



# Narrative Storytelling for STEM: The PechaKucha Oratory Exercise

Wesley T. Honeycutt  
[honeycutt@ou.edu](mailto:honeycutt@ou.edu)

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for SRL@OU

# Overview



## *Problem*

Poor communication in STEM is rampant, and conducting research without being able to articulate it well can be worse than not doing research at all.

## *Example*

Have you ever been told that your “narrative was lacking” or that your audience is not sure “what you are trying to tell” them? Has anyone ever walked you through exercises to resolve this?

## *Approach*

We can practice narrative storytelling in STEM by trimming a talk down to the PechaKucha format, practicing traditional classical narrative theory.

## *Anticipated Results*

- Learn what PechaKucha is and how to prepare a PK talk.
- Learn classical storytelling theory.
- Practice narrative storytelling by direct application to PK.
- Observe meta-practice.



# What Is PechaKucha Anyway?

- PechaKucha (PK) is Japanese chit-chat ( ペちゃくちゃ ).
- Show more and talk less.
- Strict Rules:
  - 20 slides with no animations.
  - Slides automatically transition after 20s.
  - The speaker does not touch the slides! Just talk.



# Why Is PK Useful?

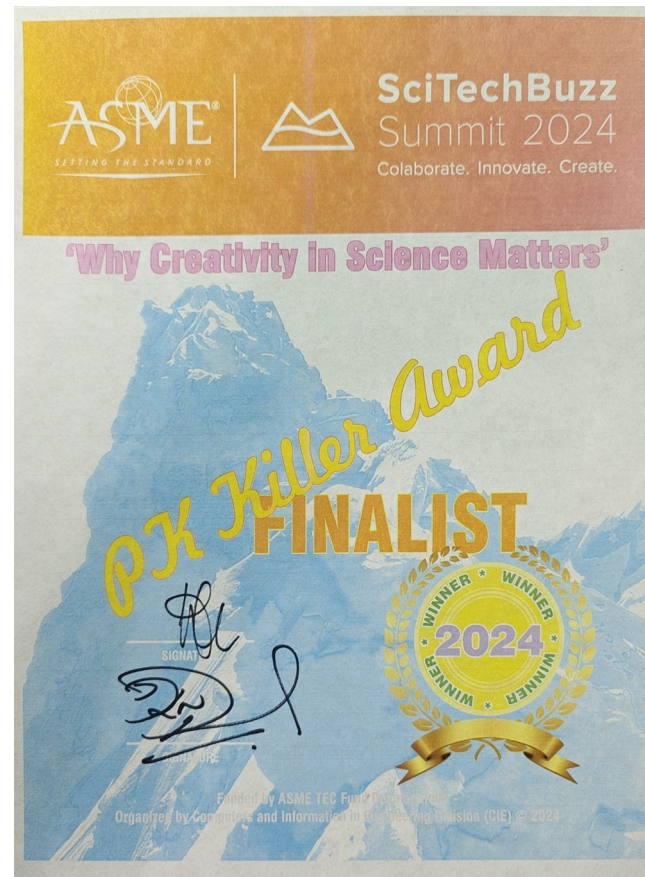
- No permission to be boring, slides move quickly.
- Distractions are minimized.
- No one has time to read the slide, so the audience must focus on the storyteller.
- More talks are available (6 min 40 s limitation).
- Focus on meaningful content.





# IDETC-CIE 2024 SciTech Buzz

- PK talks were given and the audience was invited to participate.
- I made a talk in 10 min on the spot, and presented it.
- NSF officer stayed to watch.
- I won the top award (\$100!).





# The Keys To Success

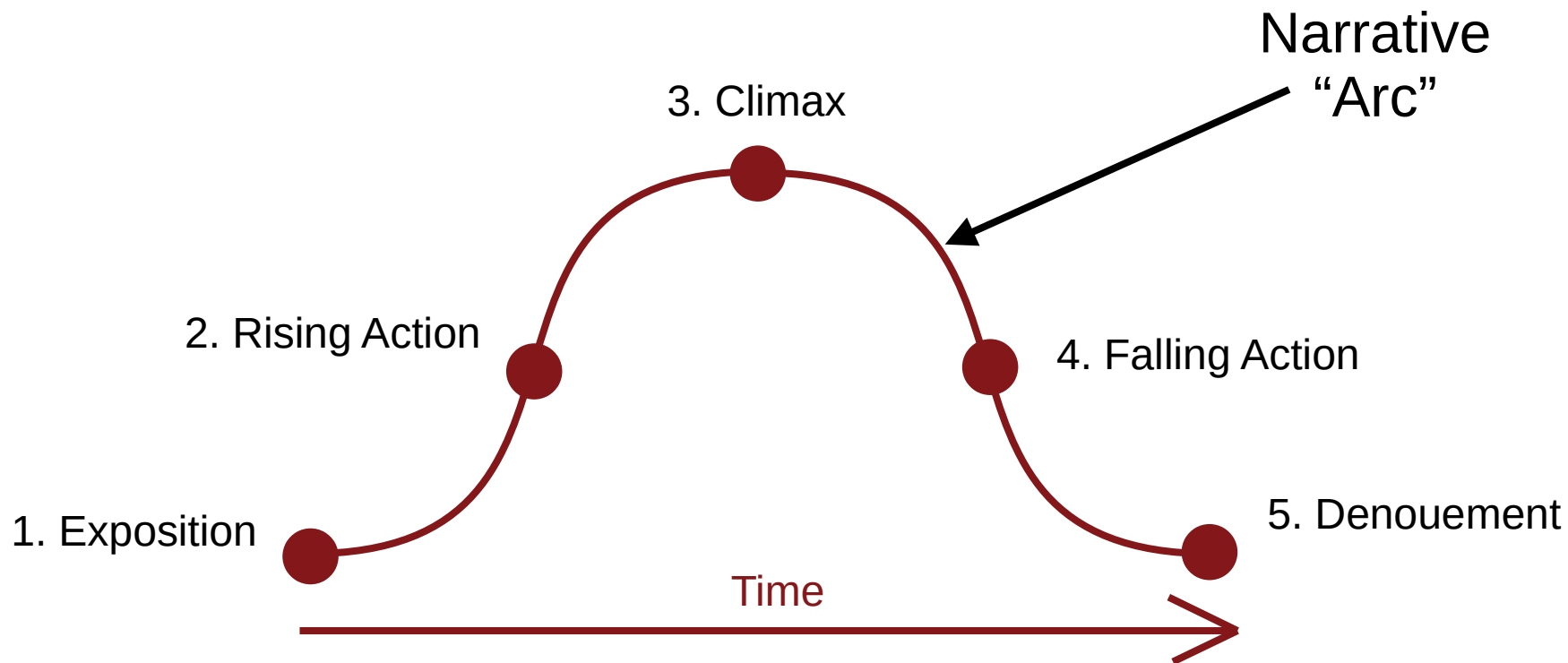
Inspire. Inform. Convince. Entertain.

Know what you want your audience to remember.

Tell a good story.

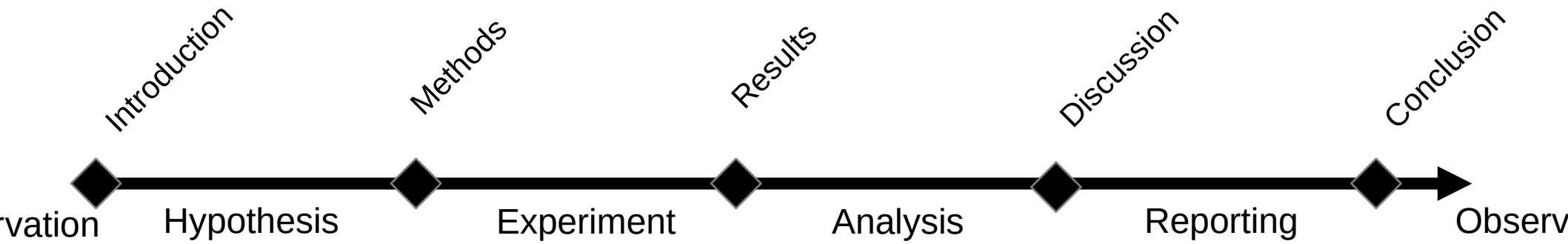


# The Parts Of A Story





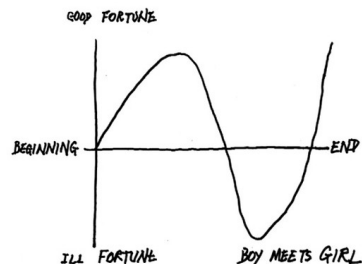
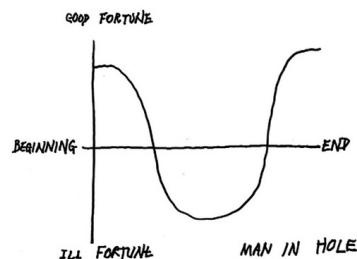
# Science Is Boring By Design





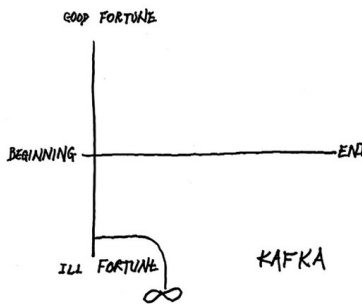
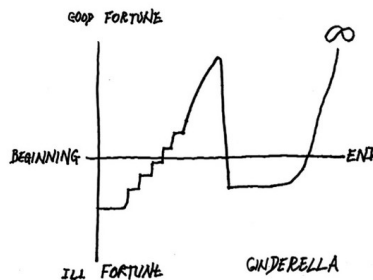
# Vonnegut's Story Arcs

The “Feel Good” story which overcomes a moment of adversity.



It was all copacetic, then things got complicated but turned out okay.

