



# KMB'25 MOBILIZING KNOWLEDGE FOR IMPACT

## CREATING INFOGRAPHICS

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# Agenda



**Welcome & Introduction**



**What Are Infographics & Why Use Them?**



**Key Elements of an Effective Infographic**



**Practical Tips for Creating Infographics**



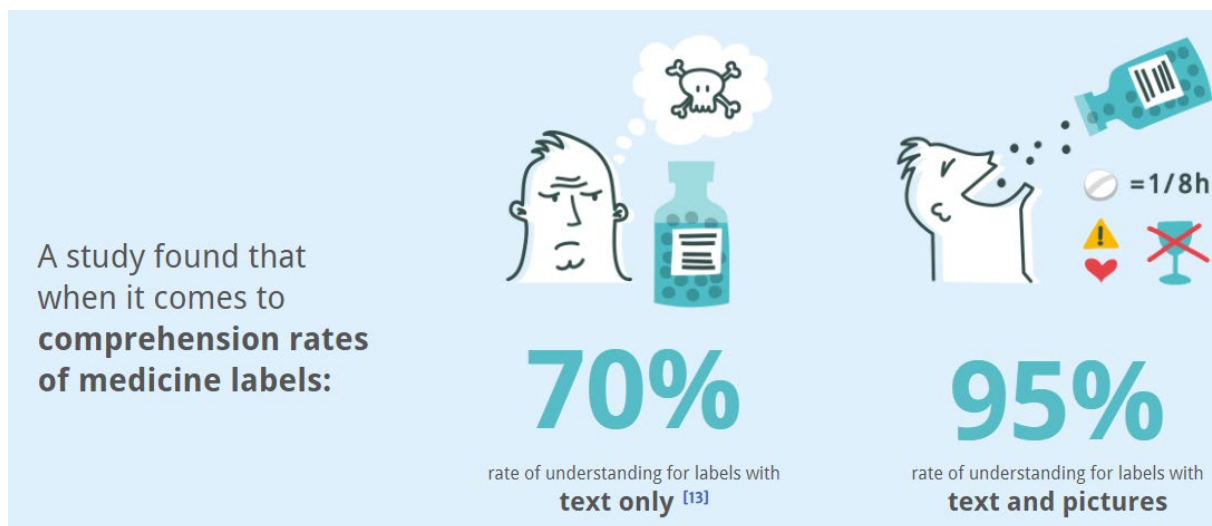
**Q&A and Hands-On Activity**



**Conclusion & Next Steps**

# What are infographics?

Infographics are combinations of text and graphics to engagingly present information quickly and clearly.



## Why is this important for Mobilizing Knowledge?

Engaging / Less Intimidating

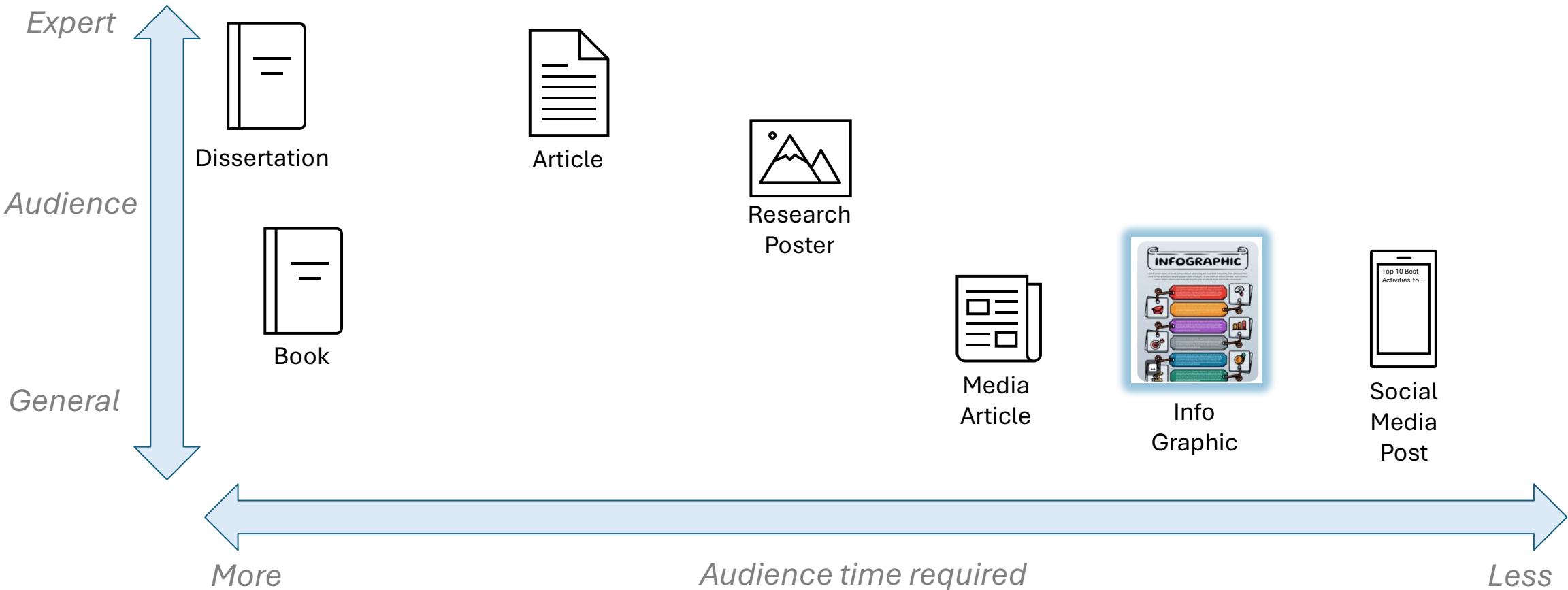
Memorable

Provide a small amount of information quickly


Generate interest

Reshape research for different audiences

# Infographic – Making Information Accessible




# A Few Examples

**How to make soapy water cleaning solution** 

Use soapy water to clean surfaces, objects, and body fluid spills.  
Make only enough solution as needed and throw out unused solution at the end of the day.

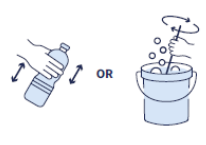
**Step 1**



Liquid soap OR Powder soap + Water


Take a clean, empty plastic bottle or bucket and add powdered or liquid soap and clean water. Use 5 grams powdered soap or 5 mL liquid soap (1 teaspoon) for every liter of water.

**Step 2**



Stir or shake well until all soap has dissolved.

**Step 3**




Label container "Soapy water for cleaning".

**How to make and use a soapy water handwashing solution**


A soapy water handwashing solution can be made by mixing water with liquid or powdered soap. Soapy water can be used just like liquid soap.

**How to make a soapy water handwashing solution**




Liquid soap OR Powder soap + 500 mL Water

Take a clean, empty plastic bottle or soap dispenser and add powdered or liquid soap and clean water. Use 10 grams powdered soap or 10 mL liquid soap (2 teaspoons) for every 500 mL water.



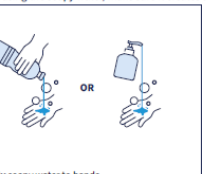
Make a small hole in the cap using a nail or other sharp object. Put on the cap and shake the bottle well until the soap is dissolved.




Shake the dispenser well until the soap is dissolved.

**How to use a soapy water handwashing solution**

When using the soapy water, make sure it creates a lather. If it does not lather, it does not have enough soap and may not be effective in removing germs.

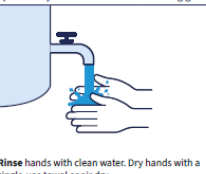


Apply soapy water to hands




40-60 sec

Rub your hands together to create a lather and scrub (entire process should take 40-60 seconds).




Rinse hands with clean water. Dry hands with a single-use towel or air dry.

**Supplies needed**



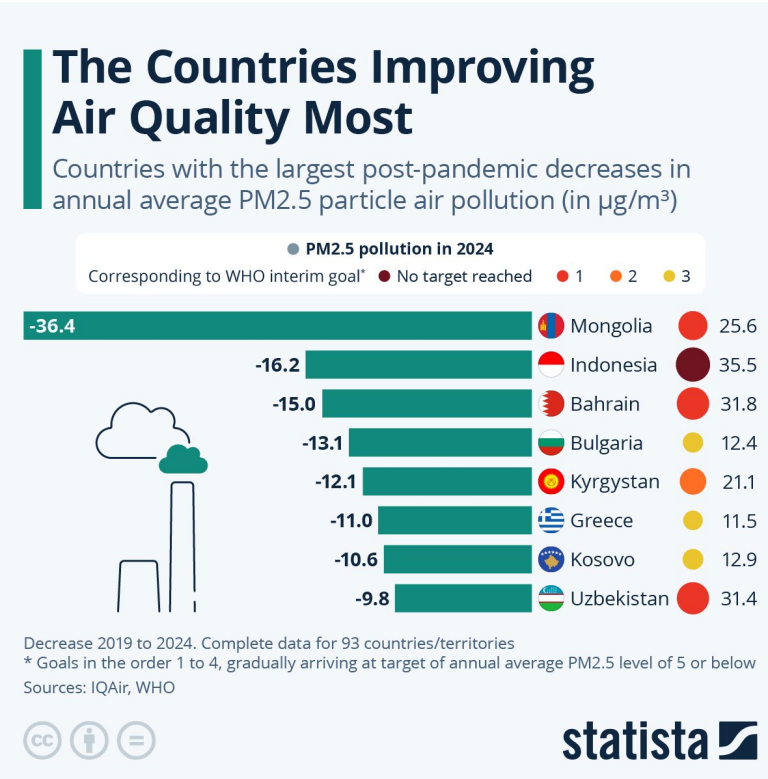
Teaspoon, Laundry detergent / powder soap or liquid soap, Bucket or clean empty plastic bottle with cap, Dispenser, Clean water, Stick for stirring, Label and pen, Nail

**1 in 3 deaths from non-melanoma skin cancer is caused by working in the sun**



**That is 19,000 lives lost per year**

<https://www.who.int/multi-media/details/1-in-3-deaths-from-non-melanoma-skin-cancer-is-caused-by-working-in-the-sun>



<https://cdn.statcdn.com/Infographic/images/normal/20113.jpeg>

<https://www.who.int/multi-media>

# A BREATHING PLANET OFF BALANCE

The amount of carbon dioxide in our atmosphere is increasing, driven primarily by the burning of fossil fuels. Half of all carbon emissions are absorbed by Earth's ocean and land. But where precisely are they going, and can it continue?

## ATMOSPHERE

THE RISE OF CARBON DIOXIDE (CO<sub>2</sub>) IN EARTH'S ATMOSPHERE CORRESPONDS TO A WARMER PLANET AND RISING SEA LEVELS.

Each year, humans release nearly 40 billion tons of CO<sub>2</sub> into the atmosphere, driving changes in Earth's climate. That is an average of about 5.5 tons for every person on the planet. But that volume is not shared equally among nations. The top four emitters (China, the U.S., the European Union and India) are responsible for nearly 60% of carbon dioxide emissions.

## LAND

HOW LONG WILL FORESTS AND OTHER PLANTS ACT AS ABSORBERS, OR SINKS, OF CO<sub>2</sub>?

As of 2015, deforestation and other land use changes contributed 3.5 billion tons of CO<sub>2</sub> to the atmosphere. Forests and other plants absorb the Earth's carbon dioxide, expelling the oxygen we need to breathe. When trees are killed by human activities, not only is CO<sub>2</sub> released, but an important carbon sink is lost.

## OCEAN

HOW MUCH CO<sub>2</sub> CAN THE OCEAN TAKE BEFORE IT REACHES A TIPPING POINT?

Where the ocean and the atmosphere touch, CO<sub>2</sub> is absorbed and carried by currents to the depths. As the ocean takes in carbon dioxide, it becomes more acidic, threatening marine life. The ocean absorbs 90% of the heat trapped by greenhouse gases, and it is warming as well. Phytoplankton, microscopic plants that bloom across miles of the ocean and form the base of the world's marine food chain, store and release carbon much like forests on land. These tiny plants, sensitive to climate change, produce more than half of Earth's oxygen.

## A DANGEROUS MILESTONE

"Passing the 400 mark reminds me that we are on an inexorable march to 450 ppm and much higher levels. These were the targets for 'stabilization' suggested not too long ago. The world is quickening the rate of accumulation of CO<sub>2</sub>, and has shown no signs of slowing this down. It should be a psychological tripwire for everyone."

Dr. Michael Gorman  
Global Change & Energy Program Manager, Project Scientist, Orbiting Carbon Observatory-2 satellite mission - NASA, Jet Propulsion Laboratory

# Mom and Baby Sleep and Mood Study

University of Victoria | Nursing  
THE UNIVERSITY OF BRITISH COLUMBIA

## Participants

**278 women**  
from all provinces in Canada completed the survey with most participants being from BC, Ontario and Alberta.

## Sleep

**6.2 hours of sleep at night (range 4-9 hours)**  
**2.4 wakes during the night on average**

**52%** rated their sleep as fairly bad or very bad  
**70%** reported infant sleep problems

**Almost 1 in 5 infants** did not meet the minimum 24 hour sleep requirements

## Mood

**31%** had intense anger  
**14%** had intense anger and probable depression  
**26%** had probable depression

**98% partnered**

## What We Learned

- Maternal sleep quality is linked to infant sleep quality
- Lower income, more children at home, probable depression, mom's sleep quality, and mom's anger about infant sleep contributed to postpartum anger

## Conclusions

- Postpartum anger is common and linked with perceptions of poor maternal-infant sleep
- Improving maternal-infant sleep may help to reduce postpartum anger and depression symptoms
- Care providers should ask about birthing persons' sleep and mood

Funding for this infographic provided by the University of Victoria Pathway to Impact Fund

# SEEING RED

Women's experiences of anger in the first two years after birth

## Intense Postpartum Anger

We interviewed a subset of 20 women who scored high on anger during the postpartum period from a larger survey study. They shared:

"We have this Incredible Hulk poster, and it says, The Monster Unleashed, and... then seeing myself as this monster being unleashed because **there's so much rage inside of me.**"

### Anger triggers:

- Violated expectations about motherhood
- Unmet needs for sleep, support, time for self
- Feeling on edge with stress, fatigue, anxiety, despair, or resentment

"I was taking care of his parents and their feelings, him, and his feelings, and the 2-year old and the 2 year old's feelings, and the new baby, and nobody was taking care of me."

