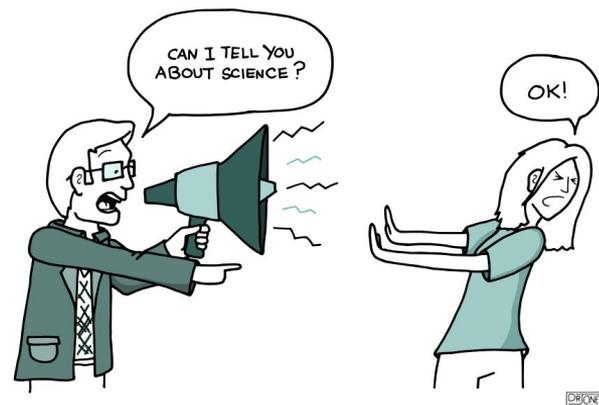


# Tips for Making Scientific Posters

Argonne ACT-SO Program

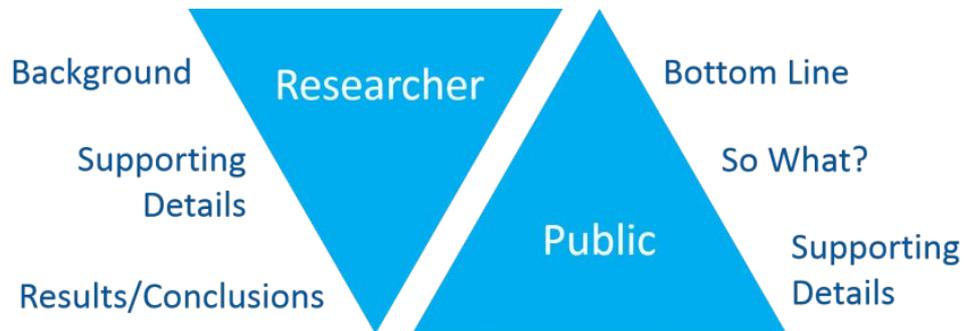
# Communicating in Three Steps

1. Know Your Audience
2. Define Three Major Points You'd Like to Communicate
3. Tell Your Story Visually, do not reproduce your paper



# Knowing your Audience

- Are you speaking to experts or the public?
- This defines what background information someone may have
- It defines what jargon you can use without explaining
- What might the audience be interested in related to my topic?
- What commonalities do I have with the audience?
- What questions might the audience ask?



Adapted from Nancy Baron's *Escape from the Ivory Tower* | AAAS | Center for Public Engagement with Science & Technology

<https://www.aaas.org/resources/communication-toolkit/>

# Defining “Three” Points

- **Why Should I Care?** Start out by communicating the "big picture" and why the audience should care. Then go into an appropriate level of detail to emphasize your key points.
- **Three-Point Structure:** What are the three things you want your audience to remember and respond to? Organize your message around these key points.



1. My research topic impacts your daily life.
2. I made measurements to understand the importance of this piece.
3. The results show why you should care about my work

# Tell Your Story

- You have your three points, now **build a story around those points** with visuals at the center.
- **Help your audience go with you on the journey with visuals** and with necessary details
- Your poster should be **self explanatory, but minimal words.**

My research topic is important for reasons .... I wanted to see if X led to Y so I setup an experiment. These are the methods I used... the results look like this... they are very different/similar from/to what we predicted... Next time we should do this to improve results.

# JARGON

- While scientific or technical terminology, also known as jargon, is useful in a particular field, it is often difficult for non-scientists to understand.
- Try out language on friends and family to get feedback on their understanding of what you are trying to say.

