Dear friends,

I am delighted to present to you our Impact Report, a celebration of the incredible journey we have embarked upon to grow a culture of research and innovation in schools. This report shows the profound impact of research projects on students and teachers. We hope for a future where every child can experience the transformative power of research and innovation.

We’ve heard captivating stories and witnessed remarkable achievements by students who’ve embraced research. Their passion for discovery and their understanding of opportunities in research and innovation have flourished and they’ve built significant skills in collaboration, problem-solving and critical thinking. But our vision extends beyond individual projects. Our mission is to create a future where research and innovation are woven into every school, nurturing critical thinkers and trailblazers.

Imagine a world where every child, regardless of their background or the type of school they attend, has access to the resources and opportunities to engage in meaningful research and innovation. A world where curiosity is encouraged, questions are celebrated, and ideas are nurtured. It is this vision that drives us forward, guiding our efforts to create lasting change in education. Read more in this report about our solution to effect this change.

I extend my deepest appreciation to our dedicated team of staff, trustees and patrons, whose commitment and creativity are helping to make this vision a reality. To our partners, teachers, school leaders and supporters, thank you for believing in our mission. Together, we shape a future where every child experiences the joy of research, and our society and economy feel the benefits of the skills, knowledge and innovation this approach grows.

We are immensely grateful for the ongoing support of the Battcock Charitable Trust for making this work possible.

Explore this report and join us in celebrating our impact. Let us ignite curiosity, empower young minds and build a brighter future through research and innovation.
Impact on students

Students share how their research experience shaped them personally, beyond what they had imagined.

While women are significantly underrepresented in the UK physics workforce, a group of schoolgirls in Northern Ireland prove that doesn’t have to be the case. “I have a great passion for physics, but always questioned doing it at university, whether I’d be capable,” said Aoife, a student at Limavady Grammar School in County Londonderry. Aoife was one of 275 students, including 96 girls, who took part in Big Data: ATLAS. The research project was developed by IRIS in collaboration with the University of Oxford and Rutherford Appleton Laboratory to introduce young people to the joy of particle physics. As part of the project, students learn techniques used by particle physicists to analyses data resulting from proton-proton collisions in the Large Hadron Collider at CERN. With their newfound skills, they then try to find evidence of the Higgs boson.

This experience not only taught Aoife new skills in computer programming, but it strengthened her confidence in her ability to understand physics. It also opened a window into a future study of the subject. “Before, I didn’t know what it could involve. It was fun to gain an insight into programming you could use for physics and the different, more advanced physics. After doing the project I think I’d really enjoy a physics degree” explains Aoife.

Other Limavady Grammar students that were part of the research project were equally impacted by the experience. “You get to know the types of things you could do with physics and decide if it’s for you,” said Ella.

For someone who didn’t study physics at this level before, Ella picked it up quickly. Taking part in the project built her confidence and sparked her passion for the subject. “It’s mind-blowing, to even think that this is real stuff that’s going on that you’re analysing. Sometimes you need to just take a minute and remember that – it’s really cool,” said Ella.

It was not an easy road for the students; finding evidence of the Higgs boson is challenging. “I didn’t do computer science for GCSE so I have been thrown in at the deep end, but I really enjoy it,” commented Darcy.

“Learning the code was tricky, seeing the error at the end was always heartbreaking. But the more we did it, the more we got invested in it,” said Darcy.

Prof Alan Barr, Professor of Particle Physics at the University of Oxford visited Limavady earlier this year to provide a masterclass, which included coding lessons. “I’m amazed at what students got through in what is really a difficult project, in terms of the new physics they’ve been learning and the computer coding they’ve had to pick up. They’ve been able to address really difficult questions in physics from their own classroom. That’s extraordinary,” said Alan.

Would the girls recommend an IRIS project to their friends? “Definitely do any research project like this, whether it’s physics or biology or chemistry. It’s interesting to do work outside your curriculum to understand that science isn’t just learning definitions and doing methods, but that’s research, finding out things for yourself, trial and error. There’s no right answer,” says Ella.
Impact on students continued

Hamdaan shares how an IRIS school research experience played a pivotal role in his decision to pursue chemical engineering at the University of Leeds.

