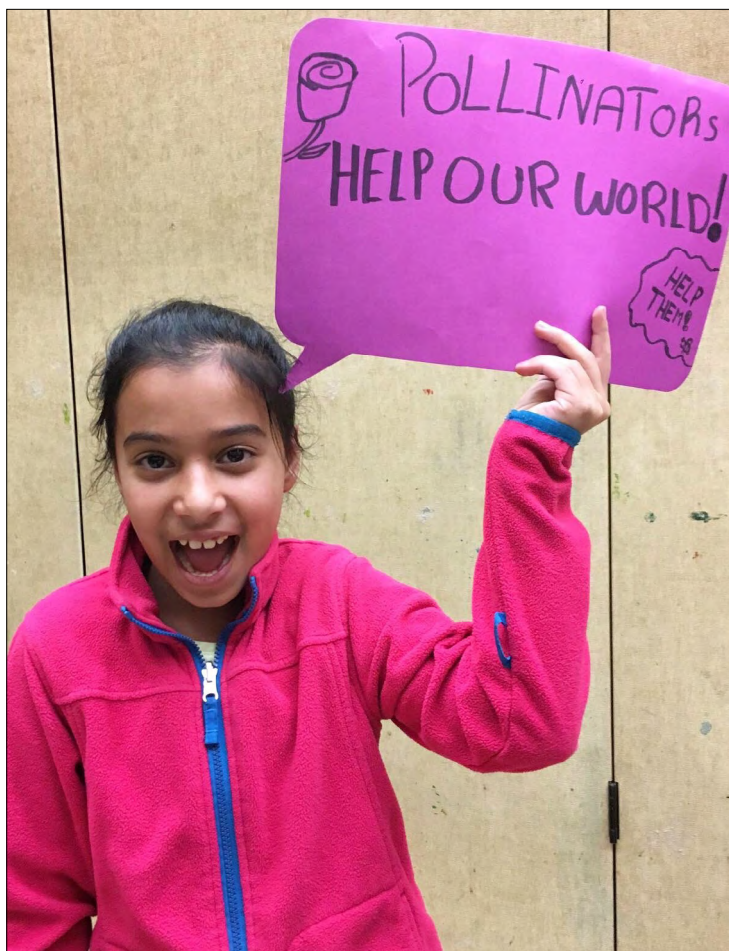


This ambitious project is the means by which the girls in the Wilderness Club aim to achieve their main goal for this year of seeing their school become the second recognized Bee School in the province of Alberta. Bee School designations are given by an organization called Bee City Canada (or its US counterpart Bee City USA) to schools, businesses, or even cities that are taking active steps towards protecting our world's pollinators. Based on the teachings of the various expertise of community partners, club participants know that a successful pollinator habitat includes sandy areas where solitary bees can nest, additional nesting areas in the form of bee condos, and a variety of native plants that bloom at different times of the year to keep a continual food source for the pollinators. As a result, the girls' design for their pollinator habitat includes places to allow underground nesting, bee boxes, and native wildflowers that they intend to plant this spring on the school property. This habitat would be maintained as a collaborative effort between students and staff and used as a wonderful, on-site educational station for students. In an effort to expand their outreach, the girls plan to plant an additional pollinator garden on a plot of land designated by Calgary Housing. Both of these gardens would provide opportunities for students and community members alike to observe firsthand the importance of native pollinators, what they do for us, and why it is so important that we take steps to protect them. At the end of the school year, the Wilderness Club hopes to plan a celebration during Pollinator Week, June 22–28, 2020, in order to honor a year of hard work spent protecting pollinators.

Engaging newcomer youth in environmental stewardship has given these girls a sense of purpose and ownership in their new communities. They have come to learn that this entire planet, no matter where we are living, is our home and that it is our responsibility to protect and honor it. Over the past four years of Project Footprint, more than 120 immigrant girls in the City of Calgary have built friendships, gained confidence, and learned about their roles and impacts as citizens of Planet Earth. Through their insight and contributions to the many different projects that this club has created, over 2,000 Calgary community members have been exposed to sustainable environmental practices and gained knowledge about the various environmental issues the world is facing. As the project comes to a close in June, organizers of the initiative can feel fulfilled knowing that CIWA's Wilderness Club has not only made a positive environmental impact in the Calgary area, but has given young immigrant girls a space to grow, belong, and feel empowered.

---

**Taylor Shryne** is a Youth Facilitator at Calgary Immigrant Women's Association. Her background is in French & Education, but she is currently pursuing a Master's Degree in Social Work.



# Healthy Schools, Bright Futures

*Engaging students and the school community in win-win-win actions to tackle climate change, address eco-anxiety, and improve health*



Image by redakter from Pixabay

By **Helen Doyle** and **Erica Phipps**, with contributions from **Lella Blumer**

**A**S THE WORLD MARKS the 50th anniversary of Earth Day on April 22, 2020, the devastating impacts of the coronavirus pandemic are showing us that local actions are vital to respond to a crisis that is shared across a global community. The same is true of climate change. While pandemics, climate change, and environmental degradation may feel like insurmountable challenges, the response to COVID-19 demonstrates that sustained individual and collective efforts are the only ways to overcome these global crises. And when leaders and experts provide clear evidence-informed guidance and policies, communities can implement solutions that bring immediate health protection, build community, and create a future that is equitable, healthy, and sustainable for generations to come. Working together, we can turn the tide of climate change, sustain health and well-being, and nurture a sense of hope.

These are stressful times for our children and youth. Already concerned with the looming consequences of climate change, students have had to cope with physical distancing and school shutdowns triggered by the coronavirus pandemic. Now more than ever, we need to cultivate a sense of empowerment by engaging young people in actions they can control and be proud of.

Each year, Canada celebrates Healthy Schools Day (HSD) — a day to take action and celebrate the efforts of students, educators, decision-makers, and school communities to make learning environments healthier and more sustainable. Led by the Canadian Partnership for Children’s Health and Environment (CPCHE), each Healthy Schools Day has a thematic focus. Recent campaigns have addressed radon and diesel bus emissions. Next up is climate change.

But climate change is too big of an issue and far too important to tackle with just one ‘day.’ For that reason, and recognizing that educational professionals and families are understandably focused on staying safe amidst the COVID-19 crisis, we are dedicating an entire year to supporting a nationwide gearing up of efforts in schools and early learning programs to take action on climate change. Why? Because halting the rise in greenhouse gas (GHG) emissions is essential to our collective future. Because taking even simple actions can help keep us all healthier now, while contributing to lower carbon footprints and helping us realize the many bonuses to children’s health and well-being of spending time in greener and cleaner environments. And because taking action, together, is the best way to inspire hope and protect the right of our young people to dream of a bright future.

