Submission on Revitalising Australia's vision for science and research

March 2023

Commissioner for Children & Young People

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Commissioner for Children & Young People

Introduction

As South Australia's Commissioner for Children and Young People, my mandate under the *Children and Young People (Oversight and Advocacy Bodies) Act 2016* is to promote and advocate for the rights and interests of all children and young people in the State.

It is also my role to ensure that South Australia meets its obligations in relation to the United Nations Convention on the Rights of the Child (UNCRC). Particularly relevant to this submission is Article 12, stating that children have the right to express their views on all matters that affect them, and Article 24, outlining that children have the right to good quality healthcare, clean water, nutritious food, and a clean environment to stay healthy.

I appreciate the invitation from Australia's Chief Scientist Dr Cathy Foley to participate in a roundtable in Adelaide on 28 March 2023, focused on discussing revitalising Australia's vision for science and research. I also welcome the invitation to contribute a written submission, further detailing some of the points discussed at the roundtable. My submission is significant as it places focus on the views and lives of children and young people, a perspective that may otherwise be overlooked in the discussions. I've listened to tens of thousands of children and young people across South Australia and my work is directly informed by their views and experiences.

Australia's National Science and Research Priorities and the National Science Statement are significant documents for Australia now and in the future. Revitalising these needs to include attention to children and young people and consider their rights now and in the future. This includes listening to children and young people about the greatest challenges they think science could help address, namely climate change, and building on strengths in the form of children and young people's interest in science and science careers. Ultimately, Australia's revitalised vision for science and research should be one which inspires and engages people across the country, including children and young people, to take an interest in science, increasing the science literacy of the nation.

Specifically, I make the following recommendations:

1. **Listen to and act upon children and young people's concerns about climate change and the environment.**
2. **Embrace the potential of children and young people's interest in science and science careers, providing equitable opportunities for work experience and career information.**
3. **Make science fun and engaging for all children and young people in schools and across the community, building a country of science literate citizens.**

If you would like to discuss anything further, please do not hesitate to contact my office.

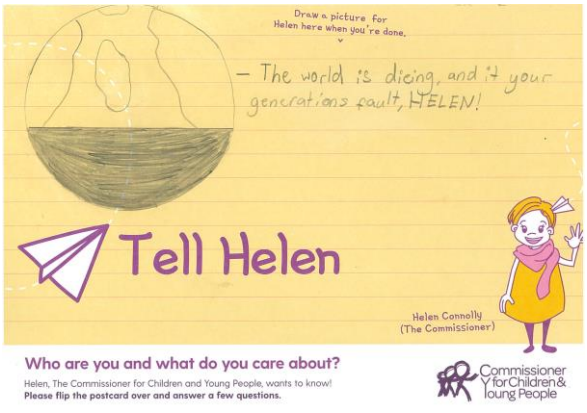
Yours sincerely

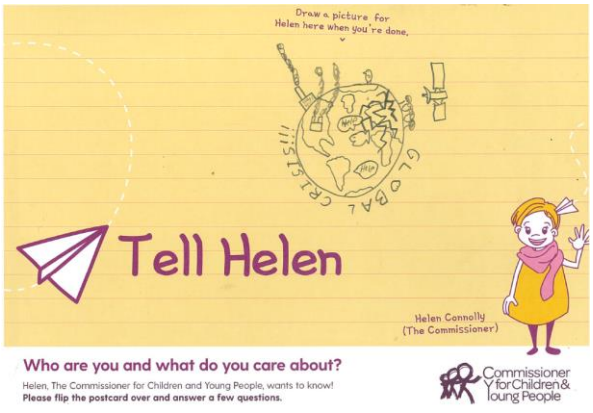
Helen Connolly
Commissioner for Children and Young People South Australia

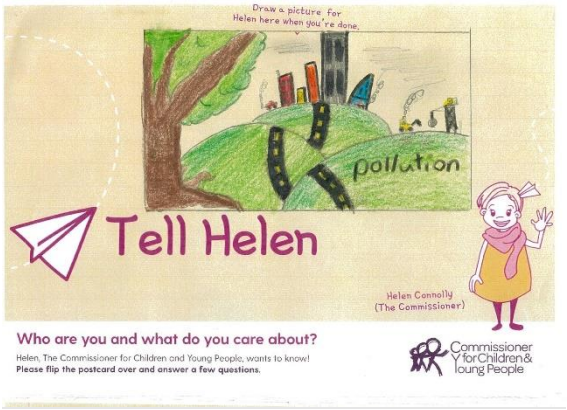
1. **Listen to and act upon children and young people's concerns about climate change and the environment.**

