SparkLab
SCIENCENTRE

AT QUEENSLAND MUSEUM

Australian Curriculum Links for Years 7 - 8

Term 3, 2021

SparkLab is a Sciencentre experience at Queensland Museum. Refer to the Exhibition Guide for an overview of the interactive exhibits and programs.

SparkLab exhibits and programs link to the Australian National Curriculum specifically in the learning areas of Science, Technologies and Mathematics, and support students to develop their general capabilities in Literacy, Numeracy, and Critical and Creative Thinking.

General capabilities relevant to SparkLab

Direct links	
Literacy	**Critical and Creative Thinking**
Comprehending texts through listening, reading and viewing.	Inquiring – identifying, exploring and organising information and ideas.
Text, word and visual knowledge.	Generating ideas, possibilities and actions.
Numeracy	Reflecting on thinking and processes.
Recognise and using patterns and relationships.	Analysing, synthesising and evaluating reasoning and procedures.
Using spatial reasoning.	
Using measurement.	

Science

	Knowledge and Understanding	Science as a Human Endeavour and Science Inquiry Skills	Sample of linked *SparkLab* exhibits and programs
Year 7	Physical sciences (ACSSU117) Change to an object's motion is caused by unbalanced forces acting on the object.	Questioning and predicting (ACSIS124) Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge. Planning and conducting (ACSIS126) In fair tests, measure and control variables. Processing and analysing information (ACSIS130) Summarise data and use scientific understandings to identify relationships and draw conclusions. Evaluating (ACSIS131) Reflect on the method used to investigate a question or solve a problem and identify improvements to the method. Communicating (ACSIS133) Communicate ideas, findings and solutions to problems using scientific language.	**Rotation station:** Students spin in a chair and *investigate* how moving their mass closer to the centre axis and changing their rotational inertia changes the speed of their rotation. **Flight test:** Students design a flying machine out of paper and test their design in the vertical wind tunnel. How does your machine move in the air flow? Make a change to the design to see the impact of that change. How does a change in wind speed affect how the machine moves in the air? **Air cannon:** Students lift a heavy bowling ball and let it fall from varying heights. The ball pushes the air in the large tube into a smaller tube, causing a light tennis ball to fly up high. Students *compare* how changing what happens to the bowling ball affects the movement of the smaller ball. **Gravity run:** Students use a series of pipes, curves, wheels, hanging bells and balls to explore forces, motion and energy transfer and transformation. Students work together to problem solve building a successful ball run or extending the challenge to create a run that fits to a set criteria. **Slow the fall:** Students drop discs made of varying materials and patterns between a track lined with magnets. Eddy currents within the discs generate a magnetic field. The interaction between the two magnetic fields will change how each disc falls. **Science Bar: Under pressure** Students *select* and observe how different substances behave and change in a vacuum chamber – where the air

			pressure is decreased and increased. They *consider* forces when observing changes. This program is facilitated by a Learning Officer. **Maker Space:** Use everyday materials to design and *create* a solution to the Maker Space challenge – ***Hanging in harmony.*** Design and construct a balanced mobile using a range of different materials and various shaped frames. How do forces affect the way hanging objects balance and move?
	Earth and space sciences (ACSSU116) Some of Earth's resources are renewable, but others are non-renewable.		**Energy from the sun/wind circuits:** Students connect circuits to solar cells and wind turbines and use these alternative sources of energy to generate electricity and make a light glow or disc spin. **Science on a Sphere:** Students can *select* a number of presentations on our 1.8m sphere, showing information collected from satellites or ground based instruments. Different presentations explore resources such as water in dams and reservoirs, and Drought risk – real time. Other presentations can lead to discussion around energy use, including Air traffic around the Earth and electricity produced Night-time lights. There are over 40 presentations (datasets) on the free-choice kiosk and a Learning Officer can access over 500 datasets via an iPad.
Year 8	Chemical sciences (ACSSU151) The properties of the different states of matter can be explained in terms of motion and arrangement of particles. Chemical sciences (ACSSU225) Chemical change involves substances reacting to form new substances.	Questioning and predicting (ACSIS139) Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge. Planning and conducting (ACSIS141) In fair tests, measure and control variables.	**Touch the lightning**: Students interact with a large plasma ball and *investigate* the intensity of the plasma filaments and where and why they are attracted to certain positions on the glass globe. **Air flow:** Students test two different vehicles in a wind tunnel (using mist trails) and experiment with varying the position of the vehicle and the wind

