



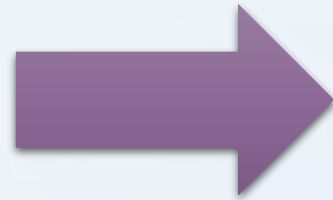
How_{to} **READ** _a Scientific Paper

[Main Menu](#)



How to Read a Scientific Paper

Why?



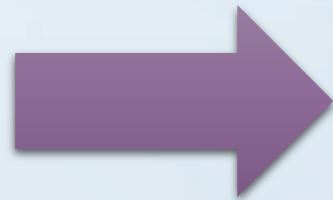
Why it's important for you to read the literature.

How?



How to make reading scientific papers as painless as possible.

Anatomy



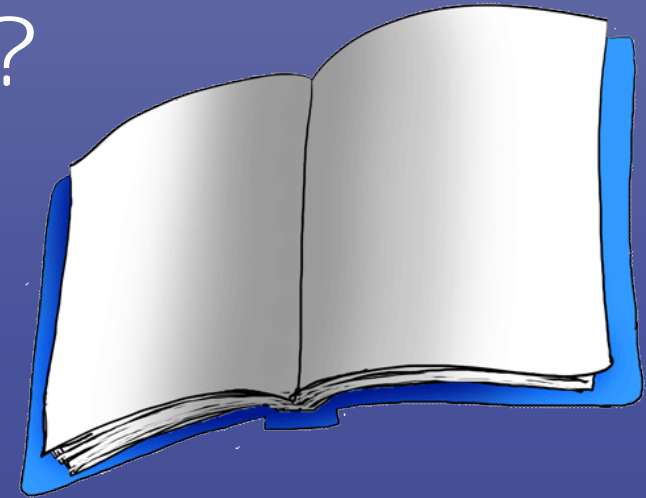
Everything you ever wanted to know... why it's there and what it's good for.

Click the buttons to navigate.

How to Read a Scientific Paper

Why?

Does your professor just want to ruin your life?

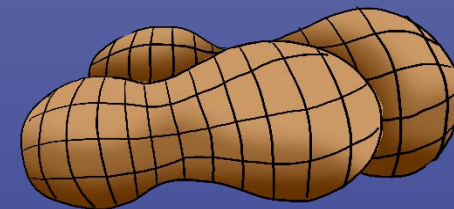


Or is there a good reason to read the literature?

How to Read a Scientific Paper

How?

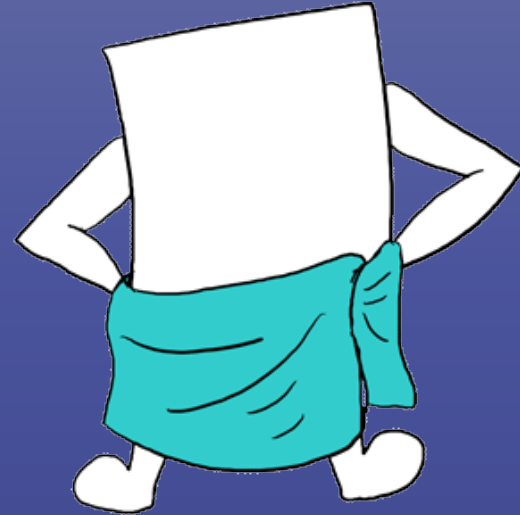
From Soup to Nuts



How to make reading scientific papers as painless as possible.

How to Read a Scientific Paper

The Scientific Paper Exposed

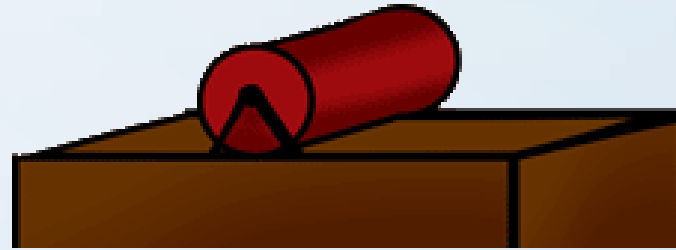


Everything you ever wanted to know...
why it's there and what it's good for.

Anatomy

Why Read?

