

# Environmental Education

**WASTE** Talking trash  
*Taking action*



Green literacy: Environmental stories



Plastic pirates in Devon



School recycling projects

**The Journal of the National Association for  
Environmental Education (UK)**



# National Association for Environmental Education (UK)

*NAEE supports a wide range of professional educators to help them improve the quality of their teaching and their **students'** learning, in relation to environmental and sustainability issues.*

## ALL MEMBERS RECEIVE THESE BENEFITS:

- *Environmental Education* journal 3 times a year
- Resources and information for teachers and educators
- Network with outdoor and environmental education specialists
- Share your ideas via NAEE online, twitter, facebook, LinkedIn, pinterest
- NAEE works with key related groups in the UK and worldwide

For details and rates, visit [naee.org.uk](http://naee.org.uk) or contact [info@naee.org.uk](mailto:info@naee.org.uk)

University students FREE | Join NAEE today!

## NAEE online:

[naee.org.uk](http://naee.org.uk), [twitter.com/naee\\_uk](https://twitter.com/naee_uk), [facebook.com/UKNAEE](https://facebook.com/UKNAEE) for information, news, blogs, curriculum documents, details of school bursaries, feature articles and more.

NAEE is a Charitable Incorporated Organisation [Charity No. 1166502] that is run by its members and volunteers who care passionately about environmental education and education for sustainable development. Our charitable object is to provide a public benefit by advancing environmental education within early years settings, primary and secondary schools, and institutions responsible for teacher education within the UK and elsewhere. Teachers are encouraged into the Executive; for more details contact [info@naee.org.uk](mailto:info@naee.org.uk).

**GROUP COLLABORATIONS:** NAEE greatly values being able to collaborate with organisations that have the same or very similar missions/goals. Some of these groups include:

*United Kingdom:* Archeology Scotland; Association for Science Education; Birmingham Botanical Gardens; British Council for Archaeology; Black Environment Network; Council for Learning Outside the Classroom; Geographical Association; London Environmental Educators' Forum; Martineau Gardens; Mount Pleasant School Farm; National Savers; Rotary International (Britain & Ireland); TIDE~global learning; Women's Environmental Network; Youth Hostel Association.

**WRITE FOR THIS JOURNAL:** If you are a teacher with experience in environmental or outdoor education, especially in pre-school or secondary school, and would be interested in writing an article for our termly *Environmental Education* journal, contact [info@naee.org.uk](mailto:info@naee.org.uk).

**BURSARIES:** Thanks to the generosity of the late Hugh Kenrick, NAEE offers bursaries of up to £400 for schools in the West Midlands to take their pupils to visit an environmental education centre. Visit [naee.org.uk/apply-for-a-school-bursary](http://naee.org.uk/apply-for-a-school-bursary) or email [kenrick@naee.org.uk](mailto:kenrick@naee.org.uk) for more information.

## National Association for Environmental Education (NAEE UK)



**President** Professor Justin Dillon

**Vice Presidents** Anne Kenrick MBE, Professor Joy Palmer, Professor Mick Waters

**Life Members** Professor David Bellamy, Norman Farmer

**Trustees** Gabrielle Back, Prof. Justin Dillon, Nina Hatch, Dr Elsa Lee, Dr Morgan Phillips, Prof. William Scott, Tim Baker

**Officers** David Fellows, Sue Fenoughty, Juliette Green, Henricus Peters, Sue Shanks, Alona Sheridan

**Fellows** Ben Ballin, Judy Braus, Margaret Fleming, Dr Melissa Glackin, Sheila Gundry, Dr Phillip Murphy

[naee.org.uk/about-naee/naee-fellows](http://naee.org.uk/about-naee/naee-fellows)

**Environmental Education | Volume 121, Summer 2019**

**Editors** Henricus Peters, Juliette Green

**Proofreader** Alona Sheridan

**Publications Coordinator** Dr Elsa Lee

ISSN 03098451 © NAEE 2019

**NAEE Office** Department of Education, University of Bath, Bath, BA2 7AY. **Office Administrator** Carolina Salter

**Email** [info@naee.org.uk](mailto:info@naee.org.uk) **Web** [naee.org.uk](http://naee.org.uk)

# Contents

UN Global Goals  
– this issue focuses on:



## NAEE

4	<b>Editorial</b>	<i>H. Peters, J. Green &amp; E. Lee</i>
4	<b>Comment</b> President's Column	<i>Justin Dillon</i>
5	<b>Profile</b> NAEE's Treasurer	<i>Sue Shanks</i>
5	<b>GEEP update</b> A pledge for the future	<i>Melissa Hopkins Taggart</i>
6	<b>Hugh Kenrick Days</b> Links to literacy	<i>Joan Evans &amp; Jessica Yates</i>
8	<b>Green literacy</b> Green stories	<i>Denise Baden</i>
9	<b>Young writer</b> Discarded lives	<i>Findlay Wilde</i>

## Focus on waste

11	<b>Curriculum links</b> Classroom activity ideas	<i>Henricus Peters</i>
13	<b>Thinkpiece</b> Wasting not; wanting not	<i>William Scott</i>
13	<b>Circular economy</b> Predicaments, not solutions	<i>Ken Webster</i>
15	<b>Recycling</b> #500recycledelephants project	<i>Sarah Eames</i>
16	<b>Food Waste</b> Small Change, Big Difference programme	<i>Danielle Johnson</i>
17	<b>Waste education</b> Plastic pirates in Devon	<i>Lucy Mottram</i>
19	<b>Water pollution</b> Motagua River in Guatemala	<i>Ana Giró Petersen</i>
20	<b>Water pollution</b> Macroalgae proliferation	<i>Marisol Rueda Flores &amp; Ian Drysdale</i>
21	<b>Plastic waste</b> Marine plastic in Mexico	<i>Marisol Rueda Flores</i>

## United Kingdom

23	<b>Sustainable Transport</b> Walking and cycling to school	<i>Rachel White</i>
24	<b>Sustainable Transport</b> Walking buses	<i>Rachel White &amp; Feargal Magee</i>
24	<b>Heritage</b> Butser Ancient Farm	<i>Rachel Bingham</i>
25	<b>Heritage</b> Interpretation	<i>Philip Ryland &amp; Jim Mitchell</i>
28	<b>Engagement with wildlife</b> 30 Days Wild	<i>Thomas Hibbert</i>
29	<b>Thoughts from the North</b> Outdoor adventures	<i>David Fellows</i>

## Reviews

30	<b>Book reviews</b> <i>Silent Spring</i> & animal books	<i>William Scott &amp; Henricus Peters</i>
32	<b>Webwatch</b> ASE resource & focus on waste	<i>Jane Hanrott &amp; Henricus Peters</i>
34	<b>Final Thought</b>	<i>Elsa Lee</i>

**Cover photos** Main picture: Pelican surrounded by plastic pollution on a beach in Mexico, image Karen Fuentes. Smaller pictures: image from Green Stories website [greenstories.org.uk](http://greenstories.org.uk); Sally Jackson delivering a Plastic Pirate workshop schoolchildren in Totnes, image Lucy Mottram; recycled elephants made from milk bottles, image Sarah Eames. Wheelie bin icon for waste pages from [clipart-library.com/free-recycling-pictures.html](http://clipart-library.com/free-recycling-pictures.html). All photos within articles by the author, unless otherwise stated.

*Environmental Education* is the termly journal of the NAEE. Views expressed in the articles of this journal are those of the authors and do not necessarily represent those of NAEE.


## EDITORIALS

Whether it is litter floating on the breeze, plastics in our seas and water-courses, or fly-tipping at the roadside, waste is no longer a problem we can ignore. We felt that it was high time that NAEF produced a journal focusing on waste – looking at the problems caused by it, but also highlighting action that can be taken to help reduce it.

One major aspect that we needed to consider when producing this edition was our use of images. We wanted to include pictures that highlighted the problems of waste, but also felt that it was important for us – as a charity promoting environmental education – to show the positive actions that are being taken to help combat the issue of waste. The Green Literacy article on page 8 gives research evidence which shows that positively-framed stories can lead readers to feel more optimistic, and more likely to take action, than stories that emphasise the ‘doom and gloom’ aspects of environmental issues.


Our first article in the Waste section is an overview of the links to the curriculum and provides suggestions of activities that can be carried out both inside and outside the classroom. This is followed by two articles that look at the complex issues surrounding recycling as a waste minimisation strategies and its links with the circular economy.

The next article shows how one person’s ‘trash’ can be another person’s ‘treasure’, by outlining a project that engages a whole school, plus the wider community, in an art project using plastic milk bottles to create 500 recycled elephants! Then come two more articles about waste education work that is being carried out in schools by external organisations: looking at food waste in London schools and plastics in Devon schools.

The final three waste articles are from Latin America, looking at issues surrounding waste and exploring solutions. These would be useful for UK teachers when comparing different places around the world and highlighting that waste is both a local and a global issue. 

**Henricus Peters & Juliette Green**

**Joint Editors *Environmental Education e-journal***

David Attenborough’s Blue Planet 2 aired in the UK in 2016 and captured the imagination of the public; its impact has been huge with estimates that 60% of people surveyed have changed their habits as a result of watching this programme. The problem of plastic waste is now a mainstream issue. David Attenborough has long held a special place in the hearts of anyone with even a passing interest in wildlife. His carefully considered approach to revealing nature’s wonder (both in soft and harsh forms) over 60 years of programme making has been instructive in ways that cannot be calculated. In all this time he has been very careful not to spoil the narrative by overegging the negative impact of humankind’s way of life on wildlife. Some have criticised this approach but it has meant his audience has been able to keep listening and watching with open hearts and minds. What is more, his audience has continued to grow and grow as parents have introduced their children to his stories. So when he finally began to use his hugely powerful voice to speak of the problems, we were all already enthralled and change was inevitable. Of course, David Attenborough and young ‘climate change warrior’ Greta Thunberg themselves have been amplified because they speak with the authority given to them by the hard work of social and natural scientists who have been investigating these questions exhaustively for decades. We know that children and young people are ready to learn more about these problems and learn about this evidence – the global youth climate strikes make this very clear – and so we are taking this opportunity to provide some further information about this issue from around the world and to give you some ideas about how you might address this problem in the classroom. 

**Dr Elsa Lee**

**Publications Coordinator**

***“We are living on this planet as if we had another to go to” – Terri Swearingen***

## COMMENT PRESIDENT’S COLUMN




Faced with the enormity of climate change, it is easy to wonder how individual actions can make any real difference. Most of us assume that we’re not alone and that we’re part of a greater community effort. However, it’s often hard to quantify

the difference that we’re making. One exception is waste. It’s hard to walk to work in Exeter where I live without seeing dozens of bins full of waste destined to be recycled every week.

Devon is particularly good at waste education and management. Lucy Mottram, the county’s Waste Education Officer, tells me that as well as recycling huge amounts of waste, all of Devon’s black bin bag rubbish now goes

to Energy Recovery facilities (mainly to Plymouth and Exeter, but some also to Avonmouth).

In order to maintain public support, Devon County Council’s Waste Education Programme works with schools, organising community days where parents and carers participate in workshops and litter picking. After-school events have been popular, particularly stalls that show how to move to plastic-free lifestyles such as waste free lunches and easy swaps such as straws and coffee cups. They’re also launching a new Scout badge which will be available to Beavers, Cubs and Scouts in Devon and next autumn they’re running a poetry competition about waste for local schoolchildren.

Devon is a leader in waste management and education and has been for some time. It just takes some leadership, some persistence, public support and high quality environmental education. 

**Professor Justin Dillon**

## PROFILE NAEF TREASURER SUE SHANKS

### Why did you join NAEF?

Although I've been aware of NAEF for a long time, it's only fairly recently that I've become actively involved in the organisation. I believe that the ongoing concerns about the environment should (must!) lead to greater information and education and everyone can play an active role in sharing and disseminating this.



### Tell us about your background.

Growing up on two small family farms in North Yorkshire, one of which included the tourist hotspot Gordale Scar, near Malham, I was completely immersed in a hands-on rural lifestyle in my childhood. My own interests in nature and wildlife led me to a degree in Ecology, followed by a 3-year research stint before settling in the Midlands. After undertaking some habitat survey work and then gaining a teaching qualification I branched out into the field of environmental education. Working largely with schools and local outdoor education centres I have developed outdoor facilities and resources, supported and delivered environmentally themed activities, managed practical workshops, trained staff and colleagues, delivered Forest School programmes and led natural history events. For many years I worked in this role for the Birmingham and Black Country Wildlife Trust before latterly becoming a freelance provider.

### Why were you selected to be a NAEF Officer?

I attended a local NAEF AGM meeting and offered my support to NAEF in whatever way would be useful. Having accrued a long time ago some basic book-keeping skills I have taken on the role of treasurer, a role I'm very happy to fulfil.

### Who are your role models in the field of education?

I'm always cheered by tuning in to Ken Robinson's much watched 2006 TED talk – Do Schools Kill Creativity? I think that innovative ideas and alternative views of

problems, crossover between different fields and critical thinking will be vital to solve future needs and dilemmas and nowhere more so than in the field of environmental education. I've also found the recent books by Richard Louv and Robert MacFarlane at once depressing, informative and inspiring.


### Who are your role models in the environmental field?

There are many but I feel very fortunate to have been inspired from a very early age by my grandfather who shared his profound knowledge, interest and passion for ecology, geology and natural history with me throughout my childhood. I think we should never underestimate the impact and role that inspiring mentors and teachers can play when igniting the interests and enthusiasms of young people.

### What does NAEF do well?

Our magazines are a great resource for all those wishing to be informed about environmental issues. Gathering together articles from across the world means there is a global as well as a local aspect to their content.

### Last thought?

It is hard for people to care for and protect what they don't know – if we want our children to be guardians of the environment in the future it is our duty to ensure that we make their childhood as nature-rich as possible. 

**Sue Shanks** is a freelance school grounds professional and Forest School leader.

She has spent the last 20 years delivering environmental education to all ages in a variety of locations, largely around Wolverhampton and the West Midlands. She also works as an environmental field leader.

She is a member of the Council for Learning Outside the Classroom Association, an accredited trainer for Learning Through Landscapes, is associated with a variety of environmental networks and is currently a Trustee of the Kingswood Trust.

## GEEP UPDATE

### Global Environmental Education Partnership: A pledge for the future

**Melissa Hopkins Taggart**

As a champion for environmental education, the Global Environmental Education Partnership (GEEP) is working to share effective environmental education (EE) practice and build the leadership required to address 21<sup>st</sup> century environmental issues.

The GEEP was launched by the United States Environmental Protection Agency, the Taiwan Environmental Protection Administration, and the North American Association for Environmental Education in 2014. The mission of the GEEP is to create a vibrant and inclusive learning network designed to build capacity in countries around the world to strengthen environmental education, leading to a more sustainable future.

During the past two years, the GEEP has worked to build a network around shared priorities for the future of environmental education, specifically through a global

Call to Action. To shape this Call to Action, GEEP relied on expertise from environmental education leaders from around the world, including past NAEF UK President Bill Scott, who is also a member of the GEEP Advisory Group<sup>1</sup>. Below is a summary of the process the GEEP used and some key outcomes.

### Background

In October 2017, and in commemoration of the 40th anniversary of the Tbilisi Declaration, the Global Environmental Education Partnership (GEEP) launched a Call to Action to gather feedback on priorities for the field of environmental education (EE) over the next decade and beyond. To spark discussion, the GEEP identified ten potential actions<sup>2</sup> that environmental educators, collectively, could take to advance our shared goals.

These actions were developed by a working group of environmental education leaders from around the world, and mindful of the incredible body of work that has come before, starting with the Tbilisi Declaration of 1977, the Millennium Development Goals, the Decade for Education for Sustainability, the international adoption of a set of ambitious Sustainable Development Goals (SDGs), and others.



Between October 2017 and April 2018, this draft Call to Action was circulated for feedback online. The global EE community was asked to prioritize these actions, reflect on how these high priority actions could be carried out in practice, and suggest any additional ideas for the future. At the close of the survey, nearly 400 participants from 46 countries responded to the online questionnaire.

### What are our next steps as a global community?


Participants demonstrated support for all 10 suggested actions, and offered a rich diversity of perspectives on what steps we, as a collective community, might take to achieve them.

The GEEP also heard from a number of colleagues about an interest in marking this milestone with a pledge to build on the great work that's been done and to think ahead to the future. To that end, the GEEP created the Tbilisi +41 Pledge<sup>3</sup>, which includes a commitment to work towards achieving three high-level goals:

1. Every nation has an environmentally informed, empowered, and active populace and workforce.
2. The leadership of every government, business, NGO, and educational institution uses environmental education to achieve environmentally sustainable outcomes.
3. Every educational institution – formal and nonformal – incorporates environmental literacy into its mission, goals and activities.

For more inspiration, watch environmental education professionals from around the world read the pledge<sup>4</sup>.

The 10 actions are steps that the GEEP believes can help us move towards achieving these larger goals. As you read through the actions and participant comments, consider how you and/or your organization can take part. We know that many of the actions complement and reinforce each other, and some will be more relevant than others. In the future, the GEEP will build on the pledge and these actions by offering resources to share what others are doing and how to improve our practice to strengthen our collective impact.

To date, hundreds of environmental education professionals, and just over 70 organizations from 53 countries, have signed this pledge. Will you join us? 

