STEM UNIT PLAN

Rossi Boots

Students will have the ability to develop their own futuristic shoe that depends on creative thinking in a fictional and engaging system.

Mitchell Coles
Cody Needham
Josh Chenda
James Sapio
Rossi Boots Industry Connection

Rossi Boots is an Australian founded business that specialises in the manufacturing of various types of boots. This organisation works hard to deliver a long lasting and comfortable boot that can withstand harsh terrains and conditions without fail. Which fortunately for this Australian business has lived to those standards by their growth and success. Rossi Boots is a fantastic local business that continuously proves themselves amongst tough opposing organisations.

The visits to Rossi Boots allowed for meaningful insights into local South Australian businesses to which was focused around compatible footwear. Being successful in a very competitive business environment is a significant achievement. Focusing on developing a boot that is appealing and durable to their audience.

Brainstorming Ideas

Coming to a final idea was a lengthy process that somewhat hindered the ability to work effectively and efficiently. Ideas included; rebuilding a boot, developing a database for the Australia foot, point of purchase for Rossi Boots, growing shoe and the futuristic shoe. Negotiating with Myron (Rossi Boots Partnership Member) allowed the group to understand many different processes and areas of boot making that helped open possible ideas. Rossi Boots were fond of creating a database to help support their business. However, with in-depth discussion this would be quite difficult to adapt to a STEM teaching unit for the students. The time and resources needed for that area of focus would be immense, which led to redefining a new topic. Fortunately, through deep discussion and brainstorming a final idea that would be engaging, innovative, promote creativity, address STEM and be of relevance to students’ interests, is the idea of a ‘futuristic shoe’. The area of focus is to create a shoe that focuses on what may become the shoe of the future. Using different technologies to develop a working model. A piece that promotes creativity and fictional imagination.

The Futuristic Shoe

Having been at Rossi Boots and visiting different ideas that varied from trying to replicate a boot, create a point of purchase or a database. These ideas helped distinguish and navigate to our idea of creating a working model of a futuristic shoe. This idea will promote engagement through using digital technologies and advanced manufacturing. Students will be given the opportunity to design a shoe that would be suited in a futuristic/fictional situation that would suit market needs and expectations. Through the incorporation of Arduino and practical electronics circuits, students will be able to add diverse and unique systems that will appeal to their desired audience. Completing the shoe will need marketing techniques to advertise their product concisely and competitively. Through using digital applications their product can be advertised through a futuristic video format, promoting a unique and creative approach to the idea. Acknowledging special learning needs, the advanced students will have the opportunity to incorporate complex electronics to the shoe such as button operations and sounds. To also look at real world issues and how this can be linked in to help serve a need or purpose. Simplifying the task to suit their preferred learning styles is imperative to ensure all students have an equitable and equal opportunity.
The science component involved within the unit surrounds foot ergonomics and electronics components. The technology would include; the use of orthographic drawings, building of a working model shoe using cost effective resources and computer applications for designed elements. The engineering component; Arduino. The mathematics area; data gathering, measurement, shapes. We believe this unit of work will promote a STEM focused learning topic due to the diverse areas for learning. Which will also encourage student engagement and enjoyment through the technique of basing on the students’ interests.

Special Learning Needs/Classroom Support

It is important to incorporate the diversity within the classroom. We will not know the diversity of the class until we are physically there. However, knowing how students learn and their behaviours can significantly affect the progress and ability to learn successfully in the classroom environment. Working in small groups within a practical setting can promote misbehaviour that affects the class progression and success. Although, with appropriate teaching pedagogies and systems this can be managed. Being aware of gifted/talented students and those with special learning needs, must be accounted for when preparing for the unit. Ensuring all students are given an equal and equitable opportunity to complete the task to a high standard.

Unit Overview

<table>
<thead>
<tr>
<th>Week</th>
<th>Lesson</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1- Double</td>
<td>Shoe History</td>
</tr>
<tr>
<td></td>
<td>2- Single</td>
<td>Field Trip</td>
</tr>
<tr>
<td></td>
<td>3- Double</td>
<td>De-construct Shoe</td>
</tr>
<tr>
<td>2</td>
<td>1- Double</td>
<td>Ergonomics of foot sizes</td>
</tr>
<tr>
<td></td>
<td>2- Single</td>
<td>Types of footwear</td>
</tr>
<tr>
<td></td>
<td>3- Double</td>
<td>Materials</td>
</tr>
<tr>
<td>3</td>
<td>1- Double</td>
<td>Research footwear designs/reasons</td>
</tr>
<tr>
<td></td>
<td>2- Single</td>
<td>ideation sketches based on group ideas</td>
</tr>
<tr>
<td></td>
<td>3- Double</td>
<td>Draw orthogonal sketches</td>
</tr>
<tr>
<td>4</td>
<td>1- Double</td>
<td>Construction of Shoe</td>
</tr>
<tr>
<td></td>
<td>2- Single</td>
<td>TinkerCAD/Arduino Introduction</td>
</tr>
<tr>
<td></td>
<td>3- Double</td>
<td>Continue.</td>
</tr>
<tr>
<td>5</td>
<td>1- Double</td>
<td>Continue.</td>
</tr>
<tr>
<td></td>
<td>2- Single</td>
<td>Illustrator introduction</td>
</tr>
<tr>
<td></td>
<td>3- Double</td>
<td>Logo finalise designed shoe</td>
</tr>
<tr>
<td>6</td>
<td>1- Double</td>
<td>Marketing, Budgeting</td>
</tr>
<tr>
<td></td>
<td>2- Single</td>
<td>Introduction to Advertisement- iMovie/Windows Movie Maker</td>
</tr>
<tr>
<td></td>
<td>3- Double</td>
<td>Video Making</td>
</tr>
<tr>
<td>7</td>
<td>1- Double</td>
<td>Continue.</td>
</tr>
<tr>
<td></td>
<td>2- Single</td>
<td>Finalise Video</td>
</tr>
<tr>
<td></td>
<td>3- Double</td>
<td>Present Advertising Video</td>
</tr>
</tbody>
</table>
### Design and Technologies: Year 10

<table>
<thead>
<tr>
<th>Content Descriptors:</th>
<th>Evidences In the Unit Plan:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design and Technologies Knowledge and Understanding</strong></td>
<td></td>
</tr>
<tr>
<td>- Critically analyze factors, including social, ethical and sustainability considerations, that impact on designed solutions for global preferred futures and the complex design and production processes involved (ACTDEK040)</td>
<td>Students will analyse how a shoe is manufactured, and ethical and sustainable considerations will be made in relation to sourcing materials and labour for the shoe production.</td>
</tr>
<tr>
<td>- Investigate and make judgments on how the characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions (ACTDEK046)</td>
<td>Shoe materials, components and system e.g the sole, heal, tongue will be identified and analysed in order to find design solutions and improvements.</td>
</tr>
<tr>
<td>- Investigate and make judgments on how the characteristics and properties of materials are combined with force, motion and energy to create engineered solutions (ACTDEK043)</td>
<td>The ergonomics of shoes will be discussed and investigated with the purpose of finding the most comfortable and efficient product.</td>
</tr>
<tr>
<td><strong>Design and Technologies Processes and Production Skills</strong></td>
<td></td>
</tr>
<tr>
<td>- Develop, modify and communicate design ideas by applying design thinking, creativity, innovation and enterprise skills of increasing sophistication (ACTDEP049)</td>
<td>Students will produce a shoe designed for the future, meeting futuristic needs. They will then need to advertise their idea to a prospective audience through enterprise techniques.</td>
</tr>
<tr>
<td>- Evaluate design ideas, processes and solutions against comprehensive criteria for success recognizing the need for sustainability (ACTDEP051)</td>
<td>The students design process will be reflective and ever changing in order that their shoe design meets specific sustainability criteria (of which stated in the marking rubric).</td>
</tr>
<tr>
<td>- Develop project plans using digital technologies to plan and manage projects individually and collaboratively taking into</td>
<td>Groups of students will need to produce a digital movie trailer with the purpose of selling their product and their concept for a futuristic context. They will also include Arduino technology in the shoe design.</td>
</tr>
</tbody>
</table>
consideration time, cost, risk and production processes (ACTDEP052)

**Digital Technologies Process and Production Skills**

- Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs (ACTDIP038)

- Design the user experience of a digital system by evaluating alternative designs against criteria including functionality, accessibility, usability, and aesthetics (ACTDIP039)

- Investigate the role of hardware and software in managing, controlling and securing the movement of and access to data in networked digital systems (ACTDIK034 - Scootle)

Research into realistic futuristic design demands will be made through digital resources and through interviewing real world industries (Rossi Boots).

