



PROGRAM SUMMARY

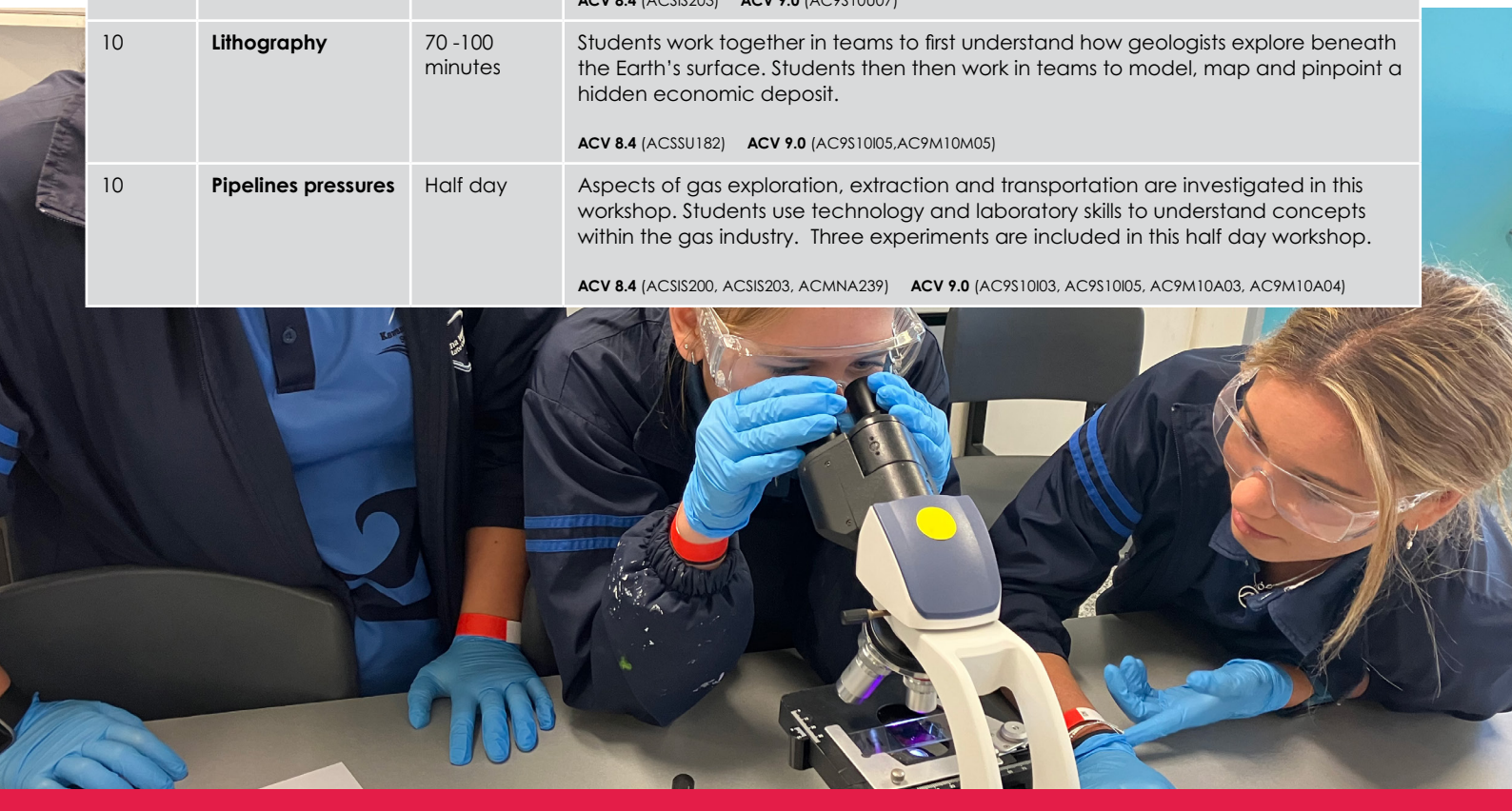
The Queensland Minerals and Energy Academy runs STEM and trade workshops across its network of 100 schools across Queensland, generating a pipeline of talent from schools to the resource sector. Workshops are curriculum aligned and contextualised to engage students in the world of minerals and energy.

