Preparing and Presenting an Accessible Scientific Presentation: 10 Things to Consider

Tips For Communicating Science Effectively

#1. Identify your audience:

This will control the level of your presentation and the amount of background material you need to orient everyone in the audience

#2. Identify the main points you want to convey in the time you have:

You can reasonably convey only 2-3 main points in a 20- or 30-minute talk

#3. Create an outline of your talk (or paper):

This will build in the logical organization of your presentation and help you decide what figures and other supporting evidence you need to make your points

How To Write an Outline

Example of basic (Level 1) structure of scientific outline:

I. Introduction (Get the reader's/viewers attention; states key idea(s) or thesis; provides essential background)

II. Procedures (Provides background on key experimental/theoretical methods)

III. Results (Presents key results that support ideas discussed in Introduction)

IV. Discussion (Interprets results; Discusses results in the context of prevailing models)

V. Summary and Conclusions (Reemphasizes key results and how they support thesis; Discusses new directions)

How To Write an Outline

Example of a more detailed (Level 2) structure of scientific outline:

I. Introduction

- A. Attention-grabbing, “big picture” statement of issue
- B. Key previous results leading to state of the field
- C. Unaddressed problems
- D. Preview of key points of talk/paper

II. Procedures

- A. Experimental methods
- B. Theoretical methods
- C. Data processing
- D. Error analysis

III. Results

- A. Key results 1
- B. Key results 2
- C. Key results 3

Provides more details of internal organization of each section

How To Write an Outline

Example of an even more detailed (Level 3) structure of scientific outline:

I. Introduction

- A. Attention-grabbing, "big picture" statement of issue
  - i. Interesting diagram to show
  - ii. Interesting quote to give or reference to include
- B. Key previous results leading to state of the field
  - i. Specific papers that will be referenced
  - ii. Previous ideas that will be emphasized
- C. Unaddressed problems
- D. Preview of key points of talk/paper

II. Procedures

- A. Experimental methods
  - i. Experimental diagram to show
  - ii. Procedural flow chart #1
- B. Theoretical methods
- C. Data processing
  - i. Flow chart describing data analysis
- D. Error analysis

Provides specific details figures, quotes, references, sentences, etc. to support section

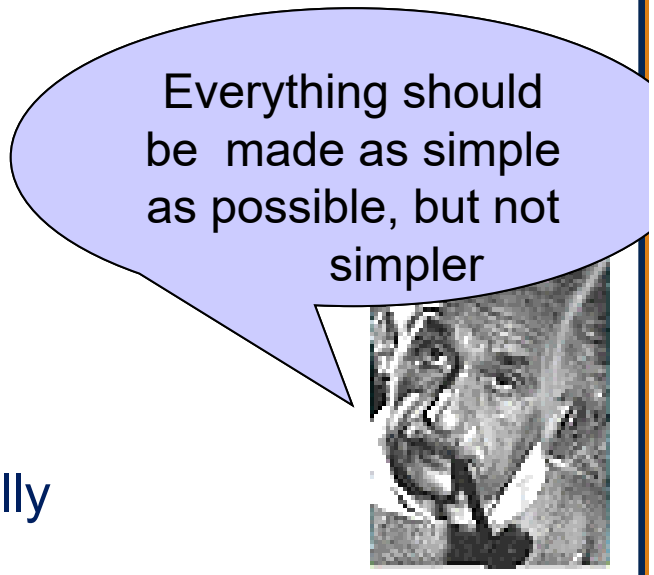
Benefits of an Outline

(1). Your talk or paper will be logically organized from the beginning

(2). It is less likely that there will be unnecessary information in your talk or paper

(3). Outlines allow you to break up your presentations and writing projects into more manageable sections that you can tackle individually

(4). You can use the same outline for presentations and papers of different lengths