The student’s videos of their shoes will be assessed against specific criteria including aesthetics and also practical application.

The use of Arduino and coding systems to apply electronic components. Understanding electrical components that can be manipulated to suit their needs.

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**Science: Year 10**

<table>
<thead>
<tr>
<th>Content Descriptors:</th>
<th>Evidences In the Unit Plan:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Science Understanding</strong></td>
<td></td>
</tr>
<tr>
<td>- Different types of chemical reactions are used to produce a range of products and can occur at different rates (ACSSU187)</td>
<td>Students will learn how particular chemicals are used in order to make materials for shoe production.</td>
</tr>
<tr>
<td><strong>Science as a Human Endeavour</strong></td>
<td></td>
</tr>
<tr>
<td>- Advances in scientific understanding often rely on technological advances and are often linked to scientific discoveries (ACSHE192)</td>
<td>Investigations into scientific theory of which informs future trends and shoe technology evolutions will be undertaken.</td>
</tr>
<tr>
<td><strong>Science inquiry Skills</strong></td>
<td></td>
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</tbody>
</table>
Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately \((\text{ACSIS200})\)

- Analyse patterns and trends in data, including describing relationships between variables and identifying inconsistencies \((\text{ACSIS203})\)

Computers will be involved in the data collection and analysis related to student’s foot characteristics. Also digit technologies (e.g. Arduino) is involved in enhancing the student’s products.

Students will undergo a statistical analysis of a small set of data, and will be finding data relationships such as: spread, mean, and median.

Mathematics: Year 10

<table>
<thead>
<tr>
<th>Content Descriptors:</th>
<th>Evidences In the Unit Plan:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Statistics And Probability</strong></td>
<td></td>
</tr>
<tr>
<td>- Construct and interpret box plots and use them to compare data sets ((\text{ACMSP249}))</td>
<td>Box plots will be contracted using computer technologies in order to display foot data in a way that can be easily analysed and understood.</td>
</tr>
<tr>
<td>- Evaluate statistical reports in the media and other places by linking claims to displays, statistics and representative data ((\text{ACMSP253}))</td>
<td>This content descriptor is relevant to the foot data collection process and the display of this information through the video at the end of the unit and box plot.</td>
</tr>
<tr>
<td>- Investigate and describe bivariate numerical data where the independent variable is time ((\text{ACMSP252}))</td>
<td>Students will have to display multiple set of data as they report their findings from their foot dimensions’ study.</td>
</tr>
<tr>
<td><strong>Measurement And Geometry</strong></td>
<td></td>
</tr>
<tr>
<td>- Solve problems involving surface area and volume for a range of prisms, cylinders and composite solids ((\text{ACMMG242}))</td>
<td>Students will be required to find the area of an irregular shape (a foot print).</td>
</tr>
</tbody>
</table>
**Design you’re own future shoe – Student Handout**

**STEM Task**

The task is to work in groups of 3-4 to collaborate and design a shoe/boot/sandal that meets the future needs and market. What would you like to have when buying this shoe? Through researching ideas, drawing and prototyping shoe designs, a final product will need to be developed that is appealing to your specific audience. From here the product will need to be advertised through a creative video format to explain to viewers why your shoe is best suited for them. This can be done through either Windows Movie Maker or iMovie on apple computer.

Be creative! Does it have to be a basic shoe?

**What will you be graded on?**
- The development of your shoe/boot/sandal through ideation and researched ideas.
- The production video displaying your group members’ product.
- Ability to work collaboratively within a STEM setting.
- Use of Arduino Coding

**Deliverables**

**Group Folio including:**
- Prototyping, ideation sketches and researched ideas
- A final working model product idea that suits future needs
- Video advertising the product
- Presentation
- Evaluation
<table>
<thead>
<tr>
<th>Marking Rubric</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yr 10</td>
<td>Shows a high level of understanding across all aspects of project.</td>
<td>Capable skills across most aspects to produce a final product.</td>
<td>Students produce a final product with competent skills.</td>
<td>Students partially demonstrate an understanding.</td>
<td>Insufficient effort and care to build skills and understanding.</td>
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<tr>
<td>Evidence of the Design Process</td>
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<tr>
<td>Investigate, Generate, Produce, Evaluate, Re-design.</td>
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<tr>
<td>Video presentation</td>
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<tr>
<td>Creative and engaging presentation highlighting the process and product.</td>
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<tr>
<td>Team work &amp; Collaboration</td>
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<tr>
<td>How well did the team work together and share the work load and contribute to final product.</td>
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<tr>
<td>Arduino Coding</td>
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<tr>
<td>Ability to devise basic Arduino coding with effective circuitry.</td>
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<tr>
<td><strong>Student Evaluation</strong></td>
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<tr>
<td>Self-evaluation which critically analysis the ideology and creativity of the final product. Look at problems encountered and way to improve.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Final Product</strong></th>
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</thead>
<tbody>
<tr>
<td>Aesthetics, STEM components, creativity and innovation.</td>
</tr>
<tr>
<td><strong>Unit Aim or Outcome: Content Description</strong></td>
</tr>
<tr>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Students develop and produce a shoe/boot/sandal idea that will suit the future needs of the market and audience through prototyping, ideation sketches and practical creation.</td>
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</table>

<table>
<thead>
<tr>
<th><strong>Lesson Outcome:</strong> <em>(what do I want the students to be able to do, know or think at the end of this lesson?)</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain how products, services and environments evolve with consideration of preferred futures and the impact of emerging technologies on design decisions <em>(ACTDEK041)</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Resources:</strong> <em>(List what you will need to have on hand for your lesson and organisational matters)</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>- unit plan outline</td>
</tr>
<tr>
<td>- computers</td>
</tr>
<tr>
<td>- wide screen projector</td>
</tr>
<tr>
<td>- Shoe History worksheet</td>
</tr>
<tr>
<td>- work books</td>
</tr>
<tr>
<td>- youtube videos</td>
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</tbody>
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<table>
<thead>
<tr>
<th><strong>Lesson Outline</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction:</strong></td>
</tr>
<tr>
<td>- Introduce the unit plan and what will be involved (get students interested and thinking)</td>
</tr>
<tr>
<td>- Start the lesson by getting the students to observe to two videos on the evolution of shoes and their history <a href="https://visual.ly/community/infographic/lifestyle/history-shoes-0">https://visual.ly/community/infographic/lifestyle/history-shoes-0</a> <a href="https://www.youtube.com/watch?v=VoLa5WL85mY">https://www.youtube.com/watch?v=VoLa5WL85mY</a></td>
</tr>
<tr>
<td><strong>Students will</strong></td>
</tr>
<tr>
<td>------------------</td>
</tr>
</tbody>
</table>
| - be able to list several marketing strategies of shoe companies.  
- to gain a broad understanding of the history and development of shoes.  
- to gain a basic knowledge of the history of Rossie boots.  
- to be able to apply this understanding to inspire futuristic ideations. | - Convey information in a clear and understandable way  
- answer questions students have  
- ask leading question to get students thinking about evolutionary ideas |

**Concluding strategy:**  
- Students will then move onto a partner research worksheet.  
- Once completed they will then do a short search of the Rossie boots website and gather 5 interesting facts about Rossie boots.  
- Students will start to brainstorm (in a class discussion) some ideas of what shoes will look like in 2070, note down some ideas in work book.  
- Get students to do a quick search on some futuristic shoes ideas out there, but then get them to note 3 “problems’ with our existing shoes that could potentially be addressed with a futuristic shoe.  
- Get students to pack up finish discussions, hand up work books for assessment.