### Managing anger:

- Protecting children from anger
- Expressing anger to communicate
- Hiding anger and internalizing
- Practicing self-compassion and care

"[Partner] and I, will apologize for our behavior because we know that we've crossed the line... Oftentimes we end up agreeing to disagree. There's not always a productive step forward."

### Support reduces anger:

- Shared parenting with partner
- Help and emotional support from family and friends
- Community programs and resources
- Health care provider and mental health support

"My husband and I, with our son, we switch nights and he sleeps with him. We'll take turns depending on how bad he is. It allows us to have compassion and graciousness for the other one."

For more information, visit: <https://journals.sagepub.com/doi/10.1177/10497323221120173>

Funding for this infographic provided by the University of Victoria Pathway to Impact Fund.

THE UNIVERSITY OF BRITISH COLUMBIA | University of Victoria | Nursing

<https://dspace.library.uvic.ca/items/802d5e66-6dc2-45d2-947c-dd0d1fe48a0a>

### CLIMATE EXTREMES, REGIONAL IMPACTS AND THE CASE FOR RESILIENCE

PLACES & PEOPLE MOST AFFECTED BY CLIMATE CHANGE

#### A WARMER WORLD

The global mean temperature is 0.8°C higher today than in pre-industrial times. The impacts on weather, water and sea level will continue to increase in severity as the global temperature rises.

WITHOUT CONCERTED ACTION, WE COULD SEE A +2°C SCENARIO IN 20-30 YEARS AND +4°C BY THE END OF THE CENTURY.

#### RISE IN SEA LEVEL

Current: 70 CM AS MUCH AS  
+2°C: 70 CM AS MUCH AS  
+4°C: GREATER THAN 100 CM

#### DECLINE IN WATER AVAILABILITY

Current: 50% EQUAL TO  
+2°C: 20% EQUAL TO  
+4°C: 50% EQUAL TO

#### CHANCE OF WARMING EXCEEDING 4°C BY 2100

Current: 4°C CHANGE IT WILL EXCEED  
+2°C: 5°C CHANGE IT WILL EXCEED  
+4°C: 10% CHANGE IT WILL EXCEED

#### SUB-SAHARAN AFRICA

Extreme wet monsoons that currently have a chance of occurring only once in 100 years are projected to occur every 10 years by the end of the century.

#### ECOSYSTEM SHIFTS FROM PRE-INDUSTRIAL TIMES (1850)

1.5°C: 41-51% LOSS IN UNIQUE LOCAL PLANT SPECIES IN SOUTH AFRICA AND NAMIBIA  
2°C: 10-15% OF SUB-SAHARAN SPECIES AT RISK OF EXTINCTION (ASSUMING NO MIGRATION OF SPECIES)

#### REDUCTION OF CROP-GROWING AREAS FROM PRESENT DAY

1.5°C-2°C: 40-80% MAIZE, MILLET AND SORGHUM CROPPING AREAS FOR CURRENT CULTIVARS  
3°C: GREATER THAN 90%

#### CROP YIELD CHANGES AT +2°C

WHEAT: 10-17%  
MAIZE: 5-22%  
SORGHUM: 15-17%  
REDUCTION IN CROP PRODUCTION

#### THE TIME FOR ACTION IS NOW

MANY OF THE WORST CLIMATE IMPACTS CAN STILL BE AVOIDED BY HOLDING WARMING BELOW 2°C. THE WORLD BANK IS WORKING WITH OTHERS TO DELIVER BOLD IDEAS THAT WILL MAKE THE BIGGEST DIFFERENCE.

- HELP PLACE ROBUST VALUE ON CARBON
- SUPPORT REMOVAL OF HARMFUL FOSSIL FUEL SUBSIDIES
- CARRY OUT TRIPLE WINS OF CLIMATE-SMART AGRICULTURE
- BUILD LOW-CARBON, CLIMATE-RESILIENT CITIES
- WORK WITH OTHERS TO ACCELERATE ENERGY EFFICIENCY

#### WORLD BANK CLIMATE FINANCING

\$7.1 BILLION (FOR CLIMATE MITIGATION IN 2012)  
\$4.6 BILLION (FOR CLIMATE ADAPTATION IN 2012, DOUBLE THE PREVIOUS YEAR)

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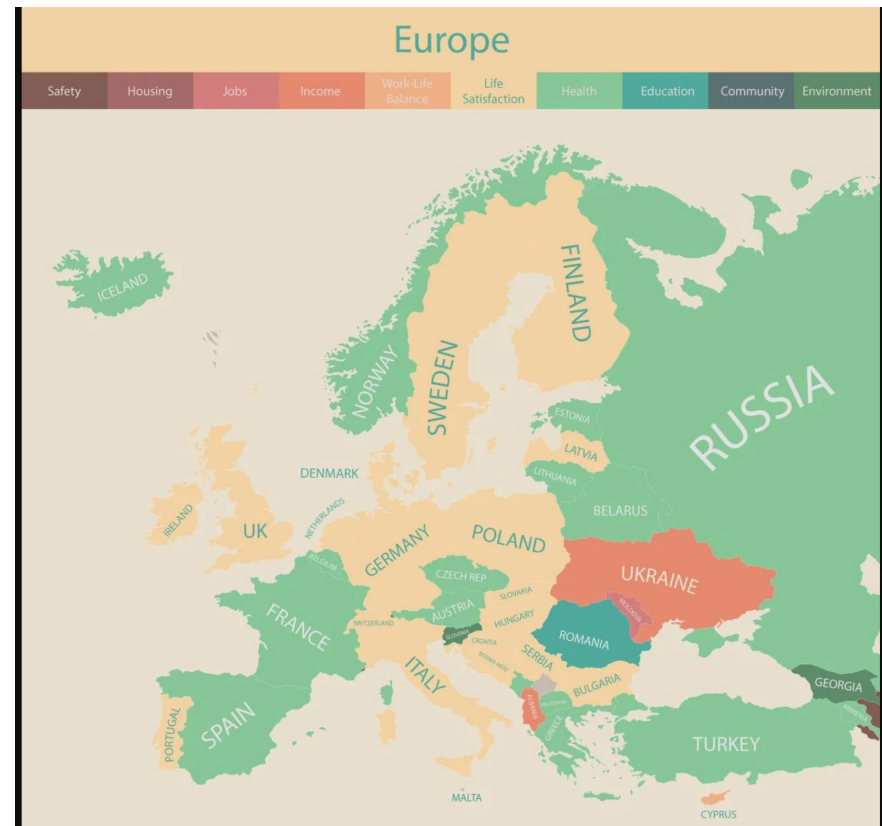
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# WHAT MATTERS MOST TO PEOPLE AROUND THE WORLD



### WHAT MATTERS MOST TO PEOPLE AROUND THE WORLD

Canada, USA, Central America, South America, Brazil, Africa, Asia, SE Asia & Australia, Australia.

movehub

<https://www.worldbank.org/en/news/feature/2013/06/19/Infographic-Climate-Change-in-Sub-Saharan-Africa-South-Asia-South-East-Asia>

<https://www.movehub.com/blog/what-matters-most-map/>





# Asthma

## What You Need To Know

**Triggers**  
"Asthma triggers", which catalyze an asthmatic reaction can be airborne allergens such as pollen/dust, respiratory infections, physical activity, cold air, air pollutants, and strong emotions and stress.

**Causes**  
Asthma is a multifactorial disease - It has genetic, allergic, environmental, infectious, emotional and nutritional components. It isn't clear why some people develop asthma and others don't, but genetics play an important role.

**Asthma is a chronic inflammatory disorder characterized by airway inflammation in the lungs, resulting in increased mucus production and airway hyper-responsiveness.**

**Clinical Manifestations**

- The clinical manifestations of asthma are caused by the obstruction of the conducting airways of the lung.
- Such manifestations include recurrent episodes of wheezing, chest tightness, coughing, and shortness of breath. Symptoms tend to worsen at night or waking from sleep.
- Symptoms are often seen in children during wintertime or within adults provoked by constant exposure to relevant allergens.

**Morphological Changes**

Asthma involves an integrated response from various cell types in the lungs. Two airway cell types critical for pathogenesis are epithelial and smooth muscle cells. Epithelial cells initiate inflammation in the airway and produce mucus, which leads to airway obstruction. Smooth muscle cells are responsible for the excessive contraction causing the airway to narrow, preventing adequate amounts of oxygen to reach the lungs.

**Asthmatic pathophysiology appears through an abnormal or inadequately regulated CD4+ T-cell immune response.**

**Cells at work**  
T-helper 2 (Th2) cells produce cytokines including interleukins IL-4, IL-5, IL-13 which stimulate growth, differentiation, and recruitment of mast cells, eosinophils, and B-cells, all that are involved in inflammation and allergic response.

**Pathogenesis**  
In asthma, this Th2 inflammatory arm of the immune system is overactive. An unknown inhaled stimulus stimulates airway epithelial cells to secrete cytokines and interleukins to react on mast and lymphoid cells to recruit hematopoietic cells and initiate the release of Th2 cytokines. The released cytokines act on epithelial cells and smooth muscle cells to drive the pathological responses such as inflammation, that contribute to asthmatic symptoms.

**Treatments**

While asthma cannot be cured, it can be controlled. There are vast amounts of medications to suppress symptoms.

**Long term control medications**

- Inhaled corticosteroids
- Leukotriene modifiers
- Combination inhalers
- Generally taken daily, these medications keep asthma under control.

**Quick relief medications**

- Short acting beta agonists
- Anticholinergic agents
- Corticosteroids
- Used as needed for rapid relief of symptoms during an attack.

**Allergy medications**

- allergy shots
- immunotherapy
- biologics
- These may help if your asthma is triggered or worsened by allergens

**Innate Immunity**  
Diagram showing pathogen recognition by a dendritic cell leading to cytokine release and leukocyte recruitment.

**References**

- Mayo Clinic. Diagnosis and treatment of Asthma.
- European Lung White Book. Childhood Asthma.
- Miller, A. L. (2003). The etiologies, pathophysiology, and alternative/complementary treatment of asthma. *Alternative medicine review*, 6(1), 20-30.

# BACTERIAL MENINGITIS

An INFLAMMATION of the MENINGES - the layers that protect your brain and spinal cord

Caused by many types of bacteria:

- Streptococcus pneumoniae*
- Neisseria meningitidis*
- Group B streptococcus*

**500,000 NEW CASES YEARLY**

**HOW DO I GET BACTERIAL MENINGITIS?**

You ACQUIRE the disease - primarily spread person-to-person through droplets, secretions, or even close contact

**HOW DOES IT WORK?**

Bacteria in the upper respiratory tract contain mechanisms that defend itself against our immune system, such as antibody cleaving proteins

The bacteria attaches to our lining and passes from our respiratory tract to our blood using these mechanisms

Once it reaches the nervous system, it attaches and crosses our blood-brain barrier using special adhesive proteins like PLC1 and CbpA

The bacteria evades our immune system in the blood, preventing our first-line of defense complement from breaking it down

Once inside, the bacteria replicates and causes inflammation of our meninges through special signalling molecules called cytokines and makes our own cells signal for inflammation

**WHICH CAUSES...**

- Inflammation of the meninges
- Breakdown of the blood brain barrier
- Cell death and clumping
- Excess fluid and swelling
- Blocked and thickened blood vessels
- Increased pressure in the skull from pus buildup

**AND YOU CAN SEE...**

- Fever
- Headache
- Sensitivity to light and sound
- Stiffening of the neck
- Temporary paralysis of limbs
- Seizures
- Loss of consciousness and coma
- Rash

**BUT!**

With a mortality rate of 34%, death can occur in a few hours if not treated, and up to 50% will have long-term detriments, like hearing loss and brain damage

**PREVENT BACTERIAL MENINGITIS:**

- Meningococcal vaccines
- Pneumococcal vaccines
- Hib vaccines

If a cerebrospinal fluid sample shows bacterial meningitis, treatment with antibiotics quickly is possible and ESSENTIAL

They are chosen by your doctor based on their judgement until your test shows what bacteria you are infected with

Meningitis. (2019, August 06). Retrieved from <https://www.cdc.gov/meningitis/bacterial.html>

Wardlaw, G. J., & Walker, R. L. (2015). Pathophysiology and treatment of meningitis. *Journal of Intensive Care Medicine*, 30(1), 1-11. <https://doi.org/10.1177/0885066614557973>

Chen, T. G., & Gargallo, R. (2019). Meningitis. *StatPearls Publishing*. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK537031/>

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# ATHEROSCLEROSIS

"Hardening of the Arteries"

**What Causes Atherosclerosis?**

Atherosclerosis takes place when blood vessels are damaged and there is fat, cholesterol, and other substances building up in the walls of arteries known as plaque. Eventually, these plaques can narrow or completely block arteries affecting blood flow leading to complications throughout the body.<sup>1</sup>

**Risk Factors**

- Smoking
- High Blood Pressure
- Unhealthy Diet
- High Cholesterol (HDL, LDL)
- Diabetes
- Obesity/Overweight
- Family History
- Lack of Exercise

**Development of Atherosclerosis**

- As a result of endothelial (inner wall) damage, there is activation of immune cells (**monocytes**).
- Accumulation or buildup of cholesterol and fat lead to foam cell formation.
- These foam cells (**macrophages**) will eventually die releasing substances leading to further vascular damage.
- This formed plaque can rupture leading to a blood clot (**thrombus**) blocking the arteries.<sup>2</sup>

