# Integrated STEM Stage 4 project - summary of school project details

| Project | School organisation | STEM delivery | Benefits |
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| Ambarvale High School | Class Year 8  Entire cohort | Teachers 2 teachers per KLA, with support | For teachers  * new ways of group learning * improved technical skills * collaboration between faculties * learnt from each other * opportunity to work with students in different learning environments and structures  For students  * increased engagement and motivation through mini-challenges * gained confidence in problem solving and collaborative learning * access to university activities * engaged with wider school audience |
| Topic - teacher chosen Students designed a modification for a learning, social or physical school environment, in own school and in local primary school | Timetable 10 sessions  30 periods of 60 minutes  Periods donated by each KLA  Plus a three-hour block timetabled every fortnight | Groups  * Teacher-allocated * 4 students per group |
| Unique features  * ‘Mini-challenges’ to build specific skills as required for final project | Learning spaces  * Usual KLA classrooms * No modifications   At times, other spaces used, purpose-designed for project-based learning | Assessment Formative assessments:   * exit slips * teacher observations * learning logs   Group presentation to teacher panel:   * assessed using a rubric * by peers, using ‘Two stars and a Wish’ |
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| Baulkham Hills High School | Class Year 8  Selected students who were “naturally inclined to STEM” | Teachers TAS, science and mathematics teachers Each taught STEM independently | For teachers  * increased opportunities to collaborate, share resources and integrate the curriculum  For students  * improved problem-solving skills * explored real life case studies * developed teamwork capabilities |
| Topic - teacher chosen Design and produce a digital weather station and collect, analyse and interpret weather-related data around the school | Timetable 10 weeks, KLA lessons:  TAS - 2 x 40 minute lessons/week  Maths - 6 lessons  Science - 14 lessons | Groups  * Student-formed friendship groups |
| Unique features  * School-developed workbook * Smaller individual projects * One large class project * Extension activities in unit of work | Learning spaces  * Usual KLA classrooms * No modifications | Assessments Formative assessments, including use of (separate) mathematics and TAS workbooks |
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| Bellingen High School | Class Year 8  Entire cohort | Teachers All three KLA teachers in each class, [simultaneously with combined class] | For teachers Improved understanding of:   * cross-curriculum links between subjects * true nature of STEM and its application   Improved:   * communication * collaboration * negotiation skills  For students  * enjoyed the experience * were fully engaged throughout the process * learned to work with other students |
| Topic Students designed a multi-storey structure to withstand earthquakes  Students and teachers chose the topic together | Timetable 4 periods per fortnight over 20 weeks:  2 x STEM  1 x science  1 x mathematics | Groups  * Student-formed friendship groups * Teachers adjusted according to skills |
| Unique features  * Recommend smaller class size in future | Learning spaces  * Science and maths classes in labs with group seating * TAS in usual workshops | Assessment  * ePortfolio in Google Classroom for top classes * Teacher assessment and peer assessments in all classes |
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| Bowral High School | Class Year 7  Students selected show an aptitude towards or higher ability in STEM | Teachers One teacher from each science, maths and TAS were chosen through an EOI Workload shared equally between the teachers, including mentoring | For teachers  * exposure to other syllabuses and potential teaching methods * improved understanding of content delivery of other KLAs * benefit of cross KLA collaboration and content delivery * improved staff wellbeing through interactions  For students  * solving a real world problem * working with industry partners * developing links between learning and future careers * skills in using a range of Google Apps to collaborate with peers |
| Topic - teacher chosen Design a transport vehicle that is not reliant on fossil fuels, within a budget | Timetable 3 hour STEM block every Wednesday morning - taught by a TAS teacher  Additional 1 period from each of maths and science. | Groups  * Initially, students formed groups * As the project progressed, teachers altered the groups; sometimes based on skill sets |
| Unique features  * Use of Meccano and Lego sets * STEM project ran for 13 weeks as the 3-hour block/week, then extended as the STEM class for the rest of the year * Planned to continue next year under a different model | Learning spaces  * Dedicated STEM classroom * No modifications | Assessment  * Formative and summative assessment used throughout. * Students were assessed on:   completion of all components of the challenge  presenting information  working individually and in group   * Assessment rubrics where provided to students at the beginning of the project |