Year Level	Program Name	Length of Program	Description
7	Pulleys for productivity	70-100 minutes	<p>A practical, hands-on experiment to understand the mechanical advantage provided by pulleys. The concept is linked to various mining machines to understand how they have been designed to account for mechanical advantage.</p> <p>ACV 8.4 (ACSSU117, ACMNA180) ACV 9.0 (AC9S7U04, AC9M7A04)</p>
7	Physics in Flight	100-140 minutes	<p>Held as inter school challenge, or as a school verses school battle, students learn about the fundamentals of drone flight, and then test their problem solving with a paper plane flight time competition.</p> <p>ACV 8.4 (ACSSU117) ACV 9.0 (AC9S7U04)</p>
7	Water: yours, ours, Mine	Half or whole day	<p>Students discover the key elements of water treatment by hands on exploration of water filtration, flocculation and sedimentation. Turbidity and pH testing help students make informed decisions before finishing their session by creating their own water treatment method.</p> <p>Activities include</p> <ul style="list-style-type: none"> • Filtration • Flocculation • Sedimentation
7	Filtration	45 – 60 minutes	<p>A hands on exploration of different filter mediums takes students on a journey to discover not only the effect of pore size, but also pore arrangements.</p> <p>ACV 8.4 (ACSSU113, ACSSU116, ACSIS126, ACSIS130, ACHGK037, ACHGK040, ACHGK041) ACV 9.0 (AC9S7U06, AC9S7I03, AC9S7I05, AC9HG7K01, AC9HG7K04, AC9HG7K03)</p>
7	Flocculation & Sedimentation	45 – 60 minutes	<p>The use of flocculants to decrease sedimentation time in treaty dirty water is investigated in this short science experiment. Students will use turbidity sensors and pH stripes to collect data and optimise settling time when using a flocculant.</p> <p>ACV 8.4 (ACSSU116, ACSIS126, ACSIS130, ACHGK037, ACHGK040, ACHGK041) ACV 9.0 (AC9S7U06, AC9S7I03, AC9S7I05, C9HG7K01, AC9HG7K04, AC9HG7K03)</p>
7	Water Treatment Design	45 – 60 minutes	<p>The use of flocculants to decrease sedimentation time in treaty dirty water is investigated in this short science experiment. Students will use turbidity sensors and pH stripes to collect data and optimise settling time when using a flocculant.</p> <p>With budget constraints as their challenge students are tasked to design the most effective water treatment system by applying the information collected in the filtration and flocculation and sedimentation activities.</p> <p>ACV 8.4 (ACSSU116, ACSIS126, ACSIS130, ACHGK037, ACHGK040, ACHGK041) ACV 9.0 (AC9S7U06, AC9S7I03, AC9S7I05, AC9HG7K01, AC9HG7K04, AC9HG7K03)</p>
8	Treasures of the Earth	70-100 minutes	<p>This session investigates the linkages between elements on the Periodic Table and their uses in everyday life. The associated activity is conducted as a scavenger hunt using the “30 Things” publication, produced by the Minerals Council of Australia.</p> <p>ACV 8.4 (ACSSU113, ACSSU152) ACV 9.0 (AC9S7U06, AC9S8U04)</p>
