NamPower National Science Fair

Science Fair Guide

2016
By

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1. Introduction

Namibia’s National Science Fair is an annual event where the best Science Fair projects for all the Regions compete against each other. This event normally takes place during August or September.

The aim of the National Science Fair is to:

- To stimulate interest in young people in science, math, and engineering;
- To provide educational experience through participation in scientific research;
- To give public recognition to learners for the work that they have done;
- To encourage inquisitive students to explore their environment in a systematic, logical manner; and
- To stimulate students interest in science and technology while simultaneously promoting the development of the life skills of communication, decision making, evaluation of alternative solutions, and critical thinking.

2. Entering a Science Fair

A. Eligibility/ Limitations

A student must be selected by a Regional Science Fair and be in Grades 1–12.

Each student may enter only one project.

Each Regional Science Fair may send 20 gold medal projects to the National Science Fair:

- 10 Primary School projects, and
- 10 Secondary School projects.

Secondary Schools may only enter individual projects, with only one student allowed per project. Primary Schools may enter team projects. Team projects may have a maximum of two members. Teams may not have more than 2 members at a Primary School Science Fair and then eliminate members at regional and national competition.

There is a broad range of categories in which students can complete science fair projects. A list of the categories and subcategories can be found in this booklet (Annex 2).

Interested learners and teachers should contact their nearest Regional Science Fair Coordinator for more information.

Ensure that entry forms are fully completed; that the information is clearly readable and you
have entered your project in the correct category.

Any project done must fall under one of the Expo Categories.

NB. Not all gold medal winners at regional level will be selected to participate at the National Science Fair.

Any project done must fall under one of the Science Fair Categories (Annex 2).

**B. Continuation of Projects**

As in the professional world, research projects may be done that build on work done in previous years. A valid continuation project is a sound scientific endeavour. Students will be judged only on the most recent year’s research. The project year includes research conducted over a maximum of 9 continuous months from January – September.

Any project based on the student’s prior research could be considered a continuation project. If the current year’s project could not have been done without what was learned from the past year’s research, then it is a continuation project for competition. These projects must document that the additional research is an expansion from prior work (e.g. testing a new variable or new line of investigation, etc.). Repetition of previous experimentation with the exact same methodology and research question or increasing sample size is examples of unacceptable continuations.

Display boards and the abstract must reflect the current year’s work only. The project title displayed in the finalist’s booth may mention years (for example, “Year Two of an On-going Study”). Supporting data books from previous related research may be exhibited on the table properly labelled as such.

**3. Types of Projects**

**A. Study**

**Definition:** A collection of data that gives evidence of a fact (or facts) or a situation of scientific interest. It could include a study of cause and effect.

This is the easiest type of project since it involves mainly reading and writing. Information for this type of project can be gained from several written sources, via books, internet, magazines
and newspapers, speaking to people knowledgeable about the topic and can be enhanced by the use of photographers, charts, drawings and models.

The skills involved in this category are the selection of appropriate sources, the ability to extract relevant information from these sources and to synthesis this information into a pleasing presentation. There must be evidence that the pupil has gained knowledge from his/her study.

Pupils need to be knowledgeable about their chosen topic and be able to answer questions related to it and see the relevance of what they have worked on in the Namibian context.

The projects which are grouped as Studies are only allowed for the Primary School learners from Grade 1 to 5.

**B. Investigation**

**Definition:** An undertaking to test a hypothesis using experiments, data and scientific methods. The participant is actively involved in solving a problem.

A scientific project is an investigation in which you try to solve a problem or answer a question that you have identified. When you do an investigation, you follow a method that allows you to test an idea or solve a problem and come to a clear conclusion. Projects for the National Science Fair must have original work done by participant e.g.

- survey of more than a 100 questionnaires,
- experimental work with a lot of testing.

This is the pinnacle of the exhibition as it includes many scientific skills mentioned in all syllabi. An investigation must be original and where possible topical. In an investigation, the student is actively involved in solving the problem. It thus follows that topics in this category are often formatted as questions:


Here we expect to see the inclusion of innovative ways of finding out more about their chosen
topic through interviews, questionnaires, experiments, observations, field work and that this has been carried out consistently over a period of time. We are looking at how they went about this, adaptations to the original project design to overcome problems, clear understanding of the results obtained and good scientific interpretations of these and finally a conclusion relating back to their aim – essentially did they achieve what they set out to do and if not, why not?

An Investigation is dependent on the acquisition of scientific skills. Below find a brief explanation of some of these skills needed for a good investigation:

   a) **Questioning or identifying the problem**
   This is the ability of identifying a problem (often from observations made) and formulating it into a question.

   b) **Hypothesizing or predicting**
   This really is making several intelligent guesses as to what the possible answers could be to the questions formulated.

   c) **Testing**
   The need to try and find out if the hypothesis (predictions) is right or wrong. You need to prove this through doing experiments, calculations, interviews, etc. You often have to design one or more experiments to do this. This is initially done on paper (in your logbook) and then it is done practically. In designing an experiment, it is very important to identify all the variables and to control these wherever possible. Very often, testing a prediction is done by a series of careful observations. Observation is the ability to use all senses (sight, sound, smell and taste) to observe phenomena whether they are physical, biological or social and to record them simply and concisely.

   d) **Record the results**
   This is a clear statement of the results obtained whether by experimentation or observation. Results of experiments and of surveys are often recorded by tables, histograms, pie charts or graphs. It is important to show mathematical calculations as well in your recordings.

   e) **Conclusion**
   Here it is important to be objective and draw conclusions from the results recorded, which can then be used to support the hypothesis or not.
The projects which are grouped as Investigations are allowed for both Primary & Secondary School learners from Grade 1 to 12. It is compulsory for pupils from Grade 6 to 12 to do an investigation.

**C. Models/ Innovation/ Technology**

**Definition:** A working model that demonstrates a scientific principle and from which the learner acquired technical skills or which was used in experimentation to obtain data for an investigation.

This type of project should display some technical knowledge. Acquired skills will also be part of the final assessment. It is important that exhibitors ensure that their models work for the duration of the Science Fair. The emphasis is less on the display board and more on the model made its purpose, how it was made, adaptations to solve problems encountered and a clear understanding of the science underlying the model. Commercially available kits and models are unsuitable for display as a science project, unless they are used for some other purpose in the Fair.

Background knowledge is required: for example, if a pupil has entered a model of a crane, then an understanding of pulleys and levers would be expected.

The projects which are grouped as Models are allowed for both Primary & Secondary School learners from Grade 1 to 12.

**4. Steps to a Good Scientific Project**

**STEP 1: Choosing a topic**

The topic for your project should be something that you are interested in and that you want to learn more about. You may think of a good topic straight away just by looking at the list of the National Science Fair categories, or you may need to look for ideas for your topic. You can get ideas for projects from:

- Newspaper and magazine articles;
- The Internet;
- Television programmes; and
- Practical problems from your community.

Your idea for a project should be an original one. This means that it should be your own idea and not somebody else’s. Do not repeat an experiment from the school syllabus or choose a problem to which people already know the answer. For example "Determining the specific heat capacity on iron" is not an original topic for your Science Fair project. The method to follow is well known from school textbooks and you can easily look up the answer.

The best Science Fair projects are not always complicated, but they are imaginative and well carried out.

A good project is often:
- a clever solution to a problem; or
- a new idea for a piece of apparatus; or
- a study or survey that no-one has done before.

Be original, but **DO NOT** choose a project that:
- could be dangerous to yourself or others;
- needs any experiments on insects, live animals or humans; or
- involves collecting plants or animals that are protected by Nature Conservation laws.

State your topic as a question or aim and then formulate your hypothesis (what you think the answer is going to be).

Students must submit their project idea to their teacher, before starting a project, for approval. Ethics needs to be considered at this point.

**STEP 2: Do a research plan**

Every student should type a research plan which you should submit to your teacher/mentor/qualified scientist at the beginning of your project.
Aim for an original and creative project! This plan shows how you intend to do your project so it is written in the **future tense**. The length of your research plan should be between 2-4 pages.

Research plan for **ALL** projects must include the following:

A. Question or Problem being addressed
B. Hypothesis or Engineering Goal (Engineering projects only)
C. Description in detail of method or procedures engineering project areas that will answer the question you asked or solved the problem:

The following are important and key items that should be included when formulating **ANY AND ALL** research plans:

- Procedures (Method)
- Variables: independent, dependent and controlled/fixed
- Data Analysis: how you will analyse the data

D. Bibliography: List the three (3) most important references (e.g. science journal articles, books and internet sites) that you used to get information about your topic and that you will refer to in your introduction/part A above.

**STEP 3: Gather background information**

Gather information about the topic. What do you need to know to answer the question? What do you think the answer will be? Form your hypothesis.

Use books and Internet sites for your research. A summary of your research must be included in your introduction. Remember to record your references/bibliography.

**STEP 4: Collect data**

- Do experiments to test your hypothesis;
- Interview people interested in your topic;
- Do surveys or send out questionnaires - a minimum of 100 people if applicable, make a working model to illustrate the solving of your problem. Use what is at hand, an e.g. use material from home;
- Keep handwritten notes in a project data book (e.g. file, diary or scrap book);
A project data book is your most important piece of work;
Accurate and detailed notes make a logical and winning project;
Good notes show consistency and thoroughness to the judges;
Record data in the data book and then transfer to tables when writing your report; and
Make sure you date every entry.

DO NOT USE BRANDED PRODUCTS IN YOUR EXPERIMENT RATHER IDENTIFY USING LETTERS OR NUMBERS. YOUR PROJECT WILL BE DISQUALIFIED IF YOU INCLUDE BRANDING.

**STEP 5: Record your results in tables**
- Generate graphs from your tables;
- Add photos; and
- File a blank copy of your questionnaire/survey in your data book.

**STEP 6: Discuss results**
- Interpret the data or make comparison;
- Look at trends and patterns; and
- Note limitation and errors in your discussion.

**STEP 7: Conclusion**
State whether your results support or do not support your hypothesis. Your conclusion(s) must be based on your findings and must be linked to your hypothesis/aim/engineering goals.

*FOR THE NATIONAL SCIENCE FAIR: Challenge and test your hypothesis again and make sure that you collect more data between the Regional and the National Science Fair to support your hypothesis. Test your prototype and redesign, rebuild and retest your new prototype.*

**STEP 8: Evaluate the whole project**
- Review
Teachers can use the project as part of class work. When assessing the projects at school level, teachers can assist students in upgrading their projects so that they can participate in a Regional and National Science Fair.

**STEP 9: Compile a Project File using the following Headings**

1) Choosing a title for the project: Title simple and must be descriptive;
2) State problem/aim and hypothesis;
3) Introduction, including information collected and description of project;
4) Method (numbered, logical, concise, third person includes variables);
5) Results (record of data in tables and graphs);
6) Analysis/discussion and interpretation of results (including errors and modifications);
7) Conclusion/s;
8) Bibliography/References (with a list of books, magazine articles or internet sites where you acquired important information);
9) Acknowledgements (this is a list of the people who helped you and the help each one gave. For example, someone might have lent you a piece of equipment, taken photographs for your poster or given you some important advice); and
10) Abstract (limited to 250 words).