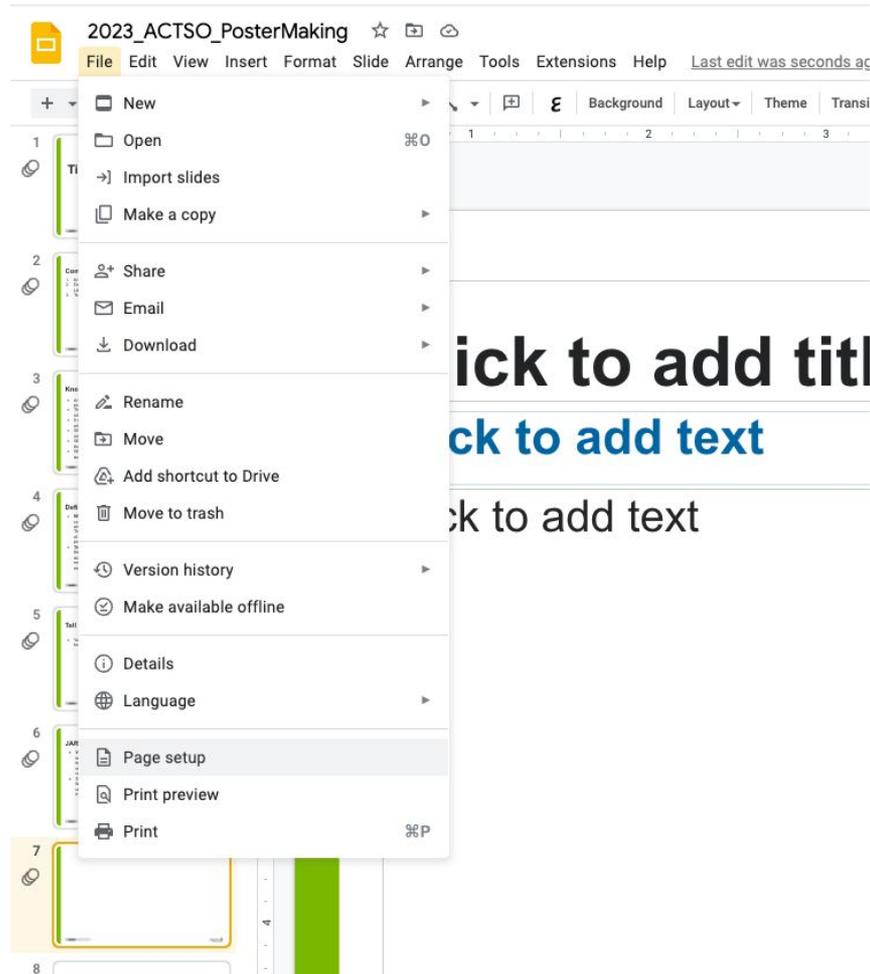
"Jargon can be, in my mind, a tool, a weapon, a wall, and/or a bridge. Jargon is important shorthand within a field, but that language can be used to keep others out, or to shut others down."

- **Joe Heimlich**

# Making a Poster

## Google Slides

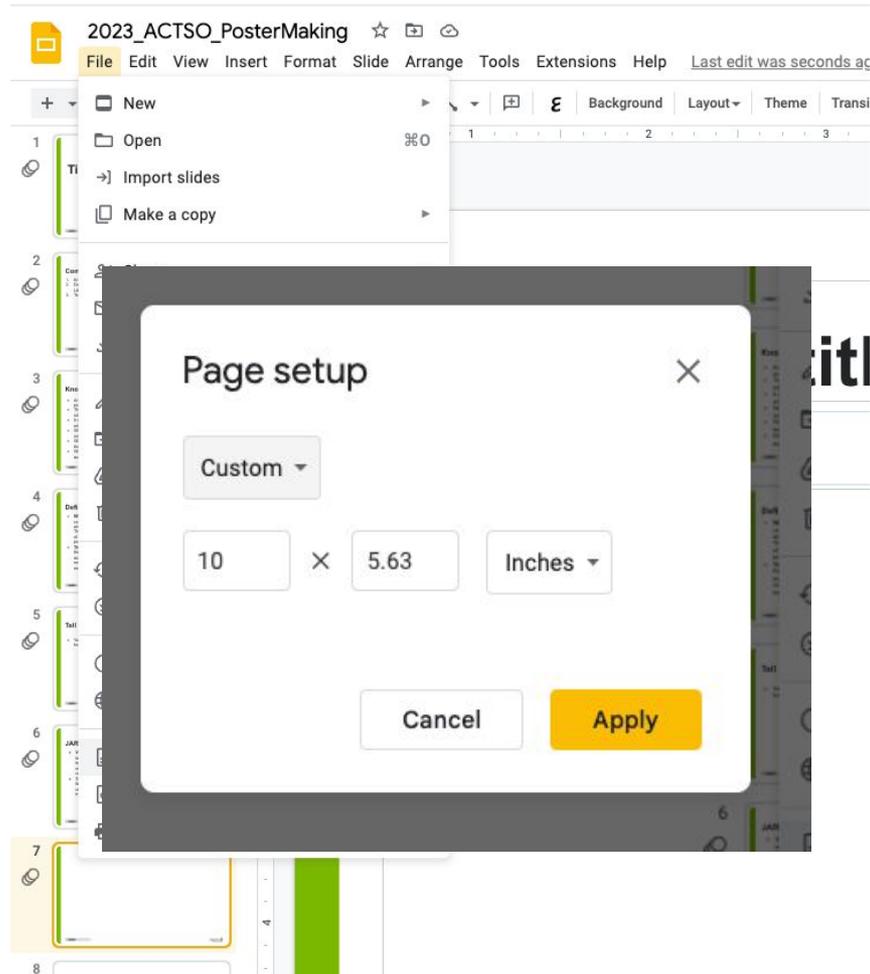
- File->Page setup



# Making a Poster

## Google Slides

- File->Page setup
- Select Custom and enter size:
  - 48 x 36 inches for landscape
  - 36 x 48 inches for portrait
- Example Template
- Example Template



# Details Matter: Font

Can you read this?

