



Flying High with Drones at Your School

A TEACHER'S GUIDE



Inspiring the next generation to solve some of the world's toughest challenges with STEM.

How to Start a Drone Program at Your School

It's easier than you might think.

Starting a Drone and Geospatial program at your school can feel daunting at first, but it doesn't have to be with the support of drone and geospatial experts. Here's how we'd approach the process [➔](#)



01

Educational Benefits

Research and consider the student learning outcomes, and educational benefits. We've outlined these in the following pages.

02

Gather Whole School Support

Seek the support of the leadership team and spruik the benefits to other departments to garner their support. The more buy-in and support you get from your peers the better. One suggestion might be to host a special STEM event, where all departments are invited to attend a special learn to fly drone session. In our experience, once everyone has seen how a drone class is managed and the cross curricular links, it alleviates any fears they might have.

03

Fund the program

Do you need to secure funding to purchase the equipment? Check if there is funding available in your department's budget or suggest pooling funds across multiple departments to fund the purchasing of the equipment. Alternatively, submit an application for funding to your school council as part of the annual budgeting cycle. We can provide you with a quote for equipment, PD, and teacher resources so you are set up and ready to go!

04

Identify the best school approach

Develop a scope and sequence to show how drone and geospatial programs best fit your school. Which programs, and technologies suit which grade levels and how can you embed these programs in a whole-school approach. If you want to start small, then simply start with a STEM club and build from there.

05

Build teacher confidence and capabilities

Drone and geospatial technology is rapidly evolving and it is important that teachers continue to build their confidence, capabilities, skills, knowledge, and expertise to ensure the outcomes for the students are exemplary. Regular access to a range of sustained and specialised professional development opportunities will strengthen your drone and geospatial program content knowledge and pedagogical practices.

06

Expand your program with school-industry partnerships

To maintain relevancy and to immerse your students in real world problem solving, there is a need for organisations and schools to work together in order to ensure that your teachers and students are provided with the most up-to-date use of drones, technology, and geospatial science applications.

In the following pages, each of these will be discussed in greater detail, to help guide you through the process of incorporating drone and geospatial education programs at your school.





Four Reasons Why Drone and Geospatial Education Needs to be Incorporated into Your Programs

01 Drones are becoming more prevalent in society

Like the internet and GPS before them, drones are rapidly becoming powerful business tools. Drones are increasingly being used beyond its military origins and used by consumers, commercial, and government organisations. The current uses for drones is extensive, and continuing to grow. Here are some of their current uses: delivery, emergency rescue, law enforcement, firefighting, medical, farming, photography, wildlife conservation, environmental monitoring, 3D mapping, real estate, construction, surveying, and the list goes on.

Drones are rapidly becoming mainstream and it's predicted that the global commercial drone market is expected to exceed \$8.5 billion by 2027. ([Source](#))

02 Drone and geospatial education encompasses the application of future skills

With the continual rise of digital technologies and automation, the next generation will need to demonstrate complex problem solving, creative analytical thinking and innovation, cognitive flexibility, computational thinking, judgement and decision-making, leadership, and digital literacy. Spatial science, also referred to as geographic information science, plays an important role in many scientific disciplines as it seeks to understand, analyse, and visualise real-world phenomena according to their locations.

The demand for a geo-enabled workforce is only increasing. Drones and geospatial education is critical to inspire the next generation to pursue careers in these associated industries.