Everything is terrible, then things got better until Happily Ever After

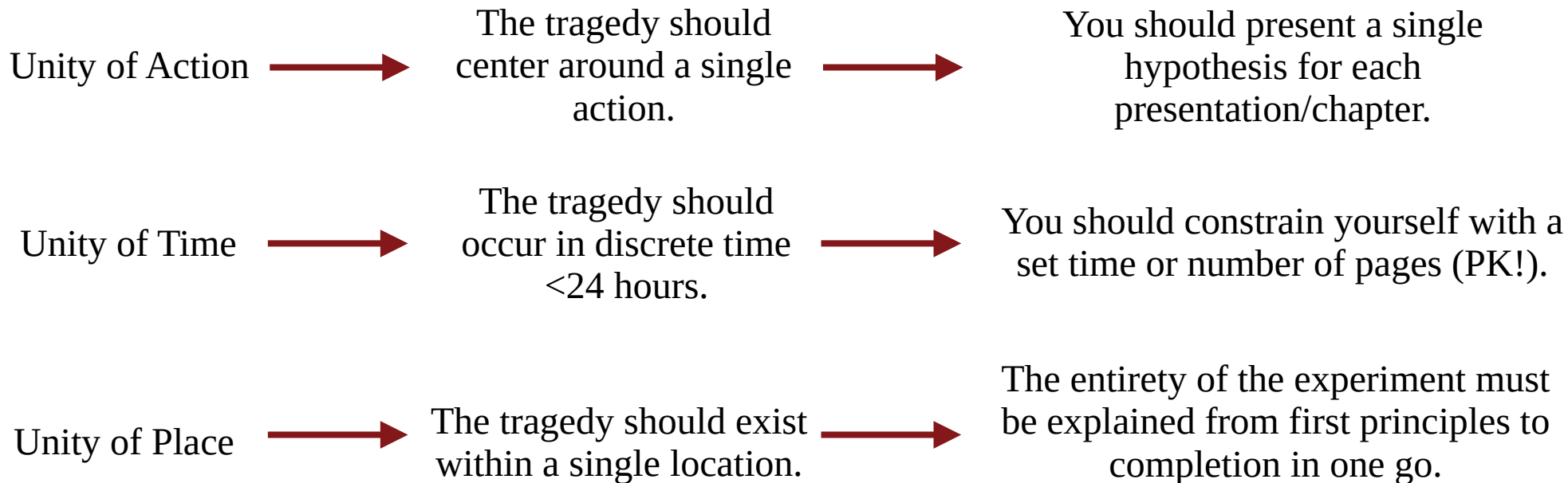


Everything is terrible, then it got worse.

Hamlet, indigenous “teaching” stories, and Truth are all flat lines.  
BUT

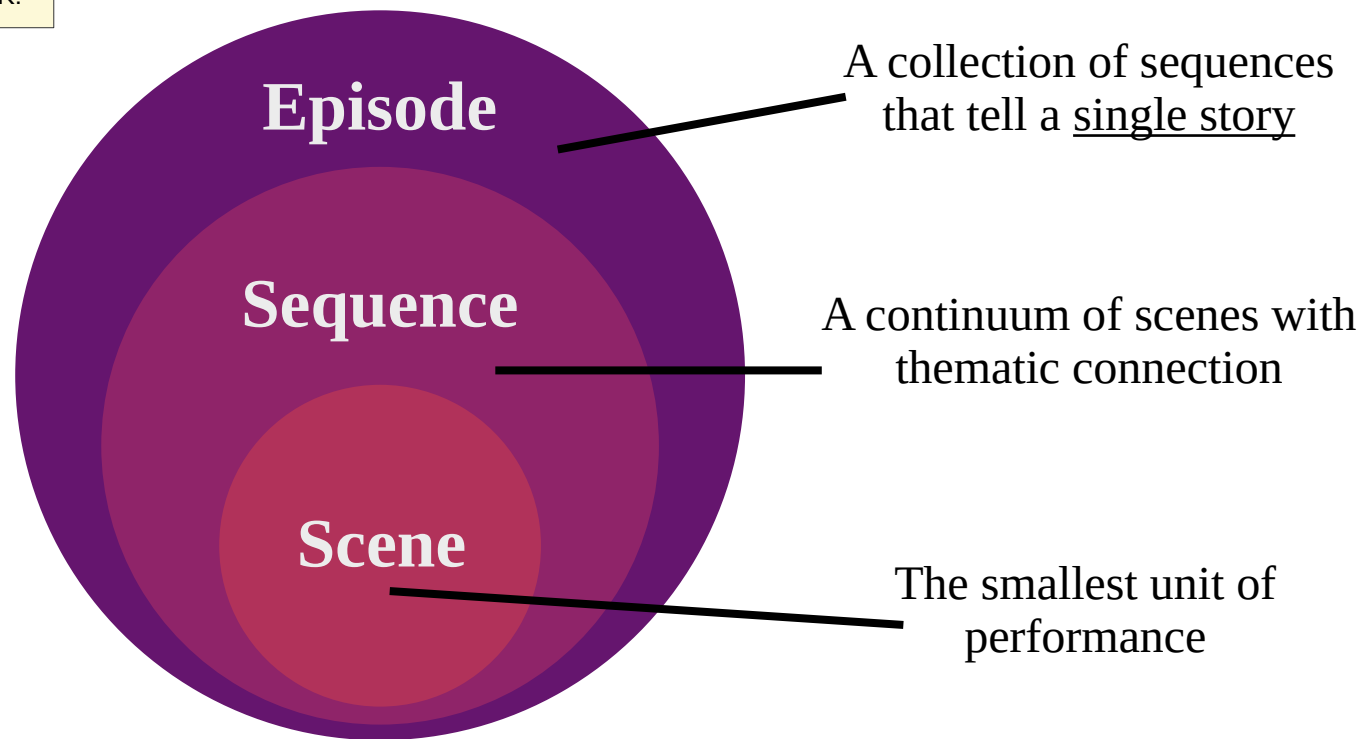


# Aristotle's Unities Of Tragedy





# Big Projects - Episodes



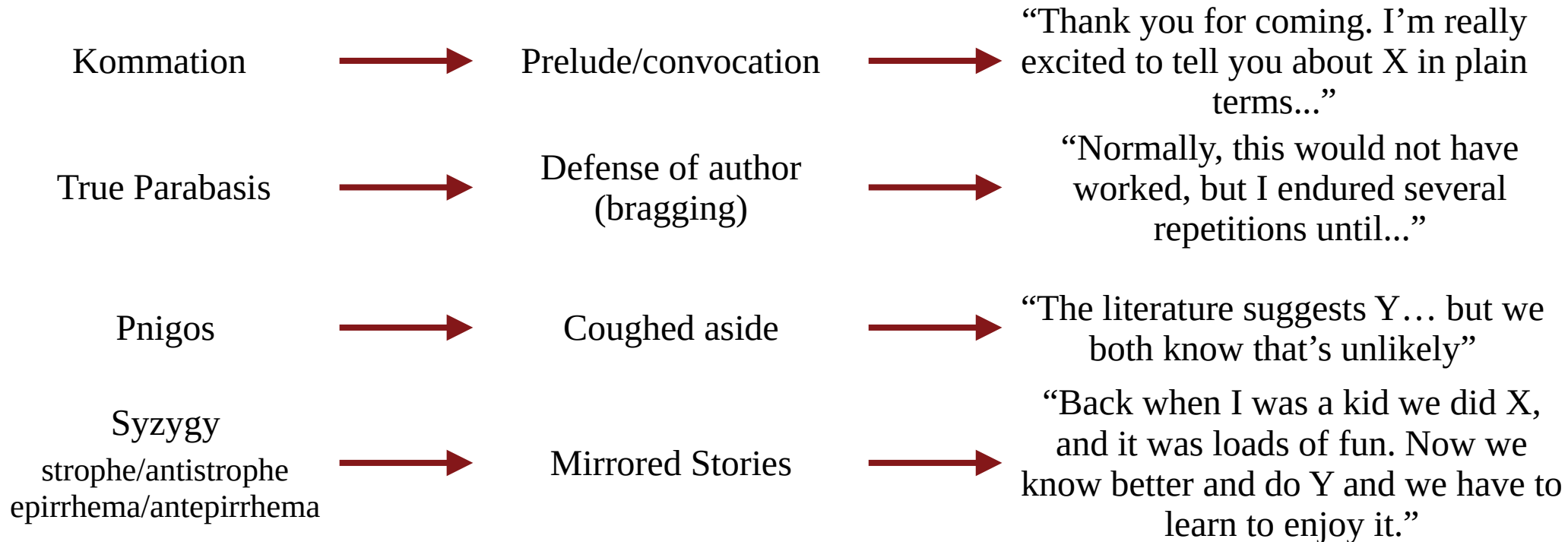
In large projects like a Master's Thesis or a Doctoral Dissertation, assemble an encompassing tale with individual "episodes" for each chapter.