**Microscopic/Macroscopic Changes**

The plaque is yellow to white in colour, and has a patchy texture. It narrows the arteries leading to an enlargement of the blood vessels as the blood vessels are dilating or expanding to improve blood flow. This plaque can rupture resulting in blood clot formation leading to a heart attack or a stroke due to reduced blood flow.<sup>3</sup>

**Clinical Signs & Symptoms**

As atherosclerosis develops gradually, early stages of the disease do not present clinical symptoms. The signs and symptoms occur as the arteries are narrowed or blocked.<sup>4</sup>

- Chest Pain
- Shortness of Breath
- Fatigue
- Muscle Pain/Weakness
- Confusion

**Treatment**

- Avoid Stress & Harmful Habits
- Exercise
- Weight Loss
- Healthy Foods
- Medication/Angioplasty Surger

**References:**

- Libby, P., Berkman, D., Weisberg, M., et al. (2002). Atherosclerosis: current hypotheses and emerging links to the brain. *Journal of Neurological Science*, 181, 1-10.
- Libby, P., Berkman, D., Weisberg, M., et al. (2002). Atherosclerosis: current hypotheses and emerging links to the brain. *Journal of Neurological Science*, 181, 1-10.
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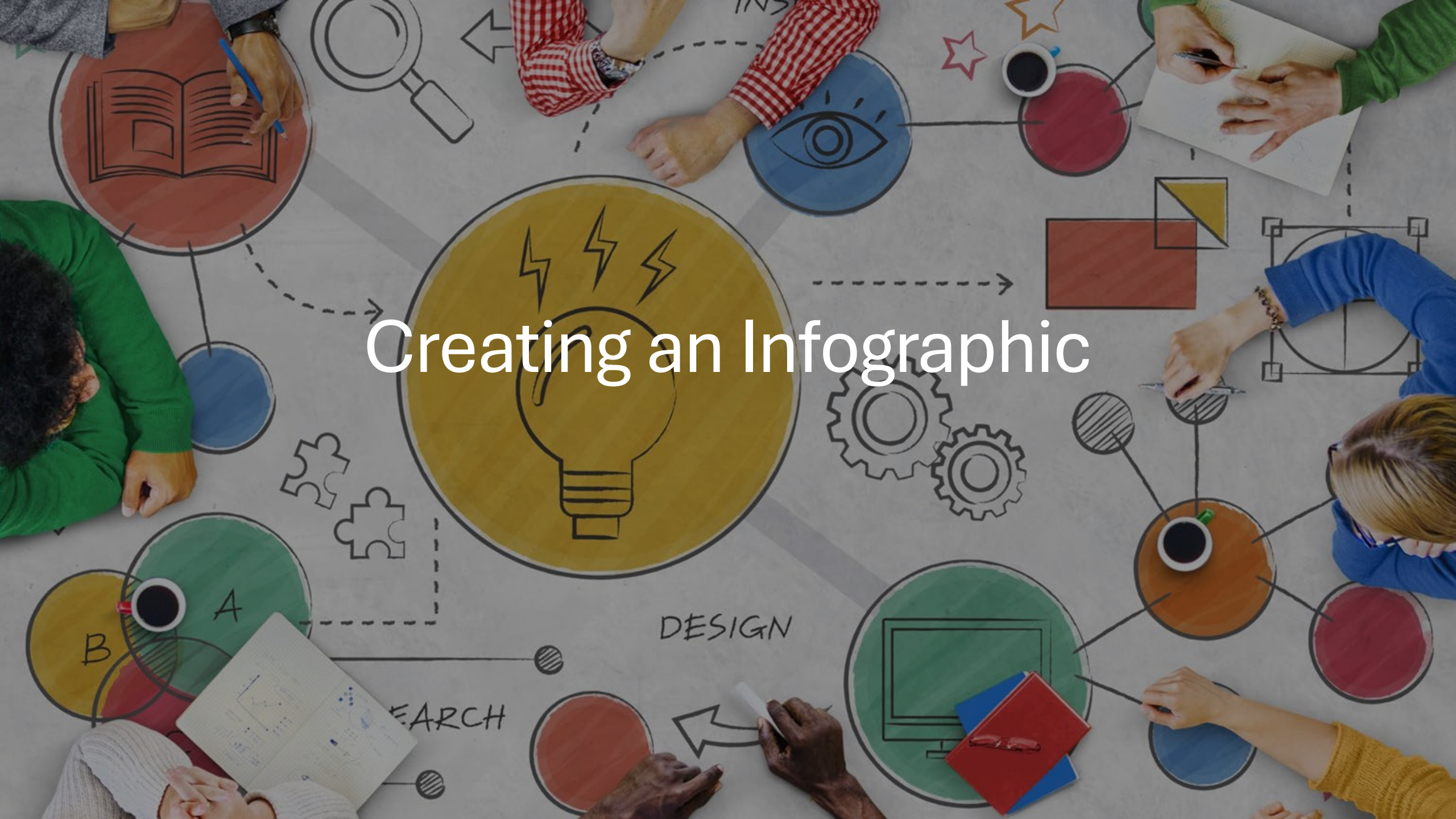
Undergraduate Infographic Course Assignments  
<https://brocku.ca/brock-news/2021/05/health-sciences-students-use-infographics-to-teach-public-about-disease/>

# Challenges

- Distilling your information
- Focusing on a specific audience; knowing what they will identify with / find interesting
- Creating visuals
- Different design considerations than a presentation or paper
- Many skills required:
  - In-depth knowledge of the research
  - Audience perspective / avoiding curse of knowledge
  - Storytelling
  - Graphics & design skills



# Creating an Infographic



# GET STARTED: THREE STRATEGIC ELEMENTS



**MESSAGE**



**AUDIENCE**



**MEDIUM**

# Message

What is your goal?



What do you want people viewing your infographic to do?

Take an action

Discover a new  
idea or other  
information

Trigger curiosity  
(to read your  
paper/book)

# Audience

## Interest

- Will they be excited about this topic?
- Have they seen messaging on this before?
- Do they have lived experience related to the message?

## Capabilities

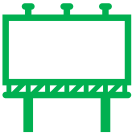
- Jargon and abbreviations
- Literacy and numeracy levels

## Circumstances

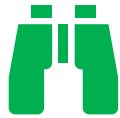
- When/where might your audience see this message
- Expectations / Stigma

# Medium

## Possibilities



**Does the media  
match your  
audience?**



**Given the media,  
will your infographic  
be accessible?**

Font sizes, colours,  
level of detail



**Social media**



**Printed - What  
size?**



**Online  
(interactive)**



**Within larger  
document?**



# Three Components

Infographics utilize three general components



Visual

[colour, typography, graphic]



Content

[facts, data, statistics]



Knowledge

[insight/perspective]

# THE PROCESS OF DESIGN

UNCERTAINTY / PATTERNS / INSIGHTS

CLARITY / FOCUS



RESEARCH



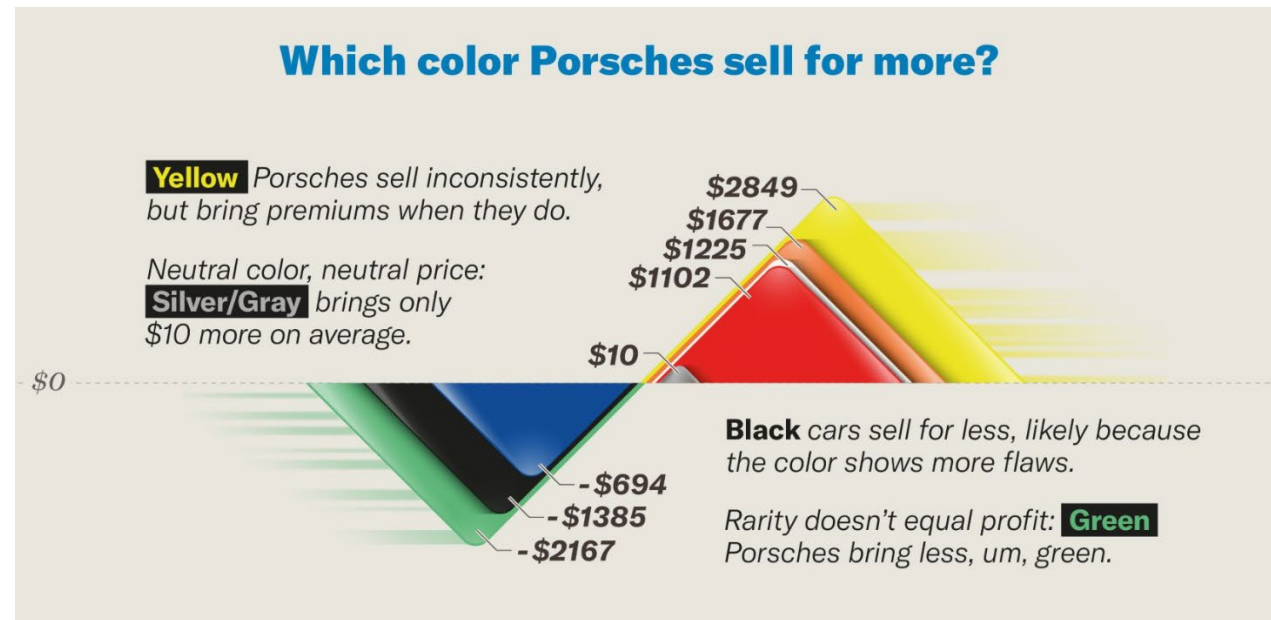
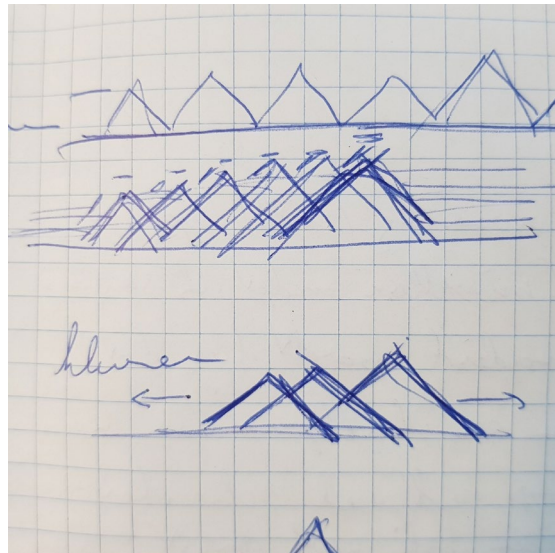
CONCEPT PROTOTYPE



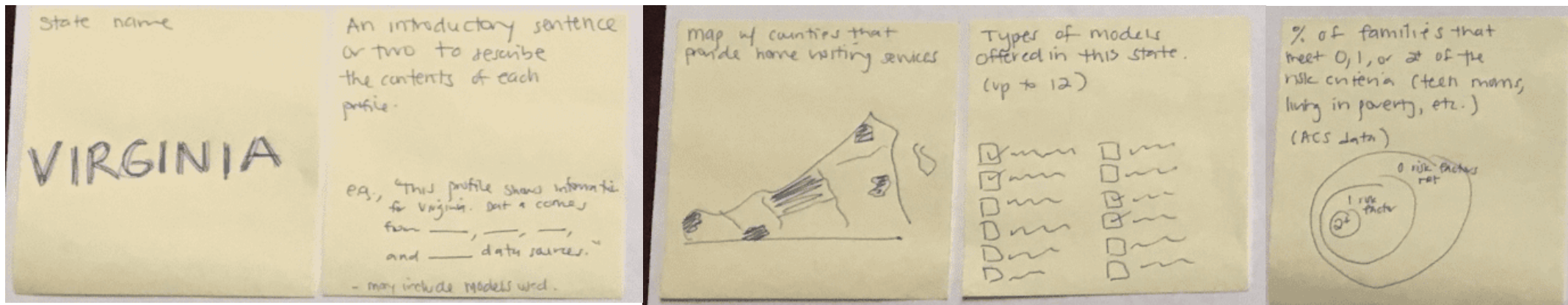
DESIGN

The Process of Design Squiggle by [Damien Newman, Central Office of Design](#) is licensed under a [Creative Commons Attribution-No Derivative Works 3.0 United States License](#).