It's Current!



Textbooks can be years out of date by the time they are published. Journals tell you what is happening...

RIGHT NOW!

Why Read?

It's Current!

It Can Be Replicated!



Popular articles and books give you general information and results. Scholarly journals give you enough information that **you could do the experiment yourself.**

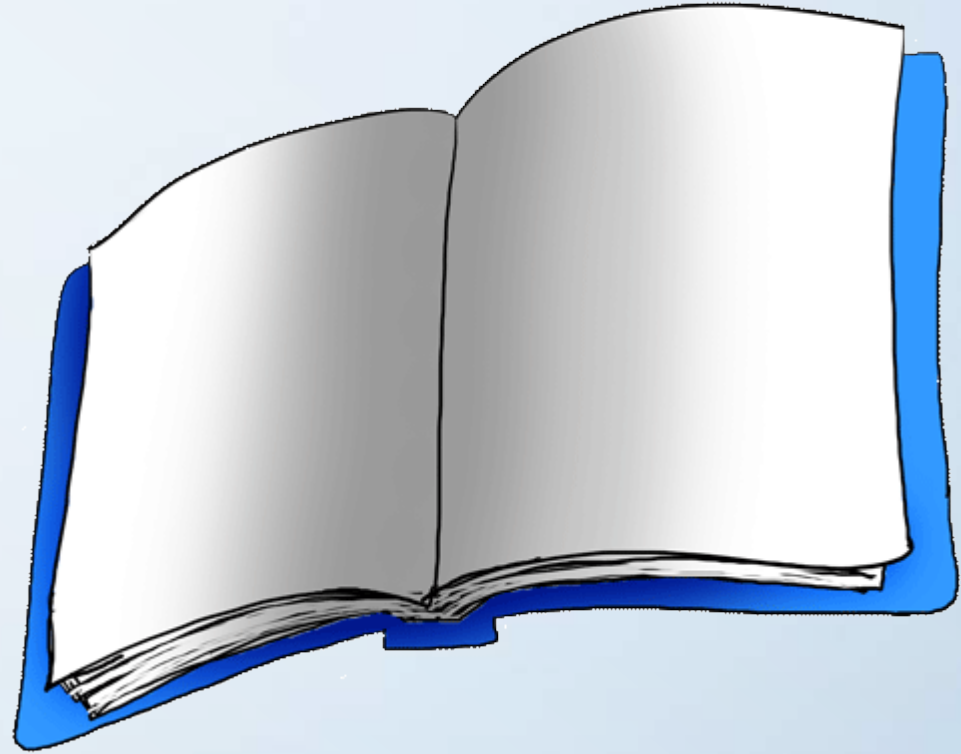
You can verify the research to see if you get the same results.

Why Read?

It's Current!

It Can Be Replicated!

It Has Actual Data!



If you need to know **exact results or properties** for your own research...

Articles include actual data, uncertainties, conditions of the experiment, and much more.

Why Read?

It's Current!

It Can Be Replicated!

It Has Actual Data!

You Can Evaluate The Conclusions!

Do You Believe It... Or Not?

Articles provide the authors' explanation of their results and conclusions. You can see their assumptions and determine whether you believe them or not.



Why Read?

So, There You Have It...

Current

It's the most up to date stuff

Has Raw Data

Save time – use their results

Replicable

I can redo the experiment myself

Shows Logic

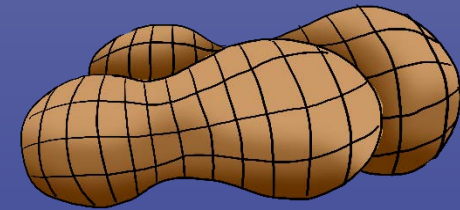
Do you believe it... or not?

All the Reasons to Read Scientific Papers

How to Read a Scientific Paper

How?