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| Burwood Girls High School | Class Year 7  Entire cohort at different times over the project | Teachers TAS teachers only | For teachers  * collaboration across faculties * increased awareness of and skills in other syllabus content * improved collegial relationships * great satisfaction seeing improved student engagement  For students  * improved problem solving skills and teamwork * confidence to take risks and try new ideas * practical, real world skills * great satisfaction while creating and innovating |
| Topic - teacher chosen Design, construct and test a device to deliver a projectile to a target | Timetable 8 weeks  4 periods of TAS every two weeks  4 additional periods from science to TAS  Science and mathematics content integrated into TAS classes | Groups  * Students and teachers chose groups together, within each TAS or science class * Some friendship groupings * 3-4 students/group |
| Unique features None | Learning spaces  * Usual TAS classroom * No modifications | Assessment  * Formative assessments used * ePortfolio on Google Drive: design ideas evaluation sheets, videos, photos * Moodle for tracking students’ learning * Final completion to demonstrate catapults. |
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| Campbelltown Performing Arts High School | Class Year 8  Students selected based on NAPLAN and Literacy and Numeracy continuum results | Teachers STEM was taught by the three STEM KLA teachers - Science, TAS and maths. | For teachers  * ways of linking subject content and skills to real-life authentic examples  For students  * renewed interest in STEM subjects |
| Topic - teacher chosen Design a solar-powered racing car | Timetable 10 to 11 weeks  1 period per cycle allocated from each of science and mathematics (2 periods)  Usual TAS classes  Allocation was flexible, depending on the stage of the project | Groups  * Student-formed groups * Teachers used discretion to alter groups according to student abilities |
| Unique features None | Learning spaces  * Usual KLA classrooms * No modifications | Assessment  * Detailed design folio:   design and evaluation sections  proposal, research, concepts and procedures   * Folio presented in slideshow, video, oral presentation or documents * Science and maths provided the theoretical work within the portfolio  ‘Shark Tank’ model competition as final assessment |
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| Cherrybrook Technology High School | Class Year 8  Two classes formed:   * + One based on student interest and skill in mathematics and science   + Other class chosen randomly | Teachers Primarily taught by TAS teachers  Other faculty teachers swapped periods (with TAS) as required | For teachers Better sense of how to deliver STEM content and assess STEM skills in an integrated fashion For students Understanding how STEM skills cohere in real-world problem solving |
| Topic - teacher chosen Design, make and evaluate a solar-powered land-based vehicle to deliver water to rural and remote communities | Timetable 20 weeks  6 periods per fortnight | Groups  * Student-formed friendship groups * Modified by teachers for classroom management purposes, as required |
| Unique features None | Learning spaces  * Usual KLA classrooms * No modifications | Assessment  * Research of topic * Presentation of findings and solutions * Quiz on understanding of construction, solution and interpretive equations |
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| Coleambally Central School | Class Year 7  Students selected by teachers, but there was no specific STEM class | Teachers 3 x teachers from science/TAS  1 x mathematics  Of the three teachers, one teacher was teaching both science and TAS | For teachers  * building collegiality |
| Topic - teacher chosen Design a toy for a toy company | Timetable 10 weeks, with per cycle allocations:  Science x 7 periods  TAS x 5 periods  Mathematics x 7 periods | Groups Students did not work in groups | For students  * enjoyed creating final product |
| Unique features None | Learning spaces  * Technology workshop and science labs used for all subject lessons * No modifications | Assessment  * Folio including designs, and the final product |  |
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| Corrimal High School | Class Year 8  Entire cohort - 2 classes | Teachers 3 x Head Teachers: science, TAS and mathematics | For teachers New opportunities to:   * teach content from different KLAs * collaborate * use technology * implement project-based learning * apply 21st century learning and assessments  For students  * collaborating * using technology * participating in project- based learning * applying 21st century learning |
| Topic - teacher chosen Design and build a hydraulic-powered robotic arm | Timetable 2 classes - each for 1 term in succession  6 lessons per 2-week cycle | Groups  * Individual work or in groups, depending on the stage of the project * Groups mainly chosen by teachers * In some instances, formed by students |
| Unique features None | Learning spaces  * Dedicated STEM learning space * Furniture and materials specifically purchased for the STEM room | Assessment  * Formative: primarily monitoring techniques * Summative assessment:   testing of the robotic arm (performance)  design folio |
