2022

TASMANIAN SCIENCE TALENT
SEARCH (TSTS)

INFORMATION BOOKLET

GLASS: More than meets the eye





Contents

The Tasmanian Science Talent Search	
Submission Information	<u>4</u>
Themed Categories	
Picture Books	<u>6</u>
Creative Writing	<u>7</u>
Posters	<u>8</u>
Photographic Essays	<u>9</u>
Videos	<u>10</u>
Scientific Essays	<u>11</u>
STEM Challenge	<u>12</u>
Open Categories	
Research Investigation	<u>15</u>
Environmental Science Project	<u>18</u>
Engineering Inventions	<u>19</u>
Risk Assessment Form	
Sponsors	



The Tasmanian Science Talent Search

About the Tasmanian Science Talent Search

The Tasmanian Science Talent Search is an initiative of the Science Teachers Association of Tasmania. It has been operating continuously since 1960 (though not always by the same name) and has involved over 60,000 students since its inception.

Through the TSTS, we aim to:

- Inspire a lifelong interest in science
- Promote high quality teaching and learning
- · Highlight a Pathway to Excellence

The <u>National Science Week 2022</u> school theme is *Glass: More than Meets the Eye*.

This year is also the **United Nations International Year of Glass**, celebrating the past, present and future of glass for a sustainable, equitable and better tomorrow!

Awards and Prizes

10 Categories will be judged across 6 divisions. All categories will be awarded a First Prize and Runner Up.

Merit awards will be awarded across the divisions and sections

Categories

THEMED

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

OPEN

- Research Investigations
- Environmental Science Project
- Inventions & Engineering

Please note not all divisions are eligible for all categories. See the category information for details.

Divisions

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

Division 6: 11 – 12

Contact and Help

For all queries or questions please contact TSTS Coordinator Alana De Luca via tsts@stat.org.au



Submission Information

Conditions of Entry

TSTS 2022 is open to all Tasmanian students K-12.

All entries must be submitted via the www.stat.org.au website, following the required submission procedure.

There is no entry fee for TSTS 2022

STAT expects that work submitted to the TSTS is of a high standard. On rare occasions, where entries do not meet that standard, the judging committee reserves the right not to award prizes in a division.

If possible, students in Intermediate Secondary and Senior Secondary Divisions who submit entries for: Creative Writing, Scientific Essay, STEM Challenge, Research Investigations, Natural Sciences Project, and Invention/Engineering should pass their work through Turnitin and submit the report with their entry. with the summary report submitted with their entry.

If students are not able to access Turnitin, judges reserve the right to submit a student's entry for checking.

A Risk Assessment form is required for **ALL** Tasmanian Science Talent Search entries for the Open sections of the TSTS: Research Investigation, Environmental Science Project, Inventions & Engineering entry and the STEM Challenge if appropriate. A risk assessment form can be found at the end of this booklet.

Entries that do not follow the submission guidelines for their category will not be considered. Please read the entry guidelines and 'what to do' sections carefully. For the Inventions & Engineering category, models and inventions may contain commercially available components such as switches, motors, meters etc, however entries must not have been solely assembled from, or based on commercially produced kits.

Safety Considerations

Students and their supervising teachers or parents should ensure that their science 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 involving hazardous chemicals, explosives, rocket fuels, 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 volts DC.

Projects involving illegal activities will not be accepted.

Electronic Submission Requirements
All entries must be submitted via the
www.stat.org.au website, following the
required submission procedure.

All entries should be submitted as PDFs EXCEPT in the video category where a weblink should be provided.



Themed Categories

Picture Books

Creative Writing

Posters

Photographic Essays

Videos

Scientific Essays

STEM Challenge



Picture Books

This category is open to DIVISIONS 1 - 3

Entry guidelines

- Entries must be relevant to the topic Looking through a glass window 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 science 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. 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: 29 July 2022

What to do:

- 1. Decide on the 5 key science ideas you want to cover in your entry.
- 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.
- 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 All entries must be submitted via the www.stat.org.au website, following the required submission procedure.

Resources and inspiration

Exploring Picture Story Books
Writing Your Picture Story Book



Creative Writing

This category is open to **ALL DIVISIONS**

Entry guidelines

- Entries must be relevant to the topic Glass: More than meets the Eye.
- 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

What to do:

- 1. Decide on the 5 key science ideas you want to cover in your entry.
- 2. Write your piece. Be creative!
- 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.
- Submit your entry as an A4 PDF. All entries must be submitted via the www.stat.org.au website, following the required submission procedure.



Posters

This category is open to **DIVISIONS 1 - 5**

Entry guidelines

- Entries must be relevant to the topic Glass: More than meets the Eye.
- Only individual entries will be considered for this category.
- Entries should be informed by personal research or be part of a learning sequence.
- Entries should integrate understanding of scientific concepts with artistic skill and interpretation.
- Information posters, diagrams, scientific charts, and pictorial essays will not be considered.
- Posters may combine graphic and text elements.
- Typed text is encouraged but not essential. Handwriting should be clear and legible if used.
- · Word limit: 20 words.

Submission Deadline: 29 July 2022

What to do:

- Decide on the topic for your poster.
 Posters should advertise 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. Remember to limit text to 20 words.
- Submit your poster as an A3 PDF. All entries must be submitted via the www.stat.org.au website, following the required submission procedure.



Photographic Essays

This category is open to **DIVISIONS 2 - 6**

Entry guidelines

- Entries must be relevant to the topic Glass: More than meets the Eye.
- 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.

What to do:

- 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.
- Submit your essay as an A4 PDF. All entries must be submitted via the www.stat.org.au website, following the required submission procedure.



Videos

This category is open to **ALL DIVISIONS**

Entry guidelines

- Entries must be relevant to the topic Glass: More than meets the Eye.
- 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 postproduction 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.

What to do:

- 1. Choose the topic you wish to convey in your video.
- 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.
- Include a credits section. Make sure to add everyone involved and what they did.
- Upload your video to a video sharing site like <u>YouTube</u>
- 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 and inspiration

Sleek Geeks

MyState Filmmaking Guides



Scientific Essays

This category is open to **DIVISIONS 4 - 6**

Entry guidelines

- Entries must be relevant to the topic Glass: More than meets the Eye.
- Entrants may choose from one of the following topics for their scientific essays:
 - Glass is the answer to saving our planet
 - 2. Glass is not sustainable
 - 3. The properties of glass are fundamental in forensic science
 - 4. Glass is still the doorway to our innovative future
- Indicate the topic choice in the header 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

What to do:

- 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.
- Add an acknowledgements paragraph at the end of your essay including anyone who helped develop your essay including in the planning or editing stages.
- Submit your essay as a PDF. All entries must be submitted via the www.stat.org.au website, following the required submission procedure.

Resources and inspiration

Persuasive Writing

Plagiarism & Referencing



STEM Challenge

This category is open to **ALL DIVISIONS**

This year's challenge is to EITHER

Design an innovative solution to clear glass waste created by your school or community, centred on reusing and repurposing glass containers in a creative way

OR

Explore how glass and other materials are used in buildings and create a design for a new classroom using glass products.

Entry guidelines

- Entries must be related to one of the two topics above.
- Entries may be submitted by individuals or by small groups of up to 3 students. Divisions 1 and 2 may submit whole class entries.
- A bibliography should be included at the end of the report.
- Reports may include photographs, drawings, schematics, and videos to support the text.

Submission Deadline: 30 September 2022

What to do:

- 1. Decide which challenge you want to undertake.
- 2. Do some research. What are some existing solutions to the problems? Are there any issues with these?
- 3. Follow the suggested STEM process on the next page.
- 4. Write up a report.
- Submit your entry as an A4 PDF. All entries must be submitted via the www.stat.org.au website, following the required submission procedure.

Resources and inspiration

Science Week



STEM Challenge

Suggested STEM 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?
- Tell us about your creative decisionmaking process.
- What are some of the various ideas you considered?
- Explain why you selected the approach you took and why other ideas were not chosen.

Plan a model

- 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.
- If you are taking the research path, what equipment would you need? How would you conduct it? What would be your hypothesis?
- Describe the engineering details; list the steps that would need to be taken and the materials needed, and how it will work.

Identify any safety issues and how you would lessen risk.

Test your model/research methodology (even if it is not real) and reflect.

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



Open Categories

Research Investigations

Environmental Science Projects

Engineering Inventions



Research Investigations

This category is open to **ALL DIVISIONS**

Entry guidelines

- This is an open section. Students 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. 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.

What to do:

- Choose the topic you wish to investigate.
- 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.
- 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 on the next few pages for more information.
- 8. Submit your report as an A4 PDF. All entries must be submitted via the www.stat.org.au website, following the required submission procedure.

Submission Deadline: 30 September 2022

Resources and inspiration

Controlled Experiments

<u>Variables</u>

SEIA

Science Project Abstracts

The Scientific Method

Materials and Methods

Prediction v Hypothesis

Research Plan



Research Investigations

Writing a Primary Research Investigation Report

A Research Investigation showcases the entire process of planning, conducting, and reporting on a scientific experiment or inquiry.

The report should include:

Cover page – include a title, name, or names (if it is a group entry), school, year level and a relevant picture.

Abstract – an 80–100-word overview of your project

Introduction— this is where you explain why the topic was chosen. It could be a problem to solve or a question to answer. State what you already know and have discovered through research. Introduce terminology or vocabulary relevant to your topic, process, or the equipment you used.

Aim – state the purpose of your experiment, what you hope to learn, discover, or find out.

Prediction and/or Hypothesis – students must include one, the other or both. Students can have multiple predictions/hypotheses if more than one simple test is conducted as part of an investigation.

Variables – these are the factors you change, control or measure/observe to determine if a causal relationship exists.

Materials – make a detailed list of all equipment (e.g., 6 x 1L plastic tubs; 15g salt). Diagrams/photos can help show how you set up the equipment.

Method – a clear, step-by-step description of what you did (past tense). Can include diagrams or photos.

Risk Assessment – a focus on safety is important. Untrained teachers/parents might not model safe practices. Include a section on risk/safety.

Results – include clearly labelled tables, graphs, charts, photos, diagrams, maps, observations etc.

Discussion – As a minimum, this section should:

- Describe patterns in the results
- Explain patterns by suggesting the cause
- Explain any errors/problems that occurred and what you did to fix them
- Identify what could be done to discover more about the topic (i.e., the next point of learning)

Conclusion – summarise what you did, the reason you did it and state the main outcomes/findings. Was the aim fulfilled? Was the prediction accurate? Was the hypothesis supported? Can you relate your findings to the real world?

References and/or Bibliography – these record the sources used in your background research. By Upper Primary many students cite facts in-text.

Acknowledgements – of people who gave input, advice, help, equipment and what they did. Did a teacher suggest the idea? Did a parent do some of the typing?

Appendix – include logbooks, photo records, risk assessment and any other relevant information judges may need.



Research Investigations

Writing a Secondary Research Investigation Report

A Research Investigation is an extended written task in which students show the entire process of planning, conducting, and reporting on a scientific experiment/inquiry. Top senior entries are Project-Based Learning or Depth Studies.

The report should include:

Cover page – include a title, name, or names (if it is a group entry), school, year level and a relevant picture.

Abstract – an 80–150-word overview of your project

Introduction – explain why you chose the topic, define terminology and explain the research you've done. This should be detailed and directly relevant. Cite sources in-text.

Aim – state the purpose of your experiment, what you hope to learn, discover, or find out.

Prediction and/or Hypothesis -

students must include one, the other or both. Students can have multiple predictions/hypotheses if more than one simple test is conducted as part of an investigation.

Variables – these are the factors you change, control or measure/observe to determine if a causal relationship exists.

Materials – make a detailed list of all equipment (e.g., 6 x 1L plastic tubs; 15g salt). Diagrams/photos can help show how you set up the equipment.

Method – a clear, step-by-step description of what you did (past tense). Can include diagrams or photos.

Risk Assessment – a focus on safety is important. Include a risk assessment for and a section on risk/safety.

Results – include clearly labelled tables, graphs, charts, photos, diagrams, maps, observations etc.

Discussion – As a minimum, this section should:

- Describe any patterns in your results
- Explain the cause of any patterns in your results
- Analyse the validity of your results by identifying any errors/problems in your experimental design
- Evaluate the relevance, importance, or 'real-world' application of your findings
- Identify extensions or new hypotheses that require future investigation.

Conclusion – summarise what you did, the reason you did it and state the main outcomes/findings. Was the aim fulfilled? Was the prediction accurate? Was the hypothesis supported? Can you relate your findings to the real world?

References and/or Bibliography –

References are those sources you cite; a Bibliography records all sources used in research, experimental design etc.

Acknowledgements – of people who gave input, advice, help, equipment and what they did. Did a teacher suggest the idea? Did a parent do some of the typing?

Appendix – include logbooks, photo records, risk assessment and any other relevant information judges may need.



Environmental Science Projects

This category is open to DIVISIONS 4 - 6

A Natural Sciences 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. Students 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.
- A Natural Sciences Project gives students the opportunity to showcase applied science. It differs from a Research Investigation because it is not focused on generating a hypothesis or controlling experimental variables:
- Entries must showcase (a) results of an initiative completed in the last 3 years; or (b) the status of an initiative 'in progress'.
- Projects must be directly relevant to the entrant's school or local community.
- The Project must incorporate scientific information and evidence from research.
- 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

What to do:

- 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.
- Present your observations and results.
 Use measurements where possible.
 You can display your results however you like, as tables, graphs, photos, interview, maps, etc.
- 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. All entries must be submitted via the www.stat.org.au website, following the required submission procedure.



Engineering Inventions

This category is open to **DIVISIONS 3 - 6**

Entry guidelines

- This is an open section. Students 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. ICT-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 page identifying people who worked on the initiative must be included.
- Entries must include a risk assessment to be considered.
- Both a logbook, video, and report 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

What to do:

- 1. Choose a problem.
- 2. Design a device or product to solve the problem or offer a different approach to the problem.
- 3. Write up your report. Reports should include:

Aim – the goal of your invention

Introduction – explains the problem you identified, limitations of existing solutions and what is new about your invention.

Design Brief – how you built, tested & refined your invention.

Discussion – explains scientific principles that apply to your invention. Analyses the results of tests. Describes limitations and proposes further improvements.

References & Bibliography – provides a record of your background research.

Acknowledgements – of people who gave advice, help, equipment and what they did.

Appendix - Logbook, risk management, link to video of your invention in operation etc.

Video - Video the invention in operation. Video quality is not assessed, but judges need to see and hear the invention working to judge it.

4. Submit your report as an A4 PDF. All entries must be submitted via the www.stat.org.au website, following the required submission procedure.

Resources and inspiration

Engineering Design Process

Submission Deadline: 30 September 2022



Student Name(s)

Teacher

Risk Assessment

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

Name(s)*				
Project Title				
*Parent/Guardian if student is home schooled				
Answer Parts 1 and 4 for all entries. You will only need to answer Parts 2 and 3 if you are using hazardous materials, equipment, or potentially hazardous biological agents.				
Part 1: Project risks				
List risks associated v	with project:			
Describe the safety precautions and procedures that you will use to reduce these risks:				



Risk Assessment

Part 2: Specific hazards

Part 2: Speci	nc nazaros
List all hazard	dous chemicals, activities, and/or equipment that you will use:
List any poter	ntially hazardous biological agents that you will use:
	safety precautions and procedures that you will use to reduce the risks associated us chemicals, activities, equipment, and/or any potentially hazardous biological ed above:
Part 3: Specif	fic hazards
Describe the agents that y	disposal procedures of any hazardous chemicals or potentially hazardous biological ou will use:



Risk Assessment

Part 4: References

List the source(s) of safety information you used, incluguidelines:	iding websites, books or laboratory safety		
 I/We have talked with my/our teacher/parent(s) if home schooled/mentor about the risks associated with this project and how I/we will manage these. I/We have discussed with my/our teacher/parent(s) if home schooled/mentor 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/parent/guardian	Date:		



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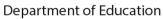


















My Tutor Group

Dr Peter Smith