University of South Australia

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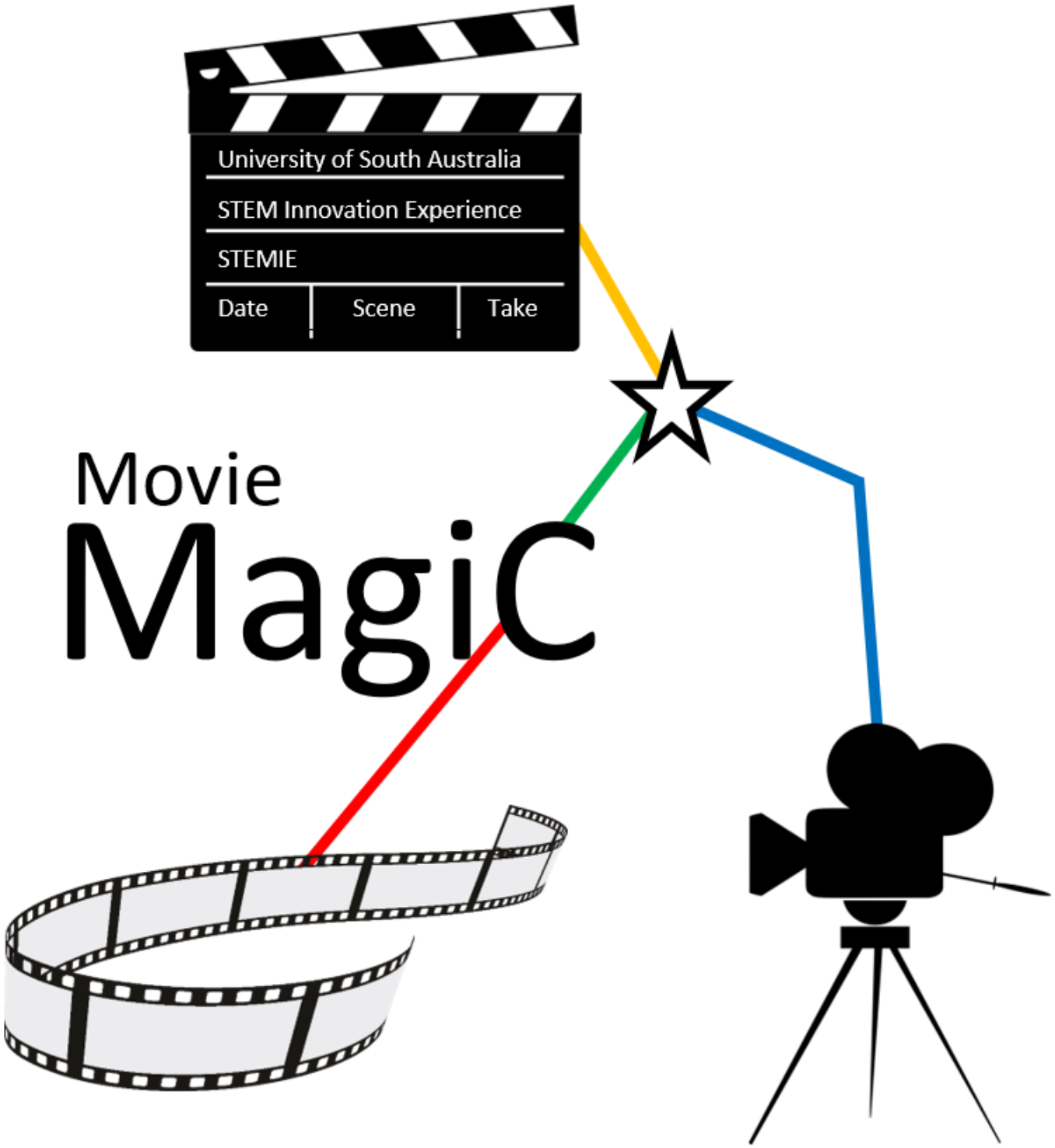

STEM Innovation Experience

STEMIE

University of South Australia

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STEM Innovation Experience

Task Information

Movie Magic

Introduction

Australia has produced many well-known films including Mad Max, Crocodile Dundee, Babe, Happy Feet, Kenny, The Sapphires, The Castle, Red Dog, The Dish, Wolf Creek, Rabbit Proof Fence, Man from Snowy River, and Finding Nemo, just to name a few.

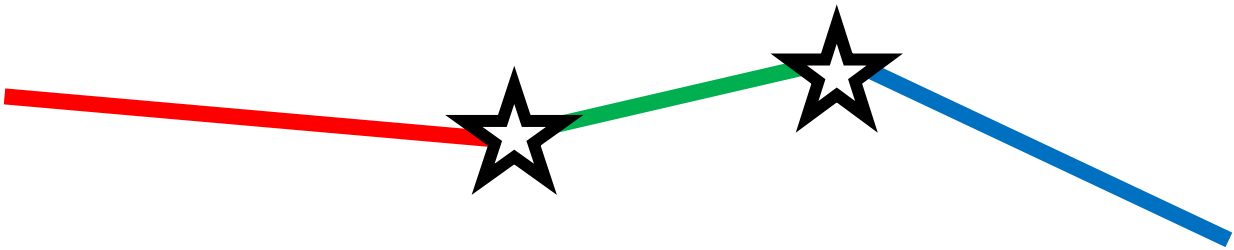
There are many aspects to producing these movies that go far beyond the camera work and acting. Prior to the filming, locations, cast and crew need to be selected and schedules developed for the smooth running of the production. Extensive make up or wardrobe requirements need to be trialled to ensure that they are prepared in time and don't hold up the film shoot on the day. Contingency plans need to be developed should weather conditions impede a shoot, and continuity between shots needs to be monitored, with some scenes filmed over many months. There are hundreds of people in numerous roles behind the scenes to make the production successful.

In Movie Magic you will learn about some of the requirements of film production and create your own 3-minute short film.

"Cinema is the most beautiful fraud in the world."
Jean-Luc Godard (French-Swiss film director)

"Movie making is telling a story with the best technology at your disposal."
Tom Hanks

"The length of a film should be directly related to the endurance of the human bladder."
Alfred Hitchcock



Movie Magic

The STEM Innovation Experience (STEMIE) will focus on the STEM skills required to produce a movie, including aspects of pre-production and post-production. The school team will need to develop branding for their company and also apply for financial backing to professionally produce their 3-minute short film.

The Requirements

The Movie Production will require completion of the following tasks:

- Research into the science behind cinematic techniques including a scientific investigation into a specific effect, as outlined in the Science Component.
- Design and 3D print your company logo and incorporate an interactive aspect using Arduino coding for the launch of your brand at the Regional Showcase, as outlined in the Technology Component.
- Design and create a prototype camera dolly, as outlined in the Engineering Component.
- Creation of a budget spreadsheet for your 3-minute short film as outlined in the Mathematics Task

Your school is trying to win financial backing to professionally produce your 3-minute short film. You will need to write a summary showing your budget for the cost of recreating your film professionally. The summary also needs an explanation of the cinematic effect used and where in the film it can be seen, a summary of your camera dolly prototype and how it works and finally an “about us” section covering how STEMIE was implemented in the school and the official launch of your company brand.

Cast and crew on location – Port Parham, SA

STEMIE – The Three Parts

STEMIE will consist of three parts:

- The Learning Phase
  - This is completed at school and work is uploaded to an online platform with the link sent to the UniSA STEMIE email address STEMIE@unisa.edu.au The purpose of this phase is to demonstrate the learning that has occurred within the experience and to provide evidence that students have met the requirements to qualify for the Regional Showcase event.