My family and I had always planned for me to be a doctor, but taking part in DNA Origami at sixth form changed those plans. One night, I was modeling my scaffolds and staples. I was up until 2 am trying to figure it all out and I realised that, whilst it was challenging, I felt like I belonged there. Taking part in the analytical research, seeing the problem-solving and even seeing some of the applications was inspirational, it showed me ‘this is what you could be, so give it a go.’

It was difficult to explain to my family that I wanted to pursue chemical engineering instead of medicine at the time, but I had a conversation with my mum recently and she said: ‘I can’t believe I ever said you should be going into that field, because look at you now. You’re going off to do so many different things in so many different places in the world and you’re only 19’. Yes, it was a hilly road to begin with, but I’m seeing the benefits of that journey now.

I’m thankful for IRIS, the project leads and my teachers for being able to support me with the project. I don’t know what would have happened if I didn’t do it.

Without seeing why you’re studying science, there is no motivation for exploring it. If schools use research as a vector to try to get more young people into these diverse fields of study, they’ll allow students to experience these subjects for themselves. Young people will become passionate about them and bring that passion into STEM careers. It will, ultimately, have a greater impact on science as a whole.

My advice to students thinking about taking part in an IRIS project is to throw yourself into it and don’t look back because the skills you gain from it are quite honestly invaluable. And that no matter what, you will come out a better person.

Hamdaan (July 2021)
University of Leeds
Project: DNA Origami

Hamdaan
St John Fisher Catholic Voluntary Academy

Taking part in the analytical research, seeing the problem-solving and even seeing some of the applications was inspirational, it showed me ‘this is what you could be, so give it a go.’
Impact on students continued

We surveyed 426 students at the end of their projects about the impact of taking part in real research. This is what they told us.

Ishaan
King Edward VI Camp Hill School for Boys

It’s a unique opportunity because it’s outside of the curriculum learning, there are no boundaries and it’s really fun.

Students’ perspective

99%
Would recommend IRIS projects to their peers

Sophie
Our Lady’s Grammar School

90%
Said they know more about what it’s like to work in STEM after completing an IRIS project

Selma
Liverpool Life Sciences UTC

94%
Would rate their experience as good to very good

Yuvan
Altrincham Grammar School for Boys

77%
Said working on an IRIS project allowed them to explore new areas of STEM

92%
Really valued being part of a research community through IRIS

96%
Said they know more about how STEM can help in the real-world after doing an IRIS project
Impact on students continued

We think taking part in research and innovation equips students with the skills they need for the future. Our survey shows they agree.

It’s been a really great lesson about the scientific method, the process of conducting research, analysing, background research, and all of the elements of research.

I’ve learned quite a lot about statistical analysis. I presented at conference, so I also learned the art of speaking to a large group of people. As a 16-year-old, it’s really empowering.

With school, there’s an answer you’re trying to get to and a way you’re supposed to interpret data. With original research, there is so much depth, so many different conclusions that you must measure up. It’s a beneficial skill.

Skills for future work

72% Said it helped them to analyse complex information

88% Improved their research skills

72% Improved their communication skills

89% Improved their teamwork skills
The ‘Skills Builder Universal Framework’ highlights essential, transferable skills for employability.

We asked teachers to indicate which of these essential employability skills their students have developed through their IRIS project.

Freddie
Altrincham Grammar School for Boys

81% Listening and speaking: speaking
58% Listening and speaking: listening

Brooke Porter (Teacher)
Dover Grammar School for Girls

87% Problem solving: problem solving
71% Self-management: staying positive
68% Problem solving: creativity

Maryam
Dixons Allerton Academy

62% Collaboration: leadership
72% Self-management: aiming high
94% Collaboration: teamwork

It’s a real privilege to present and shows how people value our ideas and take the time to listen to what you’ve learned.

I’m always overwhelmed with how students can multitask, doing IRIS projects alongside other schoolwork helps them enhance those skills even more. I’m always impressed to see what they can manage to achieve in such a short space of time.

I’ve always been interested in climate change and this project has increased that. It’s taught me research skills and got me more interested in science.
Inspiring future researchers

Our recent survey shows that IRIS research projects open a window into the excitement and diversity of STEM careers.