Each chapter, even the introduction and conclusion, must stand alone without the others, telling a single story, not just a sequence of scenes



# Aristophanes' Comedic Parabases

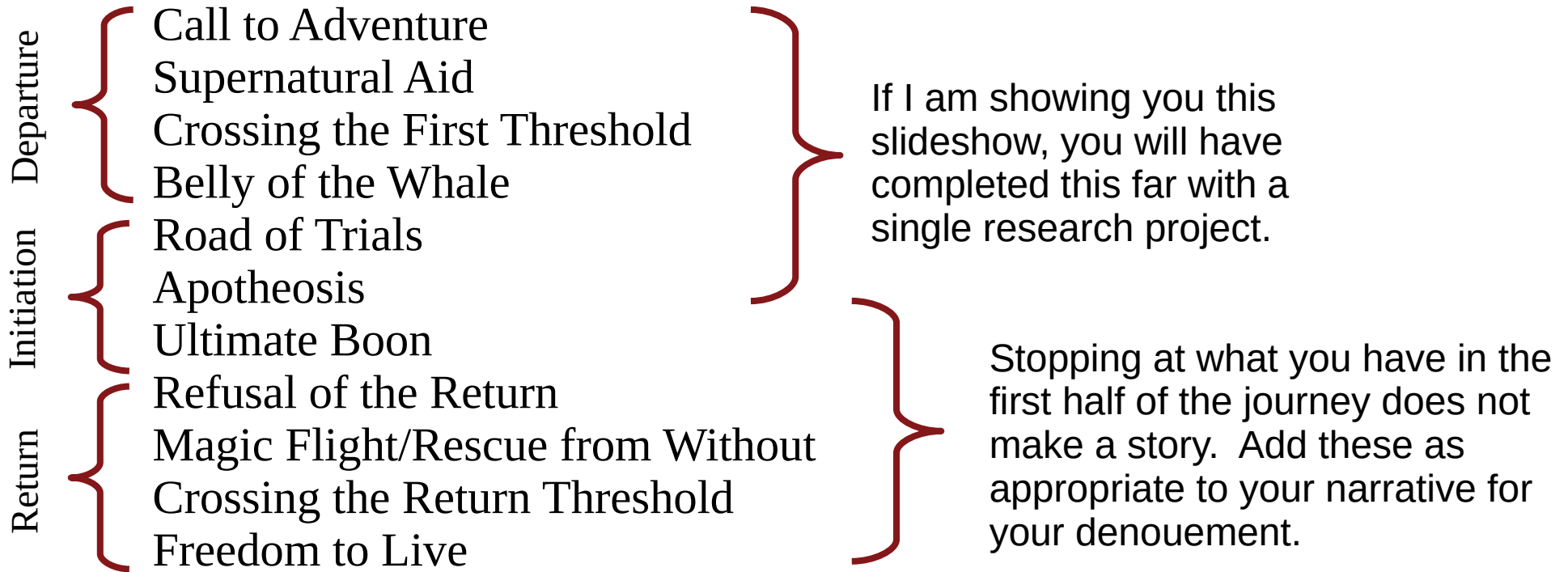
The narrative of science is structured, but the value comes from commentary







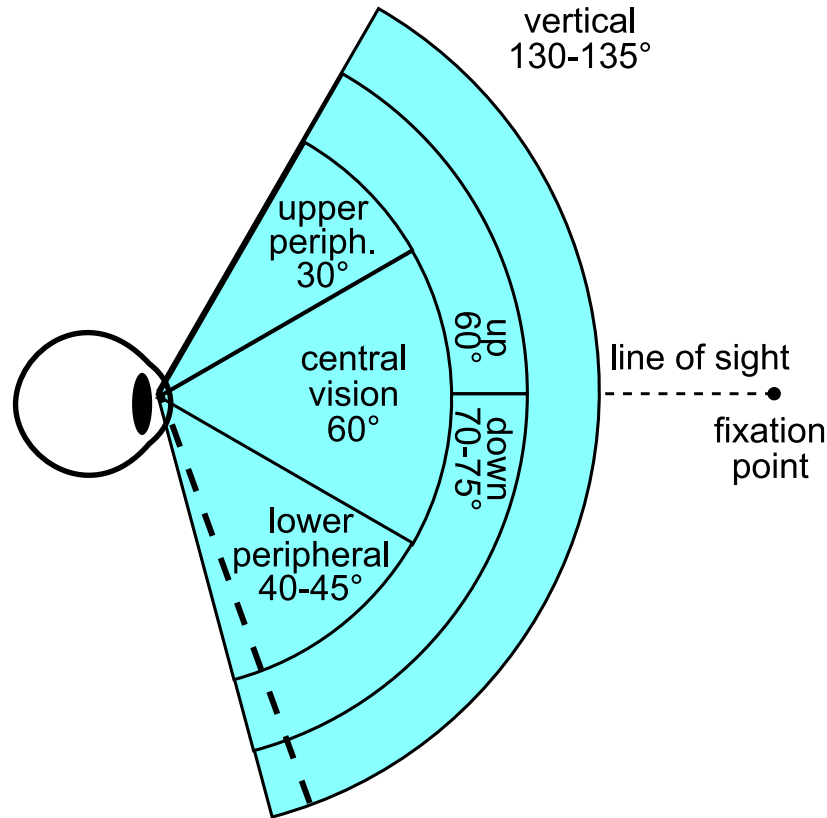
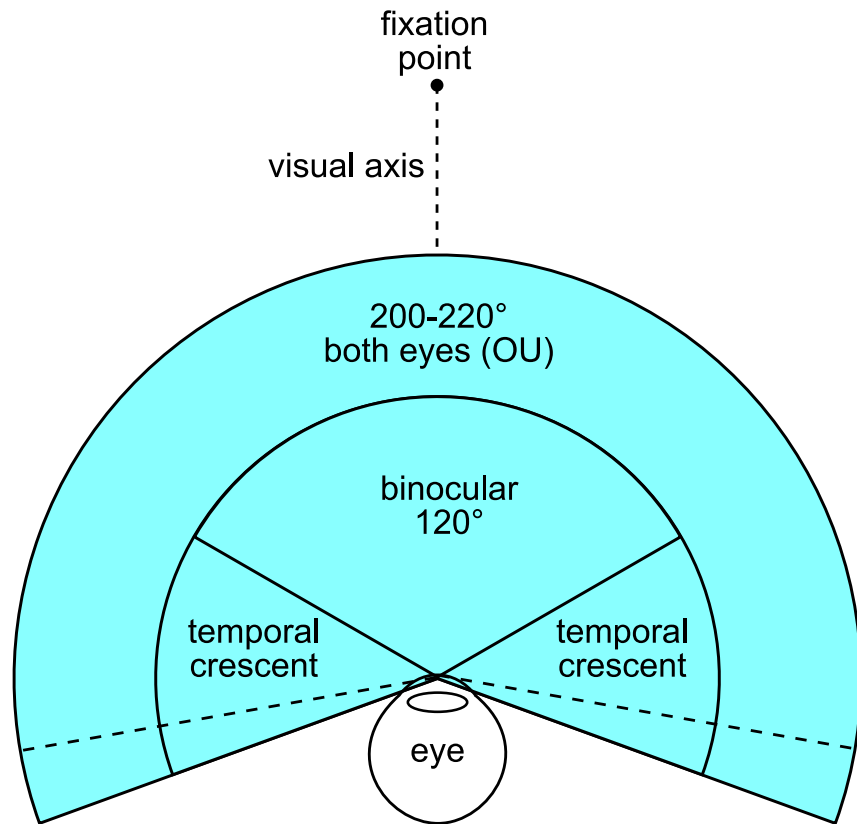
# Heroic Myths - This Is About YOU.





# The Human Eye - FOV

Keep information in forms which acknowledge the focus of the human eye as a binocular instrument. Favor landscape over portrait for individual units of information.





# Human Eye – Saccade/Fixate





# Information Left-to-Right

Since Westerners are trained to read left-to-right, we also process information from left-to-right.



This bias influences our perception of information. Consider lateral movements on screen.

[1]Egizii, M. L., Neuendorf, K. A., Denny, J., Skalski, P. D., and Campbell, R., 2018, "Which Way Did He Go? Film Lateral Movement and Spectator Interpretation," Visual Communication, 17(2), pp. 221–243.

[2]2016, "Evil Kermit," Know Your Meme [Online]. Available: <https://knowyourmeme.com/memes/evil-kermit>

. [Accessed: 03-Apr-2024].

[3]1938, Alexander Nevasky, Mosfilm.



✉ [honeycutt@ou.edu](mailto:honeycutt@ou.edu)

Last edit: Sep 12, 2024





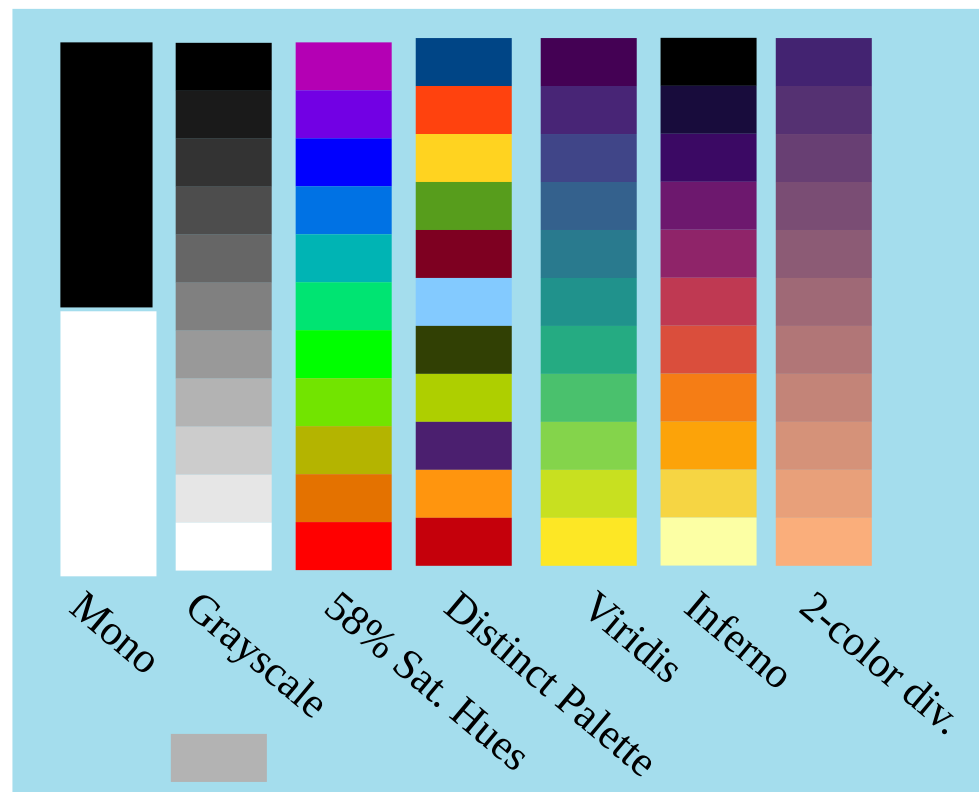
# Lines And Fonts

- Fonts must be clear at a distance (18 pt. min for presentations in most cases).
- Use serif for lines of text (like this one) and sans serif for standout text (like the slide title).
- Italics are for Latin. Quotation marks are for emphasis. **Bold** draws saccadic eye movement.
- Line weight is driven by need. Enough to stand out, but not so much it gets cluttered. Less is more.