**STEP 10: Showing your work**

Your presentation must include the following:

- Presentation for your display board must be printed onto A4 (landscape/ portrait)
- Your presentation must be presented logically and must be eye-catching
- Project data book/ Journal/ Log book
- Project File with Abstract
- Surveys, Questionnaires (if applicable)
- Working model on table (if applicable)
Display boards will be provided.

*Below in sub-section I and II is a suggested lay-out for the display boards.*

## 1. Display Board Dimensions

The National Science Fair will provide the display boards. It is compulsory to use the display boards provided at the National Science Fair.

Each exhibit at the National Science Fair is given a space of:

- maximum 1.5m table length, and
- a display board.

If the project is an Engineering project, a physical model of prototypes that fit onto the table will be allowed. The maximum dimensions are 50 x 50 cm. Please note that no part of the project may be put onto the floor.

**Dimensions:**

Display Boards for the National Science Fair will be standard with the following dimensions:

- *Middle length = 150cm*
- *Left Side length = 50cm*
- *Right Side length = 50cm*
- *Height = 100cm*
- *Table length = 150cm*
Please Remember: There are space restrictions as given in illustration above.
II. Suggested layout for Display Board (a summary of your project)

Left Side:
- Introduction/ Purpose or Problem
- Background information
- Hypothesis / Aim

Middle:
- Large title (Font size 150) (Title should be the same as submitted on entry to Regional and National Science Fair), and
- Name and grade and photo of participant underneath the title
- Method, including variables
- Results - include tables and graphs (this includes observations and calculations)

Right Side:
- Discussion/ Analysis and Interpretation of results
- Conclusion
- Bibliography and Acknowledgements
- Photos (if applicable)

Your poster is the most important part of your project. Your poster should be easy to read and understand. It should explain what you did, how you did it and what you found out. Make your poster eye-catching and interesting. You want visitors at the Science Fair to stop and read about what you did. Summarised information must be laid out in a logical order. Anyone who wants more information can read your report. (Your report is very important).
III. An example of the layout for a display board (Headings)

5. Your Project should have the following:

   A. Project Display Board
   
   See page 9-12.

   B. Project Data Book

   • This is a record of **ALL** your work - no matter how untidy it is!
   • Everything should be dated;
• File all emails;
• File notes from interviews;
• File all designs and plans;
• File copies of articles/webpages you have read - either in alphabetical order or in order of importance to the project; and
• File all survey questionnaires.

C. Project File with Abstract, Signed research plan, signed plagiarism form and a consent

• Neat file - contents page with headings below, dividers, logical arrangement;
  • At the front of the file – signed research plan, abstract, signed plagiarism form and consent letter from a qualified scientist for human subjects and animals;
• Introduction (Why and includes background research);
• Aim (To find out/to determine etc.);
• Hypothesis/ Engineering Goals (Statement that you are going to test which includes independent and dependent variables);
• Procedure/ Method (How the project was carried out in the 3rd person and includes fixed variables);
• Results (What happened - tables & graphs);
• Analysis of Results (Results/findings/graphs explained in words, more extensive in report than on poster)
• Discussion, errors and modifications (Patterns and trends are noted and explained, anomalies/ unusual results are discussed, limitations noted and clarified);
• Conclusions (Refer directly to aim/hypothesis or engineering goals incorporates results; states whether supports engineering goals or hypothesis);
• References (Which books and webpages you consulted and these must be referenced correctly, the first reference must be the one where you got your project idea from); and
• Acknowledgements (People you talked to and who helped you and state what help they gave you).
An Abstract

What is an abstract?
The purpose of an abstract is to serve as a link between the title of a scientific project (research study) which may be a brief paragraph or two (limited to 250 words). The abstract is a useful summary of the project that provides justification for the research. The abstract allows the reader to conclude whether your project write-up is worth reading. Your abstract appears at the beginning of your project file as well as on your display after acknowledgements.

How to Write an Abstract
The abstract should include the following headings:

a) Purpose of the Project/Experiment
   • An introductory statement of the reason for investigating the topic of the project; and
   • A statement of the problem or hypothesis being studied.

b) Procedure/Method Used
   • A summarisation of the key points and an overview of how the investigation was conducted;
   • An abstract does not give details about the materials used unless it greatly influenced the procedure or had to be developed to do the investigation; and
   • An abstract should only include procedures done by the student. Work done by a mentor (such as surgical procedures) or work done prior to student involvement must not be included.

c) Observation/Data/Results
   • This section should provide key results that lead directly to the conclusions you have drawn; and
   • It should not give too many details about the results but must include the most important data generated in the investigations.

d) Conclusion(s)
   • Conclusions from the investigation should be described briefly;
• The summary paragraph should reflect on the process and possibly state some applications and extensions of the investigation; and

• An abstract does not include a bibliography or references or acknowledgement.

6. Referencing/ Bibliography

Referencing means that you give credit to the various sources you have used when writing your assignment/report. A reference list should include any documentation that is not your own. All sources should be arranged alphabetically according to the surname of the first author.

The references should be written in the following order:

Author’s surname and initials, year of publication, title (underlined or italics), edition, place of publication, publisher. This is the Harvard style of referencing. Other referencing styles are also acceptable.

A. Books:

  e.g. Kritzinger, A.A.C and Fourie, C.M.W 1996 *Basic Principles of Financial Management*, Cape Town, Juta

B. Journals:

  Journals should be written in the following order: author’s surname and initials, year of publication of the journal, title of article, title of journal, volume, pages.

  e.g. Manning, T. 1996 “Three steps to the future”, Human Resources Management, 12(8), 8-9

C. Chapters in books:

  e.g. Smith, R.J. Comparative themes in higher education, in “Trends in High Education” edited by J.N. Green. London: Benton

D. Newspaper Articles

  The reference should be written in the following order: year, newspaper, date and month, page.

  e.g. 1908. *Business Day*. 25 June: 7

E. Internet referencing:
F. Theses and Dissertations


G. Info on Referencing and Photos

For more information on Harvard Style referencing and referencing of visual material (images/photos) please visit the following websites:

http://rmit.libuides.com/content.php?pid=220068&sid=1827557

http://www2.lib.uct.ac.za/infolit/bibharvard.htm

7. Planning a survey

Surveys may only be part of your background research and not the whole project. Before you start you need to ask yourself these questions relevant Science Fair information is added in brackets:

- What are the objectives of the survey (is it to find out opinions as part of background research or is it to obtain scientific data which would be part of the results of the investigation)?

- Are there other sources of data I could consult before carrying out a survey (literature search)?

- How will I ensure that those who have a stake in the outcome of the survey support it (well-written permission letter)?

- How will I develop the list of people/organisations to be surveyed and how reliable is the contact information (important part of research plan)?

- How should I design my sample (group of people taking the survey) to minimize cost and maximise the accuracy and flexibility of the results?

As you develop the questionnaire you need to know:

- What information is required to meet the needs of my project (part of aim and
hypothesis)?

- What is the best way to word questions so that I will get unbiased responses (procedures/method)?
- How will I design the survey questionnaire to ensure the questions are clearly understood and answered properly (procedures/method)?
- What is the most reliable and cost-effective method of delivering the survey (procedures/method)?
- How should I pre-test the survey questionnaire (in the pilot study)?
- When should I use the results of the pre-test?

**When dealing with the respondents you need to answer:**

- How will the confidentiality of the responses be protected (all questionnaires are filled in anonymously)?
- Who will respondents contact when they have questions (you, the investigator)?
- How long do respondents have to respond (shorter deadlines work better)?
- What will I do if they don’t respond (accept this as it’s their choice to complete the questionnaire)?
- What is an acceptable response rate? What will I do if my response rate is unacceptably low (for an initial study for Expo a minimum of 100 completed survey questionnaires is needed so if you get too few send out more survey questionnaires)?

**Before you analyse and present the information, you need to know:**

- How will I assess whether or not the responses are biased and how will I correct my data for bias if it exists (double blind questions)?
- What is the best way to present the data so that my audience grasp the importance of my findings (tables and graphs)?
- How will I demonstrate that the results are statistically valid, accurate and reliable (all fixed variables must be controlled and there needs to be a sufficiently large sample size for the study to be reliable)?
- What techniques will be used to impute, estimate and weight the responses to give accurate, fully representative results (statistical analysis)?
- What techniques will I use to analyse the data (analysis and discussion)?
8. Interview
All participants will be interviewed as part of the judging process.

Please take note of the following points:

- Introduce yourself by name;
- Know your topic;
- Be enthusiastic;
- Speak clearly with confidence;
- Use appropriate language;
- Listen to the judges' questions;
- Don't read off notes or recite a prepared speech, answer the questions;
- Make sure your answers are to the point; and
- Be aware of time constraints.

9. Useful Points to Remember

- Bring your own drawing pins, staples, Prestik, Velcro, masking tape or whatever else you need to put up your display;
- Bring your own extension cord if you have a model or apparatus that needs 220 volt electricity to work;
- Do not include any live animals, insects, spiders and fish in your display. Photos and video clips may be shown instead;
- Do not include any animal or human body parts in your display. (Refer to page 23 and make sure your project is ethical);
- Burning of any substances or use of open flames as part of your exhibit is prohibited;
- Do not leave valuable items on your display. The organisers will endeavour to make sure that things are safe at the National Science Fair, but will not be responsible for any losses;
- No chewing gum during interviews; and
- Switch off cell phone during interviews.
10. Parents and Teachers

The National Science Fair supplies a forum for students to display their scientific knowledge and skills. Parents and teachers can act as mentors to the students, but must not display their own scientific knowledge and skills. Judges will disqualify any project that was not done entirely by the student(s).

The role of the teacher is that of a mentor. The National Science Fair depends on teachers to distribute information about the National Science Fair to students. Simply through their encouragement and support, enthusiastic teachers can inspire their students to great achievements.

A teacher can guide students through the stages of a scientific project and ensure their scientific approach.

Summary of the scientific method:

- **STEP 1** Students must submit their research plan to their teacher, before starting a project, for approval. Ethics needs to be considered at this point.

- **STEP 2** Choose a topic or question.

- **STEP 3** Gather information about the topic. What do you need to know to answer the question?

- **STEP 4** What do you think the answer will be? Form your hypothesis/state your engineering goals.

- **STEP 5** Test your hypothesis/test your prototype/evaluate your prototype and redesign if necessary.

- **STEP 6** Draw conclusions based on the results of the testing.

Teachers can use the project as part of class work. When assessing the projects at school level, teachers must assist learners in upgrading their projects so that they can participate in their Regional Science Fair.

**Individual projects are encouraged, but no more than 2 learners (Primary phase only) are allowed to work together on a project.**

Teachers need to enter their learners’ projects for the Regional Science Fair.
11. Ethics and Plagiarism

A. Ethic Statement

Scientific fraud and misconduct are not condoned at any level of research or competition. Such practices include plagiarism, forgery, use of presentation of other researcher's work as one's own and fabrication of data. Fraudulent projects will fail to qualify for competition in the National Science Fair.

B. Plagiarism

What is plagiarism?

