LEARNING ENVIRONMENTS: a STEM-integrated Design Inquiry	
Australian Curriculum Learning Areas (ACARA, 2017) Science – Content descriptions - Electrical energy can be transferred and transformed in electrical circuits and can be generated from a range of sources (ACSSU097) (Related directly to use of Littlebits) - Identify, plan and apply the elements of scientific investigations to answer questions and solve problems using equipment and materials safely and identifying potential risks (ACSIS103) - Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data using digital technologies as appropriate (ACSIS107) - Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE083) Maths – Content Descriptions - Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147) - Interpret secondary data presented in digital media and elsewhere (ACMSP148) Digital Technologies – Content descriptions - Acquire, store and validate different types of data, and use a range of software to interpret and visualise data to create information (ACTDIP016) - Define problems in terms of data and functional requirements drawing on previously solved problems (ACTDIP017) - Explain how student solutions and existing information systems are sustainable and meet current and future local community needs (ACTDIP021) Design and Technologies – Content Descriptions - Investigate how electrical energy can control movement, sound or light in a designed product or system (ACTDEK020) (Related directly to use of Littlebits) - Critique needs or opportunities for designing, and investigate materials, components, tools, equipment and processes to achieve intended designed solutions (ACTDEP024) - Generate, develop and communicate design ideas and processes for audiences using appropriate technical terms and graphical representation techniques (ACTDEP025) - Select appropriate materials, components, tools, equipment and techniques and apply safe procedures to make designed solutions (ACTDEP026)	Australian Curriculum General Capabilities Critical and Creative Thinking - Inquiring – identifying, exploring and organising information and ideas - Generating ideas, possibilities and actions - Reflecting on thinking and processes - Analysing, synthesising and evaluating reasoning and procedures Information and Communication Technologies (ICT) - Investigating with ICT - Creating with ICT - Communicating with ICT - Managing and operating ICT Personal and Social Capability - Self-awareness - Social awareness - Social management Numeracy - Recognising and using patterns and relationships - Interpreting statistical information Literacy - Comprehending texts through listening, reading and viewing - Composing texts through speaking, writing and creating - Visual knowledge

<table>
<tr><th colspan="2">Understandings</th></tr>
<tr><td>Students will understand...
- Data can be used to make generalisations and help us gain greater understanding about a topic
- Data can be collected to help us make observations
- Data can be analysed to help solve problems
- Scientific method
- Design thinking process</td><td>Essential Questions:
- What are the needs and preferences of all learners in the classroom?
- Are our current learning environments conducive to learning?
- What would make our learning environment better?
- What digital solutions can we design to improve our learning environments?</td></tr>
<tr><td>Students will know...
- How to research (and evaluate sources)
- How to use data collection tools, such as iPad apps
- How to use Littlebits circuits and bits related to sound, temperature and light
- How to conduct quantitative and qualitative research through surveys and interviews
- How to use the Design Thinking process to design a digital solution</td><td>Students will be able to...
- Record their research findings
- Make their thinking visible through mind maps, etc.
- Use iPads (and other tools) to collect data about light and/or sound and/or temperature
- Collect data about preferences for learning environments using surveys
- Present their findings and use it to design a digital solution
- Share their prototype and their design process
- Evaluate their learning throughout the unit</td></tr>
<tr><th colspan="2">Assessment</th></tr>
<tr><td>Performance Tasks

Determining preferred learning environments
Maths – Create, administer, analyse and present survey findings

Investigating learning environments
Science – Write up of Scientific process of experiment (related to sound, light or temperature)

Scientific knowledge of circuits, light and sound
Science and Design and Technologies assessment – video explanation of how a circuit works (using Littlebits)

Improving learning environments
Technologies – Creation of working prototype of digital solution using Littlebits
- Record and Presentation of design process</td><td>Other evidence

Inquiry Journal (throughout)
- Research results and notes (with sources cited)
- Evaluation of ‘scientific’ sources worksheet
- Photos of visible thinking routines
- Annotated diagrams
- Sketches, notes
- Brainstorming, mind maps, etc.
- Reflections at each juncture
- Survey at each juncture about six facets of understanding
o e.g. Six facet rubric</td></tr>
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