

# PUBLICATION OF A SCIENTIFIC PAPER- FROM PROTOCOL TO PUBLICATION

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# SCIENTIFIC WRITING

- Writing scientific papers is different from writing in the humanities.
- Scientists describe: **Facts, hypothesis, ideas, theories.**
- They cite the article, chapter, or book from which they have learnt the facts, hypothesis, ideas or theory.
- The preparation of a scientific paper has almost nothing to do with literary skill. **“It is a question of Organization”** Robert A. Day



# WRITING A SCIENTIFIC PAPER

## Writing style and word usage

- Clear, short, declarative sentences (easy to write and easy to read).
- Precise
- Unambiguous
- Short sentences .
- Add variety, flow and sequence.



# FROM PROTOCOL → PUBLICATION

The material

- Define the problem
- Decide on the objective(s) & develop a hypothesis
- Devise a methodology to test the hypothesis.
- Conduct the the study
- Interpret the results & draw conclusions

Preparation of a Scientific Paper

Check the specific requirements of the Journal  
You have targeted for publication of your paper

# THE “PRE-WRITING STAGE”



START

Literature  
search

Write an  
outline

Select a  
Journal\*

Decide on  
the format

Start  
Writing

- Helps in determining the format and length of paper

# GETTING STARTED

- The hardest part:
  - Deciding on the right topic
  - Deciding on the right journal
  - Gathering sources of information
  - Putting it all together
  - Writing the paper, taking into consideration the instruction of the Journal editorship.

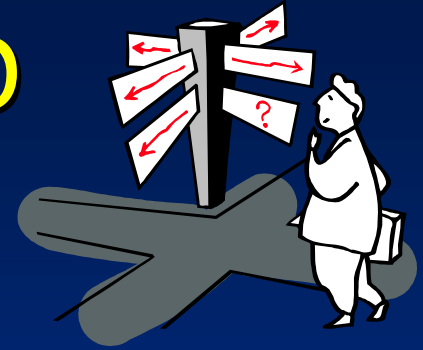


# PREPARING THE PUBLICATION- COURSE OF ACTION

- How to start, where to start?
- Identifying topics of interest.
- What do you want to say about your topic?
- Outlining your paper.



# GETTING STARTED



Start by answering some questions:

- What is the purpose of this paper?
- Are you describing original and significant research results?
- Are you reviewing the literature?
- Are you providing an overview of the topic?
- Some thing else?

Contd.....

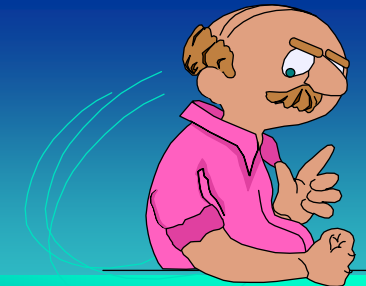




# GETTING STARTED

.....Contd

- How is your work different from that described in other reports on the same subject?  
(Unless writing a review, be sure your paper will make an original contribution)
- Which is the most appropriate journal/book.?
- Who is the audience? What will you need to tell them to help them understand your work.



# Collecting Information

- Literature Review-An essential component of Research.
- Must be performed thoroughly.
- Latest information must be collected:
  - books
  - journals
  - internet
  - personal contacts
  - reports
- Collected information must be recorded properly:
  - reference cards
- References list must be thoroughly checked for errors.

# TYPES OF PRESENTATIONS

- Article
- Reviews/Editorial
- Notes
- Communication
  - Letter or correspondence
- Book Chapter





## Selection of “Title”

Use the fewest possible words that accurately describe the content of the paper

Quit all waste words  
e.g. “A study of .....,  
‘Investigation of .....,  
‘

**Be Specific**

The most important  
rule for any writing

Keep your readers  
in mind



# COMPONENTS OF A PAPER

- Title
- Byline and affiliation
- Abstract
- Introduction
- Subjects and methods
- Results
- Discussion
- Conclusions
- Acknowledgement
- References



# GETTING STARTED

.....Contd

Clarify your goals

Organize your material  
Into a standard format

IMRAD



# IMRAD

- Introduction
- **M**aterial and Method
- **R**esults
- **A**nd
- **D**iscussion





# ABSTRACT

## Functions/objectives:

- To summarize the major aspects of the entire paper.
  - **Should Include:**
    - The question you investigated.
    - Design and methods used.
    - Major finding i.e. key quantitative results or trends.
    - Summary of your interpretations or conclusions.