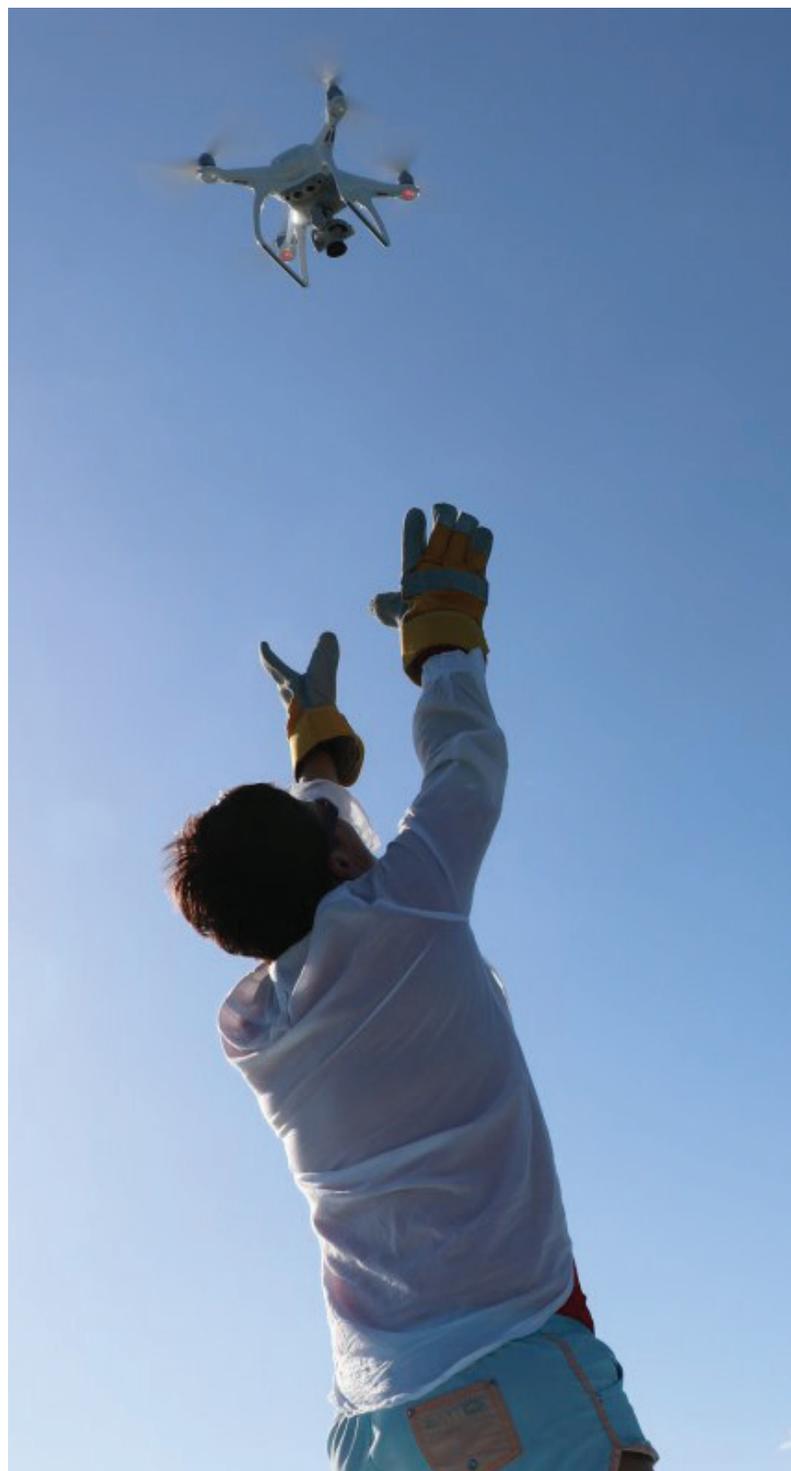
03 Everything autonomous, needs geospatial intelligence

With the rise of smartphones, self-driving cars, drones, robots and machines that think, there has been an exponential increase in the amount of spatial information required. In fact, it's believed that over 80% of all the data in the world has a spatial relation. The application, analysis, interpretation and understanding of geospatial data will continue to grow in importance and will touch everyone in their daily lives.

If the future is automation, then geospatial intelligence is a necessity.

04 Drone and geospatial education does not discriminate

Today, women only represent 27% of the STEM (Science, Technology, Engineering and Maths) workforce in Australia. We also have one of the lowest rates of girls involved in STEM in the Western world. This has been attributed to a tangle of reasons, but in short, socially constructed gender stereotypes regarding girls' ability in STEM negatively affects the way girls see themselves, resulting in them less likely to choose STEM subjects in secondary and tertiary education. Research has shown that there is little to no difference in boys' and girls' average ability at STEM subjects, so to encourage participation in STEM careers, we need to tackle the stereotypes they are exposed to, and we need to do this early.



Everyone should have the opportunity to understand the role that drones, and geospatial technology plays in society.

Schools that include drones, and geospatial concepts across the curriculum are at the forefront of learning, and ensuring their students are well prepared for the future.

