

## **The Discovery Society Annual Report 2024**

Report of the Trustees for the year ending 31<sup>st</sup> December 2024.

The Discovery Society was registered as a charity (Charitable Incorporated Organisation – CIO) on 21<sup>st</sup> November 2019. As such its first full year of operation should have been the year ending 31<sup>st</sup> December 2020. There was however no report for the year 2020, as this was not required by Charities Commission rules, and the majority of the society's activities were severely disrupted by lockdown measures related to the global COVID-19 pandemic. These restrictions commenced just 4 months after the charity's registration date. The first reporting year was therefore 2021, this being the fourth annual report

### **Our Aims**

The charitable aims were amended by the charity commission on 28<sup>th</sup> November 2022 following a resolution at the meeting of 25<sup>th</sup> November 2022. The word 'scientific' was removed from the charitable aim, to broaden the scope and reach of potential charitable activities.

"The charitable object of The Discovery Society is to advance the education of the students at The Bewdley School by providing and assisting in the provision of facilities [not required to be provided by the local education authority] for understanding of and engagement in exploration and research."

### **Our Research Strategy**

The Discovery Society is a Charitable Organisation attached to an 11-18 comprehensive Secondary School with the purpose of encouraging scientific exploration and research. We live in an era where the popular view is that the world is 'discovered' and the only 'new knowledge' is based around technologies that we create. The world for school age children is so technologically oriented that the fundamental principle which has driven the creation of this charity, is that children need to be encouraged to interact with the natural world and to view finding out how it works as a central component of their learning. Without such an impetus, we will always struggle, for example, to understand both the concept of climate change and the impact of human activity on the other species we share the planet with.

### **Research Interests**

Students at the school follow the National Curriculum for Science for year 7 to 11 (age 11-16). In our Sixth Form students study Advanced Levels in Biology, Computer Science, Chemistry, Geology and Physics. The curriculum for all of these subjects is prescribed by the examination bodies under the regulation of the Joint Council for Qualifications (JCQ). The core elements of study are therefore determined beyond the institution:

- Learning materials are determined by these externally driven curriculum arrangements
  - Research interests are drawn from these materials and the themes from which they arise
- We are also partnered with the University of Birmingham Earth Sciences Department (School of Geography, Earth and Environmental Sciences) who will support us with our research, and many of the research interests will draw from the research areas they are currently focussing on. These will include postgraduate and postdoctoral researchers. In the event that any of our sixth form students

become co-authors in research papers, the drafting and publication processes will be carried out by the professional scientists at the University. This also includes the potential for students to engage in research through Operation Wallacea.

### **Member Benefits**

Aside from the benefits offered by involvement in exploration and research, members will potentially have access to the following accreditations:

- Bronze, Silver and Gold Duke of Edinburgh Awards
- Bronze, Silver and Gold Crest Awards
- Involvement biannually in Operation Wallacea which offers PADI registration
- Kidderminster Beekeepers Society
- Tree people

It is anticipated that this initial menu will expand as the charity matures and hones its expertise.

### **Review of Activities**

The principal activities planned for 2024 were:

1. Operation Wallacea – 2 Staff and 9 students from Year 11,12 & 13 students to visit Honduras for a two-week expedition from 3/7/24 to 17/7/24
2. Duke of Edinburgh – planned offer of Bronze, Silver and Gold Awards
  - a. Current numbers enrolled in the various awards – Bronze 71(40% of Y10), Silver 27 (17% of Y11), Gold 21 (42% of Y13)
3. Planning Operation Wallacea trip to Mexico for a two week expedition 3/7/25 to 18/7/25 2 staff, 10 students
4. Submission of Royal Society project outcomes
5. Development of Science Garden and links with local community to develop regular visitors to environmental club

## Operation Wallacea Report - Honduras

### Operation Wallacea Report

In July 24 the Bewdley school took 9 students and 2 staff to Honduras in Central America with Operation Wallacea. The aim of the trip was to assist the Operation Wallacea team in terms of Biodiversity surveys but also to enhance the scientific experience of the students. Travel such as this also helped the students develop resilience, team building and being able to see the world from a wider perspective.

