THE FORMULA 1®
TECHNOLOGY CHALLENGE

IN SCHOOLS

PROJECT MANAGEMENT GUIDE

THE BASICS FOR YOUR PROJECT MANAGEMENT PLAN

&

YOUR PROJECT *'FIREBALL'* TEMPLATE

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Acknowledgements

Acknowledgements and thanks are extended to David Connolly and Warwick Shields of the Australian Government's Department of Defence, for their valuable contribution in developing this resource.

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SIMPLE PRINCIPLES AND CONCEPTS

1. Project Management[1] is simply applying your knowledge, skills, tools and techniques to activities to meet a project outcome. Project Management is achieved by applying a combination of processes for initiating, planning, execution, monitoring, controlling, and closing.

2. Managing a project includes:

   - Indentifying what you want to achieve;

   - Establishing clear and achievable objectives;

   - Balancing the competing demands for quality, scope, time and cost; and

   - Adapting the specifications, plans, and approach to the different expectations of the various people involved in your project.

3. A project is defined by the Project Management Institute as 'a temporary endeavour undertaken to create a unique product, service or result'.

4. Projects can vary in size, nature and difficulty. It can be as simple as building a garden shed to building and launching a space craft. Regardless of your project's size, it will have a start and finish date, it will usually require resources (people, material and equipment), and result in the delivery an outcome.

5. Before starting a project you should have clear objectives. That is, a concrete statement that describes the things your project is trying to achieve. Write it down so the objective can be evaluated at the end to see whether it was achieved. It does not have to be long and one technique for writing an objective is to make sure that it is SMART - Specific, Measurable, Attainable/Achievable, Realistic, and Time-bound.

6. Objectives are important for three major reasons:

   - They are described in business terms: Once they are accepted, they represent an agreement between the Project Manager and the project sponsor (in this case your school or college and Re-Engineering Foundation Australia). The specific deliverables of the F1 in School Design and Technology Challenge, for instance, may or may not make sense to some people. However, the objectives should be written in a way that they are understandable by team members, industry partners and the people who will judge your project.

   - They help frame the project: If you know the project objectives, you can determine the deliverables needed to achieve the objectives. This then helps you nail down the overall project scope, helps you identify risks and allows you to provide estimates on your effort, time and cost. Once the project starts, you can decide that all of the work that you are doing will in the end help you achieve your outcome.

   - They help you achieve success: At the end of the project, you should be able to talk to people to determine whether everything expected in the project objectives had been achieved. If all of the objectives were not fully met, you may still be able to claim partial success.

7. The project objectives ideally should be agreed before the project starts. The outcomes of the project are created based on the objectives - not the other way around. That is, you don't agree on the outcome first and then establish objectives to match. A key is to understand your objectives and then determine outcomes that are needed. Then structure the entire project to meet the outcomes (see your Project *Fireball* template objectives below).

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[1] A Guide to the Project Management Body of Knowledge

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8. Regardless of how big or small the project is a Project Management Plan[1] should contain all the relevant information needed to manage the project. A Project Management Plan1 can be a formally approved document that says how the project can be carried out, monitored and kept under control. It can be in a simple summary form or more detailed with one or more secondary plans and other planning documents. A common mistake is to make the plan more complicated than it need be by including too much detailed information. To avoid this, you can make sure that the plan is a 'what' document and not a 'how' document. This means that the plan should describe what has to be done by whom and when, but does not detail how the work will be carried out.

[1] A Guide to the Project Management Body of Knowledge

PROJECT MANAGEMENT PLAN

Things to consider when getting started on your Project Management Plan

1. The Project Management Plan describes how a project can be developed and managed. It provides an overview of the work to be undertaken in the project, the roles and responsibilities of team members, and identifies when key decision and reviews should be taken.

2. The Project Management Plan is an important document that is used to management the project from start to finish. It defines how a project is to be undertaken, monitored, controlled and closed.