# START BY SKETCHING

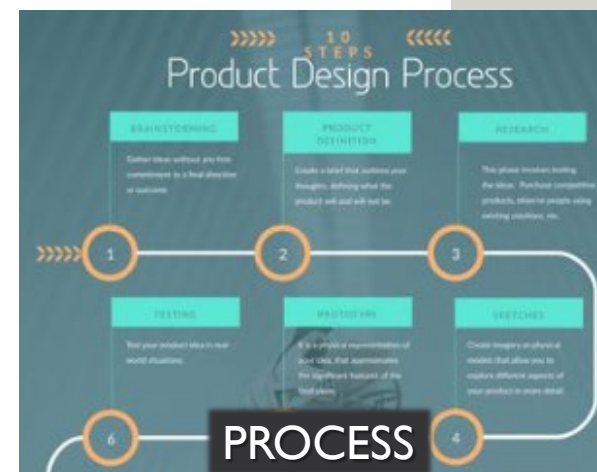
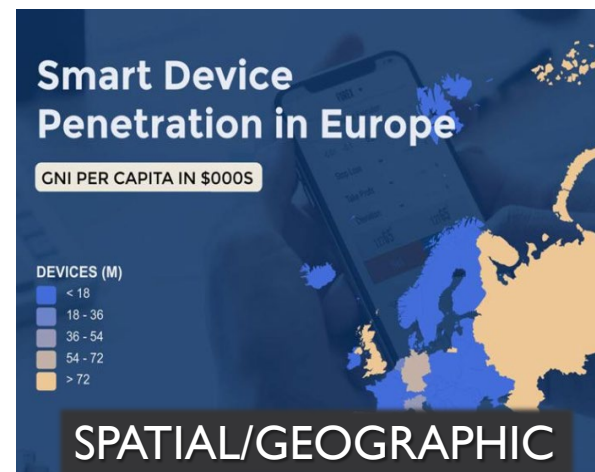
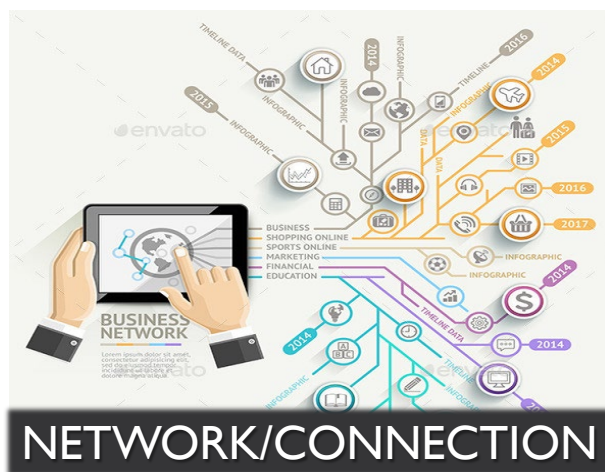
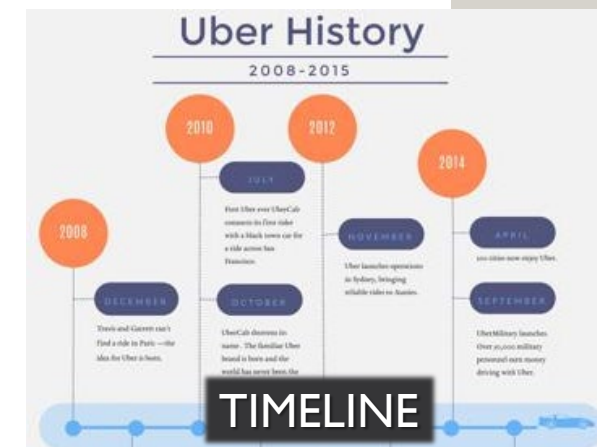
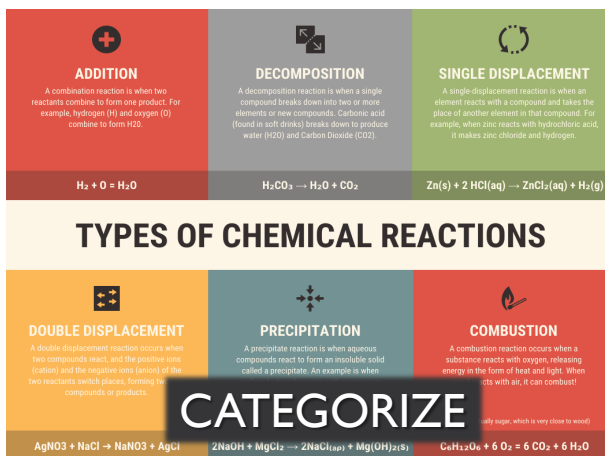
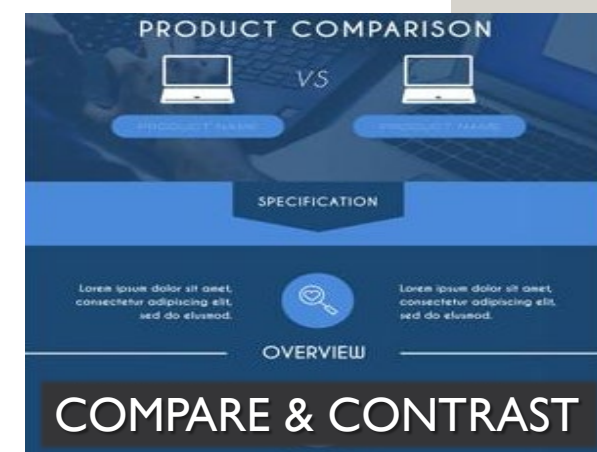
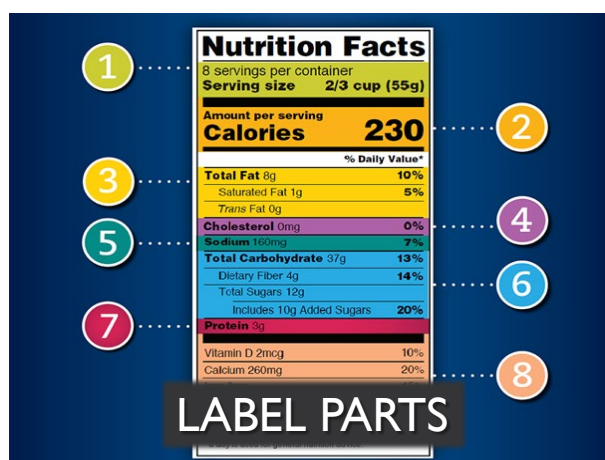


From <https://twitter.com/SonjaKuijpers/status/1351116614725472260>



From <https://depictdatastudio.com/how-drawing-makes-us-better-at-data-visualization/>

# InfoGraphic Types

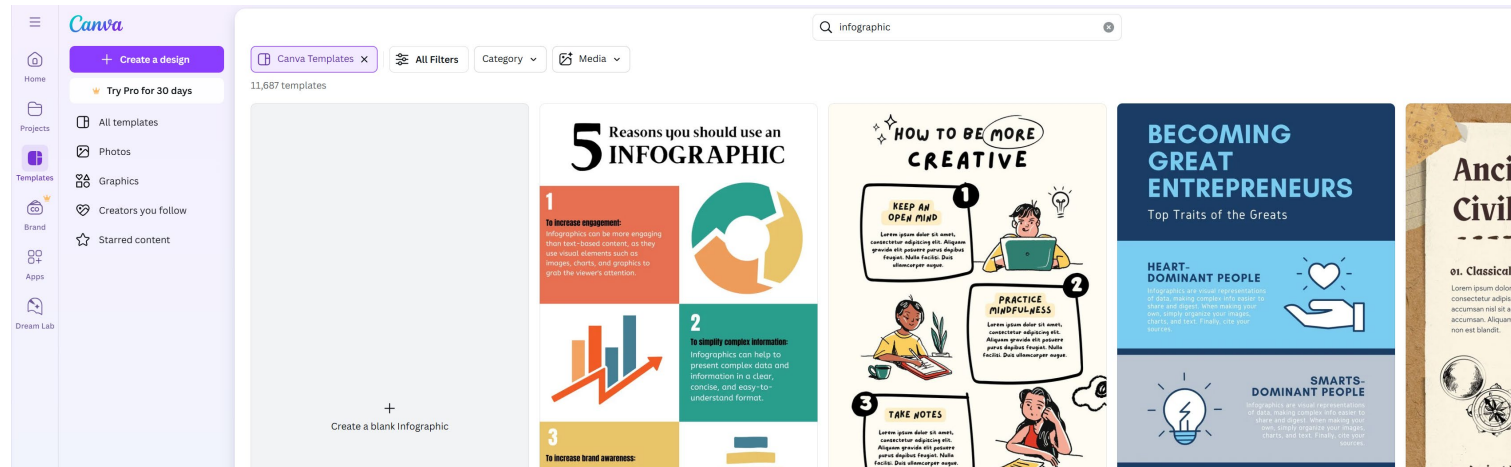


# Find Examples & Templates

Canva.com

<https://www.canva.com/templates/?query=infographic>

11.6 thousand  
infographic  
examples



Piktochart

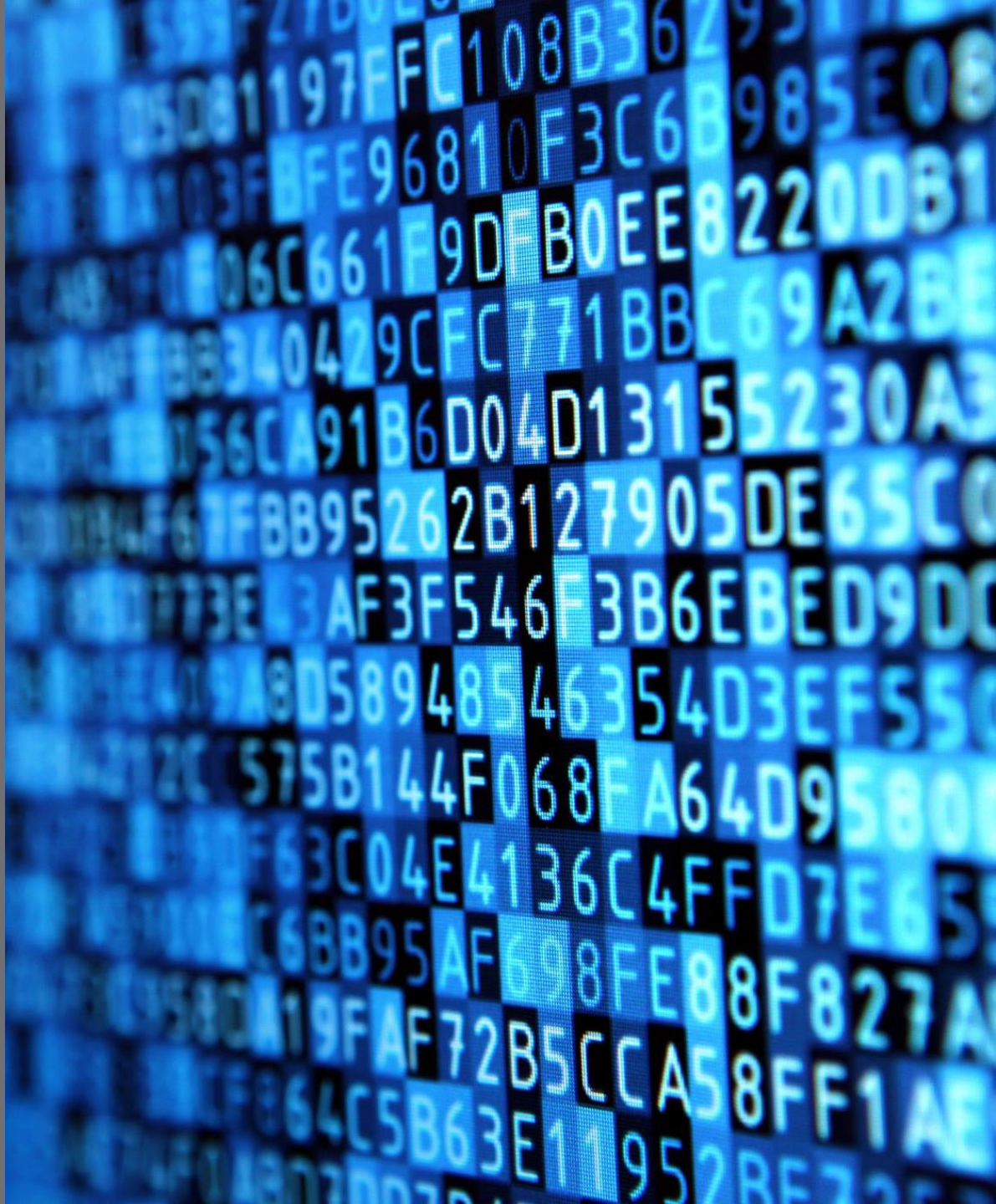
<https://piktochart.com/templates/>

Venngage

<https://venngage.com/templates/infographics>

# Design Tips

The background features a dark blue gradient with intricate, glowing patterns of green and yellow-green. These patterns consist of numerous small dots and thin, wavy lines that create a sense of depth and movement, resembling a digital landscape or a complex data visualization. The overall aesthetic is modern and technological.



# Fonts

# FONTS: THE BASICS

Serif

Sans Serif



# USE **two** TYPEFACES MAXIMUM

(OFTEN **ONE** IS ENOUGH)

INSTEAD OF MORE FONTS USE:

- **WEIGHT**
- COLOR
  - *Italics*
- **SIZE**
- case

# TYPE AND CONTRAST

Be careful  
with small  
differences  
in  
luminosity.

What works  
on your  
display may  
not work in  
general.



# Layout

# DIRECT ATTENTION

## DRAW ATTENTION TO ONE THING FIRST

THEN USE COLOR, SIZE, SPACE,  
AND PLACEMENT TO DIRECT  
VIEWERS TO THE NEXT  
IMPORTANT POINT

Walking Skyscrapers  
New York City Walking Tours  
NYU School of Architecture  
Continuing Education Program  
Fall 2004

Experience the history and variety of Manhattan's noteworthy architectural wonders—the skyscrapers that have given the city its signature skyline and inspired its residents for nearly one hundred years.

### Tour Programs

The Flatiron District September 17  
New York's first skyscraper and the industrial buildings of the early 20th Century

Lower Manhattan September 24  
Explore the concrete canyons that rose up on the site of New Amsterdam

Midtown October 5  
The corporate megaliths of the 1970s and 1980s

Sign up now! Space is limited.  
\$125 per three-hour tour. Purchase the package of three for \$275

Call the office of Continuing Education at NYU:  
212.555.2259 or visit us on the Web at  
[www.nyu.edu/arch/walk.html](http://www.nyu.edu/arch/walk.html)  
One academic credit  
Tours are open to the public

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## New York City Walking Tours

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or visit us on the Web:  
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WE TEND TO SCAN TOP TO BOTTOM  
THEN LEFT TO RIGHT



BUT...

**SIZE & COLOR** CAN

PREEMPT THAT ORDER

# 755

## Steroids or Not, the Pursuit Is On

Barry Bonds is taking aim at the career home run record. He needs only six more to tie Babe Ruth and 47 to equal Hank Aaron.

Lines are cumulative home runs.

**Hank Aaron**  
755 homers  
23 seasons



**Babe Ruth**  
714 homers  
22 seasons



**Barry Bonds**  
708 homers  
20 seasons



**Bonds takes lead**  
Home runs  
after 16 seasons  
Bonds 567  
Aaron 554  
Ruth 516

600

714

755

20 seasons

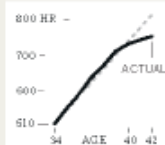
Bonds was injured last season. He played 14 games and hit 5 homers.

### Homer Pace After Age 34

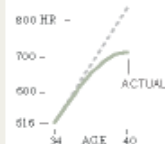
If the accusations are correct, Bonds was 34 in his first season on steroids. Here are projected home run paces for each player after age 34.