More Tips: #4. Present One Key Idea Per Slide

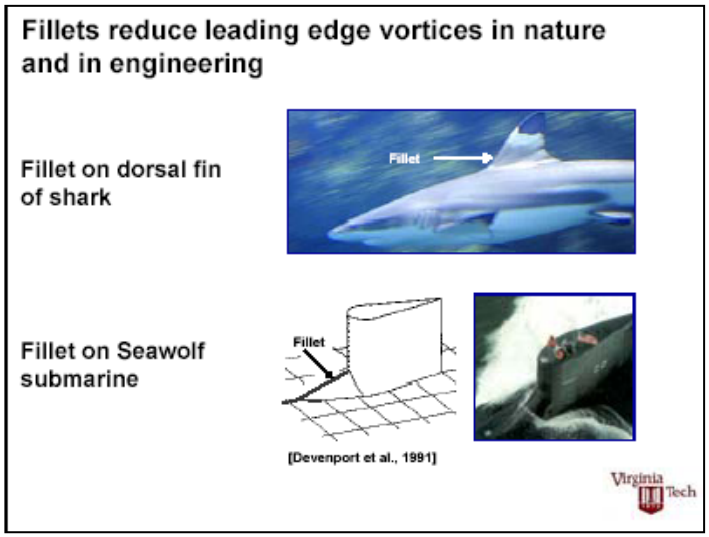
State the main idea of the slide in the slide heading.

For each slide you create, make sure you can identify the main point you want to make:

- If you find a slide that doesn't have a clear point, eliminate it!
- If you find a slide with more than one key point, separate into multiple slides.

Use the header to state the main idea of the slide

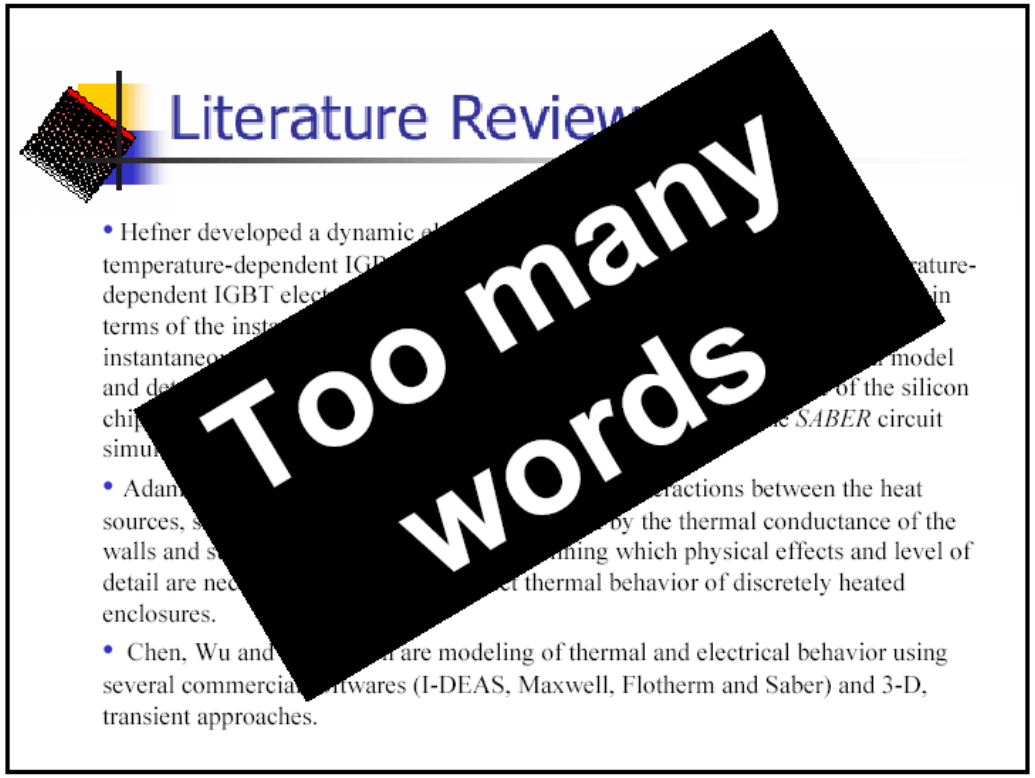
Use the body of the slide to support and provide evidence for the main idea



#5. Avoid Information Dense Slides

Write only key ideas succinctly on slides, avoid text heavy slides

Too much text….