3. Based on the F1 in Schools rules and regulations (Australia), your Project Management Plan should include information on the following:

    a) The car's design and manufacturing process (including research and analysis);

    b) The project team and all the people involved in the project;

    c) The roles and responsibilities of each team member;

    d) Any marketing, partnerships and collaboration with industry partners;

    e) Any testing of key components that will be undertaken during the car's development and track testing prior to competition judging; and

    f) Any innovative ideas that the team has explored during the development phase especially with industry partners.

4. This document will help your team plan to meet all the requirements of the F1 in Schools competition and in doing so:

    a) Achieve your outcomes;

    b) Obtain the resources (people, material and equipment) needed to achieve the objectives within a timeframe;

    c) Give guidance to all project members, and other interested groups or individuals; and

    d) Gain help from sponsors, supporters and industry.

5. The detail in this plan will vary according to the size, nature and complexity of the project, and whether it has just commenced or is in progress. Ideally the plan should be developed before the project starts to ensure that all the resources required to complete the project have been committed, and that the sponsors and supporters agree on how the project will be managed.

6. Don't be too concerned if some sections of the plan initially contain little information, while some sections might not be relevant to you at all. You can start small and as the project progresses the plan can be expanded as information gradually becomes available. It can be kept simple or more detailed depending on the size and complexity of your project.

PROJECT MANAGEMENT PLAN TEMPLATE
PROJECT *FIREBALL*

1. PURPOSE

The purpose is to state how Project Fireball will be developed and managed to achieve the objectives. It is an overview of all the activities to be undertaken by the project team, roles and responsibilities, teaming arrangements with industry, the project outcome (an F1 car design), a project schedule and any risks associated with the project.

2. BACKGROUND

In general terms, briefly describe the background to the project; why it is required and who has authorised it. (For example, the F in Schools Technology Challenge in Australia is a program of the Schools Innovation Design Challenge which is an initiative of the Re-Engineering Australia Foundation. The project's main objective is to help change perceptions of design, engineering, manufacturing, science and technology by creating a fun and exciting learning environment for young people to develop an informed view about careers in these areas of industry.)

3. REFERENCES

Include any references that are relevant to this document. (Consider including reference to the F1 in Schools rules and regulations on the REA website and possibly specification.)

4. PLANNING CONSIDERATIONS

Prerequisites

The following prerequisites exist for the project:

Prerequisites are the preconditions that need to be in place for plans to be undertaken. Risks to the project are assessed on the basis of prerequisites not being met. Typical prerequisites may include:

- *Resource and funding;*
- *Timely delivery of components by the competition organisation;*
- *Agreement by some authority to a key issue on which the project is based; and*
- *Guaranteed delivery or supply of a key product, service or result from another project or process on which the project must rely. (This could be a component being produced by industry or testing such as a suitable race track model.)*

5. PROJECT APPROVAL

(The Staff and School Board of (XYZ) college/high school have decided to enter a team into the F1 in Schools Design and Technology Challenge. The decision to enter the competition has been based on the benefits and outcomes a project of this nature will achieve in developing the learning skills of students, and the practical experience that will be gained in working in a team environment with industry, sponsors and supporters of the project.)

6. PROJECT DEFINITION

Project Objective(s)

Briefly describe the key objectives of the project based on the scope of the project. For example:

The objectives of Project *Fireball* are:

To design an F1 racing car that is compliant with the rules and regulations of the F1 in Schools Design and Technology Challenge;

- *To be innovative in design, production and testing;*
- *To build the fastest racing car and win the competition; and*
- *To establish excellent close working relationships with industry partners.*

Constraints

The following constraints apply to the project:
State any constraints in terms of time or budget that may have been identified. In other words, if the project has to be completed by a certain date, and within a set budget, then these are considered constraints.

Products/Deliverables

The scope of a project is defined in terms of the principal products (including services) that the project will deliver. Along with a list of the products, a brief product description should be provided so that all those affected by the product, or involved in its production, have a consistent understanding of what is to be produced, its quality criteria and how these will be checked.