It can be defined as follows:

To use another person's words or ideas and to pretend that they are your own. The following are considered as plagiarism:

- To steal or borrow another person's work;
- To pay another person to write your assignment;
- To copy directly from a source without referencing the original source;
- To use another person's ideas and build on them without giving credit to the original ideas;
- To paraphrase another person's work word-for-word; and
- To present false data (fabricated, altered or borrowed without permission).

The worst form of plagiarism is to do it intentionally:

- to pretend that another person's work is your own;
- to buy a piece of written work from somebody (e.g. from the internet); or
- to pay somebody to write your assignment for you; or
- to write something word-for-word from a source without acknowledging that source (or to "cut and paste" from the Internet).
Plagiarism can also occur unintentionally: when you rewrite another person's ideas or words in your own words, or use small sections of another person's writings without acknowledging it as a source.

Fraudulent projects will be disqualified at the National Science Fair. **It is compulsory that every participant has a signed copy of the plagiarism form in their file.**

**C. Make sure your project is safe and ethical**

Ethics is concerned with what is right or wrong, good or bad, fair or unfair, responsible or irresponsible. Research on micro-organisms, human or animal subjects including surveys, need a form signed by a supervising scientist or teacher giving approval for the project to be done. Any surveys (questionnaires) need another form giving consent or permission by parents or schools. Both forms need to be filed in the project file in the appendix.

Before you start a project, it's important to know the rules - especially if you're thinking of using animals, human subjects, hazardous equipment or materials, recombinant DNA or other biotechnological materials. (By the way, "animals" include pets and livestock and humans include family members and students in your class or school.) It's heart breaking to have your project disqualified at the National Science Fair because you broke the rules - or maybe even the law!

Any research or experiment on potentially hazardous biological agents, animal or human subjects must be done under the supervision of a qualified scientist/laboratory. A signed letter from the qualified scientist or/and laboratory will be required before participating at the National Science Fair.

**D. Ethics Infringements**

Students are encouraged to check their ethical infringements before exhibiting their projects at the National Science Fair. Please note that the following are not allowed at the National Science Fair:

- Living organisms including animals, fish, insects and plants;
- Agar plates and other growth mediums for microbiology studies;
- Human or animal parts including tissues and body fluids (for example blood, urine,
hooves, skins etc.);

- Dangerous chemicals: Poisons, drugs, medications, controlled substances, hazardous substances and devices (for example firearms, weapons, ammunition, reloading devices, knives and any other sharp instruments);

- Flammable substances;

- Photographs or other visual presentation depicting humans or vertebrate animals in surgical techniques, dissections, necropsies or other lab procedures or who belittle people in any way or show animals being harmed in any way;

- Brand names or any other branded products;

- Food substances that are not in completely sealed containers (plastic wrap is not acceptable as it can easily be removed);

- Water except if in sealed apparatus; and

- Any apparatus deemed unsafe by the National Science Fair organisers.

**NB: Photographs will be sufficient for judging**

**In order to rectify the problem you need to take note of the suggestion below:**

- Remove all living organisms and take them to a member of the ethics committee or venue committee;

- Remove all human or animal parts and take them to a member of the ethics committee or venue committee;

- Remove all dangerous chemicals and take them to a member of the ethics committee or venue committee;

- Remove photos or presentations that belittle people or animals from your poster and file. **NB: you may not cover them up**;

- No brand names to be visible. Please make sure all branding is covered label with e.g. Product A, B or Product 1, 2 etc.;

- Food must be sealed into containers and then shown to the ethics committee; and

- Water must be removed or enclosed into sealed apparatus.

### 12. Administrative Considerations

- All titles must reflect the essence of your project. No fancy words, slogans or rhyming, please! The judges must know what the project is about by reading the title.
• Every project must have an abstract form (A4) on the bottom right hand corner of the project board.

• Entries should be in the correct categories. The description of twenty words required when entering is crucial for us to categorise the entry correctly. NO category changes will be allowed as from the start of the week before the National Science Fair.

• All electrical appliances must be safe and compliant.

• No project may be wider than the space allocated.

• While we will supply electrical plug points, we cannot guarantee power supply. Make sure you can present your project WITHOUT electricity, should there be problems with electricity. Please bring your own lead/electrical cord (if you need it for your project).

• Laptops get stolen, so please keep yours with you the whole time. We will not accept any responsibility for your aids.

13. Judging

Judging is based on the following criteria:

**Part A: Value of project**

• Originality of the project. The student is able to think and act independently. Refers to reading, originality of approach, use of resources, depths of planning and execution of investigation; and

• Scientific method. Command of the scientific method, scope/range of investigation, results, analysis, conclusions.

**Part B: Written communication of project**

Written communication of research (Display Board, Project File, Project Data File/ Journal/ Logbook)

**Part C: Oral communication**

The interview with the judges is aimed at establishing the exhibitor’s understanding of the topic,
the originality and thoroughness of their methods and experimentation.

Most of what an exhibitor has done should be on display or should be discussed during the interview. A standard set of judges’ criteria are used at the National Science Fair. Please make sure that you study the judges’ criteria before you participate at the National Science Fair. (Refer to judging sheet)

PLEASE NOTE THAT AT THE NATIONAL SCIENCE FAIR, THE CHIEF JUDGES’ DECISION IS FINAL AND NEITHER DISCUSSION NOR CORRESPONDENCE WILL BE ENTERED INTO.

Part D: Relevance

The judges will assess whether the project relates to the priorities of the country.

14. Adjudication

- All the participants must wear school uniforms;
- Participants’ etiquette: No eating and drinking while being judged. All cell phones off/on silent, please;
- Each learner must make sure that their project has a category number as well as a project number before the judging starts;
- Each project will be judged by at least 2 adjudicators (simultaneously or separately);
- Each adjudicator will attach a round coloured sticker to the exhibition board. If not, the participants should ask for the stickers;
- If the project has not been visited by at least 3 adjudicators (simultaneously or separately) by 17h30, please report it at the info desk;
- Any problems with adjudication should be reported not later than 18h30 at the info desk by the teacher. (Red forms). No complaints will be dealt with after 18h30;
- You must always be present at your project during judging. If you are not present, you will not be judged. Should you go to the rest rooms, please ensure that you leave a note at your project!
- Participants may only leave the hall after their category has been judged and an announcement made in this regard. Please do not leave beforehand, as judges might want to revisit your project to confirm their assessment; and
No persons, other than participants, officials and special guests will be allowed in the hall during adjudication. Persons without a sticker will be requested to leave the hall.

15. Prize Giving Ceremony

All the participants must wear school uniforms to the Prize Giving Ceremony.

16. Prizes

Prizes for projects will be awarded as follows:

Medals

All projects are eligible for a medal and will receive it as follows:

- Gold medal – 80 - 100%
- Silver medal – 70 - 79%
- Bronze medal – 60 - 69%
- No Medal awarded – Below 60%

Category winners

- one per category per phase

Overall winners

- one winner as best Primary phase project
- one winner as best Secondary phase project

Best School

- one winner as best Primary phase
- one winner as best Secondary phase
Best Region

- one winner as best Region
Annex 1: Organising and Planning a Science Fair (Checklist)

The following schedule shows you the sequence of planning/things to organize for a Science Fair. If a teacher/parent/science enthusiasts, etc. follows the following guide to preparing a science fair it will be a success.

Please Note:
It is a syllabus requirement that all learners from grades 5 to 10 do projects as part of their continuous assessment mark. This syllabus requirement should be linked to the Science Fair.

Form an organising committee

- All science and mathematics teachers are required to be members. Select a Chairperson (and General Manager);
- Secure funding for the event by organising special events;
- Encourage learners to participate; and
- Invite some knowledgeable person or various experts to speak to the learners.

Management team

- **General Manager** – Chief co-ordinator selects the team and allocates tasks to team members – Chairperson at all meetings. All the team members listed below report to her/him;
- Publicity and program organiser (opening/closing ceremonies);
- Funding and finance controller;
- Entries co-ordinator;
- Judges co-ordinator: recruitment/allocation of projects to be judged by each judge/plays judge for each category who leads team discussion on the allocation of marks. Selects Quality Control Team;
- Refreshments co-ordinator;
• Floor manager (tables arrangement/floor plan/power/water and problems/);
• Results co-ordinator;
• Results collator; and
• Allocation of prizes committee.

**Preliminary Planning**

• Get dates of the various science fairs.(Regional/National);
• Based on the above set a date for the internal School Science Fair. (these marks to be used for continuous assessment marks);
• Have set days for co-ordination meetings;
• Draw up a programme for the year – this should be done in the 3rd trimester for the next year;
• Provide guidelines to all learners on how to do projects and assist them by giving examples on each topic in the syllabus;
• Plan mentorship programmes;
• Secure venues;
• Plan transport requirements; and
• Plan the School Science Fair.

**Science Fair Planning- Logistics/procedures**

1. Get suitable location for the number of projects;
2. Publicise event and provide all information;
   • Make posters;
   • Invite press, NBC etc.;
   • Write an article which must be freely available;
   • Take photographs;
   • Invite other schools from the cluster group;
   • Keep a record of all the results;
- Send results to press / NBC;
3. Tables for projects;
4. Chairs;
5. Table cloths;
6. Display boards with all details – e.g. Title of project; Name(s) and grade(s) of learners;
7. Category numbers for the projects;
8. Receive entries;
9. Accommodation / arrangements for guests and judges;
10. Meals;
11. List of projects in the various categories;
12. Electrical points;
13. Public announcements facility;
14. Information centre and people to run it;
15. Floor manager; and

**Judges**

1. Training of judges – keep a list;
2. Invitation forms to judges - follow up and reminders;
3. Judging criteria forms (see examples);
4. Select judges for each category;
5. Briefing of judges;
6. Judges meeting room. Identification badge indicating that the person is a judge;
7. Clipboard for judges and writing material;
8. Stickers indicating that judging done;
9. Judging tables for each category;
10. Judge convenors for each category;
11. Chief Judge and 2 Deputy Chief Judges;
12. Quality Assurance Group;
13. Refreshments/ meals for judges;
14. Thank you cards for judges;
15. Judges comments cards;
16. Collating of results (computer if there are a large number of projects.); and
17. Judges select medal winners, category winners - controlled by quality assurance group.