### References

1. [thegeep.org/en/advisory-group](http://thegeep.org/en/advisory-group)
2. [actnowforee.org/actions](http://actnowforee.org/actions)
3. [actnowforee.org/pledge](http://actnowforee.org/pledge)
4. [youtube.com/watch?v=SdKE2L8yIAw&t=85s](https://youtube.com/watch?v=SdKE2L8yIAw&t=85s)

**Melissa Hopkins Taggart** is responsible for managing NAAEE's (North American Association for Environmental Education) international programming – most notably through the GEEP. Melissa has more than 20 years of experience in conservation, education, evaluation, and fundraising.

## HUGH KENRICK DAYS

### Linking with literacy

**Joan Evans & Jessica Yates**

The following reports are from Kenrick Day visits that linked to reading and stimulated children's writing.

#### Shirestone Academy, Year 4 Kenrick Day visit to Birmingham Botanical Gardens, November 2018

Shirestone Academy is a primary school situated in Kitts Green, Birmingham, with nearly half of our pupils registered for Pupil Premium. As part of our varied curriculum, we look to offer learning opportunities in the local area which they may not experience otherwise.

During the Autumn Term, our literacy was based around the book *The Great Kapok Tree*<sup>1</sup> by Lynne Cherry and our geography was based on the Amazon Rainforest and in particular how deforestation is causing global concern. We studied the difference between ourselves and the Amazonians and how these people could make money without cutting the trees down. We went on to study how tourism could fill this funding gap and studied the different activities that tourists could engage in, including rainforest treks to witness the trees, plants, animals and birds first hand.

In science, we were studying food chains which related back to how the loss of habitat results in the decline in numbers of species and how that, in turn, can disrupt the delicate balance natural balance within the rainforest.

During the 'Rainforest Fun with Live Animals' workshop at Birmingham Botanical Gardens, the children learnt about the size and uses of rainforest plants and animals.



Demi wrote, "*I learnt how Amazonians use a poisonous dart frog to kill animals.*" Sean immediately questioned, "*How can the people eat the animals poisoned by the arrow?*" James [the Education Manager] told them that the meat has to be cooked completely which then kills off the poison. The children were completely engaged during these workshops and specifically when he brought out the insects for them to touch and hold.

During lunchtime, we took the children to explore the Tropical House where we spotted a Kapok Tree and then outside to the aviary where they got the chance to see birds they had read about in *The Great Kapok Tree*.

During the 'Food Chain' workshop, the children constructed a food web and saw how if one animal starts to die out, it affects the other animals. Finally, they played a game showing how the energy flows through a food chain from the sun to the final link in the food chain.



The children were able to carefully handle animals, including this giant stick insect, during the animal workshop. Image: Joan Evans

Back at school, the children reflected on what they had learnt, and the experience was used as the basis for our 'big write' where they used it as the basis for a letter to thank the Kenrick Trust. Emily wrote, "*Unbelievably all the teachers learnt something new as well as the children.*" They talked about their concern for the animals of the rainforest and I showed them how it is not inevitable by showing them the short film/rap *Dear Future Generations: Sorry* by Prince Ea<sup>2</sup>.

They then spent a week studying *There's a Rang-tan in my Bedroom*<sup>3</sup>, using it as a stimulus for guided reading, topic and literacy.

The visit meant that the children were able to study the rainforest up-close and it brought to life the curriculum they had been learning.

**Joan Evans** is a Year 4 teacher at Shirestone Academy in Birmingham.

### St Columba's Catholic Primary School, Year 1 Kenrick Day visit to Mount Pleasant School Farm, February 2019


The trip to the farm was very beneficial to the children, as these children reside in a very urban area. When asked, none of them had visited a farm before and were only familiar with farms from fiction books. Many children knew that a farm has "*a farmer and a farmer's wife*" and could not say why anyone else would work on a farm. They also included animals such as "*pigeons*" and "*hamsters*" as animals that could be found on a farm, further demonstrating their baseline knowledge.



Feeding one of Mount Pleasant School Farm's chickens.  
Image: Jessica Yates

This trip has benefited the teaching of '*animals including humans*' within the National Curriculum<sup>4</sup>. Thus, providing a wider context when classifying animals and when introducing life cycles. However, there was a literary focus for this trip as well. We have been using the trip to the farm as a 'hook' for our English lessons. Children learned how to structure a formal letter after they found wool, straw and upturned chairs in their classroom. They decided that an escaped sheep had visited the classroom and they had to write a letter to Mrs Hatch to let her know as soon as possible! From the engaging hook, after the visit the children focussed on the text *Click Clack Moo: Cows That Type*<sup>5</sup>. After reading the story at the farm, some identified that the cows "*will have to work harder*" on their letters as they were "*not that good*", compared to

their learning at school. In following lessons, children used their new knowledge to edit one of the cows' letter and create a more persuasive argument.

As pupils have not been to a farm before, much of the terminology had no context and thus was difficult for them to access. The visit had enabled them to use new knowledge to aid them when writing about the topic of a farm. We have also used this in our topic lessons, when understanding the differences between rural and urban places in the UK and the importance of recycling. Children have also been more aware of wasting milk, saying that we "*can't waste the cows' milk!*" and avoided putting any left-over milk in the bin. One child decided to ask for a recycling bin at school and the class asked the school councillors to bring it up at the next meeting. 



Walking through the milking shed at the dairy farm. Image: J. Yates

**Jessica Yates** is a Year 1 teacher at St Columba's Catholic Primary School in Birmingham.

### References

1. Cherry, L. (1998). *Primary The Great Kapok Tree: A Tale of the Amazon Rain Forest*. USA: Harcourt Brace International.
2. Video available here: [tinyurl.com/oruj7ob](https://tinyurl.com/oruj7ob)
3. Script available here: [tinyurl.com/y2nmtead](https://tinyurl.com/y2nmtead)
4. Department for Education (2013). *Science programmes of study: key stages 1 and 2 National curriculum in England* (p.7) [tinyurl.com/y6tlssu3](https://tinyurl.com/y6tlssu3)
5. Cronin, D. (2003). *Click, Clack, Moo - Cows That Type*. London: Simon & Schuster Children's UK

Thanks to the vision and benevolence of the late Hugh Kenrick, who had a great passion for birds and wildlife, NAEE's Kenrick Days project offers bursaries for West Midlands schools to visit environmental centres for curriculum-focused activities. Since the project began in 2012, over 4,000 students have benefitted.

**Contact:** [kenrick@naee.org.uk](mailto:kenrick@naee.org.uk)

**More information:** [naee.org.uk/apply-for-a-school-bursary](https://naee.org.uk/apply-for-a-school-bursary)



### How writers are imagining a greener future

**Dr Denise Baden**

A year ago I wrote an article for the Centre for the Understanding of Sustainable Prosperity (CUSP)<sup>1</sup> newsletter on how positive stories that present visions of what a sustainable society might look like are needed to help inspire behaviour change and greener policies. Since then, I followed on from previous research into positive role models in education and positive vs negatively framed news stories to investigate responses to fictional stories about sustainability or climate change.

#### Research Findings

Readers were exposed to two short stories that had a catastrophic focus, one set in the near future about a woman caught in a flood caused by climate change, and a dark dystopia set in a world we had destroyed. Readers were also exposed to two short stories that were more positive – one described a boy inspired by David Attenborough's Blue Planet series to collect plastic, and one seemed to describe an eco-warrior, but the delightful twist was that the bomb she was planting was a seed bomb that would populate an industrial waste ground with flowers. Readers were asked to reflect and report on how these stories made them feel after each one and then to specifically reflect on which types of stories motivated them to adopt greener behaviours.

The results clearly showed that the positive stories which showed easily relatable people taking positive action were much more likely to give rise to intentions to adopt greener behaviours. Typical responses to the positive stories incorporated themes of feeling empowered to make a difference, having seen specific examples of what they can do, feeling more hope and also positive mood, for example:

*"It made me want to help. It made me feel happy as it shows everyone can make a difference."*

*"I thought this story was inspirational, made me want to do the same!"*

In contrast, the majority of readers reported that the catastrophic stories put them off. Common themes were switching off due to avoiding anxiety and fear, or a feeling of being preached at or manipulated, or in many cases, a sense of passive fatalism. A typical quote was:

*"It made me feel bleak, a bit hopeless, it's very dark. Didn't leave me with good feelings or particularly inspired to change or do things differently. Just depressed!"*

#### Implications

These results are important as they counter the commonly held assumption that people need to be scared into action. However, they accord with what would be predicted by psychological theories of behaviour, such as Ajzen's 'Theory of Planned Behaviour'<sup>2</sup>. The process seems to be that, whereas both positive and negative stories about climate change can increase knowledge and awareness and a sense that something *ought* to be done, negative stories can reduce efficacy. Negative/catastrophic stories can also induce emotions such as fear, anger or guilt which can lead to avoidance and a reduced likelihood of taking action. Solution-focussed stories, on the other hand, increase efficacy – a sense that one's actions will make a difference and thus are

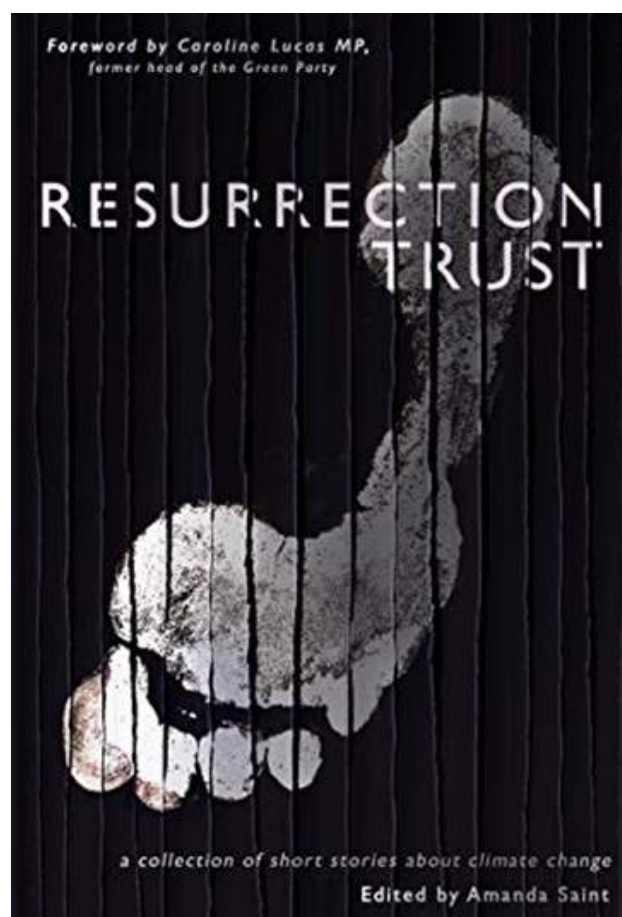
more likely to lead to positive action. Also positive emotions are associated with greater action tendencies as predicted by Frederickson's 'Broaden and Build Theory of Positive Emotions'<sup>3</sup>.

#### Short Story competitions

Concerned that the majority of our cultural offerings set in the future are dystopian, and that current portrayals of green characters in mainstream fiction tend to be negative, I collaborated with our Creative Writing School to set up a short story competition. We asked writers to check out potentially transformative solutions on our website and integrate them into their story. The kinds of sustainability solutions included are transformative ideas such as the Sharing Economy, the well-being index, The Carbon Credit Card, sustainable food, energy, transport etc.<sup>4</sup> Each idea comes with suggestions on how it can be integrated into the backdrop of a story or as the main focus. For example a rom-com, could be set in a society that replaces ownership with borrowing and the heroine goes to a clothes library to borrow a dress for her big date; or the hero in a crime drama could live in a city where everyone has gardens on their roofs, uses the latest green technologies, eats insect burgers and generates energy from their own waste, and so on. The short story competition last year was very successful and out of around 200 entries, 50 were excellent quality.

#### Book launch: *Resurrection Trust*

The top 20 short stories have now been published in an anthology which is available to buy: *Resurrection Trust*<sup>5</sup> – a collection of funny, dark, mad, bad, upbeat, downbeat and fantastical short stories about living sustainably. From eco communities to singing buildings, and sharing economies, these stories showcase a myriad of ideas about how humans can live more harmoniously with nature, and each other. The foreword is by Caroline Lucas and it includes a review by Jonathan Porritt.






## Upcoming writing competitions

Based on the success of the short stories competitions, we are running further competitions across 7 formats:

- Stage play: deadline June 30<sup>th</sup> 2019
- Radio play/comedy series: deadline 12<sup>th</sup> July 2019 (first prize of £500 sponsored by British Academy of Management)
- Screenplay: deadline Sept 2019 tbc
- Short film: deadline Oct 2019 tbc
- TV/Netflix series: deadline Nov 2019 tbc
- Interactive fiction: deadline Dec 2019 (first prize of £500 sponsored by Principles of Responsible Management Education, UK and Ireland chapter)

All of the writing competitions are free to enter, have £750 worth of prizes and student categories. 

## References

1. [cusp.ac.uk](http://cusp.ac.uk)
2. An explanation of the theory can be found here: [tinyurl.com/yakxlynx](http://tinyurl.com/yakxlynx)
3. An explanation of the theory can be found here: [tinyurl.com/y7jcann3](http://tinyurl.com/y7jcann3)
4. [greenstories.org.uk/story-ideasresources](http://greenstories.org.uk/story-ideasresources)
5. [tinyurl.com/yxlgzn7s](http://tinyurl.com/yxlgzn7s)

.....

**Dr Denise Baden** is an Associate Professor within Southampton Business School at the University of Southampton. She is engaged in research and teaching in the areas of ethics, entrepreneurship, sustainable business and corporate social responsibility to undergraduate, postgraduate and MBA students.

**Contact:** [greenstories@soton.ac.uk](mailto:greenstories@soton.ac.uk)

**More information:** [greenstories.org.uk](http://greenstories.org.uk); [facebook.com/greenstoriesoton](https://facebook.com/greenstoriesoton); Twitter [#GreenstoriesUK](https://twitter.com/GreenstoriesUK)

## YOUNG WRITER

### Discard – a thing rejected as no longer useful or desirable

#### Findlay Wilde

I live in a very rural setting in the heart of Cheshire and have lived in the countryside all my life. My passion for wildlife was fueled by the everyday birds, mammals and insects I would come across every time I walked out of my front door; but my commitment to campaign about environmental issues was also fueled by the things I have seen in the countryside (sometimes within walking distance from home and sometimes further afield); inexcusable things.



Dead pheasants found dumped in a bag. Image: Findlay Wilde


Several pheasant shoots take place in the surrounding area, and during the season I can hear the shots being fired. In February this year there was a post on our village Facebook page. The post described a fly-tipping incident on the track that leads to the river. I had to see this for myself to understand the scale of the situation. As I approached, I could see the large blue plastic bags and I already knew what was in them from the pictures I had seen on Facebook.

But that was not all. There were also some black bin bags in the mix. Again I had to look, so I opened the bin bags and found the bodies of two Canada Geese.

According to a 2016 article in Shooting UK, approximately 35 million game birds, mostly non-native pheasants, are released each year. They are farmed and then many are shot for sport. Some will eventually be eaten, but clearly not all of them. The number of social media posts I see about stink pits and fly-tipping of shot birds is alarming. Birds shot for pleasure and then simply discarded.

There are so many dark sides to the shooting industry, but this total waste of life (in the name of sport) is unjustifiable. This is not an acceptable part of rural life. The outrage and disgust on the Facebook post from the local community was clear to see.

I was very interested to hear from the shooting community regarding their thoughts on how we can all tackle this. Regardless of my thoughts on shooting, I am not for a minute suggesting that this discard practice is something carried out by all shoot organisers, but it is widespread within their industry and they have to literally clean up their act.

According to the Facebook post, the bags were originally wrapped in a carpet to hide the contents, but once the carpet had been removed I counted about 30 shot pheasants. 30 pheasants that had been shot for pleasure and then dumped by the side of a country track that families use frequently as they walk to the river. 

.....

**Findlay Wilde** is a Cheshire-based conservationist, ringer, birder, environmental blogger and campaigner. He wants to do everything he can to protect nature now and in the future. Currently he is trying to raise awareness about hen harrier persecution in particular, but he is also trying hard to move the natural world higher up the political agenda. *#Think500YearsAhead*

**More information:** Twitter [@WildeAboutBirds](https://twitter.com/WildeAboutBirds)



# Are we wasting away... our future?



A child taking part in a beach clean-up.

Image: Beachwatch Great British Beachwatch Annual Report 2017, Marine Conservation Society

## Curriculum links: waste and recycling

*Environmental Education* ejournal Editor Henricus Peters suggests some classroom activities around waste and recycling ..... 11

## Wasting not; wanting not

NAEE Chair of Trustees Professor William Scott's thoughts on waste and the circular economy ..... 13

## Realities of the circular economy

Ken Webster, former Head of Innovation at the Ellen MacArthur Foundation, provides an overview of recycling as a solution to waste ..... 13

## A whole school recycling project

Sarah Eames explains how Sandfield Close Primary School in Leicester engaged the whole school and wider community in a project to raise awareness of recycling ..... 15

## Taking a bite out of food waste

Danielle Johnson of Groundwork London reports on the work that is being done in schools as part of the Small Change, Big Difference programme ..... 16

## Waste education in Devon

Lucy Mottram, Waste Education Officer for Devon County Council, on curriculum-linked activities being carried in Devon ..... 17

## Water pollution in Guatemala

The Healthy Reefs Initiative's Ana Giró Petersen looks at how waste water and pollution are affecting the Motagua River basin ..... 19

## Microalgae proliferation in Central America

Marisol Rueda Flores and Ian Drysdale of the Healthy Reefs for Healthy People Initiative explore the effects of fleshy macroalgae, due to human activities, on coral reefs ..... 20

## Plastic waste in Mexico

Marisol Rueda Flores looks at the impact of plastic waste in Mexico – a country which is estimated to introduce more than 101,000 tons into the ocean each year ..... 21

## Final Thought

NAEE Publications Coordinator Elsa Lee explores the complex nature of waste ..... 34



## Waste and recycling in the curriculum: suggested classroom activities

### Henricus Peters

#### English

Students can read and research using information sources – books, the internet, interviews, visit a library, gallery or museum – to find and clarify information about waste: pollution, debris, waste, re-use, reduce, recycle, rubbish/litter, decomposition, plastics.