8	Treasures of the Earth	70-100 minutes	<p>This session investigates the linkages between elements on the Periodic Table and their uses in everyday life. The associated activity is conducted as a scavenger hunt using the “30 Things” publication, produced by the Minerals Council of Australia.</p> <p>ACV 8.4 (ACSSU113, ACSSU152) ACV 9.0 (AC9S7U06, AC9S8U04)</p>

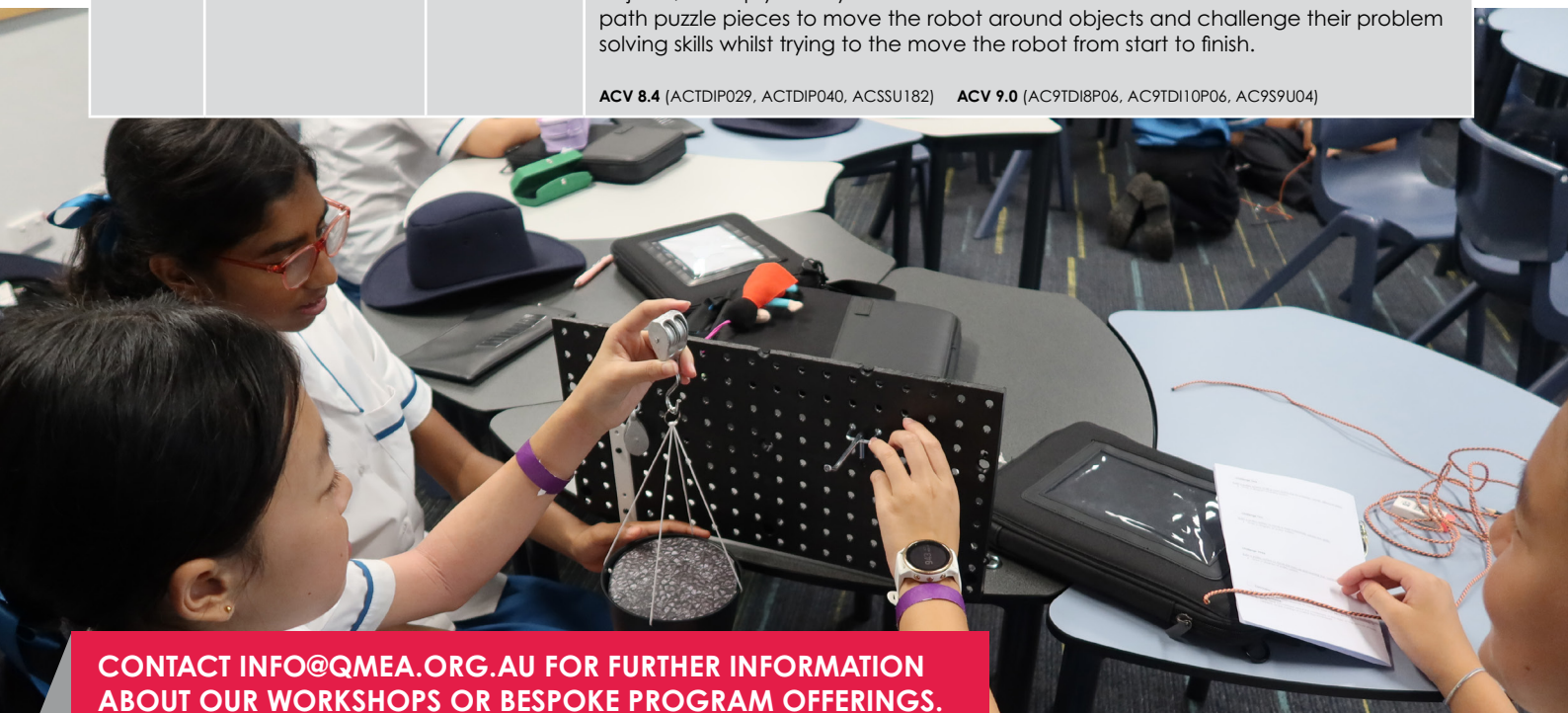
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8	Rockin' Reactions	Half or whole day	<p>Students engage in hands on activities that are based around geology and the rock cycle. Students will also have the opportunity to engage with professionals from the resources sector.</p> <p>Activities include</p> <ul style="list-style-type: none"> • Watch it cool • Air drill • Round the rock cycle <p>ACV 8.4 (ACSSU155, ACSSU153, ACSSU225) ACV 9.0 (AC9S8U04, AC9S8U05, AC9S8U07)</p>
8	Watch it cool	70 -100 minutes	<p>A look at how the cooling rate of an igneous rock can create crystals of different shapes and sizes, which allows geologists to make inferences about rock formation conditions. This includes an experiment that investigates how the speed of cooling affects crystal size and shape.</p> <p>ACV 8.4 (ACSSU153, ACSIS141) ACV 9.0 (AC9S8U04, AC9M8M05)</p>
8	Air Drill	70 -100 minutes	<p>Using air as a tool to break rocks is explored in this workshop where students construct a model air drill to work as a geologist and explore sample collections and location identification.</p> <p>ACV 8.4 (ACSSU155) ACV 9.0 (AC9S8U05)</p>
8	Round the Rock Cycle	100 -140 minutes	<p>Explore the rock cycle through a series of chemical experiments that model the effects of heat and weathering in the rock cycle.</p> <p>ACV 8.4 (ACSSU153, ACSSU225) ACV 9.0 (AC9S8U04, AC9S8U07)</p>
8	Heavy Hydraulics	Whole day	<p>Heavy Hydraulics asks students to collaborate whilst assembling and building a model hydraulic arm. Students will use CAD programming to design a chassis to attach the hydraulic arm. The activity will focus on aspects of the design thinking process and the use of technology within engineering projects.</p> <p>ACV 8.4 (ACTDEK034, ACTDIP027) ACV 9.0 (AC9TDE8K06, AC9TDI8P04)</p>
9	Lighting the way	70 -100 minutes	<p>Builds on student knowledge of how light travels and investigates the method by which retroreflectors are a means of passive light reflection. Their use within the resources sector is explored and how they underpin safety on a mine site.</p> <p>ACV 8.4 (ACSSU182, ACMNA208) ACV 9.0 (AC9S9U04, AC9M9M05)</p>
9	Beakers Bots Build	Whole Day	<p>Students discover the key elements of water treatment by hands on exploration of water filtration, flocculation and sedimentation. Turbidity and pH testing help students make informed decisions before finishing their session by creating their own water treatment method.</p> <p>Activities include</p> <ul style="list-style-type: none"> • Lazer maze • Sample Selector • Perforated Well Casing • Resourceful Robots
9	Lazer maze	70 -100 minutes	<p>Manipulate the laser beam to travel from start to finish while avoiding set obstacles, students are set increasingly more difficult challenges to see which group can be the most successful.</p> <p>ACV 8.4 (ACSSU182) ACV 9.0 (AC9S9U04)</p>
