STEM School-Industry Partnerships

A guide to establishing STEM School-Industry engagement in South Australia

STEM LEARNING

Government of South Australia

Department for Education

Credits

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PREFACE

The critical importance of STEM knowledge and skills to Australia's future is undisputed. However, our students are not being sufficiently equipped with the knowledge and skills required to perform to their fullest potential in STEM-related study, jobs, careers, research and innovation. School-industry engagement that brings real-world contexts to education and promotes authentic learning experiences can help to provide students with strong foundational knowledge in STEM, inspiring them to take more challenging STEM subjects and develop a life-long interest in STEM issues.

Not only are there too few students choosing STEM subjects, the performance of those who do take STEM options 'shows an alarming trend towards mediocrity'[1]. In addition, there are under-represented groups being girls, Aboriginal and Torres Strait Islanders, students from low SES backgrounds and students in regional and remote areas.

In order to make STEM subjects compelling, to not only attract students but inspire them to excellence, education and industry must work together. The STEM Partnerships Forum, chaired by Australia's Chief Scientist, Dr Alan Finkel, has recently released its comprehensive report *Optimising STEM Industry-School Partnerships: Inspiring Australia's Next Generation (2018)*. The report notes that well-supported teachers with a confident knowledge of their discipline are central, but that industry too "...is in a privileged position to inspire and lead students... it can play a greater role in developing a skilled workforce by connecting the concepts taught in our classrooms to real-world applications".

The *National STEM School Education Strategy* was endorsed by Australian Education Ministers in 2015. The two goals identified in that strategy are:

- ensure all students finish school with strong foundational knowledge in STEM and related skills;
- ensure that students are inspired to take on more challenging STEM subjects.

Reflecting the imperative detailed in the national strategy, South Australia's Department for Education has its own STEM learning strategy, designed to increase the participation in STEM related subjects. Dynamic school-industry relationships are a key component of this strategy.

Development of this Guide

There have been many formal and informal, school-industry projects developed throughout South Australia. However, many educators are uncertain about how to engage with industry. Similarly, there is goodwill on behalf of organisations (including business, government and non-government), but they do not necessarily know how or what type of contribution would be most valued. In fact, in the development of this guide 'where to start' was identified as one of the biggest challenges.

This guide is therefore a significant step forward in facilitating productive and sustainable engagement that will help to grow the STEM capacity of our students. Developed through a partnership between the Department for Education and DXC Technology and facilitated by Match Studio in UniSA, the guide has been compiled in consultation with South Australians from education and industry who have been leading the way in engagement. As well as providing a starting point for new relationships, this guide will provide valuable foundations for increasing support in the growth of STEM engagement between school and industry.

[1] Education Council, (2017), *Optimising STEM industry-school partnerships: Inspiring Australia's next generation*. Issues Paper, December 2017, page 5

INTRODUCTION

Engagement between schools and industry will take on many forms. It might be short or long-term, as simple as a single visit to a classroom by an individual, or as complex as a partnership run across a hub of schools for multiple years. This guide is not, therefore, intended to be prescriptive. Rather, it provides a comprehensive overview of the inputs and characteristics that affect all school-industry engagement to differing extents. It highlights potential pitfalls, provides specific tips, and offers prompts and checklists to help develop engagement opportunities that suit the unique needs of the students at the heart of your work.

The research informing this guide is based on several resources and references (refer to page 20) as well as interviews and workshops with representatives from school and industry with significant STEM partnership experience.

The guide begins by introducing the benefits of engagement and then outlines the guiding principles of school-industry engagement that underpin this guide.

The three sections—'why, what, who', 'strong foundations' and 'evaluation' provide an overview of how to establish and develop a partnership.

Each of these sections includes several practical prompts to consider across the lifetime of a partnership.

This is followed by real-world examples of partnership models. There are descriptions and links to current projects and programs you might be able to join.

It is more common for schools to approach industry than for industry to approach schools and the guide has been written with this in mind.

However, the guide is still intended to be a useful resource for organisations from the private, government and non-government sectors.

A great deal of the information provided for schools is also applicable to organisations, and there is a section of tips written specifically for industry.

Similarly, the guide has been kept general enough so that it can be used in both primary and secondary schools.

This guide needs to be applied to schools and partner organisations within the context of any existing policies and principles. For example policies or principles that guide the individual school, and those that guide the broader education department, as well as those that govern the private business or organisation.

The guide concludes with a range of links to further resources.

WHAT IS SCHOOL INDUSTRY ENGAGEMENT?

Engagement models: Models of school-industry engagement range from long-established work experience programs to programs focussed on long-term vocational training developed between school and industry. Engagement might be as simple as a classroom visit by an industry professional or it might be a more complex, formal partnership run over a number of years. An example of a partnership might involve a business presenting a work-based problem to students who then work to solve the problem and present a final solution to the business.