- The Regional Showcase
  - This part will consist of an online event with University of South Australia staff judging the Science, Technology, Engineering and Mathematics components that have been completed at school. Schools will have a 1 ½ hour judging timeslot to demonstrate their work in these four areas. At the conclusion of all judging, the winning schools will be notified via email. In the event of a tie between schools within a region, the online overall task will be used as a tie breaker to decide the winner.

- The STEMIE Final
  - The winner from each Regional Showcase event, in addition to any wildcard schools (selected by the panel of judges after all Regional Showcase events) will compete in unseen STEM challenges at the University of South Australia. Details of dates and locations can be found in the initial invite emailed to schools and will also be sent again to winning schools.

STEMIE – Referencing

Research elements used within STEMIE Checkpoint Submissions and the Regional Showcase need to be referenced. The preferred style of referencing may vary between each school participating in STEMIE.

UniSA Outreach recommends using the SACE Guidelines (or equivalent in each state) for Referencing Documents when submitting work for assessment within STEMIE.

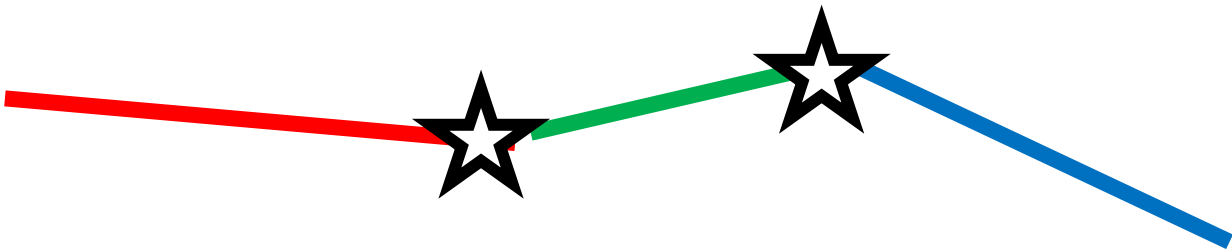
The Student Guide to Referencing and *Guidelines for Referencing* documents can be found at this link https://www.sace.sa.edu.au/learning/research-advice/referencing

STEMIE – The Learning Phase

School Leaders and Teachers can choose how they implement The Learning Phase in their school. Components within The Learning Phase have been developed to be scalable from a small group of students to multiple classes interacting in the experience.

Throughout the Learning Phase, there are identified checkpoints where progress must be submitted. There are six (6) required tasks that must be submitted to qualify for the Regional Showcase. The additional tasks are optional for in school use only and do not need to be submitted to UniSA. Schools can use some, none or all of the optional tasks as they progress through STEMIE, but tasks R1 to R6 must be available for viewing via an online platform (website link or equivalent is preferred).

The range of assessment tasks requires team members to hold varied skill-sets, so working in teams with complementary abilities is advantageous. There are five key components within The Learning Phase – the Science, Technology, Engineering, Mathematics and Overall Summary components



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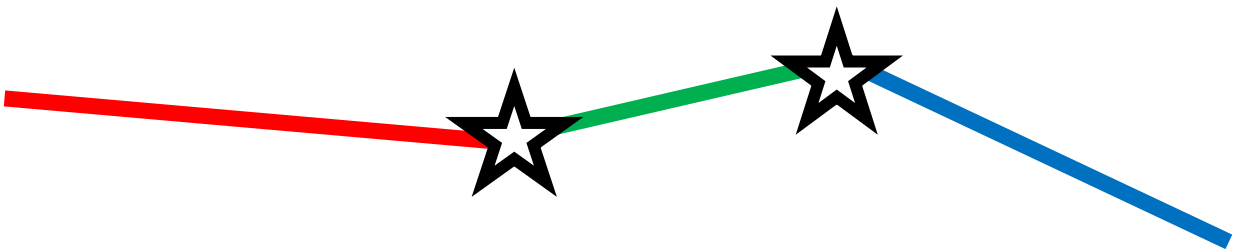

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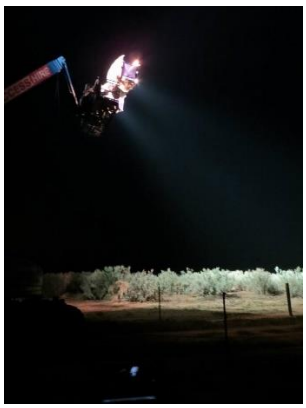
STEM Innovation Experience
Movie Magic

Science Component

Science Component – Background Information

Creating cinematographic effects requires an understanding of science. Numerous chemical reactions are utilised in special effects, including creation of smoke, explosions, and colour changes. Physics underpins any collisions or stunts that need to be filmed. Cinematographers also utilise physics when designing various lighting techniques and chromakey applications.



Wolf Creek 2 Night Shoot - On location in Lower Light, SA.

Night scenes are expensive due to the cost of running high energy lighting and higher staff wage rates. Cinematic techniques can be used to create night scenes from day shoots. This can save money on production costs.

Science Component – The Requirements

As a group, investigate the science behind cinematic techniques.

Complete an investigation into one specific cinematic technique.

Demonstrate this cinematic technique in the Movie Magic 3-minute short film.

Note – Unsafe special effects are not permissible. Ensure that any experiments, replications of special effects or stunts follow the school safety procedures and are approved by the relevant people in your school.

This can be achieved by completing some or all of the following:

- Research various cinematic techniques and the science behind how they work
- Create and conduct a practical investigation methodology into a cinematic technique
- Analyse results and draw conclusions from the practical investigation
- Adhere to school laboratory safety when conducting the practical investigation
- Discuss and critically analyse the practical investigation methodology, with reference to strengths and improvements
- Summarise considerations with reference to the cinematic technique and incorporate this technique into the 3-minute movie production

Science Component – Practical Investigation

The practical investigation methodology needs to be created to account for a specific cinematic technique. The purpose for conducting this investigation is to support the research about the technique and developing an understanding of how it works. The technique also needs to be incorporated into the Movie Magic 3-minute film production.

Ideas for this investigation could include:

- Special effects – chemistry of colour changes, exothermic reactions, smoke and mirrors, flame tests
- Camera and lighting angles – light and shadows, ambient, artificial and gobo lighting (use of templates to make shapes with light), angles and lenses, use of chromakey
- Stunts and Set production – pulleys and levers, collisions and momentum
- Other relevant sets of conditions

The methodology for the investigation can vary from school to school, however the format for the submitted practical write-up must include the following headings:

Practical investigation methodology of cinematic effect experiment

- Hypothesis
- Aim
- Materials
- Method (including any safety requirements)

Results and conclusion from cinematic effect experiment

- Results
- Conclusion

Discussion and analysis of the cinematic effect investigation methodology

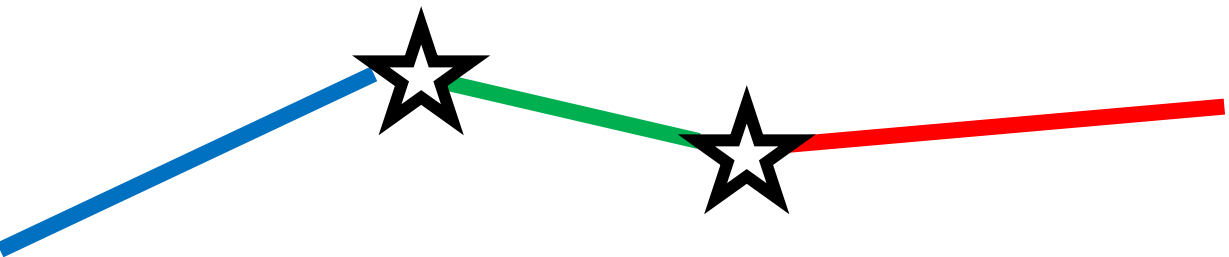
- Accuracy and precision of methodology
- Sources of random error
- Sources of systematic error
- Suggested improvements and limitations

Science Component – Elements for the Regional Showcase event

At the Regional Showcase event, students representing their school will be required to deliver a formal presentation to a film production company representative (UniSA Staff) regarding their chosen cinematic technique.