Should be self-contained

Provides the reader the basic contents of the paper

# Abstract

Should state the principal objectives and scope of the investigation

Should concisely summarize the results and principal conclusion

# THE ABSTRACT

## Should not contain:

- Lengthy background information.
- Reference to other literature.
- Incomplete sentences.
- Abbreviations or uncommon terms that may be confusing to the reader.
- Illustration, figure or table or references to them.

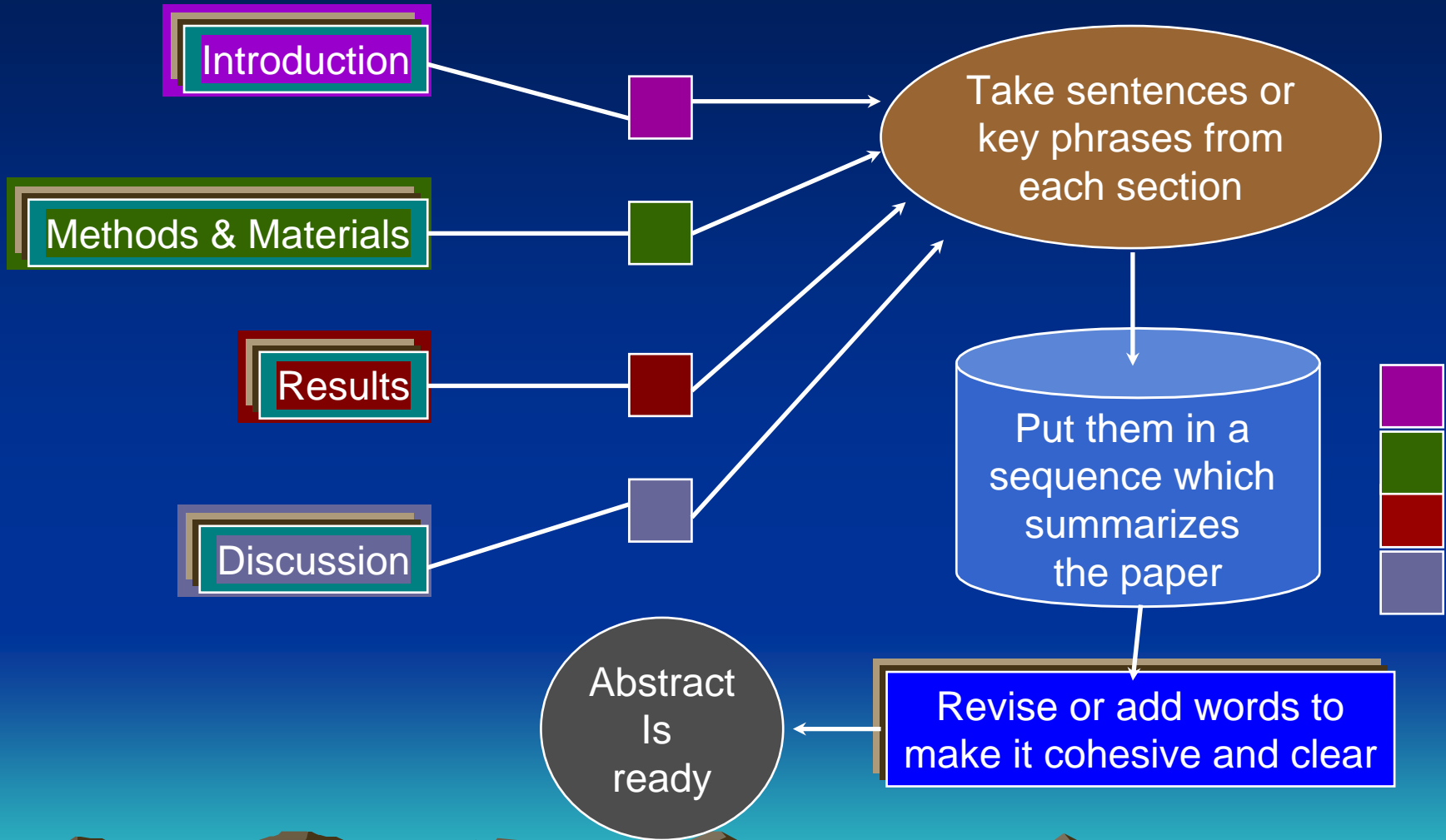


# STYLE OF ABSTRACT

- Only text may be structured.
- Use active voice or passive construction.
- Concise, but complete sentences.
- Use past tense
- Get to the point quickly
- Maximum length 200-300 words.



# COMPOSING THE ABSTRACT



# ABSTRACT

Must be  
written last





Key Words  
List

Words which help find the  
Article



# INTRODUCTION

- Explains the objectives of the study and why it is a worthwhile effort to conduct the study





Introduction  
Should address:

- Why did you undertake this study?
- What is the state of existing relevant knowledge?
- What specifically are you going to do & why you are doing it? (*State your hypothesis and/or objectives*)



# INTRODUCTION .....Contd

## FUNCTION

Establish the context of the work being reported. By:

- Discussing the relevant primary research literature
- Summarizing current understanding of the problem under investigation.

State the purpose of the work in the form of:

- hypothesis
- question, or
- problem under investigation

Explain briefly your rationale and approach and possible outcomes.

