YOUNG SCIENTISTS TANZANIA

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Irish Aid
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FACTFILE & PROGRAMME DETAILS

OCTOBER 24 & 25, 2012
AGA KHAN DIAMOND JUBILEE HALL
DAR ES SALAAM, TANZANIA


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Forward

The proposal to develop Young Scientists Tanzania (YST) grew out of the work of the Combat Diseases of Poverty Consortium (CDPC) at the National University of Ireland, Maynooth, through which African researchers and scientists on training programmes in Ireland were exposed to the development education work of the CDPC and its engagement with the BT-sponsored Young Scientist & Technology Exhibition Ireland. This interest led to a proposal from the CDPC African alumni to explore possibilities to develop a similar initiative in East Africa, where a persistent weakness in science education is considered to be a real constraint on innovation in development.

Young Scientists Tanzania provides a platform for young secondary school students to come together to investigate theories, discover new technologies and advance current knowledge through research and innovation. The development of science and technology is deemed vital for economic and social development in sub-Saharan Africa, yet it has long been neglected and poorly funded in many of the region's countries. In recognition of this, African science ministers resolved that 2011 would begin the African Decade for Science. The practical aspects of achieving this goal require the nurturing of young scientists from early stages in learning and an appreciation by the general public of the importance of science in daily life and economic development.

Young Scientists Tanzania would like to acknowledge the support and advice of the Young Scientist & Technology Exhibition Ireland Limited.

Message from the Minister of Communication, Science & Technology

The Ministry of Communication, Science and Technology is proud to support the Young Scientists Tanzania (YST) initiative with this truly innovative and transformational approach to developing a science culture in our country.

As the economy of Tanzania grows, we need to support young people to develop the scientfic skills that are necessary for the development of our country now and in the future. Science is an important instrument for improving our society and economy. The YST will help us to create a workforce that will have the capabilities to find new solutions to the problems we face in our society and find new ways to drive our economic development.

YST gives young scientists the opportunity to demonstrate that science, technology and engineering are not only interesting and exciting, but also vital for socio-economic development. It also provides students with the opportunity to participate in scientific learning experiences away from the classroom and to explore the unlimited potential of science. YST offers students, from all over Tanzania, the opportunity to participate at an annual exhibition in Dar es Salaam. During this exhibition, young scientists will share with us their passion and enthusiasm for the projects they have researched and developed. Students will have the confidence to engage with the scientific method.

I would like to pay tribute to the schools and teachers who are working on projects for the Young Scientists Tanzania. I encourage schools and students to give serious thought to entering this competition. I would also like to thank all the team at YST and commend them for their commitment in initiating this project in Tanzania.

I am also pleased to learn that the Pearson Foundation and Irish Aid are committed to sponsoring the YST and we look forward to working with them in the future. I would also like to thank other sponsors of this important venture.

Hon. Prof. Makame Mbarawa (MP)
Minister for Communication, Science and Technology

Message from the Minister of Education and Vocational Training

As Minister for Education and Vocational Training, I am delighted to support the Young Scientists Tanzania (YST) initiative. The work of the YST complements very well the intention of the Government of Tanzania to strengthen education in the sciences. The Ministry supports the objectives of the YST and the promotion and popularisation of science and technology; linking science and technology to active citizenship and the fight against poverty; and improving the teaching of the sciences.

YST will harness the curiosity in our secondary school students. Science and Technology have long been recognised as key enablers for social and economic development and yet there is a shortfall of secondary school students taking science subjects or graduating in these areas. Initiatives like the Young Scientists Tanzania will inculcate a passion for science and technology, as well as developing entrepreneurial skills. I am convinced that it will act as a catalyst for young people to continue with these subjects through third level education and into the workplace.

The YST will provide an annual showcase for Tanzanian students to display their talents. Students will demonstrate their originality, scientific process and research skills to great practical effect. The Young Scientists Tanzania annual exhibition allows like-minded young scientists to meet their peers from across this great country, to share their work and make many new friends.

I would also like to thank the other sponsors for supporting this important venture, as well as to the students, teachers, organisers and judges who put so much energy and planning into the event.

Dr. Shukuru Jumanne Kawambwa
Minister for Education and Vocational Training

Message from the Co-founder of Young Scientist Ireland

When Father Tom Burke and I launched the Young Scientist Exhibition in Dublin, Ireland in 1965 with 230 projects, we had no idea just what we had started. Our plan was to create an exciting event that took science out of the classroom showing that it is all around us in everyday life.

We could never have imagined it growing to what it has become today, with 5,000 students entering almost 1,800 projects and more than 35,000 visitors attending the exhibition itself. The Young Scientist Exhibition provides a platform to showcase the scientific excellence of the young people of Ireland and a focal point for the media to help promote science and technology to the scientists of tomorrow.

I am therefore delighted that the Combat Diseases of Poverty Consortium has decided to launch Young Scientists Tanzania, in association with the Ministry of Science, Communication and Technology, Ministry of Education & Vocational Training, and with support from the Pearson Foundation and Irish Aid.

I am pleased that it will be modelled closely on our Dublin event, as I believe it is just as important to make science and technology exciting and relevant in Tanzania today as it was in Ireland all those years ago.

Have a great event in October 2012.

Dr. Tony Scott
Co-founder
Young Scientist Exhibition
Dublin
Ireland

Message from the President and CEO of the Pearson Foundation

All of us at the Pearson Foundation very much look forward to the two-day celebration of science, investigative learning, and teamwork that will be on display at the Aga Khan Diamond Jubilee Hall, Dar es Salaam, on Wednesday 24th and Thursday 25th October 2012.

In recent years, we've had the privilege of helping to bring young people together in a variety of settings—gatherings where they were invited to share all they know with esteemed educators, with their peers, and with their communities. In the process, we've seen first-hand the impact that such opportunities to explore and share common experiences make possible for all who take part.

Young Scientists Tanzania provides a platform for a select group of the nation's secondary school students to come together to investigate important scientific theories, discover new technologies, and advance current knowledge through scientific research and innovation. We're certain that the chance to develop presentations that showcase these efforts will change the lives of the young people who participate. At the same time, participants will develop—and inspire—Tanzania's next generation of scientists and educators, young leaders whose engagement is vital for the broader economic and social development of sub-Saharan Africa.

The Pearson Foundation would like to thank the Ministry of Communication, Science and Technology; the Ministry of Education and Vocational Training; Young Scientist Ireland; and other sponsors and supporters of Young Scientists Tanzania. Even more, we wish to celebrate the schools, teachers, and students of Tanzania whose engagement will help shape this important educational gathering.

The young scientists of today are future leaders of research, technology, and innovation; by extension, they are the future leaders of advancement for Tanzania as a nation. We are deeply proud and excited to support these students through Young Scientists Tanzania, and we encourage Tanzanian secondary school students to take part in this essential new program.

Mark Nieker
President and CEO
Pearson Foundation

Message from the Ambassador of Ireland to Tanzania

Ireland is delighted to have the opportunity to support the Young Scientists Event in Tanzania.

