How to generate a scientific paper
(descriptive/ method-driven or problem-driven)

1) Make prediction or hypothesis (= most parsimonious assumptions, free of contradiction)

   If needed, write first a proposal (Summary, state of the art, own preliminary results, working plan including alternatives and feasibility estimation, flow chart and financing plan).

Ask yourself:
What is the problem?
Why did you select this problem?
How will you address the problem?
What controls are needed?
How is accessibility?
What is the long-term strategy?

Think about suitable material and approaches;
Outline the experimental design;

2) Practical part:

Perform experiments and document results;

Compare observation with expectation;

Do (proper!) statistics if applicable;

Perform repetitions, modifications, further controls where needed;
e.g., for T-DNA insertion mutants: copy number, 2 independent mutants, RT-PCR, rescue with WT gene

3) Chose a suitable Journal; read and follow carefully the instructions for authors,
Write the article as you would like to read:

short, clear, interesting

Title:
Should be a concise and clear statement

Authors:
The first author should have done a large part of experiments and at least have written a draft of the paper. Each other author should have significantly contributed to the paper. The senior (last) author should have conceived the work and/or designed experiments/have written the final version of the manuscript. All authors must have read the manuscript and have agreed to the manuscript's content!

Summary or abstract:
Enframe briefly the problem; make statement about
i) aims, main results, their novelty and impact, including conclusion(s),
ii) the subject and approach used.

Title and abstract are the most read part of a paper!

Example:

There is an upper length limit of chromsome size for normal development of an organism

Summary. A clearly definable upper tolerance limit for chromosome arm length has been found. As a rule we postulate that, for normal development of an organism, the longest chromosome arm must not exceed half of the average length of the spindle axis at telophase. Above this length, fertility and viability of the carrier individuals become severely impaired due to increasingly incomplete separation of the longest chromatids during mitosis, resulting finally in the loss of DNA. The experimental work that points to a limit of genome plasticity has been carried out on a series of field bean lines with karyotypes of considerable variation in length of individual chromosomes.

(Schubert & Oud, Cell, 1997)

Introduction:

Relevant, pre-existing knowledge, prerequisites and means to address the scientific topic;

in brief:

- What do we know (references)
- What do we NOT know
- Why (and how) you did this study

Do not write: “we will discuss…”

Material and methods:

Describe or refer in a way allowing others to repeat your experiments

- **Precise** details of the study design
- The methods that you used
- How you analysed the data.

Results:

Present your data as a clear text referring to *Figures* and *Tables*. *Figures* must be self-explaining with a concise capture; legends must be comprehensible without reading full text, as short as possible, but with all information needed to understand the message; the same holds true for *Tables.*

Do not force readers to read other papers to understand yours;
avoid laboratory slang, avoid too many and unexplained abbreviations;
keep a strict logic order;
avoid unnecessary wording;
write in passive form;
use past for describing the experimental outcome, and present for already validated statements;

When needed and allowed, make clear and concise subheadings;
Make clear, what are your results and what comes from others;

Never try to manipulate any data; never copy & paste without citation, distingiush reviews from original papers (for review see…)

Discussion:

Do not continue or repeat to describe results, but interpret them.

If necessary, show up alternative explanations. Refer to relevant related data/interpretations of others. Read papers before citing them. Interpret possible differences.

Address strength and limitations of your study. Draw preliminary or final conclusions.

Sum up the importance of your findings; avoid over- or understatement. (Where applicable, future direction of related work may be pointed out)

Acknowledgement:

Grants, technical support, donors of material, people who contributed intellectually by stimulating discussions or critical reading of the manuscript

References: Follow the style of journal

If allowed and needed, add Supplementals

4) Submission

Cover letter:
Include author's name and title of the manuscript;
highlighting the main points of the work and the novelty of your data;
say why you have chosen this journal;
state that the manuscript has been seen and approved by all listed authors;
suggest potential referees (referees' names, institution, and e-mail), and, if applicable, name individuals with potential conflict of interest, to avoid sending manuscripts to competitors;

If needed ...
give statement on personal communication or other permissions needed (data presented as unpublished results from individuals other than the authors require permission for use);
statement regarding databank submission of data and a list of all gene/protein names and symbols used in the paper - these must all adhere to approved nomenclature guidelines for specific species.

If required, declare conflict of interest and/or contribution of authors.

Final check:
Before submitting compare with instruction for authors again; read once more carefully. When you are slowing down during reading your manuscript, something has to be improved; do not ignore!

5) Revision:

Check arguments of reviewers/editors carefully. Follow their advice as strict as possible.

If you have valid arguments against their advice, formulate them clear and concisely.

Respond their arguments in a point-by point manner in a separate letter.

Highlight changes in manuscript in one of the revised versions.

Keep style of journal.

Be polite, even when you disagree.

Respond soon, but not immediately after receipt of request for revision.

6) Proof reading:

Read carefully; follow instructions from the journal and answer queries of the editors.

Make yourself familiar with the general symbols for different types of correction.

Have a drink with your coauthors when the paper is accepted !