----- PROJECTED PACE BASED ON AVERAGE OF PREVIOUS FIVE SEASONS

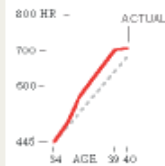
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Actual homers slightly outpace projected homers for five seasons.



**Ruth**  
Averaged 46.4 homers a season from age 30 to 34. Averaged 42.5 for next four seasons.



**Bonds**  
From age 35 to 39, he averaged 14 more homers a season than projected.



Note: Ages as of July 1 of each season.

According to allegations in a book about Bonds, he began taking steroids before the 1999 season, his 14th in the league. Two seasons later, he hit 73 home runs, surpassing Aaron's career pace.

14th season

400

200

0

5 seasons

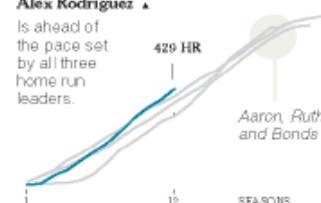
10

15

### Others Taking Aim



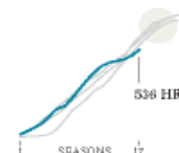
**Alex Rodriguez**  
Is ahead of the pace set by all three home run leaders.



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Averaging 40 homers a season, he has started stronger than the three leaders did.

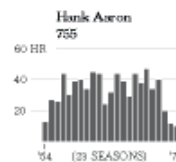


**Ken Griffey Jr.**  
Many thought he would be the first to catch Ruth and Aaron until injuries limited his output.

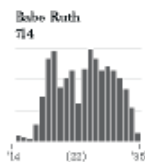


### Differing Paths to the Top of the Charts

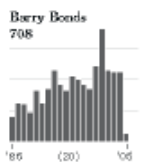
The top seven players on the career home run list, along with a look at Griffey (12th), Rodriguez (37th) and Pujols (tied 257th).



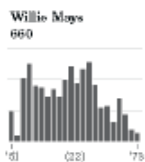
15 times hit 30 or more (M.L. most).



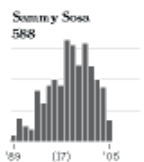
Hit only 20 over first five seasons.



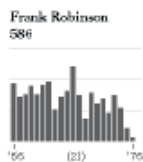
Averaged 52 from 2000 to 2004.



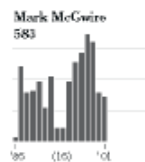
No one hit more from 1950-69.



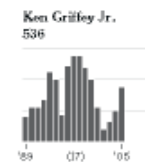
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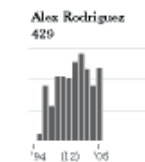
Triple Crown in '66 (49, 122, 316).



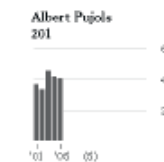
First to hit 70 in a season.



Only McGwire had more in the 90's.



Youngest to reach 400 homers.



Second most ever in first five seasons.

# BEGINNING



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23 seasons

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22 seasons

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20 seasons

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Home runs  
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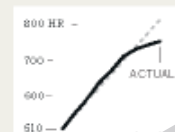
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Ruth 516

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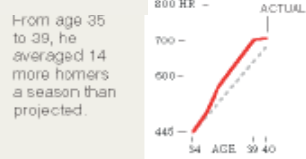
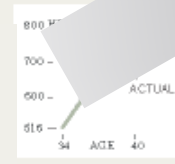
### Aaron

Actual homers slightly outpace projected homers for five seasons.



### Ruth

From age 35 to 39, he averaged 14 more homers a season than projected.



Note: Ages as of July 1 of each season.

Others  
Taking Aim



Alex Rodriguez

# END

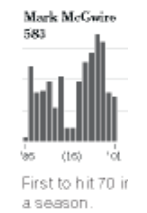
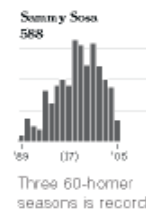
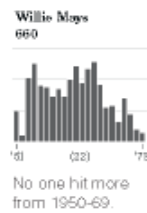
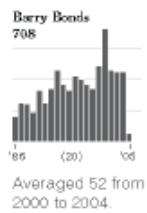
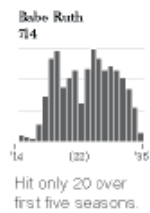
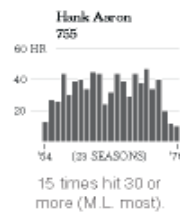
# MIDDLE

**Albert Pujols**  
Averaging 40 homers a season, he has started stronger than the three leaders did.

**Ken Griffey Jr.**  
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## Differing Paths to the Top of the Charts

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# EPILOGUE

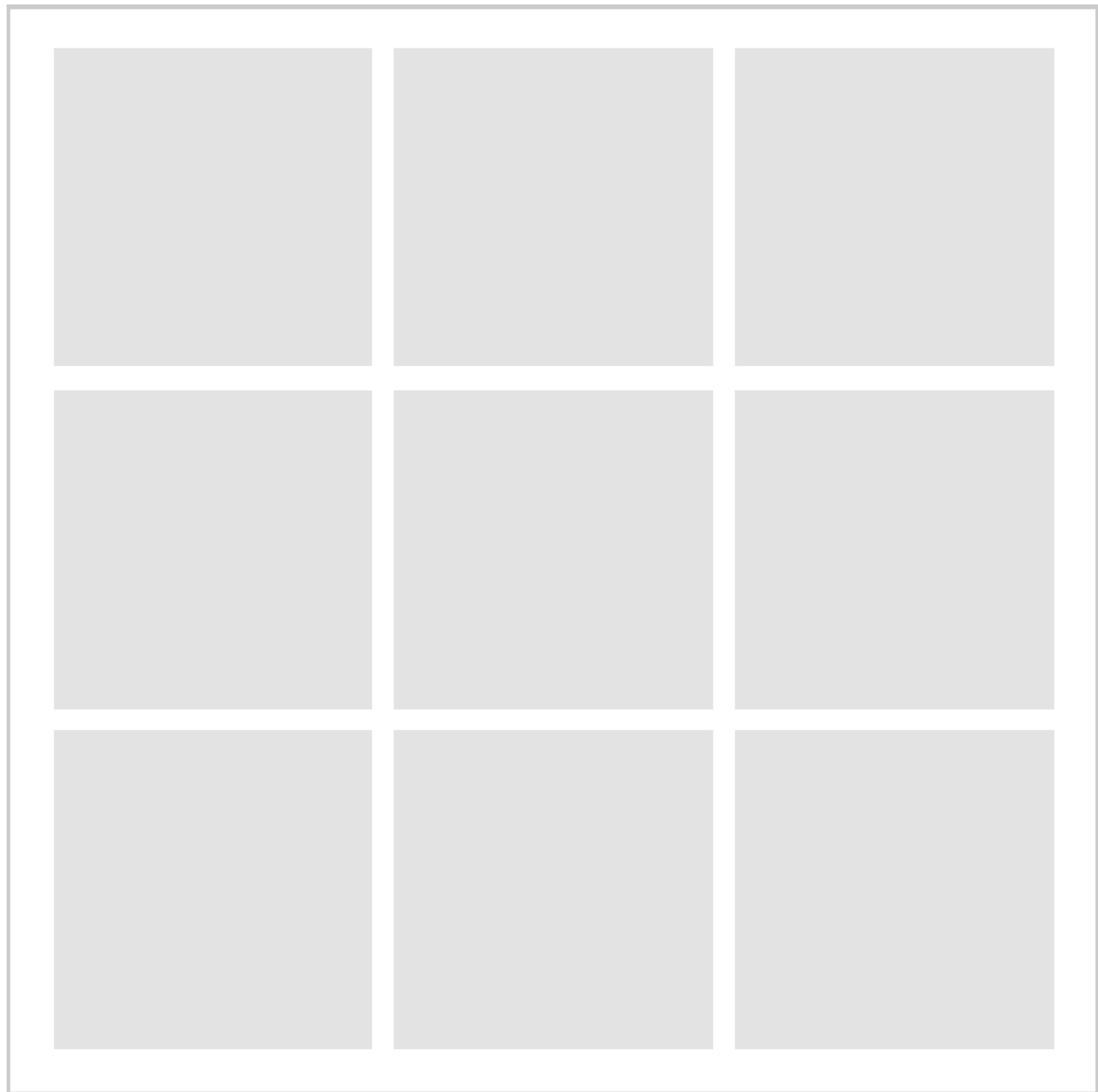
Illustration by Alex Ward/The New York Times



# THE GRID

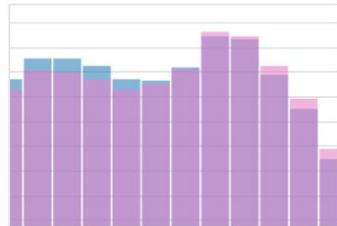
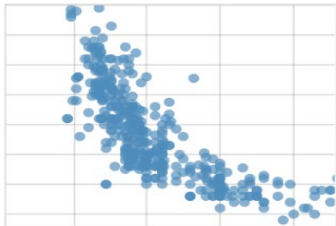
A TOOL TO ORDER AND UNIFY SPACE

# MODULAR GRIDS

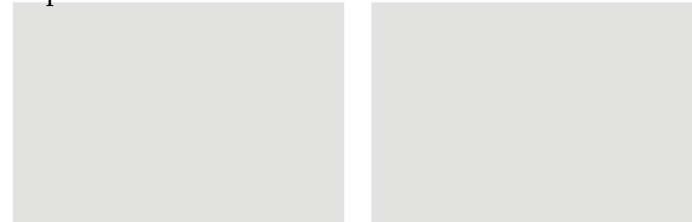
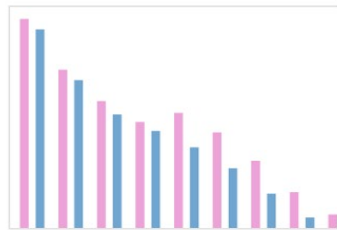


# A BIG DISCOVERY

12 April 2022



The lysine contingency - it's intended to prevent the spread of the animals in case they ever got off the island. Dr. Wu inserted a gene that makes a single faulty enzyme in protein metabolism. The animals can't manufacture the amino acid lysine. Unless they're continually supplied with lysine by us, they'll slip into a coma and die.



**COMBINING  
&  
SPLITTING  
PROVIDES A  
CONSISTENT  
WAY OF  
LAYING OUT  
SPACE**

# 755

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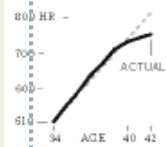
**Bonds takes lead**  
Home runs after 16 seasons:  
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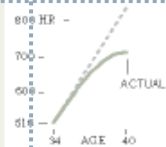
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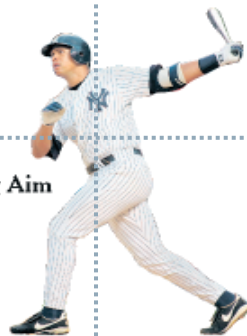
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### Others Taking Aim



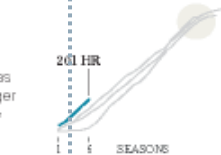
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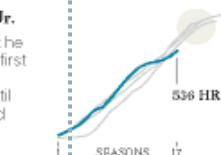
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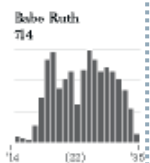
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### Differing Paths to the Top of the Charts

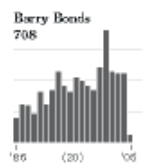
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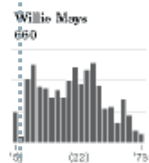
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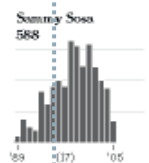
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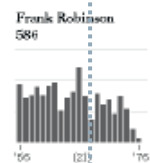
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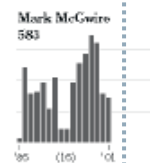
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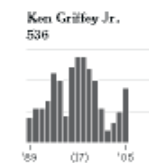
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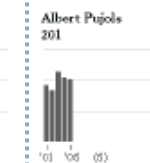
First to hit 70 in a season.



Only McGwire had more in the 90's.



Youngest to reach 400 homers.



Second most ever in first five seasons.

# LIAR LIAR

Most of us like to think we can get ahead in life while keeping our noses clean. But, as Ian Leslie explains, we only got to the top of the evolutionary tree because we had a gift for misrepresentation

Y

ou could call it humanity's dirty little secret. What helped to make us the most intelligent species on Earth was, to be honest, our talent for deception.

The human brain, possibly evolution's most impressive achievement, is also a bit of a mystery. We have much bigger brains, relative to our bodies, than any other mammal. Our hominid ancestors had brains about a third the size of ours. At some point between 2 and 15 million years ago, our ancestors' brains began to expand, and at quite a rate. Scientists have never been sure why.

For a long time, the nearest thing to an accepted explanation was that our intelligence resulted from our facility for making tools. But in the early 1980s, two young primatologists at the University of St Andrews began to wonder if it wasn't linked to something less flattering to our self-image: a capacity for deceit.

Richard Byrne and Andy Whiten had read descriptions of chimpanzee trickery in the works

of Jane Goodall, and during their own fieldwork in the Drakensberg mountains of South Africa they noticed baboons engaging in deceptive behaviour. For instance: a young baboon gets in trouble with several elders, including his mother, for attacking another member of the group. When he hears them coming for him, grunting aggressively, he stands and stares into the distance. The elders, thinking that a predator or rival troop must be approaching, stop and stare too. There is no threat. But the elders are distracted enough to forget what they came running over for.

Another example: an adult male baboon shoves a female off her feeding patch. Rather than protest or retreat, she flicks her gaze in a characteristic way from him to a younger male who is happily feeding nearby. The first male charges over to the younger one and chases him away. The female, meanwhile, returns to her patch and resumes feeding.