From Soup to Nuts

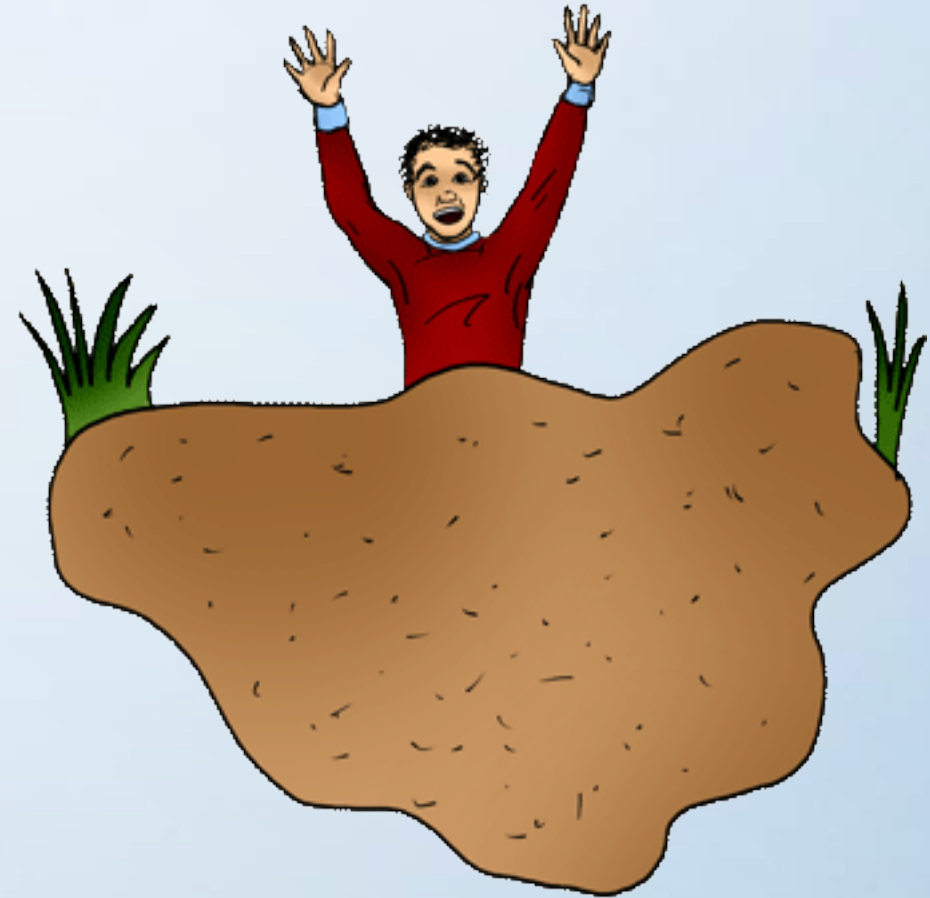


How to make reading scientific papers as painless as possible.

How To Read...

STOP

Don't Read Straight Through!



It's like walking through quicksand!

How To Read...

Before you read, you need the right equipment....



A Scientific Dictionary:

- Look up terms you don't know.
- Try www.AccessScience.com, for an online dictionary.



Your handy-dandy notebook:

- Make notes so you'll remember your insights.



Your friends and colleagues:

- Explaining to others will help you understand the paper yourself.

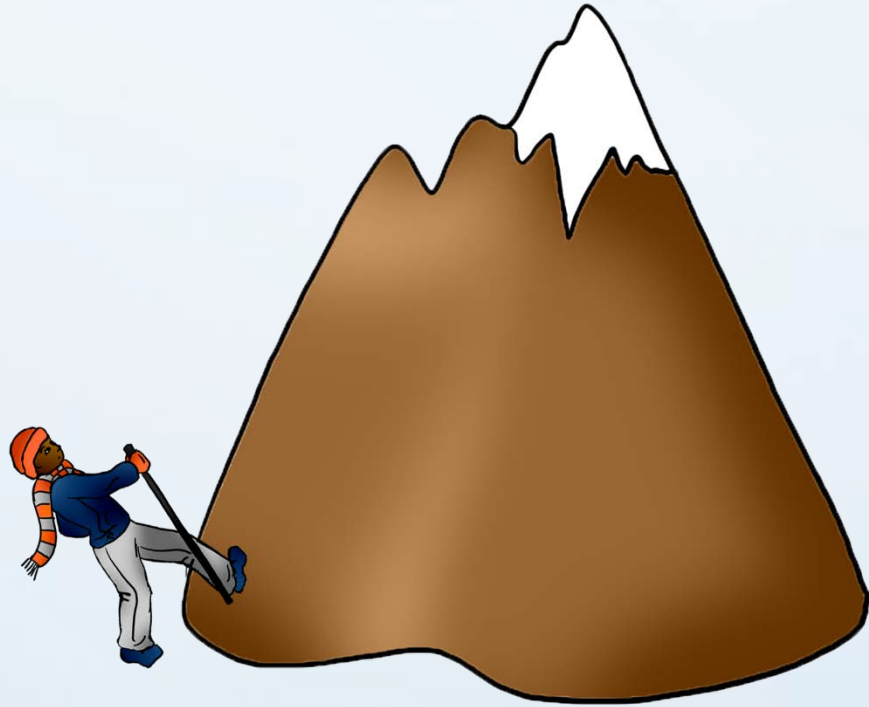
How To Read...