The Next Generation

95%

Of teachers agreed students had increased their science capital by taking part in real research through IRIS

1 in 2

Students became more interested in a STEM career

2 in 3

Students learned that research can be hard work but is rewarding

3 in 4

Students were more confident that 'people like me are researchers'

IRIS helped me to overcome scientific challenges and exposed me as a developing individual to greater career opportunities. Female student Year 10

IRIS has convinced me to pursue a career in science in future, and prior to it I was unsure of the career I wanted. Male student Year 10
Cat and Marieke talk about how research and innovation make classroom learning more exciting, even for the teachers.

For me, it’s all very novel to have the chance to diversify a bit into the other sciences. It’s been good to learn with my students and share these experiences with them.

Cat Rutley
Hele’s School

I used to be a research scientist. The whole reason I got into teaching was to try and show pupils that it’s really good fun doing research, and it’s people like them who do research jobs not just some strange person somewhere else.

I love doing research with kids. I started a science club at Mullion and it’s been running for a long time. Pupils come and do research in their spare time. I open up my classroom over lunch on Wednesdays. It’s an inclusive group, no restrictions on age or ability, anyone can join.

I provide access to research equipment, including microscopes and laptops. I show them how to use satellite data, including Earth Observation browsers and the Sentinel Hub. I challenge them to come up with their own research ideas, postulate their own questions, then to use the scientific method to try and figure out the answers.

The kids definitely get a lot out of it and it’s not necessarily the people you think. It lets them apply what they’re learning in class, helps them to delve deeper into their subjects and find what interests them.

I think it’s important for schools to structure pupils’ days in a way that allows them to explore their subject outside the syllabus and lets that wonder unfold. I encourage teachers to start a club at their school. Yes, some students may need more support than others. But it’s a real opportunity to meet them where they are. If you feel more comfortable with structure, introduce students to an IRIS project as they are fully supported and free.

This year, I started a new school, and it was the first year we worked with IRIS. We chose to take part in Cosmic Mining and Big Data: ATLAS. I began by speed-reading the introduction materials, which were really interesting, but I had no idea how the kids were going to find the project. It’s turned out a huge success.

As a chemistry teacher, it’s been great to delve into stellar research with Cosmic Mining and explore physics and computer modelling with the ATLAS project. For me, it’s all very novel to have the chance to diversify a bit into the other sciences. It’s been good to learn with my students and share these experiences with them. They get to share in the responsibility too, because they’re teaching me at times.

Watching the transition of the kids from the start of their research to the end, I can see that their confidence, presentation skills and ability to share their research at conference has massively improved.

So much so that I had them share their work with the next group of students coming through. We’re keen to drive this work further as we’ve seen how important it has become for the students.

I would have enjoyed a project like this at school, it’s such an incredible opportunity. Just having the time to research at this age is amazing. Most students don’t experience it until university. It’s about valuing education beyond just classroom learning and getting students through their GCSEs and A-levels. It’s about giving them the chance to experience the bigger picture. Seeing students use the knowledge they’ve learned and apply it to their own research and, possibly, figuring out what they might do further into their lives is really nice.

Our students are planning to do DNA Origami and Ionic Liquids next, I’m looking forward to it.

The kids definitely get a lot out of it and it’s not necessarily the people you think. It lets them apply what they’re learning in class, helps them to delve deeper into their subjects and find what interests them.

It lets them apply what they’re learning in class, helps them to delve deeper into their subjects and find what interests them.
Impact on teachers continued

Feedback from 78 teachers shows that our projects reinvigorate the way people teach and that research is a positive way to expand students’ learning beyond the curriculum.

When you teach the same curriculum year after year, it’s easy to forget that fresh ideas can spark all sorts of new things they haven’t thought about or I haven’t thought about before. Giving students the freedom to explore new ideas, sparks their excitement and that’s fulfilling.

"The opportunity to explore science, in areas that are not directly linked to the curriculum and meet other enthusiastic teachers at conference. It just makes life so much more interesting."

Jayne Pierre
Dixons Sixth Form

I find myself talking about the research projects the boys are doing with other teachers and students. I’ve integrated their work into my teaching, they’ve presented to the class and students enjoy the lessons.