*Can you read this?*

*Can you read this?*

can you read THIS?

Use fonts that are easy and FAST to read at a distance.

This also helps non-native speakers.

Bigger is always better! But at a minimum:

72 font size for titles

48 for headings

24 for body text.



# Visual Hierarchy

- Constructed using graphic design
- negative/positive space
- Contrast
- Repetition
- Proximity
- Color
- alignment

Visual Hierarchy

**YOU READ THIS FIRST**

You will read this when skimming

You will probably not read this on a skim

You will not read this. **Unless a phrase is bolded**

*Psst... This is using "anomaly"  
to break the flow of the hierarchy. Cool huh?*

Reference

# Negative/Positive Space

- The balance between negative (background) and positive (foreground) space is important

# Negative/Positive Space

- The balance between negative (background) and positive (foreground) space is important
- Too much negative space gives an incomplete or disassociated appearance.

# Negative/Positive

## Space

- The balance between negative (background) and positive (foreground) space is important
- *Too much negative space gives an incomplete or disassociated appearance.*
- **Too little negative space gives a busy, cluttered, and difficult to read impression.**

# Types of Contrast

---



# Color Usage

- Color is powerful at bringing attention so use it carefully
- Too much is confusing, overpowering
- Stick to warm or cool colors
- Can use colors to organize content



# Color Usage

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- Too much is confusing, overpowering
- Stick to warm or cool colors
- Can use colors to organize content

## Inorganic Biochemistry of Iron Proteins

Duke University – Department of Chemistry – Durham, NC

**Purpose:**  
To study iron protein biochemistry from the perspective of the iron Protein = Ligand

**TRANSFERRIN**  
A mechanistic study of the iron release by receptor-bound transferrin using spectroelectrochemistry

**FERRIC BINDING PROTEIN**  
Role of a synergistic anion on modulating iron uptake in a bacterial transform by pathogenic bacteria: A study in kinetics and thermodynamics

**HEMOGLOBIN**  
Effects of subunit cross-linking on hemoglobin oxidation states determined by spectroelectrochemistry

**The Iron Paradox**  
Iron is needed for nearly every living cell. Iron is toxic and can produce reactive oxygen species & must be controlled.

**Iron Abundance in Humans**  
46.69 mg/kg in humans  
7% in Red Blood Cells (Hemoglobin)  
0.1% in Transferrin  
Turnover of transferrin iron is ~20 mg / 24 hours with 80% of this Fe being transported to the bone marrow for hemoglobin synthesis.  
Bacteria can also target Tf as a source of iron.

Proteins act as the 1<sup>st</sup> & 2<sup>nd</sup> coordination shell of iron and can modulate the kinetics and thermodynamics of reaction.

**Techniques:**  
Spectroelectrochemistry  
UV-Visible Spectroscopy  
Fluorescence Spectroscopy  
Difference Spectroscopy  
Stopped-Flow Kinetics  
SUPREX

**Transferrin**  
How is Fe<sup>3+</sup> removed from Tf when K<sub>d</sub> = 10<sup>-21</sup>?  
**Specificity:** When transferrin binds to a receptor, the reduction potential shifts into a biologically relevant range.

**Spectroelectrochemistry** utilizes a short pathway created by an O<sub>2</sub>/N<sub>2</sub> cell, to measure the variations in optical spectra as the analyte is oxidized or reduced by an externally applied potential. This technique is ideal for a biological analyte because only a small sample volume is required.

**Chemically modified Hb**  
-Cytochalasin  
-Polyglutination  
-Conjugation to polysaccharides & proteins

**Implications**  
Reengineering redox center not necessary  
- Does for activation not thermodynamic  
- Structural modifications provide kinetics by altering structure of heme cavity

**Transferrin**  
Iron is transported by transferrin, a short pathway created by an O<sub>2</sub>/N<sub>2</sub> cell, to measure the variations in optical spectra as the analyte is oxidized or reduced by an externally applied potential. This technique is ideal for a biological analyte because only a small sample volume is required.

