HOKKAIDO UNIVERSITY

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Author(s)	Greve, Ralf
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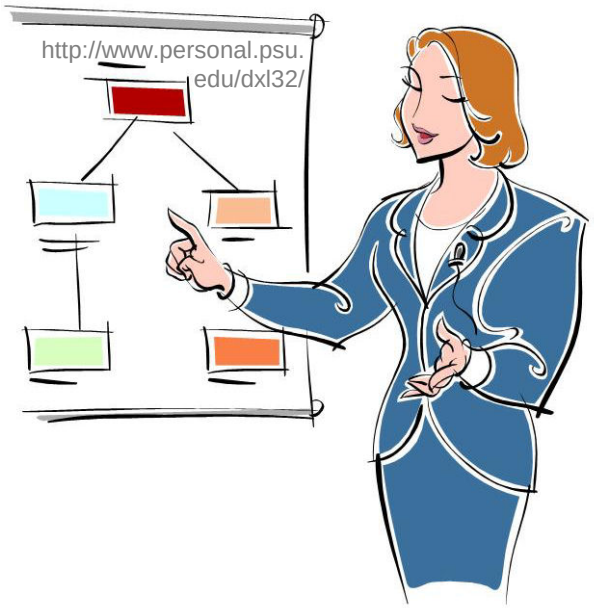
How to Give a Great Scientific Presentation



Ralf Greve

Institute of Low Temperature Science, Hokkaido University, Sapporo, Japan

Literature

- These slides.
- Robert R. H. Anholt:
  Dazzle 'em with Style: The Art of Oral Scientific Presentation.
  Academic Press, 2nd edition 2005, ISBN 978-0123694522.
- Michael Alley: *The Craft of Scientific Presentations.*
  Springer, 2nd edition 2013, ISBN: 978-1441982780.

Acknowledgement

Some material for this talk was taken from

Samuel B. Silverstein: *The Art of Scientific Presentation.*
(Formerly available at http://www.physto.se/~silver/.)

Why bother?

~~"In scientific presentations it only matters what~~
~~you say, not how you say it."~~

Delivery, not content, often makes the lasting impression!

"Dazzle 'em with style"

Bad presentations can have fatal consequences

Original whistleblowing slide by Morton Thiokol engineers failed to convey the message

HISTORY OF O-RING DAMAGE ON SRM FIELD JOINTS

		Cross Sectional View			Top View		
	SRM No.	Erosion Depth (in.)	Perimeter Affected (deg)	Nominal Dia. (in.)	Length of Max Erosion (in.)	Total Heat Affected Length (in.)	Clocking Location (deg)
61A LH Center Field**	22A	None	None	0.280	None	None	36° - 66°
61A LH CENTER FIELD**	22A	NONE	NONE	0.280	NONE	NONE	338° - 18°
51C LH Forward Field**	15A	0.010	154.0	0.280	4.25	5.25	163
51C RH Center Field (prim)***	15B	0.038	130.0	0.280	12.50	58.75	354
51C RH Center Field (sec)***	15B	None	45.0	0.280	None	29.50	354
410 RH Forward Field	13B	0.028	110.0	0.280	3.00	None	275
41C LH Aft Field*	11A	None	None	0.280	None	None	--
410 LH Forward Field	10A	0.040	217.0	0.280	3.00	14.50	351
STS-2 RH Aft Field	28	0.053	116.0	0.280	--	--	50

*Hot gas path detected in putty. Indication of heat on O-ring, but no damage.
**Soot behind primary O-ring.
***Soot behind primary O-ring, heat affected secondary O-ring.

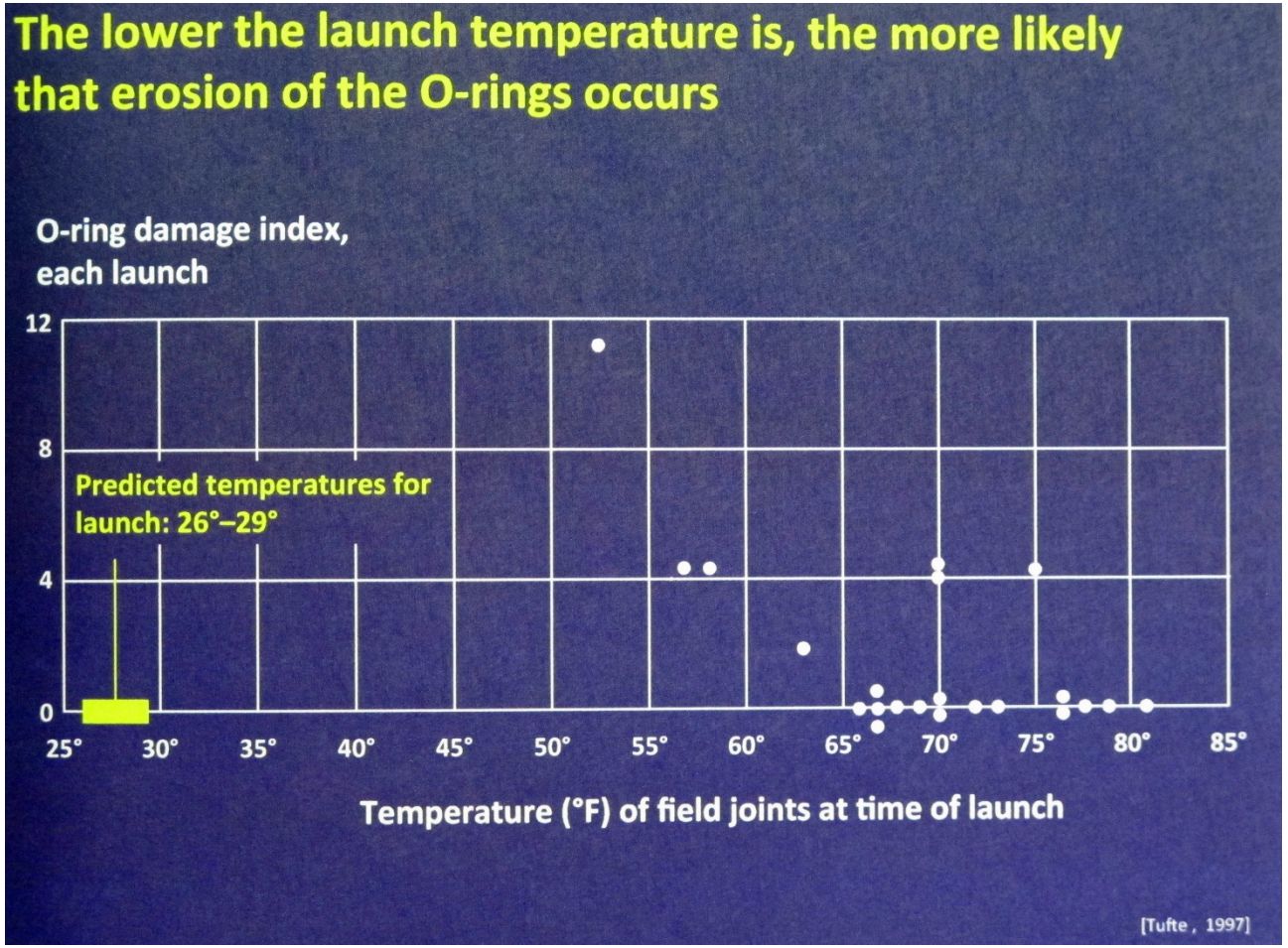
Clocking rotation of leak check port - 0 deg.