Students can present their findings in the form of Power-Points, posters, leaflets, reports etc.

Poetry is a great form of powerful communication. Plays can convey particular points of view.

#### Maths

Students can use pictorial graphs to compare two or more different countries and their waste/recycling successes. Also, they can collect and gauge the weight of a week's worth of waste or recycling.

They can undertake a 'reduce waste' challenge, by working out how many of each food item they would need for a party, using multiplication and division.

#### Science

Students can compare different materials – ask the question: 'What material is [a particular object] made of?' with possible answers: 'Plastic, wood, rubber, glass, metal, a combination of these.' This leads to discussions about its lifespan, whether or not it can be re-used etc.



Objects can be sorted based on their properties, which can then be linked to their lifespans and 're-usability'. Image: Juliette Green

As food, water and air are the basic needs of animals, use these concepts to explore questions such as: 'What happens when a turtle or whale swallows plastic?' or 'What happens when a bird gets oil in its feathers?'.

States of matter: students can identify solids, liquids, and gases; then find out about air pollution and its negative impacts on cities such as London and Beijing. They can learn about the consequences of burning our waste; and about oil spills – such as Deepwater Horizon in 2010 (the world's largest oil spill)<sup>1</sup> – and discuss lessons that could be learnt.

In studying electricity, students learn about how it is made and moved, then extend these ideas to experiment with solar equipment – using the sun's energy to produce heat or light.

Life cycles are an excellent topic to learn about decomposition – see how living things break down, i.e. natural recycling.

Students can sort through compost in groups and identify different types of compost creatures they observe and share their results with the class. They can learn about the process of decomposition, compost and why it's important by setting up a compost bin/heap<sup>2</sup> or wormery and observing how the contents change over time.

#### Art and design

Students can use a range of techniques to present their research ideas. These include painting, drawing and sculpture which can be based on recycled materials.

#### Design and Technology

Students can make use of specific techniques, both computer-based and hands-on, to design solutions to everyday problems. They can use tools to make things better or indeed make an object multi-functional, thus reducing our need to 'throw out'.


#### Geography

Students can use maps to show comparisons between cities and their levels of pollution; where a city has waste dumps; the places in a country where there is most rubbish.

#### History

Peoples' waste deposits can be extremely useful as a matter of history. Digging up parts of a city like London can show what people of a certain time period wore, did, etc. 'Waste' then becomes historical evidence of 'dwelling'.

#### An example of '4 R activities'

On the next page are some ideas from a US-sourced guide<sup>3</sup> for teaching about the 4Rs: Reduce, Re-use, Recycle and Rot (compost). 



A screenshot from the Eden Project website. Used with permission from [edenproject.com](http://edenproject.com)

#### References

1. [en.m.wikipedia.org/wiki/Deepwater\\_Horizon\\_oil\\_spill](http://en.m.wikipedia.org/wiki/Deepwater_Horizon_oil_spill)
2. The Eden Project website has a useful guide on how to make a compost heap. [edenproject.com/learn-for-everyone/how-to-make-a-compost-heap-10-top-tips](http://edenproject.com/learn-for-everyone/how-to-make-a-compost-heap-10-top-tips)
3. *Doing the 4Rs: A classroom activity guide to teach reduce, reuse, recycle and rot* (Stopwaste) [stopwaste.org/recycling/schools/curriculum-and-videos](http://stopwaste.org/recycling/schools/curriculum-and-videos)

**Henricus Peters** is Editor of NAEE's e-journal. He is a teacher who currently lives and works in Shanghai.

## Doing the 4Rs: A Classroom Activity Guide to Teach Reduce, Reuse, Recycle and Rot

Everybody creates garbage, but do we need to do so? How does creating garbage impact us at home, at school or at play? This guide will help you explore with your students the integrated waste management hierarchy of reduce, reuse, recycle and rot (compost), which we call the 4Rs.

**Natural Resources:** Students learn about the resources needed to produce products they use every day through hands-on investigation.



*Lesson 1: Renewable or Nonrenewable?* Students learn about renewable, nonrenewable and perpetual resources by looking at products made from natural resources.

*Lesson 2: Scavenge for Litter* Students collect litter found on the school grounds and link this litter back to natural resources.

*Lesson 3: Kids Doing the 4Rs* Students learn about the 4Rs hierarchy and brainstorm ways to practice the 4Rs.

*Lesson 4: Highest and Best Use of Resources* Students learn about the 4Rs hierarchy by classifying waste items from home that they sort into groups using the 4Rs hierarchy.

**Reduce:** Students examine their own consumption habits, both at school and at home, and discuss ways in which they can change their consumer behaviours.



*Lesson 5: Pack It Up* Students learn how to reduce packaging waste by comparing products that have minimal or excessive packaging.

*Lesson 6: Use Less Stuff* Students bring in paper items from home and work in groups to brainstorm ways to reduce the amount of paper they use.

*Lesson 7: The Art of Saving Birds* Students learn how their waste can impact on habitats for plants and animals.

*Lesson 8: Reduce: Where Do You Stand?* Students practice critical thinking skills while examining their own values related to reducing waste and the consumption of resources.

**Reuse:** Students are introduced to the concept of reuse. Students uncover simple ways to reuse items and create reuse projects.



*Lesson 9: Reuse or Recycle: Which Comes First?* Students explore the 4Rs hierarchy by looking at the benefits of reusing a plastic bottle before recycling it.

*Lesson 10: Reuse Choices* Students participate in making group decisions for identifying the best choice among four alternatives for reusing items.

*Lesson 11: Well-Built Quilts* Students learn about the natural resources used to make fabric and use mathematical skills to make a quilt square from reused fabric scraps and old magazines.

**Recycle:** Students discover how to recycle in their own community and learn how recycling conserves natural resources. They explore how new products get made using the materials they recycle at school and home.



*Lesson 12: From Oil to Plastic 101* Students learn about the lifecycle of a plastic product and the nonrenewable resources used to make it.

*Lesson 13: Recycling Plastics* Students learn about different types of plastic by collecting and examining examples of plastic from home.

*Lesson 14: From Tree to Paper* Students learn how trees are harvested to make paper and make recycled paper with reused newspaper.

*Lesson 15: Where in the World Do I Recycle It?* Students use multiple sources of information to research reuse and recycling options for a variety of household goods.

**Rot:** Students learn through investigation and discovery about the web of life and the decomposition cycle. They learn about the organisms that play a role in the decomposition cycle, why people compost, and how compost improves soil health.



*Lesson 16: What Is Biodegradable?* Students are introduced to the process of decomposition in a compost bin and classify found objects from their school grounds as biodegradable or non-biodegradable.

*Lesson 17: The Breakdown on Decomposition* Students learn about the process of decomposition by testing the effects of different variables on the decomposition of organic and inorganic materials over time.

*Lesson 18: Web of Life* Students learn about the food chain of a compost bin by playing a tag game illustrating the role of decomposers in a food web.

*Lesson 19: Compost: How Do You Know?* Students learn about the benefits of adding compost to soil as an amendment. They design and conduct their own experiment to test how compost affects plant growth.

Reproduced from [stopwaste.org](http://stopwaste.org)



## Wasting not; wanting not

Professor William Scott

It was good to see SpaceX's Falcon 9 rocket return to Earth the other week by landing the right way on a floating platform. There's a video available<sup>1</sup> along with a few clips of instances where this didn't quite go as well, and a nice explanation of the issues involved in enabling the safe return of the rocket. It's good to see this reduction in waste (and obviously, money). The manoeuvre reminded me of the comics I used to read as a boy when rockets always did this; so finally, real technology has caught up with tech-fi.

Of course, the waste involved in space and Earth-orbit exploration is minute compared to what we humans get up to on the ground. A World Bank report said that the world generated 2bn tonnes of solid waste (from households and commerce) in 2016. This is 740 grams per person per day (over 5kg a week). How do you compare with that average?

Across the world, at the moment 37% of solid waste goes to landfill, 33% to open dumps, 11% to incinerators and some to compost heaps. 13% is recycled. Again, these are World Bank data. But practice varies hugely across the world and between products with, for example, two-thirds of aluminium cans recycled in the United States but only 10% of plastic<sup>2</sup>. Everyone seems to agree that the average recycling rate (13%) is far too low, and young people are usually taught that it's important to do it. But recycling needs infrastructure and supply chains which are prone to economic disturbance<sup>3</sup>; landfill is much simpler technology<sup>4</sup> and open dumping (the current default option across much of Africa, the Middle East and South Asia) is even simpler.

Nature has none of these problems, of course, because all waste is natural and is simply food for other organisms. It is this simple reality that has inspired the idea of the circular economy which has been pioneered in the

UK by the Ellen MacArthur Foundation<sup>5</sup> which is, amongst other things, promoting product re-design that enables component materials to be recovered in a high-quality state and reused. This principle is now being increasingly used in the manufacturing industry, although the public isn't aware of it. The Foundation has a collection of lessons for schools and colleges which are free to download<sup>6</sup> and are a good starting point for an exploration of waste issues<sup>7</sup>.

## References/notes

1. Video clip: [tinyurl.com/y5npcb5w](https://tinyurl.com/y5npcb5w)
2. The numbers are huge; in 2010 almost 56 billion aluminium cans were recycled. This was a recycling rate of 58.1%. See here for a discussion of the problems with relying on recycling as a waste reduction strategy: [tinyurl.com/y683t6q3](https://tinyurl.com/y683t6q3)
3. For example, on January 1st 2018 China (the world's biggest scrap importer) stopped accepting recycled plastic and unsorted scrap paper from abroad, and cut imports of cardboard.
4. Especially if you don't bother to cap the structures to seal in the methane produced and allow it to be used for energy extraction.
5. [ellenmacarthurfoundation.org](https://ellenmacarthurfoundation.org). A short video introduction is here: [tinyurl.com/y53556pw](https://tinyurl.com/y53556pw)
6. [tinyurl.com/y3fqof9l](https://tinyurl.com/y3fqof9l)
7. See also a special report on waste published in September 2018 by The Economist: *A load of rubbish*. Much of the data in this article is from that report. It's available here: [tinyurl.com/y8w5psds](https://tinyurl.com/y8w5psds)

**William Scott** is a retired Professor of Education at the University of Bath, where he was head of its Education and Sustainability research programme, director of the Centre for Research in Education and the Environment, and a deputy-director of the University's Institute for Sustainable Energy and the Environment. He is Chair of NAEF Trustees.

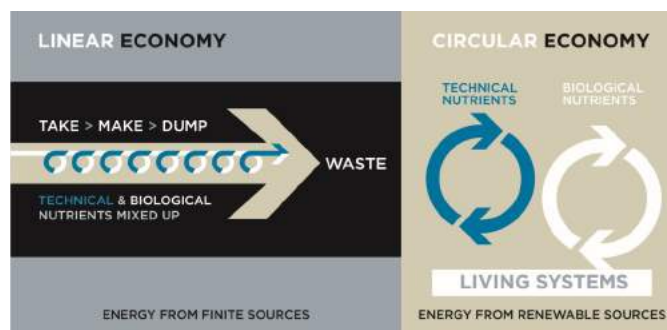
# WASTE CIRCULAR ECONOMY

## When principles meet the world of the urban recyclers

Ken Webster

The circular economy is an intuitive concept which has seen a rapid uptake since its revival as a term in the period after 2010. It intends that products, components and materials are kept in their highest value at all times; that the idea of waste is replaced by the idea that everything is food for another process; that instead of through-put there should be 'round-put' through which stocks of all kinds – natural capital and social capital as well as machine goods or valuable metals, for example – are maintained and rebuilt or regenerated and this means that stocks, flows and feedback are part of an effective and not just efficient set of processes. Intuitive? Just imagine the forest over time: energy flows through and materials cycle; molecules and structures grow, live and die and are scavenged to build again, an ever changing dynamic but with its basic rules of life, evolved through 3.8 billion years. It is not remotely close to a human society conceived of through the lens of physics and the machine

mindset of the industrial age but one conceived through a mindset deeply influenced by biology and ecology. Circular economy advocates are almost always systems thinkers and the systems they think about are not simple mental pipeworks. They are not plumbers.



The linear and circular economy models. Image: The Ellen MacArthur Foundation (after W. McDonough and M. Braungart)

To some people however, a circular economy is just 'recycling on steroids' or a beefed-up waste management toolkit. Some people want to include incineration and landfill, which takes some mental gymnastics. That notion is so far from the idea of creating effective systems which enrich capitals and take insights from living

systems as complex iterative systems that it can be backheeled to where it came from – essentially recycling is the stuff that happens when most of the other options have been used up, not the first option. Recycling in much of today's circumstances can in all honesty be seen as legitimizing wasteful production – oh never mind it gets recycled – how else can the linear economy of scale and efficiency be maintained if there is not an attachment to throughput. The 'inevitable consequences of scale' is another way of putting it. Overproduction, not scarcity of stuff, is the key challenge. No wonder recycling looks like a winner as very little of importance appears to change from the consumer, retail and producer angle. Conscience salvaged.

Walter Stahel made a simple but profound point in how a little mathematics can upset the logic of recycling:

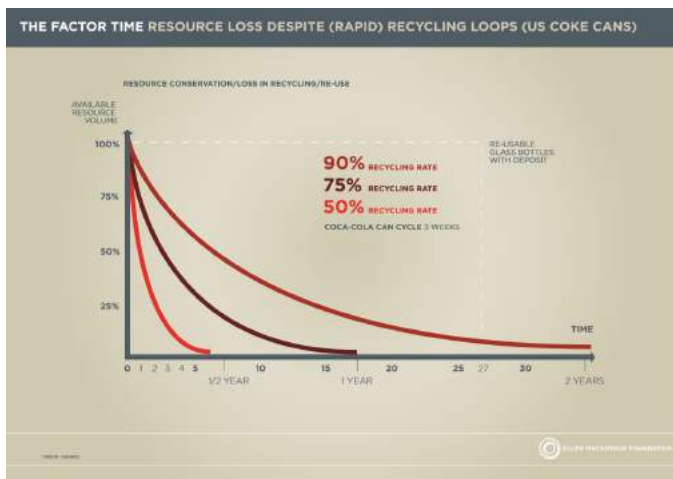


Image: Ellen Macarthur Foundation / WalterStahel

Stahel nails it. If you have two facts: (a) a short cycle from manufacture to use to recovery and recreation; and (b) even very high recycling rates – in the region of 90% – then to use the vernacular: 'we're screwed'.

It's going to mean every ton of non-degradable metal or plastic ends up in landfill within a couple of years at 90% recycling. That's the problem, and the joy, of knowing about iterating systems. '90%' is a snapshot in most people's mind which means 'hey it's great news!' but time erodes that confidence using the mathematics of feedback. Is that ironic?

So how is the circular economy working out with the more active groups of workers and collaborators in the urban recycling community? These are the quasi-formal groups in countries across the globe who have tried to create a living from 'waste picking' and recycling. Often it is a circular economy of poverty, which is in no-one's interest to continue. If the circular economy promises ways to add value, what does the messy real world tell us, other than the fact that reality is complex?

In the city of Buenos Aires, Argentinian cooperatives have organised to coordinate urban recycling in the niche they inhabit between large-scale municipal waste collection and landfill or incineration and the indigent and desperate checking bins for something to eat or sell.

The good news is that given support – some land to build a structure and the social wage (a kind of basic income for some categories of citizen), they can get on with adding value. They do this by sorting waste but also going the next step with basic processing for which equipment is necessary, and often skillfully adapted from existing obsolete or redundant machines. There is

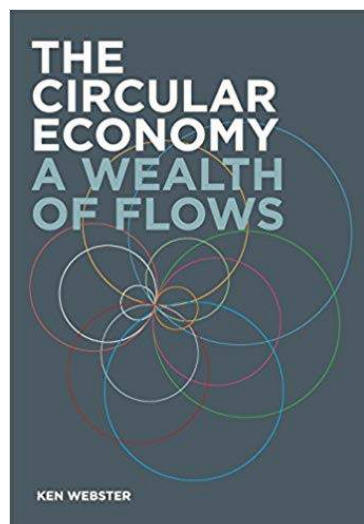
chipping of polypropylene into clean saleable raw material, there is the equivalent for expanded polystyrene (EPS) which is sold to the building trade for use in lightening agent for concrete. There are compressing machines for cardboard into bales which are much more valuable in that form. As an experiment they are trying to make roofing material from plastics that don't fit saleable categories, or building bricks with a waste and concrete mix. These are thought to be helpful for the very poor in their *barrios* (informal settlements).