This presentation will be held online via a Zoom link and time limits will need to be strictly adhered to.

The presentation should be a maximum of seven (7) minutes, with up to an additional three (3) minutes for questions from the Film Production Company representative (UniSA Staff).



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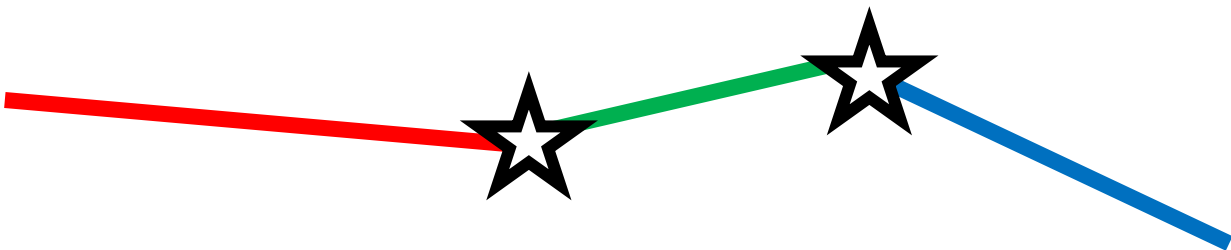
Movie Magic
STEMIE Regional Showcase
Science Component

School: _____

Criteria	Marks Available	Total Marks
1. Summary of cinematic techniques and how they are applied in movies.	**3 2 1 0 N/A**	
2. Understanding of the science behind a specific cinematic technique.	**3 2 1 0 N/A**	
3. Incorporation of research and practical results into presentation to make informed decisions about the application of the cinematic effect.	**3 2 1 0 N/A**	
4. Delivery of content knowledge, including the ability to answer questions posed by UniSA staff.	**3 2 1 0 N/A**	
5. Communication and interaction with UniSA staff, including the use of visual aids and appropriate presentation timing.	**3 2 1 0 N/A**	
Total Marks:		**/15**



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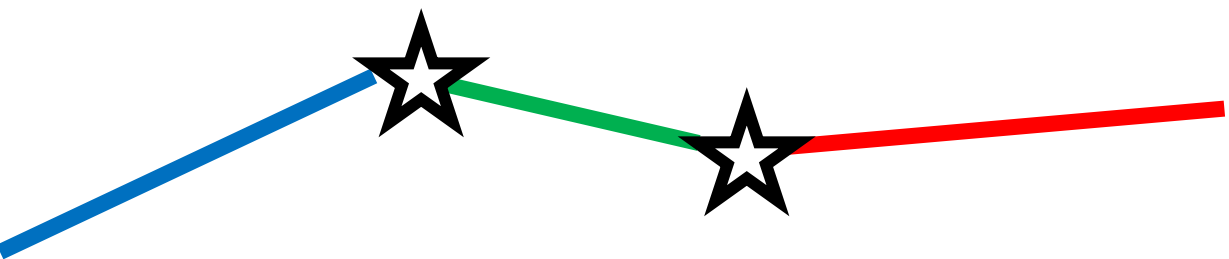

University of South Australia

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STEM Innovation Experience
Movie Magic

Technology Component

Technology Component – Background Information

The movie industry is very competitive, and a successful brand can make all the difference in promoting your company. Studios have their own logos, jingles and icons to help make them stand out from the others. These need to be creative, have some sort of meaning to the company, and also be memorable and catchy.

Technology Component – The Requirements

Create a trade display for the launch of your film production company.

This should include:

- Your 3D printed logo
- An animated and/or interactive display created with the use of Arduino coding
- An A4 handout about your company
- Your 3-minute short film showing on a continuous loop

This can be achieved by completing some or all of the following:

- Brainstorm and investigate existing movie studio branding
- Design your logo and then create a 3D version of your logo using a CAD program.
- Justify how your logo uniquely identifies your company
- Develop a way to make your logo interactive, such as synchronised lights to music, reacting to sound, temperature or lights, etc.
- Investigate additional ways to make your logo interactive
- Evaluate the development of your interactive display

Technology Component – Interactive Company Logo

Using Computer Aided Design (CAD) software, design a 3D version of your company logo for printing. Create a trade display to launch your logo. This must include your 3D printed logo, and incorporate interactive features using Arduino coding (light display and additional features). Other materials can be used as required but the display area should not exceed a space of 70cm x 70cm (excluding the use of laptop or device to run the display).

The intended purpose is to promote your company branding and corporate image by revealing your 3D printed company logo in a memorable way. The functionality of the device will need to be demonstrated to UniSA Staff, along with the ability to trouble shoot simple errors in a sample Arduino code. The quality of the display including the logo design and potential engagement with the display will be assessed as part of the criteria. The short film also needs to be on display at the launch, but the content of the film itself will not form part of the assessment in the technology task.

Technology Component – Elements for the Regional Showcase event

At the Regional Showcase event, students representing their school will be required to demonstrate their working interactive logo display.

As a minimum, the logo display should be able to detect an input and respond with lights.

To be awarded further points, the display will need to demonstrate additional features such as, but not limited to, lights synchronised to music, additional inputs that respond autonomously, or external features that interact with the logo in the display. Additional points will be awarded for working additional features.

The judging will be held online via a Zoom link. We recommend having a mobile phone or iPad in the meeting to allow the device to be easily viewed from different angles.

Programming Component – Elements for the Regional Showcase event

Along with presenting their display, students will also be required to complete a trouble shooting activity to find simple errors in a section of Arduino code. The errors will be based on the activities covered in the student workshop “Introduction to Coding” section of the STEMIE Moodle.

The UniSA Staff judging the display will work through a checklist to award marks for each of the criteria. For additional features to be awarded marks, they must be successfully demonstrated in the allocated judging time.

Troubleshoot a sample code with errors (errors will be based on the introduction to coding activities on the STEMIE Moodle) This will have a 2 minute time limit.

Each school will have a maximum of 10 minutes to demonstrate their prototype and 2 minutes to find the errors in the sample code supplied.