Okay, all packed?



Then, let's go!

How To Read...

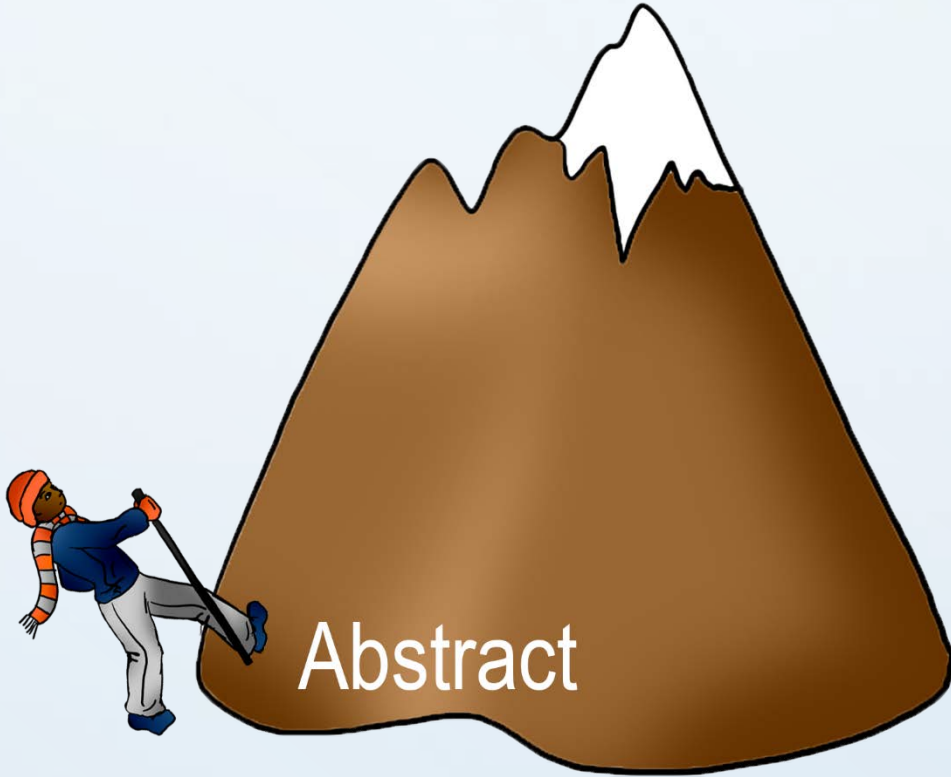


Okay, let's start our trip to understanding scientific papers!

In this section, we will read sections of a paper in the order that makes for **faster, more efficient comprehension** than reading the paper straight through.

