SparkLab SCIENCENTRE

AT QUEENSLAND MUSEUM

Australian Curriculum Links for Years 3 - 4

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 3	Chemical sciences (ACSSU046) A change of state between solid and liquid can be caused by adding or removing heat.	Nature and development of science (ACSHE050) Science involves making predictions and describing patterns and relationships. Questioning and predicting (ACSIS053) Identify questions that can be investigated scientifically and predict what might happen based on prior knowledge. Planning and conducting (ACSIS054) Suggest ways to plan and conduct investigations to find answers to questions. Processing and analysing information (ACSIS215) Compare results with predictions, suggesting possible reasons for findings. Evaluating (ACSIS058) Reflect on the investigation, including whether a test was fair or not.	**Science Bar: Melting moments** Students lead the investigation by suggesting ways to change various solids into liquids. Students *decide* which solids to test, *describe* their observations and make predictions. This program is facilitated by a Learning Officer.
	Earth and space sciences (ACSSU048) Earth's rotation on its axis causes regular changes, including night and day.		**Science on a sphere:** Students can *select* a number of presentations on our dynamic 3D model of the Earth, including Earth's rotation and day night (Day/Night Terminator), night-time lights around the Earth and the cloud movements over the past several days (Clouds – Real time). There are over 40 presentations (datasets) on the free-choice kiosk and *a* Learning Officer can access over 500 datasets via an iPad. **Spinning Earth:** Students observe and *identify* day and night on a large rotating Earth and also observe and *explain* the orbit of the moon around the Earth.

			Spin up a storm: Students observe and *describe* patterns in a fluid filled sphere. What changes happen as they spin the sphere fast, slow or change direction? *Compare* this to weather patterns on Earth or giant storms on Jupiter.
	Physical sciences (ACSSU049) Heat can be produced in many ways and can move from one object to another.		**See the heat:** Students view their body or other objects through a special infrared (heat) camera. They can observe and *explain* how rubbing their hands together heats them up and how to transfer heat from their hands to other parts of their body. **Science Bar: Melting moments** Students lead the investigation as they explore how we can change a way that a solid melts. Students *identify* and *select* different ways to produce heat and different surfaces to explore energy transfer. Students pose questions, make observations and predictions, and *explain* their thinking. This program is facilitated by a Learning Officer.
Year 4	Chemical sciences (ACSSU074) Natural and processed materials have a range of physical properties that can influence their use.	Nature and development of science (ACSHE061) Science involves making predictions and describing patterns and relationships. Questioning and predicting (ACSIS064) Identify questions that can be investigated scientifically and predict what might happen based on prior knowledge. Planning and conducting (ACSIS065) Suggest ways to plan and conduct investigations to find answers to questions. Processing and analysing information (ACSIS216) Compare results with predictions, suggesting possible reasons for findings. Evaluating (ACSIS069) Reflect on the investigation, including whether a test was fair or not.	**Science Bar: Will it float?** Students *select* and observe how objects and liquids float or sink in different liquids. They consider the density of the objects and how we can change the density of a liquid and change how different objects float. This program is facilitated by a Learning Officer. **Science Bar: Snap, crackle, watt?** Students *select* different materials and observe how rubbing certain materials together can create static electricity. They *investigate* how they can use static electricity to make something move. This program is facilitated by a Learning Officer. **Science Bar: Going down hill** Students *select* materials for testing as they *investigate* how they can change how something moves down a ramp. This program is facilitated by a Learning Officer.