University of South Australia

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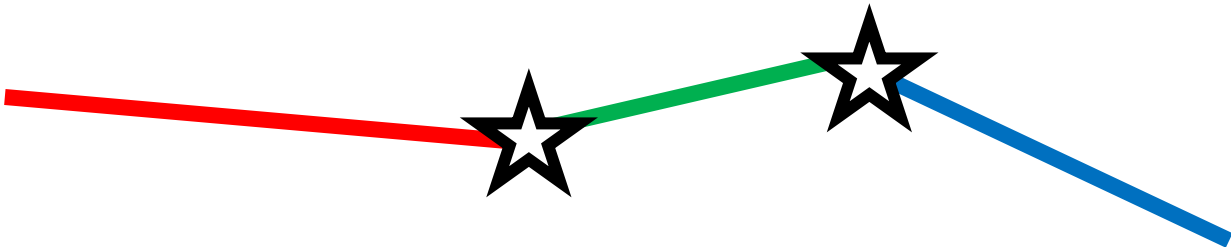
Movie Magic
STEMIE Regional Showcase
Technology Component

School: _____

Criteria	Marks Available	Total Marks
3D printed component	**1 Mark** – Printed but has visible scaffolding/rafting or general flaws in the print, and no obvious function in the device **2 Marks** – Well printed but only serves an aesthetic purpose **Or 3 Marks** – Well printed and has a set function in the device	
Input Detection *Does the launch display respond to an input?*	**1 Mark** – Responds to a basic on/off input (switch/button etc) **+1 Mark** – Responds to quantitative input (light intensity/sound volume/temperature)	
Output Response *Does the launch have a light display?*	**1 Mark** – Has lights incorporated into the launch display but not fully functional **+1 Mark** – Lights are functional but not interactive **+1 Mark** – Lights are synchronised to music or interactive in some other way	
Short Film Display	**1 Mark** – Short film is available for viewing at the launch in a capacity other than screen sharing on Zoom.	
Additional Features *These must be successfully demonstrated within the judging time limit?*	**+1 Mark** – Additional feature is successfully demonstrated **+1 Mark** – Another additional feature successfully demonstrated **+1 Mark** – Another additional feature successfully demonstrated	
Can find errors in the sample code	**1 Mark** – Can find 2 errors in the sample code **+1 Mark** – Can find additional errors in the sample code **+1 Mark** – Can find all errors in the sample code	
Total Marks:		**/15**



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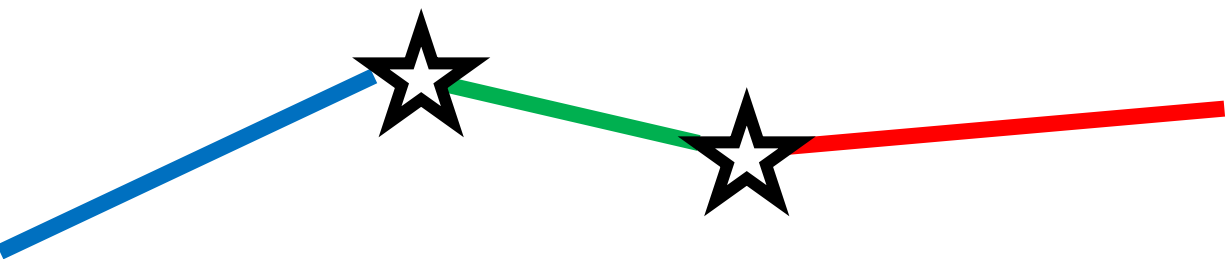

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STEM Innovation Experience
Movie Magic

Engineering Component

Engineering Component – Background Information

Custom designed wheeled carts, called camera dollies, are used to improve stability while filming. The smooth movement of the dolly allows the camera to follow the action or assist in cinematic effects like zooming in on the drama. The camera dolly needs to be able to track forwards, backwards, sideways and diagonally, and can even include the ability to adjust the camera up and down on a jig. Sometimes the dolly is set up on tracks while other times it can be a hand-held steady cam. Either way, a dolly grip is trained to operate the dolly leaving the camera operator to concentrate on their role. In the case of a steady cam, the dolly grip will use silent touch signals to help the camera operator navigate around objects while filming.

Engineering Component – The Requirements

Design and construct a prototype for a camera dolly that can navigate the set track in the designated time, while meeting the necessary requirements for the build.

This can be achieved by completing some or all of the following:

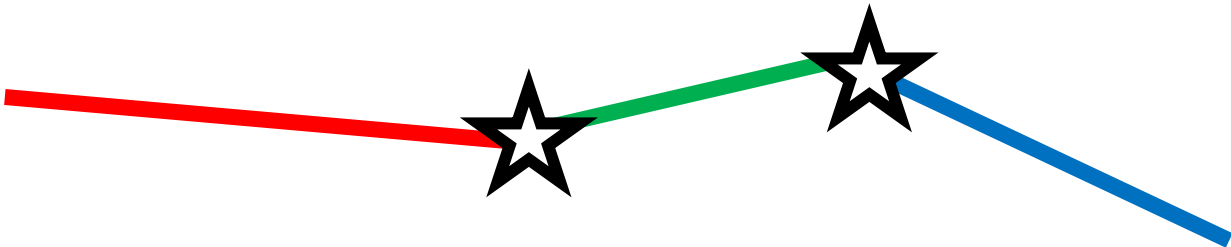
- Brainstorm and investigate existing camera dolly designs
- Sketch dolly designs for construction and testing
- Test the properties of different types of construction materials (e.g. glue, masking tape, lego, balsa wood, etc.) to evaluate the best construction method
- Construct and test the camera dolly
- Explain the functions of the preferred design
- Produce sketches of the chosen design (by drawing and/or CAD packages)
- Construct the chosen design for testing at the Regional Showcase event

Engineering Component – Prototype Requirements

The camera dolly can have maximum width (at any point) of 30cm. There is no height restriction and any materials can be used in construction except pre-constructed camera trolleys or devices. The winning trolley will be able to navigate the set track and return accurately to the target zone.

Camera Dolly Specifications

- **Must not exceed 30cm width at any point, (note: smaller prototypes will be easier to return within the starting target zone)**
- **Must be able to balance a 3D printed replica of a Go Pro camera**
- **Pre-existing camera dolly devices cannot form any part of the prototype**



Track Specifications

- **The camera dolly must start in the bullseye of the track and return as close as possible to the target point.**
- **While meeting the time specifications, the device must be able to balance a "camera" block and must travel over the dots at the corners of the track**

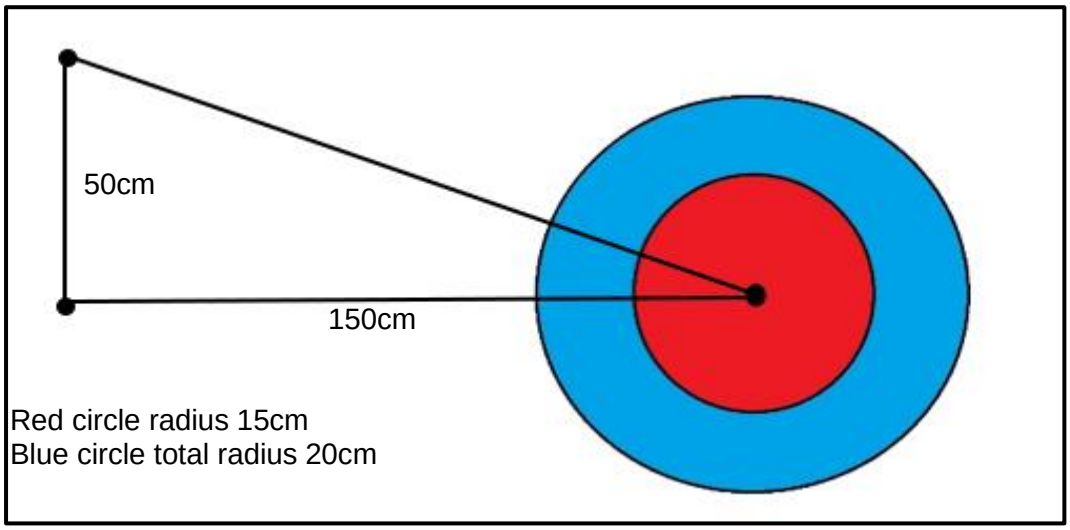
Requirements:

- There are no restrictions to the materials used, but a pre-built camera dolly or device cannot form any part of the prototype.
- The camera dolly must completely fit within the 30cm diameter target zone.
- The dolly must be able to balance a 3D printed replica of a Go Pro camera. (stl file for this replica is available on Moodle, or email STEMIE@unisa.edu.au if you need samples printed.
- The camera dolly can be manually controlled or, fully automated (the latter generates more marks).
- The camera dolly must clearly cover the corner dots while on the test path.
- The camera dolly will need to return to the target zone (or as close as possible)

Note – the supply of building materials is the responsibility of the school.