When Byrne and Whiten asked around, their colleagues regaled them with similar anecdotes. The two developed a hunch: that these stories represented something beyond aberrant aspects of primate behaviour, and that our closest relatives — chimps, gorillas and orang-utans — are practised, habitual deceivers. Byrne and Whiten also began to suspect that such behaviour might be linked to the development of primate intelligence: those animals with the mental sophistication to trick their way into getting more food, as our female baboon did, would have had a reproductive edge. Through the slow work of natural selection, the primate brain evolved to cope with the demands of such trickery.

So a connection between deception and mental capacity in our primate ancestors might help to explain the development of our own brains. This was an exciting thought. But initially, Byrne and Whiten found it hard to get any of their research published despite amassing a substantial body of evidence. Deception just was not a subject that many in their field took seriously.

**VERVET**  
Average group size

24



Average neocortex size  
(cubic centimetres)

61.4

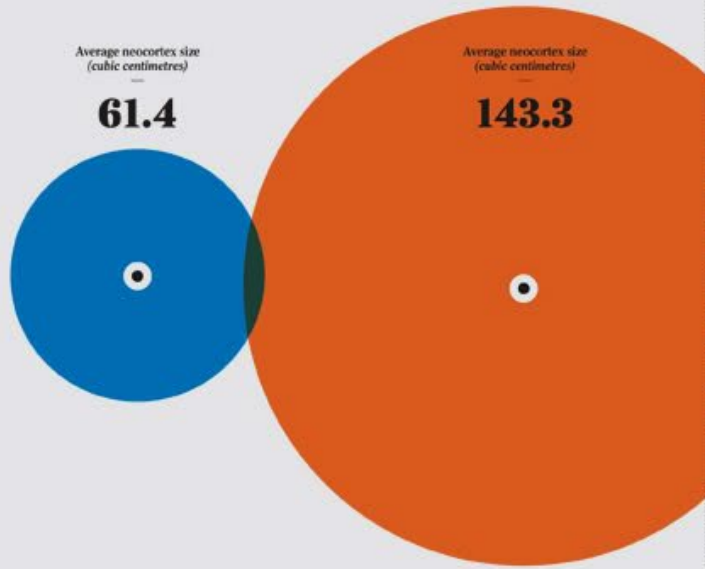
**YELLOW BABOON**  
Average group size

39



Average neocortex size  
(cubic centimetres)

143.3



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In 1988 the two primatologists finally published their work in the form of a book, *Machiavellian Intelligence*. An unsettling read, it explored "the idea that intelligence began in social manipulation, deceit and cunning co-operation", showing that animals, far from living in a state of innocence, are as manipulative and underhand as the worst of our own species. It was persuasive too, making a big impact not only in primatology but in psychology, anthropology and medicine.

Byrne and Whiten believed that what they termed Machiavellian intelligence was linked to the size of the group an animal lived in: the bigger the group, the more complex the calculations individuals needed to make to survive. But there was little hard evidence for this until 1992, when Robin Dunbar, at the University of Liverpool, came up with a way to demonstrate a link between brain size and the complexity of an animal's social life.

Dunbar, too, had noticed that the size of a primate's brain appeared to be related to the size of the group it lived in. Baboons have big brains and live in big groups; vervets, who have smaller brains, live in smaller groups. He decided to investigate by looking at the neocortex. This is the "thinking" part of the brain: the part that deals with abstraction, self-reflection and planning. It was also the part that showed such rapid expansion in primates — especially humans — two million years ago.

Dunbar plunged into the vast accumulation of primate data from around the world, looking for a correlation between the size of an animal's neocortex and the size of its social groups. He found a link so strong that he was able to predict, with impressive accuracy, the group size of a species he hadn't looked at, just by knowing its brain size. He even came up with a prediction for human →

## SEEING IS DECEIVING

Many species, not just primates, practise deception as one of their survival strategies. The eastern hognose snake will, if threatened, fake its own death by rolling over on its back, emitting a foul stench and letting its tongue loll out of its mouth. The mimic octopus, found in the waters off Bali in Indonesia, can disguise itself as one of several other sea creatures, all the better to lure its prey.

Even plants deceive. The mirror orchid of North Africa produces small flowers to attract potential pollinators. The flowers have no nectar, but the orchids have a special ruse to seduce the wasps that pollinate them: they impersonate female wasps. The blue-violet centre of the flower resembles the wings of a female wasp at rest, while a thick set of long red hairs imitates the hairs on the insect's abdomen. It's bait — insect porn for horny male wasps.

### THE MIMIC OCTOPUS...

... as a sea snake



... as a lion fish



... and a flatfish



### BRAIN SIZE

2.5-1.6 million years ago  
(*Homo habilis*)

1.8-1 million years ago  
(*Homo erectus*)

600,000 years ago  
(*Homo neanderthalensis*)

200,000 years ago  
(*Homo sapiens*)



HEADLINE

# LIAR LIAR

Most of us like to think we can get ahead in life while keeping our noses clean. But, as Ian Leslie explains, we only got to the top of the evolutionary tree because we had a gift for misrepresentation

## DECK OR STANDFIRST (ARTICLE SUMMARY) INTRODUCE CONTENT/PROVIDE INSTRUCTIONS

**Y**ou could call it humanity's dirty little secret. What helped to make us the most intelligent species on Earth was, to be honest, our talent for deception.

The human brain, possibly evolution's most impressive achievement, is also a bit of a mystery. We have much bigger brains, relative to our bodies, than any other mammal. Our hominid ancestors had brains about a third the size of ours. At some point between 2 and 1.5 million years ago, our ancestors' brains began to expand, and at quite a rate. Scientists have never been sure why.

For a long time, the nearest thing to an accepted explanation was that our intelligence resulted from our facility for making tools. But in the early 1980s, two young primatologists at the University of St Andrews began to wonder if it wasn't linked to something less flattering to our self-image: a capacity for deceit.

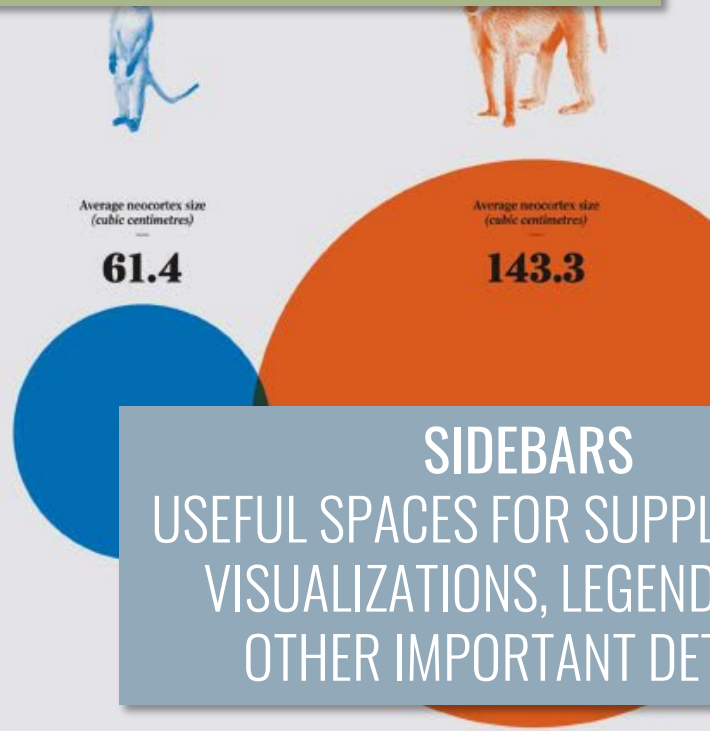
Richard Byrne and Andy Whiten had read descriptions of chimpanzee trickery in the works

of in the bel tro for he sive eld be appr... threat. But the elders are distracted enough to forget what they came running over for.

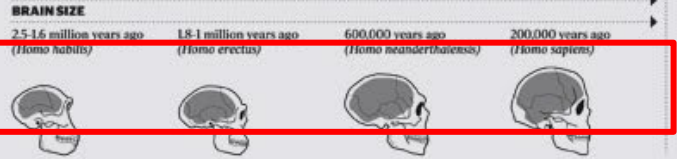
Another example: an adult male baboon shoves a female off her feeding patch. Rather than protest or retreat, she flicks her gaze in a characteristic way from him to a younger male who is happily feeding nearby. The first male charges over to the younger one and chases him away. The female, meanwhile, returns to her patch and resumes feeding.

When Byrne and Whiten asked around, their colleagues regaled them with similar anecdotes. The two developed a hunch: that these stories represented something beyond aberrant aspects of primate behaviour, and that our closest relatives — chimps, gorillas and orang-utans — are practised, habitual deceivers. Byrne and Whiten also began to suspect that such behaviour might be linked to the development of primate intelligence: those animals with the mental sophistication to trick their way into getting more food, as our female baboon did, would have had a reproductive edge. Through the slow work of natural selection, the primate brain evolved to cope with the demands of such trickery.

So a connection between deception and mental capacity in our primate ancestors might help to explain the development of our own brains. This was an exciting thought. But initially, Byrne and Whiten found it hard to get any of their research published despite amassing a substantial body of evidence. Deception just was not a subject that many in their field took seriously.



## SIDEBARS USEFUL SPACES FOR SUPPLEMENTAL VISUALIZATIONS, LEGENDS, AND OTHER IMPORTANT DETAILS



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... the size of a primate to the size of its brain. He found that primates with big brains and large social groups had to have smaller brains relative to their body size. This is the part that deals with social interaction and planning. It is a very rapid expansion — two million years ago, the average primate brain was the size of a primate's neocortex. He found a way to predict, with a high degree of accuracy, the size of a species he was looking at, just by knowing its brain size. He even came up with a prediction for human

### SEEING IS DECEIVING

Many species, not just primates, practise deception as one of their survival strategies. The eastern hog-nose snake will, if threatened, fake its own death by rolling over on its back, emitting a foul stench and letting its tongue loll out of its mouth. The mimic octopus, found in the waters off Bali in Indonesia, can disguise itself as one of several other sea creatures, all the better to lure its prey.

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#### THE MIMIC OCTOPUS...

... as a lion fish

... and a flatfish



# MINIMALISM

IF YOU CAN DO IT WITH LESS, **DO IT!**

TRY TO SHOW **ONLY WHAT'S NECESSARY.**

USE DESIGN TO **COMMUNICATE**, NOT DECORATE.





From <https://www.weidert.com/blog/avoid-boring-visuals-and-create-effective-usable-infographics>

## A MATTER OF *life & death*

This chart displays the time it takes for fruit to rot beyond edibility. Savour the sweetness before it disappears.

**apple**  
7 days

**con**  
As soon as an apple is cut into, it begins to oxidize into brown mush.

**pro**  
Apples are full of fibre, which is good for healthy digestion.

**banana**  
4 days

**con**  
An enzyme called tyrosinase reacts with oxygen to speed up the process of rotting in cut bananas.

**pro**  
Rich in potassium, bananas help the body's circulatory system deliver oxygen to the brain.

**strawberry**  
3 days

**con**  
An excess of moisture in strawberries causes botrytis fruit rot, also known as gray mold.

**pro**  
Strawberries contain more vitamin C than oranges, which contributes to improved eyesight.

**orange**  
5 days

**con**  
Very high in acid, oranges can break down tooth enamel over time.

**pro**  
Oranges contain a powerful antioxidant called beta-carotene, which protects skin cells from damage.

<i>nutrition facts</i>	Calories	Sugar (g)	Potassium (mg)	Vitamin A (%DV)	Vitamin C (%DV)
Apple	65	12	130	1	4
Strawberry	50	8	170	0	160
Banana	110	19	450	2	15
Orange	80	14	250	2	130

per 5 oz serving

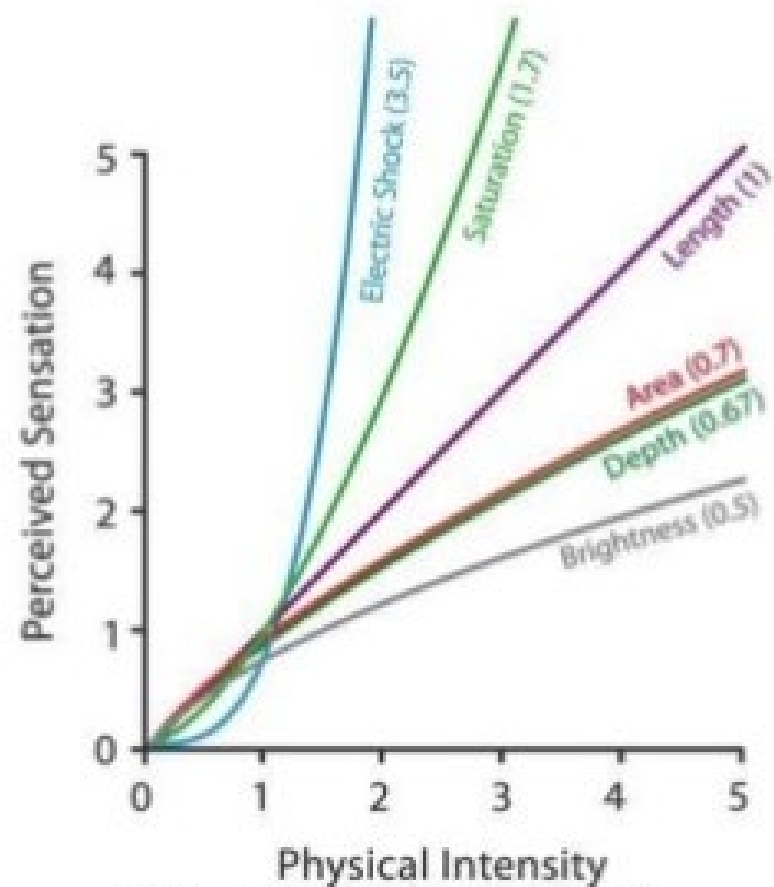
From <http://t.co/ZgXSI1zLsz>



# Colours

# Colour Draws Attention

Use colour carefully



"On the psychophysical law", Stevens, 1957

AND THIS THIRD

**YOU READ  
THIS FIRST  
THIS SECOND**

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

AND THIS THIRD

**YOU READ  
THIS FIRST  
THIS SECOND**

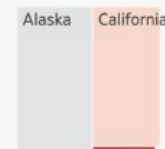
Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

### Crude oil production, 2020

Gulf Coast (PADD 3)  
7.7 million barrels a day



West Coast (PADD 5) 0.9



Offshore

Rocky Mountains (PADD 4) 0.8



North Dakota Okla.



