stat.
Science Teachers
Association of Tasmania Inc.

Innovation: Powering Future Industries

2023

Tasmanian Science Talent Search

stat. Science Teachers Association of Tasmania Inc.

Tasmanian Science Talent Search 2023

Innovation: Powering Future Industries

CONTENTS

The Tasmanian Science Talent Search

About the Tasmanian Science Talent Search

The Tasmanian Science Talent Search (TSTS) is an initiative of the Science Teachers Association of Tasmania. It has been operating consistently for the last 60 years (although not always under the same name) and has involved over 60 000 students across Tasmania.

Through TSTS we aim to inspire a lifelong interest in science, promote high quality teaching and learning, & highlight a national path to Science and STEM excellence.

The National Science Week 2023 Schools Theme is **Innovation: Powering Future Industries.** This theme incorporates the advancement in technologies across industries, particularly the use of artificial intelligence (AI) and its application and use across all science fields. Student investigations could include the use of AI in industry, advancements in renewable energy technology, data science, & environmental monitoring.

TSTS Categories

The 10 categories will be judged across 6 divisions. All categories will be awarded first place, runner up prizes. Prizes vary across the various categories and are allocated on a yearly basis according to sponsorship.

Categories

Themed Categories

- Picture Book
- Creative Writing
- Photographic Essay
- Video
- Scientific Essay
- STEM Challenge

Open Categories

- Environmental Science Project
- Engineering & Invention Project
- Research Investigation

Divisions

Division 1: Years K - 2
Division 2: Years 3 - 4
Division 3: Years 5 - 6
Division 4: Years 7 - 8
Division 5: Years 9 - 10
Division 6: Years 11 - 12

Please note that not all categories are available in all divisions.
See the category pages for details.

Contacts & Help

For more information, visit stat.org.au/tsts
For all queries please contact TSTS Director Alana De Luca via tsts@stat.org.au

Science Teachers Association of Tasmania

The Science Teacher's Association of Tasmanian Inc (STAT) is a professional association for Tasmanian science educators from kindergarten to tertiary level. It is a fully volunteer run, non-profit professional association that exists for the support of science education in all its forms.

STAT Mission Statement

Supporting all Tasmanian Science Teachers to provide excellence in science education.

Strategic Priorities

- Committed to developing a community of science teachers through collaboration and networking
- Aims to provide a variety of professional development, responsive to the needs of STAT members
- To grow teacher capacity and student outcomes through the sharing of resources and knowledge
- Supporting inclusive student focused learning in Science and STEM

Supporting inclusive, student focused learning in Science and STEM

Through the Tasmanian Science Talent Search, the Science Teachers Association of Tasmania supports student focused learning in Science and STEM and encourages science teachers to provide their students with the opportunity to develop a broad understanding and application of science which is fundamental now and in the future. Through TSTS we aim to develop students skills and attitudes which will contribute to the development of the wider community and world in which they live and will work.

Submission Information

Entry Fees

School STAT Member: Free (unlimited entries)
Individual STAT Member: Free for individuals own students (up to 30 entries)
Non-STAT Member: $10 per entry

Conditions of Entry

TSTS2023 is open to all Tasmanian students K - 12. All entries must be submitted via the stat.org.au website, following the required submission procedure.
STAT expects that work submitted to the TSTS is of a high standard. On the rare occasion that entries do not meet that standard the judging committee reserves the right not to award prizes in any division.
Entires submitted to the TSTS may be displayed on the STAT website or shared at presentation events.
The Tasmanian Science Talent Search reserves the right to publish entries, entrants names, and any photographs taken at TSTS related events.
If possible, students in Divisions 4 - 6 who submit entries for Creative Writing, Scientific Essay, STEM Challenge, Research Investigations, Environmental Science Projects, or Invention & Engineering Projects should pass their work through Turnitin and submit the report with their entry.
If students are not able to access Turnitin, the judges reserve the right to submit a student's entry for checking.
A risk assessment is required for all TSTS entries in the Open Section categories & the STEM Challenge. A risk assessment form can be found at the end of this booklet.
Entries that do not follow submission guidelines for their category will not be considered. Please read the entry guidelines carefully.
For the Inventions & Engineering Project category, models and inventions may contain commercially available components but must not be solely assembled from or based on commercially available kits.