### **Week 1 - Cusuco National Park**

The staff consisted of two biology specialists to help support the science work, Sarah Leach and William Morris. The students consisted of six year 11 students, one year 12 and two year 13 students and was a mix of boys and girls, some with aspirations to study Biology related degrees, others just with the drive to travel and experience the world.



The first week was spent staying with local villagers in Buenos Aires village in the Cusuco National Park. Students and staff were immersed in family homes and were made very welcome by local families. We spent the days surveying vegetation, mist netting for birds and night time bat surveys. During the evening the staff and students were involved in lectures about local flora and fauna.

6 of the students and one staff member also took part in a canopy access course and saw the rain

forest from a different angle.



The second part of the week was spent in tents at the satellite camp which had a rustic feel with basic facilities including accommodation in tents and hammocks with very basic trench toilet systems. Each satellite camp has a camp fire which becomes the central point for socialising and swapping stories between surveys and in the evenings. We also had the opportunity of enjoy the luxury of a "jungle shower" in a nearby stream. Here the staff and

students worked with Opwall staff to continue survey work deep in Cusuco cloud rainforest. They took part in night time herpetavore surveys, mammal surveys, mist netting for birds and invertebrate surveys. The surveys consisted of a 2 km transect that led out into the rainforest from the satellite camp. Both students and staff were pushed to their limits physically and mentally. The terrain in Honduras is extremely mountainous with over 82% of the land mass being classed a mountain. All staff and students coped with the challenges well and took each day in their stride.



## Week 2 - Dive Site Bay Island Utila



The second week of the expedition consisted of a week at the Dive site on the Bay Island of Utila, students and staff stayed in dive accommodation at Bay Islands College of Diving (BICD) for the week.

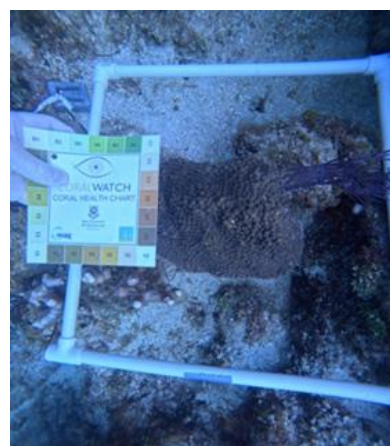
Conservation Initiatives

at the site are focused on restoring populations of a keystone sea urchin species, and managing threats from the invasive lionfish. People living on the Bay Islands are economically reliant on dive tourism, therefore protecting the reefs is a conservation priority. Opwall work closely with the local community to assist with this.



Students and staff who had completed their open water dive training in the UK took part in coral reef surveys with Opwall scientists. A small group of students and one member of staff trained at the dive site and completed the PADI open water diver certification. One student also went on to complete their advance dive training.

At the end of the two weeks staff and students return home with a wealth of science and travel experiences, with students using these experiences to enhance their next steps at college and further education.





## Duke of Edinburgh Report

Engagement with The Duke of Edinburgh Award scheme remain very high, with 697 students participating since 21/11/19:

	2019-20	2020-21	2021-22	2022-23	2023-24
Bronze	66	84	92	70	92
Silver	36	63	38	36	38
Gold	8	30	16	12	16

## Royal Society Project Report

“Tomorrow’s climate scientists: Can aerial mapping and imagery be used to identify the areas of greatest flood risk on our school site?”

### Environment Conservation Through The Use of Technology

The Bewdley School  
The University Of Birmingham



#### Overview and aims

Our project aims to survey The Bewdley School site, using drones to visually map the grounds. We are currently collating this data via 3D mapping software, to allow us to form a visual model of the site. We aim to use this model to allow us to figure out which parts of the site are at risk of flooding (from the river Severn) and then use this data to help prevent flooding in these areas in the future.

#### Summary of investigations and key findings

- The project provided some key findings into just how vulnerable our site is from potential flood damage.
- Students gained valuable skills in computing and data gathering.
- Due to the towns (Bewdley) flood defenses we have seen the issue of flooding pushed further down the river, towards the school.
- Students have discovered that technology is an essential part of modern life in many sectors and vital to allow our rivers to thrive.
- When undertaking the survey we gained valuable communication from the local community who were surprisingly quite defensive of the project and worried that the school were acting with the view to make the flooding worse further down the river to try and lessen the impact on the school site. This communication was key to ensure better education and understanding with the local community.
- Students developed more people skills when challenging members of parliament in a select committee.
- People skills have been key to this project running smoothly.
- These two images perfectly illustrate our vulnerability to the river and the blue line shows how close we are to the river bank.