Engineering Component – Elements for the Regional Showcase event

At the Regional Showcase event, testing will need to be demonstrated along a specific test track as shown in the diagram below. The track surface needs to demonstrate the dimensions below using either tape; or the actual vinyl mat that can be purchased from Print Lord. (links available on the STEMIE Moodle). The track will need to be in place before the judging commences but any additional materials used on the track for the test run will need to be added and removed within the judging time limit.



This device will be demonstrated and judged online via Zoom. A device such as an iPad, tablet or mobile phone will need to be a logged into the meeting to allow the judges to view the device from requested angles.

The camera dolly will have two (2) attempts at the track. The best run from the two will be scored.
Schools will be scored according to how accurately they navigate the course and the functionality of the camera dolly platform.

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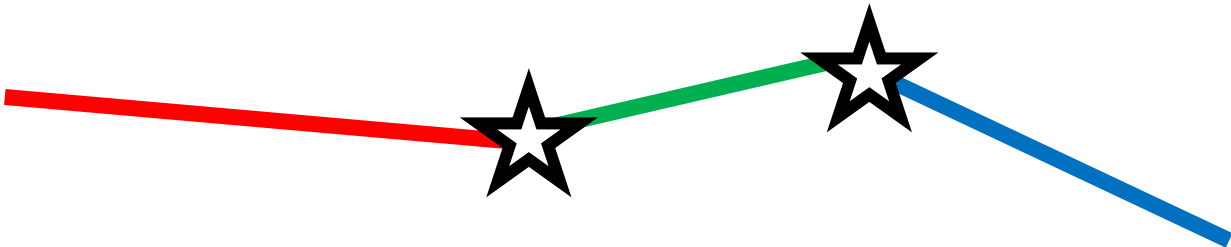
UniSA Education Futures

Movie Magic
STEMIE Regional Showcase
Engineering Component

School: _____

Camera dolly, diagonal or diameter, does not exceed 30cm	Can balance the camera block on the platform	Total Marks Run 1	Run 2
		/15	/15

Criteria	Marks Available	Total Marks
Functionality *Platform adjustment*	**1 Mark** – While stationary, can adjust the platform height manually **2 Marks** – While stationary, can adjust platform height remotely **or 3 Marks** – While moving, can adjust the platform height remotely	
Accuracy *Accuracy of return point* *Accuracy during transit*	**1 Mark** – Returns to the blue zone **2 Marks** – Returns part of the vehicle to the red zone **or 3 Marks** – Returns entirely within the red zone **+1 Mark** – Travels over the first dot **+1 Mark** – Travels over the second dot	
Autonomy	**1 Mark** – Can navigate the track but needs direct pushing by a dolly grip **2 Marks** – Can navigate the track but needs some manual steering (eg a stick or remote control) by the dolly grip **or 3 Marks** - Can navigate the track autonomously during transit	
Additional features	**+1 Mark** – Balances the block for the entire test track **+1 Mark** - Camera dolly has a 3D printed component **+1 Mark** – Additional relevant feature **+1 Mark** – Additional relevant feature	
Total Marks:		**/15**



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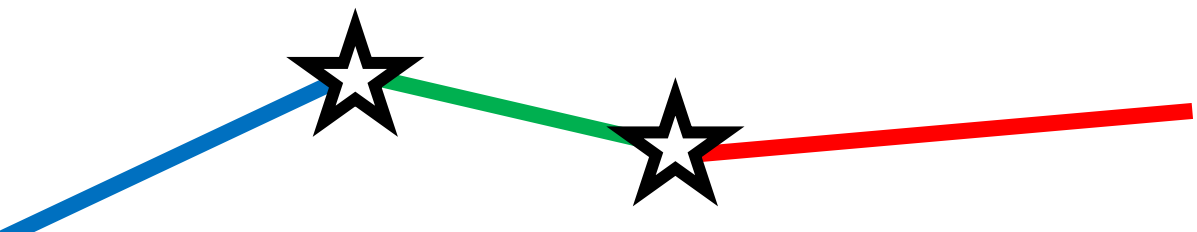

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STEM Innovation Experience

Movie Magic

Mathematics Component

Mathematics Component – Background Information

Movie production is a multi-billion dollar industry and provides many employment opportunities beyond acting and camera work. Behind the scenes there are numerous staff including caterers, location scouts, make-up artists, directors, photographers, and visual effects technicians, not to mention employment linked to accommodation, transport, equipment hire, and then the distribution and marketing of the movie.

Movies are often allocated a budget that they need to adhere to. Going over budget can mean that producers may need to reduce their own takings to keep the film afloat.

Left - *Crocodile Dundee* (1986), had a budget of under $10 million, and was the highest grossing Australian movie for over a decade.

Right - Stunt doubles complete tasks that could potentially injure actors and halt production, leading to major budget blow outs.

Mathematics Component – The Requirements

As a group, create a mathematically justified costing to produce a 3-minute short film.

Produce an interactive spreadsheet that can demonstrate how the budget will be impacted if human resources or production costs are modified.

Mathematics Component – Movie Budget

This can be achieved by completing some or all of the following:

- Brainstorm the requirements to consider for the production of a short film
- Create a scheduling run sheet for the production of scenes in the short film and use this to calculate staffing costs
- Produce a spreadsheet to demonstrate how changes to filming production can impact on the total budget
- Calculate the total cost of production, including pre and post production costs
- Produce a budget proposal for the production of the short film

Mathematics Component – Movie Magic Budget Breakdown

The Movie Budget breakdown needs to account for:

- Human resources, including producer, director, cast and crew costs
- Production costs, including location and equipment hire fees, costumes, catering, accommodation, transport, and consumables such as, make up, special effects equipment, etc.

Note - Development including story rights and writers fees, as well as marketing and distribution fees, do not need to be considered in this budget.

A spreadsheet will need to be created that can account for increases and decreases in production costs and adjust the total to reflect these changes. This spreadsheet will be demonstrated at the Regional Showcase.

Mathematics Component – Elements for the Regional Showcase event

At the Regional Showcase event, students representing their school will be required to present their budget and spreadsheet to a UniSA Staff for judging. Schools will be assessed by means of Question and Answer. From a list of five (5) seen questions, schools will need to respond to two (2) questions chosen by the judge, before being asked to respond to one (1) unseen question. Students will also need to demonstrate how their spreadsheet can account for changes is human resource or production costs by recalculating the total cost in two (2) scenarios as requested by the UniSA Staff on the day. The change will be requested as a percentage difference.

Each school will be allocated a 10-minute timeslot for judging at the online Regional Showcase. The spreadsheet will need to be shared in the Zoom meeting during the judging timeslot.

UniSA Staff will judge the responses in a Question and Answer session, incorporating two (2) seen and one (1) unseen questions.

They will also judge the ability to demonstrate impact on the total cost due to changes in human resource costs or production costs.

