



## **The Discovery Society Annual Report 2022**

Report of the Trustees for the year ending 31<sup>st</sup> December 2022.

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 second 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 in Operation Wallacea which offers PADI registration

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 2022 were:

1. Operation Wallacea – planned for 2 staff and 7 students from 3/7/22 to 18/7/22
2. Duke of Edinburgh – planned offer of Bronze, Silver and Gold Awards
  - a. Current numbers enrolled in the various awards – Bronze 92 (55% of Y10), Silver 38 (22% of Y11), Gold 16 (30% of Y13)
3. Royal Society Project – “Tomorrow’s climate scientists: Can aerial mapping and imagery be used to identify the areas of greatest flood risk on our school site?”

### Operation Wallacea Plan

#### Schedule

|              |   |
|--------------|---|
| 3/7/22       | Fly to Martinique via Paris and stay overnight at Hotel Bambou (dinner & breakfast) |
| 4/7/22       | Travel to Dominica via L’Express Ferry and travel/walk to 3 Rivers Eco-Lodge        |
| 4 – 9/7/22   | Week 1 - Forest Camp & terrestrial rainforest ecology course                        |
| 6/7/22       | Ecology course includes Volcanology Day with Rob Watts (Volcanologist)              |
| 10/7/22      | Walk/travel to Rosalie, then whale watching transfer to Fort Shirley                |
| 11 – 15/7/22 | Week 2 - Learn to dive and/or complete Caribbean reef ecology course                |
| 16 – 18/7/22 | Travel back to Rosalie; Ferry to Martinique; flight back to UK via Paris            |

Two staff and seven students travelled as above, with donations of £5,000 from the Bewdley Old Grammar School charity and £500 from Bewdley Town Council towards costs.

### 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.

Voluntary and skill activities are now being suggested/guided towards pupils to reflect the society’s aims of furthering exploration and research, with a number of pupils now contributing regularly to research run through the Zooniverse organisation.

## Royal Society Project Plans

### Project Aim

To embed the school into the local community through active involvement in the community's flood monitoring activity

### Objectives

1. To build a new skill set in the school in using drone technology as a 3D mapping tool.
2. To build on our already strong partnership with the University of Birmingham.
3. To create a 3D map of the school grounds which can be used as a basis for our wider understanding of flood risk across the school site.
4. To use the newly acquired skills to support the Abberley and Malvern Hills Geopark Forum in 3D mapping its routes and member sites.
5. To offer students the opportunity to learn beyond the formal curriculum, including from adults who are not their teachers

### Student benefit and learning mapped onto project aims

1. Students will learn about drone technology, its uses, and the software that can be used with its imaging technology to create 3D maps.
2. Students will learn about the central importance of University Research in building our understanding of the world around us.
3. Students will learn how to apply their newly acquired skills to map the school grounds in detail, helping them to utilise environment agency data to evaluate flood risk.
4. Students will benefit from their experience of using scientific methods to analyse the world around them, in understanding how real-world knowledge is built and used.
5. Students will benefit from working with adults who are not their teachers, in building their own understanding of how their own strengths and skills sets position them for involvement in wider project work. In addition to our project partner, Dr Carl Stevenson at the University of Birmingham, we are also very grateful for the support and advice of Ian Jones, of the Environment Agency.

### Scientific Method

By working with the University of Birmingham and with support and advice from the Environment Agency, the activity and outcome of this project will be firmly rooted in cutting edge academic and scientific methods and real-world applications. Students will use their training to design and implement independent and group projects. Through this the process of identifying a question, framing this as a hypothesis through researching the scientific context, designing a test for this hypothesis that allows falsification and evaluate the results.

In this project we are asking the question, can drone/UAV surveying methods be used effectively in flood monitoring? Our starting point is that the school site is prone to flooding and we want to know which parts are lowest lying and therefore at most risk. Essentially, we will create a 3D topographic model of the school campus. River levels can be modelled to simulate flood risk zones. We then propose to use the same method to survey the river level from safe distances during high flow conditions. These models can be compared to river level and flow data from the EA's Bewdley station and used to evaluate how effective drone/UAV models capture actual river levels. With our data and support and advice from the EA we can examine where variations in the modelled and measured levels are meaningful. Students will also need to understand the link between hydrology and geology of the local river section and the regional weather patterns and climate.



## Engagement Levels

### Operation Wallacea

Following advice from the Opwall Team about COVID-19 restrictions in the Caribbean area, the expedition was postponed until 3<sup>rd</sup> July – 18<sup>th</sup> July 2022. We therefore lost 3 of the 7 students as they have left and started university courses. We were able to recruit 2 more year 13 students and 1 from year 12. The group who travelled were largely a replacement for the original planned group due to the delay. The male Head Teacher and female Head of maths took 5 year 13 girls, a year 13 boy and a year 12 boy. In advance of the expedition 1 of the girls, the 2 boys and the Head Teacher undertook PADI open water diving training, so that they could engage in the reef ecology course as qualified divers.