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#### Evaluative project summary

##### Success of the project

- Students gained an understanding into data gathering.
- That data was then used by students to produce images of the schools site using photogrammetry.
- High quality images of the schools site were produced and showed the weak parts of our site and gave students a deeper understanding of the destructive side of the river and having a school site susceptible to flooding.
- The project gave students the chance to use technology they would not normally be exposed to.

##### Engagement of STEM partner and its impact

- Our STEM partner, University of Birmingham, has been a valuable relationship to the school, skills using the drones and how to analyse the data were gained from our partner and provided skills the students wouldn't normally be exposed to.
- Further development was planned to visit a local site for a shared trip to expose students to university trips and what to expect in future, unfortunately this didn't happen due to time constraints in the curriculum and ensuring courses can still run as normal.
- Our STEM partner is still actively engaged with the school and willing to help develop our legacy projects further.

##### Legacy projects and further development into the curriculum

- There are several plans in development for the next academic year to engage students further with STEM, one directly linked to the project and the other not:
  - The drones will be used next year to engage students in biodiversity, with direct links to computing, biology and geography. Student will go to Wyre Forrest, use the drones to map the growth patterns of different species of tree from the air taking 4K images, students will then map which species thrive in the Wyre Forrest and which are present but struggle, we will then grow those species on site to promote biodiversity in the area.
  - During the academic year, students in the lower school will engage with STEM subjects by coding self driving cars which will be 3D printed and assembled by the students, the cars will need to traverse increasingly difficult assault courses with the aim to be, who can produce the most affect algorithm/s to complete the assault courses in the least amount of steps taken, empathising code efficiency, subjects links being computing and design technology primarily.

##### Budget

- All budget has been spent on the hardware for the project (4 DJI drones) and the software (Agisoft software for data analysis).

**Co Headteacher Catherine McDougall**

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Registered charity number: 1186512

## Environment Conservation Through The Use of Technology

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### Background information

- The Bewdley School site is located by the river Severn, which frequently floods its banks
- This poses a significant risk to flooding the school both now, and even more in the future (due to the increases risk of flooding due to climate change)
- In the past, during times when the Bewdley town has been flooded (at location such as Beales Corner), the school and leisure centre have been with mere meters of being flooded
- Access to the leisure centre has also been impeded due to a stream flooding the access path
- We have used drones, to visually map the site by capturing a sequence of images
- We are currently collating this data via 3-dimensional mapping software
- This will allow us to find the parts of the site prone to flooding by the River Severn
- We will use this to prevent flooding in the future



An image of one of our team members flying a drone



An image taken from a drone, during the survey, showing the school, town and the river Severn

### Research and investigations undertaken

- We used the DJI mini 2 drones to capture a multitude of images of the parts of the Bewdley School site, which board the river Severn
- We are currently collating this data to form our 3D model of the site
- We are then going to use this model to allow us to find the areas of the site most vulnerable to flooding
- Once the areas have been identified, we aim to put in defensive measures to prevent flooding in the future

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An image showing two members of our team flying one of the drones used in the survey

### Results and conclusion

- We currently only have the images we have captured via our drone (an example of some of these are below)



An image taken from our drone showing the school and the river Severn



An image taken from our drone, showing one site where we carried out our drone survey from



An image taken from our drone, showing the Leisure Centre field



An image taken from our drone, showing a stream that is fed of the river, which, during times of flood, overflows its banks – preventing access to the Leisure Centre

### Evaluation or next steps

- We will soon have our 3D model completed and expect to find that a majority of the school, which is located along the riverbank, is at risk of flooding
- We will find out the areas at risk of flooding by using the model and data about the heights the river has, and could get to when it floods, to find out which buildings are at risk of flooding
- We will then use the model and predictions about how high the river could get to put in place suitable defensive measures to protect the site from flooding



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Some images of our preliminary 3D model