**Assessment:** *(What will be the assessment task, tightly relating it to your lesson outcome. the criteria, and how will you record student progress?)*

Students will be assessed on their listening and comprehension skills by completing the “History shoe fact Sheet”

**Any special considerations or contingency plans:**  
*(Consider students with special needs or the particular needs of your class or school)*

Ensure that your presentation of information is done in a multi model fashion  
Students can complete the worksheet in pairs if required but teacher is to approve the paring.
### Week 1: Lesson 2

<table>
<thead>
<tr>
<th>Subject: STEM</th>
<th>Context: background research and Knowledge</th>
<th>Yr Level: 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Number: 2</td>
<td>Lesson Topic: Rossie Field Trip</td>
<td>Duration: 90 mins</td>
</tr>
</tbody>
</table>

**Unit Aim or Outcome: Content Description**
Students develop and produce a shoe/boot/sandal idea that will suit the future needs of the market and audience through prototyping, ideation sketches and practical creation.

**Lesson Outcome:** *(what do I want the students to be able to do, know or think at the end of this lesson?)*
Investigate and make judgments on how the characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions *(ACTDEK046)*

**Resources:** *(List what you will need to have on hand for your lesson and organisational matters)*
- School Bus
- Work Books
- School Camera

**Lesson Outline**
**Introduction:**
- Introduce the run of the day, get students organised for the trip.
- Drive to Rossie boots
- Get a tour of the production floor (take photos)
- Students are to make notes: things that stood out, questions, and inspiring ideas
- Have time to look at final products
- Time to ask the expert questions

**Teaching strategy/Learning Activity:**

**Students will...**
- Gain the ability to describe steps involved in the manufacturing processes of a boot
- List components that makes up a boot
- Gain an understanding of what it takes to produce and market a boot at an industry level.

**Teacher will...**
- Facilitate good questioning and investigation
- Give learning prompts throughout tour
- Have an understanding of Rossie boots and their production so that in can guide your prompting.

**Concluding strategy:**
- Drive back to school
- Have a discussion of what the students learnt, found interesting, and something that sparked their imagination.
**Assessment:** *(What will be the assessment task, tightly relating it to your lesson outcome. the criteria, and how you will you record student progress?)*  
Students will be assessed on their ability to reflect upon learning, and to produce questions based on their experience. With this being noted in their work books.

**Any special considerations or contingency plans:**  
*(Consider students with special needs or the particular needs of your class or school)*  
Ensure that students that have a physical disability are able to be included in the tour. Ask a few parents to come along to help guide the students in a safe fashion around the production floor.
### Week 1: Lesson 3

<table>
<thead>
<tr>
<th>Subject: STEM</th>
<th>Context: background research and Knowledge</th>
<th>Yr Level: 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Number: 3</td>
<td>Lesson Topic: De-construction of Shoes</td>
<td>Duration: 90 mins</td>
</tr>
</tbody>
</table>

#### Unit Aim or Outcome: Content Description
Students develop and produce a shoe/boot/sandal idea that will suit the future needs of the market and audience through prototyping, ideation sketches and practical creation.

#### Lesson Outcome: *(what do I want the students to be able to do, know or think at the end of this lesson?)*
Investigate and make judgments on how the characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions *(ACTDEK046)*

#### Resources: *(List what you will need to have on hand for your lesson and organisational matters)*
- Old shoes
- Band saw
- Texters
- Paper pencil
- Scissors
- Stanley knife
- Cutting boards

#### Lesson Outline
**Introduction:**
- Introduce the lesson
- Have a shoe and talk about its components (visual run down; sole, tung, etc)
- Cut shoe and pass it around for students to analyse
- Students will hand teacher their old shoe to be cut up
- Then the students can start drawing their shoe cross section and labelling the components
- The students can then deconstruct the shoe entirely

#### Teaching strategy/Learning Activity:
**Students will...**
- Understand in detail the components of a shoe
- List correct terminology of sections of a shoe
- Look at the cross-section concept and why it is informative
- Articulate engineering concepts involved in shoe construction

**Teacher will...**
- Give space for students to experience self discovery.
- Provide a safe environment for students to work in
- Give constant educational prompts so that students learn knowledge from their practical experience.
**Concluding strategy:**
- Pack workshop up and collect up all the pieces of shoe
- Have a discussion about recycling and waste disposal (sustainability)
- Also discuss ethically produced shoes

**Assessment:** *(What will be the assessment task, tightly relating it to your lesson outcome. the criteria, and how you will you record student progress?)*
Students will be assessed on their labeled drawings of their cross section shoe, and their on task participation.

**Any special considerations or contingency plans:**
Make sure that the scissors are being used in a safe way, and there are no materials and fibers that will cause injury to the students.
Provide an extension task for the advanced students by challenging them to draw a perspective three D drawing of their cross sectioned shoe.
Unit Aim or Outcome: Content Description
Students develop and produce a shoe/boot/sandal idea that will suit the future needs of the market and audience through prototyping, ideation sketches and practical creation.

Lesson Outcome: (what do I want the students to be able to do, know or think at the end of this lesson?)
Investigate and make judgments on how the characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions (ACTDEK046)
Different types of chemical reactions are used to produce a range of products and can occur at different rates (ACSSU187-
Critically analyse factors, including social, ethical and sustainability considerations, that impact on designed solutions for global preferred futures and the complex design and production processes involved (ACTDEK040)

Resources: (List what you will need to have on hand for your lesson and organisational matters)
- Workbooks (comprehension questions)
- deconstructed shoe
- whiteboard
- Leather video

Lesson Outline
Introduction:
- Introduce the lesson by initiating a closer analysis of the student’s deconstructed shoe. (list the materials used in the shoes on the white board)
- Show the students the video on how leather is made: https://www.youtube.com/watch?v=9vbTceYwFg
- Discuss the main materials of shoes: rubber, leather, fabric canvas, synthetics, and foam.
- Then discuss sustainability and sourcing materials (e.g. the fact that rossie imports from Indonesia, India, and NZ)
- Answer a series of question in their workbook around materials

Teaching strategy/Learning Activity:
Students will...
- List several types of materials included in the construction of shoes.
- Explain why specific materials are used in specific types of shoes.
- Describe how leather is made and sourced and the impact of the leather industry.
- Begin to discuss in a group about the links between the use of material and sustainability.

Teacher will...
- Ensure that students understand how sustainability concepts affect them
- Provide time and the space for questions
- Have physical teaching aids to promote learning
**Concluding strategy:**
- Collect work books and
  - pack class up

**Assessment:** *(What will be the assessment task, tightly relating it to your lesson outcome. the criteria, and how you will you record student progress?)*
Students will be assessed on their comprehension question about how leather is made, completed in their work books.

**Any special considerations or contingency plans:**
Make sure that there are subtitles on the YouTube videos
Ensure that the teacher is sensitive to people against the leather and beef industry.
### Week 2: Lesson 5

<table>
<thead>
<tr>
<th>Subject: STEM</th>
<th>Context: Deeper Analysis into Shoe and Foot ergonomics</th>
<th>Yr Level: 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Number: 5</td>
<td>Lesson Topic: Foot Analysis and Data</td>
<td>Duration: 90 mins</td>
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</tbody>
</table>

**Unit Aim or Outcome: Content Description**  
Students develop and produce a shoe/boot/sandal idea that will suit the future needs of the market and audience through prototyping, ideation sketches and practical creation.