**Prize Giving**

1. Venue
2. Decorations
3. Table for trophies, certificates, medals
4. Have a master of ceremonies
5. Participants in school uniform
6. Entertainment
7. Program
   - Opening prayer
   - Music /choir for national anthem
   - Guest speaker, and dignitary for handing out certificates medals, trophies etc.
   - Special announcements -
   - Thanks and acknowledgements
Annex 2: Category List

There are eleven (11) Categories for the National Science Fair. Below is a table indicating these Categories:

<table>
<thead>
<tr>
<th>Category Numbers</th>
<th>Category (including sub-categories contained within category)</th>
</tr>
</thead>
<tbody>
<tr>
<td>An</td>
<td><strong>Animal Science</strong> (Development, Ecology, Animal Husbandry, Pathology, Physiology, Cytology, Histology, Population Genetics, Systematics, Entomology, Ichthyology, Ornithology, Herpetology, etc.)</td>
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<tr>
<td>Ch</td>
<td><strong>Chemistry</strong> (General Chemistry, Analytical Chemistry, Inorganic Chemistry, Organic Chemistry, Physical Chemistry, etc.)</td>
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<tr>
<td>Ev</td>
<td><strong>Environmental Science</strong> (Ecology, Earth Science, Geography, Geology, Marine Science, Recycled Material, Tourism and Eco-Tourism, Water and water related projects, etc.)</td>
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<tr>
<td>Fo</td>
<td><strong>Food Science and Food Technology</strong> (Food Chemistry and Biochemistry, Food Microbiology and Biotechnology, Flavour Chemistry, Food Processing and Engineering, Enology (Winemaking), Brewing Science, Dairy Processing, Seafood Science, Value-Added Foods, etc.)</td>
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<tr>
<td>Hu</td>
<td><strong>Human, Medical and Health Sciences</strong> (Human Anatomy, Physiology, Drugs, Social and Psychological Science, Primary Health Care, Prevention, Hygiene, Disease Diagnosis and Treatment Epidemiology, Genetics, Molecular Biology of Diseases, Physiology and Pathophysiology, etc.)</td>
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<tr>
<td>IT</td>
<td><strong>Information and Communication Technology</strong> (Digital Technology, Cybernetics, Algorithms, Data Bases, Artificial Intelligence, Networking and Communications, Computational Science, Computer Graphics, Software Engineering, Programming Languages, Computer Systems, Operating Systems, etc.)</td>
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<tr>
<td>MS</td>
<td><strong>Mathematics and Statistics</strong> (Algebra, Analysis, Applied Mathematics, Geometry, Probability and Statistics, etc.)</td>
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<tr>
<td>Ph</td>
<td><strong>Physical Science, Astronomy and Space Science</strong> (Atoms, Molecules, Solids, Astronomy, Biological Physics, Instrumentation and Electronics, Magnetics and Electromagnetics, Nuclear and Particle Physics, Optics, Lasers, Masers, Theoretical Physics, Theoretical or Computational Astronomy, etc.)</td>
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<tr>
<td>Pl</td>
<td><strong>Plant Science</strong> (Agriculture/Agronomy, Development, Ecology, Plant Genetics, Photosynthesis, Plant Physiology (Molecular, Cellular, Organismal) Plant Systematics, Evolution, etc.)</td>
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</table>
Annex 3: Judging Sheet – STUDIES

(Grades 1 to 5)

**Definition:** A collection of data that gives evidence of a fact (or facts) or a situation of scientific interest. It could include a study of cause and effect.

Category Name: ........................................................ Category Number: ...............................  

Project No: ............................................................

Participant’s Name: (1) ..............................................................................................................  

(2) ........................................................................................................................................

Grade of Learner (highest if there are different Grades in group): ........................................

Project Title: ......................................................................................................................

School: ................................................................. Region: ..................................................

Judges

Name: ................................................................. Signature: .............................................

Summary sheet

<table>
<thead>
<tr>
<th>Section</th>
<th>Part 1</th>
<th>Part 2</th>
<th>Part 3</th>
<th>Part 4</th>
<th>Part 5</th>
<th>Part 6</th>
<th>Part 7</th>
<th>Part 8</th>
<th>Part 9</th>
<th>Part 10</th>
<th>Total</th>
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<tr>
<td>Scientific Value of Material</td>
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<td>Appropriate Analysis of Material</td>
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<td>Scientific Interest</td>
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<td>Knowledge and Understanding</td>
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<td>Interviews</td>
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<td>Skills Learnt</td>
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<td>Relevance</td>
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<td>Log Book</td>
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Judges: Do not Calculate this Total
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Further explanation</th>
<th>Mark allocations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Scientific Value of Material</strong>&lt;br&gt;&lt;br&gt;Assess the extent to which it:&lt;br&gt;&lt;br&gt;• demonstrates or illustrating scientific principles and knowledge so as to inform and interest others to acquire and/or apply this knowledge; and&lt;br&gt;&lt;br&gt;• is useful as an enrichment of a topic in the syllabus.</td>
<td>Level 1: Poor selection of material very common knowledge and of very little use [1 - 5]</td>
<td>Level 1</td>
</tr>
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<td></td>
<td>Level 2: Material of reasonable value [6 - 10]</td>
<td>Level 2</td>
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<tr>
<td></td>
<td>Level 3: Very good scientific value – Original in the combination of knowledge presented to provide scientific knowledge which can be applied to solve problems [11 - 15]</td>
<td>Level 3</td>
</tr>
<tr>
<td><strong>2. Appropriate analysis of studied material</strong>&lt;br&gt;&lt;br&gt;- logical and creative presentation of selected material so as to:&lt;br&gt;&lt;br&gt;• improve the understanding and appreciation of the subject presented in the project; and&lt;br&gt;&lt;br&gt;• be used to solve or understand a problem that is commonly encountered.&lt;br&gt;&lt;br&gt;(The variety of material studied and how creatively it is analysed, selected and correlated)</td>
<td>Appropriate analysis and correlation of information. Good and creative integration of a variety of resources and logical presentation of the material.</td>
<td>Level 1</td>
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<td></td>
<td>Level 1: Below the grade of the learner [1 - 5]</td>
<td>Level 1</td>
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<tr>
<td></td>
<td>Level 2: Good for the grade of the learner [6 - 10]</td>
<td>Level 2</td>
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<td></td>
<td>Level 3: At a level above the grade of the learner [11 - 15]</td>
<td>Level 3</td>
</tr>
<tr>
<td><strong>3. Scientific interest and depth of the study</strong>&lt;br&gt;&lt;br&gt;including presentation of data or information that enhances the value of the information</td>
<td>Level 1: Depth limited and of very little scientific interest [1 - 3]</td>
<td>Level 1</td>
</tr>
<tr>
<td></td>
<td>Level 2: Good depth of study and scientifically interesting [4 - 7]</td>
<td>Level 2</td>
</tr>
<tr>
<td></td>
<td>Level 3: Very good depth of study very interesting and creative use of interesting data to reinforce the value of the project [8 - 10]</td>
<td>Level 3</td>
</tr>
<tr>
<td><strong>4. Knowledge and Understanding</strong></td>
<td>Level 1: Very little understanding and limited knowledge of the subject presented to verify the hypothesis [1 - 3]</td>
<td>Level 1</td>
</tr>
<tr>
<td></td>
<td>Level 2: Adequate understanding and knowledge of the subject [4 - 7]</td>
<td>Level 2</td>
</tr>
<tr>
<td></td>
<td>Level 3: Very good knowledge of the subject. Can answer questions revealing a very good understanding. Demonstrates enthusiasm for the subject and skilful use of data e.g. graphs, pie-charts and tables that enhances the understanding of the subject [8-10]</td>
<td>Level 3</td>
</tr>
<tr>
<td><strong>5. Sources and variety of sources used and applied</strong></td>
<td>Level 1: Very few resources consulted [1 - 2]</td>
<td>Level 1</td>
</tr>
<tr>
<td></td>
<td>Level 2: Good Endeavour to look for sources and sources utilized well [3 - 4]</td>
<td>Level 2</td>
</tr>
<tr>
<td></td>
<td>Level 3: Wide variety of sources sincere effort made to consult different sources and how the sources were utilized in the project [5]</td>
<td>Level 3</td>
</tr>
<tr>
<td><strong>6. Visual impact</strong></td>
<td>Level 1: Little dramatic impact- spelling mistakes poor language use. Photocopies of material. Information taken directly from the Internet [1 - 2]</td>
<td>Level 1</td>
</tr>
<tr>
<td></td>
<td>Level 2: Good impact- no spelling mistakes good language [3-4]</td>
<td>Level 2</td>
</tr>
</tbody>
</table>
7. Interview ability and enthusiasm in presenting the project

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The learner is unsure of the material or the process of the project – has difficulty in answering the questions about the project [1 - 5]</td>
</tr>
<tr>
<td>2</td>
<td>The learner can summarise the project adequately – can answer the majority of the questions [6 - 10]</td>
</tr>
<tr>
<td>3</td>
<td>The learner presents the information well - can answer all. The questions clearly and logically – has a clear idea of How to do further investigations [11 - 15]</td>
</tr>
</tbody>
</table>

8. Skills learnt:
- Presentation skills;
- Reading skills;
- Writing skills;
- data presentation;
- finding resources; and
- comprehension.

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Skills level below the grade level of the learner [1 - 2]</td>
</tr>
<tr>
<td>2</td>
<td>Skills and knowledge at grade level [3 - 4]</td>
</tr>
<tr>
<td>3</td>
<td>Skills and knowledge above the grade level [5]</td>
</tr>
</tbody>
</table>

9. Relevance

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Has little relevance to the country, syllabus or to problem solving [1 - 2]</td>
</tr>
<tr>
<td>2</td>
<td>Relevant in terms of benefit to the country, understanding of the syllabus [3 - 4]</td>
</tr>
<tr>
<td>3</td>
<td>Very relevant to the country, to solving of problems or contributing to make the syllabi relevant [5]</td>
</tr>
</tbody>
</table>

10. Log book/ Written Material

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No log book kept for a short period less than a month [0 – 5]</td>
</tr>
<tr>
<td>2</td>
<td>Log book less than 2-3 months - adequate material [6 - 10]</td>
</tr>
</tbody>
</table>

INTERVIEW NOTES: please complete in detail

COMMENTS: please complete this section in detail.

1. Do you think this project is of a standard to be selected to participate in an International Science Fair in 2015? Yes/No Motivation.

If you answered Yes above please complete this section: What improvements would you recommend for this project? Please specify.
If you answered Yes above please complete this section: Who could mentor this finalist if selected for an International Science Fair in 2015? Please print the name and email address of this person.

2. For ALL projects: Please write comments on the following for your panel discussion and for use by the International Selection Panel.

Poster

Project data book/rough work

Scientific report

General
Annex 4: Judging Sheet – INVESTIGATIONS

(Compulsory Grades 6-12)

(Optional Grades 1 – 5)

**Definition:** An undertaking to test a hypothesis using experiments, data and scientific methods. The participant is actively involved in solving a problem.