The first week was spent on a variety of ecological surveys, including 'fishing' for indigenous and invasive (from Costa Rica) Anoles (small lizards); mist netting for bats and for birds: collecting insects and surveying aquatic wildlife. A day was also spent in measuring tree density and size in the rainforest as part of a longitudinal survey. One day was taken out for a volcano study of the whole island, and the party can be seen on the left climbing Trafalgar Falls, to spend some time in a geothermal pool at the foot of the left hand of the two waterfalls.



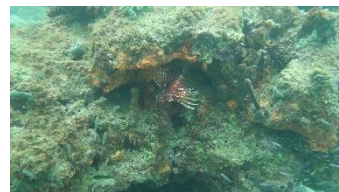


The second week was spent at Fort Shirley, with transport via Whale watching boat. The group spent an enchanting 15 minutes in the company of a small pod of Sperm Whales, consisting of 3 mothers and 2 calves. These live permanently off the coast of Dominica with the males migrating, and we had the privilege of witnessing the group coming to the surface for the calves to be fed.

Fort Shirley sits on a hill overlooking Prince Rupert's Bay, with JC Ocean Adventures on the waterfront providing the scuba diving training and equipment. Students and staff had 3 options from a week snorkelling, a 3 day intensive PADI open water course followed by 2 days of diving or a full week of diving on the coral reef.

Whichever option was chosen, the 2 dives per day in mid-morning and early afternoon, were followed by an intensive reef ecology course. As with the first week in the rainforest, this consisted of a thoroughly prepared and comprehensive series of lectures which covered the habitat, ecology and species of the reef ecosystem. There was also a clear explanation of the ongoing threats human activity poses to these ecosystems, and the kinds of mitigations required to protect them.

Two independent schools were also present, and working as mixed groups gave students useful opportunities to work with new people. The combination of intensive ecological survey work and well-structured lectures was very demanding, with excellent student engagement. Rob Watts, volcanologist, gave students a thorough overview of the geology of the island. As an introduction to earth systems, the course was exceptional, and we plan to return in 2024.



## Duke of Edinburgh

The Duke of Edinburgh Awards were able to proceed in modified format, with engagement levels being very high, with 433 participated in DofE since 21/11/19:

### 2019-20

Bronze - 66

Silver - 36

Gold – 8

### 2020-21

Bronze - 84

Silver - 63

Gold - 30

### 2021-22

Bronze - 92

Silver - 38

Gold - 16 (Y13)

## Royal Society Project

There are 8 students involved in the drone training to create a 3D map of the school, with the support of Dr Carl Stevenson, with training underway. Please see final page for project update.

A further 3 sixth form students accompanied 2 staff to the Houses of Parliament on 14 November 2022, to question a mock select committee. They questioned 3 Members of Parliament alongside 4 other schools. The event was recorded by the BBC and broadcast on BBC radio 4.

## Future Plans

As members of Abberley and Malvern Hills Geopark Forum, we are also undertaking to lead our partners in a 'Heritage Lottery' bid, to develop a peripatetic 'time capsule' with a programme to visit all Geopark visitor centres on an on-going basis. This is planned to run for 5 years in the first instance, with legacy plans built into the project.

## Our Finances

See our annual return, available online:

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

## 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 4 trustees:

| Name                | Date first held | Term    | Term Ends  | Relationship to School      |
|---------------------|-----------------|---------|------------|-----------------------------|
| David Hadley-Pryce* | 21/11/2019      | 4 years | 20/11/2023 | Head Teacher                |
| Derek Haskins       | 21/11/2019      | 3 years | 20/11/2022 | Chair of Governors          |
| Catherine McDougall | 21/11/2021      | 3 years | 20/11/2024 | Deputy Head Teacher         |
| Christopher Beech   | 11/1/2023       | 3 years | 10/1/2026  | Second in Science/DofE lead |

\* Chair of Trustees



# Environment Conservation through the Use of Technology

The Bewdley School

STEM partner organisation: University of Birmingham



UNIVERSITY OF  
BIRMINGHAM

## Overview and aims

- Our project aims to survey The Bewdley School site, using drones to visually map the grounds, and then we plan to collate 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.