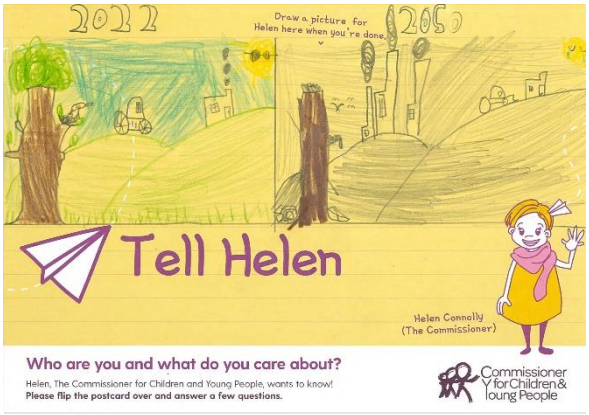
From my extensive engagement with children and young people in South Australia, climate change and other environmental issues are frequently raised as a concern, with the stress surrounding these issues negatively impacting on their wellbeing. I welcome the shift in the revitalising of Australia's science and research priorities to recognising 'Supporting stronger action on climate change' as the first of three possible priorities identified by the government, as outlined in the Terms of Reference. For children and young people in South Australia, climate change is the key challenge that science could help to address. Children and young people today are growing up in a world worse off environmentally than previous generations, and they advocate for the need to protect the environment for future generations.

My Postcards initiative asks 8–12-year-old children across South Australia about the things that matter to them. Time and time again, climate change and the environment are mentioned in relation to a diverse range of questions I ask children in the postcards – what they care about, what they worry about, what they are good at, what they want grownups to know, what would make the world better, what they would change if they were the boss of South Australia, and what would make things better for kids in South Australia. These responses are outlined in detail in my main reports from the postcards: The Things That Matter, The Things that Matter 2, and The Things that Matter 3, as well as my snapshot What SA Kids Have Told Us About the Environment.









Children and young people want action on climate change. They also have a sense of justice, recognising that climate change is having a bigger impact on some people, such as poorer people, remote communities, and Indigenous people. Children and young people also tell me of their desire for renewable energy and reduction of the need for fossil fuel, their disgust at pollution and plastics, and their love of animals and the environment. They cherish and desire access to natural spaces for play and wellbeing and want these to continue for future generations.

However, children and young people have feelings of frustration and hopelessness when they can't see climate change issues being addressed. In a recent study of 10,000 children and young people in 10 countries, 45% of respondents reported that their feelings about climate change negatively impacted their daily functioning.[1] There is a need to counter the climate anxiety and negative news cycles that children and young people experience which can have a detrimental impact on wellbeing and a feeling of helplessness about the future. More engagement with children and young people is needed to communicate action being taken and involve them in decision making. Ultimately, children and young people need to be kept informed about climate change issues and actions.

"SA looks very nice now I would like it to stay like that for future. This is very important because when I was little I used to always go to the hills with my family on walks and bike rides. I want others to have the same opportunities as me."

- 12 year old

"The government needs to consider our future. They need to start having a positive impact on the environment, because at this rate, our job in the future will be to live with the impact that past generations have left on our Earth. The government needs to address things such as climate change and realise this isn't science fiction - it's real life and if we don't do anything about it soon, it will be too late."