<table>
<thead>
<tr>
<th>Category Name:</th>
<th>Category Number:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Participant’s Name:</th>
<th>1.</th>
<th>2.</th>
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<table>
<thead>
<tr>
<th>Grade of Learner (highest if there are different Grades in group):</th>
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<tbody>
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<table>
<thead>
<tr>
<th>Project Title:</th>
</tr>
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<table>
<thead>
<tr>
<th>School:</th>
<th>Region:</th>
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**Judges**

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**Summary sheet**

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J udges: Do not Calculate this Total
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Further explanation</th>
<th>Mark allocations</th>
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</thead>
<tbody>
<tr>
<td><strong>1. Application of scientific principles and scientific thought</strong></td>
<td>The project should have a hypothesis and the processes and logic used to evaluate the hypothesis should be clearly evident.</td>
<td></td>
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<tr>
<td>A judge must assess:</td>
<td></td>
<td>Level 1</td>
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<tr>
<td>• the extent to which a project is structured using well selected experimentation and collection of valid data to enable one to come to a valid conclusion;</td>
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<td>Level 2</td>
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<tr>
<td>• the extent to which Scientific thought and principles are based and applied using valid scientific methods;</td>
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<tr>
<td>• the logic of the interpretation based the evidence produced or data collected in relation to the conclusion of validity or otherwise of the hypothesis; and</td>
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<tr>
<td>• the inclusion and relevance and accuracy of mathematical calculation and statistical evidence to support the conclusion.</td>
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<tr>
<td><strong>2. Level of innovative thinking and /or the unique way in which scientific knowledge is integrated and applied in solving a problem</strong></td>
<td>The higher the grade level of the participants the more scientific principles that should be integrated into solving the problem or verifying the hypothesis i.e. the level of integration of knowledge Knowledge should be very well applied.</td>
<td></td>
</tr>
<tr>
<td>Level 1: Below grade of the learner [1 - 3]</td>
<td></td>
<td>Level 1</td>
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<tr>
<td>Level 2: Good for the grade of the learner [4 - 7]</td>
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<tr>
<td>Level 3: At a level above the grade of the learner [8 - 10]</td>
<td></td>
<td>Level 3</td>
</tr>
<tr>
<td><strong>3. Experimentation and improvisation</strong></td>
<td></td>
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<tr>
<td>Level 1: Very little experimentation verify hypothesis [1 - 7]</td>
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<td>Level 1</td>
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<tr>
<td>Level 2: Adequate experimentation [8 - 12]</td>
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<tr>
<td>Level 3: Good experimentation with a high degree of improvisation [13 - 15]</td>
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<tr>
<td><strong>4. Presentation of data and mathematical calculation</strong></td>
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<tr>
<td>Level 1: Very little. Data presented to verify the hypothesis [1 - 7]</td>
<td></td>
<td>Level 1</td>
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<tr>
<td>Level 2: Adequate data presented to prove or disprove the hypothesis [8 -12]</td>
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<tr>
<td>Level 3: Very good collection of data and data presented clearly e.g. graphically, pi-charts etc. so that it can be quickly assessed by a judge. [13-15]</td>
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<td>Level 3</td>
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<tr>
<td>* Significant Calculations done showing mathematical ability!!!!!!!!!!!</td>
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</tbody>
</table>
5. Sources and variety of sources used and applied

<table>
<thead>
<tr>
<th>Level 1: Very few resources consulted [1 - 2]</th>
<th>Level 2: Good Endeavour to look for sources and sources utilized well [3 - 4]</th>
<th>Level 3: Wide variety of sources sincere effort made to consult different sources and how the sources were utilized in the project [5]</th>
</tr>
</thead>
</table>

6. Visual impact

|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------|

7. Interview ability and enthusiasm in presenting the project

<table>
<thead>
<tr>
<th>Level 1: The learner is unsure of the material or the process of the project - has difficulty in answering the questions about the project. [1 - 5]</th>
<th>Level 2: The learner can summarise the project adequately – can answer the majority of the questions [6 - 10]</th>
<th>Level 3: The learner presents the information well – can answer all the questions clearly and logically – has a clear idea of how to do further investigations [11-15]</th>
</tr>
</thead>
</table>

8. Skills learnt:
   - Presentation skills;
   - Writing skills;
   - data presentation;
   - experimentation; and
   - calculation skills.

<table>
<thead>
<tr>
<th>Level 1: Skills level below the grade level of the learner [1 - 2]</th>
<th>Level 2: Skills and knowledge at grade level [3-4]</th>
<th>Level 3: Skills and knowledge above the grade level [5]</th>
</tr>
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</table>

9. Relevance

<table>
<thead>
<tr>
<th>Level 1: Has little relevance to the country, syllabus or to problem solving [1 - 2]</th>
<th>Level 2: Relevant in terms of benefit to the country, understanding of the syllabus [3-4]</th>
<th>Level 3: Very relevant to the country, solving of problems or contributing to make the syllabi relevant [5]</th>
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10. Log book/ Written Material

|------------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------|
### Interview Notes: Please complete in detail

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<th>Remarks</th>
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### Comments: Please complete this section in detail.

1. **Do you think this project is of a standard to be selected to participate in an International Science Fair in 2015? Yes/No Motivation.**

   If you answered Yes above please complete this section: *What improvements would you recommend for this project? Please specify.*

   If you answered Yes above please complete this section: *Who could mentor this finalist if selected for an International Science Fair in 2015? Please print the name and email address of this person.*

2. **For all projects: Please write comments on the following for your panel discussion and for use by the International Selection Panel.**

   - Poster
   - Project data book/rough work
   - Scientific report
   - General
Annex 5: Judging Sheet – MODELS/ INNOVATION/ TECHNOLOGY

Definition: A working model that demonstrates a scientific principle and from which the learner acquired technical skills or which was used in experimentation to obtain data for an investigation.

Category Name: ............................................. Category Number: .........................

Participant’s Name: (1)........................................................................................................

(2)..............................................................................................................................

Grade of Learner (highest if there are different Grades in group): ........................................

Project Title: ..................................................................................................................

School: ......................................................................................................................

Region: ....................................................................................................................

Judges

Name: ................................................................. Signature: .................................

Summary sheet

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<th>Criteria</th>
<th>Further explanation</th>
<th>Mark allocations</th>
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<tr>
<td><strong>1. Application of scientific principles and scientific thought</strong></td>
<td>The construction should clearly indicate the scientific principles on which it is based and point out the relevant innovative features. In the case where it is used for an investigation the processes and logic used to evaluate the hypothesis should be clearly evident.</td>
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<tr>
<td>A judge must assess:</td>
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<tr>
<td>• The extent to which construction demonstrates a scientific principle or its effective use to obtain experimental data for which the investigation is done;</td>
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<tr>
<td>• The extent to which scientific thought and principles are based and applied in the construction;</td>
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<tr>
<td>• The extent to which the construction was scientifically tested; and</td>
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<tr>
<td>• In the case where experimentation is done, the assessment should include the relevance and accuracy of mathematical calculation and statistical evidence to support the conclusion.</td>
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<tr>
<td><strong>Level 1:</strong> No scientific principle used in the construction [1 - 3]</td>
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<tr>
<td><strong>Level 2:</strong> It is well constructed. The scientific principle is demonstrated but there is no innovative feature [4 - 7]</td>
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<tr>
<td><strong>Level 3:</strong> Model is well constructed and includes the scientific features and it incorporates an innovative feature. Or in the case of a working model used to obtain experimental data its design and function is effective. [8 - 10]</td>
<td>Level 3</td>
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<tr>
<td><strong>2. Scientific Knowledge</strong></td>
<td>The higher the grade level of the participants the higher the level of scientific knowledge that must be demonstrated processes involved in the construction or application of the model. The knowledge should include integrated solutions in problem solving or verifying the hypothesis i.e. the level of integration and application of knowledge should be very well applied.</td>
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<tr>
<td>Asses the level of innovative thinking and/or the unique way in which scientific knowledge is applied or integrated in solving a problem or to obtain data for the effectiveness of the unit or for the information to verify the hypothesis of an investigation.</td>
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<tr>
<td><strong>Level 1:</strong> No innovative approach or any demonstration of application of knowledge [1 - 7]</td>
<td>Level 1</td>
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<tr>
<td><strong>Level 2:</strong> Knowledge reasonably applied but not in any particularly innovative way [8 - 12]</td>
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<tr>
<td><strong>Level 3:</strong> Scientific knowledge applied or integrated in an innovative way [13 - 15]</td>
<td>Level 3</td>
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<tr>
<td><strong>3. Construction skills</strong></td>
<td>The assessment should include the determining of the effectiveness of the model for application for which it has been constructed.</td>
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</tr>
<tr>
<td><strong>Level 1:</strong> Very little experimentation verify hypothesis [1 - 7]</td>
<td>Level 1</td>
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<tr>
<td><strong>Level 2:</strong> Adequate experimentation [8 - 12]</td>
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<tr>
<td><strong>Level 3:</strong> Good experimentation with a high degree of improvisation [13 - 15]</td>
<td>Level 3</td>
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<tr>
<td><strong>4. Presentation of experimental or testing data. In the case of an investigation mathematical calculation statistical analysis must be included</strong></td>
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<tr>
<td><strong>Level 1:</strong> Very little. Data presented to verify the hypothesis or the effectiveness of the model [1 - 8]</td>
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</tr>
<tr>
<td><strong>Level 2:</strong> Adequate data presented to prove or disprove the hypothesis or demonstrate the effectiveness of the model [9-15]</td>
<td>Level 2</td>
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</tr>
<tr>
<td><strong>Level 3:</strong> Very good collection of data and data presented clearly e.g. graphically, pi-charts etc. so that it can be quickly assessed by a judge [16-20]</td>
<td>Level 3</td>
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</tr>
<tr>
<td>5. Sources and variety of sources used and applied</td>
<td>Level 1: Very few resources consulted [1 - 2]</td>
<td>Level 1</td>
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<tr>
<td></td>
<td>Level 2: Good Endeavour to look for sources and sources utilized well [3 - 4]</td>
<td>Level 2</td>
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<tr>
<td></td>
<td>Level 3: Wide variety of sources sincere effort made to consult different sources and how the sources were utilized in the project [5]</td>
<td>Level 3</td>
</tr>
</tbody>
</table>

| 6. Visual impact | Level 1: Little dramatic impact- Spelling mistakes poor language use. Photocopies of material. Information taken directly from the Internet [1 - 2] | Level 1 |
| | Level 2: Good impact- no spelling mistakes good language [3-4] | Level 2 |

| 7. Interview ability and enthusiasm in presenting the project | Level 1: The learner is unsure of the material or the process of the project – has difficulty in answering the questions about the project [1 - 3] | Level 1 |
| | Level 2: The learner can summarise the project adequately – can answer the majority of the questions [4 - 7] | Level 2 |
| | Level 3: The learner presents the information well-can answer all. The questions clearly and logically – has a clear idea of How to do further investigations [8-10] | Level 3 |

| 8. Skills learnt: | Level 1: Skills level below the grade level of the learner [1 - 2] | Level 1 |
| | • Presentation skills | |
| | • Writing skills | |
| | • data presentation skills | |
| | • experimentation skills | |
| | • interpretive skills. | |
| | • calculation skills. | |
| | • Improvisation skills | |
| | Level 2: Skills and knowledge at grade level [3 - 4] | Level 2 |
| | Level 3: Skills and knowledge above the grade level [5] | Level 3 |

| 9. Relevance | Level 1: Has little relevance to the country, syllabus or to problem solving [1 - 2] | Level 1 |
| | Level 2: Relevant in terms of benefit to the country, understanding of the syllabus [3 - 4] | Level 2 |
| | Level 3: Very relevant to the country, to solving of problems or contributing to make the syllabi relevant [5] | Level 3 |