# Color Rules

- Black and white is best.
- Grayscale is useful in moderation.
- Color should accent or explain.
- Color choice should adhere to palettes which:
  - Are discernible: avoid single-hue fade,
  - Complement/contrast each other for classifications,
  - Transition equally,
  - Ensure accessibility (e.g. no red/green).





# Minimum Noticeable Change

## Contrast Regions – Find Info

§ This is the actual size of identification numbers in the original frontispiece:



The same number, enlarged:



The number becomes clearer when the interference caused by the engraving lines is removed:

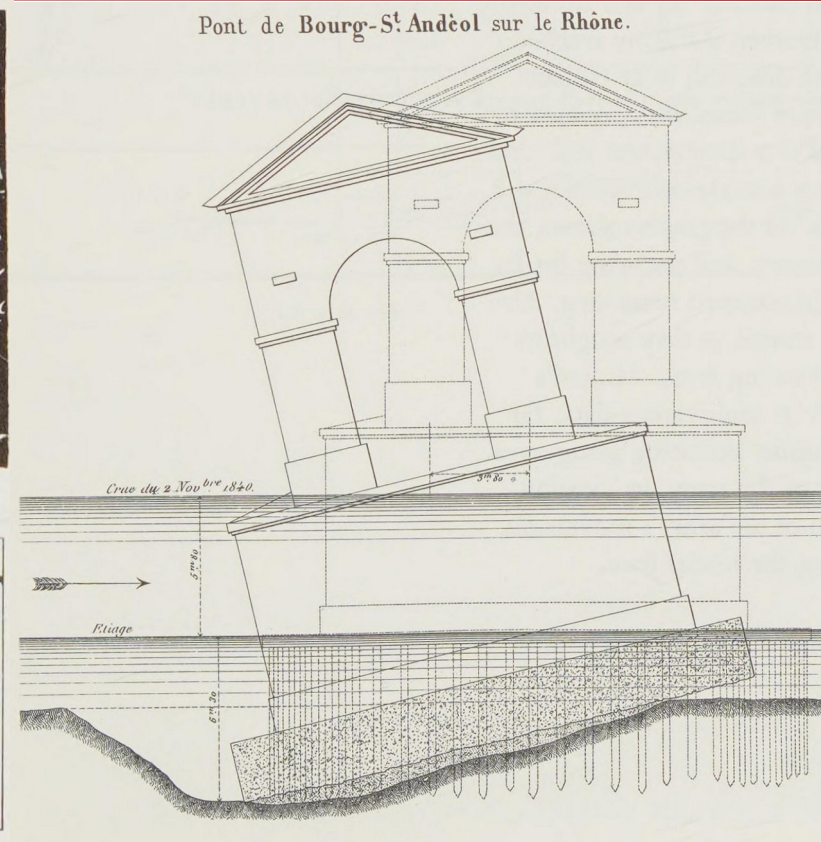
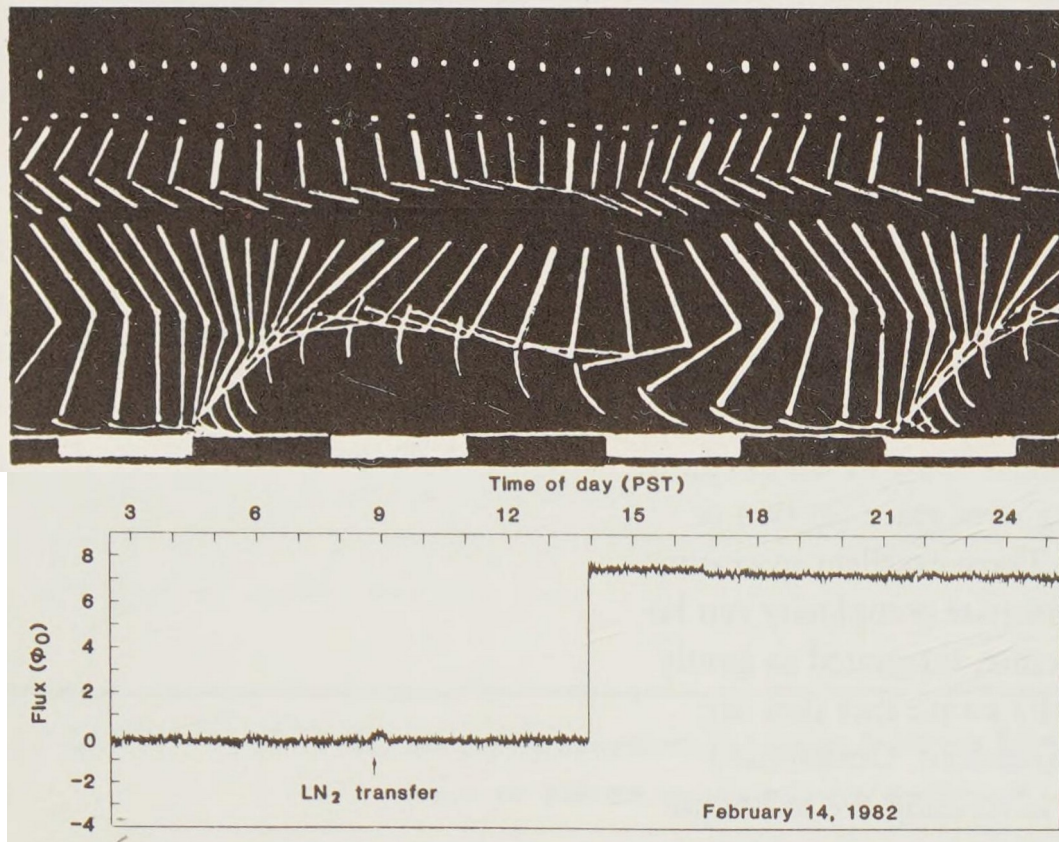