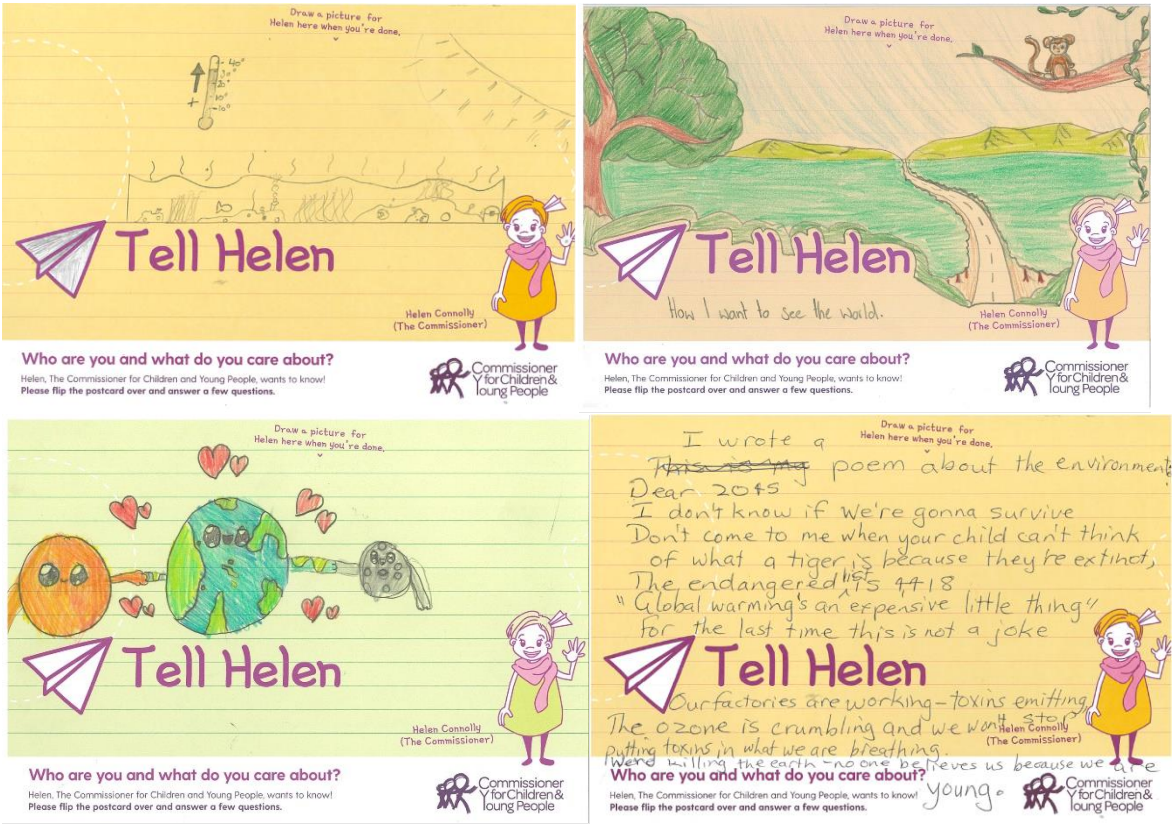
- 17 year old

"Nature and fresh air - I've always liked going outside, [to] parks, [the] beach, being around everything that's natural and not man made and made of concrete. I like being around the colours. Everything is so bright, everything feels so fresh in your imagination but in real life... it makes me feel like I'm escaping from everything in that moment. Nothing else bothers me. Nothing from the past. It's just the sun and the plants."

- 13 year old

"[We need] ...education on how to be environmentally friendly. Without a healthy and clean environment, future generations will not be able to live life to the fullest."