9	Perforated Well Casing	70-100 minutes	<p>Students engineering skills are tested by designing and evaluating different perforated well casing models.</p> <p>ACV 8.4 (ACSSU165) ACV 9.0 (AC9S9I02)</p>



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9 & 10	Resourceful Robots	100-140 minutes	<p>This session sees students work collaboratively, using Lego EV3 robots to navigate a course in order to solve a problem related to the minerals and energy sector. The session is designed as an introductory session for students with little to no prior experience with Lego EV3 robotics.</p> <p>ACV 8.4 (ACTDIP041) ACV 9.0 (AC9TDI10P05, AC9TDI10P09)</p>
9	Sample Selector	45 – 60 minutes	<p>Students design skills will be tested when they engineer a device that can consistently remove unwanted objects.</p> <p>ACV 8.4 (ACTDEK043,ACTDEK046) ACV 9.0 (AC9TDE10K03, AC9TDE10K06)</p>
10	Tradies for a Day	Whole day	<p>This program includes numerous hands-on activities that directly relate to the different trades found in the resources sector. Students will have the opportunity to hear from and work alongside tradespeople from the minerals and energy sectors.</p> <p>Activities include</p> <ul style="list-style-type: none"> • Electrical circuits • Mechanical understanding • Aptitude tests • Pneumatics challenge • Welding (Simulation) <p>ACV 8.4 (ACTDEK043, ACTDEP050) ACV 9.0 (AC9TDE10P03, AC9TDE10K01)</p>
10	Stem Unearthed	Half or Whole day	<p>The Stem Unearthed workshop combines a variety of science and engineering experiences.</p> <p>Activities include</p> <ul style="list-style-type: none"> • Finding Ore • Engineering the perfect solution • Copper Extraction • Lithography • Pipeline Pressures • Reshaping the land
10	Finding Ore	70 -100 minutes	<p>Strategy and teamwork are the keys to success when completing this activity. From geological exploration to rehabilitation in a gamified context, teams compete to be the most financially viable and sustainable in their practice.</p> <p>ACV 8.4 (ACHGK07, ACHGK071, ACHEK054) ACV 9.0 (AC9S10H02, AC9HG10K01, AC9HG10K02, AC9HE10K05)</p>
10	Engineering the perfect solution	70 -100 minutes	<p>With all the elements of process engineering, students explore the ideas of input and output in their quest to design the ultimate, repeatable process.</p> <p>ACV 8.4 (AC9S10I02, AC9S10I03, AC9TDE10K06) ACV 9.0 (AC9S10I02, AC9S10I03, AC9TDE10K06)</p>
10	Copper extraction	70 -100 minutes	<p>Chemical and physical processing is a fundamental concept in turning ore into usable metals. Copper extraction is a laboratory set activity where students investigate and compare the yields of two different methods of extracting copper.</p> <p>ACV 8.4 (AC9S10I03) ACV 9.0 (AC9S10U07)</p>
10	Lithography	70 -100 minutes	<p>Students work together in teams to first understand how geologists explore beneath the Earth's surface. Students then then work in teams to model, map and pinpoint a hidden economic deposit.</p> <p>ACV 8.4 (AC9S10I02) ACV 9.0 (AC9S10I05,AC9M10M05)</p>