Engagement partners: A school's partner might be a business, industry association, a group of businesses (for example, local traders), government department, government organisations, non- government organisations or an individual representing one of those organisations.

Engagement focus: The common types of partnerships that exist are detailed in this list by the Business-School Connections Roundtable. It is useful to understand these existing partnerships models but keep in mind that each partnership will be unique in its members and goals and your partnership may not be reflected on this list.

- Enhanced school leadership and staff development
- Enhanced student engagement with industry and business
- School to work transitions, employability skills
- Curriculum enhancement
- Provision of additional infrastructure, resources and income streams
- Support for improving student achievement, including students at risk

There is a detailed list of current projects and programs on page 15. Some of the most common examples of engagement include:

- After-school STEM clubs
- Careers information or advice
- Classroom visits
- Community capacity-building
- Competitions
- Curriculum design through the provision of real-world problems
- Mentoring pre-service teachers
- Mentoring principals or teachers
- Mentoring students
- Professional development courses led by industry
- School visits to industry
- Teacher placement schemes
- Work experience or placements

BENEFITS OF ENGAGEMENT

School-industry engagement has the potential to generate significant social and economic benefits. Authentic learning experiences that inspire students to gain a deeper understanding of STEM, lead to a more skilled workforce and an informed, well-rounded population. For students, industry and schools, there are also many specific benefits:

For students

- Greater understanding of STEM's real-world relevance (not only for employment, but also of wider issues)
- Deeper engagement with school and with learning
- Authentic feedback on learning from industry
- Improved school retention through work experience
- Enhanced career aspirations and improved work readiness
- Improved access to casual and post-school employment opportunities
- Personal development, extension of multi-disciplinary skills

For industry

- Opportunity to contribute to young people's growth and development
- Opportunity to contribute to the development of industry through enhanced skills development and the growth of diversity
- Personal and professional development of employees—increased job satisfaction, higher levels of staff morale
- Enhanced reputation, stronger community ties, greater community confidence
- Corporate social responsibility obligations
- Brand positioning
- An opportunity to authenticate learning
- Access to a youth voice / innovative problem solving
- Provide career/employment advice to schools and students

For schools

- Innovative options for curriculum delivery
- Professional development opportunities for teachers and school leaders
- Increased access to expertise / resources
- Better equipped to respond to industry needs
- Stronger links to the community
- Better equipped to provide the best careers information and advice to students Provision of stronger pathways to employment for students
- Increased capacity: improved internal resources or access to external resources
- Enhanced student engagement
- Co-design of content with industry partner

A note on primary schools and secondary schools

Currently, businesses are more likely to engage with secondary schools than with primary schools due to the focus on school-to-work transitions. In contemporary education, the drivers for engagement have evolved and industry engagement is now relevant in primary school contexts for several reasons:

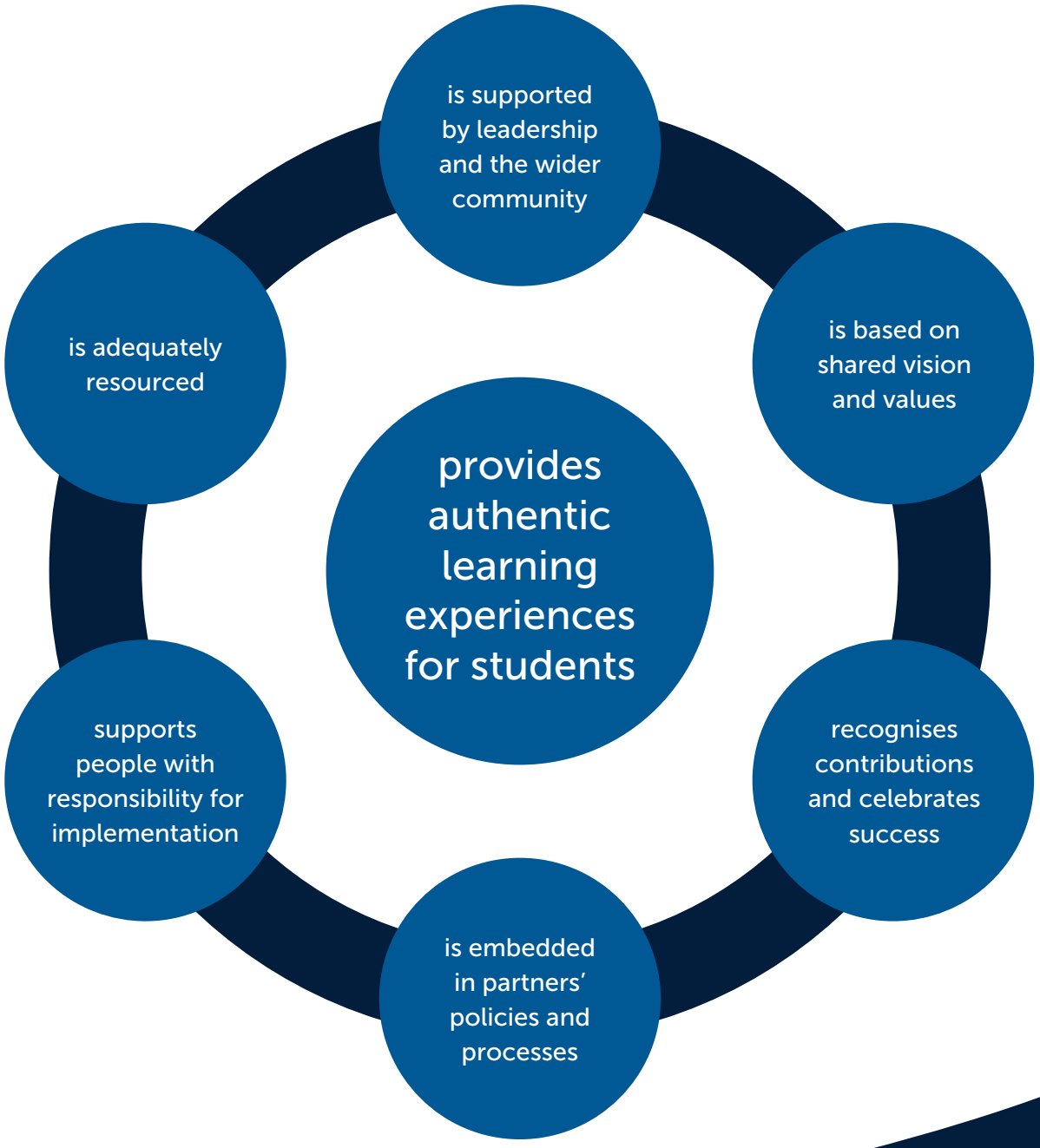
- Aspirations and attitudes to STEM are first developed in primary school.
- There are fewer STEM specialist teachers in primary school, so relationships at this level can play a significant role in building STEM capacity.
- Positive STEM interactions in primary school have a long-term impact—research suggests that if a child cannot picture themselves as a future scientist or engineer at 10 years old then they probably can't picture themselves as one at 14.
- With under-representation of many groups a significant issue for STEM, positive role models at an early age can help to address later issues of inclusion and diversity.

(Reference: Making Education Your Business: A Guide to Supporting STEM Teaching in Schools and Colleges)

GUIDING PRINCIPLES

The principles underlying the guide to school-industry engagement were developed based on a workshop involving representatives of education and industry with significant engagement experience in South Australia. They echo the principles detailed in the federal government's Guiding Principles for School-Business Relationships. With students' learning experiences at the centre, the remaining principles form a non-hierarchical relationship. Together, they promote a culture of sustainable engagement and inform the characteristics of success detailed on pages 10-12.

SUCCESSFUL ENGAGEMENT:



WHY, WHAT, WHO?

Before you begin a program of engagement, you should first be clear about why you want a partnership, what form the partnership might take, and who you might approach.

The more clearly you can articulate your answers to 'why' 'what' and 'who':

- the more effectively you will meet the needs of students.
- the easier it will be to gain the support of your colleagues and leadership teams.
- the more confidence you will have when you approach potential partners.

Use the following prompts to get you started.

Why?

Define the problem or opportunity that is being addressed

What value will the engagement bring to students, the school and industry partners?

For schools: Is the focus of engagement on:

- ☐ developing particular content/concepts/skills/capabilities/dispositions of students?
- ☐ broadening students' understanding of career opportunities?
- ☐ increasing students' engagement in learning?
- ☐ developing the skills of teachers?
- ☐ developing the skills of an under-represented cohort?

For business: Is the focus of engagement on:

- ☐ providing resources to develop the skills of an under-represented cohort?
- ☐ identifying an opportunity to foster the diversity of your industry?
- ☐ identifying this as an opportunity to develop the skills of existing staff?
- ☐ engaging help to fulfil corporate social responsibilities?

What?