Workers in a cooperative in Buenos Aires sorting waste.  
Image: Ken Webster

There is a strong sense of purpose and progress in these cooperatives. But look back at what the guiding principles of a circular economy are: its waste = food for other processes, it's the idea of 'nutrients' for sure but not to cycle contaminants, or lock materials away forever and a day and for these roofing tiles and EPS concrete mixes to be the wastes of tomorrow. It's tough, it's a predicament for sure, the outcomes are not easy to judge. At the very least these cooperatives show what imagination and ingenuity can deliver. Perhaps that's where extended producer responsibility must extend: to manufacturers not putting materials in the system which cannot easily be identified and then be turned from waste into food. Is not life hard enough for these people already? 🌱

**Ken Webster** is a Senior Lecturer at the University of Exeter Business School and was Head of Innovation at the Ellen MacArthur Foundation (EMF) from 2010-2018. He is the author of *Circular Economy, a Wealth of Flows* (2015, 2017). EMF Publishing.





## Have you heard about our herd?

**Sarah Eames**

### #500recycledelephants – a whole school recycling and conservation project at Sandfield Close Primary School in Leicester.

Sandfield Close School has been committed to recycling for a number of years and wanted to get the Eco-Schools Green Flag award. We needed a project that would make an impact not only in school but with the local community. So we began #500recycledelephants.

This encouraged children and their families to make an elephant out of a clean, empty plastic milk bottle. The repurposing of the milk bottle was important so we could not only highlight that waste could be reused but also the fact that the local council had begun to use plastic recycling bags that many families were at the time unused to.



Putting together the recycled elephants. Image: Sarah Eames

We chose 500 as there were only 400 children in our school and even with the 50 members of staff, we still needed to encourage other community groups to get involved so that we could reach our target. Sandfield's Eco Group had previously taken part in an Eco Roadshow at the National Space Centre organised by Leicester City Council's Lee Jowett [one of NAEF's Fellows] and had met an amazing duo called Fair and Funky. In their workshop we made the elephants and enjoyed it so much we thought it would be a great idea to get everyone else involved in making them. Teachers took part in a staff meeting to show them how easy it was and they made and designed their own. Children were then encouraged to make them in school and at home.


Alongside this we ran a number of assemblies highlighting the need for conservation and the plight of elephants. Children were further encouraged to write an article or create a poster about an endangered animal. These were also shared in assemblies and on our displays around the school. Each year group contributed something, from Year 1 writing about the endangered elephants they had seen at Twycross Zoo, to Year 4 discovering about the problems of palm oil plantations on the orangutans of Sumatra, to Year 6 writing persuasive letters linked to endangered animals.



Some of the finished elephants. Image: Sarah Eames

The idea spread and we were invited by Tina Barton, from the High Cross Shopping centre, to 'take over' a space in our local shopping centre during half term. This would encourage shoppers and the hundreds of staff that work there to learn more about recycling and endangered animals. We got involved with the Jane Goodall Roots and Shoots Project and were invited to London to meet her at London Zoo. What an exciting day that was.

Since the success of this project, each year we have launched a whole school project linked to recycling and an area of need. #500migratingbirds meant children created birds from recycled materials and learnt about birds and other animals that migrate, we linked our work to the RSPB Birdwatch Project. As a school, we had just begun to learn about the Global Goals for Sustainable Development (SDGs) and have tried to weave an element of these into our projects since. Next came, #500beesbugsand butterflies. Again children used recycled materials to make a multitude of creepy crawlies and we learnt about the importance of pollination. This also linked in with our Learning through Landscapes Polli:nation Project. This year we are looking at the pollution in the seas and the ever increasing problem of plastic in #500fishinanunpollutedsea. There are many projects that we are looking at including Kids vs Plastic and the Premier League Primary Stars Ocean Plastic Project.

We believe that this approach has been highly successful in raising awareness, not only in school but within our community, of important environmental issues. Using waste and recycling means that children from an early age look at the potential of throwaway objects. Linking our projects to the many other brilliant projects out there has also been important to their success. We know only too well the pressures of the curriculum for primary schools but would encourage others to adopt this approach; you can achieve so much and it will certainly enhance your curriculum and create more knowledgeable young adults for the future. 

**Sarah Eames** has been a teacher for over 25 years at Sandfield Close Primary School. She is a primary science specialist and fellow with the Primary Science Teaching Trust

#### Contact:

[seames@sandfieldclose.leicester.sch.uk](mailto:seames@sandfieldclose.leicester.sch.uk);  
Twitter [@sarahpurple](https://twitter.com/sarahpurple) [@STEMatSandfield](https://twitter.com/STEMatSandfield)

**More information:** [sandfieldclose.leicester.sch.uk](http://sandfieldclose.leicester.sch.uk)

## Small Change, Big Difference: Taking a bite out of food waste

**Danielle Johnson**

Each year in London, we throw away 910,000 tonnes of food from our homes, of which 640,000 tonnes could have been eaten. Not only is this waste environmentally damaging but it also comes at a cost of up to £70 per family per month (source: WRAP<sup>1</sup>).

Small Change, Big Difference is working with Londoners to encourage healthy and sustainable eating, reducing the amount of food we waste and recycling more of the inedible bits. Funded by the LIFE<sup>2</sup> programme of the European Commission, the campaign is delivered by project partners WRAP, the London Waste and Recycling Board<sup>3</sup> (LWARB) and Groundwork London<sup>4</sup>. Initiated in 2017, the pilot delivery in London targets householders, businesses, communities and schools and runs until March 2019, with learning shared with ten European cities as part of its replication programme.



Screenshot from the Small Change Big Difference website  
[smallchangebigdifference.london](http://smallchangebigdifference.london)

Groundwork London are responsible for the schools engagement arm and have curated an award-winning education programme designed for KS2 pupils which is currently being delivered in eight boroughs across London, with teaching resources soon available for other schools to utilise.

### Small Change, Big Difference Schools programme

The programme is a series of six interactive workshops, culminating in an event for the whole school and wider community. The workshop content is as follows:

#### Workshop 1: Preventing Food Waste and Recycling

In this session, pupils learn about food waste prevention solutions including FIFO (first in, first out), 'Grow, eat, compost, repeat' and using up leftovers. Pupils see the extent of their school's food waste when we throw the contents of a food waste bin onto a tarpaulin.

#### Workshop 2: Healthy and Sustainable Eating

Pupils learn about the recommended daily portions of fruit and vegetables and recognising the environmental impact of food through an interactive shopping trolley game and by making fruit kebabs.

#### Workshop 3: Pupil-led Planning of the Campaign Day

Using a model of co-production, pupils choose the 'what, where, why and who' parts of their school campaign day.

Giving ownership to the pupils increases the likelihood of a longer legacy and further embedding learning. Past campaigns have ranged from making smoothies using surplus fruit for parents/carers and the wider community, to collating recipes for a leftovers cookbook.

#### Workshop 4: Pupil-led Promotion of the Campaign Day

Pupils create persuasive language flyers and posters to invite parents, carers and the wider school community. In the past, pupils have created placards, radio adverts and more, to promote their event.

#### Workshop 5: The Campaign Day

This is the pupils' opportunity to take action to reduce food waste in their school community, becoming ambassadors for change. Previous campaign days have included food feasts at the school gates, crowd-sourcing a leftovers recipe book and launching a community fridge.

#### Workshop 6: Sharing Learning

Pupils share their learning through assemblies or video links with other schools and the wider school community. Schools create an action plan to foster legacy of the campaign beyond the workshops.

We're currently in the process of collating the results from the programme with initial findings in some schools showing a 70% reduction in year group food waste during our time there. Teachers and pupils have really enjoyed the workshops and feedback has been positive with comments from pupils such as:

*"I loved being a food waste warrior because it was an amazing feeling teaching others top tips to avoid food waste"*

*"My favourite things we did were playing the snakes & ladders game and the trolley game (because I was good at it), and cycling to create a smoothie. They were not only fun, but also I learnt a lot as well and will remember you and continue to preserve this Earth."*

Burst Wood Primary School Year 5 Pupils

### How did we plan the workshops?

To really get an understanding of what works well in the classroom we set up a teacher panel who reviewed each lesson plan from the start. From this we were able to ensure the programme was curriculum linked and relevant to current pedagogies, which has helped in making the programme attractive to teachers and school staff. It is written by teachers, for teachers. However, we wanted to give pupils some autonomy in their learning and so we incorporated a model of co-production into the programme. The workshops build up to a pupil-led campaign day where pupils make decisions about the event itself and how to tackle food waste within the school, taking full ownership of the day. Moreover, from research and past experience, we knew that experiential learning helps students to retain information, therefore we designed the workshops to incorporate this, where pupils can 'learn through doing' via interactive activities.

Finally, to consolidate learning and spread the messages further, we incorporated a whole school approach into the programme, working with:


- Pupils – through the workshops
- Parents and carers – through a programme of six cooking workshops
- Kitchen Staff – by linking with the school catering company who have delivered training for kitchen staff and contributed to the surplus food feast



This holistic approach brings the messages full circle, reaching multiple touch points, increasing longevity and supporting learning.

We are an award winning programme! In 2018 the schools programme was highlighted as one of the top ten Global Sustainable Education Innovations by education non-profit body HundrED<sup>5</sup>, a real achievement for the project and we're delighted that the positive work the team are doing has been professionally recognised.

### What's next?

As the pilot project in London comes to an end there are Small Change, Big Difference campaigns popping up in other EU cities. Barcelona, Brussels, Burgas, Dublin, Ljubljana, Milan, Oslo, Sofia and Vaxjo will all be releasing their own versions of the campaign. The resources and lesson plans will be made available for all schools and teachers to download later on this year, so watch this space! 

## WASTE WASTE EDUCATION

### Plastic pirates invade schools to provide waste education in Devon

Lucy Mottram

"So you're a rubbish teacher!" said the young son of a dear friend when I described what I did. And, yes, he is right; I am a rubbish teacher, as are my three colleagues working in schools across Devon, delivering high quality waste education to students aged from 3 to 18 years old.

Devon County Council's Waste Education Programme has been running for over 12 years, providing a wide range of curriculum linked workshops and assemblies, reaching hundreds of schools and thousands of pupils across Devon. Every year new links are made with teachers and schools, often inspiring schools to look at their own waste generation and recycling practices, and reduce the amount of waste going into their black bin bags.

Resource Futures are our partner contractor for our Waste Education Programme with three Waste Educators delivering workshops and assemblies every week on subjects like food waste, electrical waste and ocean plastics. The workshops use interactive and engaging teaching methods. Pictured is Sally Jackson delivering a Plastic Pirate workshop to Reception and Year 1 children at St Johns Primary School, Totnes. In this workshop the educator dresses up and plays a pirate captain taking the children on a tour of the school grounds rescuing sea animals trapped in plastic rubbish. They learn about the plastic pollution problem whilst engaging in a tale of plastic pirates on the high seas.



### References

1. [wrap.org.uk](http://wrap.org.uk)
2. [ec.europa.eu/easme/en/life](http://ec.europa.eu/easme/en/life)
3. [lwarb.gov.uk](http://lwarb.gov.uk)
4. [groundwork.org.uk/sites/london](http://groundwork.org.uk/sites/london)
5. [hundred.org/en](http://hundred.org/en)

**Danielle Johnson** is a Community Programme Manager at Groundwork London and has managed local, national and international education programmes for charities including Fair Trade, Oxfam and Sustrans. Having led on education programmes for charities for 15 years, this project is a culmination of best practice knowledge of sustainability in education settings.

**More information:** [smallchangebigdifference.london](http://smallchangebigdifference.london)

### Why educate children about waste and recycling?

Devon County Council are working with partners to manage demand for waste management services and influence the behaviour of parents, teachers and pupils by using waste educators to provide education with in-school curriculum linked workshops and out-of-school visits to waste management sites.



Schoolchildren enjoying a trip to Pinbrook Household Waste Recycling Centre. Image: Lucy Mottram

Devon County Council supports environmental education. In educating the public to Reduce, Reuse and Recycle we can teach them about resource management sustainability, and we can work together to help us all to reduce our waste.

Children are often reliant on their parents and teachers telling them about the issues that face our world today – but because environmental issues are not part of the national curriculum what children learn in class varies enormously from school to school. It is important for their futures as citizens of the world that they are prepared to deal with whatever is thrown at them in the future. This could include catastrophic weather events due to climate change, environmental degradation that drastically alters the world around them and unforeseen issues resulting from microplastics in the environment. This generation, when they are adults, will be the ones who need to invent solutions for these "wicked" problems, as they have been referred to (Dillon, 2016<sup>1</sup>). We are obligated as environmental educators to inform children of the issues, but also to make sure that they realise that the decisions they make in their own lives, about what they eat, what they buy, and how they travel, all impact on the environment, and can make a difference to planetary health.

This year our education team have seen a rise in interest in our workshops about litter and plastics in the environment, probably due to the 'Blue Planet Effect', as the extent of the plastic pollution problem becomes clearer. The emotive pictures seem to have engaged the public in unprecedented ways. Many schools in Devon are becoming 'plastic free' or 'plastic clever' or are studying the effect of ocean plastics on the environment.



Georgeham Primary School, a small school in North Devon, were the first to sign up to become a Refill School. Image: Lucy Mottram

Much of this interest is coming from students, while the coverage in the press and across social media brings the issue to the forefront of teachers' minds when thinking of topics and projects for students. It may mean that further environmental issues are easier to introduce as people tend to be more aware of the bigger picture. Our Waste Education Programme has been able to respond fast to this increase in awareness, and we have been able to introduce new workshops quickly. Many of these issues, such as plastic recycling and litter in the oceans were already part of our education campaigns. We also keep our website updated with new resources for teachers to download for free ([zone.recycledevon.org](http://zone.recycledevon.org)). Last year we created resources for Devon teachers to be able to teach about plastic litter which included a set of five lessons, ranging from art to geography and science, available for free online as a Litter Pack ([zone.recycledevon.org/litterpack](http://zone.recycledevon.org/litterpack)). The pack also contains specific advice about how to carry out a litter pick or beach clean, with advice about insurance and which local authority or landowner to ask for permission and who should remove waste once collected and bagged.



Litter Pack PowerPoint. Image: [recycledevon.org](http://recycledevon.org)

### What is the impact?

Last academic year we talked to 9102 children and 605 adults through our in-school workshops, audits and assemblies, while 798 children and 107 adults visited our waste management facilities. This means, last year alone, over 10% of all schoolchildren in Devon (estimated to be 95,000) had some form of interaction with our Waste Education Programme. This is in spite of recent service reductions due to financial restrictions. Each year we work intensively with several schools across Devon, helping them to reduce their waste and set up good recycling systems. Last academic year our Waste Educators worked with St John's Primary School in Totnes and Uffculme Academy (a Multi Academy

Trust of the Primary and Secondary in Uffculme, Mid Devon). The resulting figures were astonishing. St John's recycling figures went from 37% to 81% and they were able to reduce their waste by 66%. Uffculme Primary School now recycles 84% of their waste and made financial savings of over £600 for the academy too.

Evidence<sup>2</sup> through data from WRAP (Waste Resource Action Programme) and collected in 2015 by our partners in the programme, Resource Futures, also shows measurable differences between the amount of waste generated per pupil in schools across the country as a whole (45kg per pupil for primary schools) and the figure per pupil in Devon schools (31kg per pupil). The conversations children have at home following their education at school may also have impacts on the recycling and rubbish produced by households, but this is more difficult to measure. In surveys from 2015, 82% of respondents said that their children had discussed waste workshops at home and 59% said that their behaviour at home had changed as a result of those conversations.

We are looking to develop our ability to assess how effective our work is at changing behaviour. We would be happy to work with anyone who could provide some free research on how to improve the measurement of the impact of our Devon County Council Waste Education Programme.

### What is the future?

We are always looking at new ways to link with other organisations, in mutually beneficial ways. This year we are working with libraries and book festivals across Devon to produce a poetry competition, using children's creativity to inspire them to write about waste and the 3Rs. We are working closely with the Environment Agency plastics team, Eco-Schools and the Energy Company, EDF Pod, promoting each other's teaching resources. Waste education in Devon is a strong tool in our County Council behaviour change work helping Devon residents (both children and adults) recycle and reuse more and throw away less, which has the dual impact of making better use of precious resources as well as allowing council funding to be spent on supporting other services.

So, in answer to my friend's son I am a rubbish teacher and proud to be part of the team that is helping Devon Reduce, Reuse and Recycle. 

### References:

1. Dillon, J. (2016). *Towards a blended pedagogy: Learning inside and outside the classroom*. In M. Sands, & J. Lane (Eds.), *Science of Learning: Proceedings of the 12th International Conference*, May 25 and 27, 2016, Bilkent University, Ankara, Turkey.
2. Internal reports: Waste Education in Devon Schools – Summary of Evidence, Devon County Council. Devon Waste Education – Impact Report, June 2015, prepared by Resource Futures for Devon County Council.

**Lucy Mottram** is Waste Education Officer for Devon County Council. She is a trained teacher with experience working in farming, ecology and sustainability in the UK, Greece and Italy.

**Contact:** [lucy.mottram@devon.gov.uk](mailto:lucy.mottram@devon.gov.uk)

**More information:** [zone.recycledevon.org](http://zone.recycledevon.org)



## The Motagua River and its impacts from the ridge to the reef

Ana Giró Petersen

Guatemala is distinguished for being a country rich in water resources, it is divided into three major slopes delimited by the mountain system, these being: the Pacific, the Caribbean and the Gulf of Mexico. The Caribbean slope includes the rivers that flow into the Gulf of Honduras, which are characterized by being extensive and deep. One of the most important rivers of the Caribbean slope is the Motagua River; considered the longest river in the country, with a length of 486 km passing through 14 departments and 95 municipalities, occupying about 8.5% of the total area of the country, and with more than 5.2 million people living in its basin.