Simon Lewis
The Thomas Hardye School

Impact on teaching

Would recommend IRIS to another teacher

83%
Said IRIS projects helped them communicate the excitement of STEM subjects to their students

81%
Said IRIS projects helped them get back in touch with research

55%
Said that IRIS projects influenced their approach to teaching

Simone Blaize
Altrincham Grammar
In 2020, we commissioned UCL Institute of Education to carry out an independent evaluation of the impact that participation in our projects had on students.

The Institute for Research in Schools

An external view

In 2020, we commissioned UCL Institute of Education to carry out an independent evaluation of the impact that participation in our projects had on students.

The evaluation involved

| Before and after survey of 300 students in 20 secondary schools | 300 |
| IRIS students, 188 non-IRIS student control group | 112 |
| IRIS student interviews | 32 |

What the evaluation found

IRIS students were more positive about:
- the value of science to society
- the nature of science
- engaging with science outside the school curriculum
- feeling encouraged and aspiring to study post-16 science

Working on an IRIS project increased students’:
- connection to science (72% felt more connected)
- knowledge about science and scientific research
- awareness of scientific practice and skills
- understanding of the wider field of science
- awareness of the applications of science

Impact

Our next steps

IRIS has been integrating the reflections and recommendations of the independent evaluation into our work. This has resulted in:

- The use of the Higher Education Access Tracker (HEAT), which will give us information about the education trajectory of IRIS students and an understanding of the long-term impact of our work.
- Improvement of our evaluation practices to improve our understanding of how our projects can contribute to improving social mobility for disadvantaged young people.
- A large-scale evaluation of the IRIS Research & Innovation Programme to explore the impact on the schools and students involved.

Further articles concerning this work will be published shortly.

IRIS is on a mission to change the culture in UK education so that authentic research and innovation is part of every young person’s experience.

**Our charity:**
- Provides life changing opportunities for young people to take part in high level, meaningful research projects, while in school
- Showcases the impact of research and innovation in schools
- Facilitates, influences and drives change to embed a culture of research and innovation in schools

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**Our reach in 2022-23**

- **1,492** Students took part in IRIS research
- **104** Schools ran IRIS projects
- **197** Research projects carried out

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- **89%** Of IRIS students attend state-funded secondary schools, sixth forms or colleges
- **49%** Of students carrying out research through IRIS are girls

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**George Prince Henry’s Grammar**
Subject: Original Research

"The curriculum is confining, with a list of methods to learn for chemistry, but with research we’ve been able to plot our own way from one topic to another."

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**Elizabeth Liverpool Life Science UTC**
Subject: DNA Origami

"It has opened my eyes to all the different STEM areas. DNA Origami showed me that there’s much more to science than I knew before."

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**60,000+** Hours of support, guidance and student engagement
Jill explains why research and innovation is such an essential part of her school culture.

Our young people need to be changemakers, pioneers and experts in their fields. Their ambition is not to follow in my footsteps but to be brave enough to tread a path completely undiscovered.

We have worked hard to create a culture where research and innovation are not only valued but safe. We recognise that there are many facets to this and that to embrace and enjoy research, we need to develop tenacity, resilience and communication skills.

Over the years, we have seen just how important it is for these skills to be embedded in our culture. They allow research and innovation to occur. Who would be brave enough to take risks and be curious if they didn’t feel safe?

Our culture of research and innovation impacts students. For a start, they are happy here. They tell us that they feel proud to be a student with us. Recently, one of our Year 9 students talked at the IRIS Conference about his old school, his old life, and how he’s proud to now be a better version of himself. We firmly believe that when you create fertile ground, academic success will grow.

Our culture also impacts staff. They tell us that they actually enjoy working here, that it is liberating to get to do the job they signed up for, to be the one that lights the spark. It reminds us of why we wanted to be teachers in the first place. We talk about change, we talk about mistakes. We recognise the shared ambition and that sometimes there are bumps in the road.

Ultimately, we remind ourselves - what is education without innovation and research? School is so much more than a list of numbers and letters at the age of 16 or 18.