OTHER SRM-15 FIELD JOINTS HAD NO BLOWHOLES IN PUTTY AND NO SOOT HEAR OR BEYOND THE PRIMARY O-RING

SRM-22 FORWARD FIELD JOINT HAD PUTTY PATH TO PRIMARY O-RING, BUT NO O-RING EROSION AND NO SOOT BLOWBY. OTHER SRM-22 FIELD JOINTS HAD NO BLOWHOLES IN PUTTY.

(Alley 2013)

A stronger slide may have convinced NASA to call off the launch

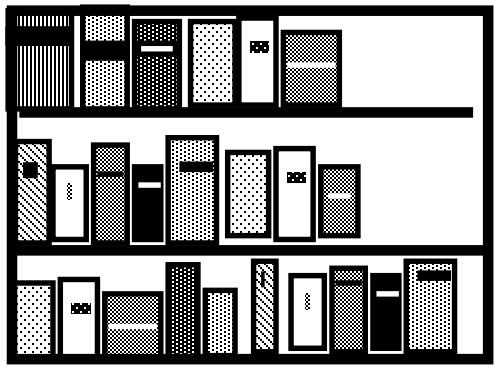


(Alley 2013)

Presentations differ from papers in some very fundamental ways

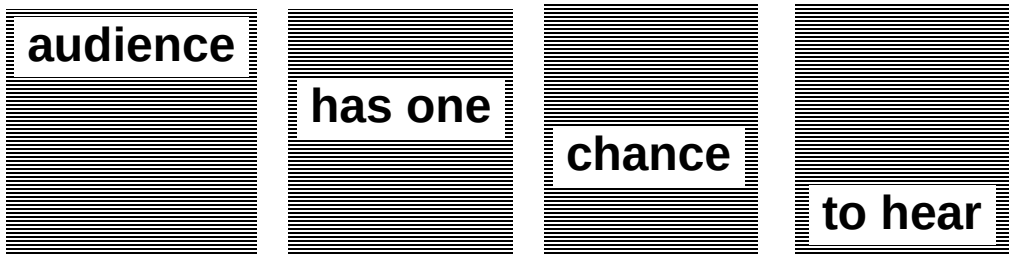
Paper (or thesis):

Reader sets own pace.
Can skip around in text.
Can look up references.



Presentation:

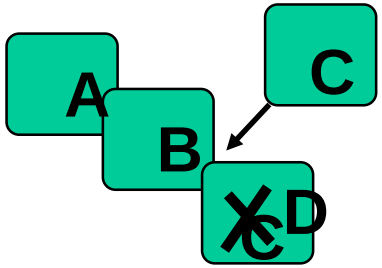
Audience has limited attention span.
Can't re-read text.

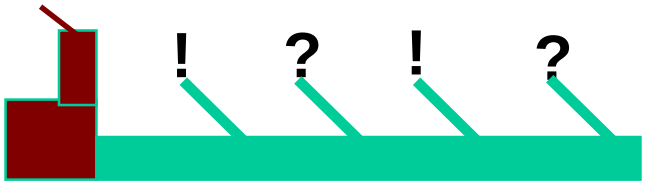


Presentations have some advantages

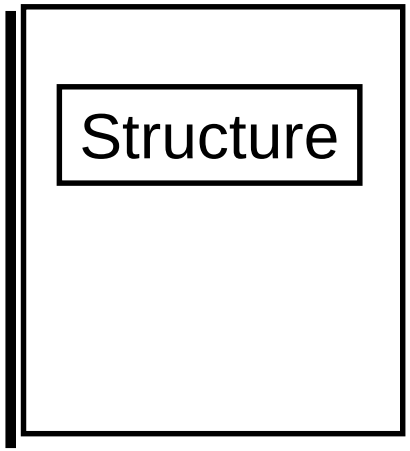
Use **sights** and **sounds** to bring work to life!

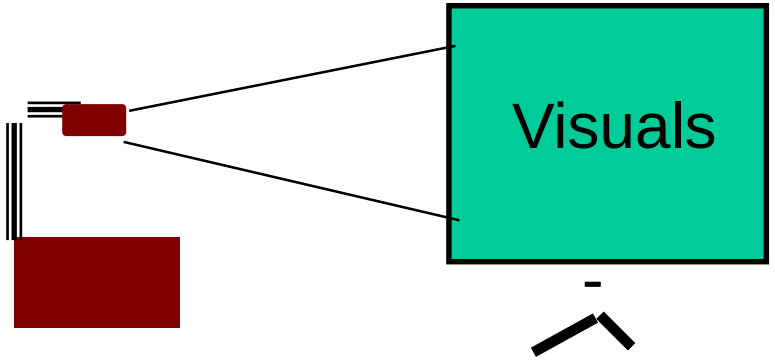
Instantaneous **feedback**.
Can **adjust** presentation.

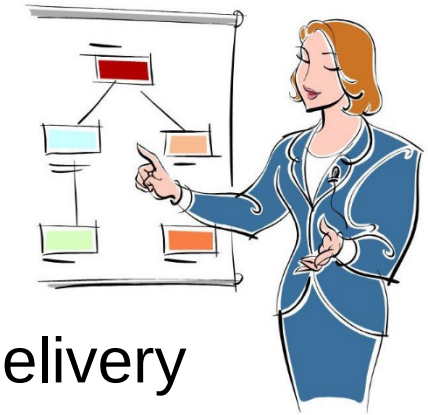




An effective presentation depends on three important aspects of style







Delivery

Structure
Credit: www.spconsult.biz

What is the message?