The Motagua River basin serves as a reservoir of forest goods, ecosystem richness with the presence of endemic species and species that are endangered due to habitat destruction. This basin is related to 55 of the 301 protected areas of Guatemala.



Where the Motagua river meets the Caribbean coast of Guatemala.  
Image: Ana Giró Petersen, Healthy Reefs Initiative

Currently, the Motagua River is being directly affected by changes in land use due to deforestation and agro-industry, but mainly due to waste water and pollution by large amounts of solid waste, where the major source of wastes are mainly plastics and styrofoam. The river acts as a receiving body for the wastewater of several communities located in the basin and sub-basins, including part of Guatemala City (where the greatest amount of pollution goes to the river). The fact that the river acts as a recipient is relevant because of its major role as a body of water that transports pollutants to the communities settled in the lower part of the river channel as well as the effects these pollutants have on the populations of fish, crustaceans and other aquatic organisms. All these impacts have caused it to be classified as one of the most polluted rivers in the country. Also, the Motagua River is intimately linked to the Mesoamerican Reef System, and its high pollution is directly affecting several marine and coastal ecosystems of environmental importance such as mangroves, seagrasses and coral reefs.

The high sedimentation and pollution caused by nutrients in the basin that then drains to the reef, is mainly caused by domestic and industrial wastewater and agrochemicals. These are the main factors that cause a negative impact on marine and coastal ecosystems.


Specifically, the deterioration of coral reef ecosystems due to an excess of nutrients in the water. A high amount of nutrients can cause an over proliferation of fleshy macroalgae, which compete directly for space in the reef, causing a decrease in coral cover.

The excess of nutrients due to poor basin management and also a low biomass of key herbivores in the reef, such as parrotfish, surgeonfish, black long-spined urchin (*Diadema*), king crab, among others, have caused the unbridled increase of macroalgae in the reefs for Guatemala and the Mesoamerican Reef System region. We must remember that reefs are important because of the key role they play in the ecosystems and the goods and services they provide. Coral reefs reduce the impact of waves, contribute to coastal protection, besides being spawning, nursery, refuge and feeding areas for a great variety of species of ecosystem and commercial importance. Coastal communities depend directly on these ecosystems for their livelihoods.

For Guatemala, urgent actions are needed to reduce coastal pollution, nutrients run-off from watersheds, pollution by wastewater and an increase in herbivory. One of the main achievements for the increase of herbivory has been the declaration of a fishing ban for the protection of parrotfish in the Caribbean of Guatemala. It was established for five years from 2015 to 2020 where fishing of these key herbivores is prohibited. This ministerial agreement was decreed by the Fisheries Department with the support of the Healthy Reefs Initiative (HRI), and HRI provided scientific information that supports this regulation to increase the fishing ban for another five years.



Coral Reef inside the Wildlife Refuge Punta de Manabique, Guatemala. Image: Ana Giró Petersen, Healthy Reefs Initiative

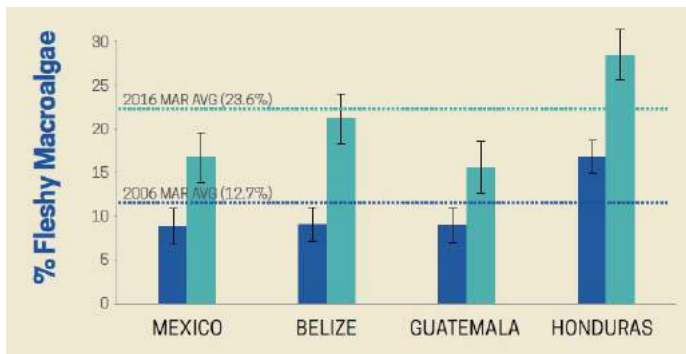
The HRI continues its efforts to reduce this problem through the establishment of new restoration programs for key herbivores (*Diadema* urchin and king crab) to deduce macroalgae in the Mesoamerican reef region. 

**Ana Giró Petersen** is based in Guatemala City, her home country. She has been leading coral reef monitoring programs in the Caribbean coast of Guatemala for 13 years, using different methodologies. She is currently working for the Healthy Reefs Initiative as the Guatemalan Coordinator. Ana worked as a professor of the University of San Carlos of Guatemala from 2009 – 2013, teaching oceanography and coral reef ecology, and has also worked in different projects for the United States Agency for International Development (USAID), Global Environmental Fund (GEF) and local NGOs.

## Macroalgae proliferation and how we combat it!

**Marisol Rueda Flores & Ian Drysdale**

In the last decade, fleshy macroalgal biomass has nearly doubled across the Mesoamerican Reef (MAR) from 12.7% to 23.6%, with significant increases in all four countries (Mexico, Belize, Guatemala, and Honduras). Given its rapid growth when there are nutrients in the water, fleshy macroalgae can quickly overgrow a reef. These nutrients originate from the inadequate sewage treatment, agricultural and industrial run-off, fertilizers from golf courses, land clearing and coastal development (including dredging).

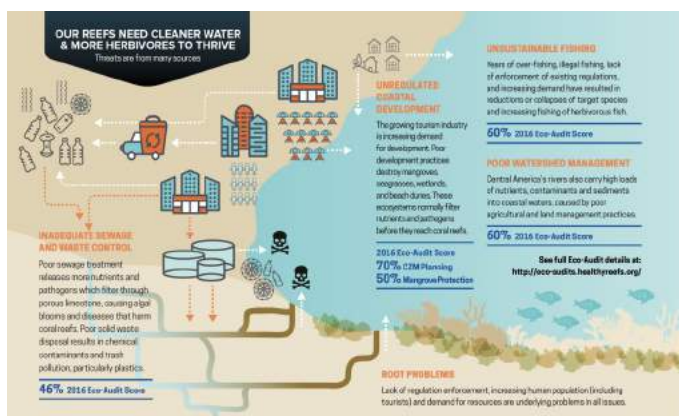


Fleshy macroalgae cover increase from 2006 to 2016.

Image: 2018 Report Card, Healthy Reefs for Healthy People Initiative

These nutrients contain high amounts of phosphates and nitrates that cause rapid macroalgal proliferation, since macroalgae feed on them. As macroalgae settle on top of corals, they interrupt the light available for corals, their biological functions such as feeding, breathing and reproduction are jeopardized, and eventually corals could die, ending up with a reef dominated by macroalgae cover.

Habitat destruction accompanies this issue, through the direct loss of mangroves and seagrass beds for coastal development and related activities; thus reducing the capacity of these ecosystems to absorb nutrients and other pollutants. The reduction of important herbivores in the reef, such as parrotfish, surgeonfish, king crabs and *Diadema* sea urchin is another great concern.



Sources of contamination and threats to our water and reef ecosystem.

Image: 2018 Report Card, Healthy Reefs for Healthy People Initiative

Urgent actions are needed to reduce coastal and watershed nutrient and sewage pollution, along with direct interventions to increase herbivory in these important ecosystem. If these actions are taken, we expect a gradual algal reduction – if not, the proliferation will continue. At the Healthy Reefs for Healthy People Initiative (HRI) we have started four projects to increase natural herbivory in the reef:

1. Parrotfish protection across the MAR
2. Caribbean king crab research for future aquaculture
3. Long-spined sea urchin (*Diadema*) lab rearing and translocation
4. Direct removal of macroalgae through volunteer divers using scissors and a vacuum to remove macro-algae.



Macroalgae proliferation in Honduras.

Image: Ian Drysdale, Healthy Reefs Initiative

All these efforts need to always be accompanied by improvement in water quality entering the reef. Especially from waste water treatment plants. Actions need to be taken to increase the number of adequate treatment plants, while at the same time increasing the number of connections to these plants. West End, a small coastal town on the island of Roatan in Honduras, has been our most successful case. The local water board (or water managing entity), called Polo's Water Association, has been able to improve potable and waste water coverage in the area.

Since 2005, a group of concerned residents, guided by HRI and The Coral Reef Alliance, have worked with granting entities to build more needed infrastructure and connect residences and businesses to the sewage system. The treatment plant was built in 2011, and when handed over to the water board in 2012, there were only 106 (or 37%) of the community buildings connected. By October of 2018, Polo's has reached 282 connections, which translates into 97% of the community, all through international grants and projects, and by working directly with the homes and businesses in the area.



Water treatment plant installation in Roatan, Honduras.

Image: Polo's Water Association




A major component ensuring the success of Polo's has been the transparent management of funds. All water and treatment payments are done at local banks, and all the accounting books are open for anyone to see by visiting the Customer Service Office. Polo's has also worked closely with the entity that oversees water boards at a national level, and this collaboration has led to the creation of nationally-sanctioned water tariffs, that include real-time costs for potable water, sewage treatment and improvements to both systems.

By providing all these advances, marine water quality has greatly improved, especially in Half Moon Bay. This bay, right in the centre of West End, is the beach used by all when visiting this small coastal town on Roatan. Through collaborations with the Bay Islands Conservation Association (BICA), who carry out marine water quality analysis on a monthly basis, we have seen a 30% reduction in *Enterococcus* [lactic acid bacteria] counts in this bay. We will soon have enough data to apply for a Blue Flag Beach Program certification, which will increase visitation and the economy of this town.



Water quality tests at water treatment plant in Roatan, Honduras.  
Image: Polo's Water Association

This case proves that a united community, with a clear focus on sanitation, can reach its goal of providing a reliable potable water service, and through transparent management of funds, can acquire grants to improve waste water treatment. Visitors can now swim in clean waters, while the neighboring reefs are showing signs of increased coral health and reduced macroalgae cover. 

**Marisol Rueda Flores** is the Communication Consultant for the Healthy Reefs for Healthy People Initiative, based in Playa del Carmen, Mexico. She earned her degree in Biology from Morelos State University in 2004 and later completed her Masters in Science on Marine Resource Management in 2007 at CICIMAR-IPN (La Paz, B.C.S., Mexico). She studied blue whales and collaborated as research assistant in different projects from population structure, fatty acids and isotopic change of several cetaceans as well as the geochemistry in the Gulf of California. She has participated in diverse environmental education programmes focusing on the ecology and biology of marine invertebrates and the substrates, cetaceans, sea turtles, tortoises and vegetation in different countries like Mexico, Costa Rica and Galapagos Islands, Ecuador. Her drive is sharing information with other people with effective communication and she has been a passionate scuba diver since 1999.

**Contact:** [rueda@healthyreefs.org](mailto:rueda@healthyreefs.org)

**Ian Drysdale** is the Honduras Coordinator of the Healthy Reefs for Healthy People Initiative. He is in charge of data collection, AGRR training, as well as the development of partner relations and other outreach and media efforts in Honduras. Ian has an undergraduate degree in Environmental Engineering and a Sustainable Development master's degree. Over the years he has worked on different projects with The Nature Conservancy (TNC), World Wildlife Fund (WWF), Conservation International (CI), Coral Reef Alliance (CORAL), United States Agency for International Development (USAID) and CARE. He resides on the island of Roatan, Honduras with his wife Jenny Myton, working on reef protection and management since 2002.

**Contact:** [drysdale@healthyreefs.org](mailto:drysdale@healthyreefs.org)

**More information:** [healthyreefs.org](http://healthyreefs.org)

## WASTE PLASTIC

### The plastic nightmare in Quintana Roo, Mexico

**Marisol Rueda Flores**

Plastic was invented in the late nineteenth century, having its peak of use in 1950 after the Second World War. Initially, plastic was created with a 'positive' justification such as decreasing the amount of time a woman would spend in the kitchen washing dishes (hilarious) thanks to the use of disposables, replacing ivory products from elephants with plastic, thus saving the death of many of them, or, being able to bring bottled water to distant places where drinking water is not easy to obtain.

The problem with plastic is the overuse we give it; producing exponentially from only 2.3 million tons in 1950 to 448 million tons in 2015 worldwide. Today 40% of plastics are used for packaging, reaching such ridiculous ends as wrapping a single apple in plastic. In the world, 6.9 billion tons of plastic waste is generated every year,

where only 9% is recycled, 12% incinerated and 79% ends up in sanitary landfills or in our ecosystems in countries where we have a poor system of solid waste collection and final disposal. This amount equals pouring 8.8 million tons into the oceans every year, which would be a garbage truck every minute.



Pelican surrounded by plastic pollution at Sian Ka'an Biosphere Reserve, Quintana Roo. Image: Karen Fuentes, Mexican Caribbean Manta Ray Project

It is estimated that by 2050, 99% of seabirds on the planet will have eaten plastic and there will be more plastic by weight than fish in the sea. Today we know that around 700 species of marine animals have eaten plastic or have been trapped in it. Surprisingly, corals are even part of this list, being able to distinguish between the colors of the microplastic in order to ingest the one of their preference.

Microplastics measure around 5mm and are the almost invisible problem of ocean contamination because, although they are not easily seen with the naked eye, they are absorbed in the trophic food web, reaching top predators, which are often part of the human diet. And the problem is even greater when we consider nanoplastic (1 to 100nm) as they can pass to animal tissues and contain additives such as water repellents, fire retardants, pigments, etc., which are toxic substances for them and for us if we are consuming fish as part of our diet.

Mexico is the 12th largest consumer of plastic in the world with more than 7 million tons and is estimated to introduce more than 101,000 tons each year to the ocean. Only 12% of the total plastic accumulated for recycling is recovered. According to censuses conducted by INEGI (the National Statistics Institute) in Mexico, between 23,915.15 and 95,624.60 tons of plastic are produced daily. That equals the consumption of between 200 to 800 grams per person per day. Of all the plastics produced in Mexico, 26% is used for the manufacture of plastic bags and film, 13% for plastic bottles, and 13% for auto parts accessories. The rest is used for the manufacture of foams, household items and packaging, among other products for industrial use.

The United Nations (UN) estimated that in the Caribbean Sea float between 600 and 1,400 pieces of plastic per km<sup>2</sup>, placing it as the second most contaminated with plastics after the Mediterranean Sea. Quintana Roo is the Mexican Caribbean coastal state and has in its front yard the second largest reef in the world: the Mesoamerican Reef. More than 400km of its total 1000km extension are in our Mexican waters.

Different people and institutions have shown great concern for this problem in Quintana Roo, so in 2018 during the Oceans and Environmental Day for a Quintana Roo free of plastic, the educator Alejandra Cornejo and I organized to create a conference entitled Desplastificate (Get Rid of Plastics), which served as a campaign to sensitize the population on the problem of plastics and in turn share ideas on how to reduce their consumption. This campaign began with the objective of changing the consumption of single-use plastics towards sustainable and less polluting solutions, influencing the government, the hotel industry, and the general population in Quintana Roo, starting with Playa del Carmen and Tulum.

Today we have expanded this campaign to other municipalities in our state such as Bacalar, Puerto Morelos, Cancun and Chetumal. The Department of Ecology and Environment of the State of Quintana Roo has also adopted this campaign, together with other participating


institutions such as the Healthy Reefs Initiative, Centinelas del Agua, Amigos de Isla Contoy and others, to accompany the process of amending the Management Law of Solid Waste of the State of Quintana Roo. This modification of the law is in the process of authorization this year, hoping that it prohibits the consumption of single-use plastic products. While this process culminates, the campaign Desplastificate seeks to create awareness about how plastics pollute our precious ecosystems, have an effect on public health and the economy of the population.

We also know from the beach clean-ups organized by Karla Munguía Colmenero, representative of 4Ocean in Quintana Roo, the amount of solid waste collected in a period of 2 hours. It includes items such as 5.2kg (133 items) of plastic bottles, 263 bottle caps, 36 disposable cutlery, 30 plastic bags, 78 six pack rings, 150 plastic cups, 63 plastic straws, 15 styrofoam cups, and the most impactful number 6,566 cigarette butts. The latter contaminate 50 litres of fresh water and 8 litres of salt water per cigarette butt.



Collected solid waste (mainly plastics) after a beach clean up in Playa del Carmen, Quintana Roo. Image: M. Rueda, Healthy Reefs Initiative

More and more information is being generated about plastics in Quintana Roo, and one of the existing projects quantifies the amount of microplastics trapped in the sargassum stains floating in the sea on Cozumel Island, led by Karen Fuentes of Mexico Caribbean Manta Ray Project.

Many more efforts must be generated to ensure that our state has a lower generation of plastic waste, an adequate management until its final disposal, which should be, for the most part, an increase in the percentage of recycling, freeing the few spaces of sanitary landfills that have collapsed in the state and especially generating a population with greater human and ecosystemic health for a sustainable future. In the Healthy Reefs Initiative, we will continue working to raise awareness of the importance of eliminating the use of single-use plastics in our daily lives, not only informing about the repercussions to our Mesoamerican Reef, jungles, cenotes (sinkholes) and mangroves, but also about the viable and easy alternatives to stop using plastics forever. 

The Healthy Reefs for Healthy People Initiative was launched in 2003 on the premise that healthy reefs are essential to sustaining healthy people. In turn, only when local people are healthy and thriving can they be expected to protect the reefs and other natural resources upon which their livelihoods and quality of life depend.