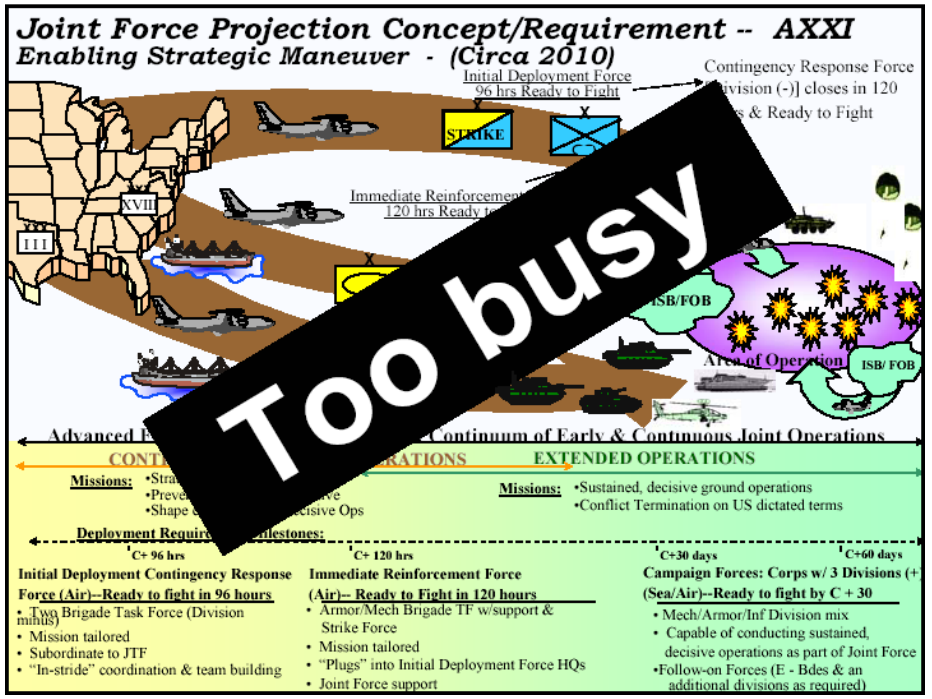


#5. Avoid Information Dense Slides

Write only key ideas succinctly on slides, avoid text heavy slides

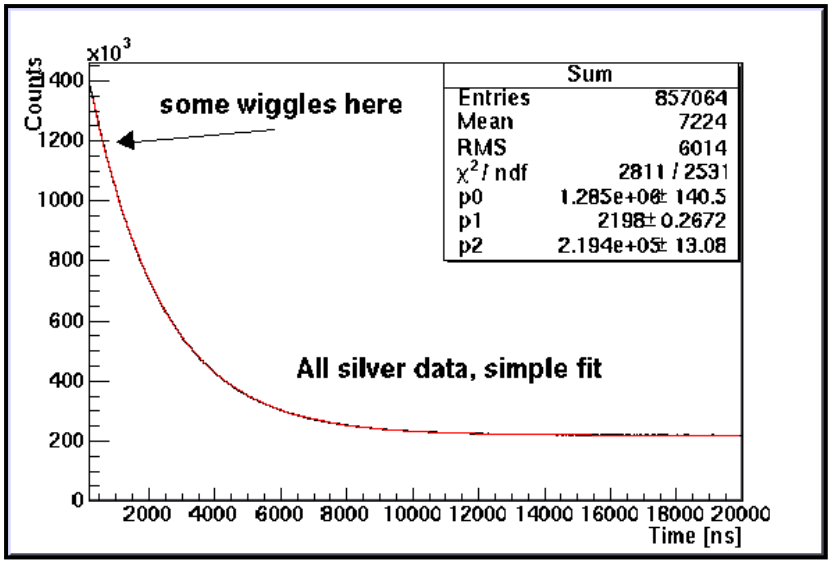
Don’t include overly busy images…include only information you plan for the audience to understand in the < 2 minutes the slide will be visible ⇨ **again, ideally one idea per slide.**