Introduce factors that might affect the experiment

# INTRODUCTION ...Contd

## STYLE

- Use active voice wherever possible
- Be concise and make your point

# INTRODUCTION ...Contd

## STRUCTURE

- Begin by identifying the area of interest
  - By using key words from the title in the first few sentences
- Establish the context by providing a brief and balanced review of pertinent published literature on the subject
  - Summarize to the reader what was known about the specific problem before you did your studies.
- Clearly state the purpose and/or hypothesis investigated.
- Provide a clear statement of the rationale for your approach to the problem under study.

# MATERIALS & METHODS

Explain clearly how the study was planned and carried out, keeping in mind the following:

- The subject used (plant, animal, human, etc) and their pre-& during study handling and care, when and where the study was carried out.
- If a field study, then give a description of the study site.

Contd.....



# MATERIALS & METHODS

## .....Contd

- The experimental or sampling design.
- The protocol for collecting data, and
- How the data was analyzed (statistical procedures used)



# MATERIALS AND METHODS ...Contd

Function

Describe to the reader the protocol used for conducting the study being reported



Write your own words (do not copy from manual)

Write in clear and understandable paragraphs form

Cite the reference of the method(s)

# Tips for writing Materials and Methods

Name the drug (if used) by its proper scientific name

Adequately describe methods (give important details)