## The challenge

Climate change is presenting real and immediate risks to

communities around the world, and Canadians and Americans are not immune to these risks. Heat-related health impacts, deteriorating air quality, vector-borne diseases, food insecurity, injury and illness from extreme weather events such as flooding, heightened anxiety, and exacerbation of health inequities have all been associated with climate change. Extended, warmer seasons have already contributed to the spread of the tick that transmits Lyme disease, with the reported number of cases in Canada having increased from 144 in 2009 to 2025 in 2017.<sup>1</sup> Longer and warmer seasons increase air pollution risk from forest fires, smog-forming chemical reactions, and pollen — all common asthma triggers. From 2015 to 2016 there were over 6,000 asthma hospitalizations among children and youth in Canada.<sup>2</sup> Climate change is expected to double or triple the number of extremely hot days in some parts of Canada in the next 30 years.<sup>3</sup> In the City of Toronto alone, heat contributes to an average of 120 premature deaths each year.<sup>4</sup> The mental health impacts of climate change and eco-anxiety — the fear and anxiety experienced by the overwhelming challenge of climate change — are very real.<sup>5</sup> Children are among the most vulnerable to climate-related mental health impacts.<sup>6</sup> Health professionals are already seeing these climate-related health impacts and are calling on governments to commit to concrete climate actions.<sup>7</sup>

Canada's Changing Climate Report (released in 2019) states that, on average, warming in Canada is double that of global warming<sup>8</sup> and warns that effects of rising temperatures are projected to intensify — with increased severity of heat waves, increased drought and wildfire risks, and increased urban flood risks from more intense rainfall. The Report highlights the urgent need to take climate action now — noting that “limited” global warming will only occur if nations around the world, including Canada, drastically and rapidly reduce carbon emissions.<sup>8</sup>

There is scientific consensus that climate change is caused by global GHG emissions largely driven by human activity.

While Canada's emissions represent a small percentage of global emissions, it is one of the highest per capita emitters. The major sources of GHG emissions in Canada are the oil and gas sector (27%), the transportation sector (24%), and buildings (12%), with the electricity sector, industry, and agriculture each accounting for approximately 8–10% and waste accounting for 3%.<sup>9</sup> Each one of us can take steps to reduce emissions, but it will take decisive action by all of us — government decision-makers, industry, business, the building and development sector, agricultural leaders, individuals, and communities — to bring about the changes needed to attain Canada's 2050 net-zero emissions goal.

Response to climate change requires both **adaptation** measures to ensure that our communities are resilient to the impacts of climate change and **mitigation** measures to reduce GHGs in order to slow the rate of global climate change and lessen its impacts. To be effective, such actions must be rapid, aggressive, and sustained — and they require collective efforts and political will.

## The solutions

The many partner organizations involved in Healthy Schools Day are working together to provide ready-made options that educators, administrators, and young people can use or adapt in designing HSD actions for their schools and local communities. A menu of campaign ideas, resources, and information can be found on the HSD website at [www.healthyschoolday.ca](http://www.healthyschoolday.ca). As the year progresses towards the culminating event on Healthy Schools Day in Spring 2021, we will be encouraging schools and youth to share their ideas and successes via social media.

Here are just some of the evidence-informed climate solutions that educators and the broader school community can undertake. These are win-win-win actions as they help to reduce GHGs, while also providing health and societal benefits.



Image by redakter from Pixabay



Image by F. Muhammad from Pixabay

### *Adaptation — Building climate-resilient school communities*

Building resiliency is a climate adaptation measure. It starts by ensuring that our school communities are aware of the local risks and health impacts of climate change, that we all understand the vulnerabilities, and that we are prepared to respond. For example, a climate adaptation measure relating to extreme heat and air quality could include a school policy of checking Extreme Weather Warnings and Air Quality Health Index forecasts and using these advisories to guide decisions about outdoor activities. Does your school community reschedule outdoor events when a heat warning has been issued? Does your school provide adequate shade to protect students and school staff from heat and sun exposure? These measures can reduce heat-related health risks and sun exposure. They can also help reduce GHG emissions if natural shade provides the sun and heat protection (as trees absorb carbon).

Part of building resilience is providing school communities with social and psychological supports to address the fear, grief, and other emotions arising from eco-anxiety. Educators have a unique opportunity to connect with children and youth about climate change in a variety of ways: through the curriculum; by direct observation in outdoor education; and in group or personal discussions about students' questions, concerns, and hopes for their collective future. Along with current, fact-based sources of information, it is crucial for educators to have the resources to address their own eco-anxiety as well as that of students in a supportive and constructive way.

There is substantial evidence that focusing on efforts that are having a positive impact on climate change and taking action, individually or collectively, can alleviate anxiety and the feeling of being overwhelmed by negativity.<sup>10, 11, 12, 13</sup> Constructive action allows students of all ages, interests, and abilities to be part of collective projects that contribute to solutions. These projects may include organizing campaigns; expressing messages through theatre, music, art, or

dance; petitioning the school board or municipality for policy changes; and educating other groups in the community. Actions such as those suggested in the next section are being taken by school communities across Canada, and they are making an impact.

### *Mitigation — Countdown towards net-zero emissions*

While broad-scale aggressive action is needed to achieve net-zero greenhouse gas emissions, there are things that individuals and communities can do to directly and/or indirectly reduce emissions and mitigate climate change. Reflecting on the sectors in Canada that contribute significantly to GHG emissions — energy production, transportation, buildings, food production, and waste — think about how your actions and those of your school community can accelerate the countdown to net-zero. These could be measures to reduce your own carbon footprint, or advocacy efforts to support policies on climate action within your own school board and at all levels of government.

Here are some suggestions for climate actions that can be led by the school community and involve educators and the student body. These are also win-win-win actions as they reduce GHG emissions, protect our planet, and provide multiple health benefits for you and your school community.

- ◇ Get active and choose low-carbon [school] travel options
  - » Supporting active and sustainable transportation systems reduces GHG emissions from transportation sources. Consider encouraging/implementing policies on active transportation, school travel planning, Active & Safe Routes to School (<http://www.activesaferoutes.ca/>), and anti-idling of buses and personal vehicles. Public transportation and zero emissions vehicles are other sustainable choices.
  - » *Bonus health benefits!* — Improved local air quality, reduced air-pollution-related health impacts such as

Looking for ideas and resources to help your students and school community engage in climate action?

Check out the

Healthy Schools Day in Canada website

[healthyschoolsday.ca](http://healthyschoolsday.ca) / [lajourneesecolesensante.ca](https://lajourneesecolesensante.ca)

Got a cool project or curriculum idea to share? Post it on social media using [#HSDClimateAction](https://twitter.com/HSDClimateAction)



Photo: Health Center for Neighborhood Technology (<https://hcnk.org/p/7724031>)

asthma, increased physical activity, reduced traffic-related injuries.

- ◇ Use energy wisely and promote renewables
  - » Implementing energy conservation measures such as turning off lights and computers when not in use, and adjusting the thermostat are energy-wise decisions. Encouraging energy efficiency measures such as building envelope retrofits and ventilation upgrades will also help reduce demand for electricity generation. Promoting renewable energy such as solar and wind power will help accelerate the transition to clean energy sources — and they could be part of an interesting science project!
  - » *Bonus health benefits!* — Improved indoor and outdoor air quality, improved thermal comfort
- ◇ Choose plant-based foods and litter-less lunches
  - » Supporting sustainable food systems can reduce GHG emissions from food and agricultural sectors by encouraging/implementing policies that
    - increase consumption of, and access to, plant-based diets as per Canada’s Food Guide for healthy eating,
    - reduce food waste,
    - promote composting, and
    - reduce single-use food packaging waste and the use of plastics.
  - » *Bonus health benefits!* — Improved healthy eating, improved air quality, improved food security, reduced exposure to plastics-related chemicals
- ◇ Plant it for the planet
  - » Greening school grounds and protecting natural ecosystems increase carbon sequestration and contribute to climate adaptation. Supporting policies on school yard greening, organizing a tree planting campaign,

participating in community gardens, or “de-paving” and greening school grounds are great ways to involve students, educators, parents, and the broader school community.