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| Dorrigo High School | Class Year 7  Entire cohort - 2 classes (32 students) | Teachers Multiple teachers from each of the three STEM faculties | For teachers  * embracing collaborative approach to teaching * sharing the benefits of project-based learning with other schools and staff  For students Year 7 students:   * welcomed into high school with a project that allowed them to experiment without fear of failure * gained confidence in approaching all facets of school life |
| Topic - teacher chosen Design and make a carbon dioxide powered car  The process involved prototyping | Timetable 11 weeks  TAS - three periods per fortnight Mathematics - 1 period per fortnight  Science - 1 period per fortnight  All classes timetabled on the same day allowing flexibility between teachers and classes | Groups Students did not work in groups |
| Unique features None | Learning spaces  * Usual KLA classrooms * TAS learning space adapted slightly to allow for some specialist machinery required for the project * Testing of the final project was done in the school hall, as a larger space was required | Assessment  * Formative assessment such as observation and informal questioning * Combination of formal skill-based assessment from the three KLAs * Peer-assessment through a mini-competition |
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| Granville Boys High School | Class Year 7 - 2 classes  Classes participated if the teacher chose to take part in the project | Teacher 4 teachers team taught for the whole of each session | For teachers  * opportunity to team teach * participating in inquiry-based learning with the students * seeing increased student participation  For students  * learnt concepts through hands-on activities * improved development of skills |
| Topic Create a racing vehicle  The topic was chosen by the students and teachers cooperatively | Timetable 1 full day/week for 7 weeks | Groups  * Student-formed friendship groups |
| Unique features  * In 2017, plan to have all Year 7 participating in STEM with a strategic move towards project-based learning | Learning spaces  * TAS workshop used as a dedicated STEM learning space | Assessment  * Marking rubric used for each KLA * Mix of formative and summative strategies, including:   portfolio  justifying decisions  demonstrated ability to calculate ratios and rates |
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| Great Lakes College – Forster Campus | Class Year 7  Students selected from the opportunity class | Teachers Science and maths teachers | For teachers  * involvement in student-centred project owned by the individual teachers  For students  * enjoyed alternative form of learning * shared learning with their parents: 27 students, from a class of 30, presented to their parents |
| Topic - teacher chosen Design and construct:   * a car powered by an electric toothbrush motor * a rescue device to escape a house * a device to measure the electrical output from a wind turbine | Timetable Science classes used  Maths faculty offering some [additional] periods | Groups Some groups formed:   * by students based on friendship preferences * randomly [by teachers] |
| Unique features  * Course to be offered as a Stage 5 Technology elective * New Head Teacher TAS very interested in running STEM at the school | Learning spaces  * Usual KLA classrooms * No modifications | Assessment  * Design folio, assessed using marking rubric * STEM students participated in the same assessments as non-STEM students * Student-developed strategy - projects presented at a parent event, assessed using a number of criteria |
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| James Cook Technology Boys High School | Class Year 8  Entire cohort | Teachers Delivered by teachers from the three KLAs. | Teachers  * enjoyed students learning in a practical setting  Students  * seeing the integration of mathematics, science and TAS curriculum * experiencing a different perspective, practical application and being more engaged in mathematics |
| Topic – teacher chosen Students designed, built and tested catapults. | Timetable Program ran for 6.5 weeks.  *55 periods integrated into the Technology Mandatory course:*  *3 periods from TAS*  *2 periods from science*  *1 from maths.*  Delivered during usual lessons, providing students with skills towards an immersive day. | Groups Student-formed groups with guidance from teachers |
| Unique features None | Learning spaces  * Dedicated learning space * No modifications | Assessment  * Digital portfolio, including a Google Classroom assessment post * Teacher observation of students’ skills |
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| Lightning Ridge Central School | Class Year 7  Entire cohort - 2 classes | Teachers STEM was delivered by usual teachers in usual KLA classes | For teachers  * renewed teachers’ energy to see positive student reaction to the integrated project-based learning * collaboration across faculties * observed how students behave and react differently to different components of the course  For students  * increased appreciation of how different disciplines affect each other * improved attendance |
| Topic – teacher chosen Students used scientific method to design, plan and construct a rocket | Timetable 4 periods/week for 10 weeks  Standard KLA classes | Groups  * Student-formed groups with guidance from teachers |