<p>| 10. Log book/ Written Material | This relates to the diary/ journal and accumulation of background material | |
| | Level 1: No log book kept for a short period less than a month [0 – 5] | Level 1 |
| | Level 2: Log book less than 2-3 months- adequate material [4 - 7] | Level 2 |</p>
<table>
<thead>
<tr>
<th>INTERVIEW NOTES: please complete in detail</th>
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</thead>
<tbody>
<tr>
<td>COMMENTS: please complete this section in detail.</td>
</tr>
<tr>
<td><strong>1. Do you think this project is of a standard to be selected to participate in an International Science Fair in 2015?</strong> Yes/No Motivation.</td>
</tr>
<tr>
<td>If you answered Yes above please complete this section: What improvements would you recommend for this project? Please specify.</td>
</tr>
<tr>
<td>If you answered Yes above please complete this section: Who could mentor this finalist if selected for an International Science Fair in 2015? Please print the name and email address of this person.</td>
</tr>
<tr>
<td><strong>2. For ALL projects: Please write comments on the following for your panel discussion and for use by the International Selection Panel.</strong></td>
</tr>
<tr>
<td>Poster</td>
</tr>
<tr>
<td>Project data book/rough work</td>
</tr>
<tr>
<td>Scientific report</td>
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<tr>
<td>General</td>
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</tbody>
</table>
Annex 6: Judges Guide

A. Judging Schedule

Day 1: Tuesday
09:00 – 18:00 Registration of Projects
16:00 – 18:00 Judges Briefing
18:00 – 19:00 Dinner

Day 2: Wednesday
06:30 – 07:15 Breakfast at different venues
07:30 Arrival of Guests
08:00 – 08:30 Opening Ceremony
08:45 – 13:00 Judging without learners present
13:00 – 14:00 Lunch
14:00 – 18:00 Judging with learners present
18:00 – 19:00 Dinner

Day 3: Thursday
06:30 – 07:15 Breakfast at different venues
08:00 – 10:00 Judging with learners present
10:00 – 13:00 Final Judging and public viewing (with learners present)
13:00 – 14:00 Lunch
15:00 – 16:00 Dismantling of projects
19:00 – 21:00 Prize-Giving Ceremony
B. Judges Briefing

Judges will consist of the following groups:

*Primary Schools*
- 1x Head Judge
- 2x Assistant Head Judges
- 1x Category Lead Judge (one for each Category)
- Category Judges

*Secondary Schools*
- 1x Head Judge
- 2x Assistant Head Judges
- 1x Category Lead Judge (one for each Category)
- Category Judges

The Head Judge must have an initial briefing with all of the judges before the judging process starts. The following should be done during the initial briefing:

- Head Judge, 2 Assistant Head Judges and all Category Lead Judges should be introduced to the judges;
- A roll call of the judges should be done;
- Projects should be assigned to judges and the projects of any no-show judges should be reassigned to another judge;
- Each judge should go through the list of assigned projects to check if there are any *conflicts of interest* and *must declare it* in order for the project(s) to be reassigned;
- Each judge *must understand and sign the form of conflict of interest*;
- Each judge *must understand and sign the form of confidentiality*;
- Each judge should check the content of their clipboard/file;
- The judging forms, procedures, criteria and guidelines should be reviewed, especially with new judges;
- It should be made clear to the judges that they *must not* do the calculations on the form because this will be done by the Quality Assurance Committee in the spirit of fairness;
and

- All judges who interview a learner must initial on the form provided at each project and put a sticker on the project to indicate that the project was judged.

During the first caucus the Head Judge should make sure that the judges understand that they are to interview all of the learners whose projects they judged earlier in the morning.

**C. Judging Confidentiality**

All results are CONFIDENTIAL until announced at the Awards Ceremony.

Judges must:

- Be discreet when discussing projects or making critical comments on the premises.
- Keep confidential any privileged information or ideas that were conveyed as part of the judging process and do not disclose such information or ideas to third parties.
- Not inform learners of the scores they have received.

**D. Conflict of Interest**

For each Category, a Lead Category Judge will be appointed. This Lead Judge will be responsible for all judging assignments within that Category.

This include ensuring that all projects are judged by 3 judges, ensuring that there is no conflict of interest with judging such as judging your school’s projects, judging your own child’s project or that of his/her classmates or judging a child from a family that you know, etc.

Each judge will receive a clipboard with a list of projects and judging forms. If there is any conflict of interest, such as being asked to judge your school’s projects, judge your own child’s project or that of his/her classmates or asked to judge a child from a family that you know, please raise this with your Category Lead Judge and asked for a different assignment. **Failure to do so will lead to your scores for this project and all other projects you’ve judged being disregarded, thus resulting in you being disqualified as a judge with immediate effect**

**E. Judging Procedure**

Awards are based on the recognition of excellence in the conception and realization of a science or engineering project. Awards encourage the learner to make further efforts in the study of science and engineering.
The Head Judge and the 2 Assistant Head Judges will be responsible for the coordination of all judging activities for Primary and Secondary Schools respectively.

For each Category, a Category Lead Judge will be appointed. This Lead Judge will be responsible for all judging assignments within that Category. This includes ensuring that all projects are judged by 3 judges, and ensuring that there is no conflict of interest with judging.

Each judge will receive a clipboard with a list of projects and judging forms.

Each project must be evaluated by 3 judges and judges must spend at least ± 10 – 15 minutes on a project.

**The judging is based on the following steps:**

1) **Initial Judging**

The projects are judged in the absence of the learners. Each project will receive a numerical score from each judge which will be recorded on the judging form. **Judges should not tally the scores on the judging forms.**

2) **First Caucus: Preliminary Scoring**

Judges within each category meet in caucus to discuss the merits of individual projects. Judges should freely discuss both the merits and shortcomings of the projects in their category.

3) **Interviewing the Exhibitors**

Judges will interview the learners whose projects they judged. The interview is perhaps the most educational aspect of the National Science Fair experience. The interview provides a means for the judge to evaluate the exhibit more accurately and should also serve to stimulate the learner's thinking, to suggest means of improving the work and working habits, to point out errors, and to provide feedback to the learner from the judge, who is most likely a specialist in a given field. Science education within the country can only benefit from this practice, thus the judges should be encouraging and supportive to the learners.
4) Handing in of Judging forms

Judges should turn in the judging forms, without calculating the scores, at the end of the interviews, to the Chairperson of the Quality Assurance Committee. Judges should remain on the premises until the Quality Assurance Committee has checked the forms for completeness.

Once the final judging has been done, all judges except the Head judge and the 2 Assistant Head judges are free to leave.

Be discreet when discussing projects or making critical comments on the premises. Judges should leave all documentation and notes regarding judging in the judging room. These items will be collected and destroyed at the conclusion of judging. Keep confidential any privileged information or ideas that were conveyed as part of the judging process and do not disclose such information or ideas to third parties. Judges may not inform learners of the scores they have received. All results are CONFIDENTIAL until announced at the Awards Ceremony.

F. Judging Criteria

Five judging criteria are used to rank the projects within each category. Each project will receive a numerical score from each judge. The five criteria are listed below. Each criterion stands on its own merits for rating and is judged independently of the others.

   a) Creative Ability;
   b) Scientific Thought or Engineering Goal;
   c) Thoroughness;
   d) Skill; and
   e) Clarity.

Judges rate the exhibit on the basis of the five criteria. Scores are recorded on the Judging Forms provided.

G. Judging Guideline

While judges may deviate from the guidelines provided, all awards must be selected based on reasonable criteria for scientific merit. All scores must be submitted according to a 100-point scale. The following are suggested guidelines for point distribution:
I. **Creative Ability**

1) Does the project show creative ability and originality in:
   a) the approach to problem-solving?
   b) analysis of the data?
   c) interpretation of the data?
   d) use of equipment, if applicable?
   e) construction or design of new equipment, if applicable?

2) Does the research support an investigation and help answer a question in an original and/or innovative way?

3) Does the project promote an efficient and reliable method for solving a problem?

II. **Scientific Thought or Engineering Goals**

1) **Scientific Thought**

   *(For engineering projects, see B.II. Engineering Goals.)*

   1) Is the problem stated clearly and unambiguously?
   2) Is the problem sufficiently limited to allow a plausible study?
   3) Is there a procedural plan for obtaining a solution?
   4) Are the variables clearly recognized and defined?
   5) If controls are necessary, did the learner/team recognize this, and were they applied correctly?
   6) Is there adequate data to support the conclusions?
   7) Does the learner/team recognize the limitation of the data?
   8) Does the learner/team have an idea of what might be important for further research?
   9) Did the learner/team cite scientific literature (vs. only popular literature, e.g., local newspapers, magazines)?

2) **Engineering Goals**

   *(For science projects, see B.I. Scientific Thought.)*

   1) Does the project have a clear objective?
   2) Is the objective relevant to the needs of the potential user?
3) Is the solution: workable? Acceptable to the potential user? Economically feasible?
4) Could the solution be utilized successfully in design and/or construction of an end product?
5) Is the solution a significant improvement over current state-of-the-art or applications?
6) Has the solution been tested for performance under conditions of use?
7) Their independent contributions to the work?

III. Thoroughness
1) Was the project carried to completion within the original scope?
2) How completely was the problem addressed?
3) Are the conclusions based on a single experiment or replication?
4) How complete are the project notes?
5) Is the learner/team aware of other approaches or theories?
6) How much time did the learner/team spend on the project?
7) Is the learner/team familiar with scientific literature in the relevant field?

IV. Skill
1) Does the Finalist/Team have the required laboratory, computation, observational, and design skills to obtain the supporting data?
2) Where was the project performed (e.g., home, school laboratory, university laboratory)?
3) Did the student or team receive assistance from parents, teachers, scientists, or engineers?
4) Was the project completed under adult supervision, or did the learner/team work largely alone?
5) Where did the equipment come from?
6) Was it built independently by the learner/team?
7) If the work was performed in a “mentor-rich” environment, does the learner/team exhibit evidence of their independent contributions to the work?

V. Clarity
1) How clearly does the learner/team discuss his/her/their project and explain the purpose, procedure and conclusions? Watch out for “canned” speeches that reflect little understanding
of principles.

2) Does the written material reflect the learner’s/team’s understanding of the research?
3) Are the important phases of the project presented in an orderly manner?
4) How clearly are the data presented?
5) How clearly are the results presented?
6) How well does the physical display explain the project?

**H. Determining the Category Awards**

Awards are based on the recognition of excellence in the conception and realization of a science or engineering project. Awards encourage the learner to make further efforts in the study of science and engineering.

Two Category Judges will judge each Project in the different Categories.

Each judge must hand in his or her completed judging forms to the Category Lead Judge.

After all of the projects in the category have been judged by two judges, the Category Lead Judge must hand the forms to the Chairperson of the Quality Assurance Committee.

The Quality Assurance Committee will look at the scores given by all the judges for a given project and the average of the three scores will be calculated as the final score for the project.

If there are discrepancies, such as one or more score(s) is (are) more than 10% higher or lower than the closest score of the other two judges for that project, then the committee will ask one Assistant Head Judge for that phase to judge the project. Once the Assistant Head Judge completed and handed in his/her judging form, the Quality Assurance Committee will look at the scores again. The three judging forms with the closest scores will then be taken and the average of these scores will be calculated.