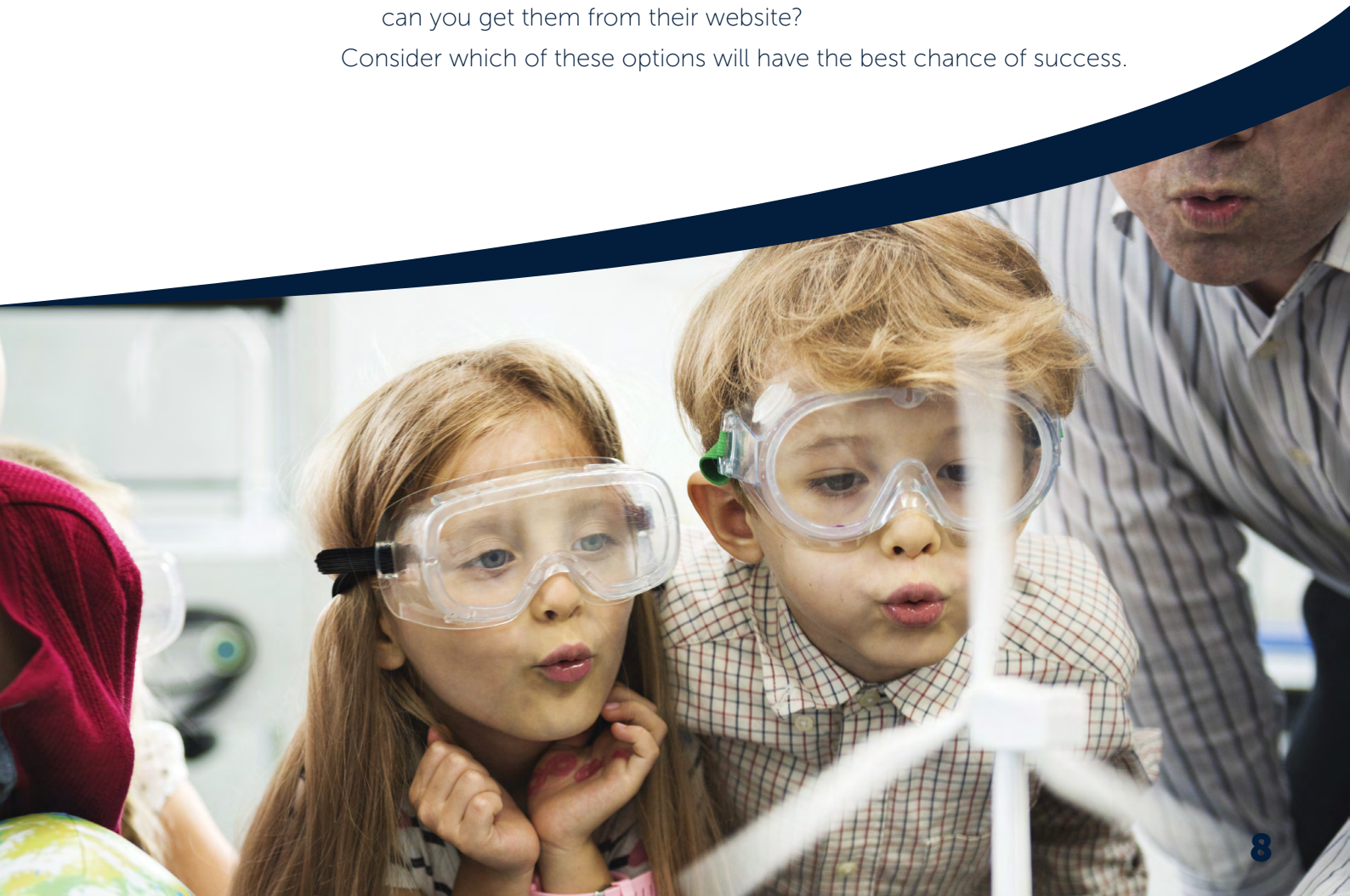
Determine the most appropriate program to address the problem or opportunity. Ask:

- ☐ Will this be a short-term or long-term unit or learning / partnership with industry?
- ☐ Is there an example of practice / engagement with industry already running somewhere else that we can emulate? (See page 15 for some examples)
- ☐ Should we focus on one subject for a single year level or stretch across disciplines and year levels?
- ☐ Can the engagement with industry be supported through a professional development or mentoring program for teachers?
- ☐ What is the link to the curriculum?
- ☐ As a school, identify is it sponsorship or are industry people required? If people- what sort of skills, what level of effort over what duration, and when?

Who? Identify and research potential partners.

- ☐ Are there teachers or other staff members who already have the expertise to connect with industry or are open to engaging with industry?
- ☐ What networks or connections are already available through colleagues?
- ☐ Are there internal opportunities such as parents or alumni?
- ☐ What are the external opportunities (start brainstorming with local businesses and grow your ideas from there).
- ☐ Are there any grants or programs offered by government and industry?
- ☐ Could a broker help to find a partner? If so, where can we find someone?
- ☐ When approaching business it is important to consider your first point of contact, and if they are the most effective person to speak to in the first instance.
    - Will you approach a convenient contact who the school already has a relationship with?
    - Will you approach the division head or CEO?
    - Will you use an existing relationship as leverage to approach the division head or CEO?
    - Is there a community engagement or outreach staff member available?
    - Can an existing contact give you the names of key staff members or can you get them from their website?

  Consider which of these options will have the best chance of success.