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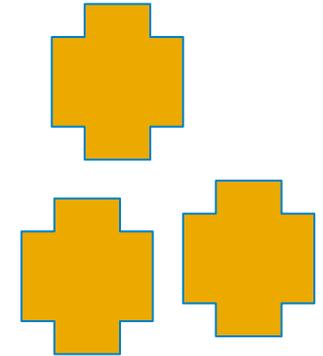
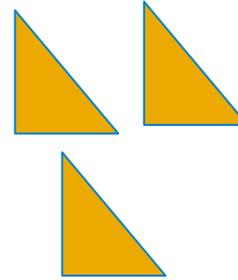
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# Proximity

- Moving elements closer or farther apart to achieve a more organized look
- Based on the idea that related items should be close together for the view, unrelated items should be separated.



# Alignment

- People like ordered visuals
- It makes them easier to digest
- More pleasing to the eye

Thing 0

Thing 1

Thing 2

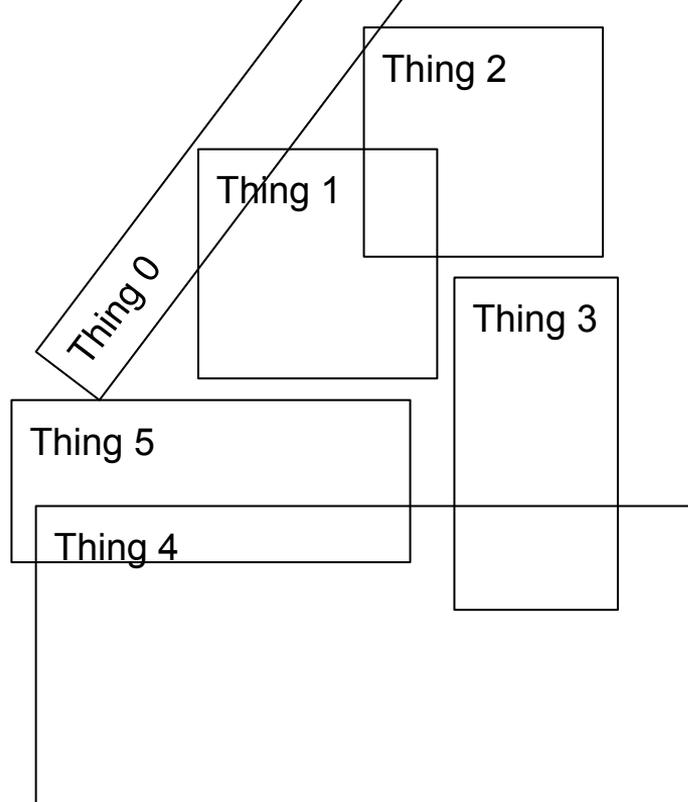
Thing 3

Thing 4

Thing 5

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- Google slides has good alignment help, use it.



# Alignment

- People like ordered visuals
- It makes them easier to digest
- More pleasing to the eye
- Google slides has good alignment help, use it.
- One exception is to emphasize

Thing 0

Thing 0

Thing 0

Thing 1

Thing 0

Thing 0

## Periodic Table

1 H Hydrogen																	2 He Helium																												
3 Li Lithium	4 Be Beryllium											5 B Boron	6 C Carbon	7 N Nitrogen	8 O Oxygen	9 F Fluorine	10 Ne Neon																												
11 Na Sodium	12 Mg Magnesium											13 Al Aluminum	14 Si Silicon	15 P Phospho...	16 S Sulfur	17 Cl Chlorine	18 Ar Argon																												
19 K Potassium	20 Ca Calcium	21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Mangane...	26 Fe Iron	27 Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	31 Ga Gallium	32 Ge Germani...	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton																												
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87 Fr Francium	88 Ra Radium	89 Ac Actinium	104 Rf Rutherford...	105 Db Dubnium	106 Sg Seaborgi...	107 Bh Bohrium	108 Hs Hassium	109 Mt Meitneriu...	110 Ds Darmsta...	111 Rg Roentgen...	112 Cn Copernic...	113 Nh Nihonium	114 Fl Flerovium	115 Mc Moscovi...	116 Lv Livermor...	117 Ts Tenness...	118 Og Oganess...																												
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- Alkaline earth metals
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- Post-transition metals
- Metalloids
- Reactive nonmetals
- Noble gases
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- Actinides
- Unknown properties

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# Pay Attention to Image Quality