		Processing and analysing information (ACSIS145) Summarise data and use scientific understandings to identify relationships and draw conclusions. Evaluating (ACSIS146) Reflect on the method used to investigate a question or solve a problem and identify improvements to the method. Communicating (ACSIS148) Communicate ideas, findings and solutions to problems using scientific language.	speed. As well as thinking about effective design, they also explore turbulence and laminar flow. **Cloud rings:** Students apply a changing force onto a rubber membrane, which forces mist out of a circular hole. How does the property of a fluid relate to the shape the cloud takes as it rises to the ceiling? Can students change this shape or how this cloud moves? **Science Bar: Mix Master**: Students predict and observe what happens when a variety of household products are mixed together. What are the clues that that a chemical reaction has occurred? This program is facilitated by a Learning Officer, however the investigation is directed by the students. **Science Bar: Will it float?** Students predict and observe what happens when various objects are placed in different liquids. Students *consider* density and suggest changes to solutions to alter the density and change the outcome. This program is facilitated by a Learning Officer, however the investigation is directed by the students.
	Physical sciences (ACSSU155) Energy appears in different forms including kinetic energy, heat and potential energy, and causes change within systems.		**Circuits:** Students *create* circuits and explore the components of circuits along with electrical energy transforming into light energy (bulbs) or kinetic energy (hand dryer fans), and how light sensors can complete a circuit and trigger an alarm. Students also explore energy generated from solar cells and wind turbines **Gravity run:** Students use a series of pipes, curves, wheels, hanging bells and balls to explore forces, and energy transfer and transformation. Students work together to problem solve building a variety of successful ball runs. Students can *investigate* potential, kinetic and sound energy.

			Science Bar: Snap, crackle, watt? Students predict, *select* and observe which materials, when rubbed together, will generate static electricity. Students then *investigate* how static electricity can be used to make something move. This program is facilitated by a Learning Officer.
	Earth and space sciences (ACSSU153) Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales.		**Science on a Sphere:** Students can *select* a number of presentations on our 1.8m sphere, showing information collected from satellites or ground based instruments. Different presentations explore: Plate movement – 200 million years ago to today, Earthquakes – real time, Earthquakes and Eruptions 1960-2010, Age of Seafloor and more.

Technologies – Design and Technologies

	Knowledge and Understanding	**Design and Technologies Processes and Production Skills**	**Sample of linked *SparkLab* exhibits and programs**
Year 7 - 8	Analyse ways to produce designed solutions through selecting and combining characteristics and properties of materials, components and equipment. (ACTDEK034)*	Generate, develop, test and communicate design ideas, plans and processes for various audiences using appropriate technical terms. (ACTDEP036)* Independently develop criteria for success to evaluate design ideas. (ACTDEP038)	**Maker Space:** Use everyday materials to design and *create* a solution to the Maker Space challenge – ***Hanging in harmony.*** Design and construct a hanging mobile. Be inspired by real world examples like twirling mobiles, sculptures, homewares, and toys. Explore the properties of different materials as you *select* materials for your design. Choose different shaped frames and *decide* where you will hang the different components. *Consider* how the different components are connected and how changing one part, affects how your mobile balances or moves. Who will you make your mobile for and what might they want it to do? What improvements could you make to your initial design ideas to make your design more effective?

			Gravity run, Flight Test and Balance bridge: Students problem solve to design a solution to the challenges posed at each of these exhibits. Through design thinking, students construct, test and improve on their designs.

* Indirect link