For almost 50 years the Young Scientists exhibition has been inspiring young girls and boys in Ireland to engage in the areas of science and technology, helping to ensure that students see science as an exciting and fascinating area for further study and employment. It is a pleasure to be involved in our own way at the start of what I hope will be a similar success story for Tanzania. I warmly welcome and applaud the support of the honourable Minister for Communication, Science and Technology Prof. Makame Mbarawa and the honourable Minister for Education and Vocational Training, Dr. Shukuru Kawambwa.

Developing students' interest in science not only benefits students themselves and their futures. The essential benefit of this event must be that it provides the motivation and stimulus for students to see how they can use research and innovation to improve tomorrow's world, indeed tomorrow's Tanzania.

In Ireland today, entries from girls now outnumber those from boys. We hope to see a strong participation by girls in Tanzania too. Half the genius among Tanzanian youth, half the ideas, half the brain power, indeed half of Tanzania's future lies in Tanzanian girls and young women.

If, in time, the Young Scientist event helps to liberate a fraction of the genius among young Tanzanians, then the organisers can be proud of themselves for the considerable effort they have invested.

We all know that inside the young minds that surround us lies the vast potential to use science and technology to improve our shared world in ways that our previous generations may never even have considered. Ireland looks forward to supporting young scientists realise their potential.

The prospect of learning from those much younger excites us. And so we wish all the best to the participants, organisers and supporters of Young Scientists Tanzania.

Lorcan Fullam
Ambassador of Ireland to Tanzania

How to Enter

Eligibility

The competition is open to secondary school students residing in Tanzania. It is recommended that students share the work as a team entry. A team is defined as comprising no more than four students from the same school and the same age grouping. There are two sections in which you can enter:

1. Junior: O Level group (Forms 1 through 4)
2. Senior: A Level group (Forms 5 and 6)

Important Dates

Young Scientists Tanzania will take place in the Aga Khan Diamond Jubilee Hall, Dar es Salaam, on Wednesday 24th and Thursday 25th October 2012. To take part in this exciting experience of a lifetime, you must submit a detailed One-Page Proposal outlining your project idea, together with a completed Entry Form, no later than **31st July 2012.**

What to Do Now

Think of a science-based idea that can be developed into a project, and work on it. The judges want to see your original research, not reams of words taken from some book or downloaded from the web. By all means use whatever help you can, but put your own individual stamp on whatever you do. The first person you should talk to is your science or technology teacher. He or she will be happy to assist you in any way possible, offering guidance and advice as needed.

Remember that universities, institutes of technology, relevant organisations, nongovernmental organisations (NGOs), libraries and the Internet may prove useful as you research your project; but please always make contact with institutions or organizations through your teacher.

Category Choice

Students can choose to enter a project in one of the following four categories. Please study the definitions carefully and be careful to choose the category that best fits the subject of your project. An incorrect choice may result in a project not being accepted.

Chemical, Physical and Mathematical Sciences

For a project to be accepted into this category, it must be based on chemistry, physics, mathematics, applied mathematics, engineering, computer programming and language, or electronics. Also eligible are projects based on earth and space sciences such as meteorology, geophysics, geology and astronomy.

Technology

For a project to be accepted into the Technology category, the core of the project must be the use of technology in new or improved applications, enhanced efficiencies, new innovations, or better ways to do things. The category could include projects related to the Internet, communications, electronic systems, robotics, control technology, applications of technology, biotechnology, innovative developments to existing problems, computing or automation. Students are also expected to understand the basic science behind the technology so that they can get the most from the project.

Biological and Ecological Sciences

For a project to be accepted into this category, it must have a biological and/or ecological focus and investigate aspects of animal, human, microbial or plant biology. Typically, projects deal with the following areas of study: Agriculture, anatomy, animal science, biochemistry, biotechnology, disease, ecology, environmental science, enzymology, food science, forestry, genetics, horticulture, medical science, metabolism, microbiology, molecular biology, physiology, physiotherapy, plant science or veterinary science.

Social and Behavioural Sciences

For a project to be accepted into this category, it must cover social and behavioural sciences: Economic, geographical, psychological or sociological studies of human behaviour, attitudes and experience; social analysis of environmental factors, demography, learning and perception; or the study of attitudes and behaviour in relation to health, nutrition, work, leisure and living habits. Also eligible are projects on consumer affairs, effects on society, social anthropology and political science, provided they involve the use of scientific methods.

Planning Process

Deciding on your topic

Get an idea of what you want to study. Ideas might come from hobbies, or perhaps problems you see that need solutions. Due to limited time and resources, you may want to study only one or two specific subjects.

Where to get your ideas

- A hobby or a skill
- Your family
- A newspaper or magazine article
- A television programme
- Your friends
- Recent courses completed
- Local contacts: Doctor, vet, dentist, engineer, scientist, etc.
- Professional organizations/NGOs
- Discussions with your teacher and parent
- Observations on daily life in your community

Research your idea

Visit your local library or use the Internet to learn everything you can on your topic. Observe related events. Gather existing information. Look for unexplained or unexpected results. Visit a university or institute of technology. Talk to professionals in the field. Consult your teacher and parents. Write or email companies for specific information. Obtain or construct needed equipment.

Remember: Research, research and research again, until you are an expert on the topic!

Organise

Organise everything you have learned about your topic. At this point you should narrow your hypothesis by focusing on a particular idea. Your library research should help you.

Make a timetable

Choose a topic that not only interests you, but also can be done in the amount of time you have available. Leave time to fill out necessary forms to participate in Young Scientists Tanzania. Certain projects require more time than others; allow plenty of time to experiment and collect data. Simple experiments do not always go as you might expect the first time, or even the second time. Also, leave time to write your report and put together an exhibit.

Planning your project

Now, before you go any further, there are a few simple questions you must ask yourself:

- What am I trying to find out?
- How am I going to do this?
- Where can I get the help I need?
- What do I expect to learn at the end of my research?
- Have I access to the apparatus or equipment to carry out the work?

Once you are satisfied that you can really get to grips with your project, you will be able to enter the Planning Stage. Remember, only a few scientific discoveries are the result of chance or luck; the majority are the result of many hours of dedicated thought and experimentation.

Read background material and literature

The rule here is read, read and then read some more! This will give you real insight into your topic. Background material can be obtained from books and journals and by using the Internet.

Plan your research design

Decisions need to be made about the experiments you will conduct, how you will design your apparatus, and, if applicable, how you will collect your data.

Carry out your research

Record each and every measurement, experiment or observation. At this stage, your project may fail completely. If so, it is still important to record and report the failure. Remember, a null result is still a scientific finding and an important guide to other scientists. Record all your observations and findings.

Analyse your results

After you have completed all of your research, you need to examine and organise your results. Try to focus on how your results relate to your original topic and its objectives. Good results merit good presentation.

Make your conclusions

You are now ready to develop a theory to explain your findings. Keep an open mind on the results you get and the conclusions you reach.