**Lesson Outcome:** *(what do I want the students to be able to do, know or think at the end of this lesson?)*
- Solve problems involving surface area and volume for a range of prisms, cylinders and composite solids *(ACMMG242)*
- Construct and interpret box plots and use them to compare data sets *(ACMSP249)*
- Investigate and make judgments, within a range of technologies specialisations, on how technologies can be combined to create designed solutions *(ACTDEK047)*

**Resources:** *(List what you will need to have on hand for your lesson and organisational matters)*  
- Paper town  
- Buckets  
- Water  
- Orthopedic shoes  
- Paper  
- Pencil  
- Workbook  
- Ruler  
- Calculator

**Lesson Outline**
**Introduction:**
- Introduce the lesson and define ergonomics: “the study of people's efficiency in their working environment.”
- Get students to see what type of foot they have by doing a “wet test”: flat foot, normal, high arched
- Show shoes that help with these types of feet.
- Students will then perform a small study. Everyone will find: they type of their foot, their foot length, the foot width, and their foot area.

**Teaching strategy/Learning Activity:**
<table>
<thead>
<tr>
<th><strong>Students will...</strong></th>
<th><strong>Teacher will...</strong></th>
</tr>
</thead>
</table>
| - Analyze and interpret data.  
- find area of an irregular shape.  
- show an understanding of their foot type and foot health.  
- make connections between foot size, type and shape and the design and manufacture. | - Ensure that all the students collect some kind of data.  
- Make connections with foot health and general well-being.  
- explain terminology |

**Concluding strategy:**  
- Pack all work books and note the data collated  
- debrief the data collation process and lead into next week which is plotting the data and analyzing it.

**Assessment:** *(What will be the assessment task, tightly relating it to your lesson outcome. the criteria, and how will you record student progress?)*  
Students will be assessed on their ability to collect data efficiently and accurately in their work books.

**Any special considerations or contingency plans:**  
Ensure that there is no judgment of other people’s feet, and that team work is utilized.  
See if students with orthotics can share about their experiences.
### Unit Aim or Outcome: Content Description
Students develop and produce a shoe/boot/sandal idea that will suit the future needs of the market and audience through prototyping, ideation sketches and practical creation.

**Lesson Outcome:** *(what do I want the students to be able to do, know or think at the end of this lesson?)*
- Solve problems involving surface area and volume for a range of prisms, cylinders and composite solids *(ACMMG242)*
- Construct and interpret box plots and use them to compare data sets *(ACMSP249)*
- Investigate and make judgments, within a range of technologies specialisations, on how technologies can be combined to create designed solutions *(ACTDEK047)*

### Resources: *(List what you will need to have on hand for your lesson and organisational matters)*
- Paper town
- Buckets
- Water
- Orthopedic shoes
- Paper
- Pencil
- Workbook
- Ruler
- Calculator

### Lesson Outline
**Introduction:**
- Continue on from last lessons data collection
- Then once the data has been collated it will be analysed to find the averages, spread, and mean.
- The class will then discuss how this can inform shoe manufacturing

### Teaching strategy/Learning Activity:
**Students will...**
- Analyze and interpret data.
- Find area of an irregular shape.
- Show an understanding of their foot type and foot health.
- Make connections between foot size, type and shape and the design and manufacture.

**Teacher will...**
- Ensure that all the students collect some kind of data.
- Make connections with foot health and general well-being.
- Explain terminology
**Concluding strategy:**
- Pack all work books and note the data collated
- Class will have a discussion about handmade tailored shoes and their purpose.

**Assessment:** *(What will be the assessment task, tightly relating it to your lesson outcome. the criteria, and how you will record student progress?)*
Students will be assessed on their ability to collect data efficiently and accurately in their work books. Also students will be assessed on their ability to plot a box graph and understand the data correlations.

**Any special considerations or contingency plans:**
Ensure that there is no judgment of other people’s feet, and that team work is utilized. See if students with orthotics can share about their experiences. Pair students up if specific students struggle with numeracy.
### Lesson Plan Proforma - Week 3

<table>
<thead>
<tr>
<th>Subject: STEM</th>
<th>Context: Researched Ideas</th>
<th>Yr Level: 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Number: 9</td>
<td>Lesson Topic: Drawing applications</td>
<td>Duration: 120mins</td>
</tr>
</tbody>
</table>

**Unit Aim or Outcome: Content Description**

Students develop and produce a shoe/boot/sandal idea that will suit the future needs of the market and audience through prototyping, ideation sketches and practical creation.

**Lesson Outcome:** *(what do I want the students to be able to do, know or think at the end of this lesson?)*

How to illustrate their interests and designs on paper accurately. Drawings that represent their designs authentically. Students use researching skills to identify possible ideas that are achievable within time constraints.

- Develop, modify and communicate design ideas by applying design thinking, creativity, innovation and enterprise skills of increasing sophistication *(ACTDEP049)*
- Develop project plans using digital technologies to plan and manage projects individually and collaboratively taking into consideration time, cost, risk and production processes *(ACTDEP052)*
- Investigate and make judgments on how the characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions *(ACTDEK046)*
- Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs *(ACTDIP038)*

**Resources:** *(List what you will need to have on hand for your lesson and organisational matters)*

- Paper/math millimeter square paper
- Pencils
- Erasers
- Steel rules

**Lesson Outline**
**Introduction:**
*How best to motivate and explain the importance of this lesson? This should be for about 5 minutes with links to prior learning or experiences.*

Introduce and teach students correct methods in developing ideation sketches and scaled drawings.

Ensure that students understand the constraints of the task. Allow students to look at the possibility of Arduino electronics (lights, buzzers, heat sensors)

Allow students to be creative but sensible. Engage students through the use of ICT by researching existing ideas.

Keeping any instructional explanations concise and clear.

**Teaching strategy/Learning Activity:**
*Ask yourself ‘What will support the students to learn the concepts I’m trying to teach and to reach the outcomes I’m aiming for? What will students be doing? What will I as teacher be doing?’*

<table>
<thead>
<tr>
<th>Students will ......</th>
<th>Teacher will...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will look at researched ideas that will help them design their own ideas.</td>
<td>Allow students to be creative and explore different ideas to help determine a futuristic shoe design idea.</td>
</tr>
<tr>
<td>Students can work in small groups to help collaborate different ideas and interests.</td>
<td>Allow students to work collectively to help brainstorm interesting ideas that all resonate within the group. Suggest different ideas.</td>
</tr>
</tbody>
</table>

**Concluding strategy:**
*Ask yourself, ‘How can I capture the main learning points of the lesson?’*

Ensure that the main points of drawing their design is understood by all students. Collect drawings from students. Make sure everyone is at least completed two ideation sketches.

**Assessment:** *(What will be the assessment task, tightly relating it to your lesson outcome. the criteria, and how you will you record student progress?)*

Student progress will be recorded with their drawings. Ensure all students have completed the expect two ideation sketches.
Any special considerations or contingency plans:
(Consider students with special needs or the particular needs of your class or school)

Students who are not completing drawings will need to look at possible materials and uses for the shoe. Students can use ICT programs to help display designed solutions.

Students will need to complete folio tasks if drawings are done.
### Lesson Plan Proforma - Week 3

<table>
<thead>
<tr>
<th>Subject: STEM</th>
<th>Context: Ideation sketches</th>
<th>Yr Level: 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Number: 10</td>
<td>Lesson Topic: Drawing applications</td>
<td>Duration: 45mins</td>
</tr>
</tbody>
</table>

**Unit Aim or Outcome: Content Description**

Students develop and produce a shoe/boot/sandal idea that will suit the future needs of the market and audience through prototyping, ideation sketches and practical creation.

**Lesson Outcome: (what do I want the students to be able to do, know or think at the end of this lesson?)**

How to illustrate their interests and designs on paper accurately. Drawings that represent their designs authentically.

Designs are annotated and group will negotiate their design.