### Research and investigations undertaken

- We used the DJI mini 2 drones to capture a multitude of images of the parts of the Bewdley School site, which board the river Severn
- We have now collated this data via 3D mapping software and formed two preliminary 3D models

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### Results and conclusion

- The preliminary 3D models have some issues, such as some incorrect depth aspects – leading to the heightened distorted patches seen



Some more images of our preliminary 3D model



### Evaluation or next steps

- We intend to attempt to create a final set of 3D models, which are optimised to remove the distortion
- To do this we intend to capture a second set of improved images – with a higher and standardised frequency, as well as a standardised exposure and capture height
- We then intend to build a final and much more accurate 3D model to help identify the areas at risk of flooding

Co Headteacher Catherine McDougall

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## Environmental Club Report

Our Environmental Science Club began in May 2023. It grew out of interest from the students in Science Week, it is run by the Deputy Head of Science, Anne Morgan, with the help of Shelia Lawes of the Kidderminster Bee Society. Over the past year and a half, the Club has carried out a number of activities, primarily based in the Science Garden. These include:

- Creating a wildflower garden.
- Creating a grass compost heap from the grass removed
- Building and installing Solitary Bee Houses (for Mason bees).
- Planting an apple orchard.
- Planting a fruit garden.
- Making and installing 4 large planters. In November 2024, these beds were filled with soil. Two beds were planted; with winter vegetables such as carrots, mint, chard, onions and garlic; and herbs such as mint, thyme and rosemary.
- In December, tulips were planted in the garden (in preparation for spring).
- Laying a path into the garden with woodchips.
- Making bird feeders using pinecones found on the school site.
- Germinating seeds such as tomatoes and basil.

When it was too cold to work outside, we continued to emphasise our recycling efforts by:

- Making paper pots and paper logs; the paper used was from old exercise books.
- Making bird scarers from plastic water bottles and coke bottles.

Two workshops were also held for the members. They were:

- A workshop on 'From where does our food come?' highlighting the relationship between bees, edible fruits and honey, led by Shelia Lawes of the Kidderminster Bee Society.
- A workshop on 'Making eco-friendly Christmas decorations from recycled materials', led by Dr Laura Hobbs, the parent of one of our members.

The Club continues to flourish – with additional plans for more planting of flowers, vegetables and trees, trips and many more activities

## Duke of Edinburgh Plans

The Duke of Edinburgh Award is offered to:	Year 10	– Bronze Award
	Year 11	– Silver Award
	Years 12/13	– Gold Award

Supported by a mixture of after school and weekend sessions, with some expeditions taking place during school time. For example, a typical Bronze expedition will mean 2 large groups each having a 2 day expedition on Friday/Saturday and Sunday/Monday.

## Operation Wallacea Plans

Preparation for Operation Wallacea in Mexico for July 2026 is well underway with 2 staff member and 9 students again students will complete the PADI Open Water Diver Training with our local provider.

## Our Finances

See our annual return, available online:

<https://register-of-charities.charitycommission.gov.uk/charity-search/-/charity-details/5148105/accounts-and-annual-returns>

The Discovery Society' Accounts      Prepared by:      P Gillett, Finance Manager, The Bewdley School  
Year ending 31.03.24      Date prepared:      16.01.25

Opening balance (01.04.23)	£66.83	
Expenditure (01.04.23-31.03.24)	-£60.00	Monthly bank fees HSBC
Income (01.04.23-31.03.24)	£39.98	Amazon Smile donations
Closing balance (31.03.24)	£46.81	

NB HSBC account was closed on 22.04.24 and balance (£46.81) transferred to new Lloyds bank account.

## Policy Framework

As all of our trustees and activities fall within the operating environment of The Bewdley School – A Foundation School, all of our operations work within the policy framework of the school. The statutory policies which apply to our activities can be found at:

<https://www.bewdley.worcs.sch.uk/statutory-policies/>

## Our Trustees

We currently have 3 trustees:

Name	Date first held	Term	Term Ends	Relationship to School
David Hadley-Pryce*	21/11/2019	4 years	20/11/2027	Head Teacher
Catherine McDougall	26/02/2020	3 years	25/02/2026	Deputy Head Teacher
Christopher Beech	11/1/2023	3 years	10/1/2026	Head of Science/DofE lead

\* Chair of Trustees