Australian Government
Department of Education

Best Practice Guide:

Establish school-industry STEM partnerships

October 2019

Opportunity through learning

Disclaimer

This Best Practice Guide is a summary of elements of the *National STEM School Education Resources Toolkit*. The Australian Government Department of Education commissioned Dandolopartners International to develop the Toolkit to assist schools and industry to establish new STEM initiatives, form school-industry partnerships, and evaluate existing and future STEM initiatives.

The Toolkit uses real-world examples of events and activities offered by education departments, industry and other providers. Inclusion of references and links to external sources does not imply endorsement of any company, product or program by the Australian Government.

The suggested attribution for this document is *Best Practice Guide: Establish school-industry STEM partnerships.*

How do I establish a successful school-business STEM partnership?

This guide is designed for schools and businesses seeking to form or enhance STEM education partnerships. Use this guide to:

- Understand the value of school-business partnerships
- Learn about common characteristics of successful school-business partnership

Why are school-business STEM relationships important?

Businesses and schools working together for STEM education is a win-win-win for students, business and schools.

Partnerships **benefit students** by:

- Promoting an understanding of the real world of work.
- Inspiring excitement and motivation about STEM.
    - Creating a link between the relevance of their education and life after school.
- Equipping students with skills they need to succeed in life and work e.g. 21st century skills.
- Raising awareness of diverse career / further education opportunities.

Partnerships **benefit schools** by:

- Enhancing and complementing curriculum content e.g. applying theory to real-world contexts.
- Providing opportunities for students to access the real world of work.
- Increasing access to internal / external resources.
- Building capability of school leaders and teachers in STEM / business.

Partnerships **benefit businesses** by:

- Actively addressing industry skill shortages / pipeline:
    - Inspire students to select subjects that reflect skill needs / gaps.
    - Promote need for wide range of capabilities including subject matter and 21st century skills.
- Promoting importance and relevance of STEM opportunities / pathways.
- Creating positive exposure for businesses / brand.
- Contributing to development of young people.
- Adding value to local business.
- Improving community reputation of industry / individual business.
- Learning about and understanding education sector.

When schools and businesses realise shared opportunities, both sectors can make unique contributions to the partnership:

What schools bring	What businesses bring
Education and teaching expertise Access to students Links to wider community Curious and engaged teachers and students	Venues and resources to support novel experiences Real world challenges and context for students STEM professionals who can act as mentors/role models Access to cutting edge technology Capacity to fund initiatives of value Knowledge of career opportunities/ networks
Shared interests	
Helping students understand STEM's role in work and life Increasing Australia's capabilities and skills for the future Effective and valuable partnerships Connecting STEM knowledge and experience Improving student STEM engagement and achievement	

Different kinds of school-business partnerships

School-business partnerships take many forms. There is no one-size-fits-all approach. They can:

- **Differ in length:** Long-term e.g. over one year, medium-term e.g. a few months, or short-term e.g. one day.
- **Differ in number of partners:** There may be multiple schools involved, or multiple businesses.
- **Differ in types of partners**: Businesses may be a global firm or a local firm, schools may be big, small, regional or metro.
- **Differ in activities / programs:** Not all partnerships will do the same activities, or have the same outcomes.

Roles for business in school STEM partnerships

There are many roles businesses can play in school-business STEM partnerships. They can do one or more of the following:

Role for business	What does it look like?	Case study
Venue	• Show students what 'real-world' business / facilities look like • Provide a space for students to work / host activities and programs • Show students specialist equipment or rooms	**Make it Now Engineering Challenges, Queensland Minerals and Energy Academy** Make it Now in Engineering (MINE) Challenges are an initiative of the Queensland Minerals and Energy Academy↗ (QMEA), a partnership between the Queensland Resources Council and Queensland Government. These five-day programs are held annually at Glencore's Mount Isa Mines and BHP Billiton Mitsubishi Alliance's mines near Moranbah. Students see real-world working environments and join business mentors on site to solve real engineering problems. At the end of the week they present their findings to management. Around 15 Queensland secondary students attend each camp.
Provide real-world learning experiences	• Base activities or programs around real world contexts and challenges • Show students business environments and facilities • Role-play with students, e.g. as team members / co-workers	**Banksia Park International High School and BTG Australasia** Banksia Park International High School in South Australia partnered with BTG Australasia to facilitate an extended real-world STEM project↗ for Year 8 students. This involved a student visit to BTG laboratories, a four-week group project on contamination avoidance in BTG labs, and presentations to a panel of BTG employees and other external panellists. The project showed students how STEM skills can be applied a real-world industry problems. Both the school and BTG were impressed with the enthusiasm and growth of students and were eager to further the partnership.
Connect with students as role models	• Host talks / Q&As / events / activities to connect STEM professionals with students • Mentor students about STEM opportunities / pathways	**MyRoad, Beacon Foundation** MyRoad↗ is an online mentoring program connecting female secondary students to business mentors across Australia. During a two-hour online session, mentors support students to understand and develop 21st century skills required for the changing world of work. Mentors share their career experiences, many in STEM-related industries, and encourage students to picture their futures. Sessions also feature videos of diverse industry role models. MyRoad officially launched in 2017 after a 2016 pilot connected 982 students with 118 mentors.