CHARACTERISTICS OF SUCCESS

Experience shows that successful engagement is built upon a foundation of commonly-identified characteristics. These are listed in the table below, along with checklists to help you consider how each relates to your planned project or program. The extent to which each of these characteristics is developed will vary between projects. Giving consideration to each will help to ensure that engagement is embedded in the school and business culture. This will promote the effectiveness and sustainability of the partnership.

Sustainability: Building a culture of engagement

It is important to focus on the sustainability of a specific partnership AS WELL AS the engagement culture in both schools and organisations. Our research shows that staff changes are one of the most commonly cited challenges faced by partnerships. A culture of engagement will help to alleviate this issue as engagement actions and activities are embedded into planning and management structures and not tied to an individual. One example is to formalise an engagement role or include partnerships in performance indicators. In a culture of sustainable engagement:

- School-industry partnerships are seen as a strategy for achieving core outcomes.
- Staff are expected to engage in partnerships.
- The value of the skills required to develop and maintain partnerships are recognised, and staff are supported to extend their skills.
- Relationships are visible and celebrated.
- Time and resources are provided to those responsible for managing relationships.
- The guiding principles underlying relationships are clearly articulated.
- The portfolio of relationships is considered dynamic, added to as required.

(Reference: Realising Potential: Businesses Helping Schools to Develop Australia's Future)

	Schools and Teachers	Industry and Community Partners
Vision, objectives, aims Clearly define the vision, objectives, aims	☐ Have they been developed in collaboration with industry representatives/ teachers/students involved? ☐ Are they understood and agreed by all partners? ☐ Are they realistic? ☐ Are they aligned to the broader school values and Site Improvement Plan? ☐ Are parameters for the partnership (E.g. subjects, year levels) achievable, flexible and measurable?	☐ Have they been developed in collaboration with school representatives? ☐ Are they understood and agreed by all partners? ☐ Are they realistic? ☐ Are they aligned to the broader industry values and objectives?

	Schools and Teachers	Industry and Community Partners
Activities and actions Identify the activities that meet the stated goals of the partnership and the project	☐ Are activities integrated into the school culture? ☐ What are the timelines, responsibilities, and definitions of success associated with each activity?	☐ Are activities integrated into the industries culture? ☐ What are the timelines, responsibilities, and definitions of success associated with each activity?
People Identify who will be involved and define their roles	☐ Who will be involved in delivering the project? ☐ Will any support staff be involved? ☐ What are the plans for any changes in leadership or people involved? ☐ Are individual responsibilities and actions clear? ☐ Are the responsibilities and actions/ activities shared appropriately?	☐ Are individual responsibilities and actions clear? ☐ Are the responsibilities and actions/ activities shared appropriately? ☐ Which representatives will be chosen by the business? Are they enthusiastic about working with schools?
Engagement structure Establish and document the administrative and management structure of the partnership	☐ Have you discussed accountability between school and industry? ☐ Are there specific responsibilities that need to be documented? ☐ What are the conflict resolution protocols?	☐ Have you discussed accountability between industry and school? ☐ Are there specific responsibilities that need to be documented? ☐ What are the conflict resolution protocols?
Communication Identify points of contact and establish communication protocols	☐ Who is the point of contact with industry? ☐ What are the agreed communication protocols with the industry? ☐ What are the agreed protocols within the school and organisation? ☐ How will you ensure communication is inclusive and involves information sharing and opportunities to learn from each other? ☐ How will you allow for flexibility in coordination of school timetables and industry schedules?	☐ Who is the point of contact with the school? ☐ What are the agreed communication protocols with the school? ☐ What are the agreed protocols within industry? ☐ How will you allow for flexibility in coordination of school timetables and industry schedules?

	Schools and Teachers	Industry and Community Partners
Leadership support Gain the support of leaders and management teams	☐ Are Principals, department heads and other key positions kept informed and involved at all key stages? ☐ Do they know the full extent of the benefits (and the risks)?	☐ Are management teams kept informed and involved at all key stages? ☐ Do they know the full extent of the benefits (and the risks)?
Wider support Gain support of the wider community	☐ Have the aims and activities been communicated to the school community? ☐ Are there any potential ethical or procedural concerns to discuss with the school community?	☐
Capacity and capability Assess the resources required not only for the partnership but also the wider project	☐ Do teachers need support for further training? ☐ Will the project involve more teacher time? ☐ Does it conflict with any other responsibilities for the people involved? ☐ What equipment will the project require? ☐ Are there any grant or funding opportunities available?	☐ Do employees need support for further training? ☐ Does it conflict with any other responsibilities for the people involved? ☐ What equipment will the project require? ☐ Are there any grant or funding opportunities available? ☐ What are the tangible and non-tangible contributions the organisation will make?
Risks and barriers addressed Identify risks and barriers	☐ What are the risks to students? Teachers? The school? School community? ☐ What are the risks to the organisation? ☐ What are the risks to the partnership? ☐ How do we mitigate those risks? ☐ What are the potential barriers? ☐ How do we mitigate those barriers? ☐ Have you informed industry representatives about the appropriate clearances to work with students?	☐ What are the risks to the organisation? ☐ What are the risks to the partnership? ☐ How do we mitigate those risks? ☐ What are the potential barriers? ☐ How do we mitigate those barriers? ☐ Do industry representatives have the appropriate clearances to work with students? (E.g. DCSI)