## Line/Area – Houdini's Handcuffs





# Depicting Time And Movement





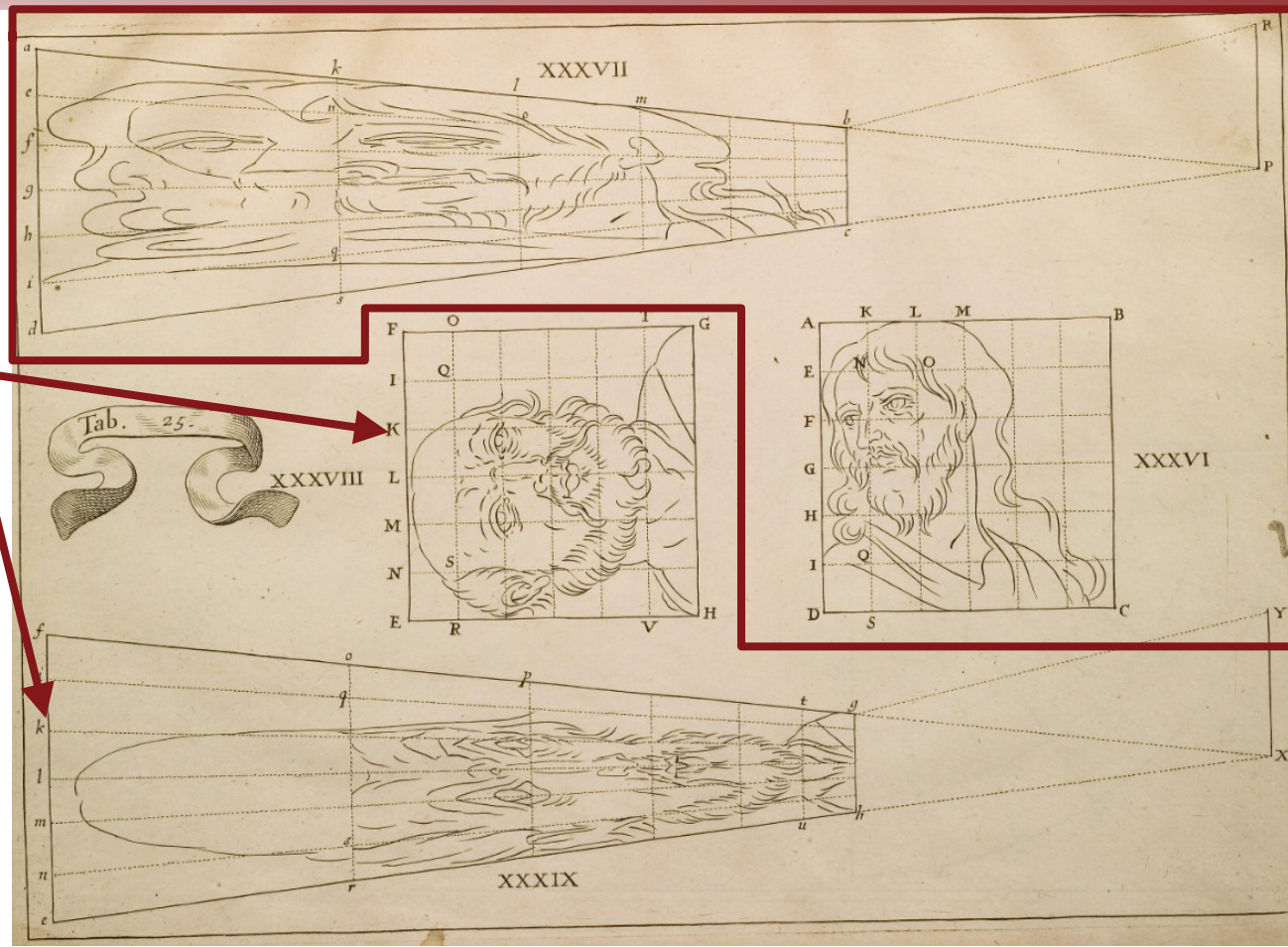


# Comparisons

Proximity

Consistent of angles

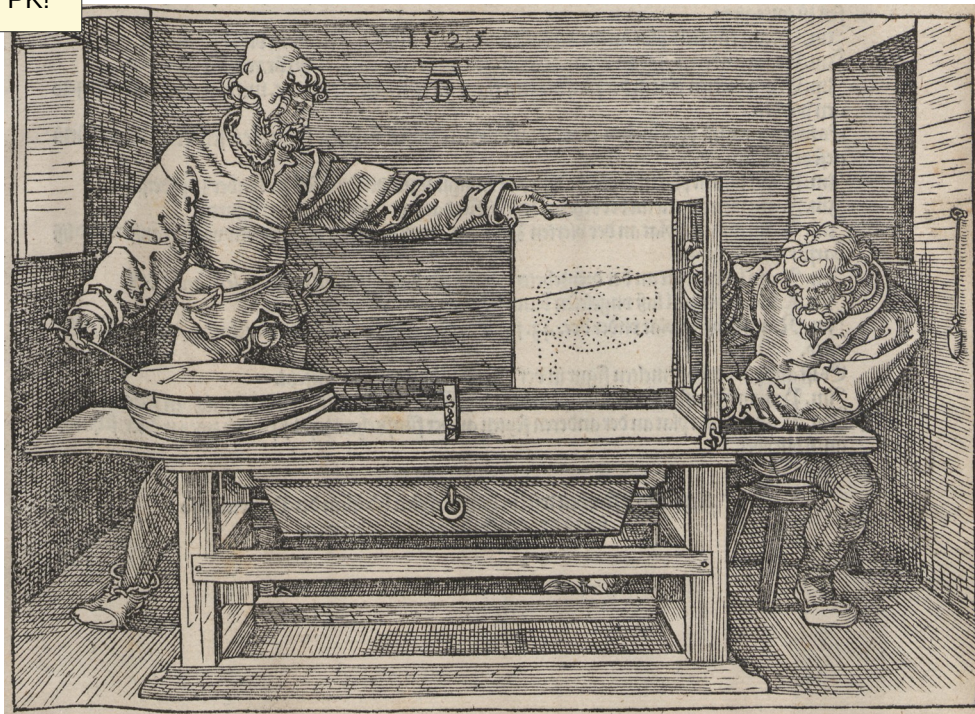
Parity of Labels



[1]J. F. Nicéron, RP Ioannis Francisci Niceronis parisini, ex ord. minim. Thaumaturgus opticus, seu Admiranda optices, per radium directum: catoptrices, per reflexum è politis corporibus, planis, cylindricis, conicis, polyedris, polygonis & aliis: dioptrices, per refractum in diaphanis.... Pars prima. De iis quæ spectant ad visionem directam. Ad eminentissimum cardinalem Mazarinum. sumptibus Ioannis Du Puis, viâ Iacobæâ, sub signo coronæ aureæ, 1763.



# Depicting Higher Dimensions



- Reduce spatial dimensionality to 2 at max.
- Add dimensions as information with:
  - Color,
  - Written numbers,
  - Extra comparison plots,
  - Other informative techniques

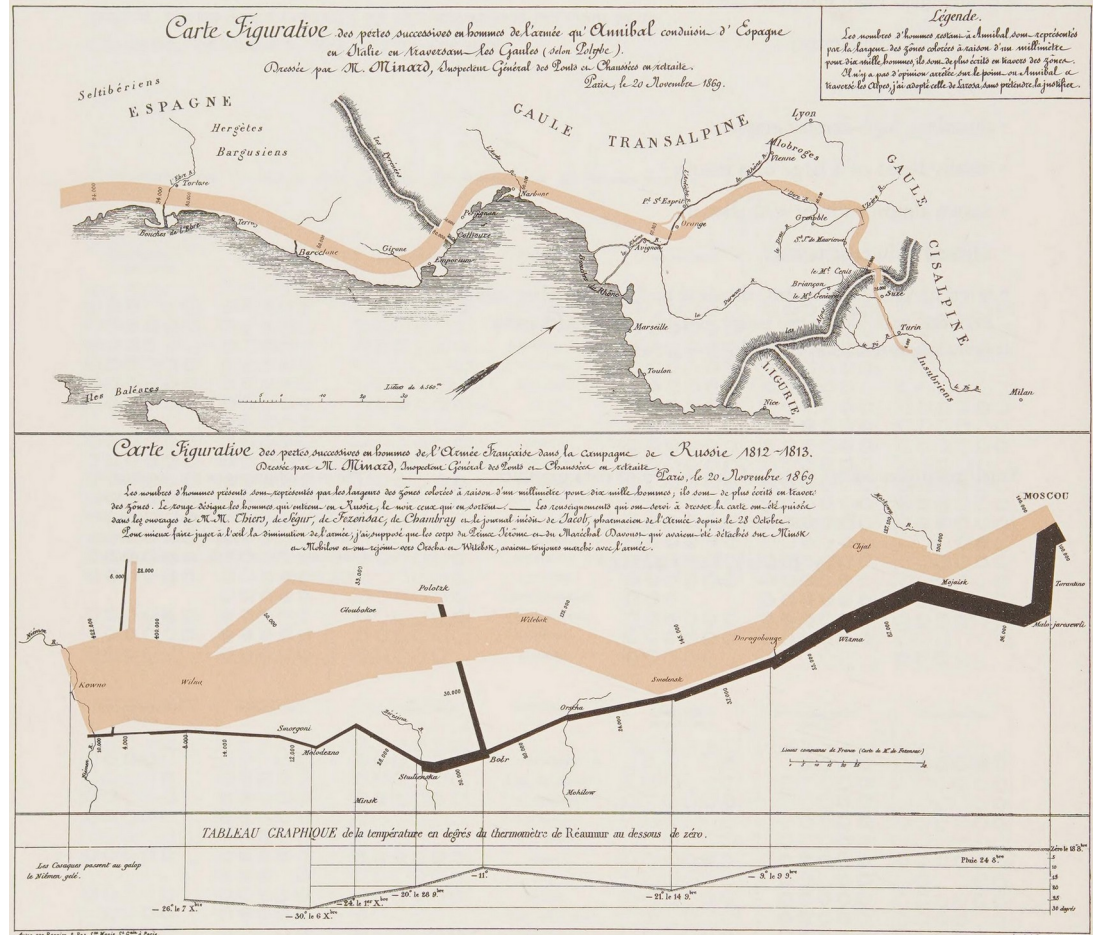




# Information Density

Graphical information can be increasingly complex. Consider the ratio of information/space. There is a limit to how much our mind can process before it stops caring.

- This can be overcome with:
  - Increased size
  - Layering
  - Segmentation of information



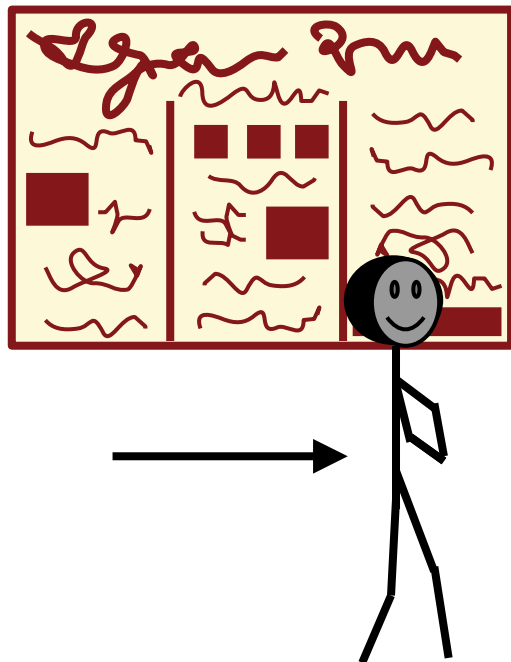
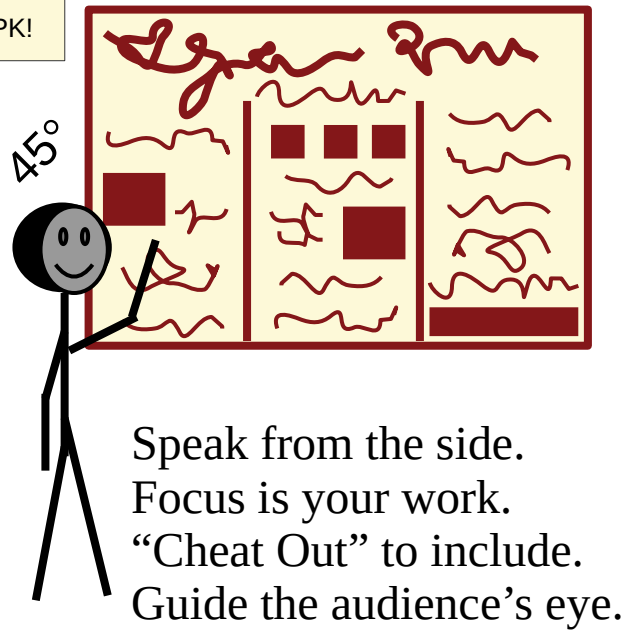


# Your Body Is On Stage

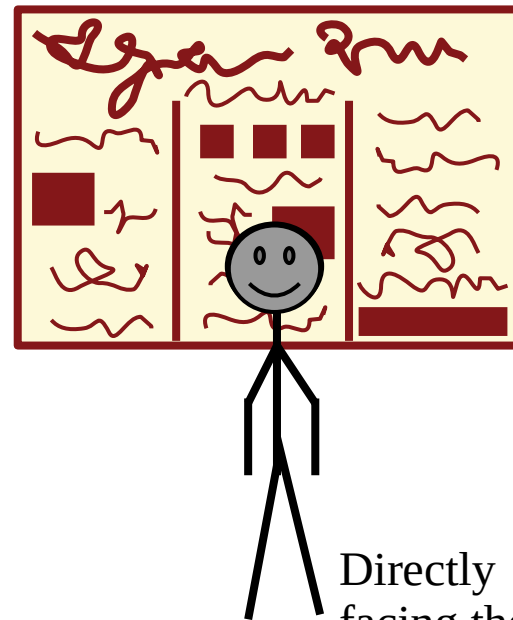
- Don't hide behind a podium (useless for PK!)
- Eye contact or the forehead trick.
- Gestures note approximate position on slides, still speak to audience.
- Become part of the illustration. Time movement to inflect important points.