Role for business	What does it look like?	Case study
Support teacher development	• Seek opportunities to mentor teachers • Provide teachers with access to real-world scenarios / challenges • Co-design aspects of the curriculum	**CSIRO STEM Professionals in Schools** CSIRO STEM Professionals in Schools↗ is a national program that links teachers and STEM professionals. Drawing on the STEM professional's expertise, partners work together to bring real-world STEM into the classroom. Partnerships often incorporate teacher development, mentoring, one-on-one tutoring, site visits, career talks and hands-on learning. The program reaches more than 60,000 students per year.
Scale-up partner	• Increase scope of an initiative (e.g. increase opportunities available to existing students / extending to new schools / increasing program duration) • Provide additional resources	**STELR and Orica** **STELR**↗ (Science and Technology Education Leveraging Relevance) is a national initiative of the Australian Academy of Technology and Engineering. STELR supplies schools with equipment packs and professional learning workshops to support hands-on, inquiry-based STEM learning. As STELR's principal sponsor, Orica↗ has supported STELR's growth and helped subsidise the costs for participating schools. STELR has been implemented in more than 600 Australian schools. In a 2013 survey of STELR schools, more than 80% reported increased student science literacy and understanding.

Successful school-business partnerships share seven common principles

Even though all school-business partnerships are different, successful partnerships share similar characteristics. Seven key principles are described below.

1. Partnerships should enhance student STEM and 21st century skills learning and outcomes	
What	Student STEM and 21st century skills, learning, and outcomes are identified as the priority in the partnership.
How	• Make student outcomes a clear objective in written agreements. • Recognise and include STEM best practice in activities. • Include student objectives in all monitoring and evaluation plans. • Create activities with planned student learning / outcome objectives. • Build capabilities of partners in STEM education through mentoring or professional learning. • Co-design classroom content.
2. *Partnerships should benefit schools and business*	
What	Understand and work towards benefits for each partner.
How	• Clearly set out expected benefits in agreements. • Enable transparent communication about intended benefits. • Run initial workshops / discussions about benefits and expectations. • Aim for activities that include the opportunity to maximise school and business benefits.
3. *Partnerships should be built on strong foundations with a shared vision and objectives*	
What	Partners have a strong sense of what they are trying to achieve, e.g. through goals, accountability and evaluation. Partnerships are sustainable and strong enough to overcome barriers.
How	• Create joint strategy that includes processes around decision-making, immediate to long-term goals, roles and responsibilities. • Design evaluation frameworks to measure student / partnership outcomes. • Document benefits / outcomes of partnership. • Set achievable and flexible guidelines for the partnership. • Celebrate partnership achievements.

4. *Partnerships should have the support of the school community*	
What	Effective partnerships have clear support / endorsement from school leaders, teachers, parents and students. The school community understands the purpose and value of the partnership.
How	• Promote partnership and its benefits within the school community e.g. create literature for parents that describes the benefits and importance of STEM and STEM careers. • Maintain communication with school community about student activities and outcomes. • Consider opportunities to involve the school community, e.g. exhibition days.
5. *Partnerships should be embedded in school and business cultures*	
What	Partnerships are embedded in organisational cultures to ensure they succeed over time.
How	• Include the partnership in standard operational structures and processes. • Have communication protocols / processes e.g. who key contacts are, process for letting partners know about key personnel changes. • Meet frequently to build trust, mutual respect and understanding of each other's culture. • Ensure roles and responsibilities are clear. • If appropriate, embed partnership through formal documentation e.g. partnership agreements or memorandum of understanding. • Ensure partnership activities are integrated into the school curriculum / business calendar
6. *Partnerships should have the support of school and business leadership*	
What	Partnerships have commitment from all levels of senior leadership across both organisations e.g. business CEO / school leadership. Include support from other key levels e.g. department managers, human resource areas, executive staff and teachers.
How	• Involve senior leadership in discussions in select meetings about partnership. • Confirm commitment and support from principal and department heads / parent organisations in written agreements. • Ensure senior leaders are aware of commitments required e.g. shared resources. • Where possible, involve senior leaders in key milestone events. • Ensure contingency planning for changes of leadership.
7. *Partnerships should be adequately resourced by both schools and businesses*	
What	Both partners contribute resources to the partnership. Resources may be tangible or intangible and include money, facilities, staffing, time, energy, skills and expertise.
How	• Identify expected resource contribution early and assess availability / capacity for partners to contribute. • Include expectations and understandings in written agreements / joint strategies.