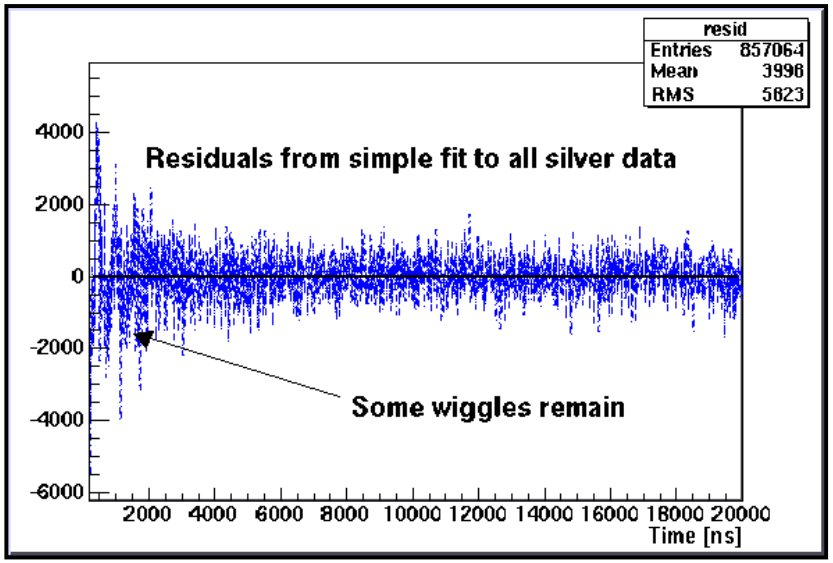
Too many distracting images



#5. Avoid Information Dense Slides

Include multiple figures on the same slide only if you want to compare them, otherwise, they may belong on different slides.

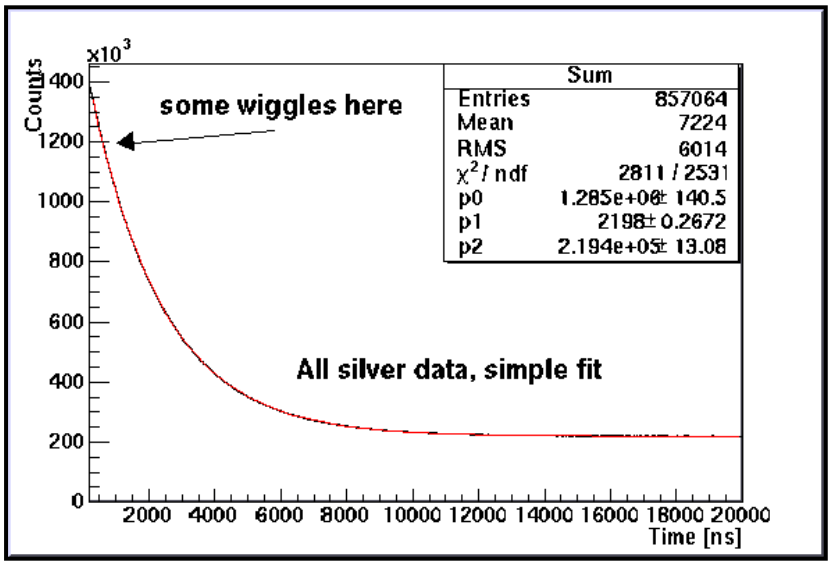


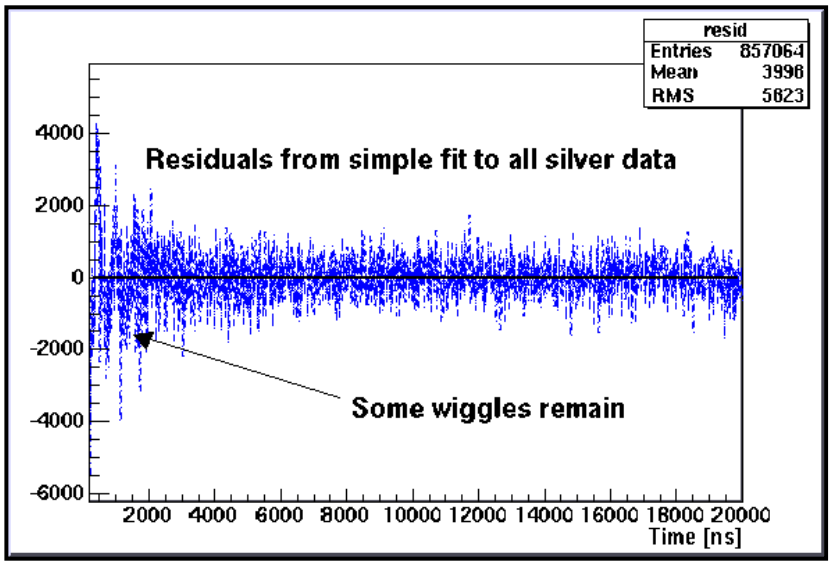


#5. Avoid Information Dense Slides

Include multiple figures on the same slide only if you want to compare them, otherwise, they may belong on different slides.