Safety Considerations

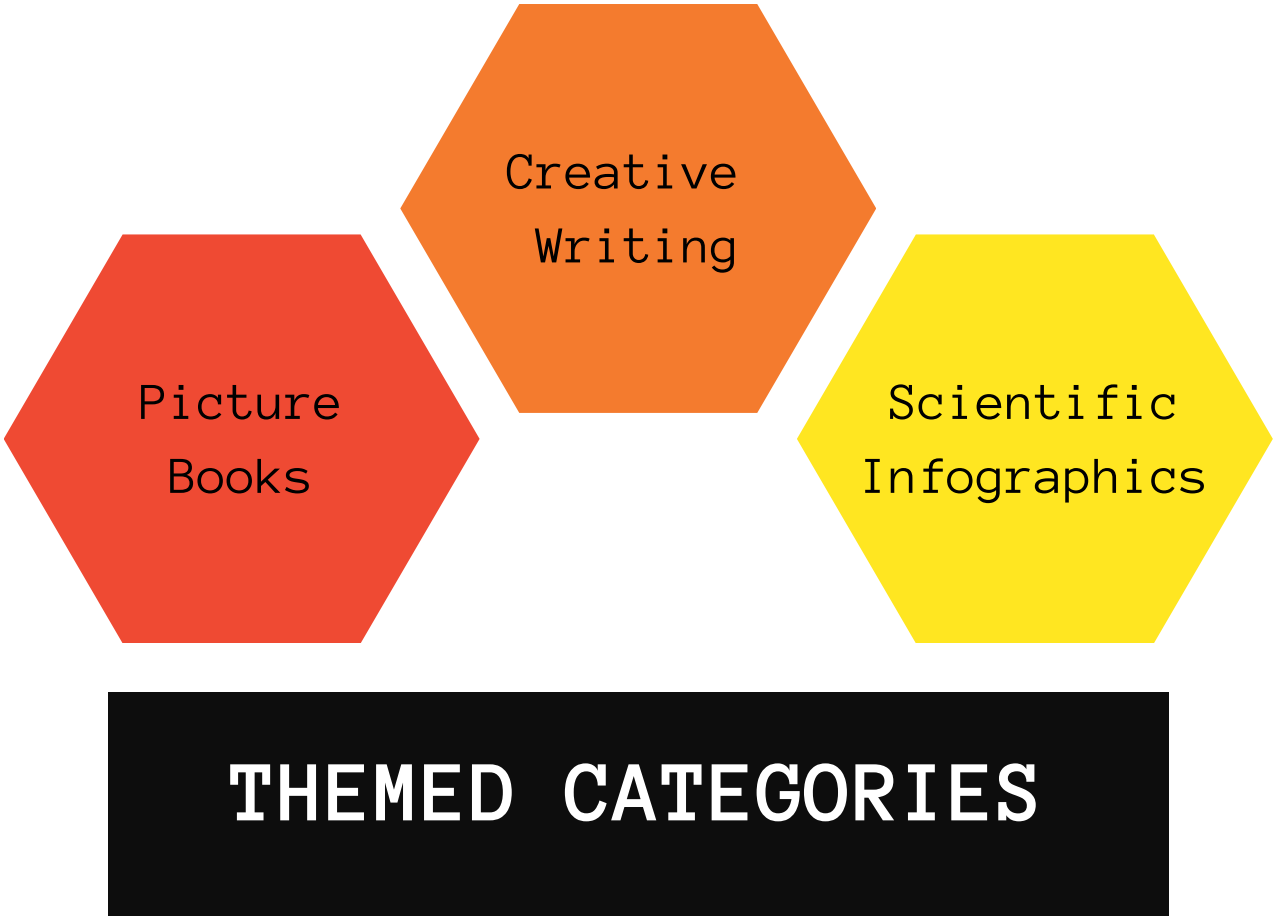
Students and their supervising teachers or parents should ensure that all entries are conducted in a responsible and safe manner. Projects involving microorganisms will only be accepted if adequate safety precautions are evident and the microorganisms present no threat to the health of individuals or the environment. Projects including explosives, rocket fuels, or other hazardous chemicals detrimental to the environment or potentially harmful to individuals will not be accepted. All electrical experiments should not be in excess of 32 volts AC or 115 DC. Projects involving illegal activities will not be accepted.

All entries must be submitted via the www.stat.org.au website following submission procedures. All entries should be submitted as PDFS except in the video category where a weblink should be provided.

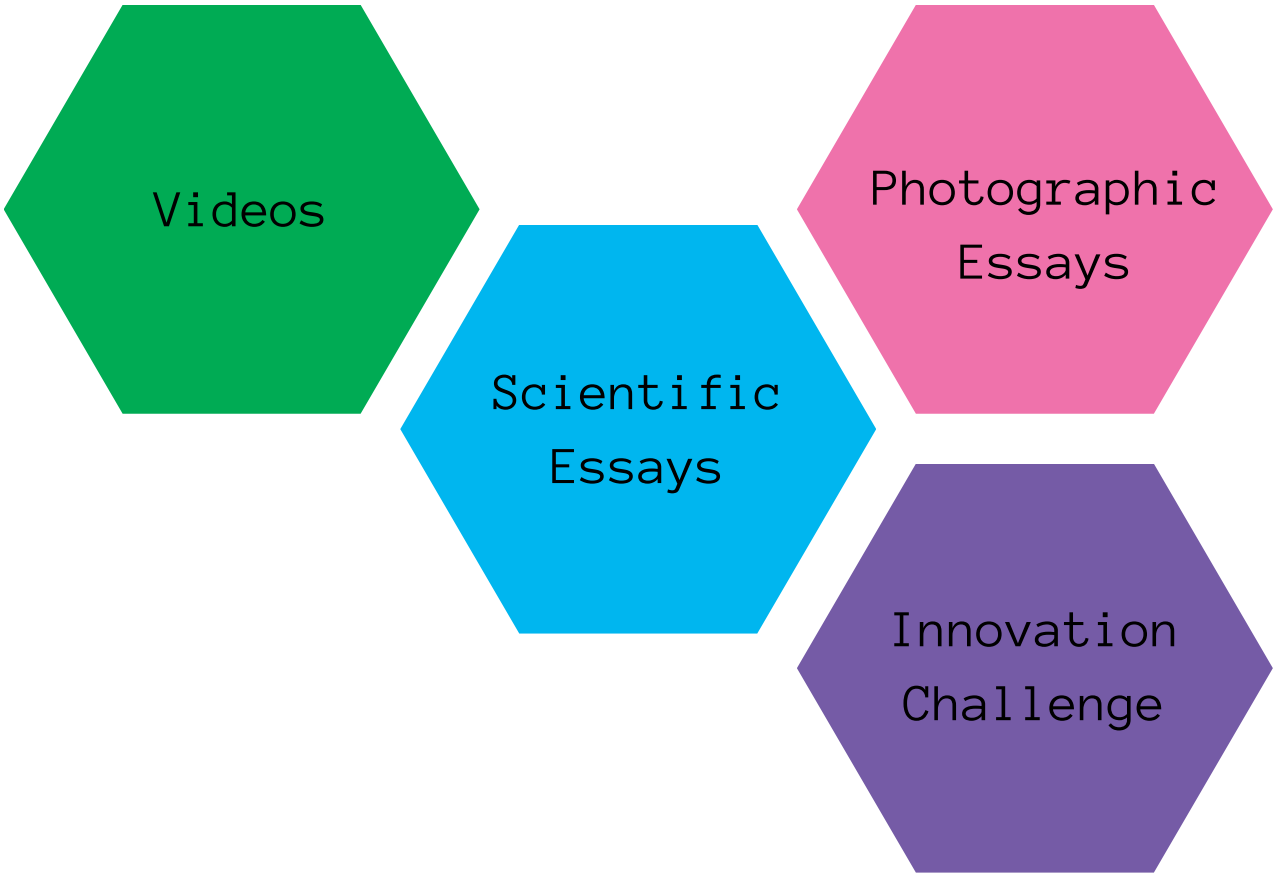
stat. Science Teachers Association of Tasmania Inc.

Tasmanian Science Talent Search 2023

Innovation: Powering Future Industries



THEMED CATEGORIES



stat. Science Teachers Association of Tasmania Inc.

Tasmanian Science Talent Search 2023

Innovation: Powering Future Industries

PICTURE BOOKS

THIS CATEGORY IS OPEN TO DIVISIONS 1 - 3

Entry Guidelines

- Entries must be relevant to the topic of **Renewable Energy** and be a work of **fiction.**
- Entrants may be individuals or small groups (of up to 3 students). Divisions 1 and 2 may submit whole class entries.
- Entries should include **scientific concepts** and **information** in the story.
- Entries should consist primarily of pictures supported by **minimal text**.
- An **appendix** including a brief explanation of **5 key scientific concepts or ideas** used to develop the story should be included.
- A **bibliography** listing all sources used to develop the entry should be included.
- An **acknowledgements** statement listing any people who helped and what they did should be included in the submission.
- Typed text is encouraged but not essential however, handwriting should be clear and legible if used.
- Pictures can be created using any medium.
- Downloaded images cannot exceed 25% of total artwork and must be cited.

Word Limits

Division 1: 200 words
Divisions 2 – 3: 300 words

Submission Deadline

7 July 2023

Instructions

1. Decide on the 5 key science ideas you want to cover in your entry.
2. Create your picture book. Remember, artwork can be created using any medium and at least 75% should be original work. Handwriting is OK as long as it is clear and legible, but typed text is preferred.
3. Add your appendix summarising the science ideas you used to develop your story.
4. Add your bibliography and acknowledgments.
5. Submit your picture book as an A4 or A3 PDF.

Resources

Exploring Picture Story Books
Writing Your Picture Story Book

stat. Science Teachers Association of Tasmania Inc.

Tasmanian Science Talent Search 2023

Innovation: Powering Future Industries

CREATIVE WRITING

THIS CATEGORY IS OPEN TO ALL DIVISIONS

Entry Guidelines

- Entries must be relevant to the topic **Innovation: Powering Future Industries**
- Only individual entries will be considered for this category.
- Entries must be **imaginative**. This could mean a diary, letter, speech, cartoon, narrative, fable, poem, etc.
- Entries should include at least **5 key science concepts**, which should be listed in an appendix.
- A **bibliography** listing all sources used to develop the entry should be included.
- An **acknowledgements** statement listing any people who helped and what they did should be included in the submission.
- Typed text is encouraged but not essential. Handwriting should be clear and legible if used.
- Illustrations can be used to complement the writing or as an integral part of the text style. Any medium can be used.
- Downloaded images **cannot** exceed 25% of total artwork and must be cited.

Word Limits

Division 1: 50 – 300 words
Division 2: 100 – 500 words
Divisions 3 – 6: 250 – 1000 words

Submission Deadline

7 July 2023

Instructions

1. Decide on the 5 key science ideas you want to cover in your entry.
2. Write your piece. Be creative!
3. Add your appendix listing each scientific idea covered in your entry. For Divisions 3 and above, this should include a short (1 – 3 sentence) explanation of each concept.
4. Add your bibliography and acknowledgments.
5. Submit your entry as an A4 PDF.

Tasmanian Science Talent Search 2023

Innovation: Powering Future Industries

SCIENTIFIC INFOGRAPHICS

THIS CATEGORY IS OPEN TO ALL DIVISIONS

Entry Guidelines

- Entries must be relevant to the topic **Innovation: Powering Future Industries**
- Only individual entries will be considered for this category.
- Entries should be informed by personal research or be part of a learning sequence.

Divisions 1 - 3

- Entries should integrate understanding of scientific concepts with artistic skill and interpretation.
- Entries should be in the style of a **scientific infographic poster**
- Posters may combine graphic and text elements.
- Typed text is encouraged but not essential. Handwriting should be clear and legible if used.

Divisions 4 - 6

- Entries should be in the style of a **scientific infographic poster**
- Posters should integrate visual style and information and contain both graphic and textual elements
- Typed text is encouraged but not essential, handwriting should be clear and legible if used.

Submission Deadline

7 July 2023

Instructions

1. Decide on the topic of your scientific infographic. Scientific infographics should communicate a science concept, issue or idea in a way that is eye-catching, informative and/or challenges a person's thinking.
2. Create your entry.
3. Submit your entry as an A3 PDF.

Resources

How to make an infographic

PHOTOGRAPHIC ESSAYS

THIS CATEGORY IS OPEN TO DIVISIONS 2 - 6

Entry Guidelines

- Entries must be relevant to the topic **Innovation: Powering Future Industries**
- Only individual entries will be considered for this category.
- Entries should include a series of 6 – 8 photographs that tell a story.
- Photographs must be taken by the entrant for the purpose of this competition.
- Photos may be edited by the entrant.
- Each photograph may include a caption of up to 20 words.
- Photographs can be arranged in any sequence.
- No photograph can exceed 1 MB and entries must not exceed 8 MB in total.
- Include a numbered list of all photographs in the order they appear and state what if any editing has been performed.
- An artist's statement of up to 200 words, acknowledgments, and bibliography should be included in the entry.

Submission Deadline

7 July 2023

Instructions

1. Take your photographs and edit them if you would like to.
2. Create your title page. This should include your project name, your name, the division you are entering, and your school's name.
3. Add your photos (one per page) in any order you like. Photos may be accompanied by a caption (up to 20 words each).
4. Write your artist's statement (no more than 200 words).
5. Add your bibliography and acknowledgments.
6. Submit your essay as a PDF. All entries must be submitted via the www.stat.org.au website, following the required submission procedure.

stat. Science Teachers Association of Tasmania Inc.

Tasmanian Science Talent Search 2023

Innovation: Powering Future Industries

VIDEOS

THIS CATEGORY IS OPEN TO ALL DIVISIONS

Entry Guidelines

- Entries must be relevant to the topic **Innovation: Powering Future Industries**
- Entries may be submitted by individuals or by small groups of up to 3 students. Divisions 1 and 2 may submit whole class entries.
- Entrants may choose any topic related to the theme and any genre.
- Videos should be informed by personal research or be part of a learning sequence.
- Videos must be the work of the entrant. Any footage from other sources must make up less than 10% of the final video.
- Only the entrant may work on the editing and post-production of the video. Techniques taught by teachers etc must be done using unrelated footage.
- Videos should be 90 seconds to 3 minutes long not including credits.
- Credits should include roles of entrants, bibliography, acknowledgments, and a list of equipment and software used.
- Credits should be up to 30 seconds long.

Submission Deadline

7 July 2023

Instructions

1. Choose the topic you wish to convey in your video.
2. Write a script and plan your shoot. Think about your use of sound, slow motion, subtitles, animation, colour, etc.
3. Film and edit your footage.
4. Include a credits section. Make sure to add everyone involved and what they did.
5. Upload your video to a video sharing site like YouTube
6. Make sure your video can be viewed by anyone with a link.
7. Submit your video by sharing a link to your entry All entries must be submitted via the www.stat.org.au website, following the required submission procedure.

Resources

Sleek Geeks

MyState Filmmaking Guides

Tasmanian Science Talent Search 2023

Innovation: Powering Future Industries

SCIENTIFIC ESSAYS

THIS CATEGORY IS OPEN TO DIVISIONS 4 - 6

Entry Guidelines

- Entries must be relevant to the topic **Innovation: Powering Future Industries**
- Entrants may choose from one of the following topics for their scientific essays:
  - Artificial intelligence is the key to advancement in technologies
  - The development of new technologies is needed to for a sustainable future
- Indicate the topic choice in the title of your entry.
- Only individual entries will be considered for this category.
- The essay must incorporate scientific information and evidence
- Essays should follow conventions of persuasive writing.
- References should be cited in-text and a bibliography included at the end of the essay.
- Include An acknowledgements paragraph listing anyone who assisted with the essay and what they did.
- Formatting: Times New Roman or Arial font, 12 pt., 1.5 line spacing, 2.5 cm margins.

Word Limits

- Division 4: 1200 words
- Division 5: 1500 words
- Division 6: 2000 words

Submission Deadline

7 July 2023

Instructions

1. Choose the topic you wish to write your essay on. Make sure it is clear which you have chosen.
2. Plan your essay. Write a thesis statement, do some background reading, and plan your arguments.
3. Write your essay. You may want to use images, tables, or graphs to support your argument, but these should be used sparingly.
4. Cite your sources in-text and include a bibliography.
5. Add an acknowledgements paragraph at the end of your essay including anyone who helped develop your essay including in the planning or editing stages.
6. Submit your essay as a PDF. All entries must be submitted via the www.stat.org.au website, following the required submission procedure.

Resources

Persuasive Writing

Plagiarism & Referencing

stat. Science Teachers Association of Tasmania Inc.

Tasmanian Science Talent Search 2023

Innovation: Powering Future Industries

INNOVATION CHALLENGE

THIS CATEGORY IS OPEN TO ALL DIVISIONS

THIS YEAR'S CHALLENGE IS TO IDENTIFY A PROBLEM FACED BY THE AGRICULTURAL INDUSTRY AND DEVELOP AN INNOVATIVE SOLUTION TO SOLVE THIS PROBLEM

THE AGRICULTURAL INDUSTRY IS THE SOURCE OF THE WORLDS FOOD SUPPLY. TO ENSURE WE ARE ABLE TO FEED THE GLOBAL POPULATION AND ALSO LOOK AFTER OUR NATURAL ENVIRONMENT WE NEED SOME INNOVATIVE SOLUTIONS

Entry Guidelines

- Entries must be related to the above topic.
- Entries may be submitted by individuals or by small groups of up to 2 students. Divisions 1 and 2 may submit whole class entries.
- A bibliography should be included at the end of the submission.
- Submissions must include photographs, drawings, schematics, and videos to support the text.

Submission Deadline

1 September 2023

Instructions

1. Do some research. What are some existing solutions to the problems? Are there any issues with these?
2. Follow the suggested engineering design process on the next page.
3. Write up a report.
4. Submit your entry as a PDF with supporting evidence.

Resources

National Science Week 2023

stat. Science Teachers Association of Tasmania Inc.

Tasmanian Science Talent Search 2023

Innovation: Powering Future Industries

SUGGESTED ENGINEERING DESIGN PROCESS

What is the problem you could solve, or the research opportunity that you would investigate, if you could?

- Find out more.
- What have other people done previously?
- What are the limitations or constraints?
- What is your goal or the mission of your project?
- How can you solve the problem or conduct the research?
- What would you do?

Decide on and design your innovative solution

- What is the innovative solution that you have developed to solve your problem
- Explain why you selected this solution you took and how it may have built on other ideas.
- Why is your solution innovative and what makes it different and unique.

Prototype and develop

- This doesn't have to be a real working model, a design on paper is fine. Unless you really want to build, then great! Maybe it could be a computer aided design, or a coded animation.
- Describe the engineering details; list the steps that would need to be taken and the materials needed, and how it will work.
- Include labelled diagrams and details explaining your solution
- Identify any safety issues and how you would lessen risk.

Test your model

- Imagine your model was real, what tests would you conduct to see if it works?
- What are the strengths and weaknesses of your solution?
- What modifications/refinements could you do to improve/adjust your solution?
- What are future possibilities of your solution?
- How could you improve your solution further?
- Record your steps with notes, diagrams, and/or photographs or video.

Share and Reflect

- Who would your solution benefit?
- Who could you share your solution with?
- What would your next steps be in getting your solution out into the world?

stat. Science Teachers Association of Tasmania Inc.

Tasmanian Science Talent Search 2023

Innovation: Powering Future Industries

Research Investigations

OPEN CATEGORIES

Environmental Science Projects

Engineering Inventions

stat. Science Teachers Association of Tasmania Inc.

Tasmanian Science Talent Search 2023

Innovation: Powering Future Industries

RESEARCH INVESTIGATIONS

THIS CATEGORY IS OPEN TO ALL DIVISIONS

Entry Guidelines

- This is an **open section**.
- Entries may be submitted by individuals or small groups of up to 3 students. Divisions 1 and 2 may submit whole class entries.
- An **acknowledgments** section listing all people who helped with the investigation and what they did must be included in the report.
- **Do not** use standard school experiments. If based on a school experiment, it should offer a novel application, have some change, or use the method across a wider range of conditions.
- Quantitative data is encourage but qualitative data will be accepted if analysed appropriately.
- A risk assessment must be included with entries. Entries without a risk assessment included **will not** be considered for judging.
- Formatting: Times New Roman or Arial font, 12 pt, 1.5 line spacing, 2.5 cm margins.

Submission Deadline

1 September 2023

Instructions

1. Choose the topic you wish to investigate.
2. Do some background research to understand the main concepts associated with your topic. Seek expert knowledge from within your community or the industry associated with your topic.
3. Identify a problem or a knowledge gap to address in your investigation.
4. Take some time to plan your investigation and your experiments.
5. Perform your experiments! Keep a detailed log book of your methods and results. Make sure you note down if anything goes wrong or was unexpected.
6. Analyse your data and decide how you want to display it. What kind of graphs or tables will best show your results?
7. Write up a report. Check out the guides below for more information.
8. Submit your report as an A4 PDF.

Resources

Writing a Primary Research Investigation Report

Writing a Secondary Research Investigation Report

Predictions v Hypotheses

Controlled Experiments

Variables

The Scientific Method

stat. Science Teachers Association of Tasmania Inc.

Tasmanian Science Talent Search 2023

Innovation: Powering Future Industries

ENVIRONMENTAL SCIENCE PRØJECTS

THIS CATEGORY IS OPEN TO DIVISIONS 4 - 6

A Environmental Science Project can be used to report on a 'grass-roots' initiative in agriculture, conservation, land management or related disciplines. Projects can be Case Studies of works completed by a school, local community citizen science group or partnership. Works currently 'in progress' are also appropriate.

Entry Guidelines

- This is an **open section**.
- Entries may be submitted by individuals or small groups of up to 3 students.
- Entries should be related to the study of the environment or solving an environmental problem **in the entrant's school or local community.**
- A **bibliography** listing all resources used must be included.
- An **acknowledgements** page identifying people who worked on the initiative must be included.
- Formatting: Times New Roman or Arial font, 12 pt, 1.5 line spacing, 2.5 cm margins.