	Schools and Teachers	Industry and Community Partners
Recognition Celebrate achievements and recognise partner contributions	☐ Are you collecting evidence of the project's benefits and achievements? ☐ Is the project visible within the school and to the wider school community? ☐ Is the partner publicly acknowledged? ☐ Have all Department for Education media consent forms been completed?	☐ Are you collecting evidence of the project's benefits and achievements? ☐ Is the partner publicly acknowledged? ☐ Have you checked with the school regarding media consent forms prior to their use?
STEM inclusion Identify appropriate STEM capital in the community	☐ Can you use school demographic data and the local context to guide choices about partnerships? ☐ Have you discussed the school-industry partnership proposal with neighbouring schools (both primary and secondary) or existing local networks to discuss whether the issue is being addressed by other schools in the region? ☐ Can you identify existing STEM expertise within the school community (teachers, parents etc)? ☐ Have you considered how best to target student cohorts less likely to do STEM subjects or see the relevance of STEM-related skills?	☐ Can you consider STEM partnerships with schools as a means of fulfilling corporate social contracts? ☐ Are you aware of practices, knowledge and resources within your workplace which may benefit schools? ☐ How will industry mentors share their passion and enthusiasm for STEM?
Evaluation Embed evaluation in all activities	☐ Have you considered collaborating on designing a long-term evaluation framework to measure improvements in student and teacher outcomes from partnership activities? ☐ How will you collect evidence of benefits to your school?	☐ Have you considered designing a long-term evaluation framework for the partnership activities? ☐ How will you collect evidence of benefits to industry and community partners?

FORMALISING A PARTNERSHIP

Do we need a Memorandum of Understanding?

A Memorandum of Understanding (MOU) or Educational Collaborative Agreement (ECA) is one way of formalising an agreement between partners and of ensuring both (or all) partners are clear on the details of the partnership. There will be times that an informal agreement will be sufficient, for example a one off visit by an industry partner to a school.

An MOU or its equivalent should

- Give a brief description of the collaborating organisations
- Name the key people and their roles
- Clearly define the objectives and scope of the partnership
- Detail the nature of the collaboration as precisely as possible by noting what each of the partners will do
- Define the time frame of the agreement
- Describe the management of the agreement
- Be signed by an authorised representative of each of the partners

EVALUATION

Evaluation promotes continuous improvement and provides valuable information for future projects. Evaluation also helps to demonstrate success. This plays an important role in student outcomes as well as motivating partners and encouraging future involvement.

Plan for it	**Commit to final and ongoing evaluation in the early stages of your planning** • How will we assess the project/learning outcomes for students against its objectives? • Where are the key stages where evaluation will be useful to assess and modify progress?
Collect data and information	**Decide what processes you will use** • What data do you need to collect? • Who will collect it? • What tools will you use? Remember to use a range of quantitative and qualitative resources.
Results	**Use the results to celebrate achievement and make improvements** • How will you share the results? • Who will you share the results with? • How can the results be used to improve the current engagement? • How can the results inform our next engagement?

TIPS FOR SUCCESS

Find a mentor

Following the prompts in this guide is a good start to getting your partnership off the ground. But talking to people who have already been in partnerships will give you invaluable insights. Find a peer or colleague from your leadership team, or another department, school or organisation who has had experience establishing and maintaining a partnership. Ask them if they would be willing to share their experience with you. This might be as simple as a meeting early in your planning so that you can describe your ideas to them and they can tell you of their own challenges and successes and the strategies that they used.

Spend time writing your partnership proposal

Whether you are a school approaching an industry organisation or an industry organisation approaching a school, a comprehensive proposal gives potential partners something concrete to consider. It will also instil confidence in you and in the partnership and a well-considered proposal provides the foundations for a shared understanding going into the relationship. This, in turn, helps to nurture a longer-term commitment to the relationship.

Take care however, to keep your proposal flexible. Remember that a good partnership is collaborative, and the proposal is only a starting point. Be mindful that schools and businesses often don't have a strong understanding of each other. Do not make assumptions, for example, about what a business can provide your school, or what the school needs from your business.

In your proposal: be clear about what you are asking; note any important dates or times; highlight the value the partnership brings to students, schools and to the business. Above all, be polite, give people an opportunity to say 'no', but make it easy for them to say 'yes'.