- Develop, modify and communicate design ideas by applying design thinking, creativity, innovation and enterprise skills of increasing sophistication *(ACTDEP049)*
- Develop project plans using digital technologies to plan and manage projects individually and collaboratively taking into consideration time, cost, risk and production processes *(ACTDEP052)*
- Investigate and make judgments on how the characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions *(ACTDEK046)*

**Resources: (List what you will need to have on hand for your lesson and organisational matters)**

- Previous non related examples
- Paper/math millimeter square paper
- Pencils
- Erasers
- Steel rules

**Lesson Outline**

**Introduction:**

*How best to motivate and explain the importance of this lesson? This should be for about 5 minutes with links to prior learning or experiences.*

Remind students of what they are working on. Ask for any information that needs clarifying.
<table>
<thead>
<tr>
<th><strong>Teaching strategy/Learning Activity:</strong></th>
<th></th>
</tr>
</thead>
</table>
| *Ask yourself ‘What will support the students to learn the concepts I’m trying to teach and to
reach the outcomes I’m aiming for? What will students be doing? What will I as teacher be
doing?’* |  |
| **Students will ......** | **Teacher will...** |
| Students will continue working on their annotated sketches. | Continue helping each student with defining drawings and demonstrating correct isometric standards. |
| Hopefully complete their designs on paper and are ready to design on CAD. | Ensure students are finishing off drawn sketches. Needs to be done before next lesson. |

<table>
<thead>
<tr>
<th><strong>Concluding strategy:</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Ask yourself, ‘How can I capture the main learning points of the lesson?’</em></td>
<td></td>
</tr>
<tr>
<td>Ensure that the main points of drawing their design is understood by all students. Collect drawings from all students.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Assessment:</strong></th>
<th><em>(What will be the assessment task, tightly relating it to your lesson outcome. the criteria, and how you will you record student progress?)</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Student progress will be recorded with their drawings and if not done, this must be done prior to next lesson. Ensure the drawings are of good standard and illustrate their different methods/ideas/strategies in completing the project.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Any special considerations or contingency plans:</strong></th>
<th><em>(Consider students with special needs or the particular needs of your class or school)</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Students who are not completing drawings will need to look at possible materials and uses for the shoe. Students can use ICT programs to help display designed solutions.</td>
<td></td>
</tr>
<tr>
<td>Students will need to complete folio tasks if drawings are done.</td>
<td></td>
</tr>
</tbody>
</table>
Lesson Plan Proforma - Week 3

<table>
<thead>
<tr>
<th>Subject: STEM</th>
<th>Context: Orthographic Views</th>
<th>Yr Level: 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Number: 11</td>
<td>Lesson Topic: Drawing applications</td>
<td>Duration: 120mins</td>
</tr>
</tbody>
</table>

**Unit Aim or Outcome: Content Description**

Students develop and produce a shoe/boot/sandal idea that will suit the future needs of the market and audience through prototyping, ideation sketches and practical creation.

**Lesson Outcome:** *(what do I want the students to be able to do, know or think at the end of this lesson?)*

Students utilise ideation sketches to develop a front, side and top view of their designed piece of footwear. The drawing should be scaled (1:3) to help for production reasons. Dimensions and annotations of where specific details will be displayed.

- Develop, modify and communicate design ideas by applying design thinking, creativity, innovation and enterprise skills of increasing sophistication *(ACTDEP049)*
- Develop project plans using digital technologies to plan and manage projects individually and collaboratively taking into consideration time, cost, risk and production processes *(ACTDEP052)*
- Investigate and make judgments on how the characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions *(ACTDEK046)*

**Resources:** *(List what you will need to have on hand for your lesson and organisational matters)*

- Previous non-related examples
- Paper/math millimeter square paper
- Pencils
- Erasers
- Steel rules
- Orthographic drawings
- Cork Board
- Stanley Knife
- Steel Rule
- Masking Tape
- Plastic wrap
- Car Tyre
- Pen/Texta

**Lesson Outline**
**Introduction:**
*How best to motivate and explain the importance of this lesson? This should be for about 5 minutes with links to prior learning or experiences.*

Remind students of what they are working on. Ask for any information that needs clarifying.

Allow time to give students materials at the end of lesson. This will allow them to start production the next lesson.

**Teaching strategy/Learning Activity:**
*Ask yourself ‘What will support the students to learn the concepts I’m trying to teach and to reach the outcomes I’m aiming for? What will students be doing? What will I as teacher be doing?’*

**Students will ......**

- Students will begin working on orthographic view drawings.
- This will be enough time for all groups to finish and begin looking at production of shoe.

**Teacher will...**

- Continue helping each student with defining drawings and demonstrating correct orthographic view drawings.
- Ensure students are finishing off drawn sketches. Needs to be done before next lesson.
- Give materials.

**Concluding strategy:**
*Ask yourself, ‘How can I capture the main learning points of the lesson?’*

Ensure that the main points of drawing their design is understood by all students. Collect drawings from all students. Begin to give students their materials ready for production next lesson.

**Assessment:** *(What will be the assessment task, tightly relating it to your lesson outcome. the criteria, and how you will you record student progress?)*

Student progress will be recorded with their drawings and if not done, this must be done prior to next lesson. Ensure the drawings are of good standard and illustrate their different methods/ideas/strategies in completing the project.
**Any special considerations or contingency plans:**
*(Consider students with special needs or the particular needs of your class or school)*

Students who are not completing drawings will need to look at possible materials and uses for the shoe. Students can use ICT programs to help display designed solutions.

Students will need to complete folio tasks if drawings are done.

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**Lesson Plan Proforma - Week 4**

<table>
<thead>
<tr>
<th>Subject: STEM</th>
<th>Context: Production of Footwear</th>
<th>Yr Level: 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Number: 12</td>
<td>Lesson Topic: Designed Applications</td>
<td>Duration: 120mins</td>
</tr>
</tbody>
</table>

**Unit Aim or Outcome: Content Description**

Students develop and produce a shoe/boot/sandal idea that will suit the future needs of the market and audience through prototyping, ideation sketches and practical creation.

**Lesson Outcome:** *(what do I want the students to be able to do, know or think at the end of this lesson?)*

Using materials to begin building and applying designed solutions.

- Develop, modify and communicate design ideas by applying design thinking, creativity, innovation and enterprise skills of increasing sophistication *(ACTDEP049)*
- Develop project plans using digital technologies to plan and manage projects individually and collaboratively taking into consideration time, cost, risk and production processes *(ACTDEP052)*
- Investigate and make judgments on how the characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions *(ACTDEK046)*
**Resources:** (List what you will need to have on hand for your lesson and organisational matters)

- Previous non related examples
- Orthographic drawings
- Cork Board
- Stanley Knife
- Steel Rule
- Masking Tape
- Plastic wrap
- Car Tyre
- Pen/Texta
- Scissors

**Lesson Outline**

**Introduction:**
*How best to motivate and explain the importance of this lesson? This should be for about 5 minutes with links to prior learning or experiences.*

Begin by defining safety precautions and room expectations.

Give shot and clear demonstration of how to begin measuring and prototyping the piece of footwear. Give students room to develop and learn through trial and error.

**Teaching strategy/Learning Activity:**
*Ask yourself ‘What will support the students to learn the concepts I’m trying to teach and to reach the outcomes I’m aiming for? What will students be doing? What will I as teacher be doing?’*

<table>
<thead>
<tr>
<th>Students will ......</th>
<th>Teacher will...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will begin prototyping their designs with resources given.</td>
<td>Help students where needed. Ensure students can learn without too much assistance.</td>
</tr>
<tr>
<td>Work collectively in groups to produce a prototype.</td>
<td>Provide materials that require machining.</td>
</tr>
<tr>
<td>Maintain the behavior due to practical tasks can promote unproductive behaviours.</td>
<td></td>
</tr>
</tbody>
</table>

**Concluding strategy:**
*Ask yourself, ‘How can I capture the main learning points of the lesson?’*

Ensure their prototyping is nearly completed, if not close to being completed due to additional assets to designs will need to be addressed in upcoming lessons.
Assessment: (What will be the assessment task, tightly relating it to your lesson outcome, the criteria, and how will you record student progress?)