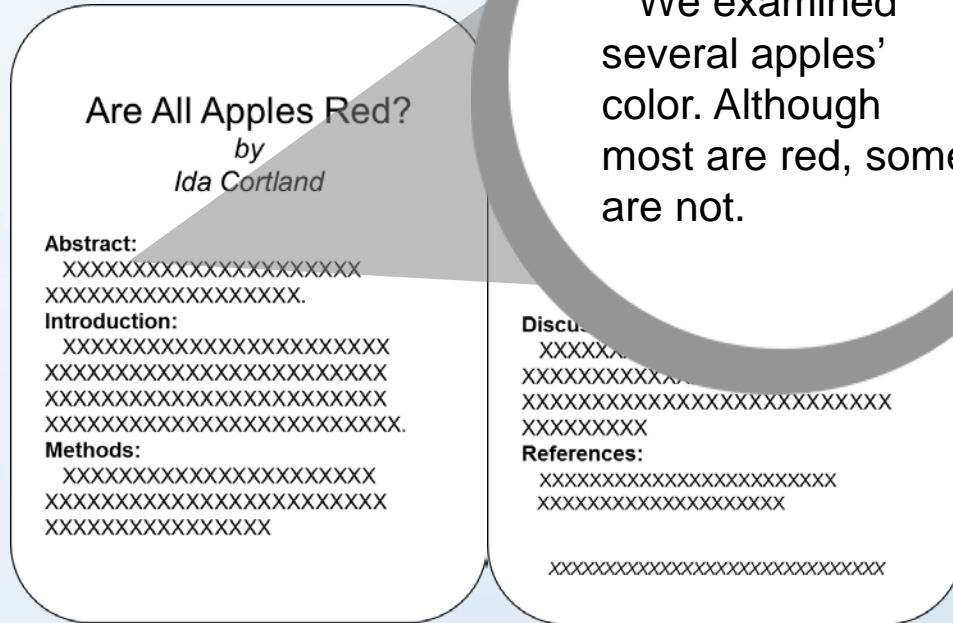
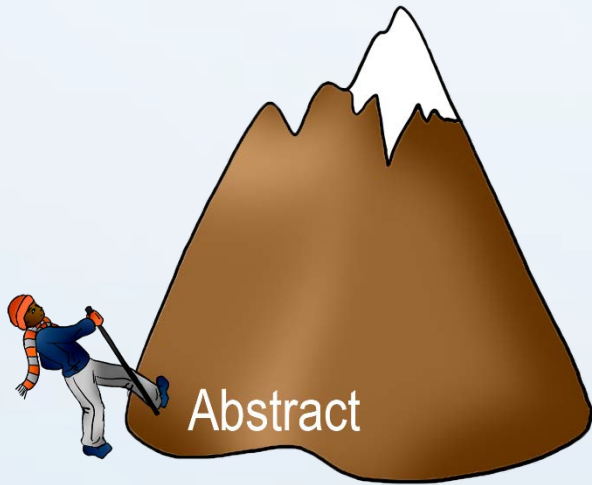
How To Read...

Okay, let's start our trip to understanding scientific papers!



First stop, **The Abstract**

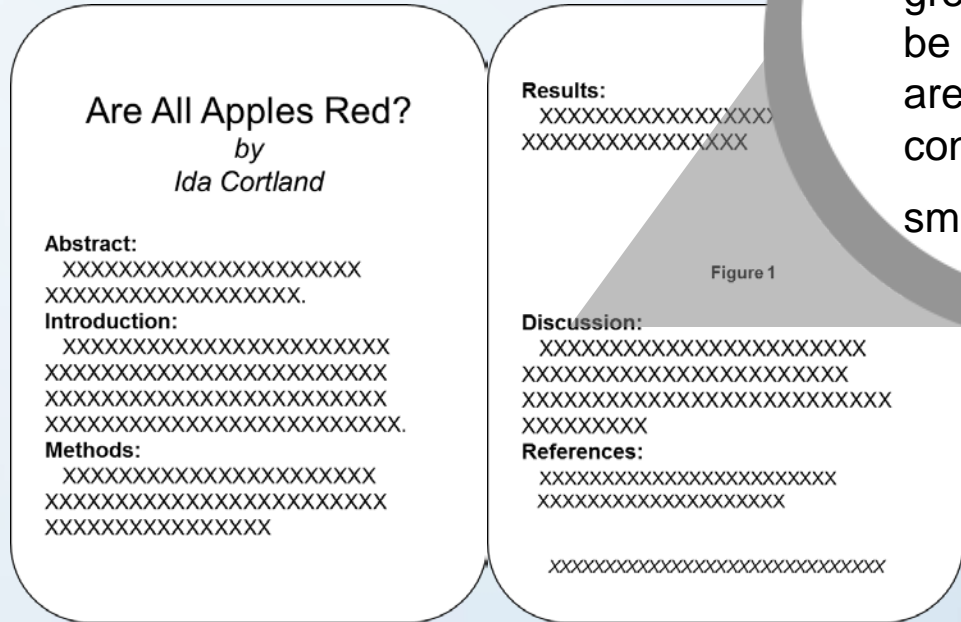
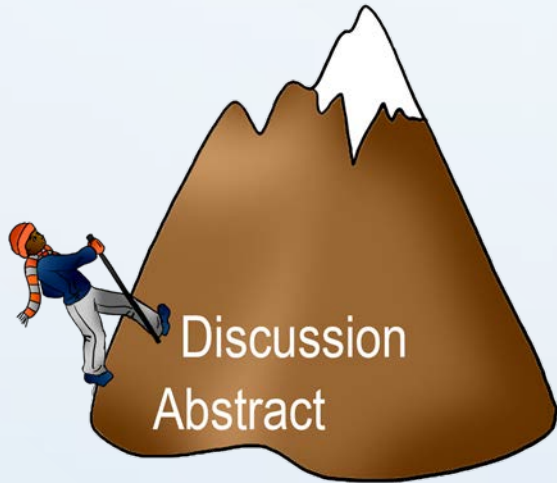
How To Read...