The spreadsheet will need to be on the device that is logged in to the Zoom meeting to allow it to be shared and viewed in the judging timeslot

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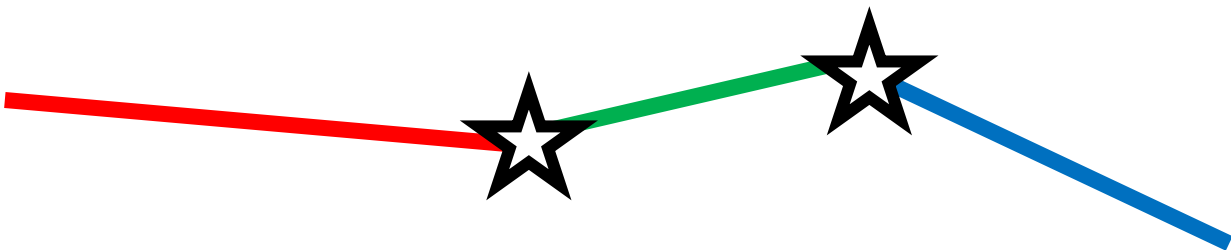
Movie Magic
STEMIE Regional Showcase
Mathematics Component

School: _____

Questions	Marks Available	Total Marks
1. Explain the categories in your spreadsheet.	**3 2 1 0 N/A**	
2. Describe how you accounted for staffing costs.	**3 2 1 0 N/A**	
3. Reflect on your graph of the total costing for the short film.	**3 2 1 0 N/A**	
4. Justify how you worked out catering and/or accommodation costs for the cast and crew.	**3 2 1 0 N/A**	
5. Justify how much of your budget is allocated to equipment and consumables?	**3 2 1 0 N/A**	
Demonstrate 2 variations using your spreadsheet (as requested by the UniSA Staff). e.g. • An increase of 8% in location fees due to rain delays • A decrease of 7% production costs due to successful first takes • An increase of 10% in total costs due to a main cast member suffering an injury Spreadsheet variation 1 Spreadsheet variation 2	 **3 2 1 0** **3 2 1 0**	
Unseen Question 1.	**3 2 1 0**	
Total Marks:		**/15**



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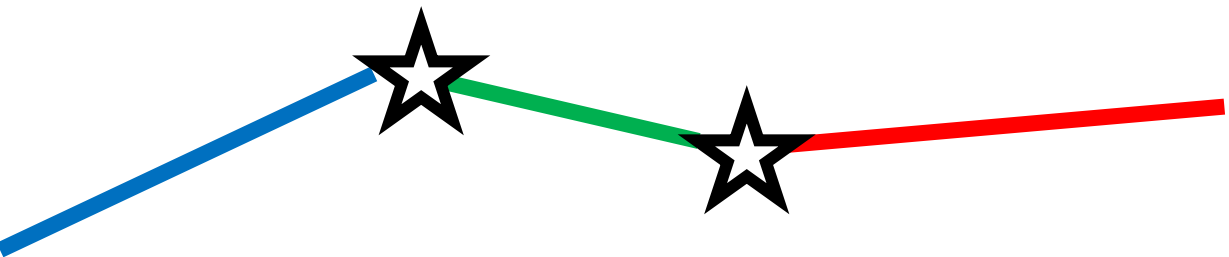

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STEM Innovation Experience
Movie Magic

Checkpoint Tasks and Overall Summary Component

Checkpoint Tasks and Overall Summary Component – Background Information

The Required Tasks need to be available for viewing via an online platform by the checkpoint dates. We recommend a website or similar platform with access via a link. If this is not possible, individual checkpoint tasks (R1-R6) can be submitted via a Google drive, drop box or similar with unrestricted access.

The purpose of these tasks is to ensure that progress has been made throughout The Learning Phase. It also allows the UniSA team to gather information relating to the implementation of STEMIE at each school site, and to gather any evidence of promotion of STEM within the school and the local and broader communities.

Overall Summary Component – The Requirements

The Overall Summary Component consists of Required task R6, the production of a 3-minute short film and STEMIE Summary Outline. The short film will also be on display at the Regional Showcase and will form part of the Technology Task Trade Display.

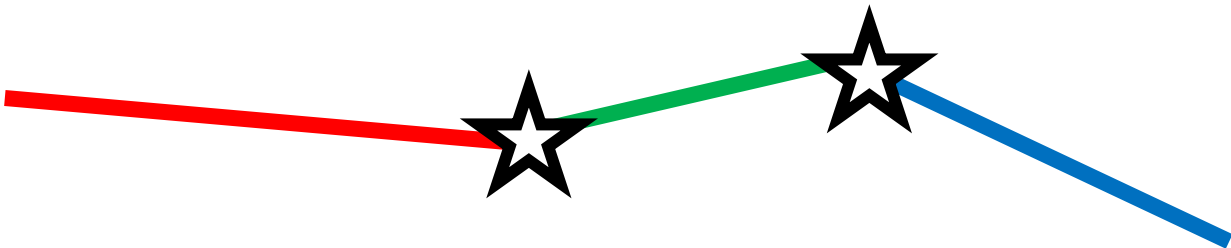
3-minute short film criteria:

- Length must be at least 2 minutes 30 seconds and must not exceed 3 minutes (excluding credits).
- The cinematic technique covered in the science component must be incorporated into the film.
- The film must have an interesting storyline, and while there is no set topic or genre, must be suitable for viewing by an audience under the age of 14.
- The use of any pre-existing footage or animations in the film must be clearly referenced in the credits at the end and cannot exceed a total of 30% of the film.
- Signed UniSA Media Release Forms must be supplied for everyone that appears on screen in the film.

Note - Factual science themed films can also be entered into The SASTA Oliphant Science Awards (subject to meeting their specific requirements).

STEMIE Summary Outline criteria:

- Summary of the development of the company branding.
- How STEMIE was implemented within the school site. (e.g. in class, after school etc)
- How STEMIE was promoted in the school, local and broader communities.
- Reflect on the difficulty of each component, identify problems that were encountered and how these were overcome.
- The outline should not exceed 2 pages (excluding photographs).



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STEM Innovation Experience
Checkpoint Task Assessment

Assessment within STEMIE will be through an online platform (Website link is the preferred platform) Schools must submit the 6 required tasks to a satisfactory standard to qualify for the Regional Showcase event. There are 20 Assessable Tasks, only 6 are ***required*** and the 14 remaining tasks are ***optional***. If students or teachers have any questions they can send them to the UniSA STEMIE email address STEMIE@unisa.edu.au

Assessment – The Process

At school, groups of students will need to work through STEMIE to produce evidence of Assessable Tasks (at a satisfactory standard) for submission at Checkpoints throughout the year.