Our young people need to be changemakers, pioneers and experts in their fields. Their ambition is not to follow in my footsteps but to be brave enough to tread a path completely undiscovered. This is what our culture of research and innovation creates.
Looking to the future

At IRIS, our mission underpins everything that we do. If we are truly going to change the culture in UK education, so that authentic research and innovation is part of every young person’s experience, IRIS itself will need to embrace innovation. That is exactly what we will be doing over the next five years.

Marcus Bernard
Deputy Director
The Institute for Research in Schools

We’ve seen the transformation that takes place when students create knowledge (research) and use it to solve problems (innovation). We’ve shown how a research and innovation culture at school empowers students and expands their horizons. Now we want to ensure all schools have access to these life-changing opportunities, capturing a diverse range of talent, especially from underrepresented groups.

Today, STEM research and innovation is more important than ever. The UK government has an ambitious plan to make the UK a science superpower. The Covid-19 pandemic has reignited and supercharged the UK’s pharmaceutical and biosciences sectors. Data science and artificial intelligence are among the new technologies that are growing exponentially. Yet there are still significant barriers to student engagement with STEM, with the sector facing a skills gap as a result.

Our survey of over 2,800 students found...

<table>
<thead>
<tr>
<th>Becoming a scientist</th>
<th>STEM is important in making positive differences</th>
<th>Doing well in STEM subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>61% But only...</td>
<td>72% But only...</td>
<td>65% But only...</td>
</tr>
<tr>
<td>Agree that anyone can do science and be a scientist</td>
<td>Actually see themselves as a science person</td>
<td>Feel empowered to make a positive difference using STEM</td>
</tr>
<tr>
<td>28%</td>
<td>54%</td>
<td>46%</td>
</tr>
<tr>
<td>Agree that STEM is important in making positive differences to global challenges</td>
<td></td>
<td></td>
</tr>
<tr>
<td>79% But only...</td>
<td>45% And only...</td>
<td></td>
</tr>
<tr>
<td>Agree that a science qualification can help you get many different types of jobs</td>
<td>Of girls feel like they do well in STEM subjects</td>
<td></td>
</tr>
<tr>
<td>39%</td>
<td>Of girls are considering studying a post-16 STEM subject</td>
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</table>

67% But only...}

Agree that there are job opportunities in STEM for people with different qualifications and skills

But only...
Driving a culture of research in schools

Taking a lead from our survey data, we have developed an exciting plan to help schools tackle some of the persistent barriers to student engagement. We aim to foster a dynamic culture of research and innovation in the classroom, and thus fundamentally change the way that the next generation of young people relate to STEM.

To do this, in January 2025 we will launch a groundbreaking online platform that will provide teachers and school leaders with the support they need to develop a culture of research and innovation in their school.

The programme will launch with five key tools:

- **Handbook**
  A reflective framework and toolkit for teachers and school leaders to develop research and innovation in their schools.

- **Online analysis tool**
  This will enable schools to assess students’ attitudes, views, perceptions and ambitions in STEM—understanding gaps in key pupil groups.

- **Education leads**
  A team of school leaders experienced in STEM school improvement who can support schools to develop a culture of research and innovation.

- **Quality mark**
  A recognised and respected quality mark for schools demonstrating a commitment to STEM research and innovation.

- **Teacher training**
  A national programme to provide professional development for teachers and leaders enabling them to improve research and innovation in schools.

Since January 2023 we have been piloting aspects of the Research & Innovation Programme in schools. Here’s some feedback...

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"There has been a new outlook towards how we do STEM and how we can really push this to become a bigger school focus.

By introducing this framework into our school, it’s enabling our students to realise that I want to do this and it’s allowing us to spread STEM opportunities to the rest of our students."

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"Head of STEM
Pilot school"

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"STEM teacher
Pilot school"

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**We have ambitious plans:**

- **50 schools**
  (impacting up to 50,000 students)
  To be using the programme by 2025

- **100 schools**
  (impacting up to 100,000 students)
  To be using the programme by 2026

For the team at IRIS, this expansion of work represents a significant investment and area of growth, but we know it is essential if we are to achieve our mission. We look forward to sharing the progress of this work with you over the coming months and years.
IRIS students’ impact on UK research and innovation

Taking part in real research adds to the body of scientific knowledge.

Here are some of the areas in which IRIS students have contributed in this academic year.