Abstract: Tells you briefly **what** experiment **was done** and **what was found**.

Question: What *specific results* are mentioned? Are they *relevant*?

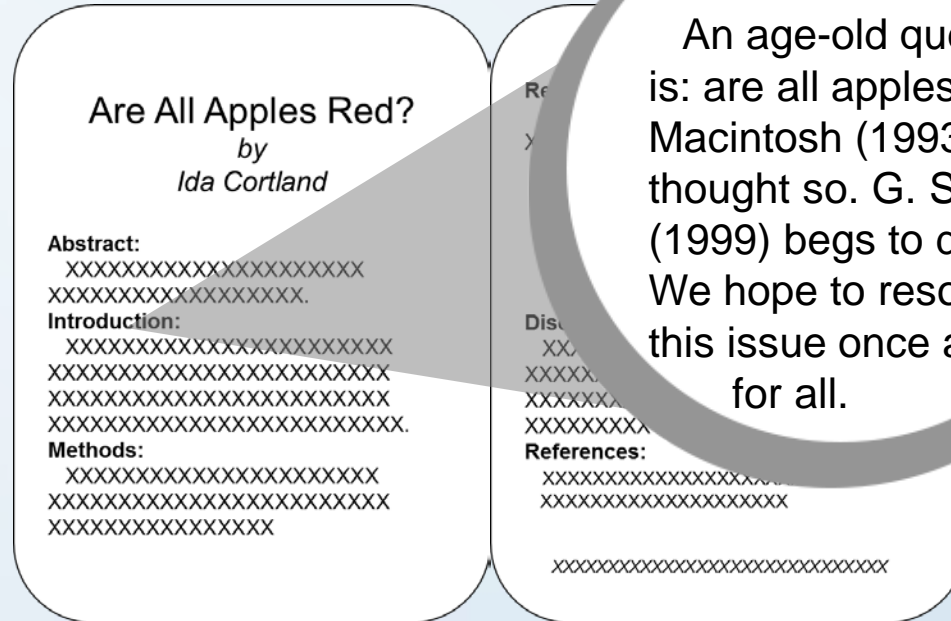
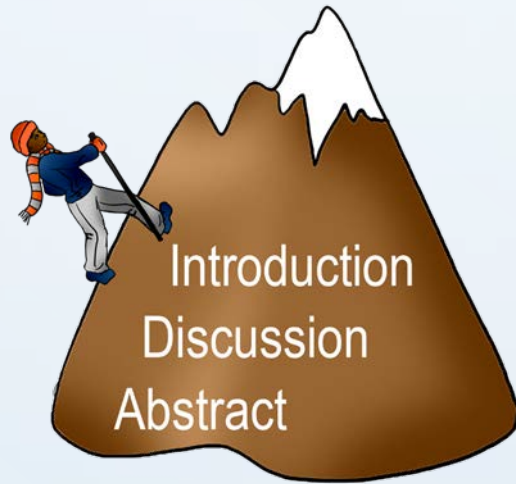
How To Read...