10	Pipelines pressures	Half day	<p>Aspects of gas exploration, extraction and transportation are investigated in this workshop. Students use technology and laboratory skills to understand concepts within the gas industry. Three experiments are included in this half day workshop.</p> <p>ACV 8.4 (AC9S10I03, AC9S10I05, AC9M10A03, AC9M10A04) ACV 9.0 (AC9S10I03, AC9S10I05, AC9M10A03, AC9M10A04)</p>



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10	Reshaping the land	70 -100 minutes	In this hands-on activity, students connect mathematics to environmental care while designing an optimal site rehabilitation . They calculate the slope and volume of topsoil needed for effective environmental rehabilitation. ACV 8.4 (ACMMG242, ACHGK070) ACV 9.0 (AC9M10M01, AC9HG10K01)
7 & 8	Powering our Future (Energy: The inside story)	Half or whole day	An in depth look at the origins of electricity which explores the National Energy Market (NEM) and energy costs through data analysis activity. Students then perform experiments using solar and wind energy to manufacture hydrogen. ACV 8.4 (ACSSU117, ACMNA173) ACV 9.0 (AC9S7U04, AC9M7N09)
7 & 8	Mining for Code	70 -100 minutes	An introductory session to Arduino coding, making use of Grove Starter Kit sensor packs. Students identify pseudocode and key coding language, as well exploring designs that incorporate the ideas of input and output to increase safety in common items. ACV 8.4 (ACTDIP029, ACTDIP027) ACV 9.0 (AC9TDI8P05, AC9TDI8P04)
7 & 8	Pit to Port	Half or whole day	This whole day workshop explores the way our resources are mined, transported and exported. Focusing on extraction methods, logistics and shipping, students learn about the use of automation, project managing and communication within the resource sector. ACV 8.4 (ACMNA152, ACMNA157, ACMNA280) ACV 9.0 (AC9S7U06, AC9S8U07)
7 & 8	Energy Transformations	70 -100 minutes	Explores the fundamentals of wind energy through unpacking wind turbine design to maximise energy generation in different scenarios. ACV 8.4 (ACSSU117, ACSSU155) ACV 9.0 (AC9S7U04, AC9S8U05)
7 & 8	Solar HyGeneration Car	70 -100 minutes	Transportation and energies of the future are discussed in this workshop, where students use solar cells to generate hydrogen and then fuel a small car. ACV 8.4 (ACSSU113, ACSSU152) ACV 9.0 (AC9S7U06, AC9S8U07)
9 & 10	Future Hy-Way	Whole day	Students explore the science of hydrogen generation and its use as a future fuel. Through hands on experiments students investigate hydrogen generation and use it to power a motor. The session culminates with students designing, building and racing a hydrogen vehicle. ACV 8.4 (ACSSU178, ACSSU187, ACSSU179) ACV 9.0 (AC9S9U07, AC9S9U05, AC9S10U07)
Various	Roaming Robots	70 -100 minutes	Autonomous robots use sensors continuously to check their position against other objects, or simply to stay on track. Students use EV3 robots with a colour sensor and path puzzle pieces to move the robot around objects and challenge their problem solving skills whilst trying to the move the robot from start to finish. ACV 8.4 (ACTDIP029, ACTDIP040, ACSSU182) ACV 9.0 (AC9TDI8P06, AC9TDI10P06, AC9S9U04)



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