# Staging



You can change sides if you want.  
Cross like a leader, guiding the viewer.  
Stay “cheated out”.  
This often means a segue or shift.



Directly facing the audience is aggressive, as is blocking the view.  
This may be desirable!



# How To Breathe

Your voice is your primary tool.

- Learn to modulate tone.
- Prepare for microphone or voice projection.
- Learn to breathe from your diaphragm.

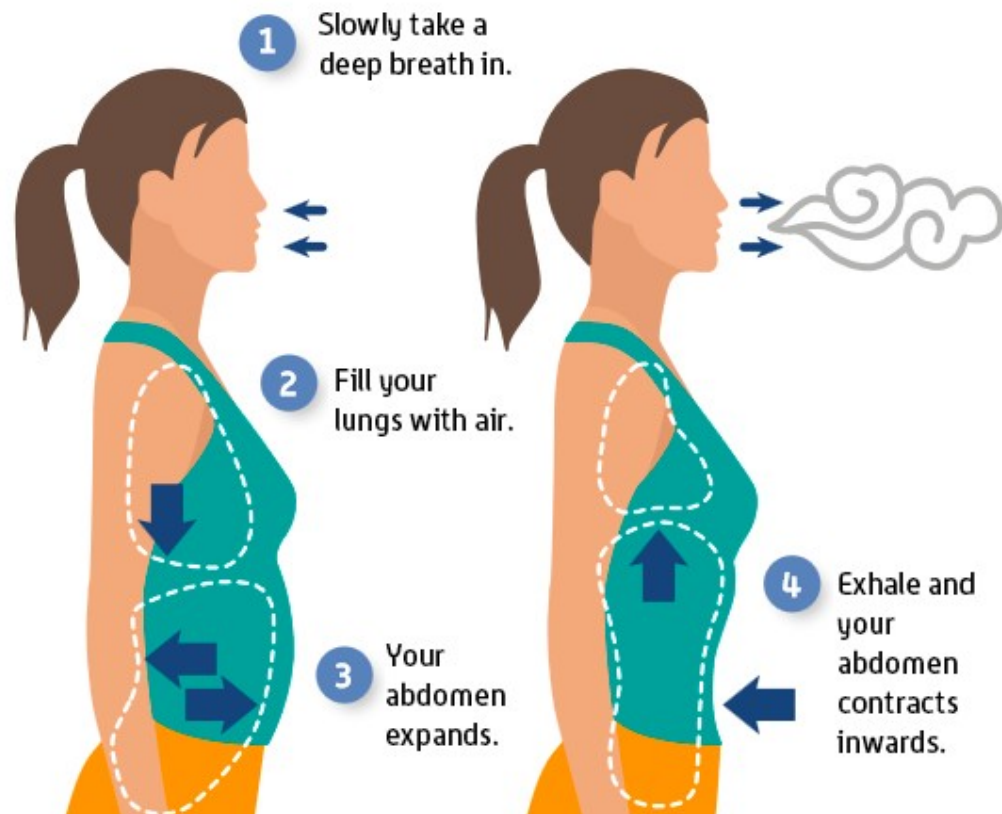
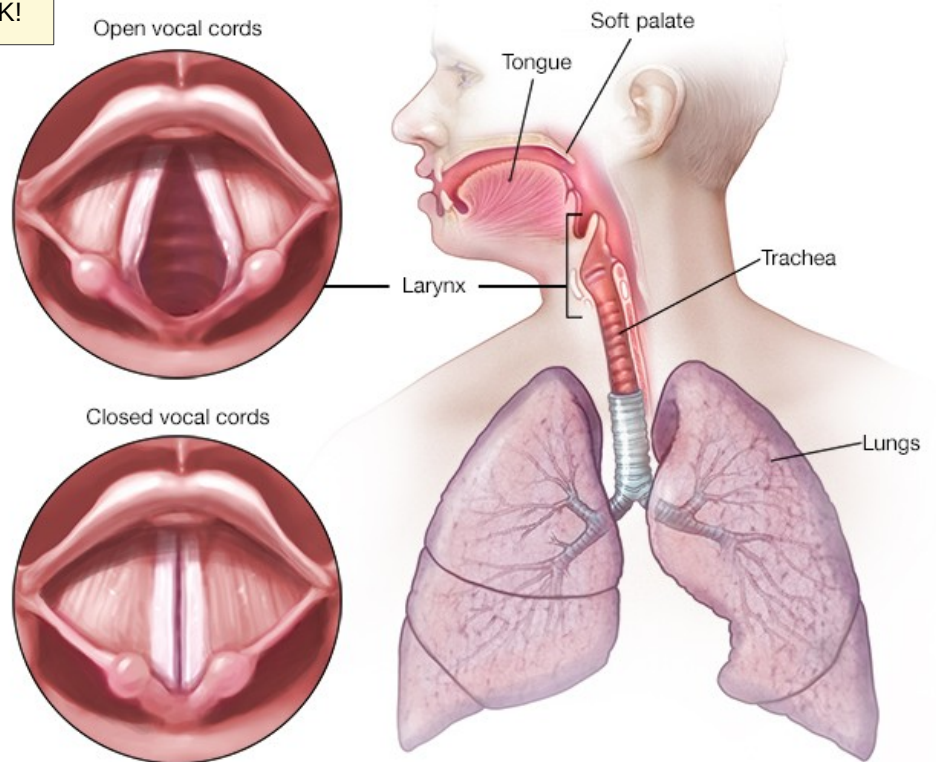


Illustration from: <https://onepointhealth.com.au>



# Your Vocal Cords



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- Posture is important for air to flow through vocal cords well.
- Head and neck can be repositioned for effect (imagine a hunched whisper)





# Physical Storytelling

- Our brains see poses and faces before anything else, including thinking.

Bliss-Moreau, Eliza, Gilda Moadab, and Christopher J. Machado. "Monkeys Preferentially Process Body Information While Viewing Affective Displays." *Emotion* 17, no. 5 (August 2017): 765–71. <https://doi.org/10.1037/emo0000292>.

- We see faces first, bodies second, then jointly process them for context.

Gelder, Beatrice de, Jan Van den Stock, Hanneke K.M. Meeren, Charlotte B.A. Sinke, Mariska E. Kret, and Marco Tamietto. "Standing up for the Body. Recent Progress in Uncovering the Networks Involved in the Perception of Bodies and Bodily Expressions." *Neuroscience & Biobehavioral Reviews* 34, no. 4 (March 1, 2010): 513–27. <https://doi.org/10.1016/j.neubiorev.2009.10.008>.

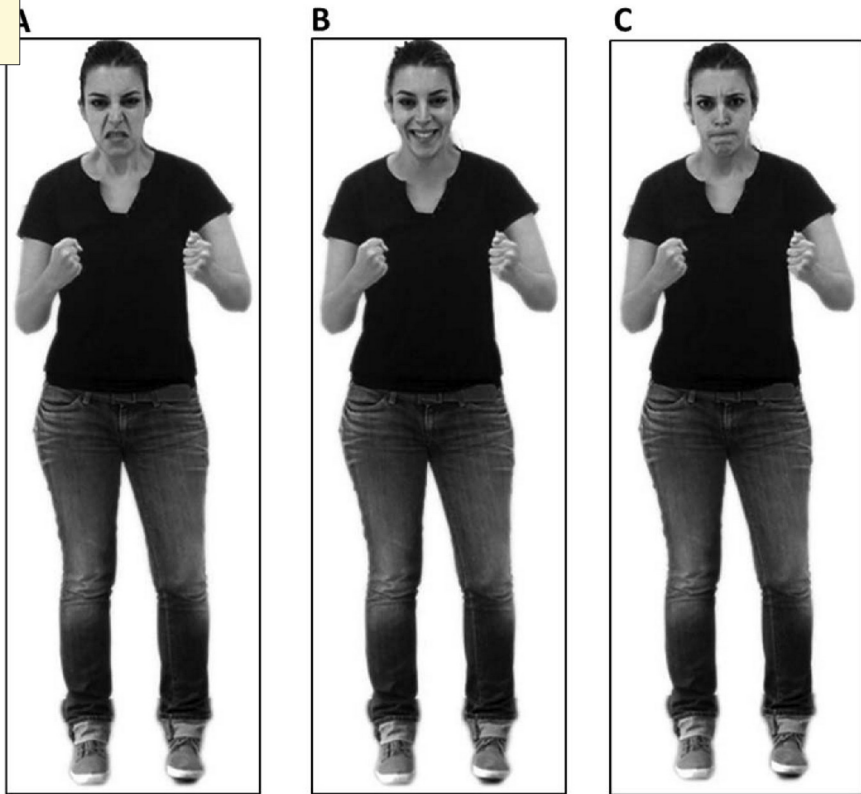
- We assess affect from movement to gauge emotion.

Pollick, Frank E, Helena M Paterson, Armin Bruderlin, and Anthony J Sanford. "Perceiving Affect from Arm Movement." *Cognition* 82, no. 2 (December 1, 2001): B51–61. [https://doi.org/10.1016/S0010-0277\(01\)00147-0](https://doi.org/10.1016/S0010-0277(01)00147-0).





# Facial And Physical Expression



- Match your posture and face.
- Move to transition your audience emotionally.
- Use your voice to inflect differences in affect between changes.



# How To Pause

- Sometimes pauses are important.
  - Give someone else a chance to speak.
  - Dramatic effect (avoid using this too much for STEM).
  - Let the audience think.
- Pause all communication (oral, visual, physical).
- In person: 3-seconds.
- Online: 5-seconds.



# This Is A Lot To Think About!

- Everything before this slide are tools at your disposal.
  - Not everything must be used.
  - Everything must be used when appropriate.
- This is doubly hard for non-native speakers.
  - Slow down your speech to match other elements.
  - Include less content if you need more time to process.