Explain each essential supply or instrument

Explain measurement or tests clearly

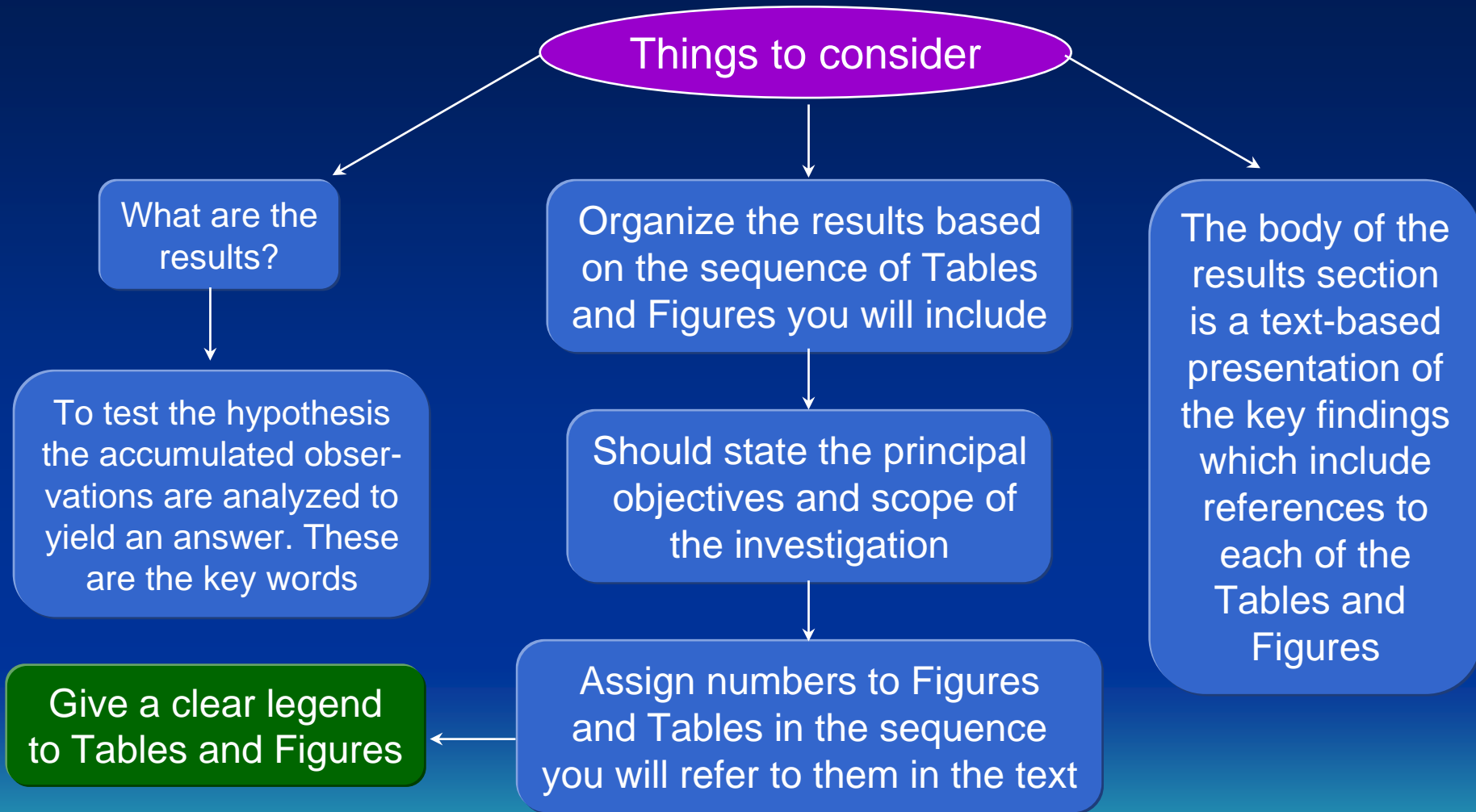


# RESULTS ...Contd

Function

To objectively present your key results to the reader, without interpretation, in an orderly and logical sequence using, illustrative material (Tables & Figures) and Text, as appropriate