| Unique features  * Current plans for a dedicated STEM learning space to be created for 2017, including:   3D printers  laser cutters  banner printers  other technologies | Learning spaces  * Usual KLA classrooms * Additional access to computer labs | Assessment  * Science and TAS assessed through the design folio * TAS also assessed the building and safety components * Scientific method report and presentation * Mathematics assessed through   formative assessments in activities throughout the project  3-5 minute presentation |
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| Liverpool Boys High School | Class Year 8  Entire cohort - 27 students/class | Teachers Lessons were shared between:  1 x science  2 x mathematics teachers  Each teacher delivering independently | For teachers  * greater knowledge of content and the project topics * increased collegial communication * support from regional and industry expertise  For students  * greater autonomy in learning * access to a higher quality program than in the past |
| Topic - teacher chosen Designed and build vehicle:   * paper plane to travel 20m * paper boat to stay afloat while holding a mass of 30g * a mode of transport that holds 30g and travels a minimum of 1m, using a renewable energy source | Timetable 11 x 55 min lessons per fortnight | Groups Students did not work in groups |
| Unique features None | Learning spaces  * Usual KLA classrooms * Additional access to science labs when necessary | Assessment  * Ongoing assessment throughout the project * Individual design portfolio and final product |
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| Macarthur Girls High School | Class Year 7  Entire cohort | Teachers Science and TAS teachers | For teachers  * opportunities for professional development * experienced project-based learning in an integrated STEM environment  For students  * experienced STEM and project-based learning * able to use technology that they were not exposed to previously |
| Topic - teacher chosen Identify an aged care or disability issue and design and build a robot to improve the quality of life of users | Timetable 20 weeks  4 periods per fortnight in usual KLA timetables  Some lessons timetabled concurrently to enable team teaching | Groups  * Teacher-formed groups * Based on students’ abilities * Each group member had a specific role |
| Unique features  * Use of Lego robotics kits | Learning spaces  * Dedicated STEM learning space * Space enlarged and fitted with flexible furniture to allow different grouping structures and work spaces | Assessment  * Two mid-project assessments; one focussed on students’ skills in Lego * Summative assessment included:   portfolio  video log  completed robotic tool |
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| Murrumburrah High School | Class Stage 4  Entire cohort | Teachers 2 x TAS teachers  Same content, taught independently | For teachers  * No extra benefits as a result of integrated STEM  For students  * experienced something new |
| Topic - teacher chosen  Design and construct two rockets, one water powered and one air powered, aimed to outperform other rockets | Timetable 10 weeks  5 x 1-hour periods per fortnight | Groups  * Student-formed friendship groups * Teachers modified groups as necessary |
| Unique features  * Used third-party rocket kits * Future implementation may require increased teacher support and expertise | Learning spaces  * Usual KLA classrooms * No modifications | Assessment  * Design folio, including   sketches, modifications, decisions  final design solution |
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| Normanhurst High School | Class Year 8  Entire cohort | Teachers Teachers from each of science, TAS and maths | For teachers  * cooperation across KLAs * improved collegiality within faculties * professional learning into how to apply learning in a STEM project  For students  * connection between faculties ensured material was more effectively covered and delivered |
| Topic - teacher chosen Investigate the science and mathematics of musical instruments and construct instruments to test the variables associated with sound production | Timetable 10 weeks  Delivered in Term 1 in science and maths classes  TAS completed the final parts of the project | Groups  * Student-formed groups * Each group developed a group agreement * Groups, and their agreements, supervised and monitored by teachers |
| Unique features  * Connection between the parts was mapped during planning * Each faculty delivered specific parts of the project; brought together at the end | Learning spaces  * Usual KLA classrooms * No modifications | Assessment  * Science: student research projects * Maths: tests mapped against outcomes * TAS: design process and portfolio |
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| Orara High School | Class Year 7  High ability students only | Teachers 3 x head teachers (science, TAS and mathematics) | For teachers  * enjoyment of the new approach to teaching * working with staff from other KLAs  For students  * enjoyed working collaboratively with their peers on real world problems * learnt new concepts and skills that were required to successfully complete their projects * level of engagement was visible in the classroom |
| Topic - teacher chosen Design and construct prototypes of rockets | Timetable 3 periods per (fortnight) cycle  Each HT used one free period/fortnight to take the class  The free periods coincided with a class teacher, who would provide support and KLA specific advice as needed | Groups  * Teacher-formed groups * Based on students’ strengths, weaknesses and social preferences |
