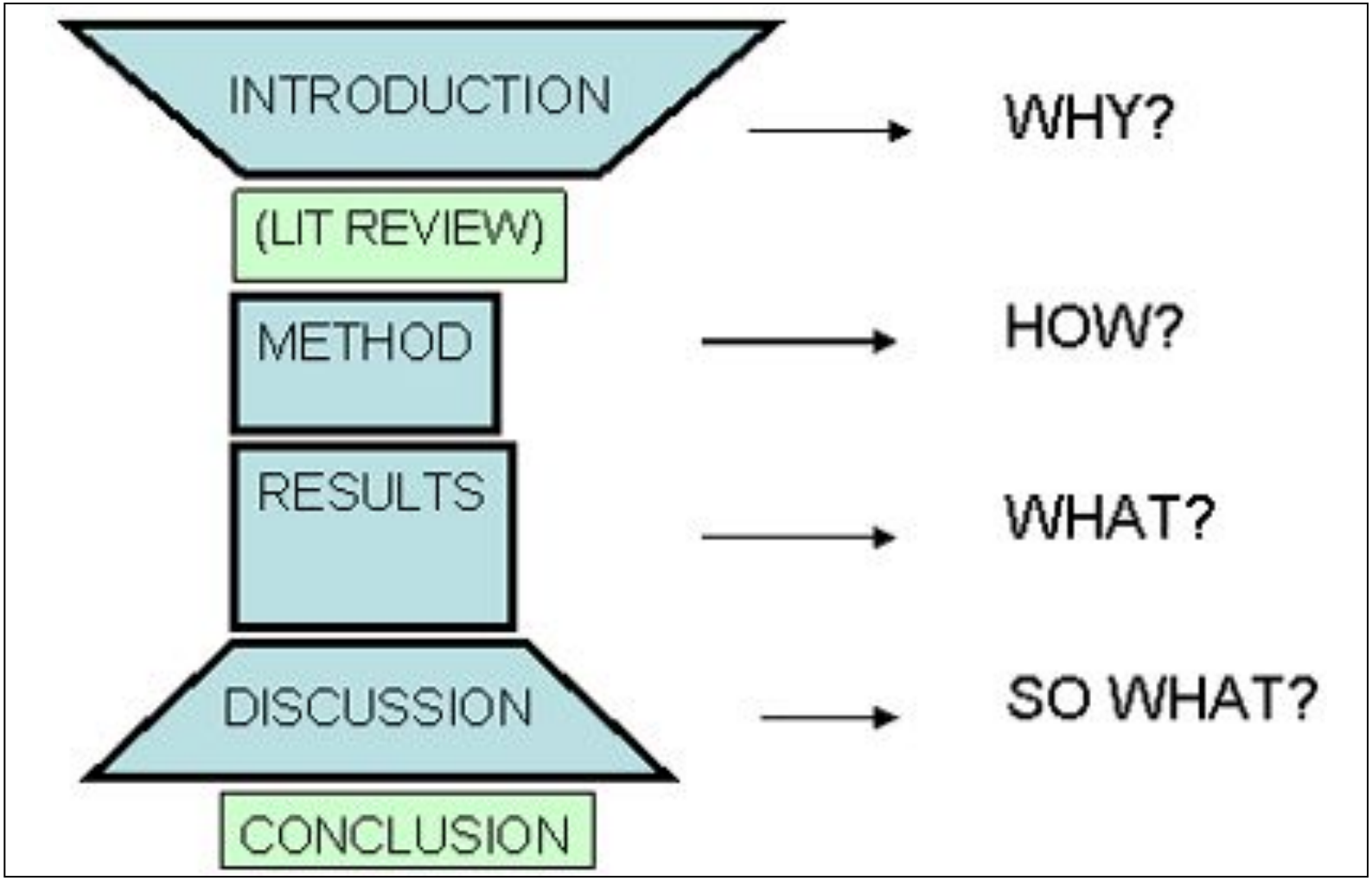
Writing Research Articles

IMRD Format Overview

IMRD: Basic Structure



This is the basic structure. The are ALMOST ALWAYS variations based on field

Central Parts of an Article

Section	Description
Introduction	The introduction serves two purposes: 1. Provides the *rationale* for the paper (moving from a general discussion of a topic to the specific question or hypothesis being investigated in the paper. 2. Attracts interest in the topic (and get readers)
Methods	The methods section (narrowly/in detail) describes: 1. Methodology 2. Materials 3. Procedures
Results	The results section is used to: 1. Describe & analyze the research findings
Discussion	The discussion section offers information on what has been learned from the research. In this section, the information shared starts with the specific research question and becomes more and more general. Also, connections are made to points laid out in the introduction.

