NET ZERO SUPERHEROES COMPETITION

INFORMATION PACK 2023/24

1. Background

AtkinsRéalis is a world-leading design, engineering and project management consultancy firm. We are **passionate** about **Engineering Net Zero** because we want to protect future generations from the threat of climate change. Collaborating with our clients, we're driven to make our world a better place.

The UK government has passed a law requiring the UK to reach Net Zero emissions of greenhouse gases by 2050. The generation currently at school will be our future leaders responsible for reaching this target, so we want to talk to schools about it.

We want to **inspire younger generations to make an impact** and **consider careers in engineering** by teaching them about the challenges of meeting Net Zero, particularly from an engineering perspective. To meet this goal, we are running a UK-wide schools competition called "***Net Zero Superheroes"***.

Our website link is here: Time to step up! - Engineering Net Zero.

1.1 Competition aims

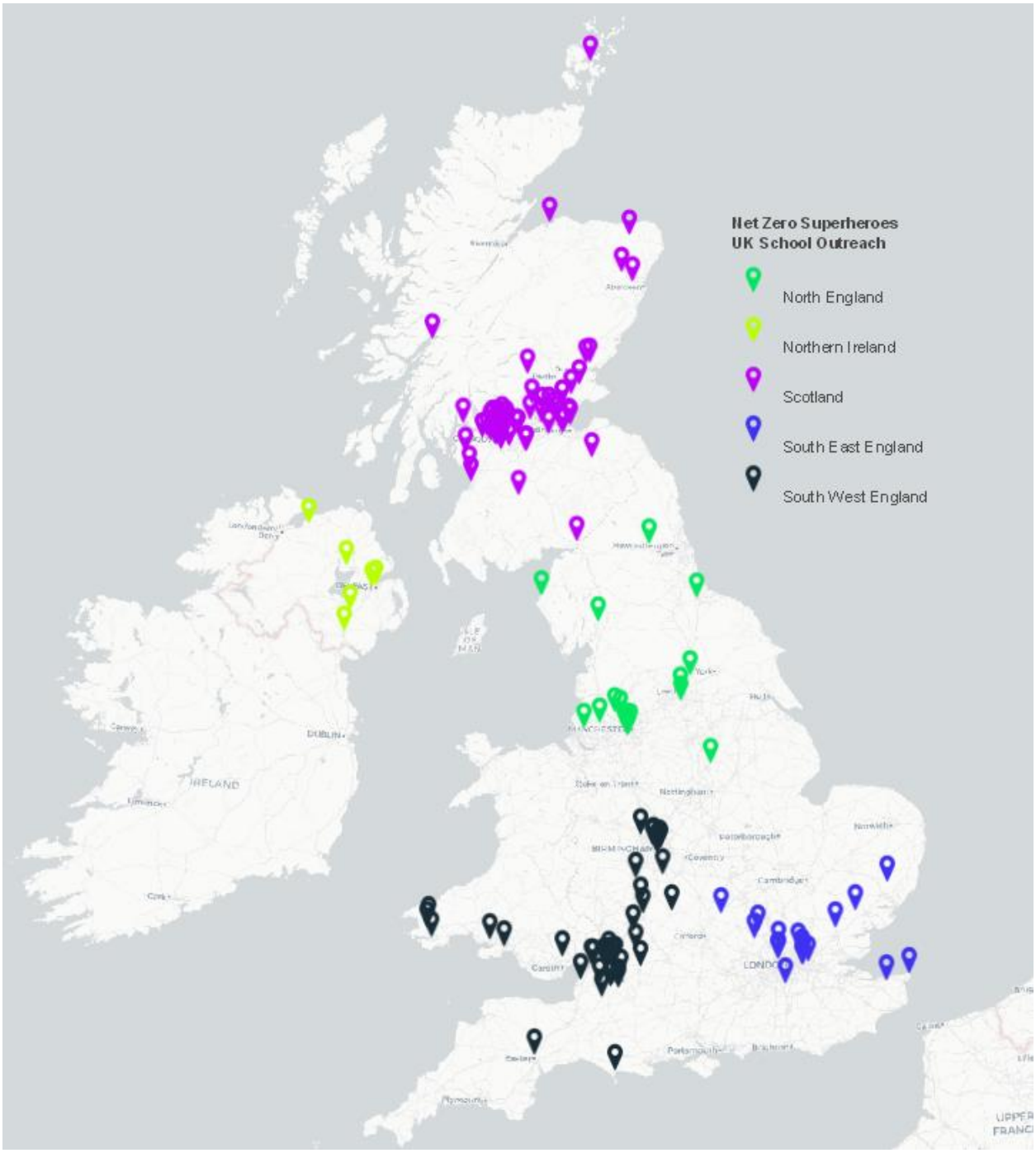
We are running our Net Zero Superheroes competition to meet the following key objectives:

- Inspire younger generations to pursue careers in STEM to play a vital role in meeting Net Zero in the UK.
- Provide school pupils with role models by meeting first hand with engineers, scientists and industry experts through AtkinsRéalis mentoring and competition judging process.
- Provide teaching support and/or materials to help with education on important topics such as *Climate Change, Carbon Footprint, Net Zero, Energy Demand, Energy Supply.*
- Raise awareness amongst younger generations about how these topics relate to them.
- Encourage pupils to think about, and make, small changes to their lives to reduce their energy demand and carbon footprint, which will have an overall impact on the Net Zero target.
- Improve knowledge about the government's Net Zero targets, the choices and challenges we are facing, and the importance of STEM in meeting these targets.
- Improve understanding of the energy system and energy trilemma, and the important role that nuclear will play in the UK's energy system.
- Create a fun, interactive and applicable challenge to maximise engagement and learning about Net Zero.
- Encourage children to use their imagination and "blue sky thinking".
- Help school pupils develop their team working and presentation skills.

1.2 Previous school outreach

AtkinsRéalis launched their Net Zero Superheroes school competition for the first time in 2020 and ran the competition for the third time last year. There has been significant growth in the number of submissions and pupils engaged each year. The 2022-2023 competition outreach was a huge success: AtkinsRéalis worked with 62 different schools across the UK (over 3,000 school pupils in total) and received over 375 entries to the competition. Employees from across the business volunteered to mentor the pupils at each of these schools.

We have engaged with schools across the UK and Northern Ireland to spread the Net Zero message. This map shows the locations of the schools across the country who have participated in the competition over the past three years.



2. Competition details

2.1 Competition task

Each team or individual should propose and present one or more creative inventions to help their school or local community contribute towards Net Zero.

Children can either work individually or in teams of up to five (through running the competition in previous years, we've found limiting teams to five children gives more opportunity for all team members to contribute).

The children should be encouraged to focus their inventions on the following key areas:

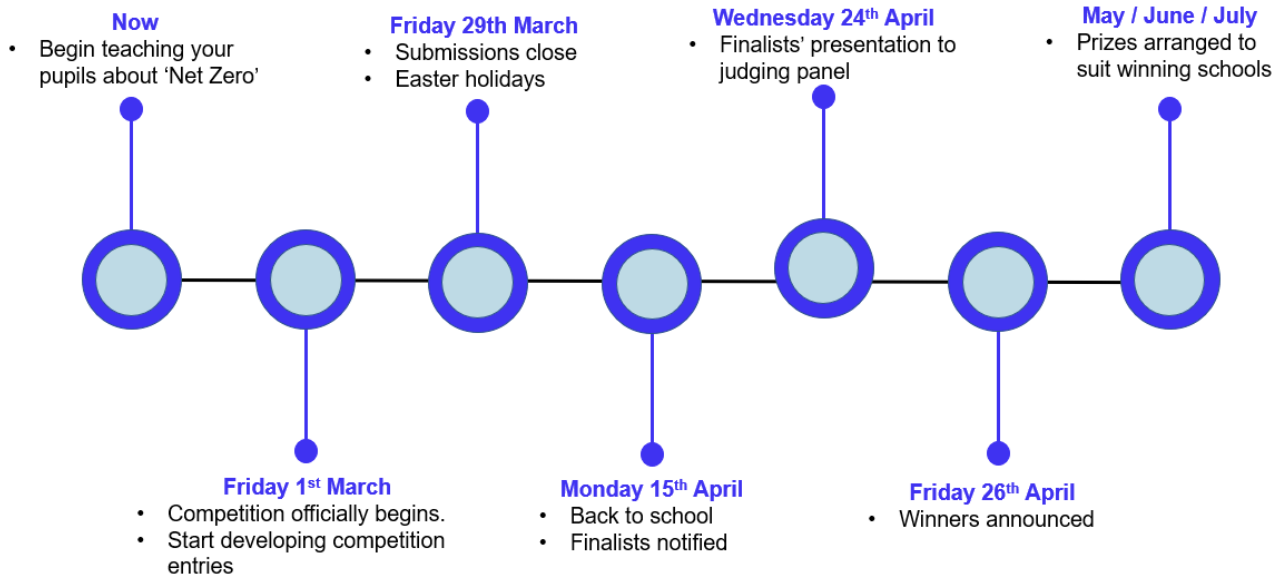
1. **Energy**
    - How could the energy demand of the school or local community be reduced?
    - How could the energy supply to the school or local community be made "greener"?
2. **Transport**
    - How could travel to and from the school be improved to reduce pupils' carbon footprint?
3. **Infrastructure**
    - How could the school building itself be improved to be more energy efficient?