| Unique features  * Plan designated STEM lessons for all Year 7 and 8 students * Planned STEM elective for Year 10 | Learning spaces  * STEM classes held in learning areas according to need for the lesson, e.g. when particular equipment is needed * 2017 plans for dedicated STEM learning space for years 7-10 | Assessment  * Final presentation * Student choice of presentation mode * Presentation guidelines provided to students prior to the project |
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| Picton High School | Class Year 7  High ability students, based on students’ academic achievement in test in Year 6 | Teachers Classes taught independently by usual KLA teachers in their own classes | For teachers and for students  * involvement in cross-curricular project-based learning * application of theoretical concepts applied to real world problems * develop and work within an emerging curriculum space  For students specifically  * ability to self-teach * learnt through discovery * asked questions * work independently and in groups |
| Topic - teacher chosen Design and construct a rocket for travel to Mars, a Mars rover and a bubble to live in | Timetable 1 year  15 x 1-hour periods per fortnight, across TAS, science and maths  Some maths and science periods were not replaced so core syllabus content could be delivered by the KLA teachers | Groups  * Student-formed friendship groups |
| Unique features  * STEM project to continue for Year 7 * Expand to entire Year 8 cohort in 2017 * Plans for Stage 5 elective in 2018 | Learning spaces  * Usual KLA classrooms * No modifications | Assessment  * 2 assessment tasks:   focused on the rocket  focused on the bubble |
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| Riverside Girls High School | Class Year 8  Entire cohort | Teachers STEM taught by the usual KLA teachers in their own classes  Each KLA had an independent focus around the topic | For teachers  * developed skills to lead through questioning rather than by providing answers  For students  * problem solving skills * skills in cooperation * increased appreciation of the skills of others |
| Topic - teacher chosen Develop solutions to establish colonies in other locations in the solar system | Timetable 6 - 8 weeks  10 lessons per cycle: 4 x TAS; 6 x science  Mathematics integrated in the rates and ratio section of the unit | Groups  * Teacher-formed groups * Based on students’ skills sets |
| Unique features None | Learning spaces  * Usual KLA classrooms * One computer room was changed to a more ‘free-form’ space | Assessment  * Assessment tasks: specific milestones in reaching students’ final goal * Folio: tracking students’ progress   recorded discussions between students and teachers |
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| Rooty Hill High School | Class Year 8  Entire cohort | Teachers STEM taught in usual KLA classes  TAS teachers delivered the 2 dedicated STEM classes/cycle | For teachers  * learnt a lot about collaboration and how to work together * added value in their professional development plans  For students  * improved in general capabilities, especially in the creative and critical thinking domains |
| Topic - teacher chosen Design a portfolio of sport products | Timetable 1 term  13 periods per cycle:  6 x science  1 x maths  4 x technology  2 x dedicated STEM | Groups  * Student-formed groups * Considering feedback from project-based learning groups in Year 7 |
| Unique features None | Learning spaces  * Usual KLA classrooms * No modifications * Designated computer space: fortnightly STEM class for students to collate their work | Assessment  * Project assessment: individual and group components * Portfolio of research and design ideas * Used Google Docs * Included videos and other multimedia |
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| Sarah Redfern High School | Class Year 8  High achieving students | Teachers Classes taught collaboratively by 1 x TAS teacher and either a science or a maths teacher | For teachers  * opportunity for professional development * improved staff skills when selecting and using technology * procurement of new equipment * improved cross-curricular support * opportunity to try and deliver syllabus outcomes in a non-traditional way * new programs, equipment, delivery methods and technologies  For students  * opportunity to direct their own design projects * experienced connections between theory and the practice of project work * presented work to others * opportunity to connect with industry experts * applied expert knowledge to own projects |
| Topic - teacher chosen Research sustainability practices for application in building designs | Timetable 41 weeks  4 x 80-minute lessons per week:  2 x Technology Mandatory  2 x numeracy - combination of maths and science | Groups  * Student-formed friendship groups * Modifications made at teachers’ discretion |
| Unique features None | Learning spaces  * Dedicated STEM learning space with 3D printer, projector and computers * New furniture is planned for the room | Assessment  * Teachers assessed students’ sustainable designs |