Gather Whole School Support and use Drones Across the Curriculum

Drones are a fantastic tool to promote cross curriculum learning opportunities. Drones stimulate curiosity and encourage students to engage in science, technology, engineering, and mathematics (STEM) investigations, or 'STEM by stealth' as we like to call it. But often forgotten, is how drone and geospatial education incorporates learning outcomes in Geography, The Arts, Humanities and Social Sciences, and English.

To help you gather support from other departments, use the following information to help your colleagues understand the potential cross curricular learning outcomes.



Build understanding, skills, and capability with Drones

The students explore applications of drone technology; understand and act according to relevant drone regulations; evaluate and implement safety processes; understand basic concepts of manual and coded flight; learn to manually control a drone in a safe manner; conceptualise a hypothetical mission based on a real-life situation and propose ideas for its solution; use coding for automated drone flight to address the mission; collaborate to iterate and improve their solution.



Build understanding, skills, and capability in Digital Technologies

The students gain practical knowledge in the use of technology and scientific experimentation. They will learn and practice block coding skills, learn new software and application management on tablets.



Build understanding, skills, and capability in Science

The students will understand how drones are increasingly being used in scientific research. They will practice science skills, including the collection and analysis of data, apply scientific knowledge and experimentation to solve real world problems.



Build understanding, skills, and capability in Mathematics

Drones help enhance the learning process and make mathematical concepts come alive. The students apply mathematical knowledge to interpret, communicate, infer, compare, predict, understand, and solve real world challenges posed under the guise of developing drone flight paths and understanding the application of drone technologies.



Build understanding, skills, and capability in Engineering

Drones are being used increasingly in the provision of goods and services to communities. The students will practice technical skills such as formulating problems, providing solutions, integrating and understanding how to apply modern technology to support real world problem solving.



Build understanding, skills, and capability in Geography

Drones promote confidence in geospatial foundations, as well as meaningful insights into the possibilities of drone-based technology in the future workforce. Through the Geography curriculum, overlaid with skills related to questioning, research, data analysis, evaluation, reflection, and communication, combined with the application of drone specific elements, the students understand real world applications. Access our published journal article - [Using Minidrones to Teach Geospatial Technology Fundamentals](#)



Build understanding of Unconscious Bias and Gender Inequalities

The students are provided opportunities to study female STEM role models and explore modern STEM careers. It is an important part of the STEM classroom to understand how gender stereotypes and unconscious bias affects their study and career choices.



Increased opportunity for students to take part in STEM activities

Drone and geospatial programs capture students attention unlike other STEM courses. They are highly engaging, inquiry-based learning opportunities that open students minds to the endless career opportunities in STEM.

At She Maps, our drone and geospatial programs include comprehensive teacher resources that are mapped across the curriculum.

Funding a Drone and Geospatial Education Program

When it comes to funding STEM programs and activities there is no one singular approach.

Some schools budgets are attached to departments, some have a separate budget for STEM, some rely solely on government funding or grants, and some schools simply have no budget for STEM initiatives at all; it varies greatly according to school type and geographic location.

Whatever your circumstances, here are a couple of tips on how to access funding for your drone and geospatial programs.

Call for Budget Submissions

Each year schools typically commit to certain budget timelines. One of the stages is referred to as budget submission, usually around September each year, where staff are invited to provide submissions for funding initiatives that fall outside of the typical departmental or school budget. [Click here](#) to download our **Guide to Funding**.

Department Approach

Speak directly with your Head of Department or School Administration to see if they can creatively move funds from other areas into a specific budget for your initiative.

Cross Department Approach

Because drone and geospatial education is cross-curricular, perhaps each department could contribute to create a pool of money to fund your drone program.

Government Grants

Increasingly science, technology, engineering and mathematics (STEM) capability is at the core of the government's science agenda.

Industry Sponsorship

Many organisations in the drone and geospatial industries have already identified a shortage in skilled workers, particularly females. Speak to She Maps, about how we might help you obtain industry sponsorship.

To understand the costs of establishing a drone and geospatial program we highly recommend that you book a time to speak with the team at She Maps. [Book now.](#)

With five years of experience selling drone and geospatial equipment and programs into schools, we are your go-to experts!

Identify the Best Approach for Your Circumstances

When it comes to implementing a drone and geospatial curriculum at your school there are many different ways you can get started.

In the table below, we outline two different approaches, starting small or taking a whole school approach.