2.2 Age group

The competition is aimed for school pupils in **Year 5** (England / Wales) and **Primary 6** (Scotland / Northern Ireland). Please email us at ENZSchools@atkinsrealis.com if you are interested in alternative STEM activities for older or younger pupils. If would particularly like to enter the competition with the Year 6 / Primary 7 age group, we are willing to accept submissions this year as an exception as we worked with this age group last year.

2.3 Competition timeline

The competition will run from **1st – 29th March 2024**. The submission deadline on Friday 29th March is strict, however schools can begin working on submissions earlier if this suits their timetables better.



2.4 Competition registration

If your school would like to take part in this year's competition, please complete the Net Zero Superheroes Competition 2024 - Schools Registration Form.

3. AtkinsRéalis support

3.1 Teaching resources

Atkins has developed several teaching resources which are suitable for standalone lessons or a series of lessons; involving practical, computer-based or worksheet-based activities. The key topics covered include but are not limited to: climate change; carbon footprint; Net Zero; climate change; energy; transport; role of engineers.

Teaching resources are available in the form of lesson plans, presentation slide decks, interactive workshops, and activity sheets. These involve a mixture of independent and group working, as well as written, practical and calculation exercises.

Practical activity worksheets that allow pupils to use recycled materials to build the following:

- A wind turbine
- A hydro turbine in a bottle
- A nuclear fuel transport device
- A floating wind turbine
- An electroscope

Desk-based worksheets will cover some of the following topics:

- Carbon footprint and Net Zero
- Energy demand
- Energy supply
- Energy sources
- Energy security
- Achieving Net Zero

Teaching resources can be provided to schools to use independently, or alternatively, AtkinsRéalis can provide a mentor (see Section 3.2) to support your school.

3.2 AtkinsRéalis mentoring

The role of your AtkinsRéalis mentor can be one or more of the following:

- Answer any queries you have throughout the competition, via email or telephone.
- Deliver Net Zero teaching resources, including lessons, interactive workshops and/or activities, either in person or virtually.
- Help the teacher with the preparation and supervision of Net Zero activities.
- Help support pupils in developing their competition entries and supporting teachers when submitting.

3.3 Schools feedback

AtkinsRéalis received very positive feedback from previous year's competitions on the support provided to various schools.

- **All Saints C of E Primary, participating school in England,** stated that *"The Atkins engineers came in and provided a fantastic lesson to the children"*.
- **Bardsey Primary School, participating school in England,** provided the following feedback: *"Great competition to encourage teamwork and a collective collaboration thinking about the issues in dealing with achieving net zero. Allowed the creative ideas of the children to flow and for them to think about tackling a real-life global issue."*
- **The Elms Junior School, participating school in England,** said that there were *"Lots of great resources provided by Atkins"* which helped them out even without a mentor!
- **Whiteshill Primary School, participating school in England,** told us that *"The children have learnt a lot about Net Zero carbon. The help from Atkins staff was fantastic."*
- **Lorne Street Primary, participating school in Scotland**, said *"This competition is a great initiative to help the children think about Net Zero. As teachers we don't always know enough about the topic to teach it properly so having mentors from Atkins has helped so much."*

4. Competition submissions and judging

4.1 Competition submission guide

The deadline for submitting entries to the competition is 12:00 noon on **Friday 29th March 2024**.