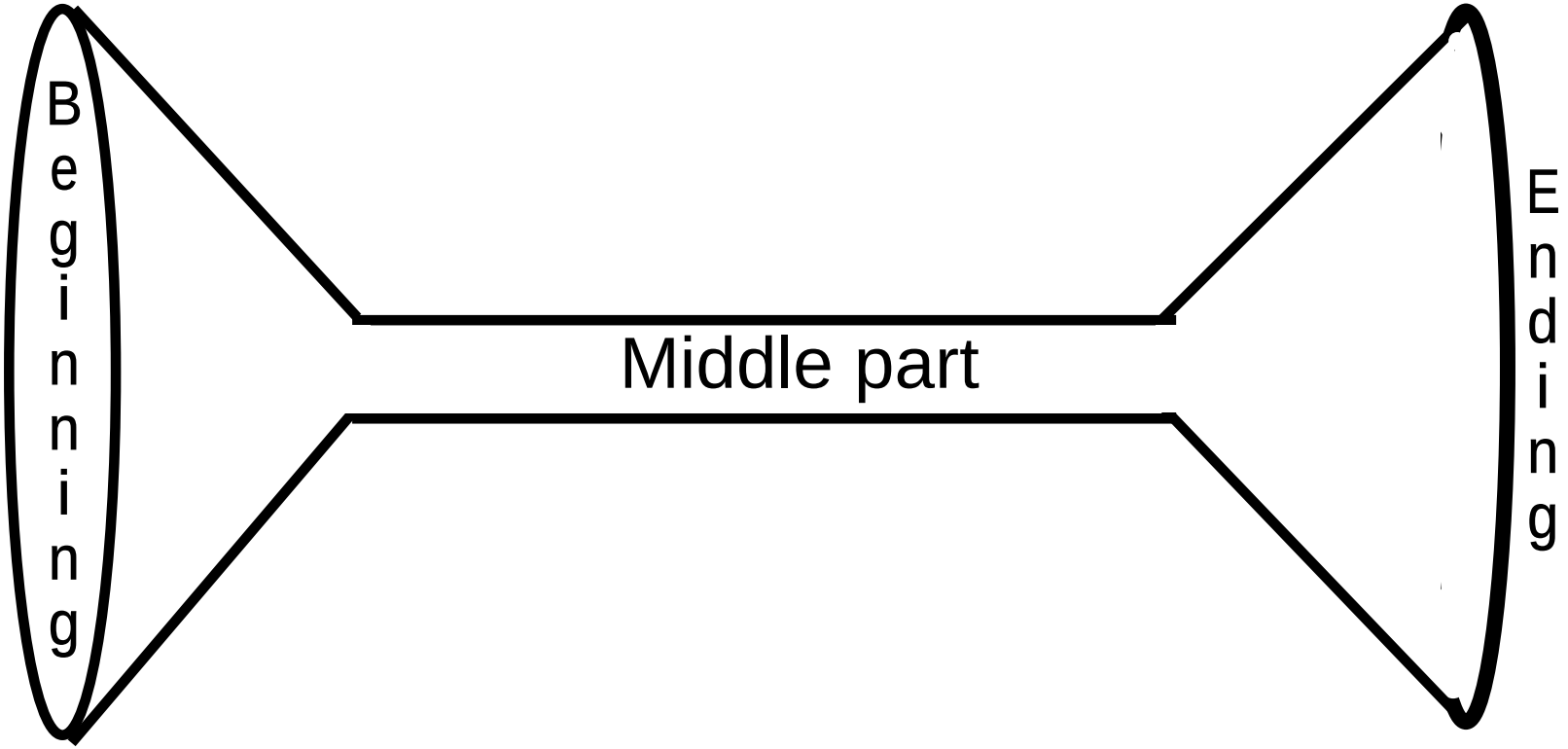
It is not possible to put every detail of your work during the last year(s) in a 20-minute presentation.

Therefore:

- Set clear priorities.
  What are the ***really important*** results?
- How can the work be ***described***
  (instead of being explained in every detail)?
- Which ***background information*** must be given in order to make it understandable?

Presentations should have a clear structure

Concise title



Title: Information in a nutshell

Brief and accurate summary of the content of the presentation.

Concise and general enough to be interesting and appealing to a large audience.

Not so general that it loses any meaning.

Good and bad titles…

Bad (too general): (unless the presentation will be merely a general overview of the topic)

"The Antarctic ice sheet and climate change."

Good (informative, concise):

"Modelling volume changes of the Antarctic ice sheet during the 21st century in response to global warming."

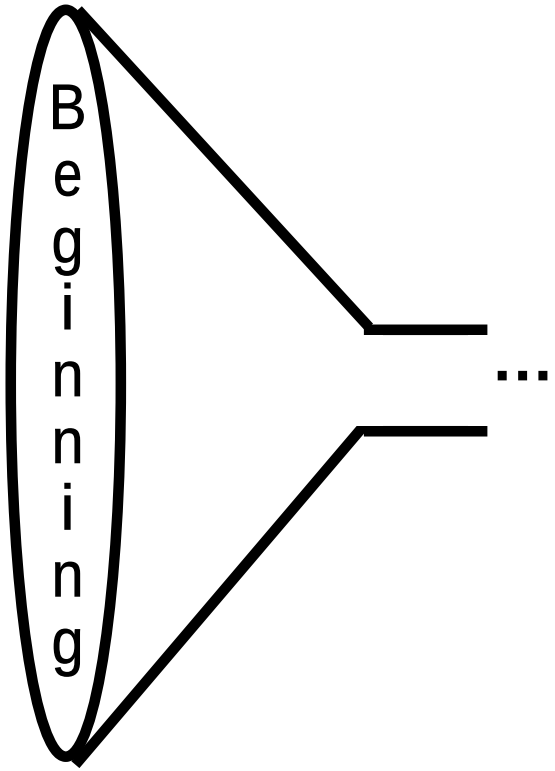
Bad (too specific, too long):

"Modelling the dynamic and thermodynamic response of the Antarctic ice sheet from 1990 until 2100 in response to the IS92 greenhouse-gas-emission scenarios of the Intergovernmental Panel on Climate Change."