- » *Bonus health benefits!* — Reduced heat-related illness, reduced UV exposure, improved air quality, improved mental health
- ◇ Talk to your students about it and make your collective voices heard!
  - » Join your students in participating in a climate action event; encourage them to write to elected officials or attend local council meetings to find out what is happening in their communities; urge your school to support climate action; or just talk about climate change with your students, families, and friends.
  - » *Bonus health benefits!* — improved mental health and social cohesion

As we commemorate Earth Day, and as countries around the world struggle to cope with the acute challenges of the COVID-19 pandemic, we continue to face the sobering reality that the planet is warming, ecosystems are threatened, and our health is already being affected because of climate change. **Climate action is the solution**, but it will take collective effort. Taking tangible action is necessary; it is also the solid footing that our young people need to feel empowered and hopeful.

In looking ahead to the 2020–2021 school year, the HSD partners will be working hard to offer practical tools and ideas to support you, as educators and administrators, to engage with young people in taking action and advocating for a brighter future — in ways that make sense within your local community. While we all embark on this climate-focused HSD campaign, we want to hear from you, via social media, to generate a coast-to-coast-to-coast sharing of ideas and commitments. So, check out the Healthy Schools Day website, sign up to the HSD listserv, talk with others, share



your ideas on how to integrate climate action with students' learning and discovery, and, most importantly, create the space for young people to generate ideas and build momentum. And then join us for Healthy Schools Day 2021 as we celebrate a country-wide bounty of ideas, momentum and actions to tackle climate change. For a brighter, healthier future.

**Helen Doyle** serves as the Environmental Health Work Group Chair for the Ontario Public Health Association (OPHA). **Erica Phipps** is the Executive Director of the Canadian Partnership for Children's Health and Environment (CPCHE). **Lella Blumer** is an organizer with For Our Kids, a network of parents involved in climate action.

## Additional Resources

Looking for ideas and resources to help your students and school community engage in climate action? Check out the HSD website at [www.healthyschoolsday.ca](http://www.healthyschoolsday.ca) / [www.lajournee-desecolesensante.ca](http://www.lajournee-desecolesensante.ca).

For more information on how to protect children from the health impacts of climate change, check out OPHA's climate action campaign: [www.makeitbetterontario.ca](http://www.makeitbetterontario.ca).

Got a cool project or curriculum idea to share? Post is on social media using #HSDClimateAction.

### Endnotes:

1. Ogden, N.H., Bouchard, C., Badcock, J. et al. What is the real number of Lyme disease cases in Canada? *BMC Public Health* 19, 849 (2019). <https://doi.org/10.1186/s12889-019-7219-x>

2. Canadian Institute for Health Information. (n.d.). Retrieved from <https://www.cihi.ca/en/asthma-hospital-stays-by-children-and-youth>
3. *Climate Atlas*. (n.d.). Retrieved from [https://climateatlas.ca/map/canada/plus30\\_2030\\_85#lat=47.61&lng=-88.51&city=449](https://climateatlas.ca/map/canada/plus30_2030_85#lat=47.61&lng=-88.51&city=449)
4. McKeown, Dr. D. *Protecting vulnerable people from health impacts of extreme heat*. (2011, July 6). Toronto Public Health. Retrieved from <https://www.toronto.ca/legdocs/mmis/2011/hl/bgrd/backgroundfile-39468.pdf>
5. *Canadian Mental Health Association*. (2019, October 17). Retrieved from <https://cmha.ca/blogs/eco-anxiety-despair-is-rising>
6. Hayes, Katie et al. Climate change and mental health: risks, impacts and priority actions. *International journal of mental health systems*, 12(28). 1 Jun. 2018, doi:10.1186/s13033-018-0210-6 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5984805/>
7. Canadian Medical Association. (2019, November 14). Retrieved from <https://www.cma.ca/news/its-time-own-our-climate-impact-lancet-report-finds-canadas-health-care-sector-contributing>
8. Canada's Changing Climate Report. (2019). Retrieved from <https://changingclimate.ca/CCCR2019/chapter/headline-statements/>
9. *Environment and Climate Change Canada*, (2019, April), Canadian Environmental Sustainability Indicators: Greenhouse gas emissions, ISBN: 978-0-660-30369-7 (pb), Retrieved from <https://www.canada.ca/content/dam/eccc/documents/pdf/cesindicators/ghg-emissions/2019/national-GHG-emissions-en.pdf>
10. Cuttler, M., (2019, September 21). *Eco-anxiety spurs youth to take action on climate change*. Retrieved from <https://www.cbc.ca/news/health/eco-anxiety-1.5291500>
11. Clayton, S., Manning, C., Krygman, K., and Speiser, M. (2017, March). *Mental Health and Our Changing Climate: Impacts, Implications, and Guidance*. Retrieved from <https://www.apa.org/news/press/releases/2017/03/mental-health-climate.pdf>
12. *Handbook of Climate Psychology*. (2018, November 16; Revised 2020, March 3). Retrieved <https://www.climatepsychologyalliance.org/handbook/304-coping-and-defences>
13. Elks, S. (2019, September 19). *Children suffering eco-anxiety over climate change, say psychologists*. Retrieved from <https://www.reuters.com/article/us-britain-climate-children/children-suffering-eco-anxiety-over-climate-change-say-psychologists-idUSKBN1W42CF>

# A GUIDE TO INVASIVES AND THE ENVIRONMENT



Provides a tool kit for youth educators. Green Teacher's new book offers innovative perspectives, program ideas, games and activities that young students (6-19) need.

This book includes innovative, youth education programs, and ready-to-use activities appropriate for various age groups.

Print: US/CA ~~\$18.95~~ \$14.95

\*Bulk prices are also available.

To order and for more information, visit us at [greenteacher.com](http://greenteacher.com) or please contact us at 1-888-804-1486 or [info@greenteacher.com](mailto:info@greenteacher.com).



# Come into the Garden, Maude

Studying in your back garden or local green space



Images by John Paull

By John Paull

*Editor's Note: What follows is a journal entry that was made in the summer of 1967 at the end of an environmental education workshop with forty teachers. John sent it to me just as coronavirus-provoked lockdowns began to firmly take hold across most of North America. Now many weeks into this unsettling moment in our history, I realize that John's piece came to me at precisely the right moment. With educators physically-distanced from their students (in some cases completely isolated from them), there is a great deal of time for reflection. This practice is, of course, a lynchpin of teacher education as well as ongoing professional development of any kind. By its nature, reflection involves looking back into the past, whether recent or distant, and making a mental note to keep the "good" and either adjust or discard the "bad." Needless to say, this article is an example of the former, and a particularly relevant one in our current situation of limited access to zoos, nature centres, and major parks. In order to get hands-on with nature, many of us are confined to our own gardens or small patches of green in our neighbourhoods. And that's okay so long as each of us re-orientes our lens to a smaller scale. I'll let John take it from here...*