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| Singleton High School | Class Year 8  Gifted and talented class,  Independent learners’ class | Teachers Three teachers team-taught each class | For teachers  * experienced a new teaching style, with a new mind set and processes * worked with staff outside their key learning areas   Improved:   * quality teaching * student-centred learning techniques * knowledge of project-based learning * understanding of STEM implementation processes  For students  * independent learning * teamwork * showed initiative * demonstrated improved techniques and research skills * had fun in their learning, while producing a quality product and developing a portfolio * exposure to a different way of learning * took responsibility for participating and assuming roles in groups * greater appreciation for the three STEM key learning areas |
| Topic - teacher chosen Design, produce, promote and evaluate a rollercoaster constructed of mainly paper | Timetable 15 weeks  TAS lessons only | Groups  * Teacher-formed random groups * Allowed some changes based on friendship preferences |
| Unique features  * Plans to integrate STEM programs into Technology Mandatory course, in 2017. * New programs are currently written * Smaller classes would be more effective in space available | Learning spaces  * Dedicated learning space in the TAFE facility, adjoining the school * A room was set up for STEM use only | Assessment  * Portfolio including:   research  design  evidence of experimentation evaluation of the design  final product |
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| The Canobolas Rural Technology High School | Class Year 7  Entire cohort | Teachers 1 x TAS teacher worked as dedicated STEM teacher | For teachers  * insight into how other KLAs do business * collaboration with other KLA staff * worked in flexible learning space * opportunity to professionally develop staff  For students  * more time spent collaborating * learnt content through a project-based learning environment * learnt from their peers, not just alongside their peers   Post-unit surveys showed:   * 85% of students enjoyed working in a flexible learning space * 83% of students enjoyed collaborating |
| Topic - teacher chosen Design and create a water filtration system | Timetable 10 weeks  4 x lessons per cycle (5 cycles):  1 x science  1 x maths  2 x agriculture lessons  Each class alternated with the usual agriculture classes | Groups  * Student-formed friendship groups * Teachers adjusted to balance group numbers |
| Unique features  * Used Lego EV3 light meters to test water clarity * Plans to extend STEM by providing more time in Years 7&8 | Learning spaces  * Library used as dedicated STEM learning space, with designated maker space, flexible learning spaces * Number of books in the library was reduced to accommodate the range of STEM needs | Assessment  * Physical portfolio * Each activity had worksheets and included research, documentation of design ideas, sketching, etc * Teacher observations   All items were transferred to OneNote for ICT skill development and practice in work sample moderation for all staff |
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| The Ponds High School | Class Year 8  Entire cohort -2 classes; one mixed ability, one gifted and talented class | Teachers  * Multiple TAS teachers * Team teaching with the three classes working together | For teachers  * learnt about new technologies * worked in a team with other teachers * experienced a new learning settings * improved programming skills and knowledge  Students  * had greater control of their learning and were able to collaborate * articulated how science, maths and technology worked together in the project * gained understanding of consolidated STEM concepts * had fun ` * improved independent learning |
| Topic - teacher chosen Design, make and evaluate an automated safety transport system for chemicals | Timetable 21 weeks  6 x 55-minute periods per fortnight (double periods)  Predominantly TAS lessons (scheduled next to science, in case science lessons were needed) | Groups  * Student-formed friendship groups * Modified at teachers’ discretion |
| Unique features  * Used Lego EV3 kits | Learning spaces  * Classrooms modified with additional computers during STEM classes * Spaces chosen next to a large open space for practical activities | Assessment  * Formative assessment strategies focussed on students’ progress throughout the project * Final presentation to the wider school community |
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| Tuggerah Lakes Secondary College – Tumbi Umbi | Class Year 8  Three classes; consecutively per term Students were chosen from the top Year 8 TAS class | Teachers  * TAS teachers * Science or mathematics teacher timetabled for one lesson per cycle | For teacher  * additional professional learning * able to try new things in the dedicated space  For students  * practical experience in maths, science and technologies * collaborated to solve real-world problems |
| Topic - teacher chosen Design a built environment that utilises sustainable materials and can harvest alternative sources of energy and water | Timetable 21 weeks  TAS lessons only | Groups  * Teacher-formed groups * Based on learning styles |
| Unique features None | Learning spaces  * Purpose build STEM space | Assessment  * Scale model of proposed built environment * Online portfolio including:   research  design solution  evaluation |