Possible Elements of a "M" Section

1. Overview of the experiment (design)
2. Population/Sample
3. Location
4. Restrictions/Limiting Conditions
5. Sampling Technique
6. Procedures (**always included!)**
7. Materials (**always included!)**
8. Variables
9. Statistical Treatment

A Checklist for Writing the "Methods"

When Describing Experimental Procedure…

- ✔ Include all information necessary for someone to replicate your procedure
- ✔ Describe the procedure chronologically

Language Considerations…

- ✔ Use the past tense to describe procedure
- ✔ Use the passive voice to "depersonalize" procedural descriptions and to keep old information at the beginning of sentences.
- ✔ Use short forms of the passive voice to reduce compound sentences and *which* clauses.

A Note about Materials

Materials can include…

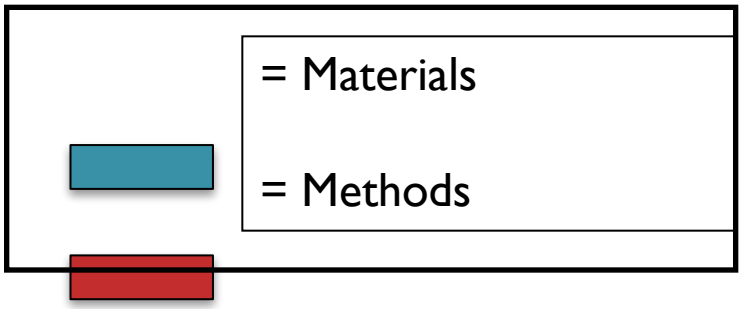
- Laboratory equipment
- Field equipment
- Human or animal subjects
- Natural substances
- Fabricated substances
- Surveys and questionnaires
- Computer models
- Mathematical models

Methods & Materials

The two are usually presented simultaneously…

<u>Example</u>

Aqueous sodium hydroxide (30g, 185mL) was cooled in ice in a 500-mL beaker, stirred magnetically while 5 g of nickel-aluminum alloy was added in several small portions, and gradually warmed to 100°C as required to maintain hydrogen evolution.



A Checklist for Materials

Information…

- ✔ Integrate the materials description with the procedural description
- ✔ Briefly identify conventional materials
- ✔ Describe new and/or specifically designed materials in greater detail

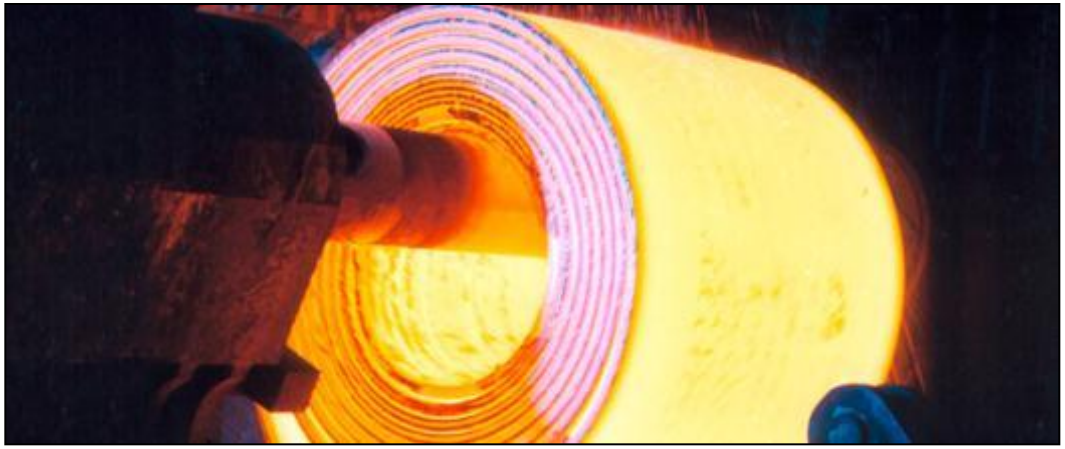
Language…

- ✔ Use past tense when describing a sample
- ✔ Use present tense when describing a larger population

<u>Practice</u>
Arrange the Parts of the Methods Section

Writing the Results: A Three Step Process

1. Indicate where the reader can find the results (the table/graph)
2. Highlight the most important findings
3. Give a brief explanation of the findings



Practice
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Indicating Results and Commenting

There are many ways to present your results and commentary. Here are two patterns:

<u>An Alternating Pattern</u>

✔Result 1 -> Comment 1
✔Result 2 -> Comment 2
✔Result 3 -> Comment 3

Better for presenting many individual results with specific comments about each result.

<u>An Sequential Pattern</u>

Result 1
+
Result 2
+
Result 3
=
Commentary

Better for a general commentary about several results.

Making Comments in the "Results"

1. Make *generalizations* about the results
2. *Explain* possible reasons for the results
3. *Compare* your results with results from another study

<u>Analysis</u>
"Identify the Purpose"

“Results” Section Checklist

Function	Type of Verb Tense
Locate findings	Present tense
Indicate the most important findings	Past tense
Comment on the findings	Present tense or modal auxiliaries
Report findings involving comparisons among groups	Comparative and superlative expressions