# RESULTS ...Contd



# RESULTS ...Contd

Things to consider

```
graph TD; A([Things to consider]) --> B[Report statistical test summaries (test name, P value) in parenthesis in conjunction with the biological results they support]; A --> C[Report negative results also]; C --> D[Present the results of your study in a sequence that will logically support the hypothesis or answer the question stated in the introduction]; D --> E[Always use the appropriate units when reporting data or summary statistics];
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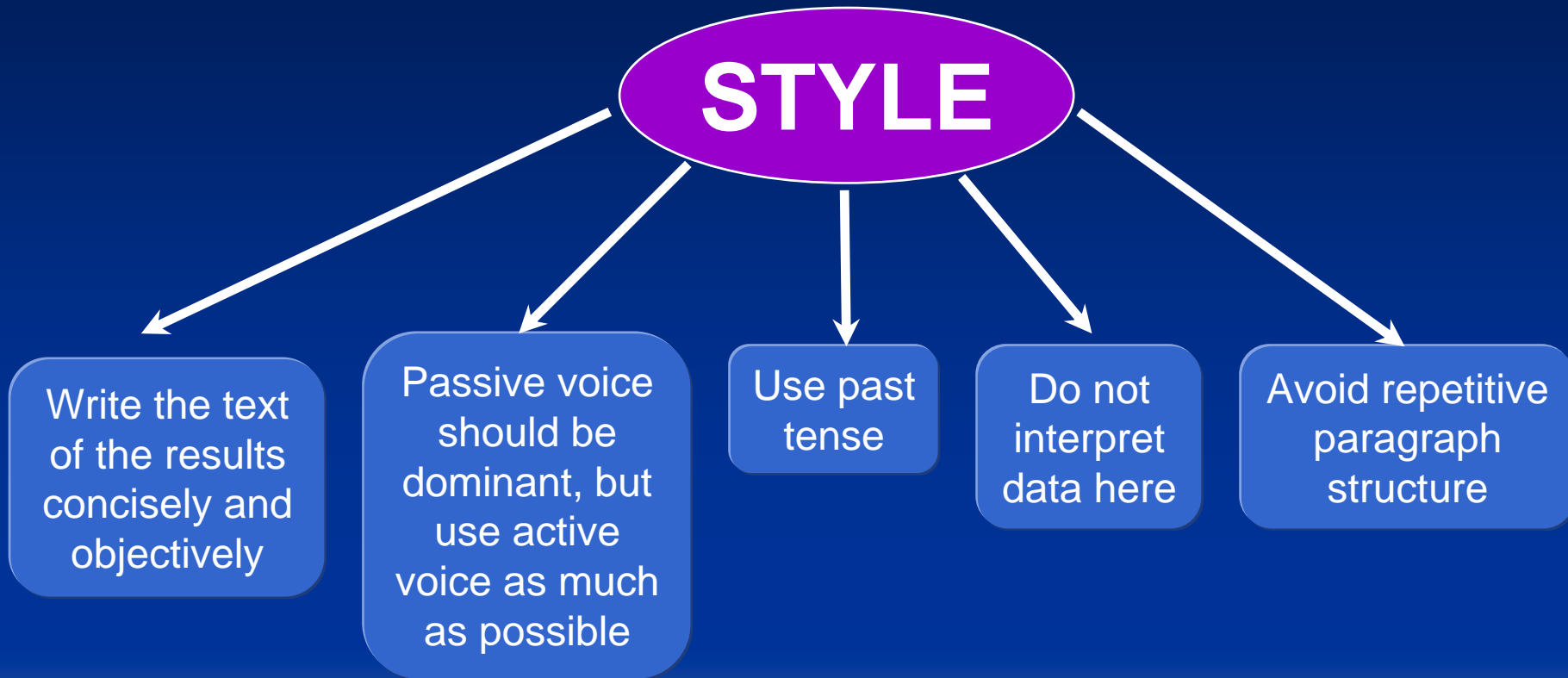
Report statistical test summaries (test name, P value) in parenthesis in conjunction with the biological results they support

Report negative results also

Present the results of your study in a sequence that will logically support the hypothesis or answer the question stated in the introduction

Always use the appropriate units when reporting data or summary statistics

# RESULTS ...Contd



Describe data trends clearly

Label graphs correctly  
(variables and units of measures)

# Tips for writing Results

Make materials graphs/tables of data, where possible


Draw neat and legible graphs  
(self-explanatory)



# DISCUSSION



Function

- 
- To interpret your results in the light of what is already known about the investigation
  - To explain new understanding of the problem after taking your results into consideration

# DISCUSSION

Function

Describe to the reader the exact protocol used for conducting the study being reported



# DISCUSSION ...Contd

## APPROACH

- Organize the discussion to address each of the experiment or studies conducted and results obtained.
- Do not restate the entire results to remind readers of the results discussed, use bridge sentences that relate the results to the interpretation.
- Relate your work to the findings of other studies including previous studies you may have done and those of other investigations.