- 16 year old



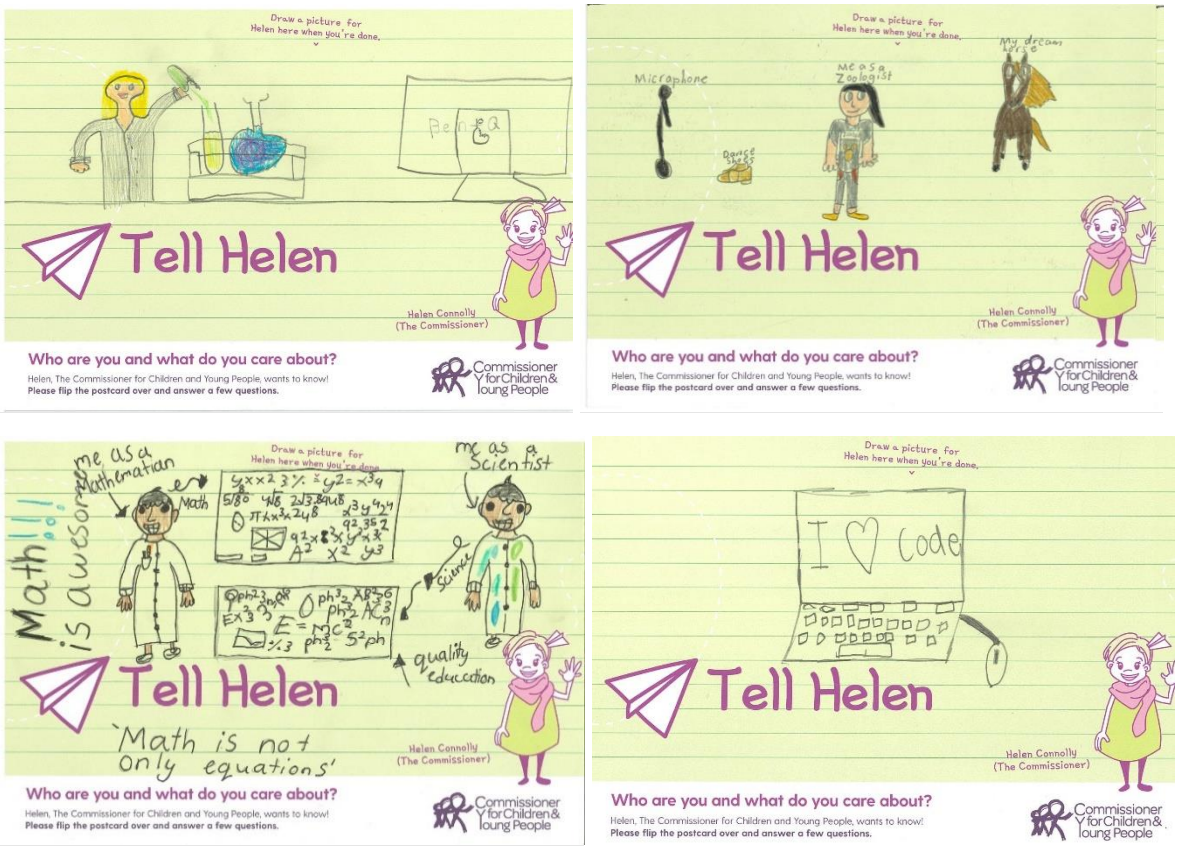
My work in the lead up to COP 27 (the United Nations climate change conference) details more of my work relating to children and young people's concerns about climate change and the environment. This can be found in my COP 27 backgrounder and Open Letter to the Australian delegates attending COP 27, arising from the Youth Climate Workshop I undertook in 2022.

2. **Embrace the potential of children and young people's interest in science and science careers, providing equitable opportunities for work experience and career information.**

Many children and young people are interested in science and science careers. But children's aspirations need to be supported and encouraged from an early age. Currently careers education and guidance, as well as work experience, are coming too late. More focus on building our scientific capability and skills for the future is needed, with a focus on children and young people.

Research has found that career aspirations are formed early on, with a majority of 7 year olds able to provide a considered answer to the question of what they would like to be when they grow up.[2] Another study found that over 80% of Year 4 students could state what type of work they wanted to do.[3] Prior to careers exploration in high school, much of the knowledge children and young people attain in relation to careers depends on the informal exposure they have had to various jobs, combined with the environments in which they are raised.[4]

Many children's career aspirations in primary school focus on science and STEM more broadly. My Job Aspirations of 8-12 year olds snapshot from my Postcards initiative shows that STEM was the fifth highest career choice by area. In terms of individual jobs named, scientist was the fourth most named job. Since then, I have asked about children's futures again, and science/STEM jobs continue to appear high on the list. These are discussed in more detail in The Things That Matter, The Things that Matter 2, and The Things That Matter to Children: What SA Children Say About Jobs, Skills, and the Future.



Research shows that children who are not interested in STEM subjects at age 10, are unlikely to pursue these subjects later in their schooling.[5] More formalised contact points with careers education early on in children's lives, can create potential for better long-term engagement in learning areas that relate to their interests and passions.