Start small, build from the ground up

Sometimes it's simpler to start small and build from the ground up. With this approach you might simply organise a special event or STEM club where the students in a particular cohort are taught how to code and fly drones.

Singular vision - An individual teacher is committed to introducing their students to the applications of drones and geospatial science in the real world.

Singular commitment - You carry the drone and geospatial flag yourself until other teachers realise the benefits.

Other attributes of this approach:

- Can be a one-off experience that is outsourced to drone incursion experts
- Helps other teachers to view how drone and geospatial sciences can be used in practice
- Build teacher confidence and overcome fears of flying drones
- Get started faster
- Reduce the time and stresses of having to obtain collective buy-in

SOMEWHERE IN BETWEEN

Whole of school approach

Taking a whole of school approach means that your school commits to incorporating drone and geospatial teaching and learning programs that are sequential across year levels and integrated across curriculum areas.

Shared vision - The school is committed to becoming known for its outstanding practices in drone and geospatial education across the curriculum.

Shared commitment - The whole school understands the importance of the drone and geospatial programs.

Other attributes of this approach:

- Annual implementation
- A linked scope and sequence across the school
- Enables sequencing of student learning
- Supports teachers to make connections between topics and units in different curriculum areas
- Involves the development of rich and engaging teaching and learning activities
- Hold special whole school events.
- Participation in tournaments and events
- School-Industry/University partnerships opportunities

Build Teacher Confidence and Capabilities

Today, every educator knows the importance of building STEM skills, knowledge, and digital literacy to prepare their students for future education, careers, and citizenship.

But sadly, even today, when many students think of a scientist, they imagine someone (often male) in a lab coat working with a microscope or test tubes.

Our vision of science is far broader. We believe that science is everything that we live and breathe in the environment. The environment is suffering and needs science to help it to overcome its challenges. So today, more than ever, there is a need for diversity in science disciplines beyond the lab coat as well as a diversity in ideas from people from all walks of life.

We also recognise that drone and geospatial education incorporates modern STEM knowledge that is rapidly evolving. For some teachers, there is an increased need to be kept informed and upskilled in these new technologies.

Never before has it been more important that teachers receive ongoing professional development to keep their skills current with the new technologies to ensure they maintain strong content knowledge and can confidently teach to intended learning outcomes.



“Effective teaching is the single biggest determinant of student improvement in schools.”

[- Source](#)

Here are some of the ways we assist schools and teachers with increasing their skills, knowledge, and confidence in teaching drone and geospatial sciences:

- Online Professional Development
- 1-on-1 mentoring sessions
- Virtual classroom presentations
- New teaching resources, developed closely with our industry partners
- Regular STEMinars that address teacher needs and share best practice.
- Drone and geospatial workshops in schools and at conferences
- Annual online drone conference, EduDrone which is specifically for teachers to learn from other teachers, STEM role models and industry professionals



Expand Your Program with School-Industry Partnerships

Schools and teachers are the principle means of instilling STEM skills and interest in students. Industry on the other hand, provides the conduit and knowledge to understand the real world application of cutting edge science and technologies. When combined, students' outcomes are intensified.

Here are our six tips for forging a school-industry partnership:

- 1. Mapping** – Spend some time mapping what your students need and where educational outcomes link to school strategic plan.
- 2. Initiatives** - Get creative with how an organisation could help resource and fund your ideas. Don't forget to think about 'what's in it for them'!
- 3. Shared Vision** - Identify which organisations to approach, and ascertain if they have a shared vision.
- 4. Pitch your idea** - Present your ideas, share your plans, and discuss the benefits for both the students and the organisation.
- 5. Finalise the Agreement** - Establish targeted outcomes, deliverables, accountabilities, and channels for communication.
- 6. Invest** - Building effective and lasting partnerships takes time and effort.

An example of a school-industry partnership

She Maps has an ongoing partnership with The Surveyors' Trust. Each year, they agree to fund exclusive access to She Maps' Lighthouse Schools Program in selected Queensland Schools. The Lighthouse Schools program is a year long, highly supported, school-industry spatial immersion program that extends the students' learning as they gain exposure to critical future STEM skills, and industry insights with real world problems to solve.

If you're not sure where to start when it comes to school-industry partnerships, then please [click here](#) to book a time to meet with the She Maps team, we will be happy to help where possible.