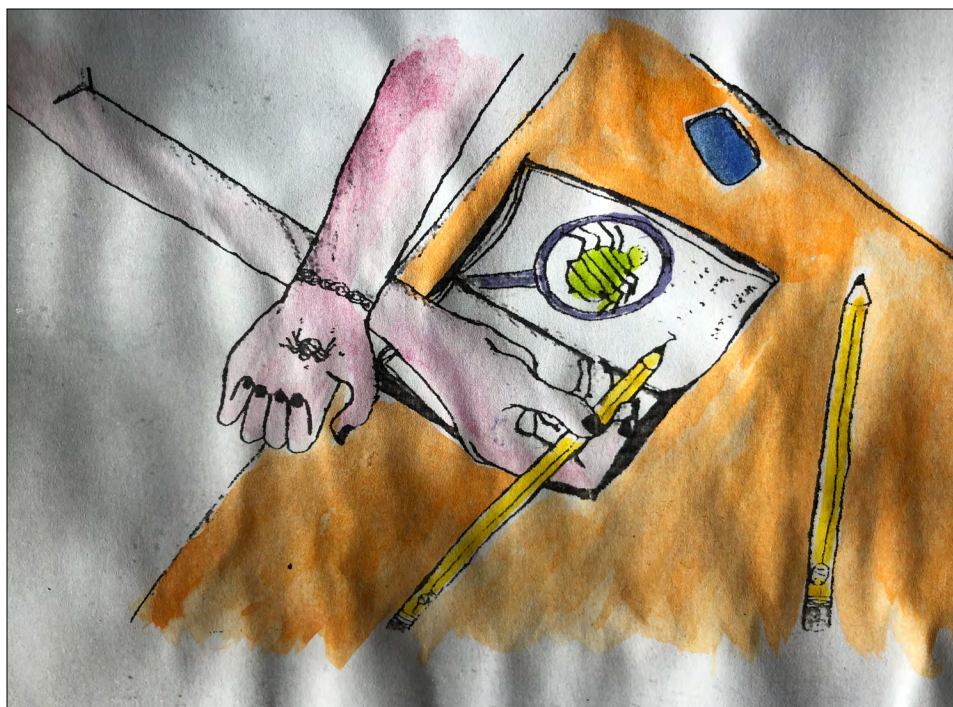
-JS

**T**HE OTHER DAY, a reception teacher from Glasgow was telling me about the little girl who, when asked to draw a long, wriggly worm, said, "I've never seen a worm."

We all know one or two apocryphal stories that make pointed statements about children's unawareness of the natural world. There is the story of the boy who was flabbergasted on his visit to the farm where he saw a cow being milked. His only experience of milk was in bottles delivered by the milkman each morning.

This is not so surprising. If you live in a high-rise flat, you don't have many encounters with worms or cows. But, so what? Would it matter if those children grew up not knowing about the cow and the worm? What relevance have the activities of cows and worms to the urban child who lives in a concrete environment. Are the children in schools and homes close to the wild countryside better informed? Is it not a case of recognising small creatures and plants but not knowing them? Surely, it is important that all children have the opportunity to experience the natural world first-hand and learn about familiar living things that share our world with us.

As teachers, we would all agree that if we are able to predict the effects of our activities on the environment, we need to know about the natural processes which sustain life on



Professional biologist, kept a small colony of woodlice in a tobacco tin for six months, dropping in the occasional dead leaf for food. Not a recommended way of keeping small creatures, but it does show what is possible. Female woodlice mature when they are about two years old and rear their young in a brood pouch under their bodies. When the offspring are ready to emerge, the female stands still and stretches her front legs out stiffly so that the young can crawl down to the ground. The three most obvious and common species of woodlice living in gardens (in the United Kingdom) are easily recognised: one curls up into a ball, another is shiny, and the third is covered in tiny bumps.

Earth. Our present-day farm crops and domesticated animals were derived from wild ancestors. With an ever-increasing human population dependent upon shrinking resources, a knowledge of wild plants and animals may become crucial — for food, medicines, and energy sources.

As teachers, we need to provide the children in our care with the opportunity to use their innate sense of curiosity to discover the natural world for themselves, to learn to enjoy it and to appreciate our dependence upon it so that they will come to care for it. For many teachers of young children, nature is an invaluable aid for educational purposes, an inspiration for language, art, music, and writing. They know that outside the door is a huge outdoor classroom, a place to learn about and to learn in. It needn't be a dense woodland, rich meadow, or clear mountain stream. Small garden plots, however well tended, provide a good base for study because they are home to a myriad of interesting small animals. Turn over a rock and you will find woodlice, slugs, and snails. Standing in silky webs are spiders; hiding under dead leaves are earwigs, centipedes and millipedes; lurking inside daffodils and roses are tiny beetles; and flitting gracefully from flower to flower are bumblebees and butterflies. Garden ponds, too, provide a welcome home for frogs and newts, mayflies and dragonflies.

Many of these small animals are easy to keep for short periods of time and have fascinating life histories. A friend of mine, a pro-

the ubiquitous wolf spider, too, is interesting. When its eggs hatch, the female wolf spider carries the young on its back until they are mature enough to fend for themselves. The much-maligned earwigs are good mothers also, keeping their eggs clean and looking after their young when they hatch.

Look closely at the garden. There are several ecological niches occupied by all manner of tiny animals. Beginning with a few woodlice, a spider, or a garden snail; a hand lens or two; and a little imagination and understanding, we can help young children develop many skills, observing and painting shapes, counting legs, measuring bodies, estimating populations, investigating how many woodlice are produced by a female in her lifetime.



Many small creatures are, despite all this, viewed with distaste by many adults who may pass on their prejudices to their children. Smouldering beneath the surface of many of us are attitudes that are hostile to nature. Some of the gardeners among us ruthlessly uproot wild plants so that their foreign relatives can grow unhindered. We may kill slugs and snails with poisons. Which one of us hasn't stepped on a snail, crushed a spider, or swatted a bee?

Perhaps finding, watching, and understanding how garden creatures live may bring about a change of attitudes in children and help them learn to live in harmony with nature and appreciate living things.

**John Paull** left his classroom teaching position in the summer of 1967 to work as science advisor to the 365 public elementary schools in the Leicestershire Education Authority. There, his role focused on promoting, encouraging, and supporting teachers' classroom science. He currently resides in rural New Mexico.



## 28TH ANNUAL AMERICAN HORTICULTURAL SOCIETY

NATIONAL  
CHILDREN  
& YOUTH  
GARDEN  
SYMPOSIUM



AMERICAN HORTICULTURAL SOCIETY

*CULTIVATING TOMORROW'S GARDENERS*  
by Energizing, Inspiring, and Training  
Today's Educators



For more information on our virtual symposium, visit <https://ahsgardening.org/NCYGS>

E-mail: [education@ahsgardening.org](mailto:education@ahsgardening.org)

Call: (703) 768-5700

Follow us on Twitter: @AHS\_NCYGS (#NCYGS2020)



**COMING IN JULY TO A COMPUTER NEAR YOU!**

**JOIN US FOR THE ONLY NATIONAL EVENT OF ITS KIND** for educators, non-profit professionals, garden designers, community members, and others dedicated to connecting kids to the natural world through gardening.

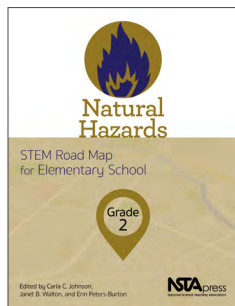
**EXPLORE** topics ranging from innovative sustainable gardening curriculum to program management, garden design, and growing techniques.

**SHARE** ideas, success stories, and inspiration with like-minded colleagues from across the nation.

# RESOURCES

**Reviewers in this issue:** Niki Card, Alison Elliott, Ian Shanahan, Devin Therien, Julie Travaglini, Veronica Uzielli, Sara Vargas Nessi, and Kim Zumach.