If you must include multiple figures/images on the same slide, use animation to bring in information one piece at a time to help audience focus on part of slide you're describing





#6. Provide Appropriate Information for Figures

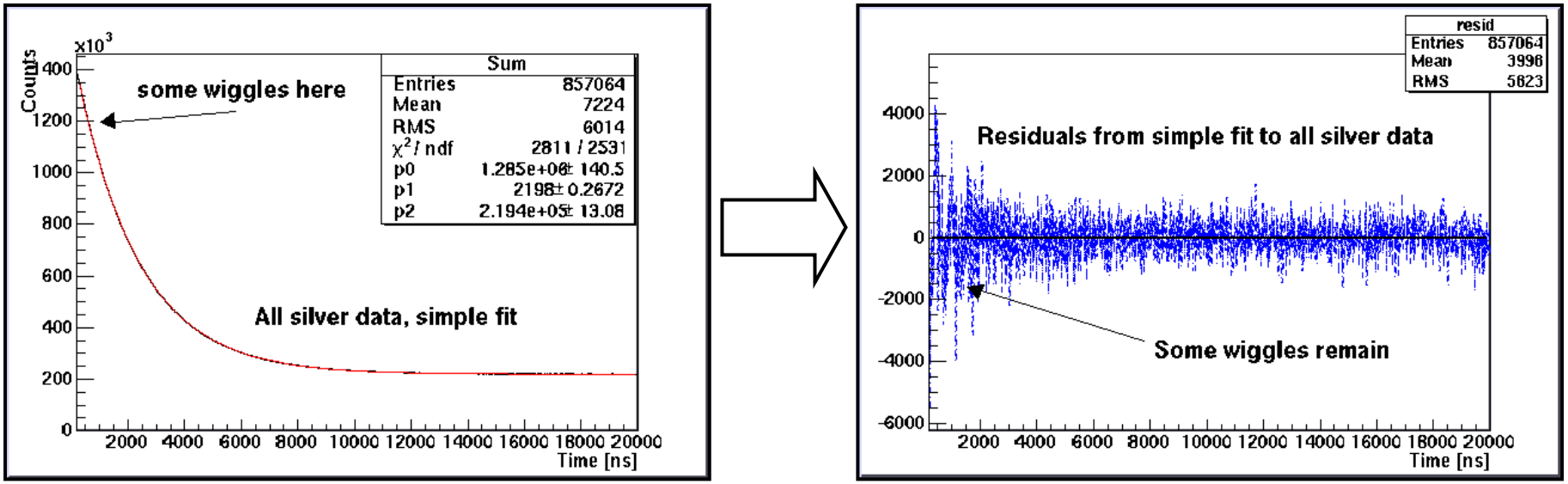
Avoid copying a graph from a formal article – they have a different style, e.g., labels are generally too small

Use color and make lines thick, labels legible

Label axes and highlight important features with arrows

Use tables sparingly – if used, highlight important parts

Remove unnecessary information from graphs/figures



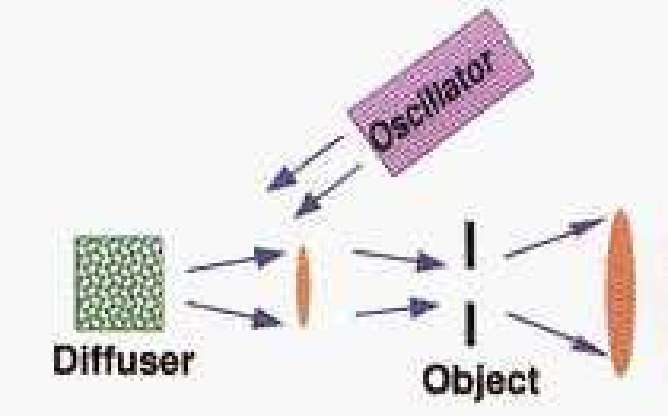
#6. Provide Appropriate Information for Figures