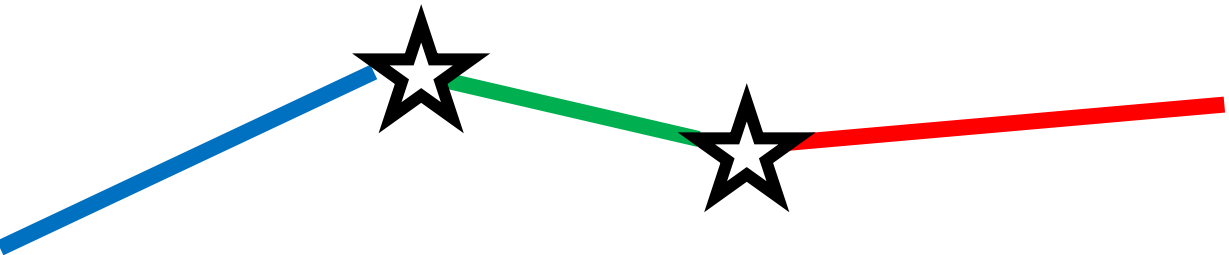
The submission requirements for each of the three Checkpoints are as follows:

- Checkpoint 0 (Last Friday in May) – optional checkpoint task
  Feedback will be provided for any schools that have sent a link to view tasks by the end of May. This is not a required deadline; it is optional for early feedback on qualification status to those schools working on STEMIE in Semester 1.
- Checkpoint 1 (Friday, Week 2 of Term 3)
  Required Task (R1) Submission of Timeline showing proposed dates and progress
- Checkpoint 2 (Friday, Week 8 of Term 3)
  Required Tasks (R2-5) Submission of required tasks in each of the Science, Technology, Engineering and Mathematics components
- Checkpoint 3 (Last day of Term 3) – **Final Progress task**
  - **Required Task (R6)** Submission of STEMIE Summary Task

The deadline for all checkpoints is 8:00pm on the dates listed above. The link to access the content (website link, drop box link or other) need to be emailed to STEMIE@unisa.edu.au by this deadline so checkpoint submissions can be viewed online.

The link will be shared with other qualifying schools after checkpoint 3 so that students can see each other's progress. Unlisted links are recommended so they are not found by searching the content, but can be viewed when the specific link is supplied. Schools will need to ensure any students in the content have school media consent, or ensure the student can not be identified from any images on the platform.

School checkpoint tasks will be assessed to ensure they meet a satisfactory level. Work that does not demonstrate a satisfactory completion will be returned via email with feedback, along with an opportunity to resubmit. For a school to qualify to compete at their Regional Showcase event, all 6 required tasks must be submitted by Checkpoint 3.



Assessment

There should only be one submission to UniSA for each required task, regardless of how many students are working on STEMIE at the school. As long as the six required task submissions are to a satisfactory standard the school will qualify to compete at the Regional Showcase.

The person emailing the tasks to STEMIE@UniSA.edu.au needs to make the subject of the email and the label of the task the School Name and Task Number (e.g. R1)

Any unsuccessful submissions will have feedback and an opportunity to resubmit.
Marks earnt in the process of qualifying for the Regional Showcase event do not carry over into the event. That is, each school starts on an even level at the commencement of the Regional Showcase event.

The winner of the Regional Showcase event will be the school who, at the end of the event, has gained the highest number of marks at the Regional Showcase event. Winners will be emailed once all schools in that region have completed the judging process.

Assessment – Optional Tasks

The remaining tasks on the matrix are optional, schools can choose to use them as part of their own assessment at school level, but they do not need to be submitted to UniSA. They are not compulsory.

Assessment – The STEMIE Final

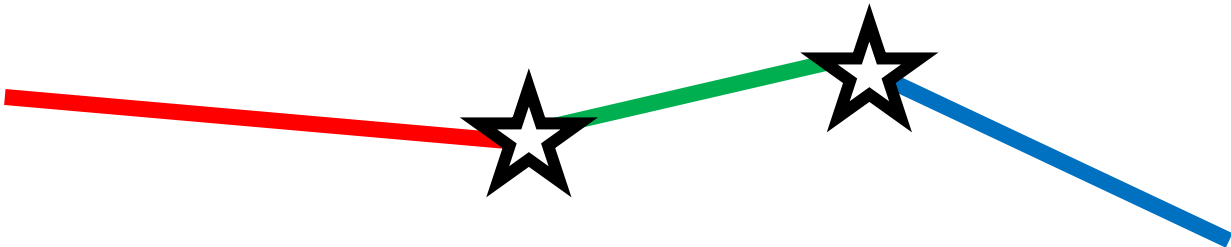
One school from each Regional Showcase will progress to the STEMIE Finals.

The school who wins their Regional Showcase event will be invited to the STEMIE Final, to be held at The University of South Australia, in November. Specific details will be supplied to winning schools.

In addition to the winners of the Regional Showcase events, there may be potential Wildcard entries into the STEMIE Final. These positions will be awarded to schools by UniSA Outreach at the conclusion of all the Regional Showcase events.

Marks awarded at the Regional Showcase do not carry over into the STEMIE Final. Each of the schools competing at the State Final will start on an even level with no advantage awarded to any school.

The school who gains the most marks at the STEMIE Final event will be crowned the winners of the STEM Innovation Experience for that year.



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STEM Innovation Experience

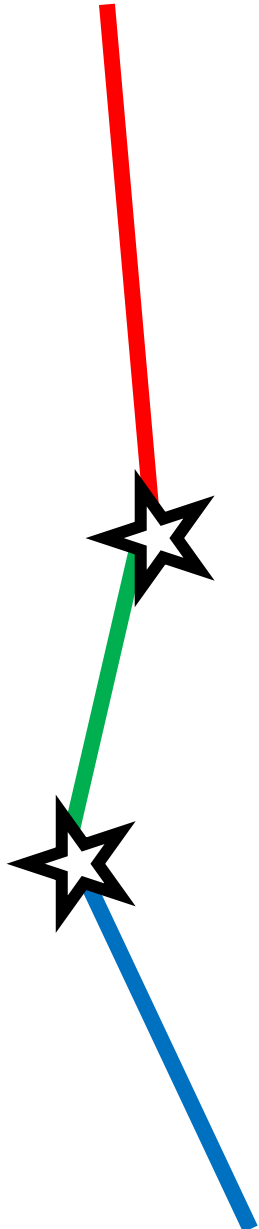
Assessment Matrix

Science Tasks	Score	Technology Tasks	Score	Engineering Tasks	Score	Maths Tasks	Score	Overall Tasks	Score
S1. Referenced research into cinematic techniques	1	**T1.** Referenced research into company branding and 3D printing	1	**E1.** Referenced research into strengths and weaknesses of camera dolly designs	1	**M1.** Mathematical justification of movie budget and contingency planning	1	**R1. Checkpoint 1** Timeline, showing tasks and proposed progress	1
S2. Practical investigation of a specific cinematic technique, including methodology, results and discussion	1	**T2.** Explanation of the interactive trade display components and their function with annotated code samples	1	**E2.** Sketch or digital 3D model (using CAD design program) of camera dolly design	1	**M2.** Mathematical justification of human resource and production costs (including scheduling sheets)	1	**O1.** One page summary outlining how STEMIE is implemented at school	1
S3. Explanation of the science behind the cinematic technique and how it is used in the video production	1	**T3.** Evaluation of display development and discussion of any additional features	1	**E3.** Summary of progress and changes to the prototype and explanation of final design features	1	**M3.** Interactive spreadsheet that can adjust the total expenditure when HR and production costs are modified	1	**O2.** Promotion of STEMIE within the school community, local community or wider community	1
R2. Checkpoint 2 Photos of progress on investigation, with dates and captions	1	**R3. Checkpoint 2** Photos of logo, display development and screen shots of code development, with dates	1	**R4. Checkpoint 2** Photos of camera dolly development & testing, with dates and captions	1	**R5. Checkpoint 2** Movie Magic mathematical calculations/ screenshots/photos with dates	1	**R6. Checkpoint 3** STEMIE 3 minute short film and accompanying brief outline	1
Possible Marks	**4**	**Possible Marks**	**4**	**Possible Marks**	**4**	**Possible Marks**	**4**	**Possible Marks**	**4**

Possible Total	**20**

Note: Only the Required Tasks (R1-R6) need to be shared with UniSA.