Midwest (PADD 2) 1.8

East Coast (PADD 1) 0.1

West Virginia

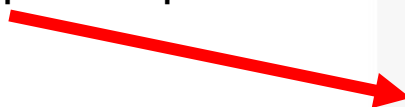
Kansas

Source: U.S. Energy Information Administration

### The Wall Street

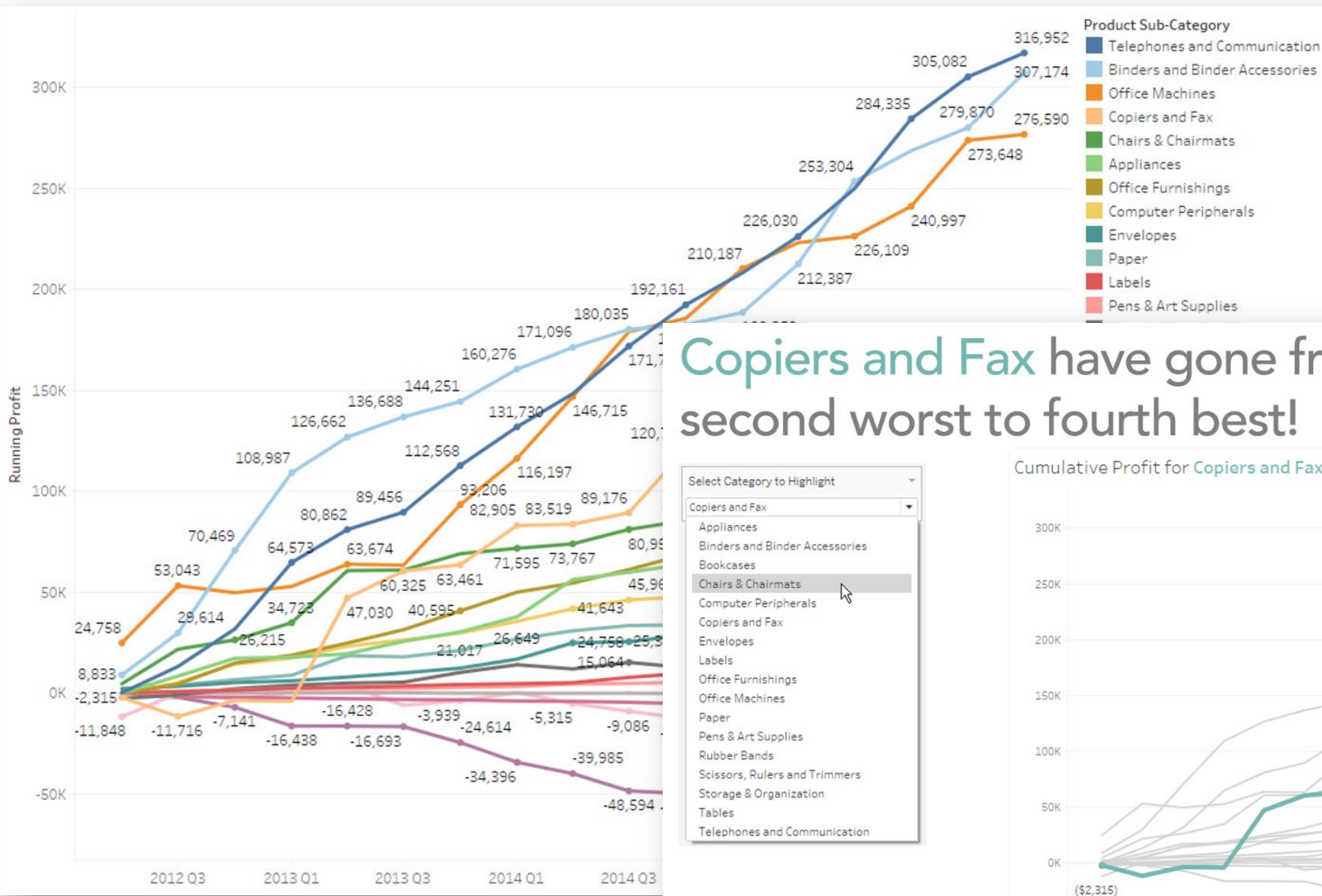
**Journal, 2021.** The reader's eyes are first drawn to the "Offshore Gulf of Mexico" category, even though it's at the bottom of the treemap.

Using colour to draw eyes to the important pieces



From <https://www.datawrapper.de/blog/emphasize-with-color-in-data-visualizations>

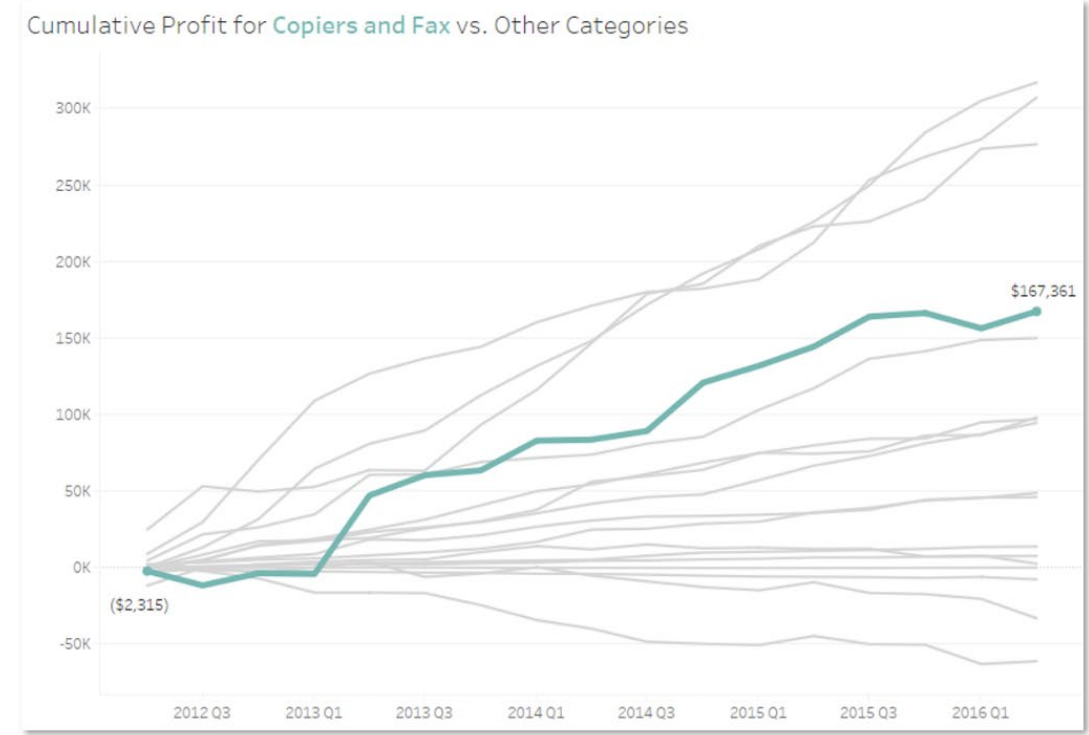
# TOO MUCH COLOUR



Copiers and Fax have gone from second worst to fourth best!

Select Category to Highlight

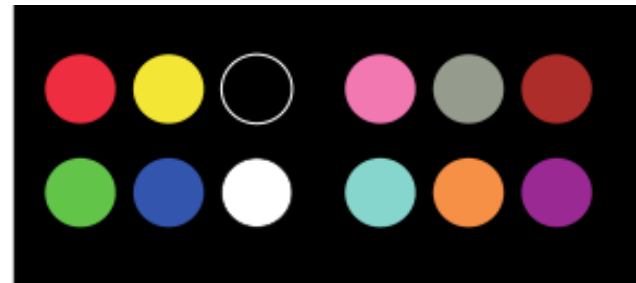
- Copiers and Fax
- Appliances
- Binders and Binder Accessories
- Bookcases
- Chairs & Chairmats
- Computer Peripherals
- Copiers and Fax
- Envelopes
- Labels
- Office Furnishings
- Office Machines
- Paper
- Pens & Art Supplies
- Rubber Bands
- Scissors, Rulers and Trimmers
- Storage & Organization
- Tables
- Telephones and Communication



# Colour

- ALWAYS HAVE HIGH LUMINANCE CONTRAST BETWEEN FOREGROUND AND BACKGROUND
- USE ONLY A FEW DISTINCT COLORS
- > 12 COLORS WILL LIKELY NOT WORK

~5 COLORS RECOMMENDED



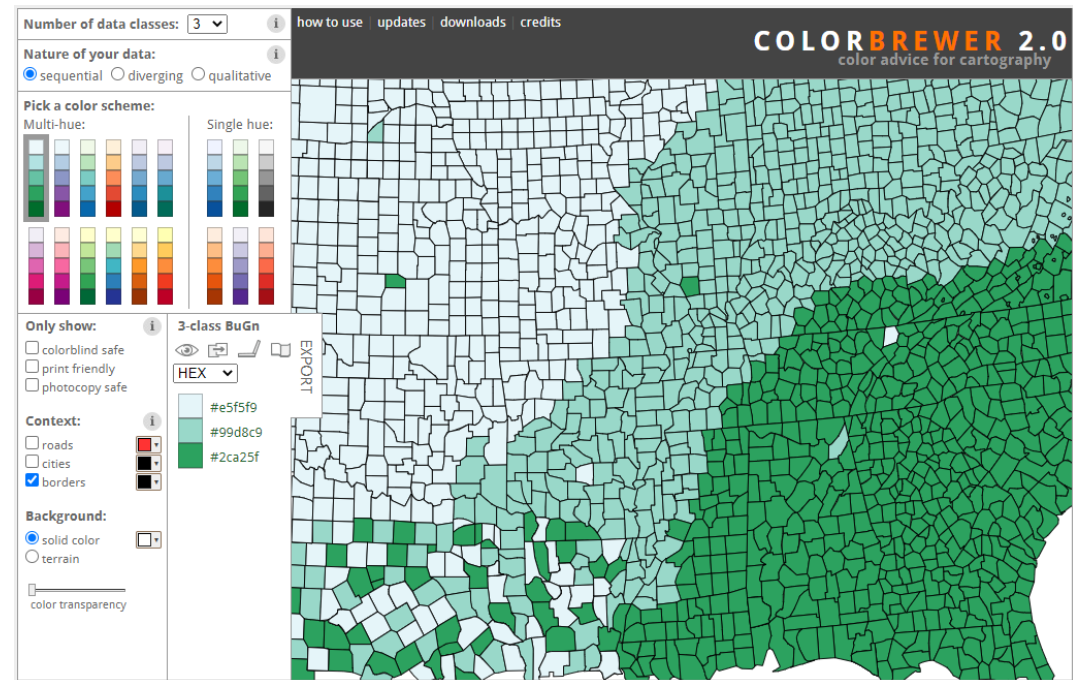
# Colour

**Adobe Color** - <https://color.adobe.com/>

- Pick great colour palettes
- Given this colour, pick complementary colours

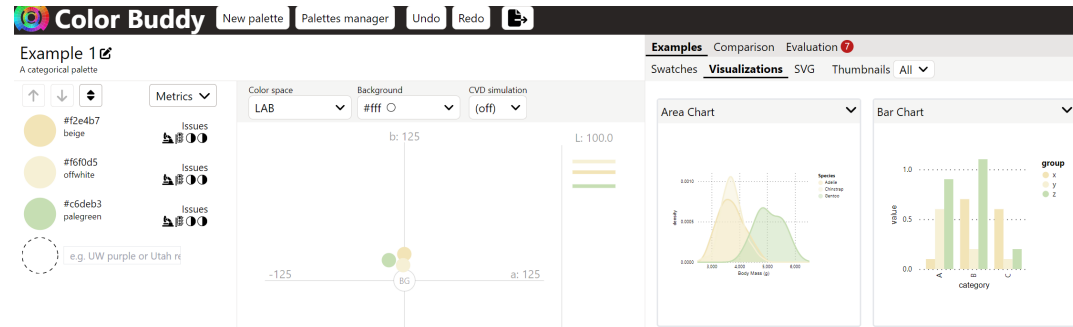
**ColorBrewer** - <http://colorbrewer2.org/>

- Help in choosing colours for maps
- Colourblind, printing, etc.



**Color-Buddy** - <https://color-buddy.netlify.app/>

- More options, shows several different types of visualization

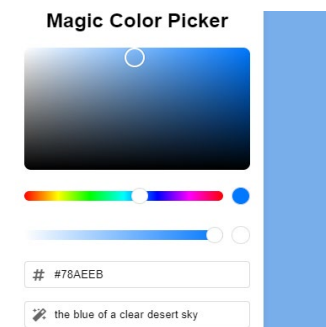


**Magic Color Picker** - <https://text2color.com/picker.html>

- AI that changes text to RGB colour codes

**WebAIM Contrast Checker** - <https://webaim.org/resources/contrastchecker/>

- Tests contrast between text & background colours so you can be sure text is legible



# TEXT

## MAKE ONE BIG POINT

Focus on delivering a single, coherent message. Keep the large, headline text focused on that message. Don't obfuscate the message with clutter/repetition.