Use arrows and labels to point out important features

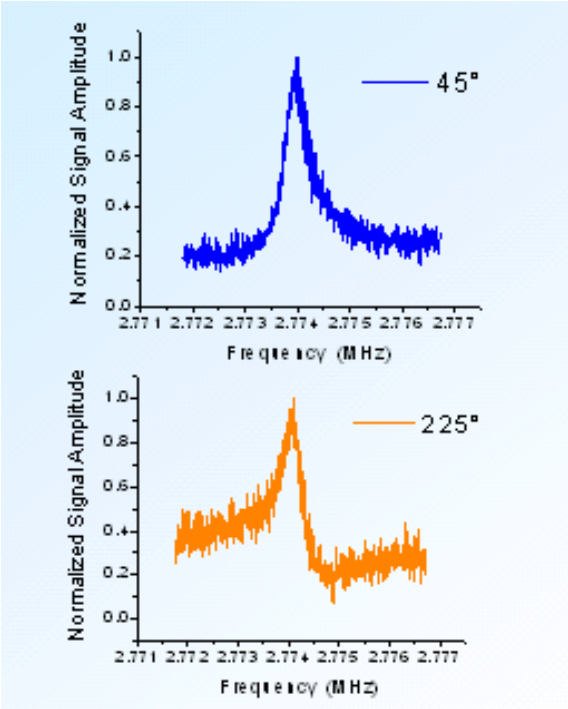
Label both axes of graphs and show units

Provide a brief caption

Give credit to source



The Nike laser system uses discharge pre-amplifiers.
(*Courtesy US Navy*)



Sample normalized signals from the two-beam optical drive.
(*Courtesy C. Michael*)

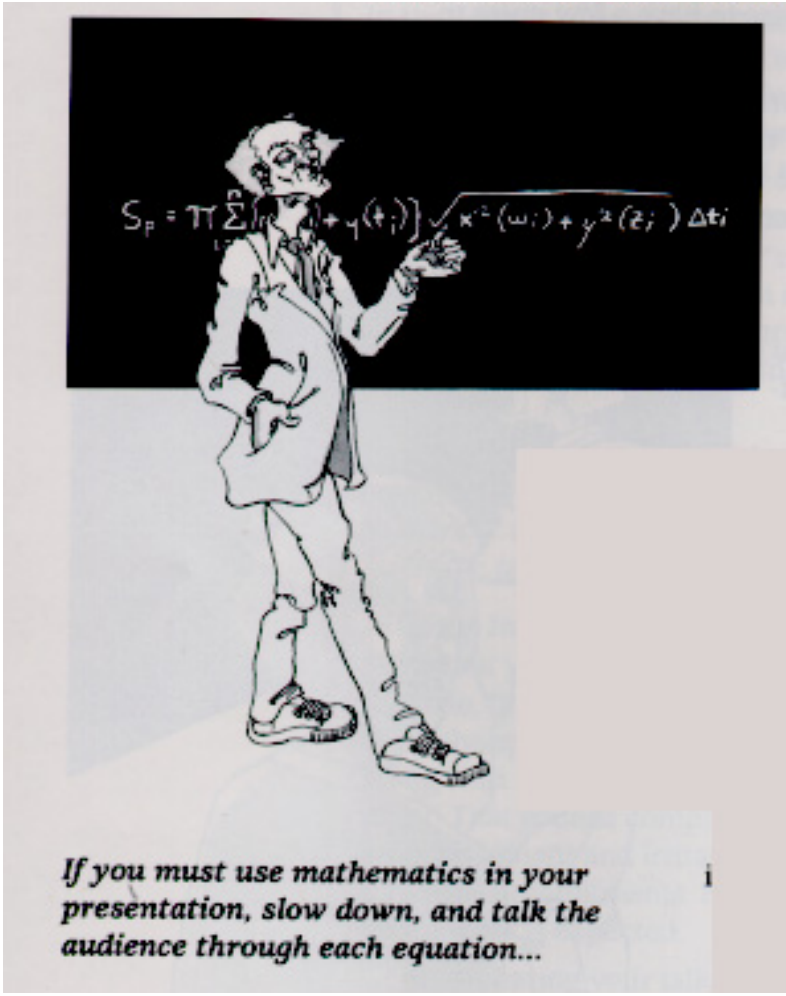
#7. Emphasize the Physics When Showing Equations

Define parameters used

Provide physical explanations of different terms in equation

Provide an intuitive explanation of what the equation means

Combine the equation with a picture that illustrates the physical principle involved



#8. Avoid Distracting Text, Colors, and Effects

Your goal is to convey your ideas, so avoid distracting text and effects!