“Effective school–community partnerships are those that have been developed with businesses or community groups to address a specific student need or develop an educational opportunity. They are well-planned, sustainable, collaborative, and based on a mutual sharing of expertise, knowledge, resources, and skills. There are clear roles and responsibilities for each group involved and there is an ongoing commitment to the partnership from the highest level in each organisation. The partners collaboratively develop a program of activities, which are closely linked to the goals of the partnership.

There is tangible evidence to show that the partnership is having an impact on the learning outcomes of the students involved”.

– Schools First Report



About She Maps

She Maps connects and collaborates with schools, academia, and industry to teach powerful, real world learning with modern STEM technologies.

She Maps is a certified social enterprise, deeply invested in eliminating bias and embracing diversity. We build teacher and student capabilities, and confidence with STEM, as well as engage, educate, and empower girls, and women to stand up and be counted.

We believe we have a collective responsibility to help prepare the next generation to fulfil, equally and diversely, the increasing demand of STEM-related jobs.

Through education, teacher/student support and collaboration we increase STEM literacy and eliminate unconscious biases, so everyone is inspired to pursue a career in STEM.

What sets us apart are our school-industry partnerships that help us to drive change, and challenge our students to solve real world challenges with STEM critical thinking.

Every student deserves to succeed with STEM, and every teacher should be empowered to help them do it.

We do this by:

- ▶ Developing compelling, high quality, inspirational, real world STEM curriculum, and educational resources for teachers, and students
- ▶ Providing engaging learning experiences, built on a foundation of problem solving, creative thinking, and collaboration, through the use of digital technology
- ▶ Linking all our programs to real world relevance, understanding industry application, and solving real world problems
- ▶ Working collaboratively with teachers to develop inclusive classrooms, as well as increasing STEM teaching capabilities and confidence
- ▶ Maintaining an ever-growing library of inspirational teachers resources that celebrates women in STEM
- ▶ Providing expert advice on the purchase of drone and geospatial equipment

We do all this under the guise of drones and geospatial concepts. Drones are our hook, but the outcomes run far deeper.

She Maps Programs

She Maps offers curriculum aligned lessons, face-to-face incursions, online professional learning and teacher resources to help empower the next generation with the skills of tomorrow.

Each of our programs, outlined below, aims to:

- Increase students STEM literacy, engagement, participation, and aspiration
- Increase teacher capability and STEM teaching quality
- Build a connection between learning and solving real world problems



Pippa & Dronie - Book & Teaching Resources

This illustrated children's book takes your students on an adventure with some amazing scientists and drone professionals to explore the diverse ways STEM skills are used to gather data and solve real-world challenges. Dronie flies through whale snot to collect DNA samples (urgh yuck, but kinda cool), maps coral on the Great Barrier Reef, and in Kakadu National Park a crocodile even tries to jump up and grab her!

BEGINNER



Classroom Drone Essentials - Indoor

In this 2.5-hour edutainment experience, students will become geospatial scientists for the day, be exposed to great role models, challenge unconscious bias, explore applications of drone technology, understand safety and drone regulations as well as learn how to fly and code micro drones. There are four modules to the program: real world application; drone safety; manual Flight; and automated flight using block coding.

BEGINNER



Map My School - Indoor

A comprehensive and fun program where students use spatial technology to learn how to create, analyse, measure, map, and communicate geospatial mapping principles to better understand the amount of shade available at your school. This program includes four versions for different experience levels and student year groups. Whether you teach at a primary or secondary school, there's a Map My School project for you.

BEGINNER,
INTERMEDIATE
& ADVANCED



Drone Mapping - Outdoors

The students will use sub 2kg drones and industry standard geospatial mapping technologies to capture and process imagery to analyse and monitor their local environment. Drone Mapping is an online professional development experience where teachers can learn how to teach drone mapping to their students.

ADVANCED



Lighthouse Schools Program

Our Lighthouse Schools Program is a progressive school-industry education initiative, where students grow and practice STEM skills to tackle and solve real world problems. This is our highest supported program, providing teachers and students with a tailored curriculum, focused on the development of spatial skills, using drones as the centrepiece. This secondary STEM school program extends student learning as they gain exposure to critical future STEM skills, and are given industry insights with real world problems to solve.

IMMERSIVE



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