# PechaKucha Style

- Rules:
  - 20 slides.
  - 20 seconds per slide.
- Recommendation:
  - One slide for the title.
  - One slide for connection.
- Tell me something interesting:
  - Interesting problems.
  - Your experience.
  - Novel solutions.
- Don't give me your research talk.

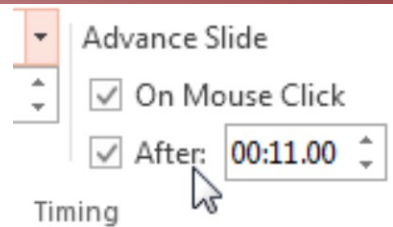


# PK Method – 20s Transition

MS Word  
Powerpoint



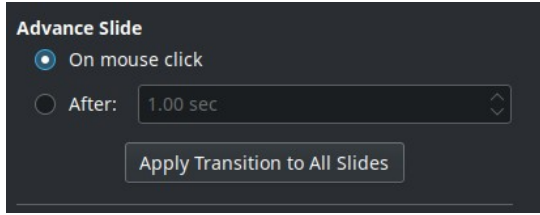
Transitions > Advance Slide > After...



LibreOffice  
Impress



View > Slide Transition > Advance Slide > After...



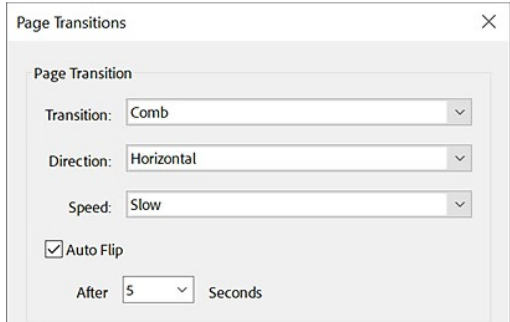
Google Slides



Adobe Acrobat  
(Pro)



All tools > Organize Pages > Page Transitions



# Exercise: Remix Your Talk

PK?

Arc

Vis.

Phys.

PK!

Type:  
Interesting  
Problem.

Goals:  
Inform.  
Convince.  
Entertain.

✉ [honeycutt@ou.edu](mailto:honeycutt@ou.edu)

Last edit: Sep 12, 2024

The grid contains 25 slides from the University of Oklahoma, organized into 5 rows and 5 columns:

- Row 1:**
  - City Planning Systems for Pollution in Urban Canyons
  - What's an Urban Canyon?
  - What's an Urban Canyon?
  - Vitruvius
  - Environmental Justice – A Wicked Problem
- Row 2:**
  - Health Outcomes, Housing, and Wind
  - Environmental Justice Index
  - Mapping Energy/Pollution Systems
  - Currently, there are no tools to disentangle such a wicked problem.
  - A Solution in Search of New Domain(s)
- Row 3:**
  - A Solution in Search of New Domain(s)
  - Research Overview
  - Mapping Energy/Pollution Systems
  - How We Will Apply the Solution to Answer New Questions
  - A Solution in Search of New Domain(s)
- Row 4:**
  - Process Efficiency
  - Ex: Surface Roughness Changes Eddy Upstream
  - Ex: Surface Temperature Depends on "SkyView"
  - Ex: Land Use Impacts Spectral Radiance, Temperature
  - Ex: T-Zone and Lapse Rate Inversion
- Row 5:**
  - Thermal Comfort Studies
  - 30 – 60° from North Aspect Ratio of 2.5
  - What we need:
  - That's cool, but who will fund such a project?
  - EAGER Keystone and Ramifications
- Row 6:**
  - EAGER Project Applicability
  - Full Project Team Requirements
  - EAGER Project as NSF Programs
  - Thanks





# Cut Useless Words

City Planning Systems for Pollution in Urban Canyons

Toward Cyber Integration for Societal Health: Improving Understanding of Urban Air Pollution: Sustainable Networks for Applied Systems Engineering

Janet K. Allen, [janet.allen@ou.edu](mailto:janet.allen@ou.edu)  
Wesley T. Hoverson, [hoverson@ou.edu](mailto:hoverson@ou.edu)  
Farukh Memon, [farukh.memon@ou.edu](mailto:farukh.memon@ou.edu)

UNIVERSITY OF OKLAHOMA

What's an Urban Canyon?

Fig. 1. The three representative cross-sections of urban canyons illustrating different canyon types.

What's an Urban Canyon?

Fig. 1. The three representative cross-sections of urban canyons illustrating different canyon types.

Vitruvius

Fig. 1. The three representative cross-sections of urban canyons illustrating different canyon types.

Environmental Justice – A Wicked Problem

Fig. 1. The three representative cross-sections of urban canyons illustrating different canyon types.

Health Outcomes, Housing, and Wind

Fig. 1. The three representative cross-sections of urban canyons illustrating different canyon types.

Environmental Justice Index

Fig. 1. The three representative cross-sections of urban canyons illustrating different canyon types.

A Solution in Search of New Domain(s)

Fig. 1. The three representative cross-sections of urban canyons illustrating different canyon types.

A Solution in Search of New Domain(s)

Fig. 1. The three representative cross-sections of urban canyons illustrating different canyon types.

Research Overview

Fig. 1. The three representative cross-sections of urban canyons illustrating different canyon types.

Mapping Energy/Pollution Systems

Fig. 1. The three representative cross-sections of urban canyons illustrating different canyon types.

How We Will Apply the Solution to Answer New Questions

Fig. 1. The three representative cross-sections of urban canyons illustrating different canyon types.

Process Efficiency

Fig. 1. The three representative cross-sections of urban canyons illustrating different canyon types.

Ex: Surface Roughness Changes Eddy Upstream

Fig. 1. The three representative cross-sections of urban canyons illustrating different canyon types.

Ex: Surface Temperature Depends on "SkyView"

Fig. 1. The three representative cross-sections of urban canyons illustrating different canyon types.

Ex: Land Use Impacts Spectral Radiance, Temperature

Fig. 1. The three representative cross-sections of urban canyons illustrating different canyon types.

Ex: T-Zone and Lapse Rate Inversion

Fig. 1. The three representative cross-sections of urban canyons illustrating different canyon types.

Thermal Comfort Studies

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30 – 60° from North Aspect Ratio of 2.5

Fig. 1. The three representative cross-sections of urban canyons illustrating different canyon types.

Thanks

• Claire M. Curry • Janet & Farrokh  
• Paula M. Cimpriach • Lee Fithian  
• Jim Curry  
• Gram  
• Gracie

UNIVERSITY OF OKLAHOMA

✉ [honeycutt@ou.edu](mailto:honeycutt@ou.edu)  
Last edit: Sep 12, 2024

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# Cut “Logic” Slides

No Research Questions  
(let audience think for themselves)

No “how we will solve this”

No quad charts!

City Planning Systems for Pollution in Urban Canyons

Health Outcomes, Housing, and Wind

A Solution in Search of New Domain(s)

Thermal Comfort Studies

What's an Urban Canyon?

Environmental Justice Index

Mapping Energy/Pollution Systems

Ex: Surface Roughness Changes Eddy Upstream

30 – 60° from North Aspect Ratio of 2.5

Vitruvius

A Solution in Search of New Domain(s)

Ex: Land Use Impacts Spectral Radiance, Temperature

Thanks

Environmental Justice – A Wicked Problem

A Solution in Search of New Domain(s)

Ex: T-Zone and Lapse Rate Inversion

\*No running  
ticker

37

# Cut Works Cited/Thanks



# Cut Non-critical Content

I had one too many slides.

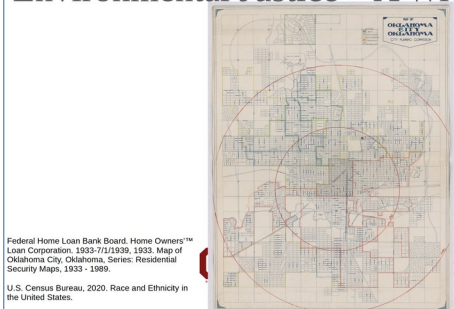
Prioritize the story over completeness.



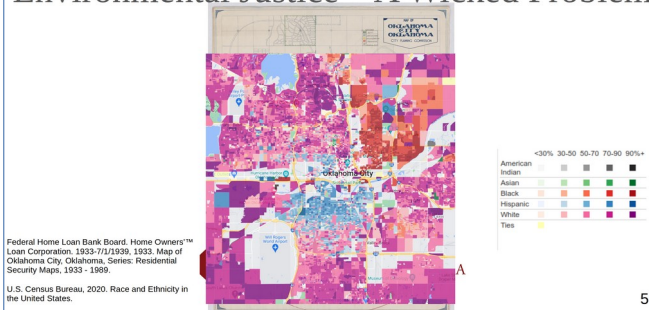


# Un-Animate Slides

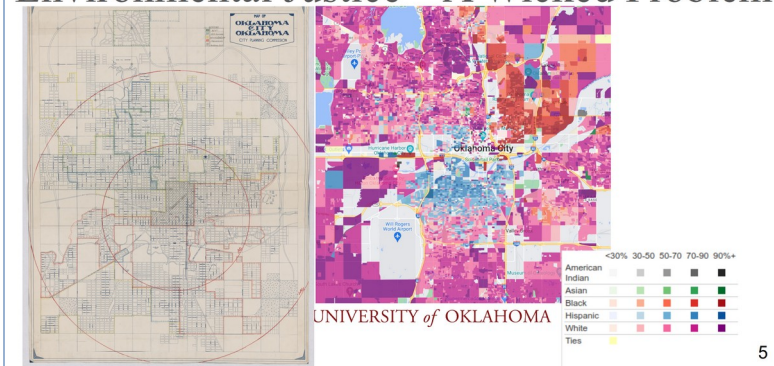
## Environmental Justice – A Wicked Problem