Student progress and efforts will be gauged through behaviours and amount of work completed. Constant notes should be taken to reflect upon when giving a formative grade.

Any special considerations or contingency plans:
(Consider students with special needs or the particular needs of your class or school)

Students who are promoting unproductive behaviours within a practical setting will be given minimal warnings and will need to either leave the class or are designated to theory.

Students that have special learning needs will need to be accounted for with a negotiated education plan.

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Lesson Plan Proforma - Week 4 & 5

<table>
<thead>
<tr>
<th>Subject: STEM</th>
<th>Context: Arduino Basic Knowledge</th>
<th>Yr Level: 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Number: 13</td>
<td>Lesson Topic: Designed Applications</td>
<td>Duration: 45mins</td>
</tr>
</tbody>
</table>

Unit Aim or Outcome: Content Description

Students develop and produce a shoe/boot/sandal idea that will suit the future needs of the market and audience through prototyping, ideation sketches and practical creation.

Lesson Outcome: (what do I want the students to be able to do, know or think at the end of this lesson?)

This lesson will move away from the building and construction of their designed piece of footwear. This will help students that may be interested in adding electronic components to their footwear. For example, students that may want to add lights or sounds that can be amplified from the piece of footwear.

- Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs (ACTDIP038)
- Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately (ACSIS200)
- Investigate the role of hardware and software in managing, controlling and securing the movement of and access to data in networked digital systems (ACTDIK034 - Scootle)
**Resources:** (List what you will need to have on hand for your lesson and organisational matters)

- 20 Arduino Uno packs
- Free Arduino software on computers
- LED
- BUZZERS
- Arduino Uno Board
- Computer access
- Bread Board
- Lead Wires
- Resistors

**Lesson Outline**

**Introduction:**
*How best to motivate and explain the importance of this lesson? This should be for about 5 minutes with links to prior learning or experiences.*

Use Tinker CAD for all students to follow to make up a basic circuit for an LED. Get the students to research ideas for what they would like.

Give demonstration on what the Arduino Uno board and software components are made of. This will take time due to minimal previous experience possibly. However, ensure all students understand the components.

Once students have seen all components. Demonstrate a basic circuit using components and code to make a light flash.

**Teaching strategy/Learning Activity:**

**Students will ……**

Students will create a circuit on Tinkercad to gain a basic understanding.

Students will then observe and learn about the components of practically making the circuit drawn on Tinkercad.

**Teacher will...**

Engage students in a following tutorial on Tinkercad. This will build basic knowledge and operation skills for the program.

Delegate components to the current groups of students (1 kit per group).

Demonstrate the practical construction of the circuit.

Extension: if completed this with time left over. Get students to have Arduino software on computer and begin code basics.
Concluding strategy:
Ask yourself, ‘How can I capture the main learning points of the lesson?’

Ensure all students are have completed a circuit on Tinkercad and have their components. Check for students understanding, did all students get a basic idea of how the circuit works? Get students to show their circuits.

Assessment: (What will be the assessment task, tightly relating it to your lesson outcome. the criteria, and how you will you record student progress?)

Asses students Tinkercad circuits, all students must have completed the task of creating a basic circuit with a LED, Arduino Uno, breadboard and resistor.

Any special considerations or contingency plans:
(Consider students with special needs or the particular needs of your class or school)

If there are technical difficulties. Get students straight onto the practical circuitry building.

If students are unproductive. Give them a task that is either in another classroom or move away from group.

If students complete extension task, assign them to start working on a circuit that they may wish to design on their footwear.

<table>
<thead>
<tr>
<th>Subject: STEM</th>
<th>Context: Production of Footwear</th>
<th>Yr Level: 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Number: 14</td>
<td>Lesson Topic: Designed Applications</td>
<td>Duration: 90mins</td>
</tr>
</tbody>
</table>

Unit Aim or Outcome: Content Description

Students develop and produce a shoe/boot/sandal idea that will suit the future needs of the market and audience through prototyping, ideation sketches and practical creation.
**Lesson Outcome:** *(what do I want the students to be able to do, know or think at the end of this lesson?)*

Design and create a logo on illustrator for laser cutting.
- Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs *(ACTDIP038)*
- Design the user experience of a digital system by evaluating alternative designs against criteria including functionality, accessibility, usability, and aesthetics *(ACTDIP039)*
- Develop, modify and communicate design ideas by applying design thinking, creativity, innovation and enterprise skills of increasing sophistication *(ACTDEP049)*

**Resources:** *(List what you will need to have on hand for your lesson and organisational matters)*

- Previous non related examples
- Orthographic drawings
- Computer for every student
- Illustrator

**Lesson Outline**
**Introduction:**
*How best to motivate and explain the importance of this lesson? This should be for about 5 minutes with links to prior learning or experiences.*

Look at logo design and identify their product name.
First sketch a logo onto graph paper with a minimum of 3 designs.
Transfer to illustrator with drink coaster size constraints 100mm x 100mm

**Teaching strategy/Learning Activity:**
*Ask yourself ‘What will support the students to learn the concepts I’m trying to teach and to reach the outcomes I’m aiming for? What will students be doing? What will I as teacher be doing?’*

Students will ...... | Teacher will...
Come up with a brand name. Produce a design each for their logo. One element from each student must be used in final logo design.

Transfer to illustrator

Test run on the laser cutter

Help students where needed. Ensure students can learn without too much assistance.

Provide illustrator guidance.

Maintain the behavior due to practical tasks can promote unproductive behaviours.

**Concluding strategy:**

*Ask yourself, ‘How can I capture the main learning points of the lesson?’*

Designs complete and transferred to illustrator for laser cutting. Test run done!

**Assessment:** *(What will be the assessment task, tightly relating it to your lesson outcome. the criteria, and how you will you record student progress?)*

Students’ ability to work in groups and collaborate.
Creative aspects of logo design.
Illustrator knowledge and application.
Final logo laser cut.

**Any special considerations or contingency plans:** *(Consider students with special needs or the particular needs of your class or school)*

Students who are promoting unproductive behaviours within a practical setting will be given minimal warnings and will need to either leave the class or are designated to theory.

Students that have special learning needs will need to be accounted for with a negotiated education plan.
## Lesson Plan Proforma - Week 5

<table>
<thead>
<tr>
<th>Subject: STEM</th>
<th>Context: Production of Footwear – Cont.</th>
<th>Yr Level: 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Number: 15</td>
<td>Lesson Topic: Designed Applications</td>
<td>Duration: 90mins</td>
</tr>
</tbody>
</table>

### Unit Aim or Outcome: Content Description

Students develop and produce a shoe/boot/sandal idea that will suit the future needs of the market and audience through prototyping, ideation sketches and practical creation.

### Lesson Outcome: *(what do I want the students to be able to do, know or think at the end of this lesson?)*

- Design and create a logo on illustrator for laser cutting. Continue working on logo designs.
  - Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs (*ACTDIP038*).
  - Design the user experience of a digital system by evaluating alternative designs against criteria including functionality, accessibility, usability, and aesthetics (*ACTDIP039*).
  - Develop, modify and communicate design ideas by applying design thinking, creativity, innovation and enterprise skills of increasing sophistication (*ACTDEP0490*).