By the time young people get to mid-high school and can undertake work experience and start to think more seriously about their careers, they may already be disengaged from science. For those who are still interested, clearer pathways to science careers are needed, and these experiences need to be equitable for all children and young people, regardless of who they are and where they live. A longitudinal study of children's career aspirations found that socioeconomic background is a significant predictor of interest in science-related careers.[6] In terms of gender, science was one of the only occupations examined in which gender was not a significant predictor (57% of males showed interest in a science career compared to 49% females). However, young men showed higher levels of interest

in STEM careers (73% of males compared to 27% of females).[7] This also highlights the need for more consideration of the distinction between 'science' and 'STEM'.

> *"The problem is I know what subjects I'm interested in eg stem and tech, but I don't know what jobs they lead to."*
> **– 15 year old**
>
> *"It's hard to get work experience as a robotics engineer or theoretical physicist."*
>
> *"STEM girls with UniSA was a very good program that I did that opened up a lot of opportunities, showing me different skills necessary for the work force."*
> **– 16 year old**

Importantly, my work has shown that there's inconsistency and inequity in terms of access to careers information and support in high school, as well as work experience opportunities. Some schools do not even facilitate work experience opportunities for students, while others have dedicated staff to organise work experience and provide one-on-one careers counselling. I have written about the issues young people have with accessing relevant work experience and careers advice in my High Stakes High School, Off to Work We Go..., and What SA Kids Have Told Us About Work & Work Experience.

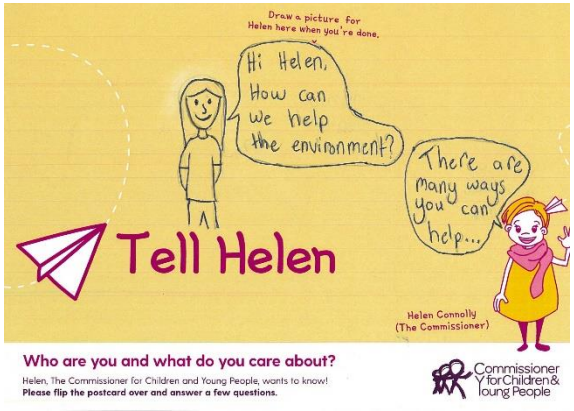
More information about career paths is needed for all young people, particularly when talking about 'jobs of the future', which is likely relevant to many future jobs in science. My Everyday Jobs video series, developed in collaboration with Committee for Adelaide, focuses on jobs of the future including science/STEM careers, including videos with a geoscientist, technology project co-ordinator, and communications digital director. The videos are aimed at young people seeking career ideas and a better understanding of where the jobs of the future will be. With new technologies and emerging industries growing at a rapid pace, it can be hard for young people to conceptualise what jobs of the future look like, and where they could be directing their interests, skills, and talents.

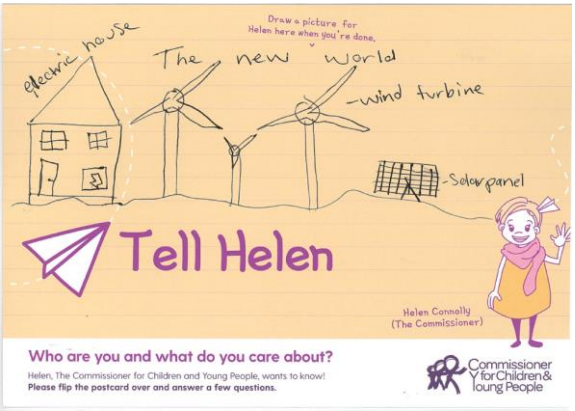
3. **Make science fun and engaging for all children and young people in schools and across the community, building a country of science literate citizens.**

Science needs to be fun and engaging for all children and young people in schools and across the community, to build a country of science literate citizens. Imagine if Australia had a nation of people as interested in science as sports! This needs to start from an early age with our youngest members of society to foster lifelong learning and interest in science. This builds on from recommendation 2 above but is much broader than careers. In fact, some young people have told me that the push for science and STEM careers is too strong, and it seems to be turning them away from being interested in science at all. We need to encourage all children and young people to enjoy science, without needing to make a career of it.

Ensuring all children and young people have access to fun and engaging science education opportunities is consistent with Australia's national goals for education set out in the Alice Springs (Mparntwe) Education Declaration: to promote equity as well as excellence in educational outcomes and to prepare young people for the future as active and informed

citizens.[8] Yet Australian children's enjoyment of science as a school subject is often low, with the Trends in International Mathematics and Science Study (TIMSS) indicating that only half of Year 4 students in Australia reported they 'Very much' like learning science, which dropped to only 27% for students in Year 8.[9] Student confidence levels and value placed on science were also low in Australia. Another study found that only 5% of children in Australia named science as their favourite subject, with other countries having mixed results but one (Pakistan) being as high as 26%.[10] Also concerning is the inequities in teaching, with TIMSS finding large variations in school resources for science lessons in Australia, including experiments and other practical activities.[11]





There is a need to engage children as citizen scientists from a young age, using hands on project-based learning, both within and outside of schools. One example of engaging children in science in innovative and exciting ways is my Commissioner's Digital Challenge which is a free curriculum-aligned resource for schools to help educators teach children and young people computational, design, and systems thinking skills. This resource is also available for libraries, community groups, home schools, and families at home, making learning possible across different settings of children's lives. My Digital Challenge is made up of Zoom Out, the only systems thinking challenge in the world (created by CCYP and Professor James Curran of Grok Academy), Learn to Speak Robot, a digital thinking challenge, and Space to Dream, where children design a toy or gadget for use on Mars. Learn to Speak Robot includes activities for children in the early years, an important group who can be overlooked when it comes to science.

"An example could be pollution in the ocean, we can make machines that take the pollution and bring it back to land and recycle them and use it again, the world would be cleaner and there's ways we can help the world."
- Year 4 student

"We can build on our creativity with all the fun things we have because of the laptops and the iPads, we've had so much fun using them, and we've learned how to code with them and how to get better at using them, which will help us later in life."
- Year 5 student

Following on from recommendation 1, climate change is another area which children and young people are requesting education and skills, as outlined in my COP 27 backgrounder. I have found that this is a topic in which many children and young people are already highly engaged, yet there is a notable divide between children and young people's calls for climate action education and the reality of what is happening across different schools. Large-scale international research (PISA) shows that young people need more knowledge and skills in relation to environmental science, which is a significant gap considering the need for future generations to address climate change and other environmental issues.[12]

It is also apparent that there are inequities in climate change education, including opportunities for inquiry-based and action-oriented learning. In some schools, children and young people benefit from enriching, hands-on and project-based educational opportunities that use resources beyond the classroom, build connections with community and engage children and young people with science as 'citizen researchers'.

Other children and young people report having teachers 'who don't believe in climate change' or who are not willing or comfortable to engage in conversations about issues related to climate change. This silence has negative impacts on children and young people's wellbeing and engagement at school, their confidence in teachers, and their hope for the future.

[1] Hickman, Caroline, Elizabeth Marks, Panu Pihkala, Susan Clayton, R. Eric Lewandowski, Elouise E. Mayall, Britt Wray, Catriona Mellor, and Lise van Susteren. "Climate Anxiety in Children and Young People and Their Beliefs About Government Responses to Climate Change: A Global Survey." *The Lancet Planetary Health* 5 (2021): e863-873. https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(21)00278-3/fulltext.

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[6] Gore, Jennifer, Kathryn Holmes, Max Smith, Leanne Fray, Patrick McElduff, Natasha Weaver, and Claire Wallington. "Unpacking the Career Aspirations of Australian School Students: Towards an Evidence Base for University Equity Initiatives in Schools." *Higher Education Research & Development* 36 (2017): 1383–1400. https://doi.org/10.1080/07294360.2017.1325847.

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[9] Thomson, Sue, Nicole Wernert, Sarah Buckley, Sima Rodrigues, Elizabeth O'Grady, and Marina Schmidt. *Trends in International Maths and Science Study (TIMSS) 2019 Australia. Volume II: School and Classroom Contexts for Learning*. (Australian Council for Educational Research, 2021). https://doi.org/10.37517/978-1-74286-615-4.

[10] Chambers, Kashefpakdel, Rehill, and Percy. *Drawing the Future*.

[11] Thomson, Wernert, Buckley, Rodrigues, O'Grady, and Schmidt. *Trends in International Maths and Science Study (TIMSS) 2019 Australia*.

[12] OECD. *PISA in Focus: Are Students Ready to Take on Environmental Challenges?* No. 120. (2022). https://www.oecd-ilibrary.org/education/are-students-ready-to-take-on-environmental-challenges_8148c568-en.