**Big Data: ATLAS**

On a quest to find evidence of the Higgs boson, 280 young people from 25 UK schools delved deep into the wonders of particle physics. Alan Barr, Professor of Particle Physics at the University of Oxford was hugely impressed with the quality of the students’ work and surprised at their ingenuity. Students from King Edward VI Camp Hill School for Boys used machine learning algorithms, essentially AI, to classify proton-to-proton collision events. This was a creative and impressive approach to the research.

**Big Data: Covid-19**

More than 50 students from 12 schools delved into the global Covid-19 database to find trends and try to provide context to them. Adeleke from Dartford Grammar School investigated the effect of new daily COVID-19 cases on recreational mobility. During the IRIS Student Conference, his poster caught the eye of Dame Kate Bingham, who led the UK government’s vaccine task force during the COVID-19 pandemic. Adeleke confidently took her through his work, explaining his conclusions and the reasoning behind them.

**DNA Origami**

This year 117 students from 12 schools explored DNA as a building material. From the nanoDentistRobot designed by Elizabeth from Liverpool Life Sciences UTC a novel way to use DNA to fight organ rejection investigated by Altrincham Grammar School for Boys, the 2023 IRIS research shone with promise for the next generation of innovators. Edward, a Year 8 student from Ralph Thorsby, wrote his own piece of code to solve a compatibility issue between programs used to manipulate DNA. The developers of the program were so impressed with his work, they incorporated his fix into their software.

**Earth Observation**

More than 100 students across 12 schools used satellite data to track the Earth’s shifting terrain to investigate how and to consider why it changes over time. Arthur from Mullion School monitored the scale of pollution levels in UK waterways. He discovered that avalanches can easily spot raw sewage discharge by using freely accessible satellite imagery to observe chlorophyll levels downstream from water sewage stations. His work has earned praise from the environmental campaign group Surfers Against Sewage. The University of Exeter invited Arthur to speak at an event and to continue his work alongside their researchers next year.
Our conferences

Young people from secondary schools and colleges across the UK shared their research with peers and the wider scientific community at the IRIS Student Conferences.

433
Students attended conferences in Exeter, London and Manchester

140
Research posters were presented by students to their peers, teachers and the wider scientific community

Exeter

Manchester

London
Between April 2022 and August 2023, IRIS experienced substantial growth. Starting with just five employees in 2019, we now employ 15 people, operating a hybrid model from our London office and a new Birmingham office. Despite this growth in staffing, the proportion of our expenditure directly supporting schools has increased since 2021.

Our initiatives, including a dedicated Research & Innovation Programme team, focus on supporting schools in promoting research, innovation, and STEM skills, fostering UK social mobility and a robust STEM economy. A pilot of the R&I programme, involving over 2800 students and scheduled to conclude in 2024, underscores our commitment.

A further 3000 students have benefited from our Research Projects in the past two years, each averaging 30 engagement hours. Successful in-person events marked 2022 and 2023, featuring record conference participation. We want every young person to experience real research and innovation while still in school. We are actively seeking backers and partners to join us to expand this vital mission.

### Accounts

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<tr>
<th></th>
<th>2022/23</th>
<th>2021/22</th>
<th>2020/21</th>
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<tr>
<td>Expenditure on charitable activities</td>
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<td>Net funds at year end</td>
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<td>£294,000</td>
<td>£376,000</td>
<td>£403,000</td>
<td>£158,000</td>
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*These are projected figures, covering a 17 month period from April 2022 to August 2023. Income arises from donations, grants and interest.

### How we spend our funds

- School support: 21%
- Strategic & operational support: 53%
- Office & overheads: 26%

Join us as we build a culture of research & innovation in schools across the UK.

Here are some ways to get involved in our mission:

- Carry out a project in your school
- Partner with us to deliver a research project to schools
- Work with us as we build a thriving culture of research & innovation across UK schools
- Support us financially to achieve our mission

Please get in touch, we’d love to hear from you.

Email: info@researchinschools.org
The Institute for Research in Schools

Email: info@researchinschools.org

Facebook, X & YouTube: ResearchInSch

LinkedIn: The Institute for Research in Schools

Website: researchinschools.org