Evaluate your project

You are now in a position to make recommendations and perhaps contribute through them to scientific knowledge. It is time to ask yourself the following questions:

- Did I succeed in researching my topic?
- Do my conclusions support my original hypothesis?
- Have I added to the body of knowledge through my research?

Research is the answer

Research is the process by which people create new knowledge about the world in which they live, in order to answer a question or solve a problem. When choosing your topic, give careful thought to how your research might enhance the world and its inhabitants.

Questioning is probably the most important part of scientific creativity and is often followed by an "if...then..." statement. Questioning usually leads to observations or experiments.

Good scientists, both young and old, use a process to study what they see in the world. By following the six stages listed below, you should be able to produce a superior scientific project.

1. **Be curious**, choose a limited subject, ask a question, identify or originate/define a problem.
2. **Review published materials** related to your problem or question.
3. **Evaluate possible solutions** and make your educated guess (hypothesis).
4. **Challenge and test your hypothesis** through experimentation (data collection) and analysis.
5. **Evaluate the results** of your experiment and reach conclusions based on your data.
6. **Prepare your report** and exhibit.

As a scientist, you should learn to be skeptical about all research results, especially your own. A good experiment may or may not answer the questions asked – but almost always leads to fresh questions that require new experiments or observations. The final hypothesis is often developed after running a number of preliminary experiments, analysing a body of results, and reaching a tentative conclusion.

Guidelines on Data Collection

Data can be collected using four broad methods:

- Documentary sources
- Observations
- Surveys
- Tests, measurements and experiments

Documentary sources

Documents can be used as the basis for an entire study or simply to set an issue in historical context. Personal documents, used judiciously, can be useful in providing information. Try to ensure that the documents you reference are the most current available. Photographs and maps may also be used.

Observations

Observation is one of the primary methods of collecting data, but care must always be taken to ensure that data are observed in an unbiased way.

The observer's senses may not be able to record everything. Also, if the observers are watching people, animals or other organisms that may change their behaviour because they are being observed, the results may be invalid.

Surveys

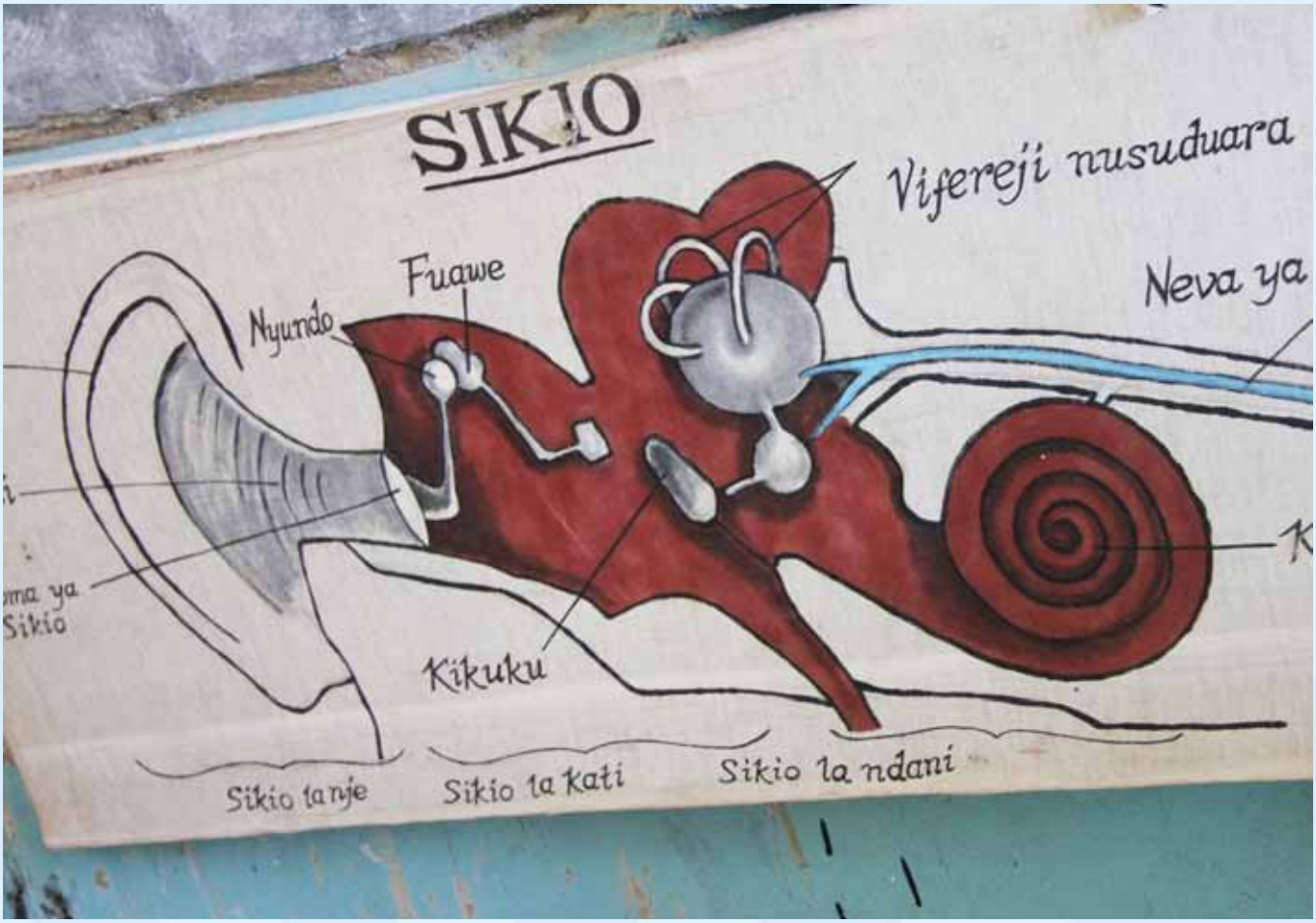
Questionnaires, interviews and schedules are some of the techniques used in conducting survey work. If you are conducting a survey, consider the following carefully:

- Questionnaire design merits great attention.
- Good interviewers do not influence the answers given during an interview. Work from prepared questions.
- Your questions should be clear and concise, and they should be designed to gather relevant information.
- Test your questionnaire in advance on a small section of the population – this is called a pilot survey. This will identify the questions that need changing, which will lead to a more effective questionnaire.
- If you are recording any type of behaviour by animals, plants or humans, it is advisable to use a diary or journal to record your observations.
- It is very important to think through how you are going to analyse the results you will get.