Beginning: Collect the audience, prepare it for the work you are presenting

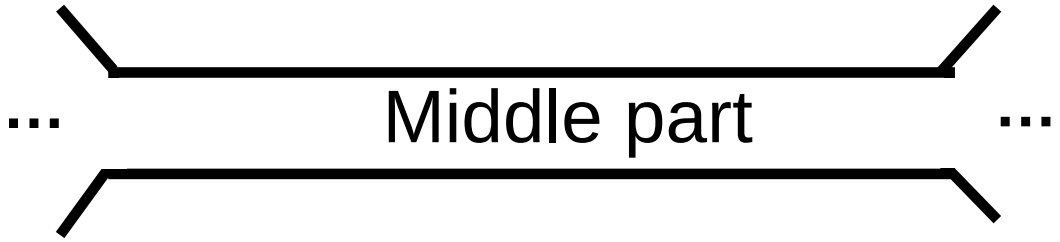
Zooming in:

- Wider context of the work.
- Importance.
- Background information.
- Perhaps historical perspective.



Middle part: The core of the presentation

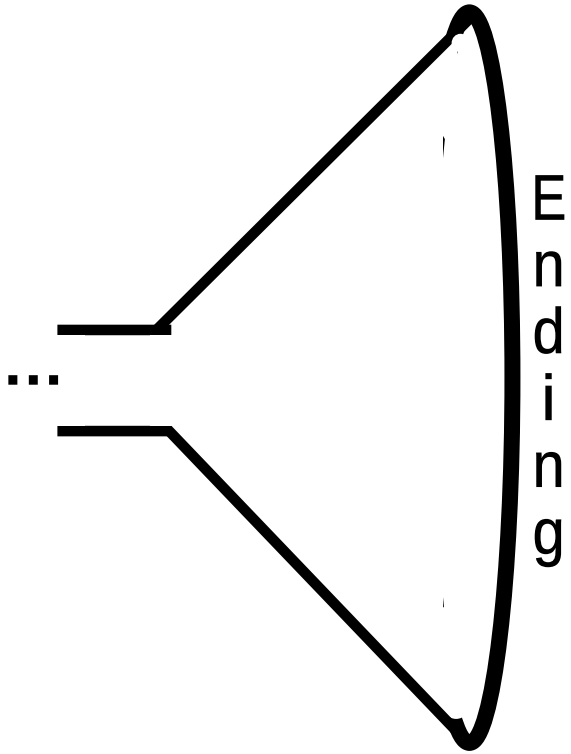
- Main part (e.g., methods, results, discussion).
- Requires ~ 2/3 – 3/4 of the available time.



Tell a story

- Logical unfolding of information.
- Smooth transitions between different points.

Ending: Release the audience, provide a take-away message

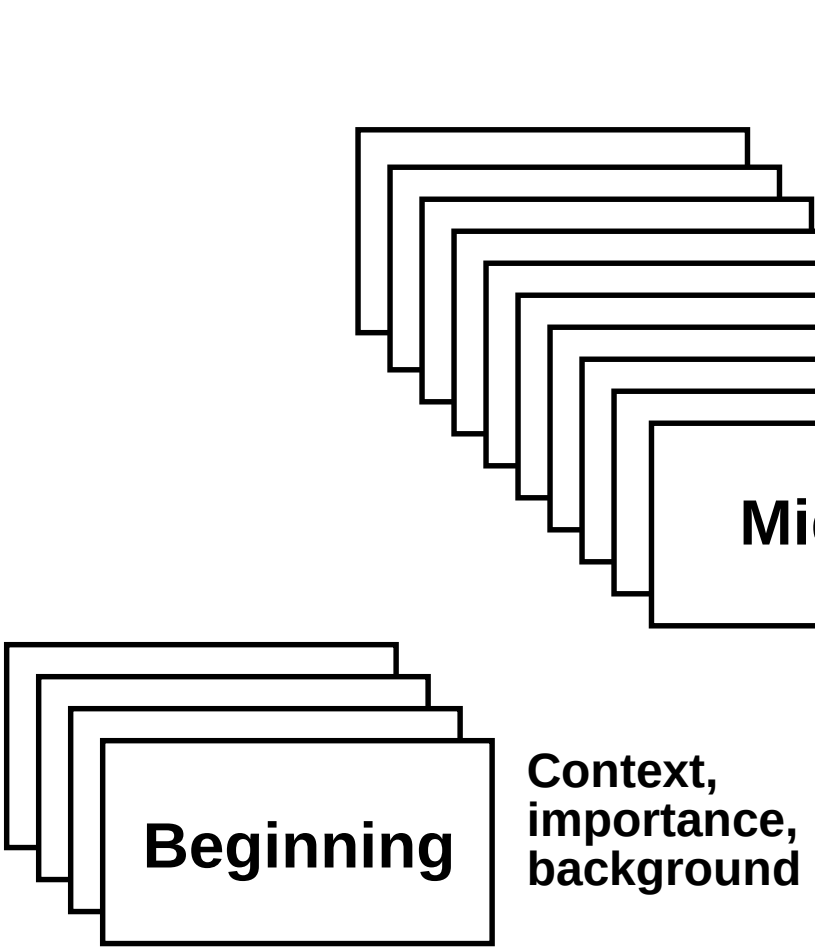


Zooming out:

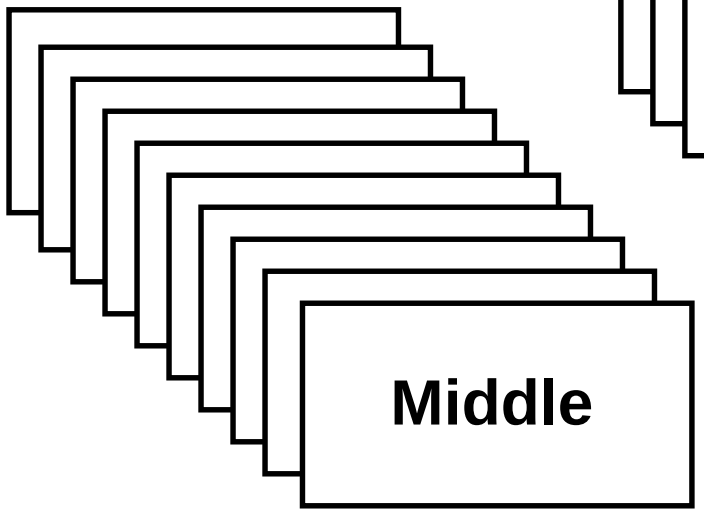
- Clearly formulated, concise conclusion.
- Summary of main results.
- Placement in the “big picture”.
- Perhaps future perspective.

Credit: www.centerforvisualmusic.org

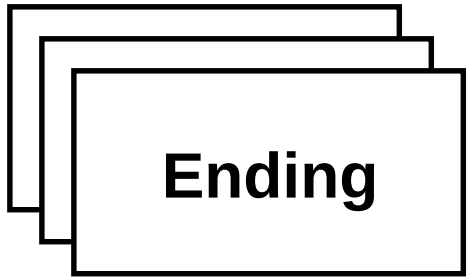
Visuals reflect the structure of the presentation



Context, importance, background



Logical order, transitions



Summary, outlook

1 visual =
~ 1 to 1.5 minutes

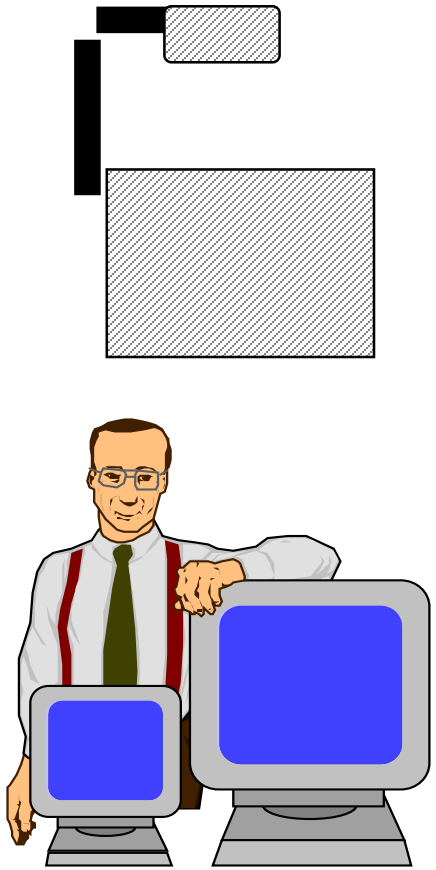
Visuals serve the presentation in several ways

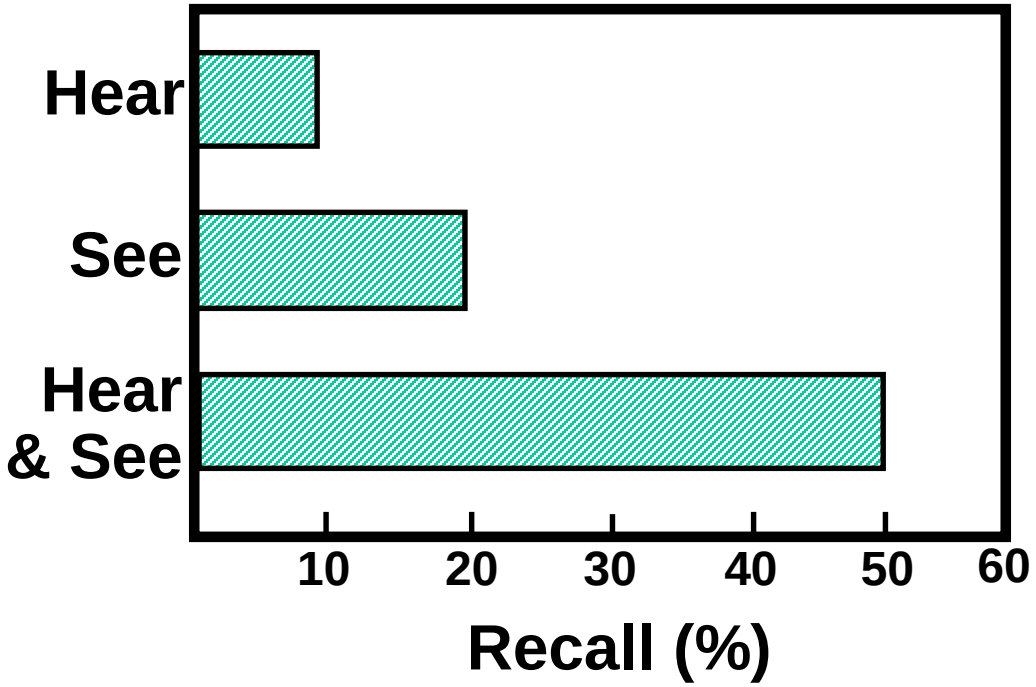
Notes for audience during presentation

Notes for audience after presentation (handouts)

Notes for speaker before and during presentation

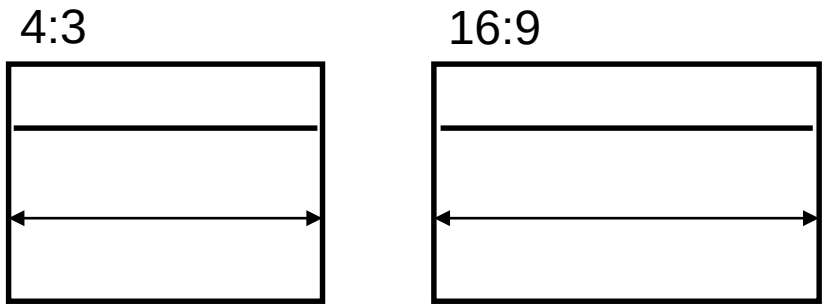
Well-designed visuals help the audience remember more of your presentation





You must make certain decisions when designing visuals

What format?



What information?

Headline/body format orients the audience

Headline

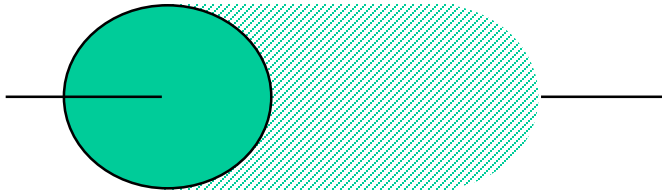
Use a headline that concisely states the idea of the visual

Body

Body supports with words

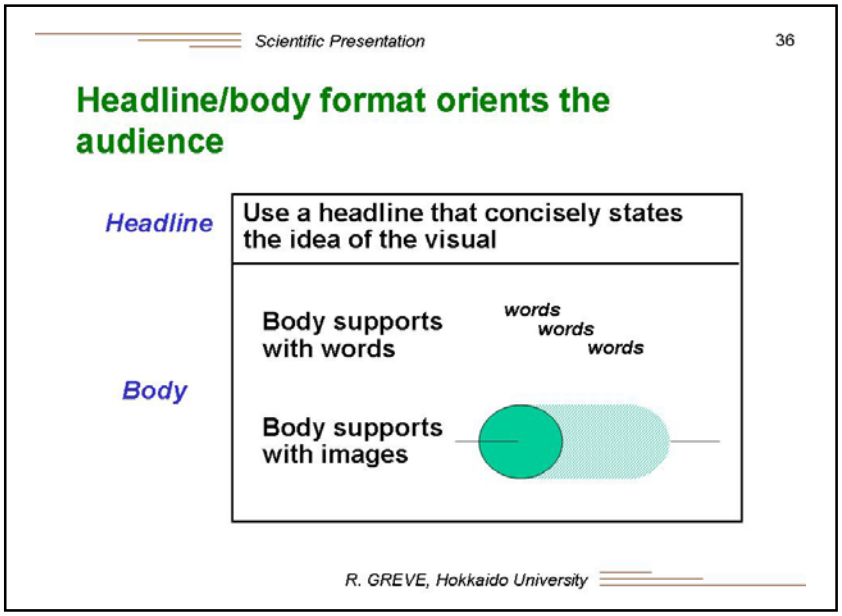
words
words
words

Body supports with images

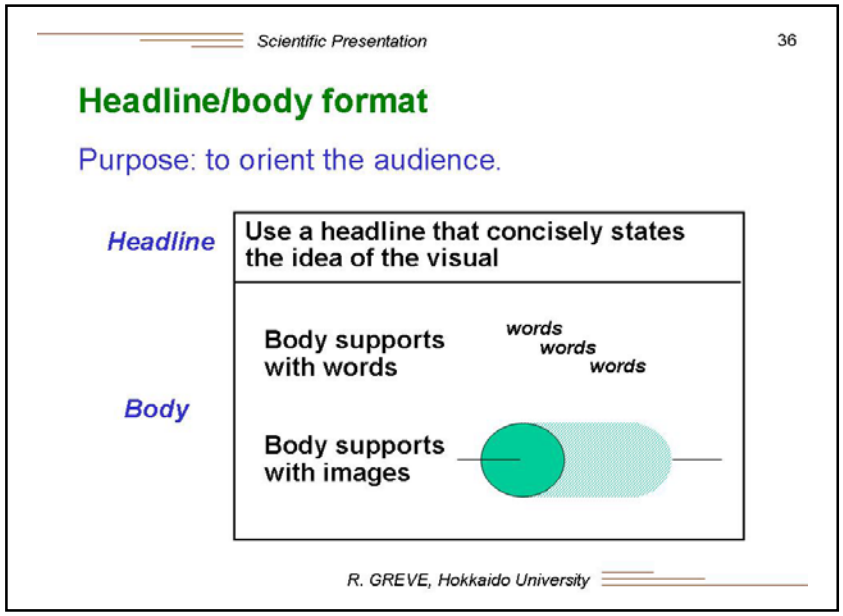


Phrase headlines vs. sentence headlines

Let's recall the previous slide:



Sentence headline (summarizes the idea of the slide).



Phrase headline (less information, informs only about the topic).

Use large, legible type

Clear typeface (sans-serif)

✓ **Arial, Calibri**
MS PGothic (日本語)

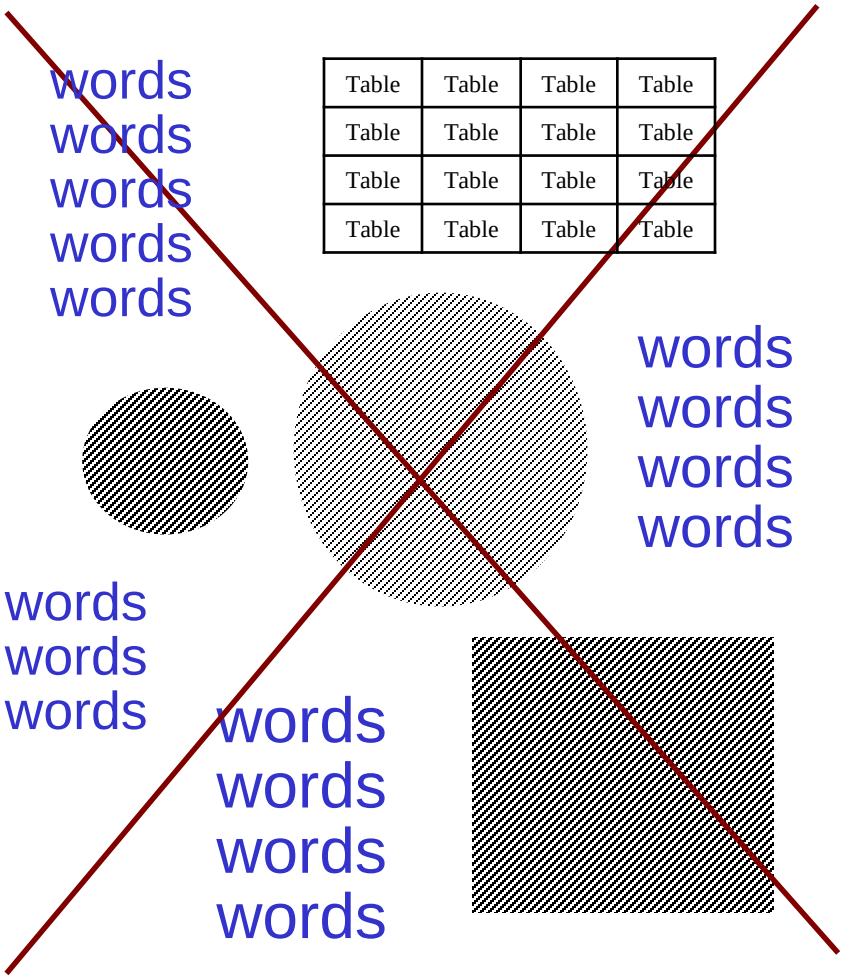
✗ **Times New Roman**
MS Mincho（日本語）

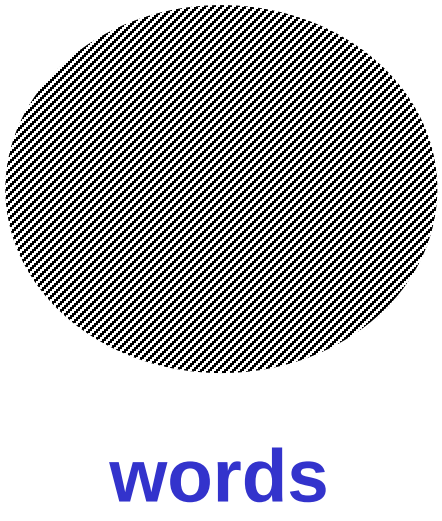
Large type size:

- 28-32 point bold for headings.
- (20-)22-24 point bold or normal for body text.
- References: small (~12 point) OK.

16 point
18 point
20 point
24 point
28 point
32 point
36 point

Avoid clutter





Don’t include information the audience doesn’t need or can’t remember

Filler information

Roentgen discovered x-rays in 1895. He found that a cathode-ray tube produced fluorescence in a distant plati-num-barium-cyanide screen.

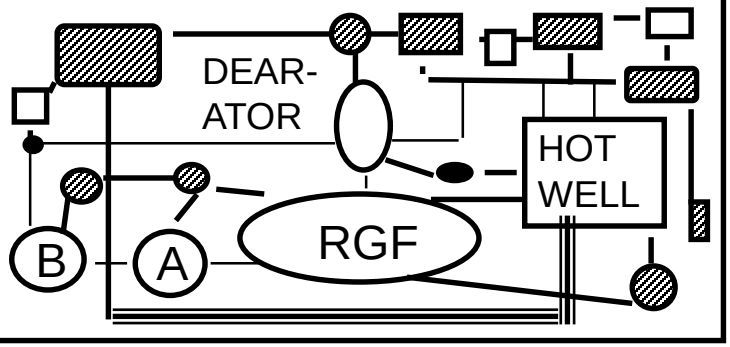
Complex maths

$$\frac{(x+2)^2 \ln x}{(x+1)^2 (x-1)^2}$$

Long lists or tables

- Corrosion
- Acid rain
- Toxic materials
- Pulsed combustion
- Energetic materials
- Pyrogenic materials
- Smog

Complex images



Keep visuals clear and simple!

- **Visuals can be an excellent support of your presentation (“hear & see”).**
- **However, if they are not easy to catch, they will draw the attention of the audience away from what you say.**

Delivery

The moment of truth…

Good preparation is the key for a good start

Be well organized.

(Presentation file + backup (!),
handouts, pointer, business cards, …)

Don’t show up just one minute before your presentation is scheduled to start!

Familiarize yourself with the environment.

(Conference/seminar room, audience, …)

Familiarize yourself with the equipment.

(Projector, computer, pointer, screen, lights, …)

How to deliver the speech

Memorize the speech

+ allows eye contact
- difficult for long speeches
- room for precision errors
- no room for improvising

Read from a text

+ ensures precision
- doesn't sound natural
- no room for improvising
- hinders eye contact

Speak freely

+ sounds natural
- much room for error

Speak from visuals/notes

+ insures organization
+ allows eye contact
+ allows improvising
- some room for error

In any case, it is a good idea to rehearse!

Prepare strong wording to emphasize important points or transitions

Beginnings

- OK: “My name is _____ and I will be talking about…”
- Better: “One question that has come up more than once during this conference is: ‘Now that decadal solar variability has been identified, what are the consequences for climate change?’”

Middles

- “This is what I have to say about the influence of aerosols. I will now discuss…”

Endings

- “To conclude, the main results of my study are ...”

Mind your voice

- Speak up and slow down!
- If possible, use a microphone.
- Articulate every word clearly (especially at the end of the sentence).
- Avoid rising intonation at the end of the sentence. (Otherwise, one has the impression of a single, endless sentence.)
- Avoid too monotonous speaking. (Changing of volume, repetition of words or phrases, pausing.)

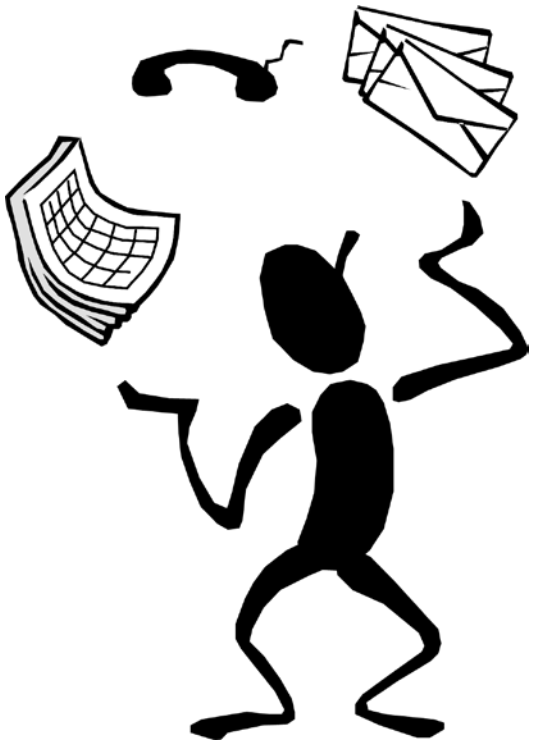
Eye contact, gestures

- Try to communicate with the audience (instead of just speaking in front of them).
- Keeping eye contact is essential. Involve many different listeners.
- Make positive use of your hands. (Emphasizing, voilà gesture…)

Stage presence

All the world's a stage, and all the men and women merely players.

– Shakespeare, from "As You Like It"



- Always stand upright in front of the audience.
- Don't sit or hide behind a lectern.
- Hold the pointer in the hand next to the screen.
- Change position occasionally.

Handling questions

- Perhaps repeat the question.
  (Entire audience can hear the question, gives extra time to reflect.)
- Don’t rush to give an answer.
  (Allows time to reflect, shows respect to the questioner.)
- If unclear or not well understood, ask for a clarification.
- Try to give a precise, short, well-articulated answer.
- Lengthy explanations should be postponed to private discussion.

If you can’t answer…

- Stay calm and openly say so. Don’t try to talk around the issue. (Nobody is perfect…)

- You then may:
  - Offer to research an answer, then get back to the questioner later.
  - Suggest resources which would help the questioner to address the question him-/herself.
  - Ask for suggestions from the audience.

Dealing with aggressive questions

- Again, stay calm.
- Don’t try to “fire back”. Avoid an open argument.
- Possible strategies:
  - Repeat the question in your own words, phrasing it more generally and neutrally. Then give an answer.
  - Suggest a private discussion.

    “I see your point, even though I don’t agree with it. Because this is a very complicated issue, which may lead to a long debate, it is perhaps better if you and I get together afterward to discuss it.”

Don’t Go Overtime!

- **End your presentation in time on a clear final note.**
- **Otherwise, the attention of the audience will drop *dramatically,* and irreparable damage is done even to an excellent presentation.**

Scientific presentation skills are important for efficiently communicating your research

Structure

Visuals

Delivery

Working on your presentation skills is extremely rewarding!

Questions, comments?

The poster should have a concise and informative title

Names of authors and their affiliations

Introduction

Provide only essential background and the reasons that motivated the study.

Subheading 1

Display item 1

Display item 2

Conclusion of part 1

Subheading 2

Display item 3

Display item 4

Display item 5

Conclusion of part 2

Subheading 3

Display item 6

Conclusion of part 3

A brief discussion that outlines the impact and indicates the limitations of the findings.

Conclusion

A crisp and concise overall conclusion should provide a clear take-home message.

Acknowledgements, references.

Appendix:

Posters

Like any scientific presentation, a poster should tell a story

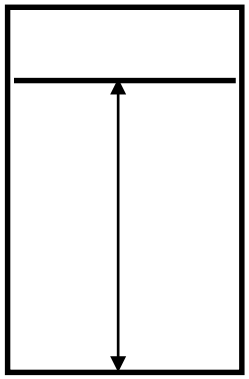
Brief, informative title.

Concise introduction.

Main part: logical, coherent sequence.

Small number of well-phrased conclusions.

Poster design



- Portrait vs. landscape?

  Depends on the available space → find out in advance!

- Clear, easy-to-read typeface (such as Arial).
- Sufficiently large type size (18 point or more).
- No disturbing background.
- Arrange sections such that the order of what to read is clear. (Best in vertical columns.)
- Aesthetic and clean overall appearance.

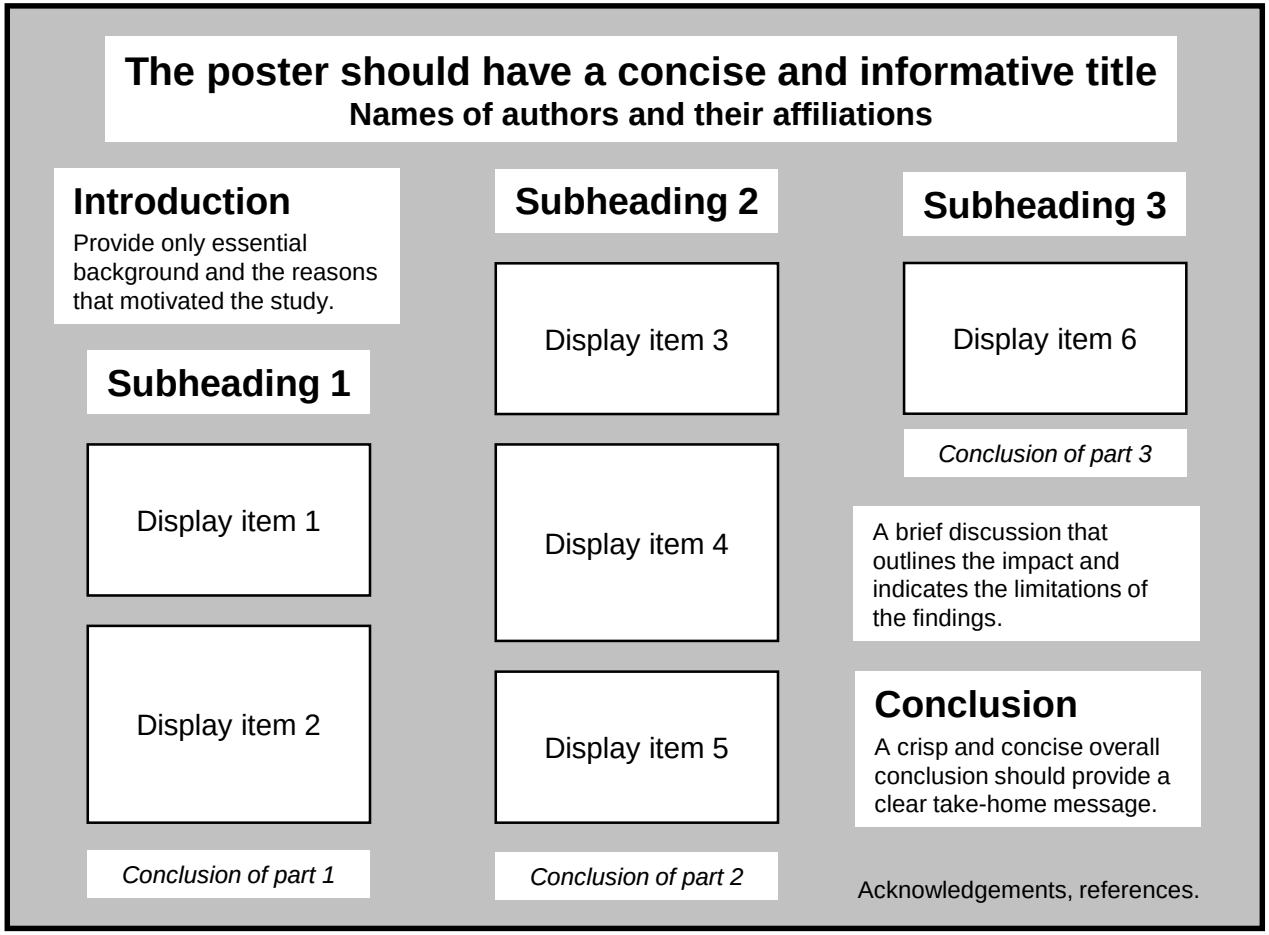
What to put on the poster? (And what not…)

- Accept the fact that a poster cannot give the same amount of information like a scientific paper or a thesis.
- If possible, use graphical representations instead of text.
- No long paragraphs of text, rather vertical lists.

Keep it user-friendly and simple!

The receptiveness of the viewers is limited, and there may be hundreds of other posters to read!

Example for a well-organized poster



Interaction with poster viewers

- Presenting author should be available at the poster at the designated time.
- Stand at the side of the poster, don’t obscure the view.
- Be ready for questions or discussions without being pushy.
- Keep your explanations brief and clear.
- Good for establishing personal relationships!