The F1 in Schools Design and Technology Challenge Rules and Regulations will tell you what you have to deliver and by when. Given that each team will be assessed against the following criteria, it may be necessary to describe the documents you will need to produce.

- *A Design Portfolio.*
- *Team identity and marketing.*
- *F1 car design process.*
- *Innovation.*
- *Collaboration with industry.*
- *Verbal presentation.*
- *Specifications.*
- *Use of Cad-Cam.*
- *Quality of manufacture.*
- *Time trials.*
- *Knock-out racing.*

7. PROJECT PLANNING

Project Strategy

This section should contain a summary describing the most appropriate means of acquiring all the component parts to deliver the project products/deliverables. For example, what arrangements will the team need to establish with industry to ensure component parts can be manufactured, tested and delivered to the project team to meet the project timeframes?

Project Schedule

The project schedule (or timeframe) should be included in this plan but only needs to be a high-level summary. It should be kept simple and may be an easy picture created in MS Excel or another application. For Project Fireball, a summary level schedule in Microsoft Project would be appropriate.

The schedule should include the timings and delivery of the major products and events (as detailed in the Project Scope) and would include product/deliverable milestones. Here is an example of a simple project schedule:

Project Fireball Schedule (example only)

Item No.	Description of product or activity	Start Date	Finish Date
1	Assemble Project Team	01 July 09	05 July 09
2	Register application with REA	01 July 09	05 July 09
3	Start project Fireball fund raising activities	01 July	31 Aug 09
4	Identify industry partner	01 July 09	28 July 09
5	Design F1 Race Car	15 July 09	23 Aug 09
6	Industry partner commences design & development	24 Jul 09	04 Aug 09
7	Industry partner delivers product	15 Aug 09	24 Aug 09
8	Assemble prototype race car	25 Aug 09	27 Aug 09
9	Conduct Testing (Stage 1)	28 Aug 09	29 Aug 09
10	Conduct Testing (Stage 2)	10 Sep 09	11 Sep 09

Project Stages

The project should be broken up into stages or manageable units for detailed planning that can be recorded in the project schedule (above).

A brief summary of activities planned for each Project Stage should be given here. From the Project Schedule, identify the planned end date of each stage and provide a short summary of the main activities associated with the product/deliverables.

Project Budget (People, Material, Equipment)

Provide an estimate of Project Costs in following Table.

	Original Estimate	Current Estimate	Total
Equipment/components you will need for your project.			
Rent or Hire of facilities			
Travel expenses/fuel			

Incidentals			
Contingency/Reserve			
Total			

Contingency/Reserve.

A brief explanation of how the contingency/reserve was determined is usually required.

Contingency/Reserve is an amount of money (budget) used to cater for:

- *The unexpected tasks that arise in the course of any project;*
- *Risks that have been identified through a risk planning process;*
- *The inherent inaccuracies with estimating; and*
- *To allow for unforeseen changes in the development phase of the project.*

A percentage allowance of between 5% to 15% of the overall project cost estimate is not uncommon, and should be separately identified to avoid it being considered as part of the cost for the project.

8. PROJECT TEAM ORGANISATION

The aim of this section is to detail the key people who are involved in the project.

- *Team Manager.*
- *Resources Manager.*
- *Manufacturing Engineer.*
- *Design Engineer.*
- *Graphic Designer etc.*

Project Team Roles and Responsibilities

The roles and responsibilities should be identified for each of the individuals/groups in the project team organisation section. Specific responsibilities (relevant to the project products/deliverables) should be listed.

Stakeholders

Identify other people or organisations that are stakeholders in the project. These could be the college or high school teacher, industry contacts and other project supporters.

9. PROJECT MANAGEMENT

This section should describe the project management activities that need to be undertaken. When writing this section it should be remembered that the Project Management Plan is an overarching plan and should not include too much detail.

