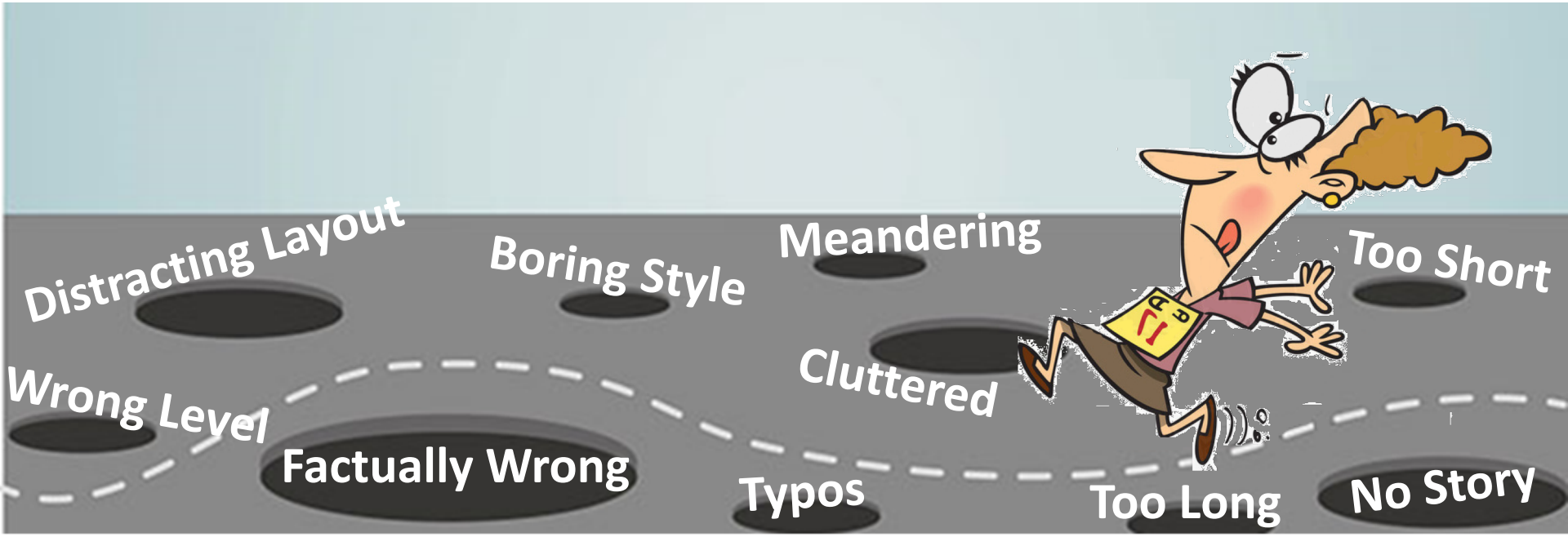
Advice on Scientific Presentations

Based on a presentation by

Prof. Zach Meisel

**see the course webpage for this and other advice on scientific presentations*

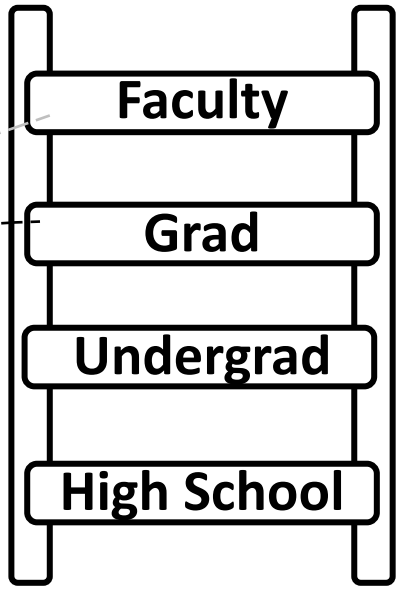
There is no *right way* to give a presentation …but there are plenty of wrong ones