## Natural Hazards



Are you a primary teacher planning to teach a unit on natural hazards? Or perhaps an intermediate teacher looking for ways to support your English

Language Learners or students who are on an adapted program? This book, *Natural Hazards: STEM Road Map for Elementary School, Grade 2*, is the complete package. Readers familiar with the STEM Road Map series of resources from the National Science Teachers Association (NSTA) Press will recognize the format of this straightforward curriculum guide. The book begins with a short section on the learning framework, strategies, and assessment before diving into three detailed lesson plans. The lessons are interdisciplinary with hands-on activities (build a vortex to simulate a tornado!), research questions (research a current natural disaster), and literacy connections (recommended non-fiction and fiction stories to engage learners). Also included in this book is a 31-page copiable student STEM notebook for students to record their thinking, observations, and learning throughout the unit. Assessment rubrics and Content Standard Connections (American) round out this well-developed resource. Edited by Carla C. Johnson, Janet B. Walton, and Erin Peters-Burton. — (KZ)

NSTA Press, 2019 ISBN: 978-1-68140-486-8 (pb); 178pp; US\$25.16 for NSTA Members; \$31.45 for non-members. E-book \$18.87 for NSTA Members; \$23.58 for non-members from <https://common.nsta.org/>

## Engaging Students to Increase Public Transit Ridership

This guidebook, published by the Federation of Canadian Municipal-



ities, is an effective tool for educating students about the possibilities offered by free public transit. The primary objectives of the guide are educational. It outlines how

to create public policy and educational programs that combine to influence the next generation of transit users about the need for a sustainable future.

Educators could use it to demonstrate how public transit empowers students by instilling in them a sense of confidence, independence, and mobility while being environmentally beneficial at the same time. Though regionally specific, the guide is an effective tool for international instructors given its applicability for all cities with transit systems. The “Field Trip Pass” — which targets teachers — outlines how a free system reduces costs, facilitates more trips, and improves access to cultural and educational facilities. This is particularly important for schools grappling with bus costs.

Several factors enhance the resource and make it particularly ideal for students in mathematics, including: the statistical details, ridership charts, and models of future ridership. Other audiences are those studying civics, geography, and environmental science. Sections throughout would also be useful for specific individual or group assignments. A future abridged guide might facilitate broader use in the elementary system. — (DT)

Federation of Canadian Municipalities, 2019, 44 pp., Non Commercial, from [fcm.ca/en](http://fcm.ca/en)



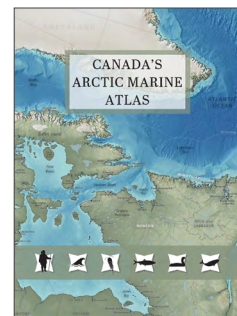
## Can You Hear the Trees Talking?

If you loved Peter Wohlleben’s book for adults, *The Hidden Life of Trees*, then you’ll delight in being able to share the

Young Reader’s Edition: *Can You Hear the Trees Talking?* This 78-page book guides young readers on a journey of discovery where they learn all about trees. How do they breathe? Do trees have grandparents? What makes trees sick? How do trees know when it is spring? These are just a few of the engaging questions that are answered through straightforward text, photographs, and diagrams. Little quiz bubbles allow you to check for understanding and clarify any misunderstandings on each topic. This book is geared towards readers aged 8–10, but it would be suitable on either the elementary or middle school library shelf. A downloadable companion guide is also available from Greystone Books. After exploring this book, a walk in the woods will never quite be the same again. — (KZ)

Greystone Books, 2019; ISBN: 978-1-77164-434-1; 84pp; US\$24.95 from [www.greystonebooks.com](http://www.greystonebooks.com)

## Canada’s Arctic Marine Atlas



Oceans North’s Canada’s Arctic Marine Atlas is necessary reading for geography and environmental science instructors. Its intention to provide an introduction to

the unique marine wildlife and culture is graphically realized through stunning images of Inuit society and environmental changes in the Arctic over the past four decades. Split into six informative chapters, the atlas clearly articulates the impact of humans on the environment; changes in the physical oceanography; and the impact of industry and climate change on all marine life and the ecosystem they rely on.

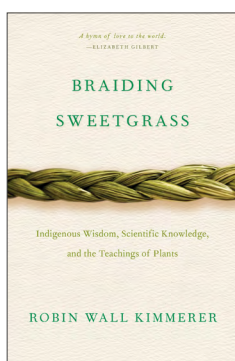
As an open source colorful ebook, this resource about Canada’s North dispels the conventional fascination with the Arctic Ocean and Northwest Passage developed by European geographers and explorers. Instead, a thoughtfully written and engaging atlas provides readers with a clear view of the social, industrial, and oceanographic worlds that are actively colliding to produce

unforeseen consequences. Instructors could easily use this resource for numerous senior elementary school through university classes throughout North and South America as well as the global Arctic and sub-Arctic regions. Independent sections could also be adapted to elementary school education, including such chapters as Humans and the Environment, Physical Oceanography, and a selection of the chapters on different marine species.

In brief, the atlas is a must read for educators of all types, including socially conscious parents. — (DT)

Oceans North Conservation Society, World Wildlife Fund, and Ducks Unlimited Canada, 2018, ISBN: 978-1-7752749-0-2 (pb), also available as an ebook, 112 pp., Non Commercial, from [oceansnorth.org](http://oceansnorth.org)

### Braiding Sweetgrass



One of the best non-fiction environmental books I've read in a long time, Braiding Sweetgrass weaves together the ideology of the Potawatomi Nation, botany, and ecological consciousness.

Robin Wall Kimmerer takes you on a journey that is not only scientific and chalk full of nature knowledge, but also historical, reminding us that nature was human beings' first teacher by sharing traditional Potawatomi uses and beliefs about plants and animals. Anyone who enjoys nature writing or learning new ways of visualizing and understanding the natural world around us will find value in reading Braiding Sweetgrass. — (JT)

Milkweed Editions, 2013, ISBN 978-1-57131-356-0 (pb), 390 pp., US\$18.00 from (612) 332-3192, [www.milkweed.org](http://www.milkweed.org)

### SOS: What You Can Do to Reduce Climate Change

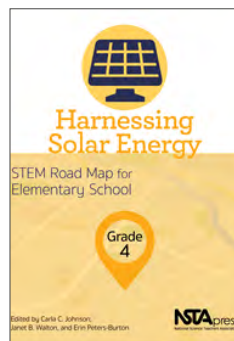
Middle and high school students would benefit from reading the succinctly-described tips in this pocket-sized guide SOS: What You Can Do to Reduce Climate Change. Using accessible language and to-the-point explanations, Seth Wynes cuts through the clutter and distills this complex topic into so-called high-impact action that can be readily applied by the average citizen.



Specifically, he focuses on Getting Around, What We Eat, and Collective Action, the respective titles for three of the four core chapters. A short section of the Introduction titled Measuring Your Impact is especially helpful as Wynes describes how greenhouse gas emissions can be measured in tonnes of carbon dioxide equivalents (tCO<sub>2</sub>e). An individual person's average annual tCO<sub>2</sub>e, then, rises or falls depending on their lifestyle choices. To further contextualize tCO<sub>2</sub>e, Wynes introduces what the global per capita annual average would need to be by 2050 for climate warming to stay below the level deemed acceptable. The rest of the book is about how to get there. Teachers may use this book as a reference for projects such as case studies of students' personal carbon footprints. All information is cited and linked to a 15-page Notes section. — (IS)

Ebury Press, 2019, ISBN 978-1-529105-89-6, 145 pp., \$16.99 CAD from [www.penguin-randomhouse.ca](http://www.penguin-randomhouse.ca)

### Harnessing Solar Energy

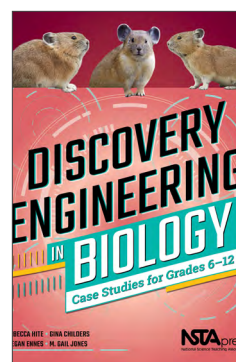


Harnessing Solar Energy is yet another tremendous resource guide in the STEM Road Map series from NSTA Press. This guide is aimed at fourth-graders, although like

most of the STEM Road Map guides, this book's activities are also easily-adaptable for younger or older learners. The driving activity of the guide, designing a solar-powered device to increase access to drinkable water, is relevant to current times and social and environmental justice issues. The guide includes everything needed to complete a thorough, meaningful science unit on energy. — (JT)

NSTA Press, 2018, ISBN 978-1-68140-402-8 (pb), 190 pp., US \$31.45 from NSTA Press, 800-277-5300, [www.nsta.org/store](http://www.nsta.org/store)

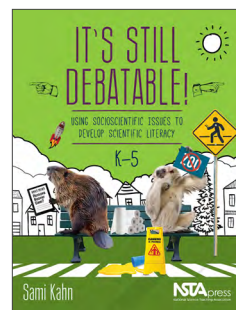
### Discovery Engineering in Biology



From algae to anaphylaxis, Discovery Engineering in Biology is full of problem-based and authentic learning experiences. Utilizing data and stories from breakthrough scientific discoveries such as algal biofuels, bioprospecting, DNA fingerprinting, and many more, this resource guide breaks sometimes-difficult biological topics into understandable and relevant learning units. Even I as an adult science educator learned new things reading this book, and I'm positive your students will learn a copious amount as well! — (JT)

NSTA Press, 2020, ISBN 978-1-68140-614-5 (pb), 437 pp., US \$41.95 from NSTA Press, 800-277-5300, [www.nsta.org/store](http://www.nsta.org/store)

### It's Still Debatable!



Are you an elementary teacher who is looking for multidisciplinary topics to engage your learners and boost their scientific literacy? If so, then this hefty, 527-page manual, It's

Still Debatable! Using Socioscientific Issues to Develop Scientific Literacy, K-5, is the book for you. Author Sami Kahn has more than 30 years of science education experience and it shows in this thoughtfully-developed framework. The beginning of the book provides the rationale for having a socioscientific approach in the science classroom and will convince you that even primary students can explore topics such as Do We Need Zoos? Are Bees Disappearing? And Who Owns Dinosaur Bones? After a thorough look at the framework and theory, the book moves on to include 14 complete lesson plans. Each lesson is exceptionally detailed from having driving questions, providing curriculum connections (American-based), a suggested schedule and sequence, materials list, comprehensive background information, and full blackline masters.

This book emphasizes that our role as science educators is to empower our students, even very young ones, to be scientific thinkers. It provides a clear and accessible path to help educators take on this daunting task. — (KZ)

NSTA Press, 2019; ISBN: 978-1-68140-629-9 (pb); 525pp; US\$36.08 (members) US\$45.10 (non-members); E-book US\$27.06 (members) US\$33.83 (non-members) from <https://www.nsta.org/publications/press/>

## Thirst for Power



It's common knowledge that turning off the tap while brushing your teeth saves water. Likewise, turning off the lights when you leave the room saves electricity. But, have you ever thought that

turning off the tap also saves electricity, and turning off the lights also saves water? The connection between power and water is the focus of the 61-minute documentary *Thirst for Power*. Based on the book written by Michael E. Webber, this Mat Hames-directed film traces the importance of water to civilization. The story begins with the aqueducts in Ancient Rome and continues through to modern-day drinking water and waste treatment facilities. This film is informative and presented in an optimistic way. It urges the view-

er to recognize that water is heavily involved, either directly or indirectly, in all our energy sources, and therefore, our need to conserve and preserve it is paramount to having a thriving civilization. This award-winning film is well worth a watch and is recommended for students in the intermediate grades and above. Additional curriculum resources can be found at [www.smartenergyeducation.com](http://www.smartenergyeducation.com). — (KZ)

Video Project, 2019; 61 min; \$89 for K-12 Schools, Public Libraries and Community Centres. \$250 for Colleges, Businesses and Other Institutions from <https://www.video-project.com/>

## Amazing Cloudscapes



Integrating the arts into science learning can be made easier by utilizing Joyce Boye's book *Amazing Cloudscapes: People and Faces*. This book includes

approximately 100 images of clouds and the sky that young children could spend hours gazing upon to find hidden faces and creatures. Young learners could also attempt to recreate the clouds in the photos with different art mediums such as paint, cotton balls, and tissue paper. For older children, in addition to recreating the clouds through art, the book could be utilized to teach the types and names of different cloud formations and weather pat-

terns. Overall, this is a great resource for any educator wanting to add some variety to their science and art routines. — (JT)

Joyce I. Boye, 2012, ISBN 978-0-98779-264-8 (hb), 120pp., US \$48.50 from [www.lulu.com](http://www.lulu.com)

## A Walking Curriculum



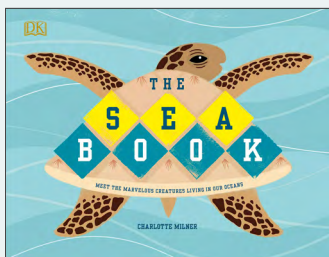
This electronic resource from Gillian Judson is an excellent introduction to the mental, physical, and educational value of walks for school-aged children. Judson provides readers with more than 25 themed walks

such as weather, colors, and motion for younger children, and arthropods, aliens (invasive species), and corridors for older learners. All activities include pre- and post-introductions and questioning as well as extensions to other subjects such as literacy. Not only does Judson provide some fresh new ideas to add to a nature walk, but she also provides the research and studies to prove the activity's importance. — (JT)

Gillian Judson, 2018; ISBN 978-1-973540649 (pb), 68pp., CA \$19.31 also available as an ebook from [amazon.ca](http://amazon.ca) \*Also Available in French & Spanish

# CHILDREN'S BOOKS

## The Sea Book



Charlotte Milner invites you on an amazing exploration of the sea, both beneath the waters, along the shorelines, and on the sea ice. The *Sea Book* is full of interesting tidbits of information about the immense biodiversity and the connectedness of

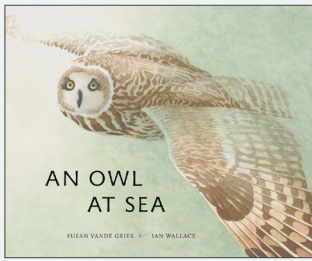
all living things, both within the sea and on land. Milner's illustrations are simple but captivating and full of color. The last third of the book allows readers to explore the impacts humans have had on the sea from overfishing,

the inundation of plastics, and the changing climate, but it ends on a positive note detailing choices we can make as individuals to advocate for the oceans. Although this book is geared for K-3, it is rich with information that older children would also enjoy. — (TU)

DK, 2019, ISBN 978-1-4654-7882-5 (hb), 48pp., CA \$20.99, from [www.dk.com](http://www.dk.com)

## An Owl at Sea

Based on a real-life story, Susan Vande narrates in prose the incredible story of a Short-eared Owl who lost its way and flew miles and miles into the ocean and discovered that the nearest land was an oil rig a long way from home. The author was inspired by a news article and leaped ahead into creating a touching piece that portrays heroes that took action in protecting the disoriented owl and