Tests, measurements and experiments

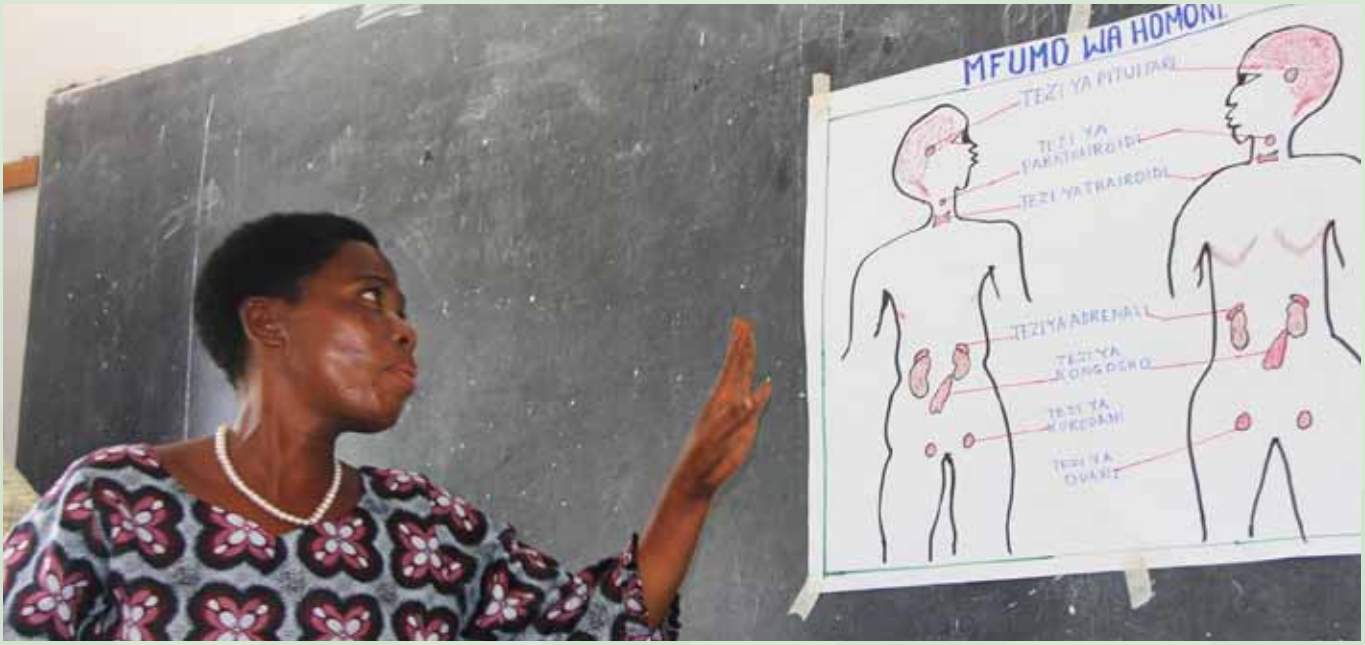
Tests, measurements and experiments should be used only if they are relevant to your research and if you are capable of doing and understanding them yourself. Particular attention should be given to the design of experiments, the requirement for controls, sufficient replication and repeat experiments where appropriate.

Ensure that any testing or experimentation you undertake is not dangerous: That is, be sure it will not put you or others at risk of injury or disease.



Guidelines on Sampling

- Remember to use a representative sample.
- A random sample means that every member of a population has an equal chance of being chosen (e.g; pulling numbers from a hat).
- A systematic sample takes every nth member from a population.
- Stratified sampling uses the idea of groups or classes within the population being analysed.
- Any group that shares similar characteristics and has boundaries may be termed a population. (Therefore, it is perfectly acceptable to refer to plant populations.)
- Quota sampling means that if you want to interview, for example, 200 people about shopping, you could go to a particular part of town where you would be likely to meet shoppers. You may have pre-set guidelines, such as age group and numbers of men and women. However, this is not a statistically random sample.
- When sampling a population, you may also need to use a control group. If, for example, you were testing the effects of a particular experience on a group of people, you would need a control group of the very same type of people, who have everything in common except the particular experience.
- Case studies, which look at a small number of individuals and a particular context in depth, may be useful in helping to understand how a particular process works. Such case studies can help inspire a better way to formulate a hypothesis for testing with a large sample.



Guidelines on Statistics

What techniques can you use to analyse data? There are three main procedures you might use:

1. You could summarise your data.
2. You could try to explain patterns which emerge, using comparison techniques.
3. You could carry out a significance test; for example, a t-test.

Summarising data

"Summarising" data is just what it sounds like. It is a way of reducing the bulk of data to a more manageable size, as well as a means of seeing the emergence of certain patterns. In summarising, you can put data into groups or classes. You can also measure typical values, such as the mean, mode and median.

Some data, of course, will not be accurately described by these statistics. Such situations require a summary technique to measure movement away from the average, called deviation from the mean.

Comparing data

We can compare data in the following ways: Firstly, we could compare the similarities and differences among the data. Secondly, we could use statistical techniques to compare the data. These techniques are widely used to compare variables.

Significance tests

When you have made your comparisons and conclusions, you need to know if they are really significant. Significance tests are used to make sure that results from comparing one data set with another are not the result of chance.

Beware of Potential Problems

The judges have identified the most common weaknesses that affect projects at the initial entry stage. A project with any of these weaknesses may not qualify for inclusion in the Young Scientists Tanzania exhibition in October 2012.

Lack of original primary research

Some studies are little more than a description of what is already known about the topic. Researching the existing body of knowledge is only the first stage of any scientific study.

Unreliable experimental methods

Frequently, projects state a particular method for data collection that simply cannot collect the data required. Suppose the aim of the project was to find out which washing powder was most effective; then certain chemical experiments should be undertaken. However, all too often students say that they will distribute questionnaires to gather this information, but what in fact they are collecting are attitudes and opinions about the most effective washing powder, rather than scientifically reliable data.

Vague or unfocused objectives

A study which aims to find out all about the ozone layer is not a realistic scientific study, as no one could be expected to uncover everything about the ozone layer. Scientific research requires you to be very specific about what you wish to find out, and setting measurable objectives is the only way to present scientific investigation. For example, a project that looks at the effects on wildlife in a particular area as a result of disturbance created by industrial activity would have to focus on a very specific issue, as this topic is so broad. Much thought should be given to focus and scope when developing your project.

Lack of clarity in describing scientific methods

This information should be given on the Project Details Form and/or the One-Page Proposal. The judges need to know exactly what experiments are being carried out in terms of specific experimental processes, materials or the who and how of a social survey.

Lack of originality

The specific question raised in a project must be one that has not been posed and recorded by any previous scientist. However, this is not to say that 20 projects on the topic of, for example, radon gas or water pollution could not be original, as they will all deal in different ways with various aspects of the topics.

Unsuitability of topic

A topic must be able to be scientifically proven or disproved by research methods available to second level students. A project on whether or not Jupiter is inhabited by living creatures, for example, is not a suitable topic.

Lack of scientific content

Often proposals are submitted that are not scientific projects, but essentially literature reviews. These proposals are information collection exercises and not scientific studies.

Safety issues

Projects which put the students themselves, animals, or others at risk of physical injury or disease will not be accepted for the exhibition.

Ethical issues

Projects which put the students themselves, animals, or others at risk psychologically or emotionally will not be accepted for the exhibition.

Investigation period

Sometimes students propose a project that is weak because the period over which the project is being carried out is too short. Judges need to be convinced that the student/team has enough time to complete the project for the event.

Question yourself

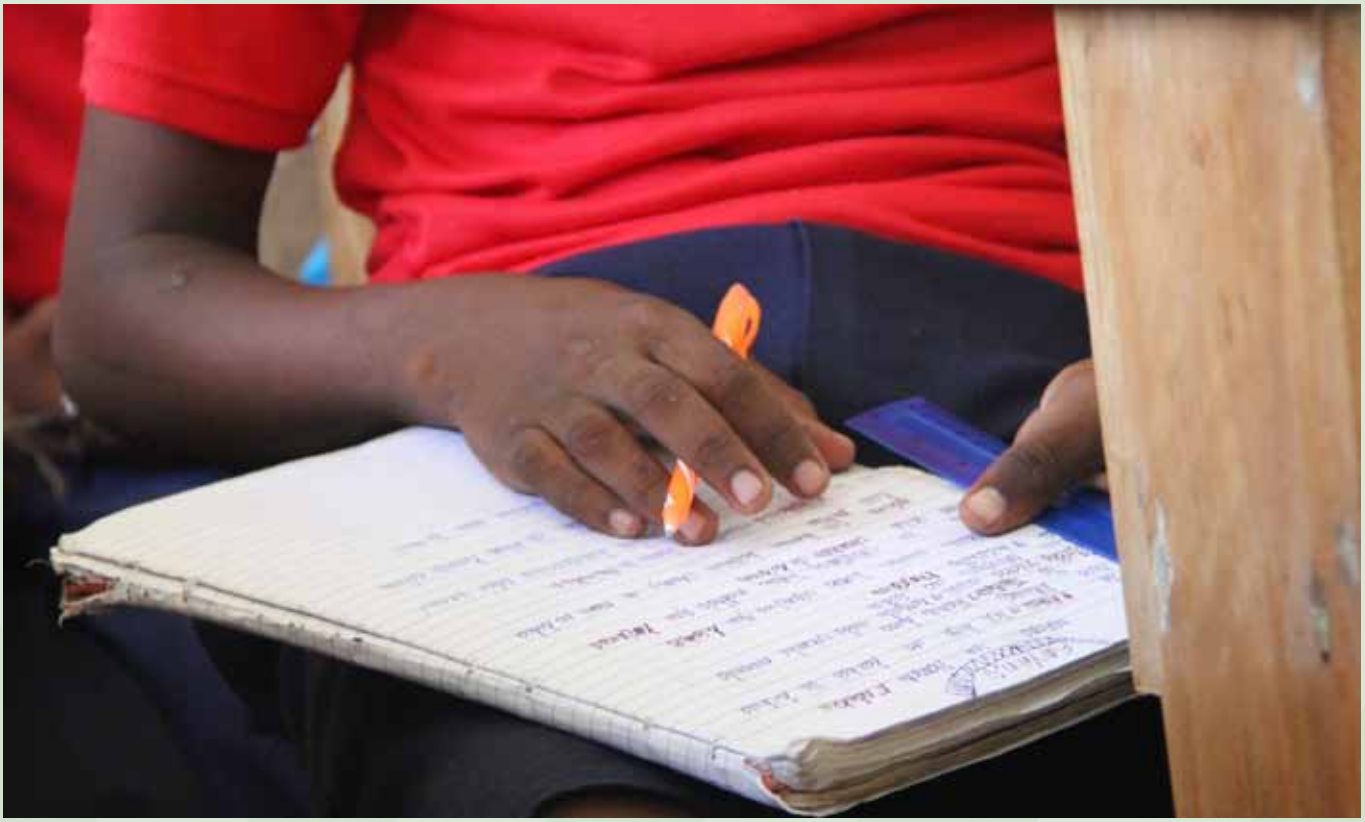
- Have you clearly defined the aims of your study?
- Have you been able to access the necessary equipment to conduct your study?
- Have you been successful with experiments and data collection?
- Have you obtained meaningful results?
- Are you confident that you can complete the project by the time of the event in October 2012?
- Has the project been entered in any other exhibition or competition? If so, be sure to mention this in your project report.
- Has the project been published previously in part or in full? If so, give details in your project report.
- Are you using potentially dangerous chemicals, organisms or equipment in your project? If so, please discuss with your teacher to ensure that your project adheres to the correct safety regulations.

Is external help allowed?

It is expected that all or the majority of the work for a project will be conducted in school, the home or an outside environment. Understandably, some projects may involve visiting distant locations. Students may seek advice or information about their project from sources beyond their school, such as on the Internet or from government organisations, universities, institutes of technology or other experts. However, it is recommended that the majority of students' work be conducted under the supervision of their relevant teachers, with appropriate levels of involvement by parents, guardians or other responsible adults. When experimental/research work is conducted by the students themselves, or on their behalf, in a laboratory that is external to their school (e.g. in a local university, a hospital or an industry), that work should be clearly identified and acknowledged within the project report book and presentation. In addition, it is a requirement that a cover letter from the external facility is included in the project report book that describes the extent of the assistance provided and the work done by the students within that facility or undertaken on behalf of the students.

Intellectual property rights

If your project includes products or processes that possess or contain new functional or technical aspects, you might consider applying for a patent. Please note that it is unwise to make any public disclosure of an invention or to put it into use publicly – at an exhibition, for example – before an application for a patent has been made, as such action may prejudice the obtaining of a valid patent.



What to Submit

Please request entry forms by writing to:
Young Scientists Tanzania, P.O. Box 23391, Plot 108. Makuyuni Road, Mikocheni B, Dar es Salaam, Tanzania.
(Entries **must** be submitted in English.)

Your entry application will include two parts:

1. Entry Form for Project

In addition to other information, you will provide your project title on the Entry Form. The project title should accurately reflect the scientific content of the project. Avoid using what you may think is a smart or catchy title; such titles are generally misleading and do not necessarily impress the judges. The title you choose will appear on your exhibition stand and in the printed programme should your project progress to the event in Dar es Salaam. Accordingly, please ensure that all spellings are correct.

2. One-Page Proposal

The proposal is a very important document, because it will form an important part of the process by which the screening judges decide whether your project is accepted. It should explain to the judges what your project is all about, helping them to determine whether you have already carried out some research and whether you are serious about entering. Take care in preparing this document.

Preparing your One-Page Proposal

When you have decided on a project and carried out some research and trial experiments, it is time to write your One-Page Proposal. This will help to not only organize your thoughts, but also to prepare the case for your project. This concise description of your thoughts about the project and of the work that you intend to carry out is an essential part of the judges' screening process.

The idea behind the One-Page Proposal is to give you an opportunity to write a descriptive piece about your study which will display your grasp of the topic. An extensive scientific vocabulary is not required. The proposal should be as concise as possible: ideally it will be word processed and limited to a single page (A4 sheet) in the region of 400 words. Remember to mention any institutes or people you have contacted for information.

When you have completed the proposal, make three copies. Two of these must be given to your teacher as well in advance of the submission deadline of 31 July 2012. Your teacher will keep one copy and send the other to YST. Keep the third one safe as a reference for your group. Your teacher will communicate directly with Young Scientists Tanzania to submit your proposal.

A decision on whether or not a project qualifies for the October 2012 exhibition in Dar es Salaam will be made on the basis of your initial application, so the One-Page Proposal is very important.

If Your Project is Accepted

At the Event

Once you arrive at the Aga Khan Diamond Jubilee Hall in Dar es Salaam and register, you will receive your exhibitor pass and student pack.

Your stand number will be confirmed when you register. Go to your stand and set up your project in the space provided. If you can, bring sticky tape, a stapler, scissors, Blu-tac and whatever else you need to display your project.

Your project will be judged three times by three different judges. The judges can spend only approximately 15 minutes at your stand, so be prepared when they arrive. They will ask you to tell them about your project and then move on to more specific questions. Make sure any mobile phones are turned off during the judging times.

Make sure that each person from your team does some of the talking. The team leader should introduce all members and explain what sections each team member will be talking about.

If you have any questions or queries, ask a member of the YST staff available on the floor during the two days of the event. They will do whatever they can to assist you.

The judges have the right to re-assign your project to another category during assessment at the event.

Things to remember

You must register first at the main entrance of the Diamond Jubilee Hall, where you will receive an exhibition pass. After registration, security will allow you to bring projects into the centre. Security will not allow anyone to gain entrance without an exhibition ID pass.

Your project will be part of the exhibition until the event closes on Thursday, 25th October at 5:00p.m. Projects may not be removed before this time.

You must be at your stand during judging times and have at least one representative of your team/school present when the event is open to the general public.

Young Scientists Tanzania cannot take responsibility for any items that may be lost, stolen or misplaced during the event.

Please also remember that each exhibitor is required to attend for the duration; that is, **Wednesday 24th and Thursday 25th October.** Talk to your parents so that they are aware of the time involved. Throughout the two days of the event you must spend as much time as possible at your stand.

The event will be open to the general public on Thursday, 25th October. A very important part of your research is the communication of your findings to the public.

What the judges look for

The judges will look for creative ability, scientific thought and approach to the work, thoroughness, skill, clarity and teamwork.

Tips from the judges

When it comes to being successful at Young Scientists Tanzania, there really is no substitute for hard work. That said, we want to give you as much help as we can along the way. The following advice and tips from our panel of judges might make your job a little easier!

1. Start to work on your project as soon as you can. Some projects can take a lot longer to complete than you envisage when you start.
2. To succeed, you have to be interested and involved in your project from the beginning.
3. Don't leave things to chance or guesswork. Research your project well, so you'll be able to deal comfortably with any queries that come your way, whether they be from the judges or members of the public.
4. Keep a detailed project diary for your work. We all forget things, and this may help you answer judging queries at a later date.
5. Accurate use of scientific methods counts for a lot when judging begins, so take your time and make sure that all your facts and figures are correct. Don't be afraid to ask your teacher when unsure about something.
6. The project title should accurately reflect the aims of the project. Avoid catchy titles, as they do not tend to impress the judges.
7. Be original. Make your project stand out from the crowd by giving good solid reasons for your choice of subject.
8. Make your exhibit as attractive as possible. Presentation may not be everything, but clear, concise work shown in an attractive manner can only benefit you when judging takes place.

Judges evaluate and focus on:

- What you did in the current year
- How well you followed scientific methodologies
- The detail and accuracy of research as documented in your report book and notebook
- Whether experimental procedures were used in the best possible way

Judges look for research that is well thought out. They consider how significant your project is in its field, as well as how thorough you were. Did you leave something out? Did you start with four experiments and finish only three?

Good communication

Judges applaud students who can speak freely and confidently about their work. They are not interested in memorised speeches – they simply want to talk with you about your research to see if you have a good grasp of your project from start to finish. Besides asking the obvious questions, judges often ask questions to test your insight into your project, such as 'What was your role?'; 'What didn't you do?'; and 'What would be your next step?' Remember: A little enthusiasm goes a long way!

Elements of Your Project

- Project report book, Summary/Abstract (included in report book)
- Project diary
- Visual display

Project report book

The judges will collect your report book for a closer look at your project.

The report book may not be returned to you until the end of the event. However, be assured that each report book will be studied carefully by the assigned judges in the judging rooms. Also please note that not all assigned judges will sign your report book. In some cases, only the first judge to complete a review will sign your book, but this does not indicate in any way that your project is weak.

When you arrive at the conference centre, please make sure that you write your stand number on the front of your report book, as this will ensure that your book is returned to the correct stand.

Your report book should include no more than 50 pages of text (word processed where possible) including appendices and references:

1. **Title page:** This contains the name of your project, the name of your school, and the names of participating students.

2. **Comments page:** Put a page into your report book which may be signed by a judge. Again please note that not all assigned judges will necessarily sign your report book.

3. **Contents page:** This includes the sections and page numbers of the report.

4. **Summary/Abstract:** This is a very important part of your project. Ideally it should be about two pages long and include a short summary of your project. Someone reading this summary should understand what you were setting out to achieve and what your main results and conclusions are.

5. **Introduction:** This should set the scene for your report. Why did you undertake the project, and what did you hope to achieve? In this section you should also refer to experiments, surveys and questionnaires, describing the part they played in your project. Make sure you refer to previous research in your subject area.

6. **Experimental methods:** This section should describe the experiments you carried out. Keep in mind the value of diagrams and illustrations.

7. **Results:** You should include a good sample of your measurements and all of your important results in this section. You can include the bulk of your readings and measurements in appendices.

8. **Conclusions and recommendations:** You should comment on the results of your work in this unit. Be clear and concise. How does your work compare with existing theories? How accurate is the data you got from your study? What are the strong and weak points of your methods? How might your work be extended and improved? Does your project contribute to scientific knowledge and research?

9. **Acknowledgements:** At the end of your report, acknowledge any help you received during the project; for example, from teachers, companies, institutions or parents.

10. **Appendices:** Include additional information, reports and any relevant letters or correspondence.

11. **References:** List any books, articles, web pages and other reference sources that helped you in your project.

Project diary

All entrants must keep a diary of their projects. You should not trust yourself to remember facts and details. Record everything in your diary and use it as an information store for writing your report. You can even write personal comments about how your project is going and what your progress is like. If relevant, record the prevailing atmospheric conditions (e.g., temperature, rain or sunshine, etc.). Remember to record all of the names of books you have looked up and all the people or institutions you have contacted. If you are working as a team, remember to appoint a leader. The leader should archive all relevant information and appoint a team member to keep the diary.