## HAVE A HOOK

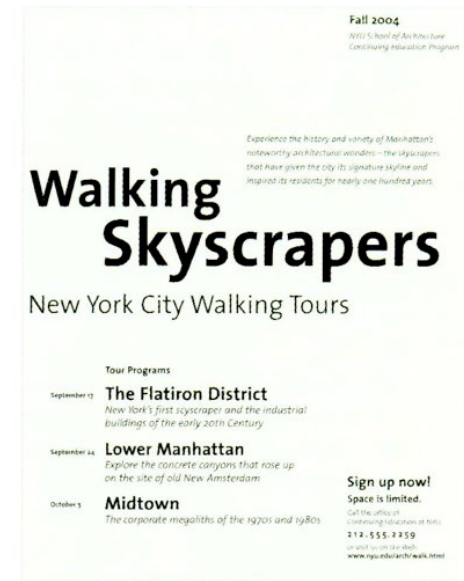
Can your infographic illuminates some fact or leads the viewer to a conclusion they wouldn't otherwise have reached.

## MAKE EVERY WORD COUNT

Space is at a premium and clutter will make your infographic look unattractive.

## SIDEBARS & EXPLANATORY TEXT

Use smaller, less contrasty text to provide detail and explanation.







# Tools to Help

Software

# Infographic Tools

Charts Bin  
Creately  
Dipity  
Easel.ly  
Gliffy  
Hohli  
Infogr.am  
Many Eyes

**Pikto Chart**  
Visual.ly  
Wordle

**PowerPoint**  
Google Presentation  
Prezi

FatPaint  
Phoenix  
Pixr

visio

Adobe Photoshop  
Adobe Illustrator  
Microsoft Publisher

create  
infographics  
with HTML, CSS

easier

harder

online  
infographic  
tools

presentation  
software

online  
image  
editors

diagramming  
/charting  
software

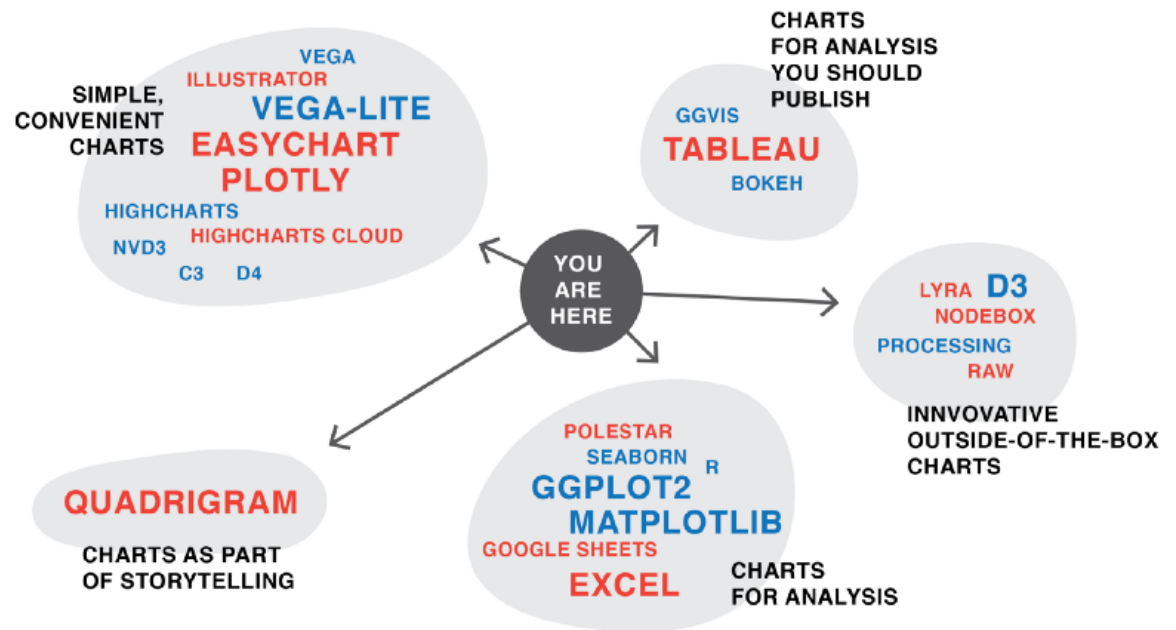
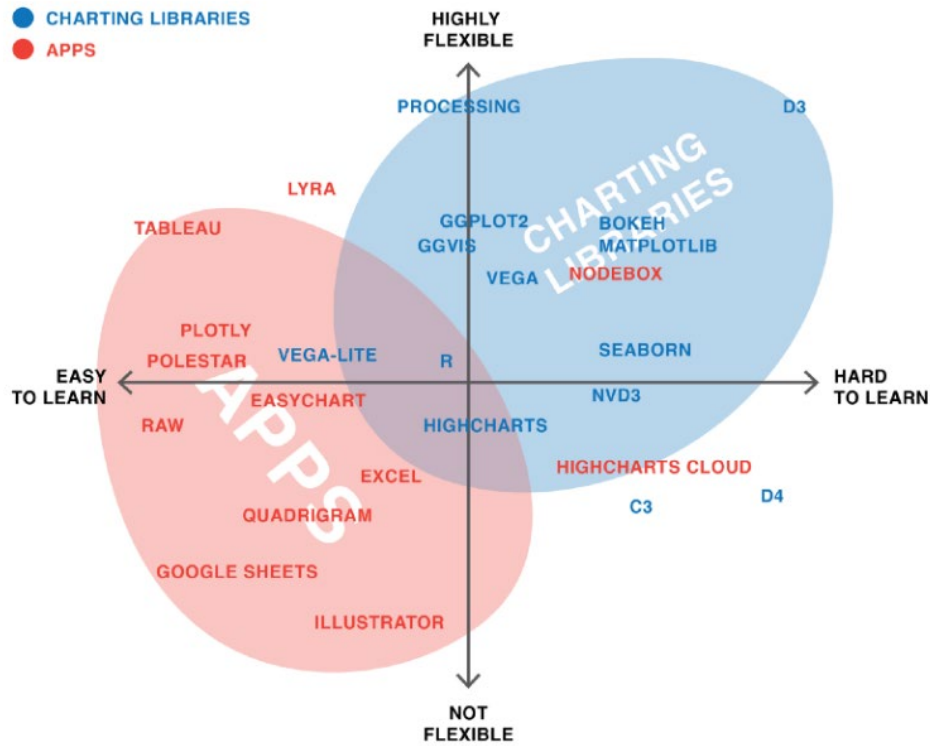
image editing /  
publishing  
software

web editing  
software

# Picking a Visualization Tool

<https://source.opennews.org/articles/what-i-learned-recreating-one-chart-using-24-tools/>

<https://lisacharlottemuth.com/datavistools-revisited> (update with new data vis tools)



# What Software Do You Already Know?

- PowerPoint (Smart Art!) / Keynote
- Adobe Illustrator / Photoshop
- Inkscape / GIMP

## Web-based Graphic Design

- Miro
- Figma
- Lucidspark
- Jamboard

# Infographic Web Tools

All of these are useful for general-purpose infographic design. Will easily allow you to place images and text. Most provide a variety of templates to start from (rather than a blank canvas). All are free with paid features and are rapidly adding AI features.

**Canva** - <https://www.canva.com/>

- Broad graphic design tool, but has several elements aimed specifically at infographics

**Venngage** - <https://venngage.com/>

- Many new AI integrations

**Piktochart** - <https://piktochart.com/>

- Variety of graphic design tools, including infographics.

**Infogram** - <https://infogram.com/>

- Infographics focus but includes image editing and charting tools

**Easel.ly** - <https://www.easel.ly/create?width=8.5&height=11&unit=in>

- General graphics design focus

**Visme** - <https://www.visme.co/make-infographics/>

- General graphics design focus

Walk throughs:

- Create a Digital Design with Piktochart. University of Guelph. Updated 2022. [LINK](#)
- Create a Digital Design with Canva. University of Guelph. Updated Feb 2025. [LINK](#)

# Data Visualization / Charts

## Tableau & PowerBI

- Desktop apps, many chart types, free license via academic program/university
- Handles big datasets, interactive web output
- <https://www.tableau.com/>, <https://app.powerbi.com/>

## Flourish, Datawrapper, RAWGraphs

- Web-based tools for “smaller” data
- Free/freemium
- Unique chart types
- <https://flourish.studio/>, <https://www.datawrapper.de/>, <https://www.rawgraphs.io/>

## Cytoscape & Gephi

- Networks aka node-link diagrams.
- <https://cytoscape.org/>, <https://gephi.org/>

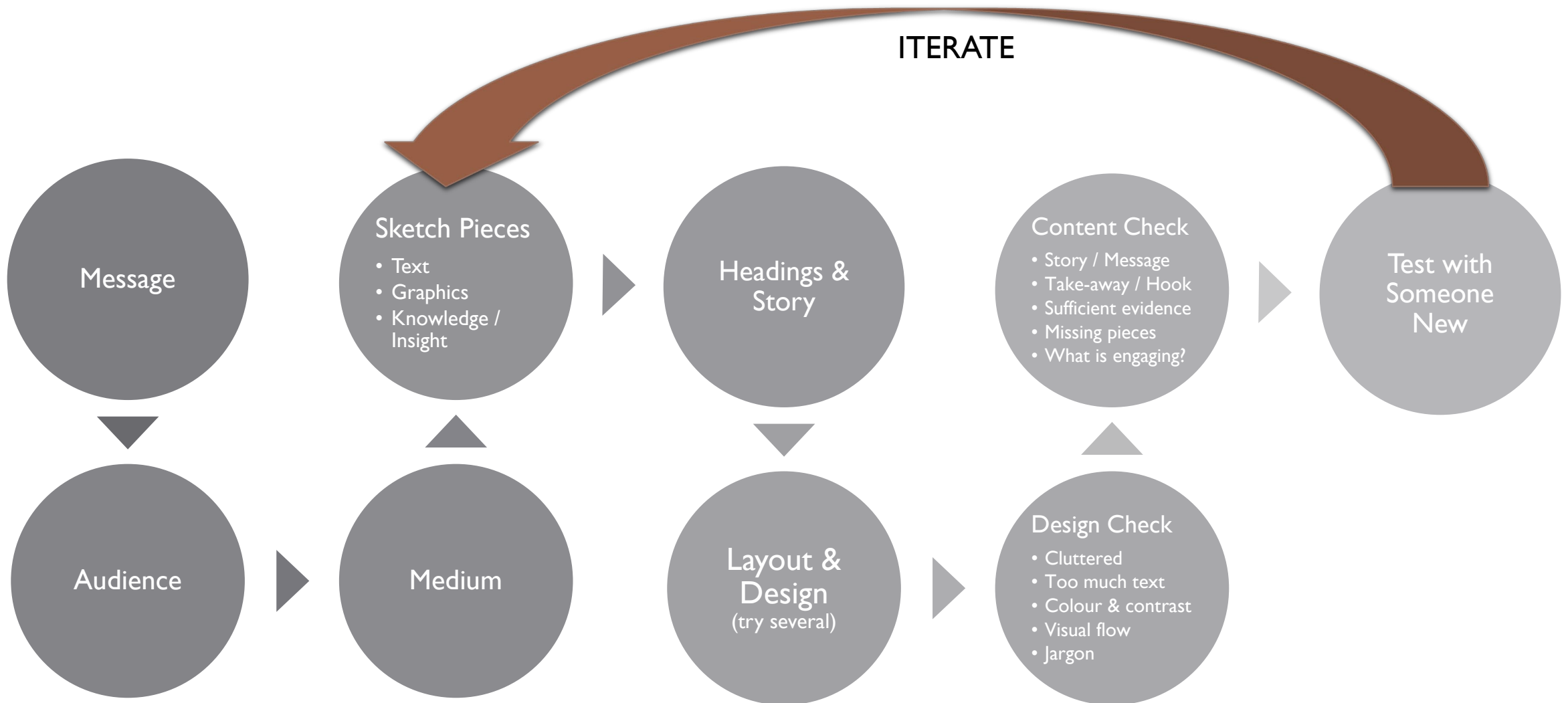
## Excel, Google Charts

- Simple charts, fast
- <https://developers.google.com/chart>, <https://excel.cloud.microsoft/>



# Wrap Up

# Walkthrough





# Activity: Identify Important Points

Pick one of your recent projects.

What do you think are 2-3 useful things to know about your project for:

- General public
- Practitioners
- Peer Academics

For each of these audiences, what minimum amount of information is needed to:

- Engage interest
- Trust this message
- Have sufficient background

# References & Resources

Infographic Design for Knowledge Mobilization. Julia Levin & Francisco Ibáñez-Carrasco.  
[Online course] [LINK](#)

Creating Infographics. [Website] [LINK](#)

Creating an Infographic. University of North Carolina Libraries. [Library Guide] [LINK](#)

Creating Infographics. Seneca Polytechnic Library. [Library Guide] [LINK](#)

Introduction to Infographics. University of Toronto Library. [Library Guide] [LINK](#)

Cool Infographics: Effective Communication with Data Visualization and Design. Randy Krum, 2014. [Book] [LINK](#)

The Functional Art: An Introduction to Information Graphics and Visualization. Alberto Cairo, 2011 [Book] [LINK](#)

Information is Beautiful Interactive Infographics. [Website] [LINK](#)

Daily Data. Statista. [Website] [LINK](#)

# UCalgary Library Resources

## Visualization Studio

- <https://library.ucalgary.ca/services/visualization>

## Spatial & Numeric Data Services

- Help with Maps, GIS, & Census Data
- <https://sands.ucalgary.ca/>

## PRISM Repository

- <https://prism.ucalgary.ca/>



UNIVERSITY OF CALGARY  
Libraries and Cultural Resources

### Welcome to the Libraries and Cultural Resources Impact Study

Complete survey to enter our prize draw



5 prizes worth \$100

We (LCR) are conducting a project to understand our impact. We are interested in learning your engagement with our collections, programs, services, and physical spaces.

The poster features a red background with a stylized graphic of hands in various colors (orange, yellow, pink, purple) on the right side. A white starburst contains the text '5 prizes worth \$100'. A white arrow points from the text 'Complete survey to enter our prize draw' to a QR code.

**JOHN BROSZ**  
**JDLBROSZ@UCALGARY.CA**  
<http://brosz.ca/slides>