			Frozen shadows: Students explore leaving shadows behind on a phosphorescent coated wall. How do the properties of this material enable the wall to glow to create these shadows? **Circuits:** Student *create* simple circuits using wires and *recognise* how some materials are good conductors and allow electricity to flow. **Magnetic liquid:** Students turn handles to move two opposite magnets and *recognise* the effects this magnetic force has on Ferro fluid (magnetic liquid). How does the liquid flow, move and change shape and why?
	Earth and space sciences (ACSSU075) Earth's surface changes over time as a result of natural processes and human activity.*		**Science on a Sphere:** There are a number of information sets that students can project onto a 1.8m sphere including: Nighttime lights - lights around the Earth generated by electricity; Dams and reservoirs - showing the locations of where all dams have been built, Drought Risk, Japan - earthquake 2011 - showing the tsunami wave and where it reached around the Earth, Land surface temperature and more. There are over 40 presentations (datasets) on the free-choice kiosk and a Learning Officer can access over 500 datasets via an iPad.
	Physical sciences (ACSSU076) Forces can be exerted by one object on another through direct contact or from a distance.		**Magnetic pendulum:** Students swing a large pendulum which has a magnet in the bob. The pendulum swings over magnets in the base. As the magnetic fields interact with each other, the pendulum is repelled in an unexpected direction. Students can physically feel the magnetic repulsion if they hold onto the pendulum. **Air cannon:** Students use a rope to lift up a heavy bowling ball. As the ball falls, it pushes air within a large tube into a smaller tube. This forces a lighter

			tennis ball way up high. What effect does changing how high you lift the bowling ball have on how the tennis ball moves? **Lift a fridge:** Students *select* one of three ropes to pull down on, which are attached to a giant lever. They *investigate* which rope and which distance from the fulcrum requires the least effort and downward force to lift an 80kg fridge. A whole body way to explore a simple machine. **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.

Technologies – Design and Technologies

	Knowledge and Understanding	Design and Technologies Processes and Production Skills	Sample of linked *SparkLab* exhibits and programs
Year 3 - 4	Investigate how forces and the properties of materials affect the behaviour of a product or system. (ACTDEK011) Investigate the suitability of materials, systems, components, tools and equipment for a range of purposes. (ACTDEK013)	Critique needs or opportunities for designing and explore and test a variety of materials, components, tools and equipment and the techniques needed to produce designed solutions. (ACTDEP014)* Select and use materials, components and equipment and use safe work practices to make designed solutions. (ACTDEP016) Evaluate design ideas, processes and solutions. (ACTDEP017)	**Gravity run:** Students work together to make a long ball run out of tubes, wheels, corner pipes, swinging bells and balls. Problem solve to make a faster or longer gravity run. **Flight test:** Design and *create* a flying machine out of paper and test in the large vertical wind machine. Does it change if the air speed is faster or slower? Make a change to your design and see the impact of that change on how your machine moves. **Maker Space:** Use everyday materials to design and make a solution to the Maker Space challenge – ***Hanging in harmony.*** Design and *create* a hanging mobile. Be inspired by real world examples like twirling mobiles, homewares, and toys. Explore the properties of different materials as you *select* materials for your design. Where will you hang the different components on your frame? How does changing one part, affect 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?

Mathematics

	Number and Algebra	Measurement and Geometry	Sample of linked *SparkLab* exhibits and programs
Year 3	Fractions and decimals Model and represent unit fractions including 1/2, 1/4, 1/3, 1/5 and their multiples to a complete whole. (ACMNA058)*	Using units of measurement Measure, order and compare objects using familiar metric units of length, mass and capacity. (ACMMG061) Shape Make models of 3D objects and describe key. features (ACMMG063) Geometric reasoning Identify angles as measures of turn and compare angle sizes in everyday situations. (ACMMG064)	**Shape maker:** Students *recognise* familiar 2D shapes and combine them to make 3D objects. 3D shapes can be combined into larger objects and students can describe the shapes, width, length and depth of the object. **Air cannon:** Students use a rope to lift up a heavy bowling ball. As the ball falls, it pushes air within a large tube into a smaller tube, forcing a tennis ball up high. Lift the bowling ball half way or a quarter of the way up and see what happens to the lighter tennis ball when you let it fall. Measuring scales on the tubes help students make height comparisons.
Year 4	Fractions and decimals Investigate equivalent fractions used in contexts. (ACMNA077)*	Using units of measurement Compare objects using familiar metric units of area and volume. (ACMMG290)* Shape Compare the areas of regular and irregular shapes by informal means. (ACMMG087)* Compare and describe 2D shapes that result from combining and splitting common shapes. (ACMMG088)*	**Shape maker:** Students *recognise* familiar 2D shapes and combine them to make 3D objects. 3D shapes can be combined into larger objects and students can describe the shapes, width, length and depth of the object.

* Indirect link