## Environmental Justice – A Wicked Problem

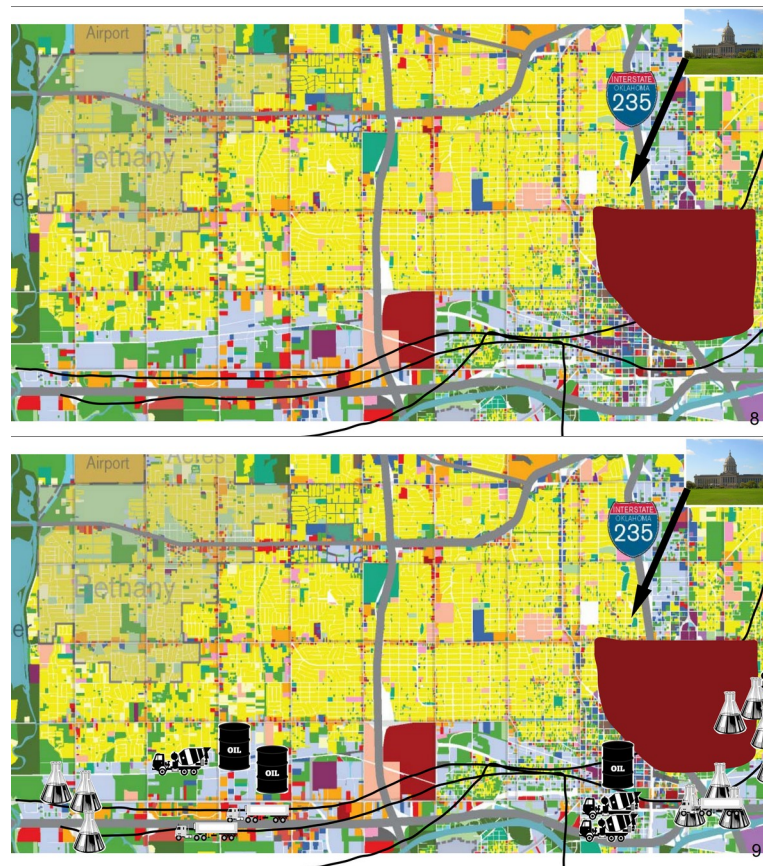


## Environmental Justice – A Wicked Problem



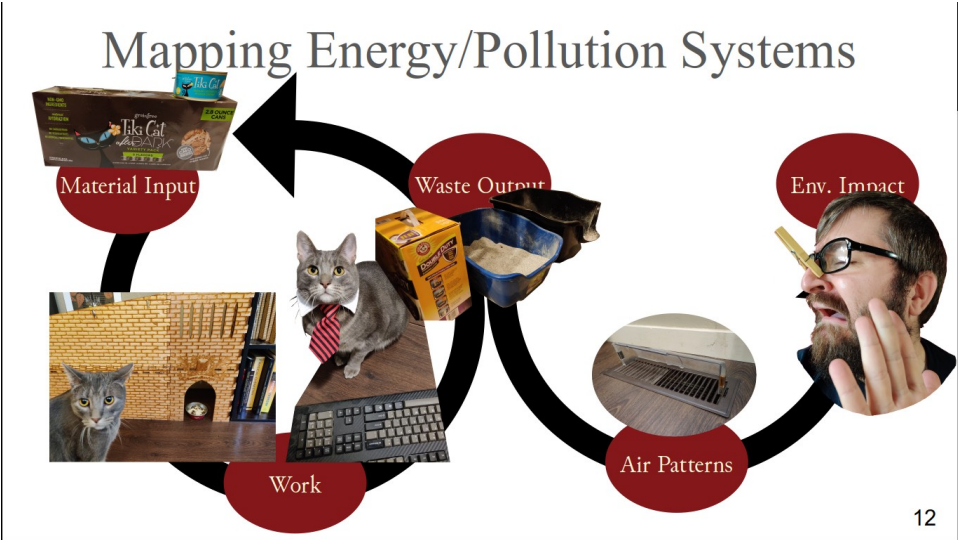
# Un-Animate; Change Story

18

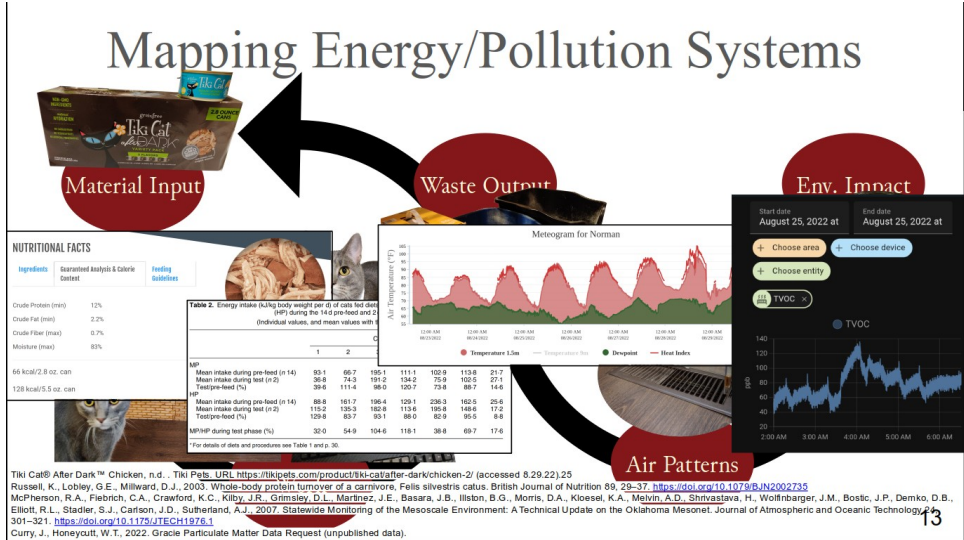




# Un-Animate; Keep Humor



12



13

# End With Credentials

If you have a  
LinkedIn,  
put it here.

If I had more  
time, I would  
include a QR  
code to my  
website.

## Talk to Me

- Wesley T. Honeycutt
- Research Scientist
- honeycutt@ou.edu



20



# The Deck

PK?

Arc

Vis.

Phys.

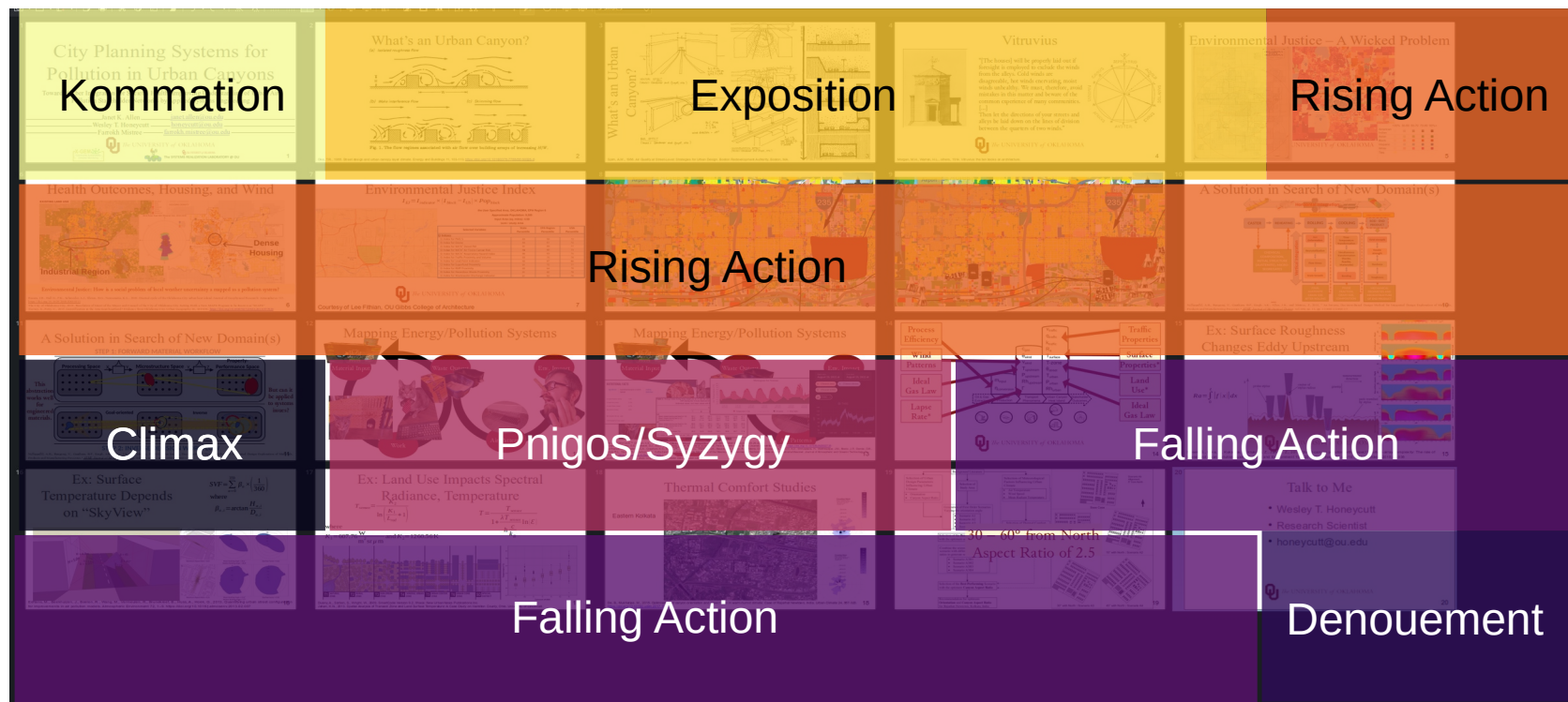
PK!







# The Deck





# Homework

- Proposed homework:
  - Pick a longer talk you have given.
  - Cut it down to the format here. Tell an interesting story.
  - Re-visit your visual information. Does it tell the story?
  - Practice it (at least) once while focusing on your body. How do you move? Can you enhance your story?
- Is anyone interested in a PK day for SRL@OU?



# Let's Talk

- How will this change how you communicate?
- I am open to talk about your projects and your stories.
- [honeycutt@ou.edu](mailto:honeycutt@ou.edu) is the best way to contact me.
- I'm de-making my website, but when it is back up, you will find me at: <http://wesleythoneycutt.com>