# What's wrong with this example?

**PIGS IN SPACE:  
EFFECT OF ZERO GRAVITY AND  
AD LIBITUM FEEDING ON WEIGHT  
GAIN IN CAVIA PORCELLUS**

Colin B. Purrington  
6673 College Avenue, Swarthmore, PA 19081 USA

**ABSTRACT:**  
One ignored benefit of space travel is a potential elimination of obesity, a chronic problem for a growing majority in many parts of the world. In theory, when an individual is in a condition of zero gravity, weight is eliminated. Indeed, in space one could conceivably follow ad libitum feeding and never even gain an gram, and the only side effect would be the need to upgrade one's stretchy pants ("exercise pants"). But because many diet schemes start as very good theories only to be found to be rather harmful, we tested our predictions with a long-term experiment in a colony of Guinea pigs (*Cavia porcellus*) maintained on the International Space Station. Individuals were housed separately and given unlimited amounts of high-calorie food pellets. Fresh fruits and vegetables were not available in space so were not offered. Every 30 days, each Guinea pig was weighed. After 5 years, we found that individuals, on average, weighed nothing. In addition to weighing nothing, no weight appeared to be gained over the duration of the protocol. If space continues to be gravity-free, and we believe that assumption is sound, we believe that sending the overweight — and those at risk for overweight — to space would be a lasting cure.

**INTRODUCTION:**  
The current obesity epidemic started in the early 1960s with the invention and proliferation of elastane and related stretchy fibers, which released wearers from the rigid constraints of clothes and permitted monthly weight gain without the need to buy new outfits. Indeed, exercise today for hundreds of million people involve only the act of wearing stretchy pants in public, presumably because the constrictive pressure forces fat molecules to adopt a more compact tertiary structure (Xavier 1965). Luckily, at the same time that fabrics became stretchy, the race to the moon between the United States and Russia yielded a useful fact: gravity in outer space is minimal to nonexistent. When gravity is zero, objects cease to have weight! Indeed, early astronauts and cosmonauts had to secure themselves to their ships with seat belts and sticky boots. The potential application to weight loss was noted immediately, but at the time travel to space was prohibitively expensive and thus the issue was not seriously pursued. Now, however, multiple companies are developing cheap extra-orbital travel options for normal consumers, and potential travelers are also creating new ways to pay for products and services that they cannot actually afford. Together, these factors open the possibility that travel to space could cure overweight syndrome quickly and permanently for a large number of humans. We studied this potential by following weight gain in Guinea pigs, known on Earth as fond of ad libitum feeding. Guinea pigs were long envisioned to be the "Guinea pigs" of space research, too, so they seemed like the obvious choice. Studies on humans are of course desirable, but we feel this current study will be critical in acquiring the attention of granting agencies.

**MATERIALS AND METHODS:**  
One hundred male and one hundred female Guinea pigs (*Cavia porcellus*) were transported to the International Space Laboratory in 2010. Each pig was housed separately and deprived of exercise wheels and fresh fruits and vegetables for 48 months. Each month, pigs were individually weighed by duct-taping them to an electronic balance sensitive to 0.0001 grams. Back on Earth, an identical cohort was similarly maintained and weighed. Data was analyzed by statistics.

**RESULTS:**  
Mean weight of pigs in space was  $0.0000 \pm 0.0002$  g. Some individuals weighed less than zero, some more, but these variations were due to reaction to the duct tape, we believe, which caused them to be alarmed push briefly against the force plate in the balance. Individuals on the Earth, the control cohort, gained about 240 g/month ( $p = 0.0002$ ). Males and females gained a similar amount of weight on Earth (no main effect of sex), and size at any point during the study was related to starting size (which was used as a covariate in the ANCOVA). Both Earth and space pigs developed substantial dewlaps (double chins) and were lethargic at the conclusion of the study.

**CONCLUSIONS:**  
Our view that weight and weight gain would be zero in space was confirmed. Although we have not replicated this experiment on larger animals or primates, we are confident that our result would be mirrored in other model organisms. We are currently in the process of obtaining necessary human trial permissions, and should have our planned experiment initiated within 80 years, pending expedited review by local and Federal IRBs.

**ACKNOWLEDGEMENTS:**  
I am grateful for generous support from the National Research Foundation, Black Hole Diet Plans, and the High Fructose Sugar Association. Transport flights were funded by SPACE-EXES, the consortium of wives divorced from insanely wealthy space-flight startups. I am also grateful for comments on early drafts by Mañana Athletic Club, Corpus Christi, USA. Finally, sincere thanks to the Guy Foundation for generously donating animal care after the conclusion of the study.

**LITERATURE CITED:**  
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Xavier, M. 1965. Elastane Purchases Accelerate Weight Gain in Case-control Study. Journal of Obesity. 2:23-40.

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# Remember:

1. Know Your Audience
2. Define Three Major Points You'd Like to Communicate
3. Tell Your Story Visually, do not reproduce your paper