## 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)
- We will be using drones, to visually map the site in 3 dimensions
- We will then collate 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

## Research and investigations undertaken



- We are only a few hundred metres down the river from Bewdley town, which has been flooded recently and has flood defences
- We face the same risk of flooding at our school, as the town, especially, as the defences cause the flood waters to be pumped down the river, where they cause flooding – which could pose a flood risk for our school



- Example of the drones we are going to use to map the site

## Results and conclusion

- We hope to find the areas that are prone to flooding, via 3D modelling of the site
- We intend to use this data to prevent the risk of flooding

## Next steps

- After October half term, we plan to get the drones up in the air and begin mapping the site
- Soon after, we will use this data to build a model of the site, via the 3D mapping software
- Finally, we will use this data to highlight the areas at risk of flooding and use this data to place appropriate preventative measures in place

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**THE ROYAL SOCIETY**

## Guidance, checklist and permissions

### Permissions and checklist

Before you submit your poster, please check the following:

- ☐ You have sought all necessary permissions for identifiable individuals in photos (please fill out the photo consent below in this case).
- ☐ You have checked the copyright for any images used that are from external sources, such as the internet or photo libraries, and have credited any individuals as needed.
- ☐ You have ensured no personal information has been shared (i.e. students names etc.).
- ☐ You have checked for scientific accuracy (i.e. no unfounded claims or theories have been presented).
- ☐ You have proofed the poster thoroughly.

### Poster guidance:

**Your poster must be submitted as a PowerPoint file no larger than 5MB. No other file format will be accepted.**  
Contact [education@royalsociety.org](mailto:education@royalsociety.org) with any questions

### Format:

- Please ensure your poster is kept in landscape layout.
- Please do **not** change the format, positioning or size of the header (where the project title, names, school logo and STEM partner logo are) and the footer (scheme logo).
- How you arrange the body of the poster is up to you but please align topics vertically or horizontally; diagonal movement can look messy. The information within the poster needs to fit between the header and the bottom of the page.
- The font and type size in this poster should be kept consistent throughout. The text is Arial and size 18pt (black) for the body section should be used. Smaller text can be used for annotating pictures and diagrams as appropriate but should still be legible (size 14pt is a minimum).
- Please be mindful of how small your images and text may appear on a standard screen and ensure you leave some blank space (gaps) between sections to make your poster easier to read.

### Photography for use by the Royal Society

Permission for third party images used within Partnership Grants project posters, provided during grant reporting.  
Date: 18<sup>th</sup> October 2022

Schools may provide the Royal Society with pre-prepared photography as part of the posters submitted as part of their mandatory reporting through the Partnership Grants scheme. These photographs, as part of the presentation documents, will be shared on the Society's website, at Royal Society events and may be used in the media\*. These photographs as part of the presentation documents could also be used in the following ways:

- In printed or online material promoting the programme of activities run by the Royal Society, including (but not limited to):
  - the Society's website or social media sites, including Facebook, Twitter, LinkedIn and YouTube
  - promotional flyers and banners
  - in the media – newspapers, magazines, websites, broadcast outlets\*
  - in marketing and public engagement email campaigns e.g. newsletters
  - in formal or public reports about the work of the Royal Society

It is the school's responsibility to ensure that all third parties (including but not limited to: children, parents, staff) represented in the photographs have given their permission for the images to be distributed and used as detailed above. Please ensure you have checked your own schools' photo permission policy, particularly with regards to children in local authority care (LAC).

It is the school's responsibility to ensure that third parties who do not wish to be photographed, or have limitations of the photography's use that exclude them from being used as above, are not included in any photography passed to the Royal Society.

The photographs as part of the presentation documents will be held in perpetuity for online, digital or print usage, while the content remains relevant. For any queries about permission relating to ongoing use, or to revoke permission for an individual, please email [education@royalsociety.org](mailto:education@royalsociety.org)

\* Once a film/audio/story/photography has been used by an external media outlet, we are no longer able to control if it is used again by the same media outlet or potentially elsewhere.

I confirm that all people depicted in the photography provided from .....  
(Please insert school/college name above) have given all required permission or consent for the photography provided to be used for these purposes by the Royal Society.

Description of photography provided (brief description of picture – what is depicted and who is included)

Teacher / school representative's details:

|            |                    |                     |                               |
|------------|--------------------|---------------------|-------------------------------|
| Name:      | David Hadley-Pryce | Position in school: | Head Teacher                  |
| Signature: |                    | Date:               | 18 <sup>th</sup> October 2022 |

The Discovery Society' Accounts  
Year ending 31.03.22

Prepared by: P Gillett, Finance Manager, The Bewdley School  
Date prepared: 26.01.23

|                                 |           |
|---------------------------------|-----------|
| Opening balance (01.04.21)      | £5,510.55 |
| Expenditure (01.04.21-31.03.22) | -£15.00   |
| Income (01.04.21-31.03.22)      | £72.49    |
| Closing balance (31.03.22)      | £5,568.04 |