Project Office Setup

The Project Office set-up plan details set up the project office. For the purposes of project Fireball the project office would probably be established in the industrial arts classroom, although some of the work would be carried out at different locations within or outside the college/high school. These should be listed.

Communication Strategy

The communication strategy is to describe the communication methods used by the project team to ensure that the information flow between the project and its stakeholders and visa versa is maintained, and meets the expectation of all parties. How often will the team meet to progress the project, who needs to be involved, how will the team communicate with its industry partners and how often etc. In general, if you answer the questions who, what, where, when, why and how, you will have a communication strategy.

Configuration Management

The Configuration Management Plan details the processes, activities and tools used for configuration management of the project. Configuration Management (CM) is a technical discipline applied to manage the evolving design of materiel and ensure that support for 'life of the project' activities have access to accurate and complete design information. For Project Fireball the team needs to build two cars of the same configuration. To satisfy these objectives, a CM system must:

- *Identify and document those physical and functional design characteristics relevant to the level of management to be applied;*

- *Control changes to these design characteristics via a documented configuration control process;*

- *Record, maintain and report design status information regarding physical items and associated configuration documentation; and*

- *Audit the design (and subsequent changes) to verify conformance to specified functional and physical criteria as defined in the Formula One specification.*

Risk Management

A Risk Management Plan looks at what could go wrong with the project and usually has four major components. It defines the context of the project from a risk perspective, it identifies the organisational responsibilities to manage the risk, it defines the processes associated with risk management and reporting, and it defines the contents and processes associated with a Risk Register. Although the risk plan may identify general risk areas, it does not contain the individual risks, which are documented in a separate Risk Register.

For Project Fireball a simple matrix listing risks, potential likelihood and consequence of the risk eventuating, and who has the responsibility to manage the risk should be sufficient. For example, a common mistake can be to fail to meet your deadline for judging. This can be listed as a high risk, with the project manager being responsible and the consequence failure to be part of the state and national judging series.

Project Environmental Management

Sustainable Environmental Management is an integral part of project management. The project office needs to consider the environmental impact of activities undertaken by the project. Environmental risks need to be identified and evaluated and management strategies developed. At a minimum the following issues need to be considered when developing this section:

- *Identify Stakeholders;*

- *Applicable state, territory or federal laws and regulations;*

- *Environmental issues (including heritage) applicable to the project;*

- *Management strategies for minimising risks; and*

- *Action to be undertaken if an incident occurs.*

Financial Management

Fundamental to the success of a project is the development of an appropriate project Financial Management Plan. It is used to identify and document all financial aspects of project planning and management including the specification of particular tasks and the nomination of those people responsible for their performance. The plan also documents commitment and expenditure plans, and provides a description of the financial records, reports and procedures to be used in the management of the project. For Project Fireball, a project budget including a record of sponsorship contributions and project expenditure should be sufficient.

Quality Management

The purpose of the quality plan is to document the following:

- *Customer acceptance criteria;*

- *Approach and processes to ensure what is delivered meets the acceptance criteria;*

- *Assigned quality responsibilities; and*

- *Change control and configuration management process.*

The project quality plan will detail how a project intends to ensure that quality is achieved and includes referencing all project documented procedures/processes raised to achieve this aim. Building a matrix detailing acceptance criteria, how this is to be met and how it is to be tested, which is agreed and signed off on by stakeholders, is one of the 'value adding' processes that the plan will provide for the project's success. It will evolve with the project and provide a vehicle for the Project Manager to outline any unique requirements that needs to be achieved.

10. TECHNICAL MANAGEMENT

This section should list and describe the technical management activities that need to be undertaken by the project team. Include any testing that will be required to prove design concepts and production items.

It could be a matrix that includes wind tunnel and speed testing.

Innovative design is an important aspect of Project Fireball and your innovative approaches should be broadly described under Products/Deliverables.