OWSD-CAM 2019 SCIENCE AND TECHNOLOGY COMPETITION

PROJECT GUIDE

Important dates:

Open call for Registration: September 9, 2019

Submission of project: November 8, 2019

Exhibition: December 17, 2019

Announcement of winners: December 17, 2019

Award of prizes: December 17, 2019

Purpose of This Guide

This Guide is designed to help you prepare for your science project. In it you will find a step-by-step process to guide you, along with some helpful hints. By using this guide, you will be able to create a successful science project!

What Makes a Good Science/technology Project?

A good science project begins with a question or problem about a topic that is of interest to you. Your enthusiasm for your topic will be clear at every stage of your work and final presentation, so think of doing a project on something that interests you.

Types of Projects

There are 3 types of project you might choose. The process of completing each is similar, but there are some differences you will need to understand.

1) **An experiment** is a science project that uses a process of scientific inquiry to investigate the question. You would think of a question about a topic, make a hypothesis (educated guess based on your existing knowledge or by reading) regarding the answer, and then design and conduct an experiment to test that hypothesis. You will make, record, and analyze observations to accept or reject your hypothesis. The key to a good experiment is identification and control of the variables.

> **Example: You might be interested in plants and have a question about what would happen if you tried different conditions for plant growth, or you might want to know whether using certain study strategies could improve test scores.**

2) **An innovation** is a project in which you design a product that solves a particular problem. You would identify a problem, and experiment with materials to design a solution. You would conduct trials to test the product, and improvements in design are made to better meet the needs of the original problem.

> **Example: You might like building models, and might want to choose to design something that solves a particular problem, such as how to lift a heavy fridge up into a tree fort, or a device that transfers heat energy to turn on a light bulb.**

3) **A study** is a project in which observations are made about an existing phenomenon and results are recorded. Instead of controlling and changing the variables, you would choose existing or naturally occurring variables for observation. Your focus is on finding a (new) explanation for the recorded observations. This type of project can also be a purely literature-researched based project in which you compare work of several others in a field and look for relationships that they may have missed. This is a less common type of project, but if done well, is certainly as strong as the experiment or innovation.

Example: You might be interested in how animals behave in certain circumstances, and may want to observe some aspect of their behaviour, such as their attentiveness to their young. You might want to do a library search to see if there are geographical patterns of disease that correspond to pesticide use

Science vs Technology

Your project can be either a science investigation or a technology project.

What's the difference?

Good Science usually involves the development of a hypothesis or a question relating to how something might work and carrying out a fair test to find an answer

- You will have to research your topic to find out about Science ideas relating to your question
- You will have to test your idea by carrying out a fair test investigation and collecting data.
- You will need to repeat your investigation a few times to make sure your results are reliable
- You will then interpret your results and what they mean in relation to your hypothesis/question

Good technology usually involves the design and creation of a solution to a real problem.

- You need to identify a real problem that needs a solution
- You will have to find out about (research) ideas relating to the problem you have identified
- You will need to come up with a range of possible solutions, then choose the best idea to make and test
- You will need to test your solution (e.g. with a fair test experiment or survey) to evaluate how well it works to solve the problem
- You may need to refine your solution and retest it to improve its performance

Here are some examples of things which are NOT good science nor good technology because they do NOT involve either of the processes described above:

model-making:	taking an existing design for a device and building it e.g. making a model volcano
surveys:	asking people for their opinions about something and collating the results
eating:	selecting a range of foods and eating them to decide which one tastes the best
playing:	following an existing method to see if you can carry out an already well-known experiment successfully

Each of the project types consists of several stages of planning and doing. The chart for an overview of the stages for the different project types.

Experiment	**Innovation**	**Study**
Ask a question	Identify a problem	Ask a question
Form a hypothesis	Select the best alternative	Form a hypothesis
Plan the experiment	Plan the prototype	Plan the study
Perform the experiment	Build the prototype	Carry out the study
Observe and record data	Test & evaluate the prototype	Observe and record data
Organize and analyze results	Organize and analyze results	Organize and analyze results
Present results	Present results	Present results

Template for written report

Section 1: Summary
A brief overview of your Entry.

Section 2: About Me:
Introduce yourself/your team.

Section 3: Question/Proposal:
Describe the question that you are investigating and your hypothesis, or the problem that you are going to try to solve and the outcome that you expect.

Section 4: Research:
An account of the research that you have done into your chosen category, and how this has influenced your chosen project.

Section 5: Method/Testing and Redesign:
Describe in detail how you carried out your experiment or tested your solution.

Section 6: Results:
Data and observations gathered during your experiment or testing, presented clearly, including a description of any patterns or trends.

Section 7: Conclusion/Report:
An explanation of how your experiment or testing answers your question, or why it fails to do so, and whether or not the outcome was as you expected.

Section 8: Bibliography, References and Acknowledgements

Sample Project Display Layout

<table>
<tr><td colspan="3">Project Title
Name of team members beginning with the name of the team leader
Name of Supervisor</td></tr>
<tr><td>Purpose

Hypothesis

Background</td><td>Procedure

Observations

Results</td><td>Conclusions

Discussion

Acknowledgement</td></tr>
</table>