- Do not introduce new results in the discussion.



Do the data support the hypothesis?

Do the results compare to the reported results?

Why did you get the results you did?

## Tips for writing Discussion

Discuss results of other studies. Do your results support or refute these?

What can be done further?

How do your results matter to living organisms?

Must include citation from each source used (Reference)

# AUTHORSHIP ISSUES

## Function

Critical and deserves a good deal of thought

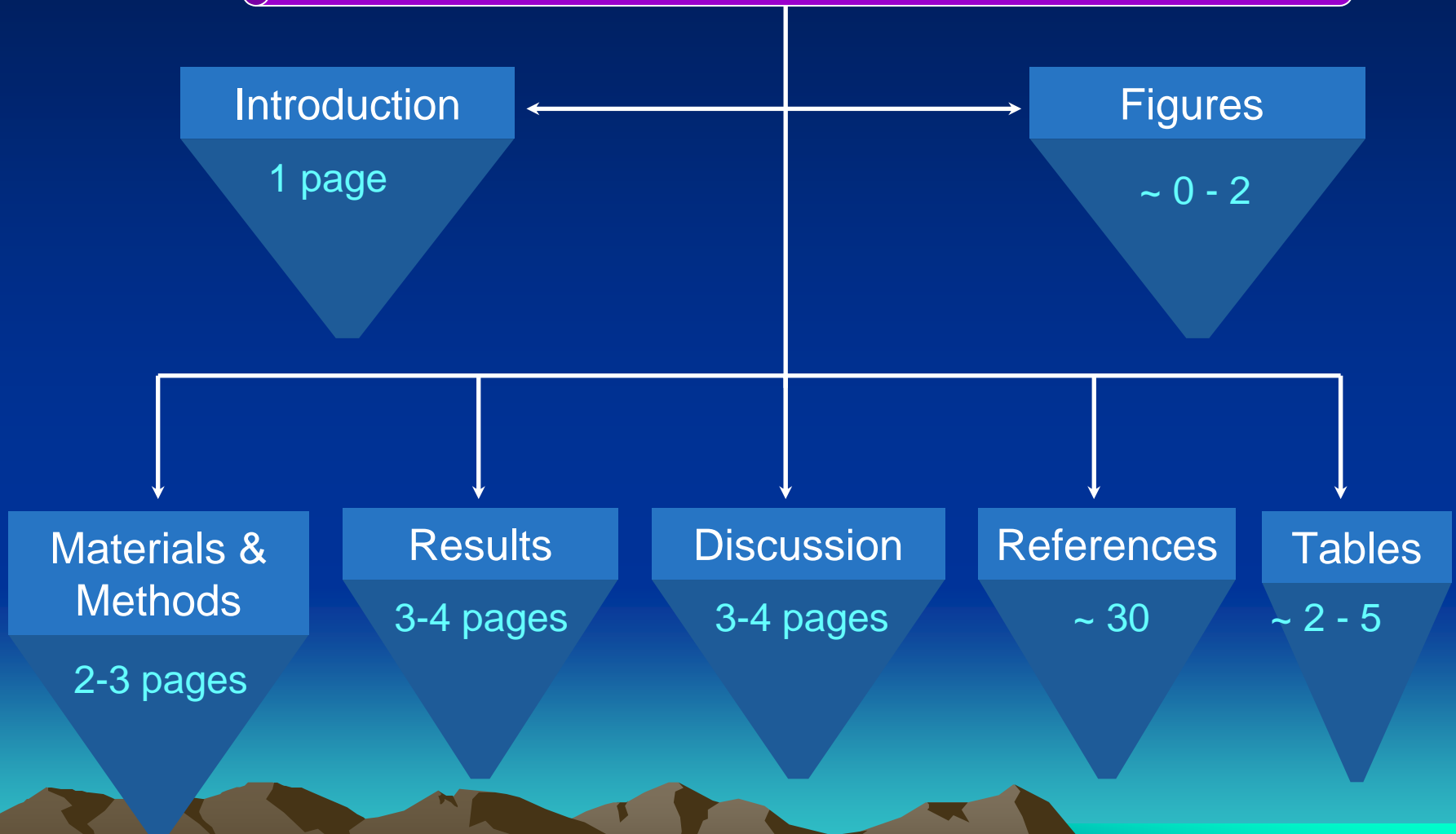
Anyone who made a substantial contribution to the paper, must be included as an author

Senior author is the person who has taken the greatest responsibility for executing the work described in the paper

All authors must be involved in at least two of the three phases to the project:

- design
- analysis
- writing

# MODEL LENGTH



During the writing process, keep  
in mind

The journal you are  
writing for

The audience for  
the paper:

- Reviewers
- Readers

If you can make a more exciting, learning experience for the reviewers/readers,  
you will increase the chance for getting the paper accepted

# QUESTIONS TO ANSWER WHEN WRITING DISCUSSION

Do your results  
provide answers to  
your hypothesis?

If not, then  
how do you  
interpret your  
findings?

Do your findings  
agree with what  
others have shown

If not, then do they  
suggest an alternative  
explanation

Given your  
conclusions, what  
is the new under-  
standing of the  
problem outlined  
in the introduction

# ACKNOWLEDGEMENT

Acknowledge

- all those who helped in the thinking up, designing or carrying out the work
- those from whom you received materials as a favor.
- outside reviewers
- any sources of funding



## Acknowledgements

Should be  
brief

Never  
flowery

# USING TERMS

## Simple past tense:

- Correct for stating what was done, either by you or others.
  - “The blood was drawn by venepuncture”.
  - “DNA was extracted”.