## UK SUSTAINABLE TRANSPORT

### The importance of walking and cycling to school

Rachel White

Not every parent and carer is able to walk or cycle with their child to school, but many could who currently aren't, and the potential benefits could have a huge impact on children's health.

#### The growing public health crisis

Nearly a third (31%) of children aged 2–15 are overweight or obese in the UK<sup>1</sup> and as many as 42% of children get less than half the recommended hour of physical activity a day<sup>2</sup>. Kids today simply aren't getting enough exercise and this is compounded by the proportion of children walking and cycling to school having declined since 1995 in England<sup>3</sup>. Meanwhile, the dominance of motor vehicles continues to grow, with as many as one in four cars on the road during the morning peak being on the school run<sup>4</sup>.

In addition, an investigation<sup>5</sup> in 2017 by the Guardian and Greenpeace found that over 2,000 nurseries and schools are in areas with harmful levels of nitrogen dioxide, above the EU legal limit. Of which the primary cause is car exhausts. This is worrying as children's lungs are still developing so they are most susceptible to toxic particulates, as shown by the recent link of a child's tragic death to air pollution.

#### A simple route to cleaner air and increased activity

There are two inter-related issues here – one is too many cars on the road around schools, which impacts the second – the low number of children walking and cycling.

The dominance of cars on the school run causes road safety fears amongst parents and carers. This in turn prevents them from allowing their children to walk and cycle to school, and contributes to an unhealthy environment.

It is clear that we need fewer cars on our roads to reduce safety fears and improve the quality of the air we breathe. We also need those journeys to be converted into more children walking and cycling. Not only is it a great way to help children achieve the recommended hour of physical activity a day, but has also been found to help prepare children for the school day by waking them up and making them more eager to learn.

Walking and cycling also brings children into better contact with their natural environment rather than being trapped in a car; and it embeds a physically active lifestyle from a young age which is something they are likely to carry into adulthood.

#### The National Cycle Network

So how can we encourage more children to walk and cycle to school?

We first need the right infrastructure in place. Road safety is a key concern for many families so we need to create as many traffic-free routes to school as possible. Sustrans is custodian of the National Cycle Network which is 16,000 miles long and runs across the whole of the UK. Currently 56% of journeys on the Network are taken for functional reasons, such as travelling to work and school and large sections are already traffic-free. Sustrans has the ambition to make the whole network traffic-free or on quiet, low traffic roads which will help give families the confidence to walk or cycle the school run.

#### School street closures

In some cases it's not possible to create traffic-free routes direct to school, particularly in large towns and cities. When this is the case we need to enable more schools to stop or reduce motor traffic outside of the school gates. One way of doing this is through 'School Streets' whereby the roads outside a school are closed for drop-off and pick up, which opens the streets back up to families and improves air quality. Edinburgh and Hackney have trialled this already with great results.

In Edinburgh, nine schools participated in a pilot of school streets. As a result, two thirds of parents and residents agree that streets with vehicle restrictions felt safer during operating times. The project also identified air quality improvements, with associated reductions in nitrogen oxides on all tested closed streets and most surrounding roads.

Filtered permeability whereby motor traffic is restricted on streets outside schools is another way to improve road safety and increase the numbers of families walking and cycling. This can be done through restricting the flow of motor traffic so it can only go in one direction or through light touch measures, such as planters which narrow the road to motor traffic and reduce the speed of vehicles.

#### Creating a culture where cycling and walking is normalised

Whilst infrastructure is vital, there needs to be the behaviour change programmes that work alongside it, so that children and their carers are confident on a bike. This is why Sustrans would like to see active travel embedded into the formal education curricula and wider school culture.

It is clear that when it comes to getting more children to walk and cycle the school journey there is no 'one size fits all approach' but when the majority of families live within a walkable or cycleable distance to the school grounds, more needs to be done to create streets that work for people and create spaces where children can get about actively in safety.



BikeLifeEdinburgh. Image: Colin Hattersley

#### References:

1. Royal College of Paediatrics and Child Health (2016) [rcpch.ac.uk/obesity](http://rcpch.ac.uk/obesity)
2. NHS Digital (2013) *Health Survey for England* [content.digital.nhs.uk/catalogue/PUB16076](http://content.digital.nhs.uk/catalogue/PUB16076)
3. Department for Transport (2014) *National Travel Survey 2014*. (England) [tinyurl.com/y6rcppb7](http://tinyurl.com/y6rcppb7)
4. Ibid. One in five cars in Northern Ireland [tinyurl.com/y4nt6jck](http://tinyurl.com/y4nt6jck)
5. [tinyurl.com/lvh586n](http://tinyurl.com/lvh586n)

Rachel White is Senior Policy and Political Advisor at Sustrans.

More information: [sustrans.org.uk](http://sustrans.org.uk)

## Walking buses at Portadown School

**Rachel White & Feargal Magee**

Portadown Integrated Nursery and Primary School is located in the town of Portadown, County Armagh in Northern Ireland, and suffers from bad congestion, making the school run a daily battle for parents, pupils and teachers alike. To reduce the number of cars during drop-off and pick-up time, the school has set up two walking buses on the Craigavon Cycle Trail to help children start their day with a little exercise and fresh air.

There is a lot of traffic in the local area because of a nearby housing estate and hospital which means the roads around the school are very congested, especially during pick up and drop off time. We're also based in a cul-de-sac, so it is difficult for cars to move around, as space is limited. This means the environment around the school gates can become very chaotic.

To help reduce the volume of traffic outside the school gates and encourage more children to walk or cycle, we organise two walking buses on the Craigavon Cycle Trail which links to the National Cycle Network Route 94 near Portadown. Forty pupils assemble at two meeting points every morning – a housing development and a set of local shops – and are led by two teaching assistants down quiet traffic-free routes. This means they avoid breathing in toxic fumes from cars and start their day with a healthy dose of exercise.

“... Me and my best friend come  
to school on our scooters with  
the walking bus every day.  
It's really fun.”  
Pupil, Portadown Integrated Primary

Quote from local Sustrans newsletter (2015).  
Image: [tinyurl.com/y2sqn46o](https://tinyurl.com/y2sqn46o)



One of the meeting points for the school walking bus.  
Image: [tinyurl.com/y46dvhx2](https://tinyurl.com/y46dvhx2)

It's great to see all the big smiles on their faces as they undertake the 10-minute walk to school – arriving fresh faced and eager to learn. The local community have even commented on how joyful everyone looks, with one local woman saying that watching the children's smiling faces pass her window is her favourite part of the day.

Without the nearby traffic-free paths, very few pupils would walk, scoot or cycle in, because the busy and congested roads in the local area are a huge safety concern. We've had fantastic feedback from parents who really value the time our two assistants put into organising the walking bus, as well as the local council.

We want to continue to encourage as many pupils to walk, scoot or cycle to school and plan to open up the cycle path which leads up to the school gates. This is currently overgrown with weeds and not accessible to our students. Doing this, I believe, will help put parents at ease, knowing their children are travelling to school on a traffic-free path which leads right up to the gates. 🌱

.....  
**Feargal Magee** is the Head Teacher of Portadown Integrated Nursery and Primary School.

## UK HERITAGE

### Experiencing the past at Butser Ancient Farm

**Rachel Bingham**

Butser Ancient Farm is an archaeological research site, working farm and specialist education venue nestled in the South Downs close to Petersfield in Hampshire. At the farm we welcome over 35,000 school children every year to get hands-on outdoors and learn about our ancient past. Activities take place between our Stone Age, Iron Age, Roman and Saxon buildings and cover a range of ancient crafts, technology and traditional skills from wattle, spinning, jewellery making and pottery to excavating in our archaeology trenches.

At Butser we aim to make the experience as multi-sensory as possible. Groups are advised in advance to wear old clothes as they are likely to end the day muddy and smelling of smoke... and with a smile on their faces!

Once groups have had an introductory safety talk we lead them to one of the houses; here the scene is set for

their visit around a roaring fire. We often close the doors to the roundhouse and plunge the space into darkness to create a real sense of the atmosphere of a prehistoric house. Lit only by a crackling fire this is often the first time the children have been so close to an open hearth.



Children having an introductory talk with Maureen in the roundhouse.  
Image: Rachel Bingham





Demonstrating spinning in front of the iron age enclosure.  
Image: Rachel Bingham

The rest of the day follows in this style – there’s no sitting down and watching as others do things at Butser – after a brief demonstration it’s all about getting stuck in and having a go. Our wattle fence activity is a great example and gives students the confidence that they could build their very own shelter if they needed to! This activity is something quite physical and needs perseverance and team work to achieve. In larger groups we split the class into two groups and they can each work on their own fence, adding an element of friendly rivalry too! The students then work in pairs and take it in turns to lay their own branch to build up the wattle fence. Once it’s a few feet high they can then try as a team to push their fence over and see how strong their handy-work is!

Learning this ancient skill is a great way to connect groups to the buildings they see all around them on the farm. Wattle is an ancient technique used in the construction of fences and walls; poles are intertwined with twigs, reeds or branches to create a rigid structure. Wattle and daub is a traditional way of constructing walls, dating back at least 6000 years, in which the lattice of wooden strips is covered in a sticky material made from wet soil, clay, straw, sand and even animal poo! Everywhere you look at Butser this wattle technique can be seen, from our Stone Age buildings, the Saxon Hall and the many fences around our animal enclosures; students can really see the outcomes of their activity in action and use all around them.

## Interpretation: creating memorable moments through informal education

**Dr. Philip Ryland & Jim Mitchell**


Environmental interpretation is widely accepted as a process of communication which aims to deliver meaningful information in an informal, relaxed way to visitors (Benton, 2009; Brochu, 2003). The type of information provided varies considerably between sites but will typically include a range of carefully selected themes and/or messages which are designed to increase the visitor’s understanding, experience and appreciation of the site’s wildlife, geology, landscape and peoples. However, information provisioning is only one aspect of interpretation, for as Tilden (1977:8) stated:

*“interpretation should capitalise on mere curiosity for the enrichment of the human mind and spirit.”*

One of the most widely recognised forms of on-site interpretation is where a guide, volunteer or ranger leads a group of visitors on an informal guided walk around the

We get some lovely feedback from teachers and students about their visit really *“enriching the curriculum through experience”* and *“allowing them to have a hands-on experience; even just sitting in a smoky roundhouse brought history to life”*. Teachers say the experience means *“the children have been able to make connections between themselves and history”*, so we can really see the value of getting outside the classroom and getting hands-on in making the past relevant today.

At Butser, we embrace life-long learning, our weekly volunteers learn traditional skills from the many craftsmen on site and we have a full schedule of public workshops throughout the year from sword making to singing. We also host lots of events and talks throughout the year and every day there is the chance for visitors to get hands-on with a range of DIY archaeology experiments from excavation and Stone Age painting to spinning and mosaic making.

Butser is all about bringing the past to life and it is only through doing and being outside that we really feel that is possible. There is an old Chinese proverb written on the wall of our offices: ‘I hear and I forget; I see, and I remember; I do, and I understand’ and we hope that by giving people the opportunity to learn and try ancient and practical skills, they will leave remembering Butser and what they have learnt for a long time. 

**Rachel Bingham** is the Creative Developer at Butser Ancient Farm in Waterlooville, Hampshire.

**Contact:** [creative@butserancientfarm.co.uk](mailto:creative@butserancientfarm.co.uk)

**More information:** [butserancientfarm.co.uk](http://butserancientfarm.co.uk)



site, stopping at various points of interest on the way (Ham, 2013; Ward and Wilkinson, 2006). In studies from 2015 and 2018 by one of the authors, the reasons for visitor engagement with a guided walk on The Jurassic Coast included:

- *“it is an enjoyable activity”* (85%, 2018 / 79%, 2015)
- *“to view wildlife”* (72%, 2018 / 67%, 2015)
- *“to learn more about the site”* (67%, 2018 / 65%, 2015)
- *“to spend time with the family”* (24%, 2018)

and in terms of the wildlife, the visitors wished to see:

- birds (85%, 2018 / 79%, 2015)
- butterflies (68%, 2018 / 70%, 2015)
- flowers (65%, 2018 / 68%, 2015)
- marine life (42%, 2018 / 46%, 2015)
- geology (38%, 2018 / 29%, 2015)
- general wildlife (36%, 2018 / 17%, 2015)

Visitor participation is a very important part of a guided walk and typically may include handling and smelling objects, spotting the signs and tracks of animals as well as sharing opinions and feelings about the site and most importantly the wildlife seen. Indeed as Lewis (1980:27) reminded us, visitors remember about “10% of what they hear, 30% of what they read; 50% of what they see and 90% of what they do”. Encouraging the establishment of an emotional connection with the site is an important aspect of interpretation and this can be facilitated on a guided walk in a variety of ways including: the passion and emotion of the guide’s commentary; the direct participation of the visitors as well as the use of ‘teachable moments’ (Brochu and Merriman, 2002; Ham, 2013). ‘Teachable moments’ provide the opportunity for the guide to engage with the group on an individual basis and ‘moments of reflection’ allow for the potential development of a stronger ‘personalised experience’ (Ward and Wilkinson, 2006). The use of ‘spirit of place’ in particular can also often be highly effective in simulating a strong association and connection with the site.

A model which has been widely adopted in order to develop effective and successful interpretation is the TORE model (Ham 2013) where TORE stands for ‘Thematic, Organised, Relevant and Enjoyable’. In applying this model to a guided walk, the leader of the walk should consider the following points.

**Thematic** – Develop an interesting theme for your walk. How does the theme support your overall on-site goals? What story are you going to tell? Use your theme or key message to help weave and reveal a fascinating tale during the walk.

**Organised** – Present your information in a way that is easy to follow. Keep the information linked to your theme. Don’t jump in ‘at the deep end’ with detailed facts, but build the story as you go.

**Relevant** – Relate your content to your audience’s interests and experience, for example by using *universal concepts*. These are things that all people relate to: emotions, needs and desires, fascinations with mystery, suspense and our wider place in history, culture and the universe.

**Enjoyable** – This doesn’t mean that the walk has to be laugh-a-minute. But, it does need to be something the audience wants to spend their leisure time doing. The subject matter could be dark, but people can still ‘enjoy’ a scary or haunting experience. In a nutshell – avoid being boring or dull by keeping things moving and lively during the walk.

The following comments reflect recent research undertaken by the authors to capture feedback from visitors who undertook informal guided activities in two locations across Dorset and Hampshire.

#### **Guided walks in a World Heritage site: Jurassic Coast**

Two comments illustrating the use of ‘teachable moments’:

*“He spotted the Green Woodpecker in flight and we all followed it to get a closer look, what a beautiful bird it was.”* (Respondent 509, 2017)

*“We were looking at the rockpools when a small crab appeared, the guide picked it up for us and talked about the life of a crab in the cove, it was great.”* (Respondent 586, 2017)

The use of ‘spirit of place’ to encourage an emotional experience can be deliberately stimulated through the enhanced use of the visitor’s senses (Davidson and Black, 2007), two examples are:

*“We sat there and felt the cool water on our feet and imagined what it was like to be a crab.”* (Respondent 586, 2017)

*“We sat there in the sunshine and I felt I could hear the earth breathing.”* (Respondent 549, 2017)

Davidson and Black (2007) also suggest that two-way communication where knowledge is shared and where visitors listen to one another as well as the guide can be powerful in establishing a connection, such as:

*“We all shared our knowledge and experiences, it was wonderful.”* (Respondent 510, 2017)

For visitors being able to ‘take part’ and ‘get involved’ can make a walk really special. Sharing wildlife identification tips is commonly mentioned by visitors as an example of this, such as:

*“During the walk, we collected some empty shells and laid them on a rock, [our guide] then identified them for us.”* (Respondent 589, 2017)

*“I shall always remember the sound of that skylark... We learnt so many birds’ songs that morning.”* (Respondent 529, 2017)



The Jurassic Coast World Heritage Site. Image: Jurassic Coast Trust

#### **Guided activity in a National Park: the New Forest**

Feedback from the New Forest National Park Walking Festival (2016 and 2017) gives further support to the need to create activities to explore and experience nature using several senses, such as:

*“Very lovely walk, feeling, listening, seeing, touching, smelling, using all your senses. The guide was very good and explained everything, what we were doing, why and when.”* (Nature Connection walk, 2017)

*“The guide was fabulous! Great with the kids. Lots of fun activities and challenges. She gave us some amazing food and drink to sample, and all from foraging.”* (Wild Foods of the Forest walk, 2016)

It is also important to involve the whole group, and not ignore younger participants. This is often commented upon in visitor feedback, such as:

*“I really appreciated those leading events - they were good at involving youngsters.”* (Wild Play walk, 2017)



It is also wise not to underestimate the effect a good guide can have, even to those who might know the subject or area well:

*"I enjoyed this walk immensely even though I know the history of the area extremely well. The guide was excellent, informative, friendly, very knowledgeable and approachable. I especially liked the snippets about the flora and fauna, and I saw a kingfisher for the first time in this area (well organised!!)."*

(Guided walk, 2017)

In summary, guided walks should show visitors, as Ham (1992:131) stated, 'things that they'd otherwise not see or that the untrained eye probably wouldn't notice' and beyond that should inspire the visitor and awaken a sense of interest and potentially a personal connection to the site. Ultimately, as Diment (1992) stated, the success of the walk will be based upon the guide's passion and 'imagination' to inspire the visitors as illustrated by this comment:

*"Her infectious enthusiasm and interactive style made it a truly memorable morning."*

(Respondent 514, 2017)


### Background to the study locations

The Jurassic Coast was designated a World Heritage natural site (criteria i) in December 2001 through meeting the World Heritage criterion that a nominated site should be 'an outstanding example representing a major stage in the earth's history' (Jurassic Coast Trust, 2019; UNESCO, 2002). The site, of approximately 2,550ha comprises 95 miles (155 km) of unspoilt coastline (described in the designation as being from low water mark to cliff top) from Studland Bay on Purbeck to Orcombe Rocks near Exmouth, in East Devon (Brunsden, 2003; Jurassic Coast Trust, 2019). The Jurassic Coast World Heritage site is both nationally and internationally important in terms of its geology, geomorphology and perhaps most notably its fossils, it represents an impressive 185 million years of earth history covering Triassic, Cretaceous and Jurassic periods as well as offering a scenic and unspoilt coastline, cliffs and beaches (Brunsden, 2003).



The New Forest National Park (219 square miles) is one of the jewels in the British landscape – a world capital for wildlife in the busy south of England. The New Forest has long been recognised as a beautiful place, rich in history and wildlife habitats; the landscape shaped by the traditional practice of grazing animals. Its designation as a National Park gives it the highest level of landscape protection. In addition, over half the national park is designated as being of international importance for nature. It's also an excellent place for people to reconnect with



the natural world, to improve their health through outdoor activities and boost their wellbeing by getting outside. Over 15.2 million recreational visitor days are taken in the national park each year. 

### References:

- Benton, G.M. 2009. From principle to practice: four conceptions of interpretation. *Journal of Interpretation Research*, 14(1), pp. 7-31.
- Brochu, L. 2003. *Interpretive planning: the 5-M model for successful planning projects*. NAI, CO: Interp Press.
- Brochu, L. and Merriman, T. 2002. *Personal interpretation: connecting your audience to heritage resources*. NAI, CO: Interp Press.
- Brunsden, D. (ed.). 2003. *A walk through time – the official guide to the Jurassic Coast*. Wareham, Dorset: Coastal Publishing.
- Davidson, P. and Black, R. 2007. Voices from the profession: principles of successful guided cave interpretation. *Journal of Interpretation Research*, 12(2), pp. 25-43.
- Diment, N. 1992. Show, tell and move on. *Interpretation*, 7(3), pp. 2.
- Ham, S.H. 1992. *Environmental interpretation: a practical guide for people with big ideas and small budgets*. Golden, Colorado: North American Press.
- Ham, S.H. 2013. *Interpretation: Making a difference on purpose*. Golden, CO: Fulcrum Publishing.
- Jurassic Coast Trust. 2019. *What is the Jurassic Coast?* Available at ([jurassiccoast.org/about/what-is-the-jurassic-coast](http://jurassiccoast.org/about/what-is-the-jurassic-coast)), [last accessed: 7<sup>th</sup> February 2019].
- Lewis, W.J. 1980. *Interpreting for park visitors*. Conshohocken, PA: Eastern Acorn Press.
- Tilden, F. 1977. *Interpreting our heritage* (3<sup>rd</sup> ed.). Chapel Hill: The University of North Carolina Press.
- UNESCO. 2002. *Operating guidelines for the implementation of the World Heritage convention*. Paris: UNESCO.
- Ward, C.W. and Wilkinson, A.E. 2006. *Conducting meaningful interpretation: a field guide for success*. Golden, CO: Fulcrum Publishing.

### The Association for Heritage Interpretation (AHI)

The Association for Heritage Interpretation is an invaluable group for anyone interested in the field of interpretation – the art of helping people explore and appreciate our world. Its mission is to support practitioners, celebrate excellence and raise the profile of interpretation generally, in order that lives are enriched by great interpretation. The AHI offers a forum for ideas, debate, networking and the sharing of good practice. In so doing, it brings together people actively involved or concerned with the interpretation of natural and cultural heritage.

**Dr Philip Ryland (MAHI)** teaches tourism and is also Associate Dean (Student Experience) in the Faculty of Management, Bournemouth University.

**Jim Mitchell (MAHI)** is Interpretation and Outreach Manager, New Forest National Park Authority. He is Chair of the Association for Heritage Interpretation.

**More information:** [www.ahi.org.uk](http://www.ahi.org.uk)

## 30 Days Wild: engaging people with the natural world

Thomas Hibbert

30 Days Wild is a campaign created by The Wildlife Trusts to encourage people all around the UK to be more connected to the natural world around them. It's a simple concept: do something wild every day throughout the month of June. They coined the term Random Acts of Wildness to describe these daily doses of nature.

Random Acts of Wildness can be something small, such as taking a few seconds out of your day to smell a wildflower, or something much larger, like spending a few hours at a nature reserve. The only defining criterion is that these acts somehow engage people with the natural world. To inspire participants, The Wildlife Trusts provided a range of resources (both physical and digital) to get people started, including suggested Random Acts of Wildness.

There is a growing body of evidence to indicate that contact with nature provides benefits to health and wellbeing, as well as resulting in more pro-nature behaviour. A study with participants of 30 Days Wild in 2015 found that the campaign led to sustained increases in people's connection to nature, with associated improvements to health, happiness and environmentally responsible behaviours (Richardson et al., 2016). The survey has been repeated in 2016 and 2017, and results will be available soon.

This is especially important in young people, where a connection to the natural world can not only improve health and well-being, but also encourage an environmentally responsible outlook in life. Recognising this, The Wildlife Trusts produced a 'Wild Schools Pack' that educational institutes could request in order to participate in the challenge. This pack included example lesson plans designed to encourage learning by making nature part of school life, both by taking children outdoors and by bringing nature into the classroom.

In 2016, 2,250 school packs were requested, with the number increasing to 5,800 in 2017, reflecting the growing interest of practitioners in introducing nature into their students' education.

### 30 Days Wild in action

One of the schools that participated in 30 Days Wild was Blandford St Mary Primary School in Dorset. Initially, the teachers intended the challenge as a post SATs respite, spending a few minutes a day outdoors to give both the children and the teachers a break. However, they quickly recognised the potential of the campaign and their engagement increased.

Some days were simply about using the Random Acts of Wildness to connect the children to nature, walking barefoot on the grass or finding shapes in clouds, but soon they began to weave nature into lesson plans. English lessons involved crafting creatures from clay and natural objects, then writing descriptive sentences about their creations. The children's experiences of nature began to expand their descriptive powers as they were exposed to new sensory stimulations.

The school's Deputy Headteacher, Sam Harris, remarked that 30 Days Wild brought on a positive change in the children, stating that:


*"Those who could be difficult to engage in class or those quiet children who rarely contributed became calmer, more engaged or more confident in participating within the class. I would even say we collectively became mindful – of ourselves, our group and of the world outside. It was transformative; you see children and the world around you in a different light and it changes what you do forever."*

The Year 4 children echoed these sentiments when sharing their thoughts on 30 Days Wild in a school assembly. Several pupils remarked that the fun and creative nature of the activities made them more eager to learn, with comments including: *"It's creative, you learn more about the world"* and: *"It's fun, you get outdoors and learn more about nature"*. Perhaps the most indicative quote was one child that remarked that: *"It makes you stop playing the X-box, with 30 Days Wild you put down the controller for once"*; a fitting appraisal for a campaign designed to reconnect people with nature in an increasingly disconnected world.



Nature crafts as an activity during 30 Days Wild.  
Image: Thomas Hibbert

By presenting nature engagement as a fun and simple challenge, 30 Days Wild encourages participation and acts as a catalyst for people discovering the benefits associated with an improved connection to the natural world around them. This in turn instils an appreciation of the value of nature, resulting in participants 'staying wild' by continuing to develop this connection beyond June.

With 50,000 individuals, families, schools and businesses signing up this year, it is proving to be a hugely successful campaign with great potential for inspiring mass engagement with the natural world. 

### Reference:

Richardson M, Cormack A, McRobert L, Underhill R (2016). *30 Days Wild: Development and Evaluation of a Large-Scale Nature Engagement Campaign to Improve Well-Being*. PLoS ONE 11(2): e0149777. doi.org/10.1371/journal.pone.0149777

**Thomas Hibbert** is Communications Support Officer for the Wildlife Trusts.

**More information:** [action.wildlifetrusts.org/page/40705/petition/1](https://action.wildlifetrusts.org/page/40705/petition/1); [facebook.com/groups/30DaysWild](https://facebook.com/groups/30DaysWild); Twitter @30DaysWild



### Thoughts from the North

David Fellows


It's been a pleasure to see more examples of learning outdoors, including schools working through the Forest Schools programme and several involved in allotments for food and tree planting. Our local newspapers are only too pleased to have local copy and especially photographs.

However my biggest surprise was to find a feature article in the School Travel journal which is linked with our fellow organisation Learning Outside the Classroom<sup>1</sup>. It was written by Mr Whitwell, deputy headteacher at Moor-side Primary School, Lancaster and highlighted their Outdoor Adventure curriculum. Two of our granddaughters have the good fortune to be at the school. Not only have they already enjoyed a wide curriculum but the younger one was about to take part in a two day expedition to Malham, staying at the Field Study Centre<sup>2</sup> in the heart of Yorkshire's most dramatic scenery where they would be studying the strange and awesome looking landscape. Also it was taking place in mid-November when weather as well as the terrain can also be challenging.



Malham Tarn Field Studies Centre.  
Image: [field-studies-council.org/centres/malhamtarn](http://field-studies-council.org/centres/malhamtarn)

Not only did she come back unscathed and keen to narrate the whole adventure in detail but she had a CD to play showing all the pupils engaged in a range of activities and also all the very special features of the area. Erin confidently reeled off what they were and took great delight in informing us on how sink holes and other specific limestone features worked in case we 'unschooled' adults would benefit from her knowledge. It took my wife back to her teaching time when she and her partner infant teacher took the six-year-olds from Barrow in Furness, many of whom hadn't been out of the town, up and through the Lake District for an overnight 'residential' at Pooley Bridge. All returned safely with plenty of memories to draw on.

A final thought. Back in my own infant school days in Liverpool I only had one outing from the classroom, a morning walk down to see the Peter Pan statue in nearby Sefton Park. I wasn't very impressed and I hadn't even taken in why it was famous! In the juniors there were no outside visits and just one residential camp on the Isle of Man. My Dad had been there sometime during the war. I think that and the cost were reasons I didn't go. Fortunately my parents liked traveling to visit their relatives in Staffordshire and liked walking, cycling and seeing Liverpool by bus, train and all the docks via the old Overhead Chicago style railway. That and my bedroom window that looked out on the key suburban station where all the major trains going south to London, Birmingham, the West of England, Cardiff and the North Wales Coast passed meant that I was building my love of travel and exploring our fascinating world. This is a pleasure that I still retain along with my memories of seeing that all the children I taught gained a good understanding and appreciation of the world outside the classroom. 

#### References:

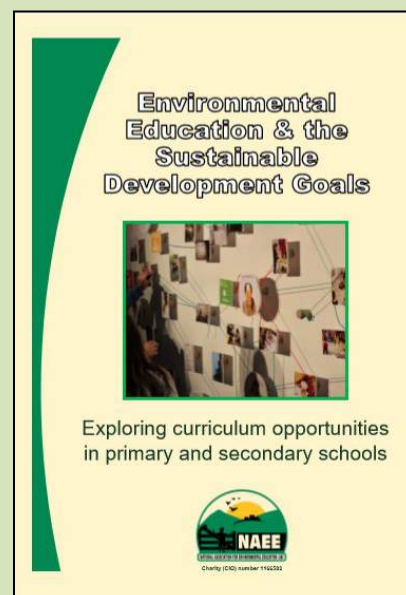
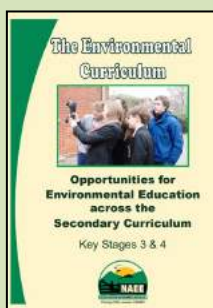
1. [lotc.org.uk](http://lotc.org.uk)
2. [field-studies-council.org/centres/malhamtarn](http://field-studies-council.org/centres/malhamtarn)

**David Fellows** is a member of the NAEE Executive. He is a former primary school teacher and headteacher.

### New NAEE publication: *Environmental Education and the Sustainable Development Goals*

This report explores curriculum opportunities in primary and secondary schools for a consideration of the goals. It uses curriculum analysis and school and NGO case studies, and its aim is to stimulate further work in schools to engage young people in learning about local and global environmental issues.

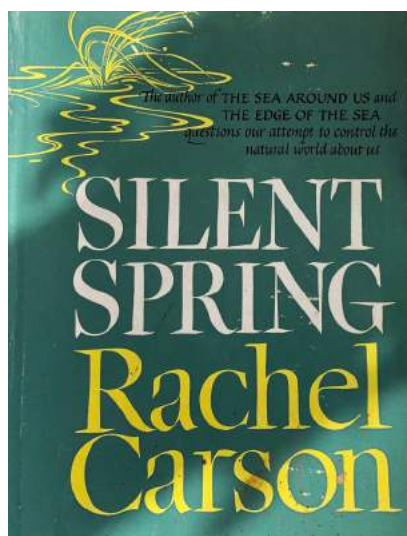
This follows on from *The Environmental Curriculum* – our curriculum guides for EYFS/Primary and Secondary schools.



Download all from the NAEE website: [naee.org.uk/latest-report-from-naee](http://naee.org.uk/latest-report-from-naee)

## BOOK REVIEWS

### ***Silent Spring* Rachel Carson**



I was woken early this morning by the dawn chorus, which makes it a very appropriate day to write about Rachel Carson's *Silent Spring*. Many environmentalists regard its publication in 1962 as the moment that awareness of the serious impacts that humans were making on the biosphere began to be widely appreciated, and a key legacy of the book was public awareness that nature was vulnerable to human intervention.

*Silent Spring* was acclaimed by conservationists but condemned by the US chemical industry and Carson was the subject of considerable criticism. Her focus was the indiscriminate use of chemical pesticides in agriculture and the effects they were having on wildlife, and she stressed the public's right to be in full possession of the facts about things that affect their lives. The book was a strong stimulus to the emerging US environmental movement and a key factor in the setting up of the Environmental Protection Agency in 1970.

A significant part of the book relates to the use of DDT and its adverse effects on wildlife, and its potential risk to human health. In 1972 DDT was banned in the USA (with international use quickly stopping). This ended one of the few effective ways of killing malarial mosquitoes which were causing the deaths of hundreds of thousands of people every year.

Although DDT is still classed as a probable human carcinogen, the 2004 Stockholm Convention on Persistent Organic Pollutants, gave a limited exemption for its use against malarial mosquitoes. Following this, in 2006, the World Health Organization [WHO] supported the indoor use of DDT in African countries where malaria remains a major health problem, saying that benefits outweigh health and environmental risks. Despite this, WHO estimates that 435,000 deaths due to malaria occurred globally in 2017, over 90% of which were in Africa.

Many now argue that, while DDT ought to have been banned for agricultural use, it should not have been eliminated from public health programmes. Some blame Carson for giving the impression that the risks to human health were greater than they actually were, while others blame over-zealous regulators. Conversely, some criticise Carson for not calling for a total ban, as opposed to regulation. This controversy continues.

I'm giving the last word to NAEF President, Professor Justin Dillon, who wrote the following in a thoughtful School Science Review article in 2005:

*"[The book] has much to offer students and teachers. The message now is as relevant as it was back in 1962. The language and scientific content probably put it outside the reach of most key stage 4 students but anyone studying A-level biology or chemistry or the AS-level science for public understanding would appreciate the relevance of the content and the accessible style of writing. Beyond that, Rachel Carson offers a role model of a woman scientist, ridiculed by a predominantly male scientific establishment and pesticide industry, who used her knowledge of science to make the public stop and think about what was being done in the name of progress."*

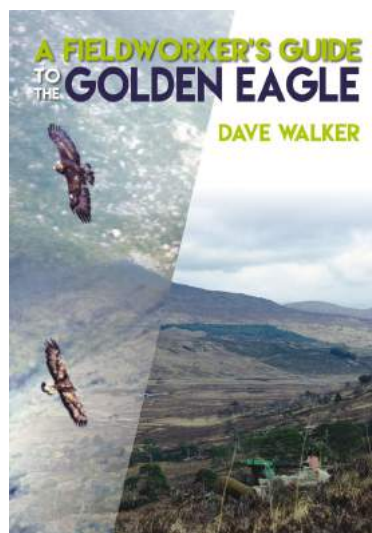
#### **Further reading**

Dillon J (2005) *Silent Spring* 40 Years on. School Science Review **86** 316.

***Silent Spring*. Rachel Carson (1962). Boston: Houghton Mifflin. Paperback pp336. ISBN 978-0141184944 (Penguin Classics; New Ed, Sept. 2000)**

**Reviewed by Professor William Scott**

### ***A Fieldworker's Guide to the Golden Eagle* Dave Walker**



The golden eagle, one of the most iconic of British birds, is both 'well-known', with many authors having written about it, and a creature about which there are still misleading ideas. *"A simple example of this is that two eagles with a visible size difference are not always a male and a female."* This is the kind of detail that author Dave Walker seeks to clarify, in this well-written practical guide.

Walker has spent more than 37 years of active, year-round fieldwork, much of it employed on golden eagle projects via the likes of RSPB. In those years, he found doubts and questions arising in the assimilated knowledge, and wanted to have (and make, if not available) clear accounts regarding territorial habits, foraging, breeding and the ecology of this amazing, yet sometimes misunderstood bird, towards creating a 'golden eagle almanac'. Why? A key reason was so that conservation efforts could be more successful. Issues such as human activity impacting the eagles' range and persecution of the eagle, mainly through ignorance or misunderstandings, have had major effects; more than



not, as is often the case. Another reason for the need for such a guide.

The guide is text, with some useful photos in the centre.

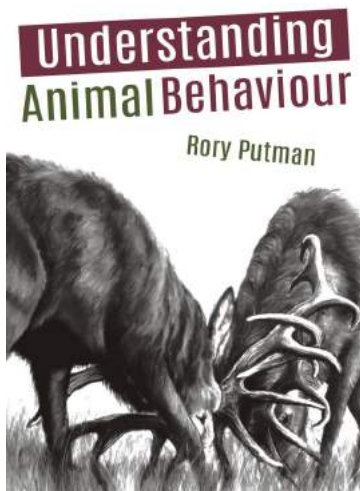
*“Dave Walker’s observations are meticulous ..... It is clear that his knowledge of their habits is second to none.”* (Birding World)

This field guide certainly fits well for conservationists, bird enthusiasts, senior high school and university students researching conservation and avian case studies.

**A Fieldworker’s Guide to the Golden Eagle. Dave Walker (2017). Dunbeath: Whittle Publishing. Paperback pp248, plus 16pp colour section. ISBN 978-1-84995-224-8. £19.99.**

## Understanding Animal Behaviour

Rory Putnam



*“Do animals have personalities?... Do animals still recognise their mothers or siblings if they happen to meet again?... Why do some animals wrinkle up their noses after sniffing at the urine of other individuals?”*

Answers to these and many, many other fascinating questions – in a chapter called ‘If We Could Talk to the Animals’, shows some of the many insights that are the basis for a very accessible and easy-to-read introduction to animals’ behaviour. The author has more than 20 years’ experience of teaching behavior to undergraduate and adult education courses. As well as being professor at Manchester, he is also a wildlife welfare expert at the University of Utrecht.

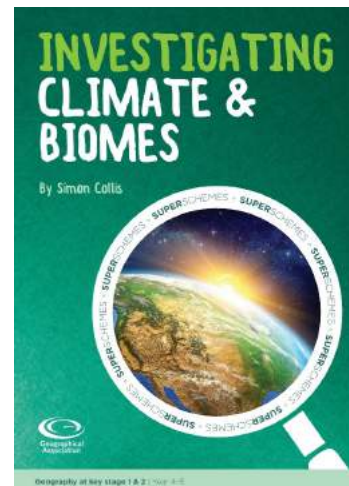
The text includes chapters on the full raft of ‘behaviours’ – from animals’ reflexes, patterns, social organisation, learning and its effects on behavior; to the all-important mating and reproduction; and finally how animals navigate. Regarding navigation, it was great reading about birds that travel *huge* distances, and how fish find their way back to the very same stream to breed, although I admit that an illustration would have been helpful. To be fair, there are a good many illustrations, a particularly delightful example being “round, waggle, and sickle dances of the honeybee”, all by wildlife artist (and the author’s wife), Catherine Putnam.

Recommended as a useful ‘go-to’ text for high school biology, and anyone who wants to better understand the motivations that trigger animals’ actions and responses.

**Understanding Animal Behaviour. Rory Putnam (2018). Dunbeath: Whittle Publishing. Paperback pp192. ISBN 978-1-84995-330-6. £18.99.**

## Investigating Climate and Biomes

Simon Collis



The ‘Superschemes’ are a very solid series of booklets covering a very wide range of topics – both urban, such as the ‘Cities of the World: London’, and natural, such as ‘Rivers’ – which are designed to help to ensure good coverage of the often large subject matter. Each book begins with advice on how to teach about that particular topic through the learning outcomes of ‘understanding and knowledge’, ‘locational knowledge’, ‘human and physical geography’, and ‘geographical skills’. The latter of these – skills such as using atlases, looking at globes, how to actually read a climate graph – are crucial to ensure our students gain or continue to develop environmental literacy. They are also vital if we are to understand and take positive action against climate change information/misinformation!

The booklets then give an overview of their topic –in this case, defining ‘weather’, ‘climate’, ‘biomes’; and how the sun acts across the Tropic of Cancer, the Equator and Tropic of Capricorn.

Next, the whole of the medium term planning is done for you, with the focus on the best possible activities for children to make the connections that are so important on geography.

Finally, four lessons are planned out in full.

Downloadable resources such as PowerPoints, and lots of activity sheets, help the teacher to reduce the preparation required. It’s a pity that these resources aren’t already in the booklet, as it means you still need to go to a computer to find, choose and download them. However, it does keep the booklet a sensible, non-bulky resource and of course keeps the printing cost down.

Top marks for a sensible commendable resources that helps open eyes to our world.

**Investigating Climate and Biomes. Simon Collis (2017). Sheffield: Geographical Association. Paperback pp12. ISBN 978-1-84377-379-5. £17.99 (£11.99 to GA members).**

Other booklets in the ‘Superschemes’ range include: *Barnaby Bear Investigates the UK* and *Barnaby Investigates the World*, both by Emily Rotchell; *Investigating Major World Cities: London* by Rita Casey; and *Investigating Rivers* by Paula Richardson, Ruth Totterdell and Andrew Turney. Available from [geography.org.uk/Shop/Publication-series/Super-Schemes](http://geography.org.uk/Shop/Publication-series/Super-Schemes)

Reviews by Henricus Peters

## Sustainability education: should it be an entitlement for all pupils?

Jane Hanrott

The November 2018 issue of *Education in Science*, the Association for Science Education (ASE)'s house magazine, included a six-page feature on sustainability and sustainability education written by a range of experts in the field, education practitioners and environmental organisations – including an article by NAEE's Justin Dillon. At the same time, ASE published an online, free to access supplement<sup>1</sup> containing yet more articles on this topic. The articles in both publications look at what effective 'environmental' and 'sustainability' education look like, and include<sup>2</sup>:

- Sustainability education: should it be an entitlement for all UK pupils?
- But don't they teach that in geography?
- Towards a convergence of science and environmental education to address wicked problems
- The Naturehood of schools
- Learning for sustainability – Scotland
- Life on the water
- Science education and the UN Sustainable Development Goals (SDGs)
- Education holds the key...
- Want to make the most of your activities for the environment, sustainability and global citizenship? A whole school approach is your answer!
- Finding opportunities for environmental education in the curriculum
- Sustainability and NUS
- Solving the problem with plastic

### References:

1. To access this extra material, please visit [www.ase.org.uk/resources/education-in-science/issue-274](http://www.ase.org.uk/resources/education-in-science/issue-274) and click on the supplement pages.
2. Note that a few of the articles are only accessible to ASE members – [ase.org.uk](http://ase.org.uk)

**Jane Hanrott** is Journals Co-ordinator at the Association for Science Education. She co-ordinates the publication of all the ASE journals: Primary Science, School Science Review, Education in Science (Executive Editor), Journal of Emergent Science, ASE International, and Science Teacher Education (Executive Editor). She works closely with the Editors and Editorial Boards on the production of journals.

### More information:

**#ASEchat** – an online Twitter forum for anyone interested in science education. Every Monday evening in term time, from 8-9pm, ASE holds a Twitter chat using the hashtag #ASEchat. Recent topics for discussion have included practical science, science capital, and teacher recruitment and retention issues. All are welcome to join – for information, please see [ase.org.uk/content/asechat](http://ase.org.uk/content/asechat)

## Focus on waste

Henricus Peters

There are many charities which have 'waste' or indeed 'pollution' as part of their mission or actions, however this list looks at the groups who have waste as their central platform or a main focus.

Please note: as with all web-based resources, it is important for teachers and facilitators to check the following resources are appropriate for their own contexts and purposes.

### Circular Economy Club

The Circular economy is “an alternative for the *fake, make, consume, and dispose*” mindset. What used to be regarded as 'waste' can be turned into a resource. This website is mainly academic resources, especially case studies – particularly useful for upper secondary and higher education.

[circulareconomyclub.com](http://circulareconomyclub.com)

### Ellen Macarthur Foundation

Mission: “to accelerate the transition to a circular economy.” Includes lesson plans, e.g. 'redesigning plastics'.

[ellenmacarthurfoundation.org](http://ellenmacarthurfoundation.org)

### WRAP (The Waste & Resources Action Programme)

“At the forefront of the circular economy... WRAP works with governments, businesses and communities to deliver practical solutions to improve resource efficiency .... Re-defining what is possible through re-use and recycling.” There are many initiatives such as SCAP – Sustainable Clothing Action Plan – but these are mainly industry-focused, rather than educational. An example is the 'UK Plastics Pact'.

[wrap.org.uk](http://wrap.org.uk)

### Keep Britain Tidy

Keep Britain Tidy aims at “giving children and teenagers an environmental voice” – via the global Foundation for Environmental Education (FEE) and is the same charity that runs Eco-Schools in England. KBT has three goals – to eliminate litter, end waste, and improve places. “This means more to us than just picking up litter, It means creating clean beaches, parks and streets. It means creating sustainable practices and eliminating waste.”

[keepbritaintidy.org](http://keepbritaintidy.org); [eco-schools.org.uk](http://eco-schools.org.uk)

### Beachwatch

Beachwatch is a project of the Marine Conservation Society that focuses on getting rid of the rubbish from UK beaches.

[mcsuk.org/beachwatch](http://mcsuk.org/beachwatch)

### Plastic Pollution Coalition

The Last Plastic Movement – includes graphic videos showing turtles with straws in pain and calls to action.

[plasticpollutioncoalition.org](http://plasticpollutioncoalition.org)

### Wildlife Gadget Man's Rubbish Walks

Jason Alexander aims to help children and adults to enjoy the outdoors, by undertaking regular beach cleans and litter picking on his 'rubbish walks'.

[rubbishwalks.co.uk](http://rubbishwalks.co.uk)



## The Great Pacific Garbage Patch

Scientists have conducted extensive analysis of the largest accumulation of ocean plastic in the world.

[theoceancleanup.com/great-pacific-garbage-patch](http://theoceancleanup.com/great-pacific-garbage-patch)

## Kids Against Plastic

A charity set up by kids, for kids! Two sisters – Amy and Ella Meek aged 15 and 13 – are taking positive action about plastics. Includes videos and lesson plans.

[kidsagainstoplastic.co.uk](http://kidsagainstoplastic.co.uk)

The Meek sisters also gave a TedX talk about plastic.

[tinyurl.com/y9q25qbc](http://tinyurl.com/y9q25qbc)

## IUCN Issues brief

A useful summary of background information from the International Union for Conservation of Nature (IUCN) about marine plastics. What is the issue? Why is it important? What can be done?

[iucn.org/resources/issues-briefs/marine-plastics](http://iucn.org/resources/issues-briefs/marine-plastics)

## Food chains: Are you eating plastic for dinner?

In this free online primary up2d activity, children use food chains to explore the impact of plastic pollution in the oceans.

Following pressure from environmental groups, the government is proposing a ban on microbeads – tiny beads of plastic found in toiletry products such as toothpastes and facial scrubs. These microbeads are finding their way into food chains and possibly onto our dinner plates! This resource includes an optional introduction to a food chains activity.

[tinyurl.com/y2vcp8k7](http://tinyurl.com/y2vcp8k7)

## National Geographic Waste Campaign

*"We made plastic. We depend on it. Now we're drowning in it."* National Geographic magazine has launched a multiyear campaign called 'Planet or Plastic?', which aims to encourage people to reduce their plastic use.

[tinyurl.com/y8v4n7I5](http://tinyurl.com/y8v4n7I5)

## Nat Geo Kids Magazine

Nat Geo Kids Magazine has information about plastic pollution.

[tinyurl.com/y62w4nu8](http://tinyurl.com/y62w4nu8); [tinyurl.com/ycrwwdcr](http://tinyurl.com/ycrwwdcr)

## UN Environment

This YouTube video posted by UN Environment tells a story of plastic pollution through an animation.

[tinyurl.com/y3v6th8b](http://tinyurl.com/y3v6th8b)

## Blue Planet II

This includes commentary from Sir David Attenborough.

[bbc.co.uk/programmes/p06bsx63](http://bbc.co.uk/programmes/p06bsx63)

## Lesson plans about waste and archaeology

[lessonplanet.com/search?keywords=waste](http://lessonplanet.com/search?keywords=waste)

(you need to be signed up to this website to access the lesson plans)

Trash Talks: [tinyurl.com/y4zna3cb](http://tinyurl.com/y4zna3cb)

Dustbin Archaeology: [tinyurl.com/y4btnrul](http://tinyurl.com/y4btnrul)

## More resources for teachers

This selection of resources is included to give teachers and facilitators who need it more background. Some of the resources may be suitable for students too but facilitators and teachers are advised to evaluate the resources to select those which are most appropriate for their own context.

Drowning in Plastic BBC 1: [bbc.co.uk/programmes/b0bmbn47](http://bbc.co.uk/programmes/b0bmbn47)

BBC Plastics Watch has an exhaustive list of links to a range of very useful resources: [tinyurl.com/ycbopu8d](http://tinyurl.com/ycbopu8d)

The Economist on why plastics are often less polluting than other alternatives: [tinyurl.com/yaw73nuo](http://tinyurl.com/yaw73nuo)

The Open University provides some very helpful resources that support understanding the problem in a balanced way: [open.edu/openlearn/plastic-planet#](http://open.edu/openlearn/plastic-planet#)

The Independent has some useful links too:

[independent.co.uk/topic/plastic-pollution](http://independent.co.uk/topic/plastic-pollution)

.....

In New Zealand, the Kiwi Conservation Club, the junior section of the Forest & Bird Protection Society, celebrates its 30th anniversary!

[kcc.org.nz](http://kcc.org.nz)

In the United Kingdom, our friends the Geographical Association celebrated 120 years of being!

[geography.org.uk](http://geography.org.uk)

2019 is the International Year of the Periodic Table.

[iypt2019.org](http://iypt2019.org)

.....

**Henricus Peters** is a teacher in China and Editor of this ejournal.

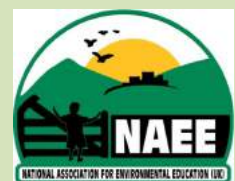
Readers are invited to send favourite and most useful websites and apps to us via [Henricus.p@yahoo.com](mailto:Henricus.p@yahoo.com)

For all news on the Association, blogs, journal back issues, a dedicated members' page, and environmental education ideas and activities, visit [naee.org.uk](http://naee.org.uk).

Follow us on social media:

 [twitter.com/naee\\_uk](https://twitter.com/naee_uk)

 [facebook.com/NAEEUK](https://facebook.com/NAEEUK)



Write for *Environmental Education* – contact the Editor [Henricus.p@yahoo.com](mailto:Henricus.p@yahoo.com)

## FINAL THOUGHT

What we have to remember is that waste is both a collective and an individual problem. It is a question of both structure and agency.

Whilst individual lifestyles create waste and, in David Attenborough's words, the one action we can all take is to "waste less" ([tinyurl.com/y6ncuv6t](https://tinyurl.com/y6ncuv6t)), waste arises from corporate and policy action and inaction; and these corporate and policy decisions are more often than not, informed by positive social intentions.

Plastic waste can be an outcome of attempts to improve food hygiene and reduce food waste, for example, or to increase profit and therefore economic wellbeing. It might be that packaging mayonnaise in glass bottles costs more in terms of carbon because the bottles are heavier to transport and so plastic packaging is preferable. And it might be that removing plastic wrapping from cucumbers works for large families who consume a whole cucumber in one day but not for a single pensioner who takes longer to eat it and benefits from the packaging to avoid adding to the food waste problem.

The solutions to the problems of waste and the learning about waste have to be balanced and considered. It cannot be just about removing plastics from the supply chain or exhorting and chastising individuals to live waste free; it has to be about finding creative solutions and working to change things across individual and institutional levels, and above all, for us as environmental educationalists, it has to be about learning. What can we learn from looking at this problem from all the angles? And how can we learn together and think critically to take collective action to solve these very wicked problems in ways that we can all benefit from.

This was the aim of our recent collaboration with Rotary UK where Gabrielle Back, long time trustee of NAEE invited school children in the Midlands to take part in a competition to raise awareness of the problem of plastic. There will be more about this competition in the next edition of *Environmental Education*.

Dr Elsa Lee



This image 'Jason' is by the artist Zac Freeman, who uses found objects to create works of art. "He builds layer upon layer of found objects, cast-offs and junk into portraits whose detail and subtlety only emerges with distance. In his Assemblage series, out of a seemingly chaotic collection of buttons, bottle tops, pen barrels, bread tags, office equipment, telephones, (and any other three-dimensional scrap plastic objects) appears an impressionistic two-dimensional face constructed from an impressive range of shades and tones."

With kind permission from the artist; image and quote from gallery website (with permission): [woolffgallery.co.uk/zac-freeman-1](https://woolffgallery.co.uk/zac-freeman-1)



Rotary

# YOUNG ENVIRONMENTALIST COMPETITION

2019



**YOUTH  
COMPETITIONS**

[rotarygbi.org](http://rotarygbi.org)

Rotary  
Great Britain & Ireland



The Young Environmental Project is a new competition organised and promoted by Rotary International in Great Britain and Ireland (RotaryGBI).

Visit [rotarygbi.org/projects/young-people/competitions](http://rotarygbi.org/projects/young-people/competitions) to find out more about the competition and download an information pack.