Foster a true spirit of collaboration

Effective, sustainable partnerships rely on a spirit of collaboration grounded in honest and on-going communication. The ingredients of a strong collaboration are:

- Shared, clearly-defined goals aligned with the broader aims of both the school and the business;
- Clear communication protocols including a single point of contact—this helps to maintain consistency and a clear line of communication;
- An appreciation of the operational differences between school and business cultures—take the time to understand differences in day-to-day organisation, planning cycles, and timing.

Work with a broker

Brokers have an invaluable role to play in helping to match schools with industry organisations. They have strong networks and a deep understanding of both curriculum needs and the skills and expertise that can be tapped in the community. They have skills in negotiation so can help you to establish an agreement and will also be a neutral point of contact if there is ever a need for conflict resolution.

TIPS FOR ORGANISATIONS

A good resource for business is Making Education Your Business: A Guide for Supporting STEM Teaching in Schools and Colleges. Some considerations specific to businesses include:

Understand your organisation

Be clear about what you can bring to schools and the internal resources you can commit to engagement

- **Articulate what makes you a good partner**
  Consider the work you do, the products you create, the skills your people have, your connections and networks—all of these have the potential to be valuable to schools and teachers.
- **Determine who has the skills, passion and potential to contribute**
  Identify the people in your organisation who will make a partnership work. Consider technical skills as well as personal attributes. Remember the opportunities for professional and personal development.
- **Know how you will support your people**
  Do the people you have identified have the time? Do they need further training?

Understand schools

Be aware that there are many operational differences between schools and businesses and make an effort to understand these differences.

- **Ask your school partners about their curriculum**
- **Ask your school partners about their demographics**
- **Consider the differences in your planning cycles**
- **Be clear about the school's timing and deadlines**

Build a business case

The support of middle and senior management is crucial to the success of a partnership. One way of fostering that support is to build a strong business case.

- **Articulate all of the potential benefits and the value it brings**
  Include the broadest social benefits as well as the specific benefits for your business, for schools and for students.
- **Demonstrate how it aligns with your company's broader objectives**
- **Link engagement to performance indicators**
  Consider indicators beyond corporate social responsibility such as personal or professional development.
- **Be clear about your capacity**
  Consider all of the resources you will be committing. This includes financial commitments and in-kind, as well as the time commitment of your people. Is this a short-term, one-off program or will it run over several years?

PROGRAMS AND PROJECTS

SPI 2016: STEM Program Index 2016, is a valuable resource published by the Office of the Chief Scientist and the Australian Industry Group. It lists over 250 programs provided by businesses, universities, science and education agencies, and government. The programs are aligned to the Australian curriculum and cover all year levels and program types.

Below is a selection of those and other programs available to South Australians.

aurecon	Aurecon Bridge Building Competition Using materials supported by Aurecon, students are tasked with designing and constructing a model bridge using the construction guidelines provided
Australian Academy of Science	Primary Connections Focus on developing students' knowledge, understanding and skills in both science and literacy reSolve: Mathematics by Inquiry In collaboration with the Australian Association of Mathematics Teachers provides resources for classroom use and professional learning Science by Doing An online science program for years 7 to 10
Australian Academy of Technology and Engineering	STELR Project An inquiry-based, school STEM program designed for years 6 to 10, but adaptable to other levels
Australian Information Industry Association	iAwards
Australian Mathematical Sciences Institute	Choose Maths National program aimed at changing the public perception of maths and statistics as a career choice for girls and young women Schools Outreach Program Provides professional development for teachers of maths in primary and secondary schools
Australian Mathematics Trust	Maths enrichment programs including competitions, teacher professional development and workshops for students Australian Mathematics Competition Australian Mathematical Olympiad Computational and Algorithmic Thinking Australian Informatics Olympiad
Australian Museum	Sleek Geeks Science Eureka Prize National science film competition for primary and secondary school students
Australian Problem Solving Mathematical Olympiads	Maths Olympiad Range of competitions focused on solving maths problems in a creative manner as opposed to reaching a solution using a prescribed method