On the 1st March 2024 all registered schools will receive a link from ENZSchools@atkinsrealis.com to the AtkinsRéalis File Transfer System. This link will allow your school to upload your submissions.

AtkinsRéalis File Transfer System allows AtkinsRéalis staff to share files with its external clients and customers around the world. Your files remain private and only available to people you share them with. Please select to share/store your files on the system for the maximum number of days (14 days) to allow our organisation team to download your submission. Access is restricted and no individual right of privacy is intended. AtkinsRéalis reserves the right to monitor and control its use.

Your submissions will be shared with our shortlisting team for the purposes of initial judging. If successful, they will then be shared to our judges, and only externally where we have received permission from the school.

Please note, Friday 29th March is the final submission deadline but if your school's entries are ready before then, please upload them to the AtkinsRéalis File Transfer System any time between the 1st and 29th March 2024.

4.2 Submission criteria

Entries must meet the following criteria:

- Posters should be submitted in PDF format.
- Posters should ideally be A3 to A0 size with maximum word count of ~1000.
- Posters should be scanned in for submission to ensure quality.
- Videos should be a maximum of five minutes long.
- Only one entry per team or individual can be submitted for judging.

4.3 Judging criteria

Judging will be completed with consideration of the following criteria:

- Creativity (this is the most heavily weighted criterion).
- Impact to the school and overall Net Zero goals.
- Feasibility (considering ease of implementation, resources, time, etc.).
- Presentation (no preference will be given to the format of the submission; however, we will be considering how well the idea is presented and how easily the design can be understood).

The scoring matrix and weighting used to judge submissions is shown in Table 4-1.

Table 4-1 Scoring Matrix

Scoring Matrix						Score Weighting
Creativity	Less creative				More creative	40%
/ 5	1	2	3	4	5	
Impact to school and Net Zero goals	Less positive impact				More positive impact	20%
/ 5	1	2	3	4	5	
Feasibility	Less feasible				More feasible	20%
/ 5	1	2	3	4	5	
Presentation	Less clearly presented				More clearly presented	20%
/ 5	1	2	3	4	5	
				Total Score:	**/ 20**	

4.4 Judging process

The top entries will be shortlisted based on the judging criteria above. The finalists will be invited to present their ideas to a judging panel of industry experts in a 'Dragon's Den'-style pitch. The judging panel will be held on **Wednesday 24th April**, once schools return after the Easter Holidays. The winning teams or individuals will be selected by the judges based on the presentation pitch of their idea.

5. Prizes

There will be some fantastic prizes available for the winning teams or individuals from the judging panel. The top prize will be a STEM or Net Zero-related school trip for the whole class. There will also be a specific prize for the team or individual whose entry was selected.

All entries will be automatically entered into a random prize draw for four different spot prizes, one per region of the UK. The regions are split as follows:

- Scotland
- Northern Ireland
- North England
- South East England
- South West England
- Wales

Please visit our website for examples of prizes awarded to previous competition winners: Time to step up! - Engineering Net Zero.

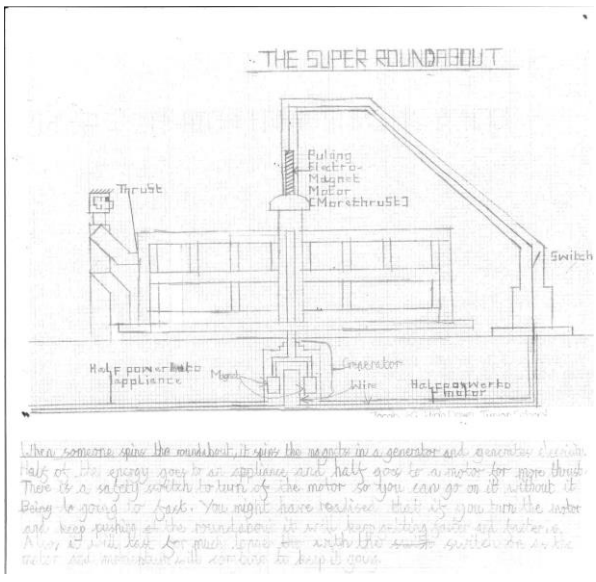
6. Hints and tips

The following are some areas hints and tips from previous year's competition:

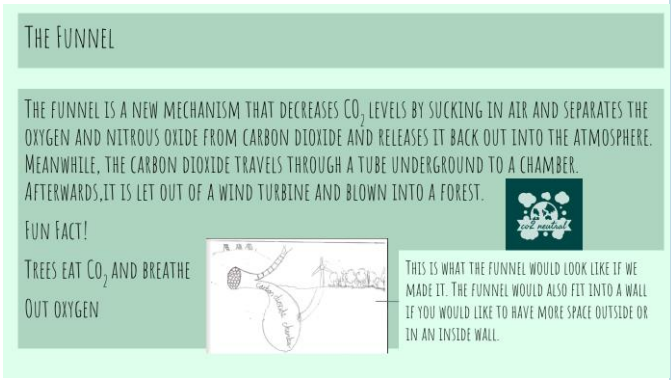
- **We're looking for pupils to get into the mindset of an engineer.** Some of the best submissions we've received in the past show the pupils have really understood the problem and given consideration as to how their invention will work from an engineering perspective. We'd encourage you to make full use of your AtkinsRéalis mentor to help the pupils to think about how their ideas might work in reality!
- **Focus on one specific idea.** We've found that some of the most successful submissions focus on one problem and fully develop one solution. A mind mapping session is a good way to get the pupils thinking about problems around Net Zero and then they can start to map these problems to possible solutions which will form the basis for their engineering invention.
- **Use of diagrams and pictures.** The combination of text, pictures and diagrams has been really useful in allowing the judges to fully understand and appreciate the pupils' work. Our judge's will not have seen the pupils ideas before, so please encourage the pupils to consider what information they want to get across if they are shortlisted to attend the judging panel.
- **Have fun and get creative!** Encourage the pupils to think of creative ways to present their ideas such as use of models, videos, songs and raps. We want the pupils to enjoy the competition and have fun while putting their submission together!

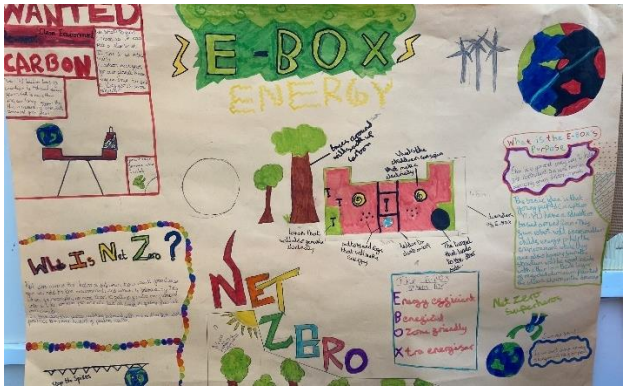
Below are some examples of submissions which have previously been shortlisted to the competition final. These are to be used for reference only to give an idea of the types of detail we are looking for. To promote creativity and diversity of thought, we would discourage you from showing these to the pupils.

"The Pedal Light" is a chair which can convert kinetic energy into electrical power. The school pupil can pedal whilst working to generate power for the school to use.



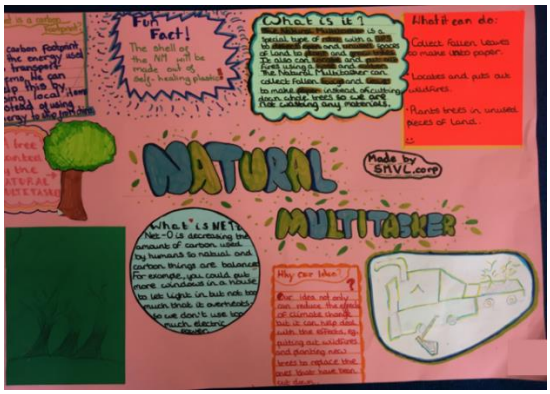
The "Super Roundabout" will generate electricity as it spins. This submission included a very detailed drawing of how the design will be engineered using electromagnetism.





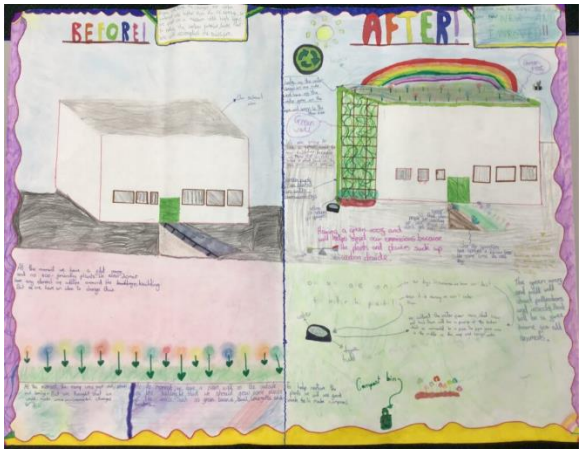
"The Funnel" is designed to separate the CO_2 and nitrous oxides from the air and let the oxygen back into the atmosphere. The diagram shows a CO_2 chamber where the CO_2 is stored underground.

The E-Box is a playground designed for the younger school in which there are lots of different games which generate electricity for use in the school. Games include spinning wheels, buttons, cogs and levers to generate electricity.

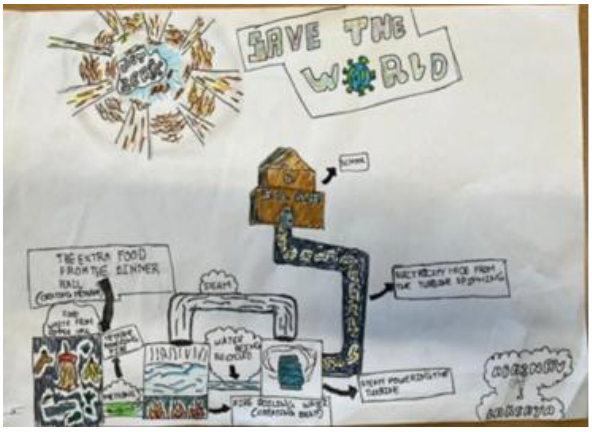


'The Earth Tree' (presented in an animation video) takes in CO_2 from the atmosphere and emits oxygen (just like a real tree) – these will be the size of wind turbines and can be installed in 'tree farms' (similar to wind farms).

The Natural Multitasker is a robot which uses GPS and data to identify areas of unused land suitable for planting trees. The data is also used to detect wildfires which the robot can extinguish. Finally, the robot also gathers fallen leaves and twigs to make paper to prevent deforestation.



Growing plants on the roof and creating a green wall will offset the amount of carbon emissions produced by the school. A sustainable system to maintain the plants was designed by storing rainwater and creating compost from lunch food waste



‘Bio Energy’ is machine that collects food waste from the canteen which produces methane gas as it decomposes. The methane was then converted into heat and electricity to heat and power the school with renewable energy.

7. School Checklist

Please refer to the checklist below to track your progress throughout the competition.

Stage	Complete
Competition registration (here)	
Receive information pack (this document)	
Arrange / plan Net Zero teaching sessions (either independently or with your AtkinsRealis mentor)	
Deliver Net Zero teaching resources (either independently or with your AtkinsRealis mentor)	
Prepare competition entry	
Competition submission 29th March	
Preparing and attending for the judging panel (if successful)	

Thank you for taking part in our Net Zero Superheroes competition. If you have any questions, we encourage you to reach out to your AtkinsRéalis mentor in the first instance. If you have not heard back from your mentor, have not yet been assigned a mentor or are completing the competition without a mentor, please reach out to our team at ENZSchools@atkinsrealis.com.

Good luck with this year's competition and remember, it's never too early to get started!

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