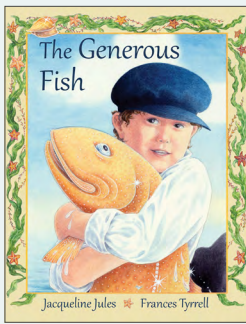


escorting it to safety. Be immersed in the graceful watercolors of Ian Wallace that perfectly complement the rhymical poetry of Vande, leading you on an exciting adventure with an optimistic ending. This sophisticated storybook is perfect for young readers

ages eight to 12. To be used as example for readers to inspire themselves to create their own nature-inspired poems. The book is supplemented with extra information about the Short-eared Owl species. — (SVN)

Groundwood Books, 2019; ISBN: 978-1773061115; 32 pp. (hb); \$19.95 from [www.groundwoodbooks.com](http://www.groundwoodbooks.com)

### The Generous Fish



Based loosely on two Jewish tales, *The Generous Fish* is a picture book to be shared with young children, and intended to inspire conversations about taking care of our earth's resources. Young Reuven befriends a special fish, who shares his wealth with Reuven's village, but when the fish begins to suffer, Reuven and the village must decide what is most important. *The Generous Fish* will inspire young readers to

care for each other as well as the environment. Written by Jacqueline Jules; illustrated by Frances Tyrrell. — (NC)

Wisdom Tales, 2020, ISBN 978-1-937786-79-3, 40 pp., US\$16.95 from [www.wisdomtalespress.com](http://www.wisdomtalespress.com)

### Silent Swoop: An Owl, an Egg, and a Warm Shirt Pocket



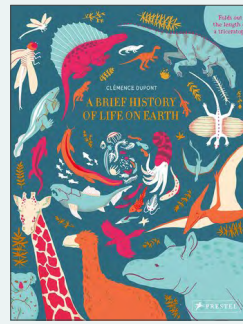
What an inspiring tale! Michelle Houts and Deb Hoeffner have shared the true story of a conservation hero, Walter Crawford, using a perfectly-fitting combination of gentle words and soft illustrations. Walter's legacy of rescuing birds and educating people about their fascinating life histories will continue to benefit the avian and human worlds through this story for years to come. Readers of all

ages will enjoy this tale and feel a greater connection to the natural world as a result. The "Explore More" sections at the end of the book provide helpful extensions for students, teachers, and parents. — (AE)

Dawn Publications, 2019; ISBN 978-1-58479-647-6; 32 pp; US\$16.95 from [www.dawnpub.com](http://www.dawnpub.com)

### A Brief History of Life on Earth

Opening up to the size of a triceratops (8 meters), this concertina style creates an interesting perspective for young readers. Clémence Dupont, through her words and simple

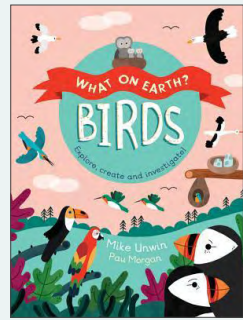


illustrations, demonstrates the ever-changing planet that Earth has been in the last 4.6 billion years and how short the appearance of *Homo sapiens* has been, a mere 300,000 years. On the back pages it becomes clear how long it has taken for the planet to stabilize to support life and how short a period of time life as we know it has existed. In fact, on most of the pages very little is happening.

The concept of time is a difficult one to grasp, but this book will help students understand. It would be appropriate for those in Grades 1–4 and will provide great opportunities for discussions. — (VU)

Prestel, 2019; ISBN 978-3-7913-7373-7 (hb); 76 pp.; CA \$33.95, from [www.prestel.com](http://www.prestel.com)

### What on Earth? Birds



Everything children want to know about birds is packaged neatly in *What on Earth? Birds: Explore, Create, and Investigate!* by Mike Unwin. The extensive information — including explanations of the parts of a bird, food, bird life, bird behavior, and bird watching — shared on the "explore pages" is paired with bird crafts and activities on the "create pages." The "investigate pages" contain activities to facilitate hands-on

learning. This book is well-organized with a table of contents, index, and glossary, and is heavily supported by simple and colorful illustrations by Paulina Morgan. It will engage and support children who are interested in birds. — (NC)

Quarto Publishing, 2019, ISBN 978-1-78603-637-7, 64 pp., \$19.95 CAD from [www.QuartoKnows.com](http://www.QuartoKnows.com)

### Animals at Night



Discover the animals that come out at night! This informative book will show you the nocturnal animals living in diverse landscapes, from the busy streets of the city to the vast savanna. Perfect for adventurous kids aged 5 to 11 curious to explore and learn facts about the animals that wait until the lights are out to start their regular routine. The adventure does not stop when you finish to

read the book! This edition comes with your own glow-in-the-dark poster that you can display on your wall. Just turn off the lights and discover all the creatures that glow in the dark. Katy Flint writes curiosities about each unique landscapes and short facts about specific animals that are depicted on the pages by the talented Cornelia Li. This dark yet colorful book awakens the curiosity and is a great resource for evoking conversations in the classroom about



different animals to get kids interested in learning new details about their favorite creatures. — (SVN)

Wide Eyed Editions, 2019; ISBN: 978-1786035400; 24 pp. (hb); CND \$25.99 from [www.QuartoKnows.com](http://www.QuartoKnows.com)

## What a Waste

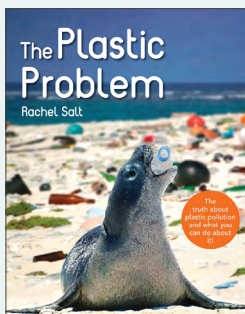


Author Jess French takes care to explain a wide variety of environmental concerns, including pollution, deforestation, single-use plastics, and food waste. The explanations are concise and accessible for young readers. French also includes a positive and empowering message of taking action against negative environmental impacts, while offering information on strategies including

conservation, cleaning oceans, recycling information, and how to get involved. The book is visually engaging and well-laid out; it has a table of contents, glossary, and index, making it a strong resource for students in Grades 4–6 learning about environmental issues. — (NC)

DK, 2019; ISBN 978-1-4654-8141-2; 72 pp.; \$16.99 from [www.dk.com](http://www.dk.com)

## The Plastic Problem



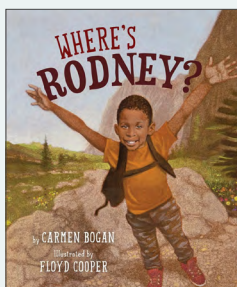
The depth and breadth of the plastics pollution crisis presented by Rachel Salt in *The Plastic Problem* screams for readers to pitch plastic out of their lives! For those aged 10 and up, this book is easy to read with its bold graphics, fact boxes, and vivid descriptions of associated human and environmental health problems. Readers are encouraged to think critically about alternatives, the circular economy, and

human consumption when seeking solutions to this global problem. It should be mandatory reading for all citizens of Planet Earth! — (AE)

Firefly Books, 2019; ISBN 978-0-2281-0231-1; 80 pp; CDN \$12.95 from [fireflybooks.com](http://fireflybooks.com)

## Where's Rodney?

Author Carmen Bogan skillfully pens the story of an urban child's delight and marvel at being taken to a vast state park in this picture book. Rodney's outdoor experiences have been limited to his neighborhood until the day his class takes a field trip to "the park" when Rodney becomes thrilled and awed by the nature around him. *Where's Rodney?* emphasizes the importance of access to nature.