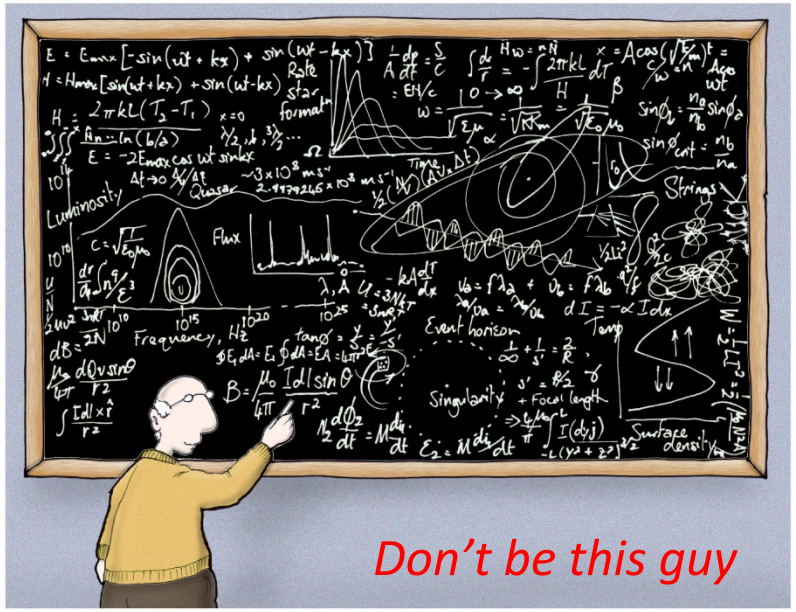


Before you start, decide on your story

Deliver the highlights.
No one cares about most of the details.

Decide who will make-up the audience, then go one level down





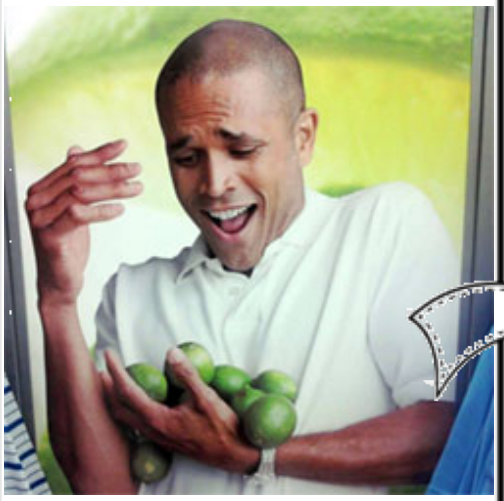
Tell your story with key figures

Name _____ Date _____

Title: Author:

Beginning

Problem:



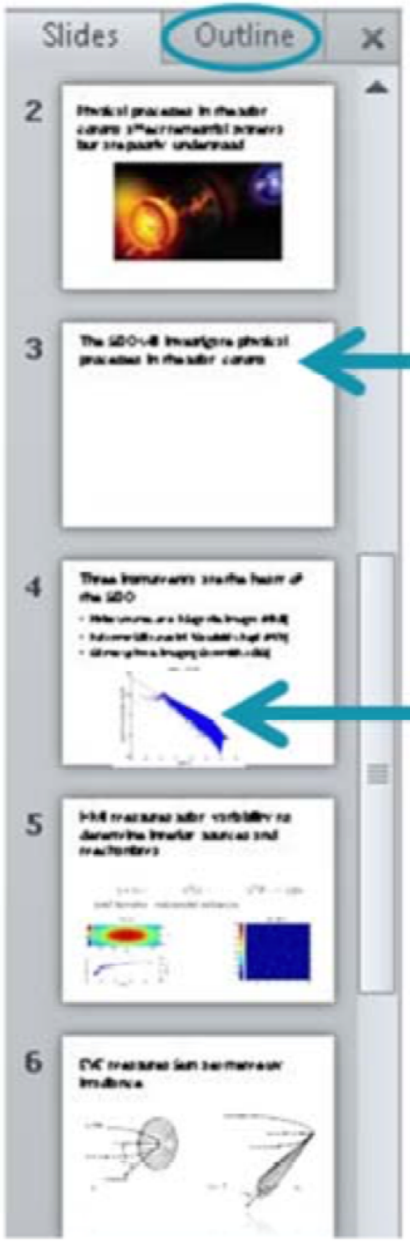
Middle

Method to Solve Problem:

End

Results:

RETELLING STORY MAP



Write out your main ideas in full sentences

The sentences become slide titles—one main idea per slide

Use the rest of the slide to explain and support the statement at the top of the slide

Tip: Read the sentences one after the other. Do they form a logical narrative?

http://people.physics.illinois.edu/Celia/PPT-Tips.pdf

PHYS3701 grading scheme is here to help you out with telling a story

A: Opening statement
A1: The topic/purpose of the study is presented.
A2: The significance of YOUR result is stated.
B: Physical principle
B1: The physical law under study is correctly explained.
B2: The relationship between the physical law and your measurement is explained.
B3: Relevant equations are correctly explained.
C: Experimental methods
C1: The apparatus is correctly described.
C2: Sufficient details are given to understand how the measurements were made.
C3: Range of ALL relevant quantities are stated and correct.
C3: Precision of ALL relevant quantities are stated and correct.
D: Data and analysis
D1: Relevant data/results are presented in an appropriate format (table, plot, etc..).
D2: The analysis is correctly carried out and well reasoned.
D3: The error analysis is correctly carried out and well reasoned.
D4: The results on each goal are achieved.
E: Discussion and conclusion
E1: Results are quoted with proper precision, significant figures, and units.
E2: The interpretation of the results is correct, data driven and evidence based.
E3: The conclusion is clear and a concise summation of important points.
F: Presentation skills
F1: Slides are free of spelling and grammar mistakes and easily readable.
F2: The speech is of good quality (volume, rate, varied tone, distracting filler).
F3: The presentation respects timing and slides instructions.
F4: Appropriate math symbols are used in equation and results.
F5: The date of your experiment and the name of your partner(s) are listed.