Word Limit

1500 – 3000 words

Submission Deadline

1 September 2022

Instructions

1. Choose a problem or challenge you wish to address in your project. Make sure to clearly outline what this problem is in your background.
2. Do some background research on your chosen topic. Seek expert knowledge from within your community or the industry associated with your topic.
3. Write up a comprehensive background section summarising your research and your project aims.
4. Include a section that addresses the methods, interventions, or strategies you will use to address your problem.
5. Present your observations and results. Use measurements where possible. You can display your results however you like, as tables, graphs, photos, interview, maps, etc.
6. Write your discussion section. This should describe the outcomes of your work, analyse what was and was not successful, identify errors or problems you encountered, and suggest possible improvements or future work that needs to be done.
7. Submit your report as an A4 PDF.

stat. Science Teachers Association of Tasmania Inc.

Tasmanian Science Talent Search 2023

Innovation: Powering Future Industries

ENGINEERING INVENTIONS

THIS CATEGORY IS OPEN TO DIVISIONS 3 - 6

Entry Guidelines

- This is an **open section**. Students may plan, carry out and report on an experimental inquiry on a topic in which they have a personal interest, or is of community relevance.
- Entries may be submitted by individuals or small groups of up to 3 students.
- Using an **Engineering Design Process**, students identify a problem then create, test, and refine a working invention.
- An invention may be a completely new idea or a significant refinement of an existing device. A method or process can be an invention.
- An entry must be a working invention that solves **a real problem.** IT-based projects in an Engineering or Science context are also eligible.
- Entries must apply **scientific principles** and show research into similar or rival inventions or devices.
- Entries must be well manufactured.
- A **bibliography** listing all resources used must be included.
- An **acknowledgements** section identifying people who worked on the initiative must be included.
- A report, risk assessment, logbook, and video **must** be submitted for an entry to be eligible.
- Formatting: Times New Roman or Arial font, 12 pt, 1.5 line spacing, 2.5 cm margins.

Word Limit

800 – 3000 words

Submission Deadline

1 September 2022

Instructions

1. Choose a problem. and research current solutions to this issue.
2. Design a device or product to solve the problem or provide an alternative to current solutions.
3. Write up your report (use the Engineering Inventions Report link below as a guide)
4. Submit your report as an A4 PDF. Make sure you include your logbook and a video of your invention.

Resources

Engineering Design Process

Engineering Inventions Report

stat. Science Teachers Association of Tasmania Inc.

Tasmanian Science Talent Search 2023

Innovation: Powering Future Industries

RISK ASSESSMENT

This form is required for all entries into the Research Investigation, Environmental Science Project, Invention & Engineering, and STEM Challenge categories.

Student Name	
Teacher* Name	
Project Title	

*Parent/Guardian if student is home-schooled

Part 1: Project Risks

List the risks associated with your project:

Describe the safety precautions you will take to minimize the risks associated with your project:

Part 2: Specific Hazards

List all hazardous chemicals, activities, and/or equipment that you will use. If your project does not involve any hazardous materials, go to part 3.

List any potentially hazardous biological agents that you will use:

Describe the safety precautions and procedures that you will use to reduce the hazards associated with your project:

Describe the disposal procedures of any hazardous chemicals or potentially hazardous biological agents that you will use:

Part 3: References

List the source(s) of safety information you used, including websites, books or laboratory safety guidelines:

Part 4: Declaration

☐ I/we have talked with an appropriate adult about the risks associated with this project and how I/we will manage these.

☐ I/We have discussed with an appropriate adult about any specific hazards associated with this project and how I/we will manage these, including the safe disposable of any hazardous materials

Signed Student(s): _____ Date:__/__/_____

Signed Teacher*_____ Date:__/__/_____

*Parent/Guardian if student is home-schooled

2023 SPONSORS

The Tasmanian Science Talent Search is an entirely non-profit endevour of the Science Teachers Association of Tasmania. TSTS relies on the generous support of sponsors to provide prize money and support the administrative costs of running this program.

We would like to give a huge thank you to this years supporters, in particular, Rowe Scientific, without whom we would not be able to provide this opportunity to Tasmania's science students.

stat.
Science Teachers
Association of Tasmania Inc.