Australian Science Innovations	Australian Science Olympiads Big Science Competition A challenge for students in years 7 to 10 Curious Minds Program A program aimed at highly capably girls in years 9 and 10, delivered jointly with the Australian Mathematics Trust
Australian Science Teachers Association (ASTA)	STEM X Academy Five day residential teacher professional learning program National Science Week Annual festival of science that takes place in August each year Science ASSIST National online advisory service for school science educators and technicians. Science Program Exciting Children Through Research Activities (SPECTRA) National science award program for students from years 1 to 10
Beacon Foundation	Builds connections between industry, education and the community. There is a range of programs in each state.
CSIRO Education	Creativity in Research, Engineering, Science and Technology (CREST) Supports students to design and carry out their own open-ended science investigation or technology project BHP Billiton Foundation Science and Engineering Awards Rewards students for creative research projects and engineering innovations, and teachers for their contribution to science STEM Professionals in Schools A national volunteer program that facilitates partnerships between schools and industry to bring STEM into the classroom Indigenous STEM Education Project Aimed at increasing the participation and achievement of Aboriginal and Torres Strait Islander students in STEM. There are 6 program elements to the project, which caters to the diversity of Aboriginal and Torres Strait Islander students as they progress through primary, secondary and tertiary education, and into employment Sustainable futures Designed to support teachers working with students in years 3 to 9. The program combines the latest in climate science with education in sustainability
Department for Education (SA)	Advanced Technology Industry School Pathways Program (ATP) South Australian STEM Specialist Schools
Engineers Australia	Discover Engineering Day Activities aimed at giving high school students a taste of skills required for the engineering profession EngQuest Aimed at lower primary, primary and middle years, encourages students to work in teams and apply problem-solving skills to the design, construction and testing of engineering projects
Engineers Without Borders	School Outreach Program Aims to establish a contextual approach to simple engineering problems

iSTEM	A program that allows high school students interested in science to meet other like-minded students and participate in enrichment programs
Mathematical Association of South Australia	Range of competitions, activities and teacher resources
National Science Youth Forum	Year 12 Program A 12-day residential program Stem Explorer Encourages science literacy in early high school years Student Staff Leadership Program Personal development and leadership training for selected students Science Teachers Program Summer school for teachers
Northern Advanced Manufacturing Industry Group	Concept2Creation School-industry projects aiming to introduce advanced manufacturing pathways to students STEM Sista A professional development program for girls
Re-Engineering Australia Foundation Ltd (REA)	Hands-on applied learning programs conducted in collaborative environments. Includes: F1 in Schools Program Jaguar Primary School Challenge Land Rover 4x4 Program in Schools Subs in Schools
RiAus	Connects communities engaged with science
Robogals	Student run organisation that aims to inspire and empower young women to consider studying engineering and related fields
SA Water	SA Water Schools Program Includes brainwave learning program, education resources, and online learning resources. Arranges school and class visits
Smith Family	Let's Count An early maths program for disadvantaged Australian children aged 3 to 5
South Australian Science Teachers Association	Promotes and supports the teaching of science in schools and fosters the professional development of science teachers. Develops and maintains links with employers, businesses, industry and the tertiary education sector
Speakers in Schools	A South Australian-based organisation connecting students with successful professionals
University of Adelaide	Masterclass with CERN-ATLAS Young Women in Technology Experience
University of South Australia	Australian Pedal Prix Competition where teams race human-powered vehicles on a closed, controlled circuit UniSA Connect A suite of programs that aim to inspire STEM study and career awareness with secondary school students

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Sarah Hyland, Business in Schools

Simon Brooks, Mitcham Girls High School

Tania Duff-Tytler, Golden Grove High School

Thierry Hermann, LeFevre High School

REFERENCES AND RESOURCES

All of the references consulted to create this guide are included here, as well as others that will be useful for use as you establish and develop your next partnership.

Optimising STEM Industry-School Partnerships: Inspiring Australia's Next Generation, **Issues Paper, December 2017; Final Report April 2018** : STEM Partnerships Forum, chaired by Dr Alan Finkel

Strengthening School-Industry STEM Partnerships: Final Project Report, June 2017, Aus Industry Group, funded through Office of the Chief Scientist

Through Growth to Achievement: Report of the Review to Achieve Educational Excellence in Australian Schools, March 2018 (Gonski)

Unfolding opportunities: A baseline study of school-business relationships in Australia, a project that includes a review of the literature; stakeholder consultations; and an online survey of over 500 schools and 200 businesses

SPI 2016: STEM Program Index 2016, Ai Group, Office of the Chief Scientist A booklet listing programs provided by businesses, universities, science and education agencies, and government.

STARportal A centralised national database of STEM activities searchable by parents, students, teachers.

School-Industry STEM Skills Partnerships: Framework for Teacher Professional Development in STEM Partnerships, Ai Group, Australian Council of Engineering Deans (ACED) & Australian Council of Deans of Science (ACDS)

Realising Potential: Businesses Helping Schools to Develop

Australia's Future, Business-School Connections Roundtable

Preparing Secondary Students for Work, A framework for vocational learning, including a range of documents and resources for specific audiences

STEM Learning: Strategy for DECD Preschool to Year 12, 2017 to 2020, Department for Education

National STEM School Education Strategy December 2015, Education Council, endorsed by Australian Education Ministers (Supported at a higher level by Australia 2030, Prosperity Through Innovation: A Plan for Australia to Thrive in the Global Innovation Race)

Overseas resources

How to guide for school business partnerships, produced by the Council for Corporate Partnerships (USA)

A guide to industry visits for school groups, produced by the Institute of Physics (UK)

Making education your business: A guide to supporting STEM teaching in schools and colleges produced by The Royal Society (UK)

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