**STEM**

**Unpacking the Content Descriptions**

**Levels 3–4**

**Unpacking the content descriptions – STEM**

**Levels 3 – 4**

**Integrating Design and Technologies and Mathematics (sTEM)**

**Focus: Integration of content related to the features of materials used in 2D and 3D objects.**

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| **Learning area** | **Design and Technologies** | **Learning area** | **Mathematics** |
| **Strand** | Technologies Contexts | **Strand** | Measurement and Geometry |
| **Sub-strand** | Engineering principles and systems | **Sub-strand** | Using units of measurement |
| **Content Description** | Investigate how forces and the properties of materials affect the behaviour of a designed solution [(VCDSTC024)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDSTC024) | **Content Description** | Compare objects using familiar metric units of area and volume [(VCMMG166)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG166) |
| **Related extract from Achievement Standard** | Students describe how the features of materials can be used to create designed solutions for each of the prescribed technologies contexts. | **Related extract from Achievement Standard** | Students use scaled instruments to measure length, angle, area, mass, capacity and temperature of shapes and objects. |
| **Suggested focus** | Learning may focus on:   * exploring the behaviour of materials under different forces * evaluating the suitability of materials for a designed product * testing the behaviour of designed solutions made from different materials * identifying and exploring the effects of forces on objects/buildings in the real world. | **Suggested focus** | Learning may focus on:   * measuring and comparing 2D objects * measuring and comparing 3D objects * exploring strategies for comparing area * comparing the volumes of objects * exploring how to use a range of tools for measuring different objects. |

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| **Sample activities** **(integrating both learning areas)** |
| * Comparing the volumes of different three-dimensional shapes before and after a force is applied to them, and then using the results to identify features/properties of different materials. * Designing and producing a container of a fixed size for a chosen liquid, using provided materials and taking into account the properties of those materials. * Investigating the effect a stretching force has on the area and properties of a sheet of given materials. * Using CAD (computer aided design) and 3D printing to design and create a 3D shape and test the behaviour of the prototype under push and pull forces. * Investigating how materials can be processed to change their size, shape, measurements, etc. |

**Unpacking the content descriptions – STEM**

**Levels 3 – 4**

**Integrating Design and Technologies and Digital Technologies (sTem)**

**Focus: Integration of content related to presenting information digitally about the suitability of materials and/or tools when designing for a purpose**

| **Learning area** | **Design and Technologies** | **Learning area** | **Digital Technologies** |
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| **Strand** | Creating Designed Solutions | **Strand** | Data and information |
| **Sub-strand** | Investigating |
| **Content Description** | Critique needs or opportunities for designing and explore and test a variety of materials, components, tools and equipment and the techniques needed to create designed solutions [(VCDSCD028)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDSCD028) | **Content Description** | Collect, access and present different types of data using simple software to create information and solve problems [(VCDTDI021)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI021) |
| **Related extract from Achievement Standard** | They explain needs or opportunities and evaluate ideas and designed solutions against identified criteria for success, including sustainability considerations | **Related extract from Achievement Standard** | They collect and manipulate different data when creating information and digital solutions |
| **Suggested focus** | Learning may focus on:   * production methods of everyday objects * testing characteristics and properties of materials * evaluating the suitability of materials for a proposed solution * environmental impacts of materials and solutions * suitability of tools for a given solution/task. | **Suggested focus** | Learning may focus on:   * formatting graphics to suit an audience * investigating methods for sorting data/information * identifying formats for presenting different types of data and information, such as lists, graphs and animations * exploring methods for finding relevant data in a spreadsheet or database. |

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| **Sample activities (integrating both learning areas)** |
| * Testing the properties of a range of possible materials for a designed solution, documenting progress via a PowerPoint presentation. * Researching the environmental impacts of 3D printing plastics, presenting findings in a multi-modal text. * Creating a list of criteria for success to evaluate a designed solution and using a digital document or spreadsheet to track record the results of the evaluation. * Designing a product for a given context, identifying and documenting environmental considerations in production and use. * Creating multimedia ‘pitch’ presentations for a designed product, including reference to sustainability constraints in their design process. * Conducting, collating and interpreting data from a survey of client preferences when designing and producing a designed solution. |