### Resources: *(List what you will need to have on hand for your lesson and organisational matters)*

- Previous non related examples
- Orthographic drawings
- Computer for every student
- Illustrator

### Lesson Outline

**Introduction:**

*How best to motivate and explain the importance of this lesson? This should be for about 5 minutes with links to prior learning or experiences.*

Look at logo design and identify their product name.
First sketch a logo onto graph paper with a minimum of 3 designs.
Transfer to illustrator with drink coaster size constraints 100mm x 100mm

### Teaching strategy/Learning Activity:

*Ask yourself ‘What will support the students to learn the concepts I’m trying to teach and to reach the outcomes I’m aiming for? What will students be doing? What will I as teacher be doing?’*

Students will …… |
Teacher will…
<table>
<thead>
<tr>
<th>Come up with a brand name. Produce a design each for their logo. One element from each student must be used in final logo design.</th>
<th>Help students where needed. Ensure students can learn without too much assistance.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer to illustrator</td>
<td>Provide illustrator guidance.</td>
</tr>
<tr>
<td>Test run on the laser cutter</td>
<td>Maintain the behavior due to practical tasks can promote unproductive behaviours.</td>
</tr>
</tbody>
</table>

**Concluding strategy:**  
*Ask yourself, ‘How can I capture the main learning points of the lesson?’*

Designs complete and transferred to illustrator for laser cutting. Test run done!

**Assessment:** *(What will be the assessment task, tightly relating it to your lesson outcome. the criteria, and how you will you record student progress?)*

- Students’ ability to work in groups and collaborate.
- Creative aspects of logo design.
- Illustrator knowledge and application.
- Final logo laser cut.

**Any special considerations or contingency plans:** *(Consider students with special needs or the particular needs of your class or school)*

- Students who are promoting unproductive behaviours within a practical setting will be given minimal warnings and will need to either leave the class or are designated to theory.
- Students that have special learning needs will need to be accounted for with a negotiated education plan.
<table>
<thead>
<tr>
<th>Subject: STEM</th>
<th>Context: Shoe Marketing</th>
<th>Yr Level: 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Number: 16</td>
<td>Lesson Topic: Advertising of shoes</td>
<td>Duration: 60 Mins (Single lesson)</td>
</tr>
</tbody>
</table>

**Unit Aim or Outcome:** Content Description

To create a ‘shoe of the future’ and be able to create an advertisement on this specific shoe.

**Lesson Outcome:** *(what do I want the students to be able to do, know or think at the end of this lesson?)*

Students will be able to show an understanding on how certain types of shoes are marketed to different people. They will come up with ideas on how they will market their ‘shoe of the future’ in the following lessons.

- Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately *(ACIS200)*
- Critically analyze factors, including social, ethical and sustainability considerations, that impact on designed solutions for global preferred futures and the complex design and production processes involved *(ACTDEK040)*
- Experiment with ideas and stories that manipulate media conventions and genres to construct new and alternative points of view through images, sounds and text *(ACAMAM073 - Scootle)*
- Develop, modify and communicate design ideas by applying design thinking, creativity, innovation and enterprise skills of increasing sophistication *(ACTDEP049)*
- Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs *(ACTDIP038)*

**Resources:** *(List what you will need to have on hand for your lesson and organisational matters)*

- Computers
- Internet Access
- Smart Board

**Lesson Outline**
Introduction:
How best to motivate and explain the importance of this lesson? This should be for about 5 minutes with links to prior learning or experiences.

Briefly touch upon what was learned last week on industry. Key points might be the brand of shoes, types of shoes etc.

A brief discussion about advertising will then be discussed. Students will be asked to respond to the following questions prompted by the teacher...

- Where do you encounter advertising?
- What advertisements stick in your head?
- What makes an advertisement memorable

Teaching strategy/Learning Activity:
Ask yourself ‘What will support the students to learn the concepts I’m trying to teach and to reach the outcomes I’m aiming for? What will students be doing? What will I as teacher be doing?’

Students will ...... | Teacher will...
Students will then look at the following videos and images in small groups and will discuss things of importance that the brand uses for marketing strategies.

Show students the following videos of: https://www.youtube.com/watch?v=Fq2CvmoGo7I

- reflect on these videos and images giving their ideas on what the company is trying to portray and market to. Is it kids or adults? What type of shoe are they selling? etc.

During this reflection students will be asked the following questions.

- Who does this ad cater towards?
- Who ‘stars’ in this ad what is their purpose?
- What is seen in the ad?
- What makes you want to buy this shoe?

Students will then look towards planning their own ad. They will research the following points before creating their ad for the shoe.

- How are persuasive techniques used?
- What type of ad will be created who will you cater towards?
- What will make users want to purchase the shoe?
- What type of shoe design is it for?

Ensure students are on task and are working collaboratively. All students must be participating in the discussion.

Ensure that students are being respectful and are keeping on task.

Question students when they begin planning their ad. Why have you chosen to style the advertisement like this? Etc.

Give students freedom of expressing their own ideas in their advertisements but also suggest ways to improve.
**Concluding strategy:**
*Ask yourself, ‘How can I capture the main learning points of the lesson?’*
Wrapping up the lesson the teacher will ensure that students are prepared for the following lessons to begin working on and producing their video. Students will be given their assignment sheet to be prepared for the next lesson.

**Assessment:** *(What will be the assessment task, tightly relating it to your lesson outcome. the criteria, and how will you record student progress?)*
Student progress will be recorded by their planning/designing of their video.

**Any special considerations or contingency plans:** *(Consider students with special needs or the particular needs of your class or school)*
Students who may have struggle answering questions may be given prompts to help them.
## Lesson Plan Proforma - Week 6: Video Making

<table>
<thead>
<tr>
<th>Subject: STEM</th>
<th>Context: Shoe Marketing</th>
<th>Yr Level: 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Number: 17</td>
<td>Lesson Topic: Advertising of shoes</td>
<td>Duration: 120 Mins (double lesson)</td>
</tr>
</tbody>
</table>

### Unit Aim or Outcome: Content Description

To create a ‘shoe of the future’ and be able to create an advertisement on this specific shoe.

### Lesson Outcome: *(what do I want the students to be able to do, know or think at the end of this lesson?)*

Students will begin and hopefully finalize their ‘shoe of the future’ advertisement.

- Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately *(ACSI5200)*
- Critically analyze factors, including social, ethical and sustainability considerations, that impact on designed solutions for global preferred futures and the complex design and production processes involved *(ACTDEK040)*
- Experiment with ideas and stories that manipulate media conventions and genres to construct new and alternative points of view through images, sounds and text *(ACAMAM073 - Scootle)*
- Develop, modify and communicate design ideas by applying design thinking, creativity, innovation and enterprise skills of increasing sophistication *(ACTDEP049)*
- Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs *(ACTDIP038)*

### Resources: *(List what you will need to have on hand for your lesson and organisational matters)*

- Computers
- Internet Access
- Props
- Video Cameras
- Video editing software - File Maker Pro, Movie Maker

### Lesson Outline

**Introduction:**

*How best to motivate and explain the importance of this lesson? This should be for about 5 minutes with links to prior learning or experiences.*

A short discussion on advertising skills that were learnt in the previous lesson will be discussed. Students will be asked to look at their assignment sheet for creating their advertisement and the teacher will go through this with students. This is where students may ask any questions they have regarding their planning and filming of their advertisement.

**Teaching strategy/Learning Activity:**

*Ask yourself ‘What will support the students to learn the concepts I’m trying to teach and to reach the outcomes I’m aiming for? What will students be doing? What will I as teacher be doing?’*
<table>
<thead>
<tr>
<th>Students will ......</th>
<th>Teacher will...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Begin working on the video both independently and collaboratively.</td>
<td>Ensure students are on task and are working collaboratively. All students must be participating in the discussion.</td>
</tr>
<tr>
<td>Report back to the assignment sheet to ensure students are staying on task.</td>
<td>Ensure that students are being respectful and are keeping on task.</td>
</tr>
<tr>
<td>Question students when they begin planning their ad. Why have you chosen to style the advertisement like this? Etc.</td>
<td>Give students freedom of expressing their own ideas in their advertisements but also suggest ways to improve.</td>
</tr>
</tbody>
</table>

**Concluding strategy:**
Ask yourself, ‘How can I capture the main learning points of the lesson?’

I will recap with students at the end of the lesson and see which stage of the video making process are they at.

**Assessment:** *(What will be the assessment task, tightly relating it to your lesson outcome. the criteria, and how you will you record student progress?)*

Assessment task is their final advertisement students will reflect on the assessment sheet to ensure they are on the correct pathway.