A few tips

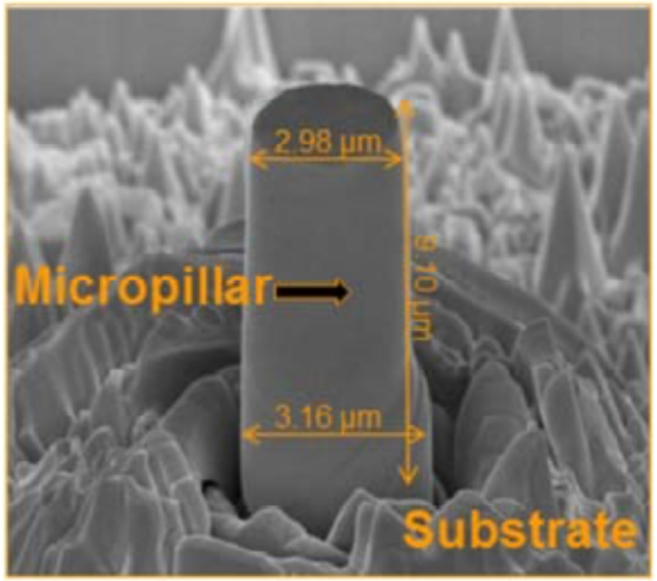
Label all elements in a figure

Point out important features

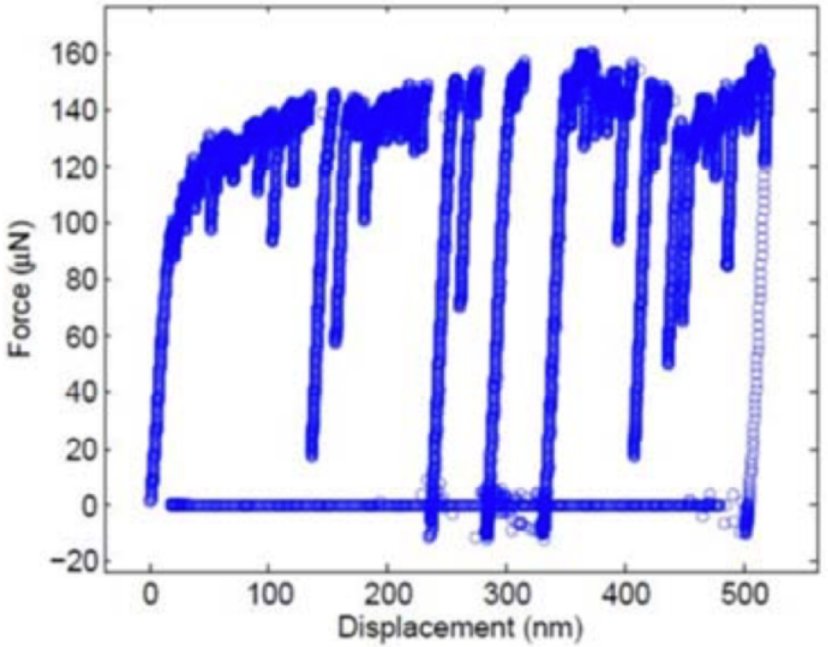
Label both axes of graphs and show units

Provide a scale

Give credit



SEM image of gold micropillars
(*Courtesy M. Wraith*)



Displacement controlled compression of the micropillars
(*Courtesy M. Wraith*)

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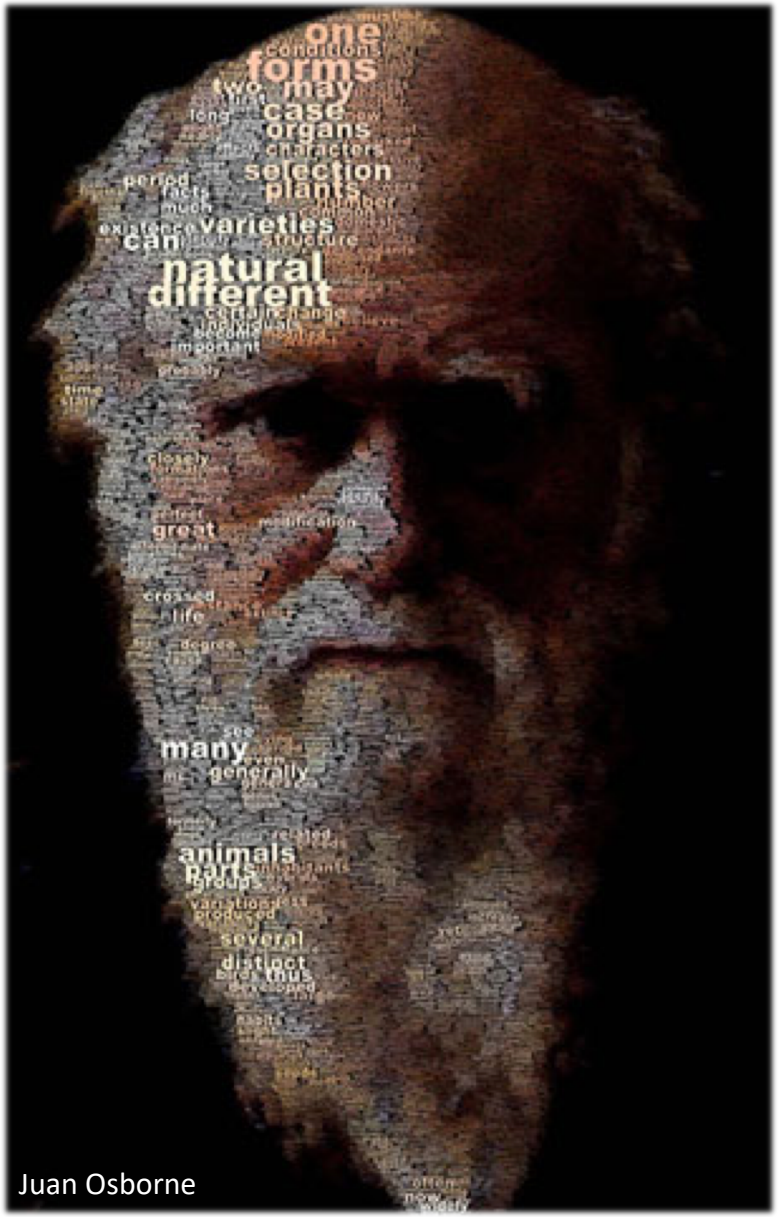
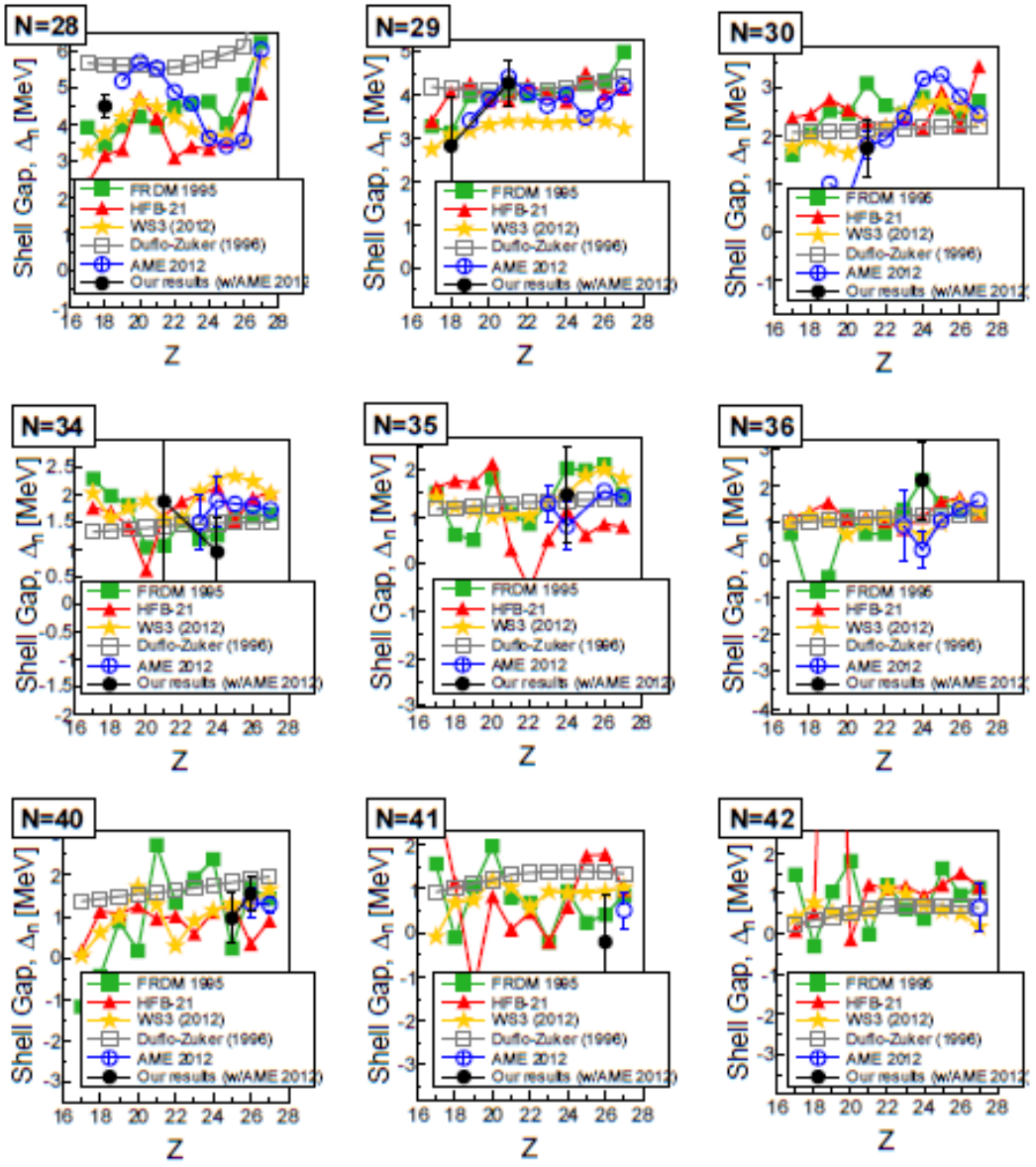
Do not use walls of text

- This portion of the slide is worse than useless.
- It isn't possible for you to simultaneously read this and listen to me and to understand both.
  So I'm either wasting my time talking to you or wasting my time typing this.
- As a speaker I will likely fall into the trap of reading this text to you, simultaneously boring you and me, likely disengaging both of our brains.
- On top of all of that, this wall of text is completely hideous.
- The only **Acceptable Use of Bullets** contains:
  - **Key facts/figures**
  - **Short, notable names/phrases**



Juan Osborne

Overly complex figures are useless too



…as are large tables (use a graph instead!)

Isotope	This experiment	AME2012	FRDM	HFB-21	DZ	WS3
^{48}Ar†	-22 280(310)	–	-21 240	-21 900	-21 889	-22 044
^{49}Ar†	-17 800(1100)	–	-14 880	-16 110	-15 648	-16 406
^{52}Sc	-40 300(520)	-40 167(142)	-39 360	-40 110	-39 241	-40 400
^{53}Sc	-38 170(570)	-38 107(270)	-36 840	-38 480	-37 148	-38 861
^{54}Sc	-33 750(630)	-33 599(363)	-32 030	-33 980	-32 623	-34 139
^{55}Sc	-30 520(580)	-29 977(463)	-29 170	-31 320	-29 597	-30 758
^{56}Sc†	$-24\ 850(590)^{+0}_{-540}$	–	-23 840	-25 230	-24 425	-25 146
^{57}Sc†	-21 000(1300)	–	-20 440	-22 550	-20 627	-21 115
^{59}Cr	-48 540(440)	-47 891(244)	-48 680	-49 160	-48 013	-48 451
^{60}Cr	-47 440(460)	-46 504(213)	-47 910	-48 200	-46 732	-46 779
^{61}Cr	-43 080(510)	-42 455(129)	-42 700	-43 710	-42 534	-42 461
^{62}Cr	-40 890(490)	-40 895(148)	-41 180	-41 960	-40 630	-40 445
^{63}Cr	-35 940(430)	-35 722(459)	-36 030	-37 290	-35 962	-35 773
^{64}Cr†	-33 480(440)	–	-34 950	-34 730	-33 545	-33 347
^{67}Mn†	-34 090(620)	–	-34 480	-34 960	-33 141	-33 294
^{67}Fe	-45 190(430)	-46 069(218)	-46 530	-46 940	-45 991	-45 577
^{68}Fe	-43 620(430)	-43 825(365)	-45 360	-45 170	-43 853	-43 665
^{69}Fe†	-39 350(600)	–	-40 230	-40 390	-39 156	-39 380

…and excessive equations (unless schematically broken-down)

Not OK

$$\varphi = \tan^{-1}\left[\frac{c\omega}{k - m\omega^2}\right] - \varphi_d$$

$$A = \frac{F_0 / m}{\sqrt{\left[\omega_0^2 - \omega^2\right]^2 + 4\gamma^2\omega^2}}$$

$$\gamma = \frac{c}{2m}$$

$$x(t) = A_h e^{-\gamma t}\sin(\omega' t + \varphi_h) + A\cos(\omega t - \varphi)$$

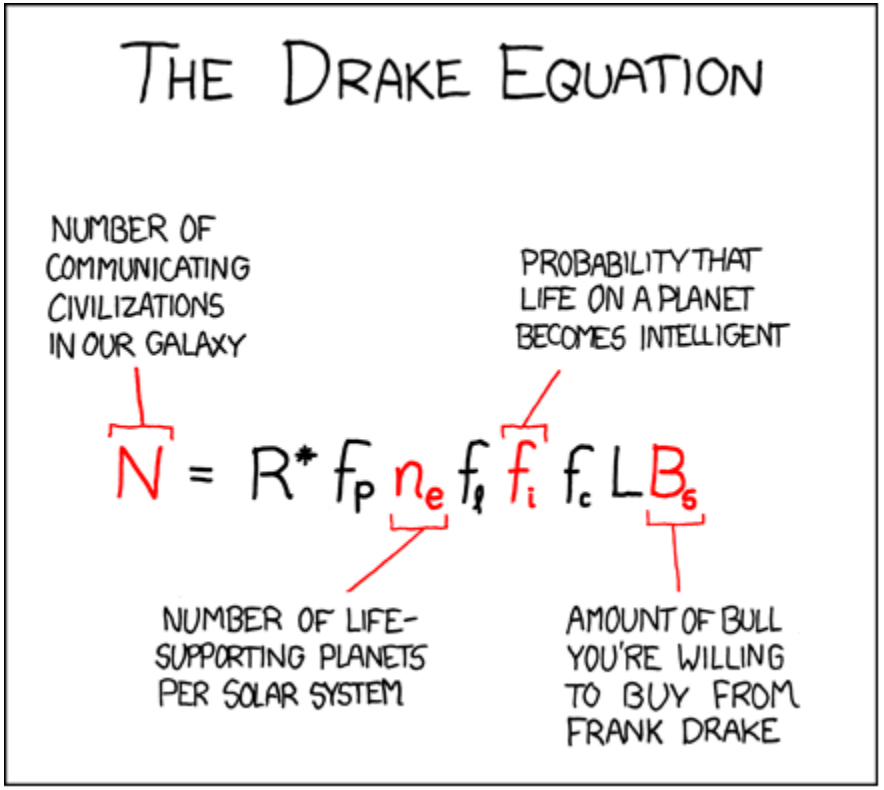
$$A_h = \frac{x_0 - A\cos\varphi}{\sin\varphi_h}$$

$$\omega' = \sqrt{\omega_0^2 - \gamma^2}$$

$$\omega_0 = \sqrt{\frac{k}{m}}$$

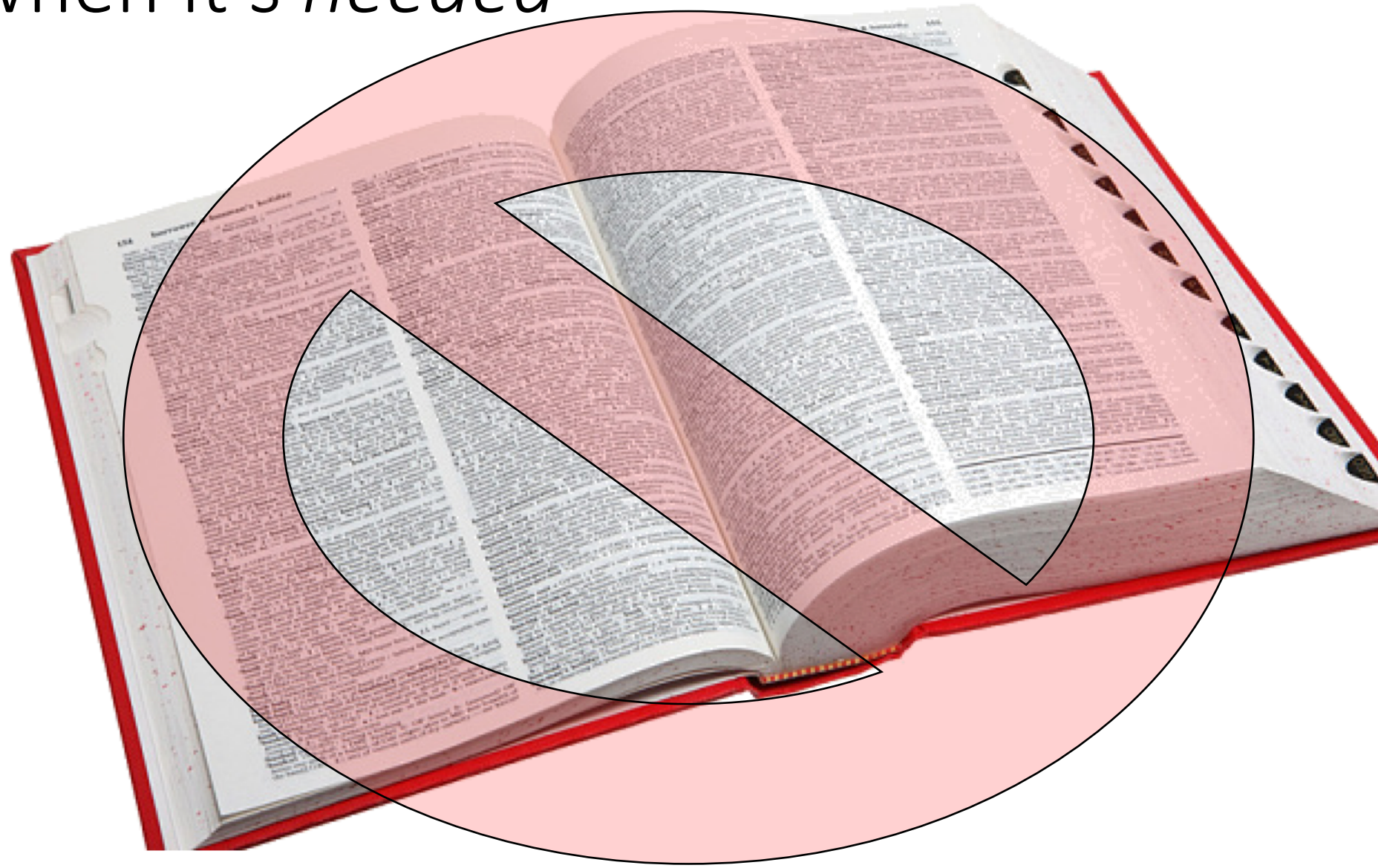
$$\varphi_h = \tan^{-1}\left[\frac{\omega'(x_0 - A\cos\varphi)}{v_0 + \gamma(x_0 - A\cos\varphi) - A\omega\sin\varphi}\right]$$

OK



**only absolutely essential equations should be shown*

Present relevant information (variables, references) when it's *needed*



Choose a neutral background and a high-contrast color for the text

Use a light-colored background with dark text

Use a dark background with light text

This isn't high-enough contrast

Neither is this

Don't ever put red on blue

Or blue on red

And avoid using gradient fills, too

http://people.physics.illinois.edu/Celia/PPT-Tips.pdf

Don't use photographic or "fill" backgrounds

They're distracting to the audience

They make your text too hard to read

Even if it's about hydrophobic materials

Even if you think it looks really cool

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Finish On Time!

End with a bang, not a whimper

Put up a "summary" slide, reiterate your two or three important points, thank the audience for their attention, and ask for questions

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