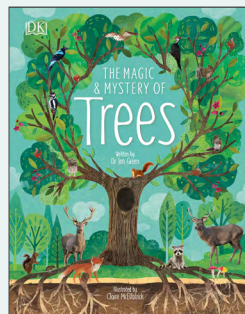


The combination of the warm, gentle paintings by Floyd Cooper

and Bogan's prose make *Where's Rodney?* a great story to share with children aged five–10. This would serve as great provocation for outdoor exploration and nature-writing activities. — (NC)

Dream On Publishing, 2017, ISBN 978-1930238-73-2, 32 pp., \$16.99 USD from [www.dreamonpublishing.com](http://www.dreamonpublishing.com)

## The Magic and Mystery of Trees

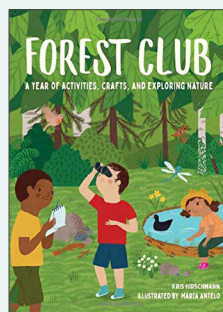


This book is a beautiful invitation to discover the secret lives of trees that are all around us, whether in deep forests, cities, or towns. We often take trees for granted, but there is so much to learn and understand about them. In fact, we are still learning how trees communicate with each other and use their senses and defenses. In *The Magic and Mystery of Trees*, author Jen Green explains in

simple language how the various parts of a tree function, how trees help each other, and how they create habitat for many of life's creatures in so many diverse climates in the world. She ends with looking at the relationship between humans and trees and how we can help them. Claire McElfotrick has cleverly illustrated the book with engaging and playful drawings mixed with collage and digital images. Students in Grades 2–4 will find this to be a wonderful resource; an index allows readers to quickly find specific information. — (VU)

DK, 2019, ISBN 978-1-4654-7936-5 (hb), 80 pp., CA \$21.99, from [www.dk.com](http://www.dk.com)

## Forest Club



Based on the guiding principle that children need time in nature to explore, observe, wonder, and connect, *Forest Club: A Year of Activities, Crafts, and Exploring Nature* is a tremendous guide to enjoying nature. In addition to interesting facts on topics such as decomposition, migration, seasonal adaptations, animal tracks, and animal homes, author Kris Hirschmann has included many corresponding hands-on activities, such as leaf and bark rubbing, berry painting, leaf wreath-making, and flower pressing. The information and activities are supplemented by fun and engaging illustrations.

*Forest Club* is meant to be shared with and enjoyed by children to deepen their forest explorations. It also contains Notes for Parents and Teachers that provide some additional ideas for fostering children's love and wonder for nature. — (NC)

Quarto Publishing, 2019, ISBN 978-1-78603-881-4, 96 pp., \$20.95 CAD from <https://www.quartoknows.com/>

# Green Teacher

## How to access the webinar archive

Green Teacher subscribers can freely enjoy all 100+ of our past webinars, which have been catalogued into 17 popular categories, making it easy to find what you want.

To access the webinar archive, please [click here](#) and enter your subscriber password.

For a list of upcoming webinars, to register and for more information, please [click here](#).



Green Teacher



PRE-ORDER  
ONLINE NOW

AGES  
8-12

RELEASING  
ON MAY 26

Random House Children's Books  
Fiction | ISBN: 978-1-9848-9632-2

A group of kids take action to save the lake in their small town after it's closed due to a harmful algae bloom. An important story about climate change and youth activism to supplement your science curriculum.

### STUDENT APPROVED

"I absolutely loved this book since I love nature because of its beauty, and we need to care for it better. I bonded with the characters and experienced real emotion while reading." —Jacob G., Age 12

DISCUSSION GUIDE AT [MICHELEWEBERHURWITZ.COM](http://MICHELEWEBERHURWITZ.COM)



## EcoSanta's Earth Christmas Album

(All Year EcoCarols)

### Help turn SANTA into an ECOLOGICAL CHAMPION!

Help EcoSanta by...

Picking litter, posting a photo of yourself with a piece of litter on #EcoSanta. Enter the Design An EcoSanta Outfit Competition. Deadline 30th May. Or enter the EcoSanta-themed Short Story Competition. Closing date - 30th September. Visit EcoSanta's Kind Kids Website to see a story of 'How Santa became EcoSanta'. Use the EcoSanta concept for yourself in new creative ways. Share your idea with Gaia Dance. Email: [gaia dance@btinternet.com](mailto:gaia dance@btinternet.com) Celebrate the Earth by learning and singing the eco-lyrics to famous carol-tunes through EcoSanta's Earth's Christmas Album.

Website: <http://www.ecologisers.com>



# Thanks to our Friends and Supporters!

Deborah Blanton  
Ann Borgwardt  
Stephen Campbell  
Christian Cote  
Don Dippo  
Barbara Enoch  
Dolores Luis Gmitter

James Karlan  
Heather King  
Kirsten Kinzler  
Amy Lang  
Lisa Lopez  
Karen McKendry  
Augusto Medina

Megan Mills  
Cindy Murdough  
Leigh O'brien  
Jeannine Palms  
Doug Pankratz  
Colleen Ronan  
Austin Roughton

Zoe Ann Stinchcomb  
Michelle Sturgis  
Joe Teft  
Rachel Wellman



*Our Supporters and Friends provide us with extra funds to help sustain Green Teacher. Join the list and find out more at [www.greenteacher.com](http://www.greenteacher.com).*

## Subscribe to Green Teacher!

**48 pages of ideas and activities, 4 times a year!**

- 90+ webinars catalogued by topic.
- Over 400+ articles and activities catalogued by topic and grade level.
- Innovative, well-tested teaching strategies for youth of all ages.
- Reviews of dozens of new books, kits, games and other teaching resources.

[www.greenteacher.com](http://www.greenteacher.com)

info@greenteacher.com

Phone: 1-888-804-1486 | 416-925-3474  
95 Robert St., Toronto, ON, M5S 2K5  
PO Box 452, Niagara Falls, NY, 14304



Green Teacher

### Single-user subscription options:

- 1-year digital subscription for one user: \$32
- 2-year digital subscription for one user: \$55
- Sample copy: \$8

### Bulk subscriptions options:

Now everyone in your school district, school, college or organization can access Green Teacher for one affordable price! Over 350 organizations and 4500 schools now receive Green Teacher digitally through bulk subscriptions.

- 1-year bulk digital subscription for a school or organization: \$49
- 1-year bulk digital subscription for school districts: **as low as \$3.50/school**

\*Contact us or visit our website for exact pricing

Prices applicable in Canada & the USA.

Canadian prices are subject to applicable taxes in your province or territory. See [www.greenteacher.com](http://www.greenteacher.com) for International pricing.

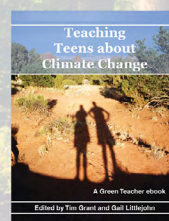
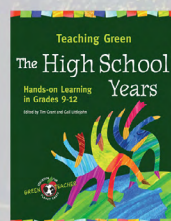
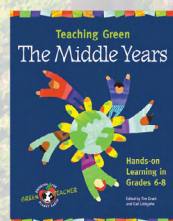
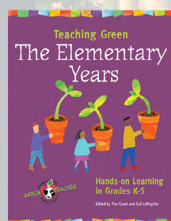
# Become a Friend of Green Teacher!



Help support our magazine so we can continue to provide environmental ideas, lessons, and inspiration to thousands of educators.

For only \$100, all friends of Green Teacher receive:

- A 2-year digital subscription
- 4 print back issues
- Your choice of any of our books
- A thank you by name in our magazine



You may also become a Supporter of Green Teacher by adding \$10 to your 1-year subscription or \$20 to your 2-year subscription. We will thank you by name in our magazine.

Order online at [www.greenteacher.com](http://www.greenteacher.com)  
or call 1-888-804-1486