**Any special considerations or contingency plans:** *(Consider students with special needs or the needs of your class or school)*

Students with special needs may need a tripod to hold the cameras steady.

Student with visual impairments may have difficulty when it comes to editing. In this case special speech to text editing formats will be used as well as magnification tools for the student to complete their task.
### Lesson Plan Proforma - Week 7: Ending of Video Making

<table>
<thead>
<tr>
<th>Subject: STEM</th>
<th>Context: Shoe Marketing</th>
<th>Year Level: 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Number: 18</td>
<td>Lesson Topic: Advertising of shoes</td>
<td>Duration: 120 Mins (double lesson)</td>
</tr>
</tbody>
</table>

#### Unit Aim or Outcome: Content Description
To create a ‘shoe of the future’ and be able to create an advertisement on this specific shoe.

#### Lesson Outcome: *(what do I want the students to be able to do, know or think at the end of this lesson?)*
Students will finalize their ‘shoe of the future’ advertisement.

- Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately *(ACSIS200)*
- Critically analyze factors, including social, ethical and sustainability considerations, that impact on designed solutions for global preferred futures and the complex design and production processes involved *(ACTDEK040)*
- Experiment with ideas and stories that manipulate media conventions and genres to construct new and alternative points of view through images, sounds and text *(ACAMAM073 - Scootle)*
- Develop, modify and communicate design ideas by applying design thinking, creativity, innovation and enterprise skills of increasing sophistication *(ACTDEP049)*
- Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs *(ACTDIP038)*

#### Resources: *(List what you will need to have on hand for your lesson and organisational matters)*
- Computers
- Internet Access
- Props
- Video Cameras
- Video editing software - File Maker Pro, Movie Maker
- Tripod

#### Lesson Outline
**Introduction:**

How best to motivate and explain the importance of this lesson? This should be for about 5 minutes with links to prior learning or experiences.

Students will be asked where they are currently in their shoe advertisement. Any students who are struggling or needing attention the teacher will help support.

**Teaching strategy/Learning Activity:**

Ask yourself ‘What will support the students to learn the concepts I’m trying to teach and to reach the outcomes I’m aiming for? What will students be doing? What will I as teacher be doing?’

<p>| Students will ...... | Teacher will... |</p>
<table>
<thead>
<tr>
<th>Continue working on the video both independently and collaboratively.</th>
<th>Ensure that students are being respectful and are keeping on task.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report back to the assignment sheet to ensure students are staying on task.</td>
<td>Question students when they begin planning their ad. Why have you chosen to style the advertisement like this? Etc.</td>
</tr>
<tr>
<td>By the end of the lesson have their video finalized and ready for next lessons presentations.</td>
<td>Ensure students are on task and are working collaboratively. All students must be participating in the discussion.</td>
</tr>
<tr>
<td></td>
<td>Give students freedom of expressing their own ideas in their advertisements but also suggest ways to improve.</td>
</tr>
<tr>
<td></td>
<td>Support students finalizing their videos, help with exporting and collect the video in a folder for presentations next week.</td>
</tr>
</tbody>
</table>

**Concluding strategy:**
*Ask yourself, ‘How can I capture the main learning points of the lesson?’*

The teacher will ensure that students have completed their videos and will ask for their files to be uploaded by USB.

**Assessment:** *(What will be the assessment task, tightly relating it to your lesson outcome. the criteria, and how you will you record student progress?)*

Assessment task is their final advertisement students will reflect on the assessment sheet to ensure they are on the correct pathway.

**Any special considerations or contingency plans:** *(Consider students with special needs or the needs of your class or school)*

Students with special needs may need a tripod to hold the cameras steady.

Student with visual impairments may have difficulty when it comes to editing. In this case special speech to text editing formats will be used as well as magnification tools for the student to complete their task.
Lesson Plan Proforma - Week 8: Advertisement Presentations

<table>
<thead>
<tr>
<th>Subject: STEM</th>
<th>Context: Shoe Marketing</th>
<th>Yr Level: 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Number: 19</td>
<td>Lesson Topic: Presentation of advertisement</td>
<td>Duration: 60 Mins (single lesson)</td>
</tr>
</tbody>
</table>

**Unit Aim or Outcome: Content Description**

To create a ‘shoe of the future’ and be able to create an advertisement on this specific shoe.

**Lesson Outcome:** *(what do I want the students to be able to do, know or think at the end of this lesson?)*

Students will watch their presentations of their shoes.

- Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately *(ACSIS200)*
- Develop, modify and communicate design ideas by applying design thinking, creativity, innovation and enterprise skills of increasing sophistication *(ACTDEP049)*
- Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs *(ACTDIP038)*
- Experiment with ideas and stories that manipulate media conventions and genres to construct new and alternative points of view through images, sounds and text *(ACAMAM073 - Scootle)*

**Resources:** *(List what you will need to have on hand for your lesson and organisational matters)*

- Chairs
- Smartboard
- Paper
- Textas

**Lesson Outline**

**Introduction:**

*How best to motivate and explain the importance of this lesson? This should be for about 5 minutes with links to prior learning or experiences.*

Students will have finished their shoe advertisements and will now begin watching the videos made by their peers.

**Teaching strategy/Learning Activity:**

*Ask yourself ‘What will support the students to learn the concepts I’m trying to teach and to reach the outcomes I’m aiming for? What will students be doing? What will I as teacher be doing?’*

<p>| Students will ...... | Teacher will... |</p>
<table>
<thead>
<tr>
<th>During the lesson for each video students will create a PMI chart on the videos that have been observed.</th>
<th>Ensure that students are being respectful and quiet during presentations.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure that all students are participating in the discussion.</td>
<td>Give students freedom of expressing their own ideas in their advertisements but also suggest ways to improve.</td>
</tr>
<tr>
<td>Supporting and congratulating students on finished videos.</td>
<td></td>
</tr>
</tbody>
</table>

**Concluding strategy:**

_Ask yourself, ‘How can I capture the main learning points of the lesson?’_

Teacher to look over final presentations to ensure students meet the criteria.

**Assessment:** _What will be the assessment task, tightly relating it to your lesson outcome, the criteria, and how will you record student progress?)_

Assessment task is their final advertisement students will reflect on the assessment sheet to ensure they are on the correct pathway.

**Any special considerations or contingency plans:**

_(Consider students with special needs or the needs of your class or school)_
Teaching Resources

Historical shoe Fact worksheet

Who invented the modern shoelace?

Who invented the first rubber sole?

What was the first sneaker called? And why are sneakers called sneakers?

What was the original reason for high heels being invented?

When were left and right foot shoes invented?

Who invented the cork wedge shoe and why?
Leather Making Comprehension Questions:

1. Name 5 things that are made from Leather:

2. How do they remove the hair from the cow hides?

3. Why do the hides turn blue after the first stage of treatment?

4. When the leather is cut to thickness what is the off cuts made into?

5. What elements do they use in the second stage of tanning?

6. Why do they press the hide into glass?
Arduino Uno Started Pack – Amazon

ELEGOO UNO Project Super Starter Kit with Tutorial for Arduino
by ELEGOO

Sale: $44.86 & FREE Delivery on orders over $49. Details

- Free PDF tutorial (more than 22 lessons) and clear listing in a nice package.
- The most economical way to starting Arduino programming for those beginners who are interested.
- LCD1602 module with pin header (no need to be soldered by yourself).
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- High quality kit with UNO R3, 100% compatible with Arduino UNO R3, Arduino kit, Arduino uno Kit, Arduino

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TinkerCAD
Evaluation Proforma

1. How did your group get to the final design and product? What processes and methods were used to get to this decision?

2. What worked well between the group member’s cohesion?

3. What would the group do differently if the opportunity was given again?

4. The group needs to critically analyse the final product of the shoe, what are the strengths and weaknesses of the final product? (aesthetics, completion, materials used).

5. Analysing the video, did the advertising appropriately show and reflect your shoe design?