Discussion: Summarizes **important results**, gives **reasons for conclusions** based on results.

Question: Do you *agree* with the logic of the conclusions?
Are these results *useful* to you?

How To Read...



Introduction: Explains motivation and importance of research, provides background information.

Question: Do you *understand* background info? Do you need to *look up references* for more info?

How To Read...

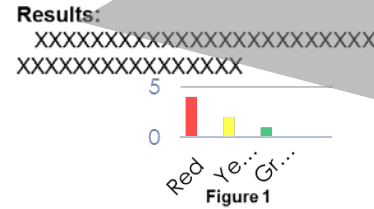


Are All Apples Red? by Ida Cortland

Abstract:
XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXX

Introduction:
XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXX

Methods:
XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXX



Discussion:
XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXX

References:
XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXX

XXXXXXXXXXXXXXXXXXXXXXXXXXXX

Results:
We found four red apples, one green apple, and two yellow apples. See Figure 1.



Results: Provides the **raw data** you might need for your own research. **Figures and tables** provide the data in a compact format for **easy viewing**.

Question: For figures, do you understand what the *axes mean*? What units are used? *Does the curve make sense*?

How To Read...



Are All Apples Red?
by
Ida Cortland

Abstract:
XXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXX.

Introduction:
XXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXX.

Methods:
XXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXX

Results:
XXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXX

Red Yellow Green
Figure 1

Discussion:
XXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXX

References:
XXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXX

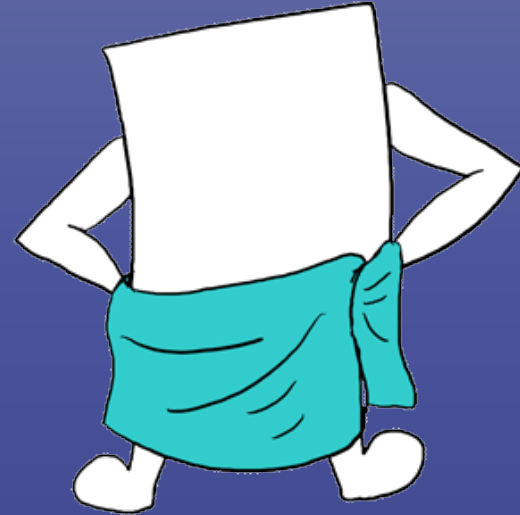
XXXXXXXXXXXXXXXXXXXXXXXXX

Congratulations!

You've reached an understanding of the paper. You can see whether the paper is relevant to your work and know where the data and conclusions are hidden.

How to Read a Scientific Paper

The Scientific Paper Exposed



Everything you ever wanted to know...
why it's there and what it's good for.

Anatomy

Anatomy of a Scientific Paper

Are All Apples Red?

by
Ida Cortland

Abstract:

We examined several apples' color. Although most are red, some are not.

Introduction:

An age-old question is: are all apples red? Macintosh (1993) thought so. G. Smith (1999) begs to differ. We hope to resolve this issue once and for all.

Methods:

We went to the local grocery store and bought one of every apple they had. We took them home and looked at them.

Results:

We found four red apples, one green apple, and two yellow apples. See Figure 1.



Figure 1

Discussion:

Since we found one yellow apple and two green apples, it must be true that all apples are not red. We concur with G. Smith's findings.

References:

Macintosh (1993) *Journal of Fruit Science*. 4(3): 121-135.

Smith, G. (1999) *Apple Technology Today*. 7(3): 4-8.

[Pomes and You, Volume 3, Issue 4 \(2003\) p.8](#)

The Abstract

Gives you a **brief overview** of what the paper is all about.

Explains **why** the authors did the experiment, **how** they did it, and **what they found out**.

Abstract:

We examined several apples' color. Although most are red, some are not.

Ask yourself, are the findings **relevant** to the question you have?

It's very important to read abstracts to help you decide **whether to read** the whole paper or not.

Abstracts are **available in many indexes** to the journal literature, so you don't even need to find the actual article to determine whether it might be interesting to read.

The Introduction

Provides the motivation for doing the experiment, explaining '**Why did they bother**'?

Introduction:

An age-old question is: are all apples red? Macintosh (1993) thought so. G. Smith (1999) begs to differ. We hope to resolve this issue once and for all.

It **explains prior research**, and what the accepted understanding of the field is.

In this case, **there is a dispute** between Macintosh and Smith, and **this paper seeks to settle the dispute**.

Methods

Gives details on how the experiment was set up and carried out.

Should explain well enough that **you could replicate** the experiment yourself, if you wanted to.

Often the hardest section to understand, since it contains specialized techniques. **Skip this section until last.**

When reading, skim and **try to pick out basic methods** used. Don't worry that much about the details – that's for grad school.

Ask your instructor or **consult a scientific encyclopedia** or textbook if you don't understand the concepts of the technique.

Methods:

We went to the local grocery store and bought one of every apple they had. We took them home and looked at them.

Results

Results:

We found four red apples, one green apple, and two yellow apples.

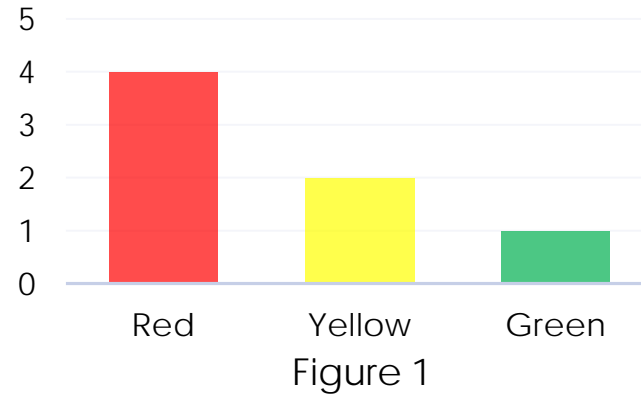


Table 1:
Apple Colors

Brand	Color
Gala	Light Red
IdaRed	Red
Macoun	Red
Fuji	Yellow
...	...

This section provides the **data the authors use** to reach their conclusions.

Figures are often included to **make the data more compact** and intuitive, and **Tables organize data** in one place for easier reading.

Understanding Figures and Tables is **EXTREMELY** important in understanding a paper.

For figures, make sure you understand what quantities are on the axes. Are they linear or logarithmic? What units are plotted?

Discussion/Analysis/Conclusion

(This section may be named any of these things)

This is where the author connects the dots – explaining what the data means, and why they support the conclusion.

Discussion:

Since we found one yellow apple and two green apples, it must be true that all apples are not red. We concur with G. Smith's findings.

Compare **your own conclusions** about the data with the authors' analysis.

When skimming the paper for the first time, after reading the abstract **read the concluding section**. It gives more detail on the specific results that were found, and **helps you determine whether the paper is relevant** to your research question.

References/Bibliography

Provides a list of resources quoted or referenced by the authors.

References:

Macintosh (1993) *Journal of Fruit Science*.
4(3): 121-135.

Smith, G. (1999) *Apple Technology Today*.
7(3): 4-8.

Allows you to go back to those sources to **see why the authors referenced** that work, and **whether those sources seem reliable** and accurate.

Format of bibliography differs between journals. For other examples visit the [Purdue Online Writing Lab \(OWL\)](#).

Author. (Year) Journal Title. Volume(Issue): pages.

Article Information

Combined with the author/title information, it **enables you to create a citation for the article** – so you can tell other people where to find it.

*Pomes and You, Volume 3,
Issue 4 (2003) p.8*

Remember, if you use the data or concepts from this paper, **you must cite it** in your reports or publications. Failure to do that is

PLAGIARISM

which could lead to failure of a course, expulsion from Purdue, and, after you leave school, legal or professional consequences.

It's always better to be **safe**, and **cite all of your sources**.

Credits

Created by Michael Fosmire

Designed & Illustrated by Aly Edmondson



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