Don’t overuse PowerPoint animations and sounds!

Make sure there is good contrast between text and background

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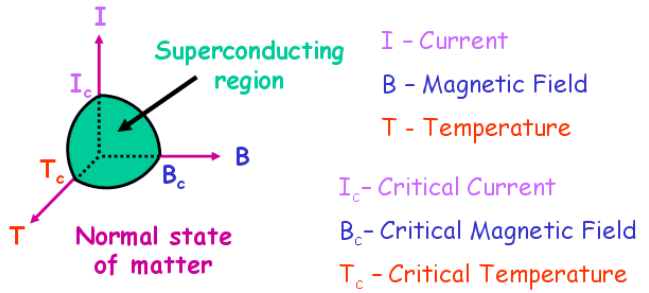
Superconductivity is an electronic state of matter that exists below certain currents, magnetic fields, and temperatures.



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Avoid red/green and
red/blue color combinations

Strive for easy reading

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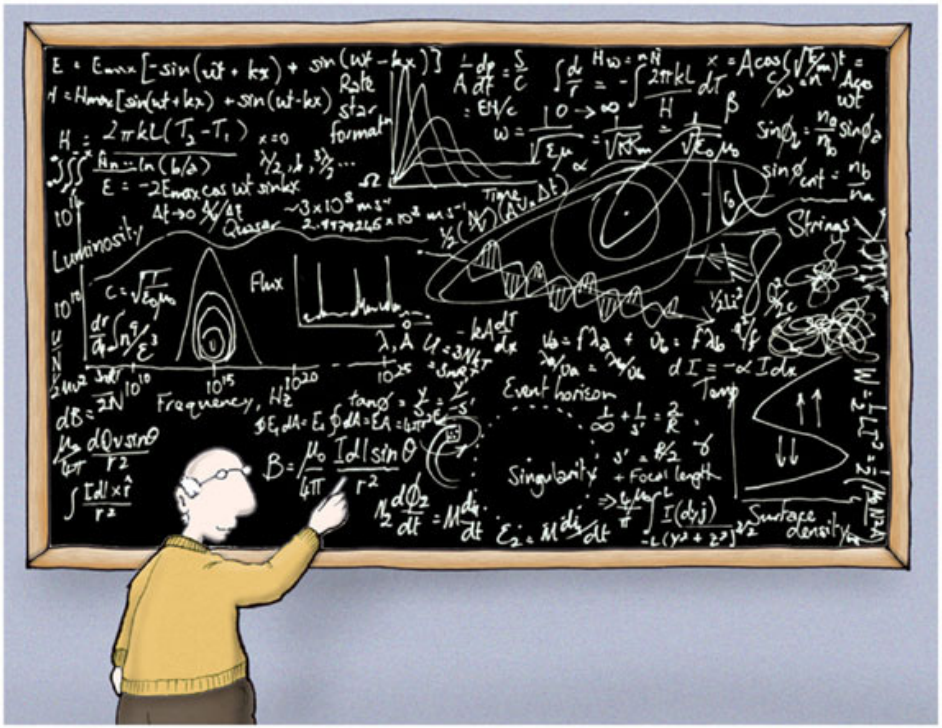
#9. Keep the Audience Engaged

Face and maintain eye contact with the audience

Don’t read your talk!

Be enthusiastic!

- If you’re not excited by your results, don’t expect the audience to be!



Astrophysics made simple

#10. Try to Minimize Distractions While Presenting

Avoid nervous mannerisms

- e.g., pacing, bobbing, waving arms, jingling coins

Use a laser pointer or stick directed at screen to point

- Don't use your hand to point to the screen…you're blocking the screen
- Don't wave the laser spot around on the screen

Train yourself to speak slowly and distinctly—practice!

Try to minimize "filler words"

- e.g., "uh", "like", "um", "okay"