  - “OD<sub>260</sub>/OD<sub>280</sub> ratio was calculated”.
  - “Alam conducted a study on Saudis and reported similar results”.



# USING TERMS

## .....Contd

- “Cholesterol level is elevated in many Saudi diabetic patients”
- “All sickle cell disease patients are anemic”
- “Prevalence of obesity is increasing in Saudi Arabia.”



# USING TERMS

.....Contd

- Present and simple past tenses may both be correct for results, discussion and conclusion.
  - “The results showed that majority of Saudi children with SCD have elevated Hb F level”
  - “Two bands were seen when PCR product was subjected to electrophoresis and visualized by staining with ethidium bromide”
  - “The frequency distribution histogram of uric acid shows normal Guassian distribution in healthy Saudi population”

# USING FIRST PERSON

- Use first person when it helps to keep the meaning clear and to express a purpose or a decision:
  - “*Akram* reported an increased frequency of D alleles of ACE in patients with hypertension, but our results show that the frequency of D alleles is the same in hypertensive and non-hypertensive patients”.
  - “We conducted a detailed investigation on Saudi females of child-bearing age to determine the levels of leptin”



# USING FIRST PERSON

- Avoid phrases such as:
  - We believe
  - We feel
  - We conclude
  - We can see
  - Personal opinions



# USING FIRST PERSON

- Use an affirmative sentence rather than a double negative:

e.g.

Avoid: This reaction is not uncommon.

Use: This reaction is common

Avoid: This result is not unlikely to occur.

Use: This result is likely to occur



# SOME SUGGESTIONS

- Use respectively to relate two or more sequence in the same sentence.
- Use the more accurate terms greater than “or more than” rather than the impressive “over” “or in excess of”
- Use “fewer” to refer to number; use “less” to refer to quantity  
e.g. fewer than 50 animals, less product, less time, less work, less than 5 mg