However if there is still a discrepancy, such as the three closest scores still being more than 10% different, than the second Assistant Head Judge will be asked to judge the project. Once the second Assistant Head Judge completed and handed in his/her judging form, the Quality Assurance Committee will look at the scores again. The three judging forms with the closest scores will then be taken and the average of these scores will be calculated.

However if there is still a discrepancy, such as the three closest scores still being more than 10% different, than the Head Judge will be asked to judge the project. Once the Head Judge completed and handed in his/her judging form, the Quality Assurance Committee will look at the scores again. The three judging forms with the closest scores will then be taken and the average of these scores will be calculated.

This would be the final score for that project.
Projects are than awarded as follows:

Gold medals: 80 – 100%
Silver medals: 70 – 79%
Bronze Medals: 60 – 69%

All projects that are given a final mark within this range will received the relevant medal regardless of the number of the same type of medal for that Category, e.g. there can be more than one gold medals awarded within a Category provided all the said projects were judged to be above 80%.

**I. Determining the Category Winner**

The Quality Assurance Committee will look at the final scores of all projects within a category and will award the project with the highest final score as the Category winner, provided that the project received a gold medal. Hence all Category winners must also be gold medal winners. Should there be a tie, the Head Judge and two Assistant Head Judges will be asked to judge the projects. The Quality Assurance Committee will than use the average of these scores from the Head Judge and two Assistant Head Judges to determine the Category winner.

**J. Determining the Overall winners**

The Head Judge and the 2 Assistant Head Judges will go through all the projects of the category winners of their phase (Primary or Secondary phase) in order to determine the overall winners. Judges decision is final.

**K. Determining Best School for Primary and Secondary**

The Quality Assurance Committee will determine the best school for Primary and Secondary as follows:

- A maximum of three projects per school can be considered.
- Only the three best projects per school will be considered.
- These top three projects will be awarded points that will be added to determine the best school for each phase.
- Points will be awarded as follows:
  - Gold Medal 5 Points
  - Silver Medal 3 points
o Bronze Medal 1 Point

- Additional Points:
  o Category Winners 5 points
  o Overall Phase Winner 5 points

Thus, a school can get a maximum of 35 points:
- 15 (3 gold medals); +
- 15 (3 category winners); +
- 5 (overall phase winner).

L. Determining Best Region

The Quality Assurance Committee will determine the Region as follows:
- A maximum of five projects per phase (5 Primary and 5 Secondary) can be considered.
- Only the five best projects per phase (5 Primary and 5 Secondary) will be considered.
- These top ten projects (five per phase) will be awarded points that will be added to determine the best Region.
- Points will be awarded as follows:
  o Gold Medal 5 Points
  o Silver Medal 3 points
  o Bronze Medal 1 Point
- Additional Points:
  o Category Winners 5 points
  o Overall Phase Winner 5 points

Thus, a Region can get a maximum of 110 points:
- 50 (10 gold medals); +
- 50 (10 category winners); +
- 10 (2 overall phase winner).
**Conflict of Interest Agreement**

As a judge of the NamPower National Science Fair I understand that I am entrusted with a duty to judge all projects fair and just, without any personal bias.

I will declare any conflict of interest before or during judging projects. Conflict of interest is amongst others:

- Judging projects of relatives;
- Judging projects of friends;
- Judging projects of learners from your current school; and
- Judging projects of learners that are in the same class as your child.

I am aware that should it arise that I have judged a project that fall within the above mentioned restrictions, I will be disqualified as a judge and all my scores will be disregarded.

_________________  ___________________
NAME PRINTED                             DATE

_________________
SIGNATURE

**Confidentiality Agreement**

As a judge of the NamPower National Science Fair I understand that I am entrusted with information of a confidential nature. The Following information is confidential and cannot be revealed to or discussed with anyone other than the relevant committee/person assigned to deal with it:

- Score sheets
- Scores
- Names of winners, etc.

I am aware that I have access to information that is strictly confidential and that I will handle and retain information in a secure manner, free from view of others, at all times, while in my possession.

_________________  ___________________
NAME PRINTED                             DATE

_________________
SIGNATURE
Annex 7: Quality Assurance Guide

A. Judging Confidentiality

All results are CONFIDENTIAL until announced at the Awards Ceremony.

Judges must:

- Be discreet when discussing projects or making critical comments on the premises.
- Keep confidential any privileged information or ideas that were conveyed as part of the judging process and do not disclose such information or ideas to third parties.
- Not inform learners of the scores they have received.

B. Conflict of Interest

For each Category, a Lead Category Judge will be appointed. This Lead Judge will be responsible for all judging assignments within that Category.

This include ensuring that all projects are judged by 2 judges, ensuring that there is no conflict of interest with judging such as judging your school’s projects, judging your own child’s project or that of his/her classmates or judging a child from a family that you know, etc.

Each judge will receive a clipboard with a list of projects and judging forms. If there is any conflict of interest, such as being asked to judge your school’s projects, judge your own child’s project or that of his/her classmates or asked to judge a child from a family that you know, please raise this with your Category Lead Judge and asked for a different assignment. Failure to do so will lead to your scores for this project and all other projects you’ve judged being disregarded, thus resulting in you being disqualified as a judge with immediate effect.

C. Determining the Category Awards

Awards are based on the recognition of excellence in the conception and realization of a science or engineering project. Awards encourage the learner to make further efforts in the study of science and engineering.
Judges will consist of the following groups:

Primary Schools
- 1x Head Judge
- 2x Assistant Head Judges
- 1x Category Lead Judge (one for each Category)
- Category Judges

Secondary Schools
- 1x Head Judge
- 2x Assistant Head Judges
- 1x Category Lead Judge (one for each Category)
- Category Judges

Two Category Judges will judge each Project in the different Categories.

Each judge must hand in his or her completed judging forms to the Category Lead Judge.

After all of the projects in the category have been judged by two judges, the Category Lead Judge must hand the forms to the Chairperson of the Quality Assurance Committee.

The Quality Assurance Committee will look at the scores given by all the judges for a given project and the average of the three scores will be calculated as the final score for the project.

If there are discrepancies, such as one or more score(s) is (are) more than 10% higher or lower than the closest score of the other two judges for that project, then the committee will ask one Assistant Head Judge for that phase to judge the project. Once the Assistant Head Judge completed and handed in his/her judging form, the Quality Assurance Committee will look at the scores again. The three judging forms with the closest scores will then be taken and the average of these scores will be calculated.

However if there is still a discrepancy, such as the three closest scores still being more than 10% different, than the second Assistant Head Judge will be asked to judge the project. Once the second Assistant Head Judge completed and handed in his/her judging form, the Quality Assurance Committee will look at the scores again. The three judging forms with the closest scores will then be taken and the average of these scores will be calculated.

However if there is still a discrepancy, such as the three closest scores still being more than 10% different, than the Head Judge will be asked to judge the project. Once the Head Judge completed and handed in his/her judging form, the Quality Assurance Committee will look at the scores again. The three judging forms with the closest scores will then be taken and the average
of these scores will be calculated. This would be the final score for that project.

Projects are then awarded as follows:

Gold medals: 80 – 100%
Silver medals: 70 – 79%
Bronze Medals: 60 – 69%

All projects that are given a final mark within this range will received the relevant medal regardless of the number of the same type of medal for that Category, e.g. there can be more than one gold medals awarded within a Category provided all the said projects were judged to be above 80%.

D. Determining the Category Winner

The Quality Assurance Committee will look at the final scores of all projects within a category and will award the project with the highest final score as the Category winner, provided that the project received a gold medal. Should there be a tie, the Head Judge and two Assistant Head Judges will be asked to judge the projects. The Quality Assurance Committee will than use the average of these scores from the Head Judge and two Assistant Head Judges to determine the Category winner.

E. Determining the Overall winners

The Head Judge and the 2 Assistant Head Judges will go through all the projects of the category winners of their phase (Primary or Secondary phase) in order to determine the overall winners. Judges decision is final.

F. Determining Best School for Primary and Secondary

The Quality Assurance Committee will determine the best school for Primary and Secondary as follows:

- A maximum of three projects per school can be considered.
- Only the three best projects per school will be considered.
- These top three projects will be awarded points that will be added to determine the best
school for each phase.

- Points will be awarded as follows:
  - Gold Medal 5 Points
  - Silver Medal 3 points
  - Bronze Medal 1 Point

- Additional Points:
  - Category Winners 5 points
  - Overall Phase Winner 5 points

Thus, a school can get a maximum of 35 points:

- 15 (3 gold medals); +
- 15 (3 category winners); +
- 5 (overall phase winner).

#### G. Determining Best Region

The Quality Assurance Committee will determine the Region as follows:

- A maximum of five projects per phase (5 Primary and 5 Secondary) can be considered.
- Only the five best projects per phase (5 Primary and 5 Secondary) will be considered.
- These top ten projects (five per phase) will be awarded points that will be added to determine the best Region.

- Points will be awarded as follows:
  - Gold Medal 5 Points
  - Silver Medal 3 points
  - Bronze Medal 1 Point

- Additional Points:
  - Category Winners 5 points
  - Overall Phase Winner 5 points

Thus, a Region can get a maximum of 110 points:

- 50 (10 gold medals); +
- 50 (10 category winners);
- 10 (2 overall phase winner).
Annex 8: Registration: Teachers

Region: .................................................................

Regional Coordinator: ............................................. Signature: .............................................. Date: .........................

<table>
<thead>
<tr>
<th>Role: Regional Coordinator, Supervisory Teacher, Judge, Driver</th>
<th>Male (M)/ Female (F)</th>
<th>Surname</th>
<th>Name</th>
<th>Institution/ School</th>
<th>Tel/ Cell</th>
<th>Email address</th>
<th>Supervising Group: Prim Boys, Prim Girls, Sec Boys, Sec Girls</th>
<th>Level: Prim (P) / Sec (S)</th>
<th>Judging Categories: (An, Ch, EA, EE, Ev, Fo, Hu, IT, MS, Ph, Pl)</th>
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<tbody>
<tr>
<td>1 Regional Coordinator</td>
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<td>5 Judge 2</td>
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T-Shirts for Teachers and Driver (Max = 6)

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<th>T-Shirt Sizes</th>
<th>S</th>
<th>M</th>
<th>L</th>
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# Annex 9: Registration: Projects

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<td>Project</td>
</tr>
<tr>
<td>Surname</td>
<td>Name</td>
<td>Surname</td>
<td>Name</td>
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<tr>
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<tr>
<td>Region:</td>
<td>Regional Coordinator:</td>
<td>Signature:</td>
<td>Date:</td>
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<table>
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<th>School</th>
<th>Project</th>
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<tbody>
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<td>Surname</td>
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<td>School</td>
</tr>
<tr>
<td>Grade</td>
<td>Study/ Invest/ Model</td>
<td>Project Name</td>
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<tr>
<td>T-Shirt Size: (S, M, L, XL)</td>
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Secondary Schools

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| 02 | | |
| 03 | | |
| 04 | | |
| 05 | | |
| 06 | | |
| 07 | | |
| 08 | | |
| 09 | | |
| 10 | | |
Annex 10:  Registration: Accommodation and Meals

The **number of Teachers and Learners** that will attend the National Science Fair needs to be indicated for each of the days, in order for accommodation and meals to be arranged. It is important to indicate which meal on the day of arrival.