All other tasks are for optional use within any internal school assessment.



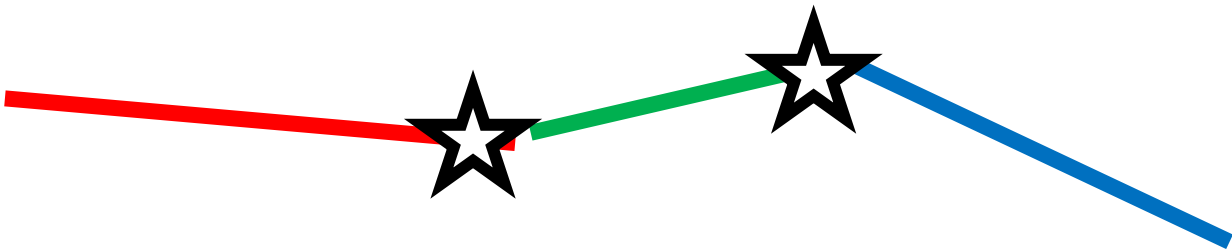
STEM Innovation Experience
Rules and Requirements

STEMIE Rules and Regulations

- While there is a competitive aspect to STEMIE, where possible, schools are actively encouraged to collaborate to share ideas, methodologies and resources.
- Accessing assistance from the wider community is also encouraged, should the required expertise to complete tasks not be available within the school.
- The first point of contact for any questions or queries relating to STEMIE is the Moodle site https://lo.unisa.edu.au/course/view.php?id=25118 This site contains electronic copies of resources provided to schools, additional web links, resources and student workshop activities.
- Additional questions can be sent to STEMIE@unisa.edu.au Teachers and their students are welcome to use this address to get assistance with their work.
- Question and Answer sessions can also be booked by schools (subject to staff availability). This will allow a UniSA staff member to Zoom link with your students and answer any potential questions they have or provide feedback on their ideas.

STEMIE Regional Showcase Judging Requirements

- To qualify for the Regional Showcase event, Required Tasks R1-R6 must be available for viewing online by the checkpoint deadlines, and to a satisfactory standard.
- The additional tasks on the assessment matrix are for optional use at school, they do not need to be submitted to UniSA for assessment.
- It is the responsibility of each school to ensure that the requirements for assessment at the Regional Showcase event are set up and that devices required to demonstrate the work during the Zoom meeting are functional.
- Each of the other Regional Showcase elements will have an allocated judging time, this will need to be strictly adhered to. Content of presentations or answers to questions that exceed the allocated judging time will not be considered.
- The supervision of students and set up of equipment for the Regional Showcase event is the responsibility of the school.
- Please ensure you have tested your devices and installed any required apps to access Zoom prior to the allocated judging time. One device must be portable during the judging of the technology and engineering tasks to allow the judges to view the prototypes from requested angles.
- The deadline for all Checkpoint items is 8:00pm on the date listed in the timeline. All submissions must be available online by this time and link received electronically via the UniSA STEMIE email STEMIE@UniSA.edu.au
- It is the responsibility of the school to keep copies of all work submitted
- Please ensure the student team representing the school and presenting ANY CONTENT at the Regional Showcase does not exceed a total of six (6) students.
- Teachers contributing to content during the judging allocations could result in the team being ineligible for the STEMIE Final position.
- Students and teachers are welcome to watch the presentations and assistance with IT issues, holding cameras etc. are not considered content linking in the judging process.



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STEM Innovation Experience
Regional Showcase

STEMIE – The Regional Showcase

Students present a selection of their work in a judging timeslot via Zoom for the Regional Showcase.

Once qualified, a team of six (6) students will represent your school.

Each school will be judged on the following:

- Science Component – Formal presentation of the learning in the science activity.
- Technology Component – Judging of the Arduino coded prototype linked to their chosen theme.
- Engineering Component – Judging the function of the Engineering prototype
- Mathematics Component – "Question and Answer" session of seen and unseen questions and demonstration of their dynamic spreadsheet.

The dates for each of the Regional Showcase events are as follows:

- Allocation of judging timeslots opens in September; links will be sent to the schools contact teacher.
- Judging occurs as per allocated timeslots.
- Emails will be sent to announce the winners of each Regional Showcase once all the schools within that region have completed the judging process.

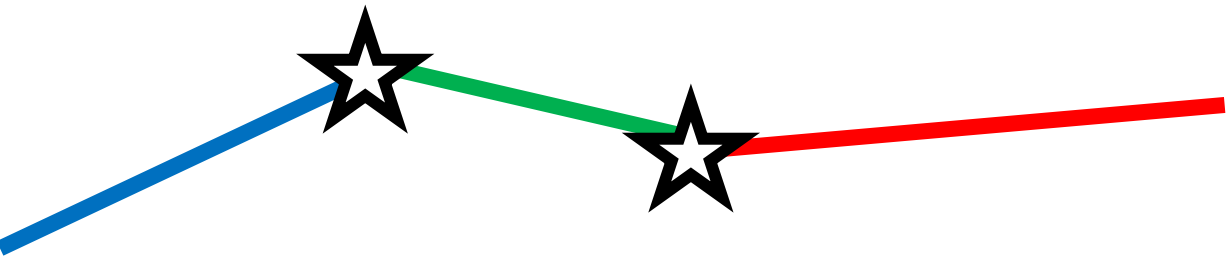
Schools will need to have the following on the day:

- Six (6) student representatives to present to judges, and their teacher to supervise.
- Presentation materials for the science component.
- Arduino coded Prototype for demonstration.
- Engineering device to be tested and judged.
- Dynamic spreadsheet and prepared answers to seen questions.
- Access to the Zoom link that will be sent to the school contact teacher on an iPad, Tablet, mobile device or similar to allow judges to view prototypes.
- Access to the Zoom link on a device that can share science presentation content and/or the mathematics spreadsheet.

Each school will be allocated a total on 1 ½ hours for their official judging timeslot, during which they will complete all assessment for the Regional Showcase event.

Students and their teacher will be required to be logged into the Zoom meeting for the duration of the judging timeslot.

In the event of a tie within a region, the overall task (Required Task 6) will be used to determine the winner. This needs to be available from the date of checkpoint 3, until the STEMIE Final date, via the online link supplied from the school.



STEM Innovation Experience

Task Information

The STEMIE Final

STEM Innovation Experience – STEMIE Final

The winners from each of the Regional Showcase event and any Wildcard entries will be eligible to compete at the STEMIE Final to be held at the University of South Australia.

The STEMIE Final will consist of a series of unseen STEM and teamwork challenges to be completed against the clock. Errors will result in time penalties, so accuracy is important. Schools from across South Australia and any participating interstate teams will be competing at the event. The winning team will be the fastest team (including any time penalties) to complete all the challenges on the day.

The event will be held in November. Specific details will be sent to the winning schools and can be found in the *Key Dates* tab on the STEMIE Moodle.
https://lo.unisa.edu.au/course/view.php?id=25118

A maximum of six (6) students per participating school, accompanied by their teacher, will compete in unseen STEM challenges on the day. The teacher will have duty of care for their students at all times, including lunch breaks.

All students that participate in the STEMIE Final will require a signed UniSA Media Release Form

Note – Transport of students to and from the STEMIE Final is the responsibility of the school.

Further details about the event will be provided via email to the Regional Showcase event winners and any Wildcard entries closer to the date.

If you have any questions about STEMIE you can email
STEMIE@unisa.edu.au