Visual display

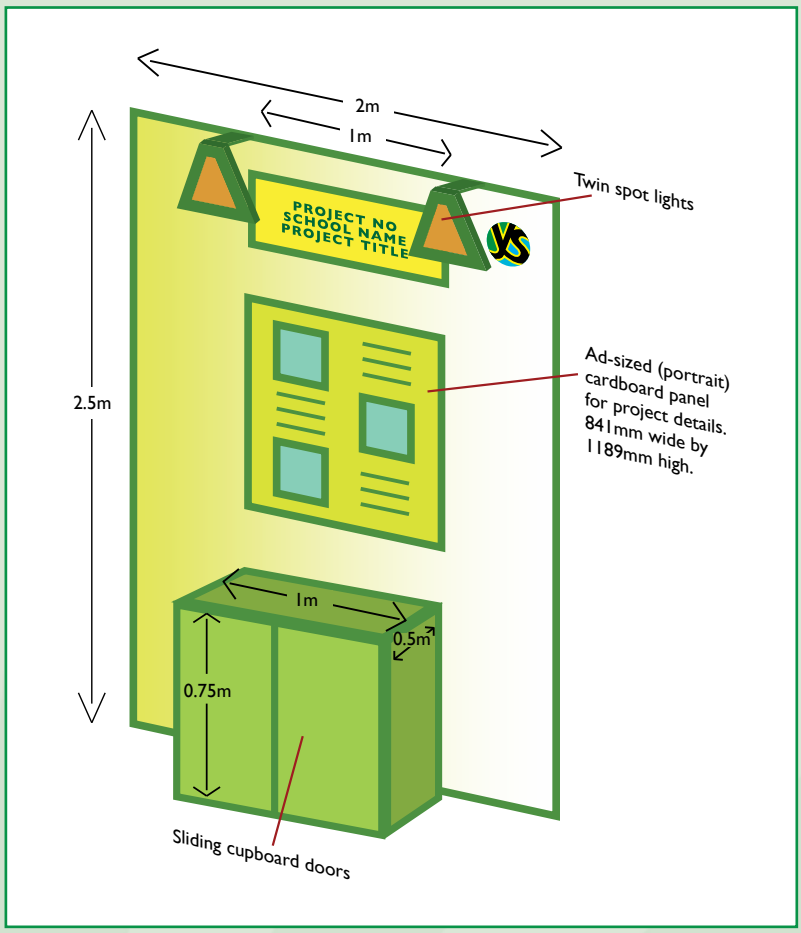
Your display should be only a summary of your project. Do not try to display your entire project. Cover just the main points and highlights. Plan your display well in advance. Use a map or plan to help you make the best use of your space. Work out the dimensions of everything you want to include. How your project is displayed on your stand will be taken into consideration by the judges when reaching their decision.

Your charts or other display material should fit within your project space. The dimensions of the display stand are as follows:

- The back display panel, which is in A0 portrait format, measures 1,189mm high by 841mm wide.
- The worktop is 1,000mm wide by 500mm deep.

Please plan your exhibit to fit within these dimensions. Cardboard sheets, sized to fit the back panels, will be available on site if required.

When you are finalising your display plan, stand back for a minute and ask yourself: Will the judges and visitors be able to move smoothly through my project...step by step...from background on to methods, and from there to results and conclusions? Is the text big enough to be read easily by both the judges and the public?



The visual display of your project should have the following characteristics:

A good title

Your title is an extremely important attention-grabber. A good title should simply and accurately reflect your research and the aims of your project. The title should make the casual observer want to know more – however, as previously mentioned, it is best to avoid "catchy" titles as they do not tend to impress the judges.

Photographs

Many projects involve elements that may not be safely exhibited at the event, but that are nonetheless important to the research/findings. You might want to take photographs of important parts/phases of your experiment to use in your display. Photographs or other visual images of human test subjects may be used only if you have obtained informed consent.

Good organisation

Make sure your display is logically presented and easy to read. A glance should permit anyone (particularly the judges) to quickly locate the title, experiments, results and conclusions. When you arrange your display, imagine that you are seeing it for the first time.

Eye-catching design

Make your display stand out. Use neat, colourful headings, charts and graphs to present your project. Home-built equipment, construction paper and coloured markers are excellent for project displays. Pay special attention to the labeling of graphs, charts, diagrams and tables. Each item must have a descriptive title. Anyone should be able to understand the visuals without further explanation. Make sure the text is large enough to be read easily.

Components that are well-constructed and correctly presented

Be sure to adhere to the size limitations and safety considerations when preparing your display. Display all required forms for your project. Make sure your display is sturdy, as it will need to remain intact for quite a while. Do not hesitate to ask for advice from adults if you need it.

Please note: It is very important to check your spelling!

Plagiarism and Ethics

Be aware of the following rules and statements pertaining to plagiarism and ethics.

What is plagiarism and how can students avoid it?

Plagiarism is using others' ideas and words without clearly acknowledging the source of that information. To avoid plagiarism, you must give credit to sources whenever you use:

- Another person's idea, opinion or theory.
- Any facts, statistics, graphs, drawings – any pieces of information taken from outside sources – that are not common knowledge.
- Quotations of another person's actual spoken or written words.
- Paraphrase of another person's spoken or written words.

These guidelines apply irrespective of the source of the information.

Ethics

Scientific and technological investigations and applications must be undertaken with integrity through the use of rigorous methods.

Participating students must ensure that any involvement of people as participants in their research is always fully justified. Participants have a duty to protect the well-being, dignity and privacy of individuals. The welfare of any animals that are subject to investigation must always be respected, and likewise any experimentation carried out in the natural environment must avoid adverse impacts.

Awards and Timetable

Prizes will be awarded to Young Scientists Tanzania prizewinners in the following categories:

Winners, Young Scientists Tanzania 2012

Young Scientists of the Year Trophy (perpetual) and a cheque, plus a trip to Dublin, Ireland, for the winning team and their teacher to visit the BT Young Scientist & Technology Exhibition in January 2013.

Runners-up, Young Scientists Tanzania 2012

Trophy (perpetual) plus a cheque.

Category Awards

The category awards take the form of First, Second and Third Prizes in Junior and Senior sections of each of the four categories:

1. Chemical, Physical and Mathematical Sciences
2. Technology
3. Biological and Ecological Sciences
4. Social and Behavioural Sciences

The category award prizes are as follows:

- First Prize: Trophy plus cheque
- Second Prize: Trophy plus cheque
- Third Prize: Trophy plus cheque

A number of Special Awards as well as Highly Commended and Display Awards will be presented in each category by the panel of judges. All project teams that qualify for the event in Dar es Salaam will receive a voucher to cover transport and accommodation.

Timetable of activities

Below is an outline of what will happen during the two days of the event.
This is subject to change, and full details will follow later in 2012.

Day 1: Wednesday, 24 October 2012

9.00a.m.–12.30p.m.	Registration and project set-up
1.30p.m.–2.00p.m.	Official opening ceremony
2.30p.m.–5.00p.m.	First and second rounds of judging

Day 2: Thursday, 25 October 2012

9.00a.m.–4.00 p.m.	Doors open to all school groups and general public
9.00a.m.–11.00a.m.	Third round of judging
3.00p.m.–4.00p.m.	Awards ceremony
5.00p.m.	Event closes

Please note: Students must not remove projects or leave the Hall before 5.00p.m on Thursday, 25th October 2012.

Rules

Terms and Conditions governing Young Scientists Tanzania 2012 (the "Event")

The following rules are designed to ensure that Young Scientists Tanzania is conducted as fairly and as efficiently as possible. Infringement of any of the Rules listed below may lead to the debarring of individuals or schools from current or future participation in Young Scientists Tanzania.

General rules for all entry submissions

1. Young Scientists Tanzania is organized by Young Scientist & Technology Exhibition Tanzania Limited, whose decision on all matters relating to the Event will be final.

2. The closing date for receipt of postal entries is 31 July 2012. Late entries will not be accepted.

3. Submission of an entry will not automatically ensure the acceptance of a project to the event. A panel of screening judges will select the projects to go forward to Dar es Salaam, and their decisions are final.

4. Students whose projects involve studies of animals must ensure that such studies are carried out in conformity with the statutory regulations.

5. The nature of a project will determine the equipment used in the project. The merit of a project will lie in the use made of any scientific apparatus and in an exhibitor's understanding of its functions, not in the equipment itself.

6. Before a project involving potentially dangerous, pathogenic, toxigenic or allergenic organisms (animals/insects, plants or microorganisms) is undertaken/entered, a competent expert must be consulted to advise on health and safety issues.

7. Projects involving the use of chemicals should list those to be used as part of the exhibit in Dar es Salaam in the Project Details form.

8. It is expected that all or the majority of the work for a project will be conducted in the school, the home or the outside environment. Understandably, some projects may involve visiting distant locations. Students may seek advice or information about their project from sources beyond their school, such as on the 'web'/Internet or from government organisations, or from universities, institutes of technology or other experts. However, it is recommended that the majority of students' work be conducted under the supervision of their relevant teachers, with, where appropriate, suitable levels of involvement by parents, guardians or other responsible adults. Where experimental/research work is conducted by the students themselves, or on their behalf, in a laboratory that is external to their school (e.g., in a local university, a hospital or an industry), then that work should be clearly identified and acknowledged within the project report book and presentation. In addition, it is a requirement that a cover letter from the external facility, describing the extent of the assistance provided and the work done by the students within that facility, or undertaken on behalf of the students, will be included in the project report book.

9. Secondary Level students in forms 1 through 6, resident in any part of Tanzania, are eligible to enter.

   There are two sections in which to enter:

   Junior: O level group (forms 1 through 4)
   Senior: A level group (forms 5 through 6)

   N.B.: The section is determined by the form that the student(s) will be in at the time of the Event in October 2012.

10. Students attending primary schools or third level colleges are NOT eligible to enter.

11. Project entries must be submitted in one of the four categories listed below.
    i. Chemical, Physical and Mathematical Sciences
    ii. Technology
    iii. Biological and Ecological Sciences
    iv. Social and Behavioural Sciences

12. Where a student wrongly classifies a project, the judges will have the right to decide its appropriate classification.

13. Projects may be submitted in any one of the categories listed (see section entitled 'Category Choice'). Individual student entries are permitted, but group work is encouraged. Each student team may submit one project only. A team member may be associated with only one project entry. Teams will consist of no more than four members in the same year group (Junior or Senior) from the same school.

14. Each team must appoint a group leader who will direct the work and later act as a spokesperson. All team members must be in attendance at the Event.

15. All members of a team should be fully involved, share the work and be familiar with everything that is going on. The final work should reflect the coordinated efforts of all team members.

16. In some instances, teams that have been accepted for the Event may need to change the number of people in their accepted project group, increasing or decreasing the number of team participants within the rule boundaries. Such changes must be made in writing to YST before 31 August 2012; failure to do so will lead to the project being judged in the original grouping in which it was entered.

General rules for accepted projects
(Refers only to projects that are accepted to exhibit at the Event in Dar es Salaam.)

17. Some students who have had their project accepted for exhibition may find themselves unable to complete it. It is very important that the organisers are immediately notified of this. Failure to notify YST of a withdrawal in good time results in empty stands at the exhibition and causes disappointment for both other students and the visiting public. If a project has to be withdrawn, please let us know immediately through your teacher.

18. Project content and material remains the property of the exhibitors but may be used by YST for exhibition or publication. If students have a project with element(s) that have commercial potential and for which they seek patents, they are recommended to have such element(s) registered before the event.

19. The judges reserve the right to withhold awards in the event of projects not reaching a satisfactory standard.

20. The judges' decision in all matters relating to the award of prizes will be final. The Pearson Foundation and other sponsors will not influence the judges' decisions.

21. YST provides exhibition stands of uniform size and design. Exhibits must be within the limits of the stand dimension. Projects not conforming to this regulation may be disqualified.

22. Exhibitors will be required to assemble their own projects in Dar es Salaam within the time allocated.

23. YST will NOT accept responsibility for damage to, or loss of, exhibits or personal belongings. Exhibitors are advised to remove valuable equipment from unattended stands.

24. Exhibits MUST be safely designed and constructed and MUST NOT use as part of the display any dangerous equipment or open flames; any toxic, flammable, explosive or irritant chemicals; or any pathogenic, toxigenic or allergenic organism (animals/insects, plant or microorganisms). Live mammals, birds, amphibians or reptiles MAY NOT be presented in exhibits.

25. Exhibitors are asked to refrain, where possible, from using brand names of firms/sponsors in their display. Reference to brands or firms should be confined to the entry's report book.

26. Exhibiting students must be present at their stands during all rounds of judging of projects at the Event in Dar es Salaam.

27. Exhibiting students will be expected to remain at their stands during the Event to speak with the visiting public about their projects. They may not leave the exhibition before 5.00p.m. on either day of the Event without prior arrangement with the Young Scientists Tanzania organisers.

28. Each exhibitor should write the team's name on all equipment, charts and report books.

Transport and Accommodation Grant Scheme

29. A Transport and Accommodation grant is available for all schools exhibiting at the Event in Dar es Salaam. In order to be eligible for the full grant under the grant scheme, a school must be located more than 40 kilometres from the exhibition hall in Dar. es Salaam (A transport grant is also available for those schools less than 40 kilometres from the exhibition hall.) YST's decision on eligibility of a school or a project entry for a grant hereunder is final.

CONTACT: Joseph Clowry
YST Project Manager/Education Officer
Combat Diseases of Poverty Consortium
NUI Maynooth
Tel: + 353 (85) 7308304/+255 (77) 7430334
Email: joseph.clowry@nuim.ie
Skype: jceire

Young Scientists Tanzania
P.O. Box 23391, Plot 108
Makuyuni Road, Mikocheni B,
Dar es Salaam
www.youngscientists.co.tz

October 24 & 25, 2012

Aga Khan Diamond Jubilee Hall | Dar es Salaam, Tanzania

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