**Region:**

**Regional Coordinator:** ...........................................  **Signature:** ...........................................  **Date:** ...........................................

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<td>Teachers</td>
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<td>Boys</td>
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<tr>
<td>Girls</td>
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<tr>
<td>Secondary</td>
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<td>Teachers</td>
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<td>Boys</td>
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<td>Accom: Total</td>
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<td>Meals</td>
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<td>Lunch</td>
<td>Dinn</td>
<td>Breakf</td>
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<tr>
<td>Meals: Total</td>
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## Annex 11: Official Abstract

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<td>Project Name</td>
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<td>Category</td>
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**Purpose of project/ experiment**

**Method used**

**Data/ results**

**Conclusion**

(Max 250 words)
Annex 12: Project Approval Form

Project Number

Learner’s Name

Category

Instructions

Set up your project according to the National Science Fair booklet rules. A member of the Project Approval Committee will approve your project. Once approved: sign this Form, get this Form stapled at the Front Desk. Finally place Form in plastic pocket at the front of your table.

Inspection by Project Approval Committee (Please tick √ and write instructions if necessary)

SECTION 1: WRITTEN INFORMATION

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<th>Not Approved/ Not available</th>
<th>Instruction</th>
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<td>1.2  Presentation done on National Science Fair display board</td>
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<td>1.3  Poster meets A4 rule</td>
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</tr>
<tr>
<td>1.4  Acknowledgement for all photographs given: “Photos taken by participant or urls given below each photo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5  No regional information at National Science Fair including: Judging sheets, certificates, no school mark sheet/certificate, etc.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Files/ folders/ books (3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.6  Project file is on table</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.7  Project data book. Log book is on table</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1.8 The project file on table contain the following in this order:

- Abstract displayed on table
- Research plan signed by teacher
- Plagiarism Form
- Binding Agreement
- Permission letter for surveys/scientist supervision (if applicable)

<table>
<thead>
<tr>
<th>SECTION 2: SAFETY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
</tr>
<tr>
<td>2.1 Electric items comply with the safety rules (wiring, no overload, all unplugged)</td>
</tr>
<tr>
<td>2.2 No models on floor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SECTION 3: ETHICAL VIOLATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove the following immediately</td>
</tr>
<tr>
<td>3.1 Brand names or branded products e.g. Coca Cola, Facebook, etc</td>
</tr>
<tr>
<td>3.2 Living organisms including animals, plants, fungi, bacteria</td>
</tr>
<tr>
<td>3.3 Human or animal parts e.g. hair, nails, foetuses, organs</td>
</tr>
<tr>
<td>3.4 Agar plates or other growth mediums</td>
</tr>
<tr>
<td>3.5 Dangerous chemicals e.g. medicines, drugs, acids, paints</td>
</tr>
<tr>
<td>3.6 Flammable substances e.g. petrol, Oil, paraffin</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>3.7 Wood (unless treated)</td>
</tr>
<tr>
<td>3.8 Hazardous substances or devices e.g., weapons, knives, bombs</td>
</tr>
<tr>
<td>3.9 Inappropriate photographs e.g., photos of operations, nudity</td>
</tr>
<tr>
<td>3.10. Unsealed water or food (must be in a transparent container and additionally sealed with tape)</td>
</tr>
</tbody>
</table>

### Approval

**A. PROJECT APPROVED: No further action is necessary.**

If the project is APPROVED with no problems, tick here: ________________

Approved by: Name (print): __________________________ Signature: _____

**B. PROJECT NOT APPROVED: Further action is necessary.**

Issued by: Name (print): __________________________ Signature: ___________

Brief description of Violation: ____________________________________________
____________________________________________________________________

Forbidden item(s): ______________________________________________________

Removed by: Name (print): __________________________ Signature: __________

**C. FINAL PROJECT APPROVAL AFTER CORRECTION OF VIOLATION**

Approved by: Name (print): __________________________ Signature: __________
D. FINAL SIGNATURE(S) (Sign, get Stamp & then place in plastic pocket on table, throughout National Science Fair)

I/we understand that the initial Project Approval check has been completed but additional reviews may occur during judging. I/we undertake to obey the instructions of the Project Approval Committee, for example, forbidden items will not be returned to the project after final approval.

Participant signature: ___________________________ Date: ________________

Participant signature: ___________________________ Date: ________________
Annex 13: Plagiarism Form

PLAGIARISM DECLARATION

1. I know plagiarism is wrong. Plagiarism is to use another's work and pretend it is one's own.

2. Each contribution to my/our project from the work(s) of other people has been acknowledged and sources of information have been referenced.

3. This project is my/our own work.

4. I/we have not allowed, and will not allow, anyone to copy my/our work with the intention of passing it off as his or her or their own work.

Name/s: (PLEASE PRINT)

____________________________________________________________
____________________________________________________________

Signature/s:

____________________________________________________________
____________________________________________________________
____________________________________________________________

Region: ____________________________________________

Date: __________________________


IF YOU DO NOT HAVE A PLAGIARISM FORM, THE NATIONAL SCIENCE FAIR HAS THE RIGHT TO WITHDRAW YOUR PARTICIPATION AT THE NATIONAL SCIENCE FAIR!!!
Annex 14: Binding Agreement Form

AGREEMENT ENTERED INTO BETWEEN NATIONAL SCIENCE FAIR
AND
THE FINALIST SELECTED TO REPRESENT THEIR REGION IN
THE 2016 NATIONAL SCIENCE FAIR (NSF)

CLAUSE 1
A finalist, representing his/her region, becomes de facto a member of National Science Fair under the leadership of the National Science Fair Director.

AGREEMENT

1. As a selected finalist at the National Science Fair (NSF) competition I agree that all communication will only be between the designated National Science Fair officials and me.
2. I adhere to the National Science Fair Code of Conduct, which is available at http://www.ncrst.na
3. I hereby enter into a binding agreement with the National Science Fair for the duration of two years following the National Science Fair competition, whereby the National Science Fair, NamPower, sponsors of the National Science Fair, organizations and businesses sponsoring special awards at NSF has the authority to use my project and photographs of myself for publicity purposes. This includes written materials and social media. I will make myself available and cooperate when contacted, interviewed, photographed and videotaped by the media before, during and after the NSF. This binding agreement is valid until 31 September 2018.
4. No form of media coverage e.g. television, radio, magazines, newspapers, scientific journals, including school media releases etc. will be allowed without the written permission of the National Science Fair director.
5. Should permission be granted for the above, it is compulsory that the National Science Fair logo and in some cases the sponsor’s logo is clearly visible. The name the NamPower National Science Fair must be promoted in all media coverage in any form of presentation.
6. Attendance is mandatory at all NSF events – judging, public day, entertainment and prize giving ceremonies. If I am not present at any of these events, the National Science Fair and sponsors have the right to withdraw their medals, prizes and selection for international participation. No teacher, participant or parent may receive any form of acknowledgement on my behalf and no medal or prize will be handed out later.
7. I am expected to be in my own room, allocated by the National Science Fair, no later than 23:00 for the duration of NSF (please note that the delegation leader may require you to be in your room earlier).
8. If I am not present at my project during judging, then I will not be judged. This is also applicable to public viewing and special judging/international selection.
9. The Chief Judge’s decision is final and no discussion or correspondence will be entered into concerning the NSF results.
10. If I am selected or wish to enter any other form of science related activities/competitions nationally and internationally, permission must be granted by the National Science Fair Director before entering into any negotiations, as there are certain protocols and conditions that apply.
11. As part of your commitment to the National Science Fair it is compulsory that you assist in some form with the organisation of your regional expo and workshops for the next two years.

CLAUSE 2
If you delete or change any part of this document you will not be eligible to participate in the National Science Fair.

TERMS
As the parent/guardian of the participating minor, I certify that I have read, understood and endorse the above agreement on behalf of the finalist, and I accept the following terms as legally binding:

1. Should I remove the participant from the care of the regional delegation leader without permission, or intervene in any way whatsoever during the National Science Fair event, such a participant then terminates all ties with the National Science Fair
2. I accept that I shall thereafter become liable for all expenses incurred by the National Science Fair relating to my child’s/ ward’s participation in the National Science Fair. In the event of a breach of any of the terms of this agreement, all monies owing to the National Science Fair must be paid within fourteen (14) days upon receipt of a written letter of demand.

Signed at ______________________ on __________________________ day of __________________________ 2016.

Finalist Name: ________________________________ signatures: ________________________________

Parent/Guardian name: ________________________________ signatures: ________________________________
Annex 15: RESEARCH PLAN FOR PROJECTS 2016

NAME: ___________________________________________ __________________________

INITIAL PROJECT TOPIC: __________________________________________________________

INITIAL NATIONAL SCIENCE FAIR CATEGORY: ________________________________

Delete this and all instructions in textboxes once you have completed your research plan.

• This plan shows how you intend to do your project so it is written in the future tense i.e. before you actually do your project.
• When typing up your research plan, keep all the headings and subheadings given below.
• You need to be sure that your project is ethical – for more information on ethics consult the National Science Fair Booklet 2016.
• The length of your research plan should be between 2 - 4 pages long.

Question or Problem being addressed:

• Write an introductory statement which gives the focus question you asked or states the problem being addressed and explains the purpose of investigating the topic.
• You should briefly refer to your background reading/literature search here.

Engineering Goals (for engineering projects) or Hypothesis (for all other projects):

• Engineering goals are a description of the device or design that you plan to make, that the judges can compare to what you actually eventually made, to see how well you addressed the problem that you identified.
• Hypothesis stated correctly according to the scientific method and including both independent and dependent variables.
Variables listed or requirements listed that the design needs:

- For scientific method projects list variables: list independent, dependent and at least 3 controlled/fixed variables
- For engineering projects list the requirements that the design needs: try this link for more information [http://www.sciencebuddies.org/engineering-design-process/engineering-design-requirements.shtml](http://www.sciencebuddies.org/engineering-design-process/engineering-design-requirements.shtml)

Procedures (method):

- Detailed description of the method or procedures that will answer the question you asked or test the hypothesis or solve the problem.
- Do not include: work done by a mentor (such as surgical procedures), acknowledgements, work done by a university lab or work done prior to your involvement in your project.
- Do not give details about the materials used.

Data Analysis:

- Describe the procedures you will use to analyze the data that answers the research question or hypothesis (scientific method projects).
- In the case of an engineering project, describe the procedures you will use to analyze the data in a way that demonstrates that you have successfully met the engineering goals.

Bibliography:

- List the five most important references (e.g. science journal articles, books, internet sites) that you used to get information about your topic and that you will refer to in your introduction above.
- Check this site to ensure that you reference your sources correctly: [http://www.exposcience.co.za/index.php/referencing-bibliography.html](http://www.exposcience.co.za/index.php/referencing-bibliography.html)

OR

Click on Reference in the toolbar in “Word”. Click Insert Citation and choose your source eg

Teacher’s/mentor’s comment:

Teacher’s/mentor’s signature and date: