

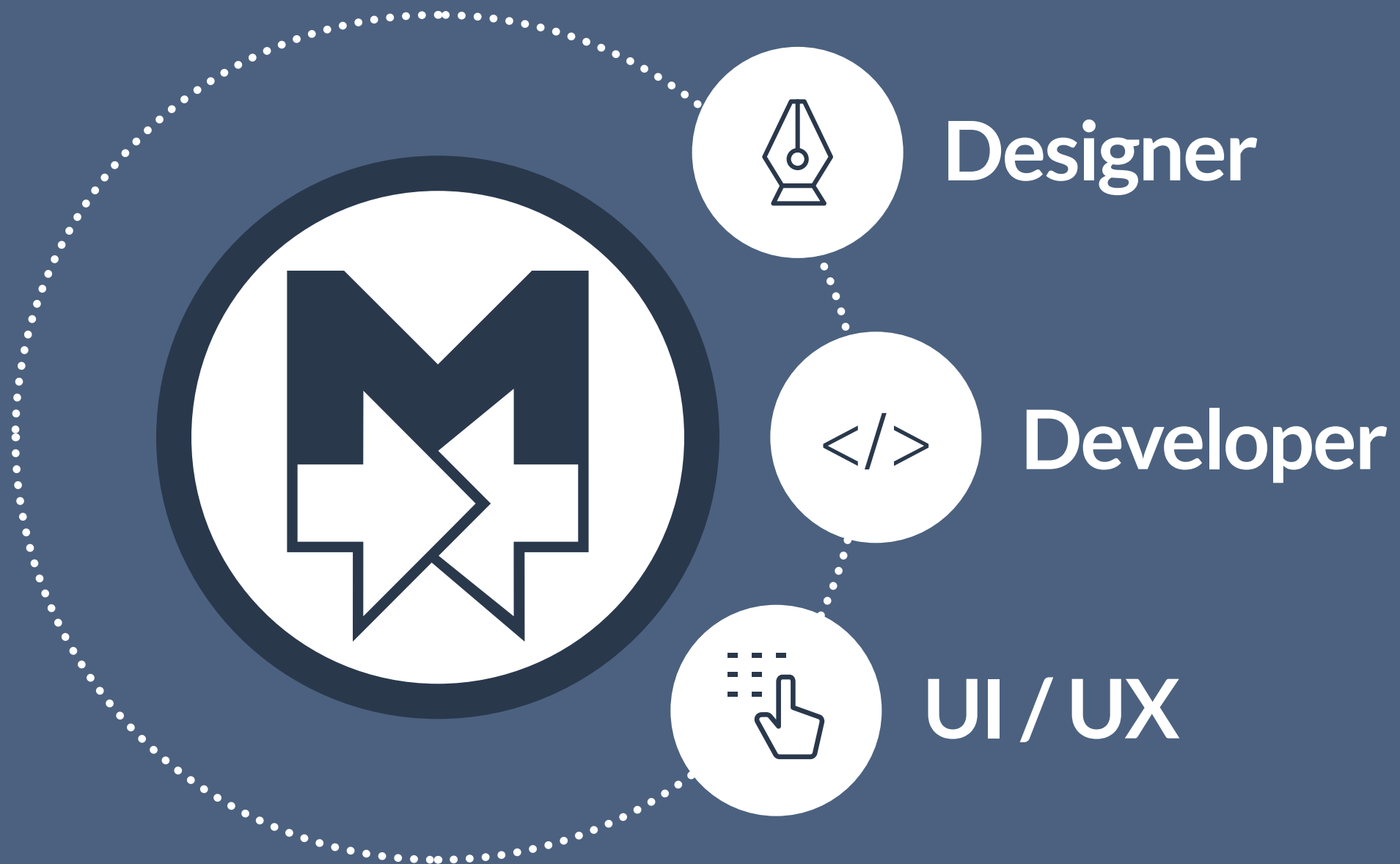


Lying with Data

Designing Honest Dashboards

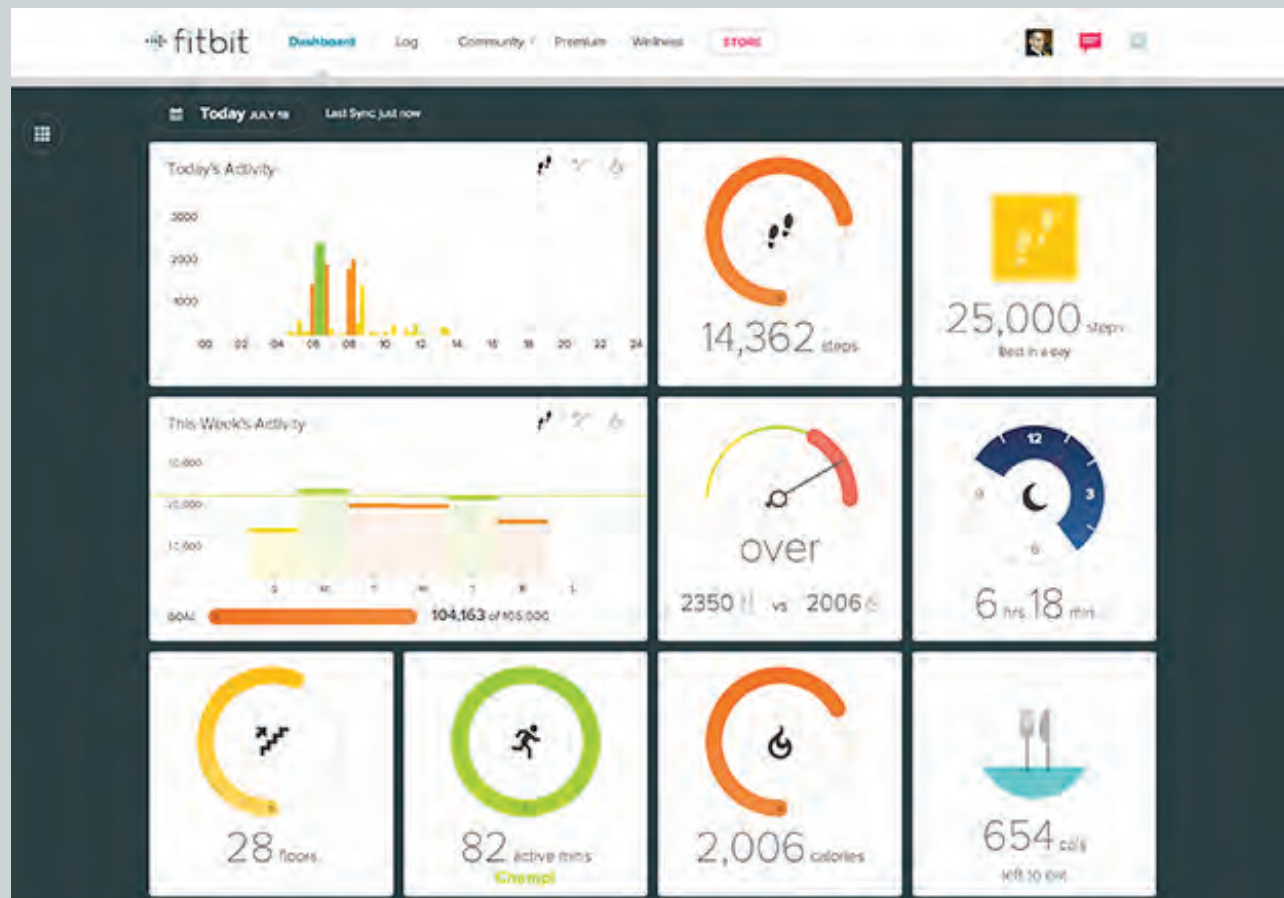


Jeremy Jones

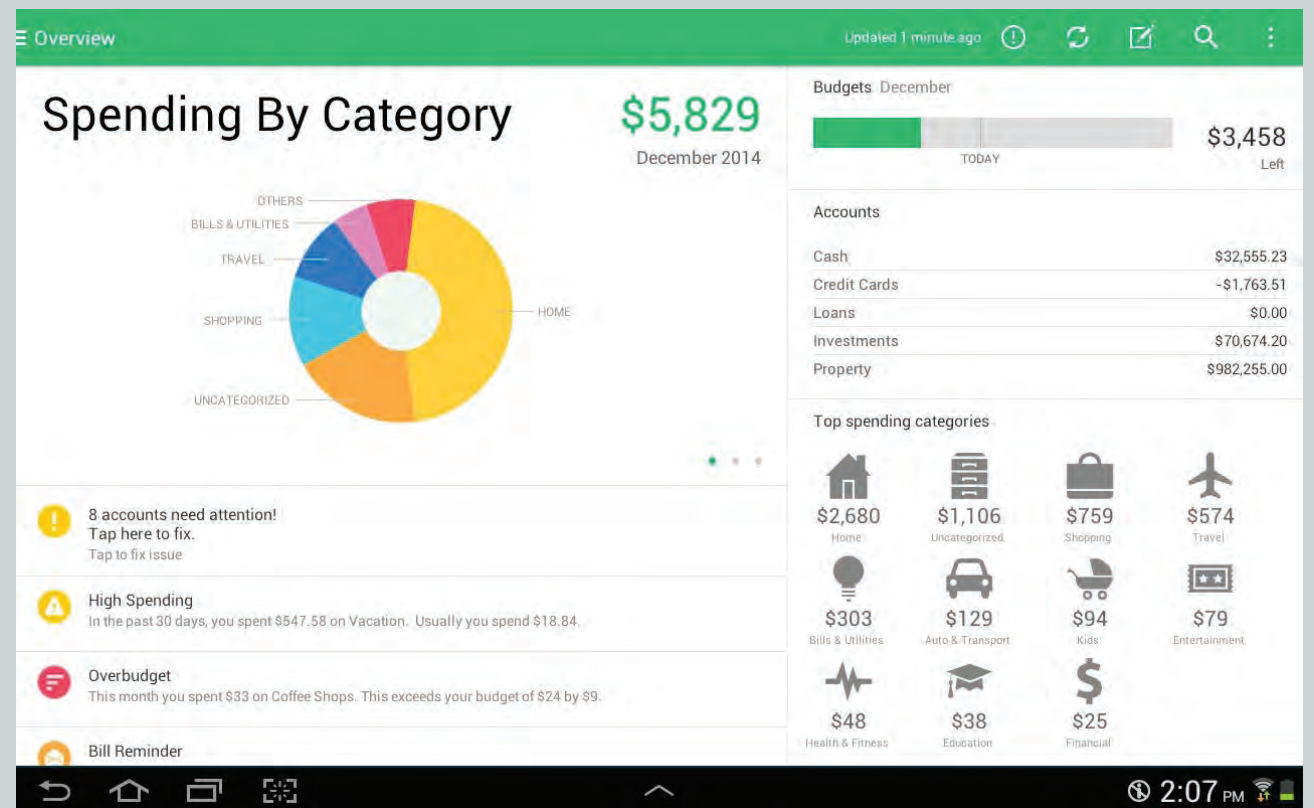




A Dashboard



Fitbit



Mint



Visualizing Data



Data



Insight



Action



The Data

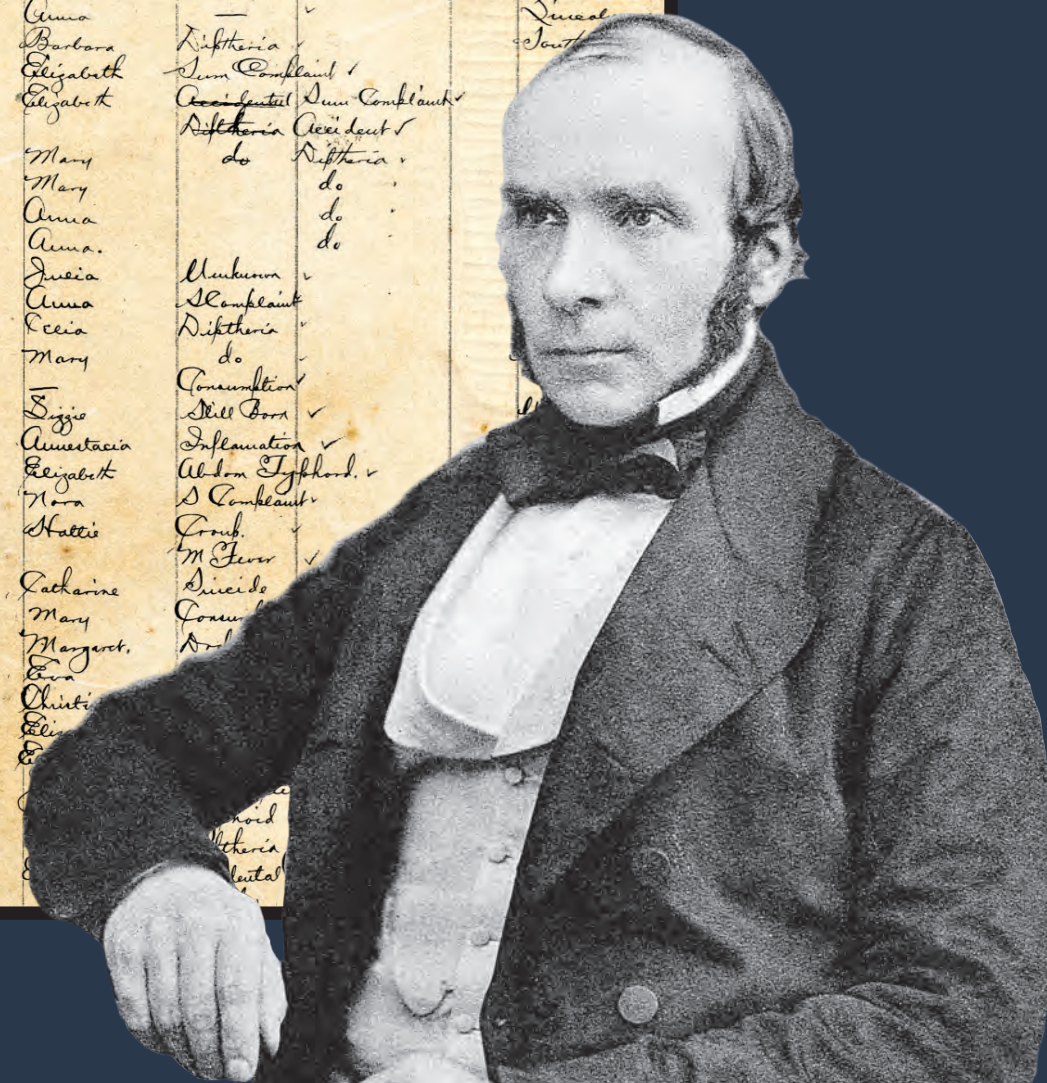
400

20

RECORD OF DEATHS.

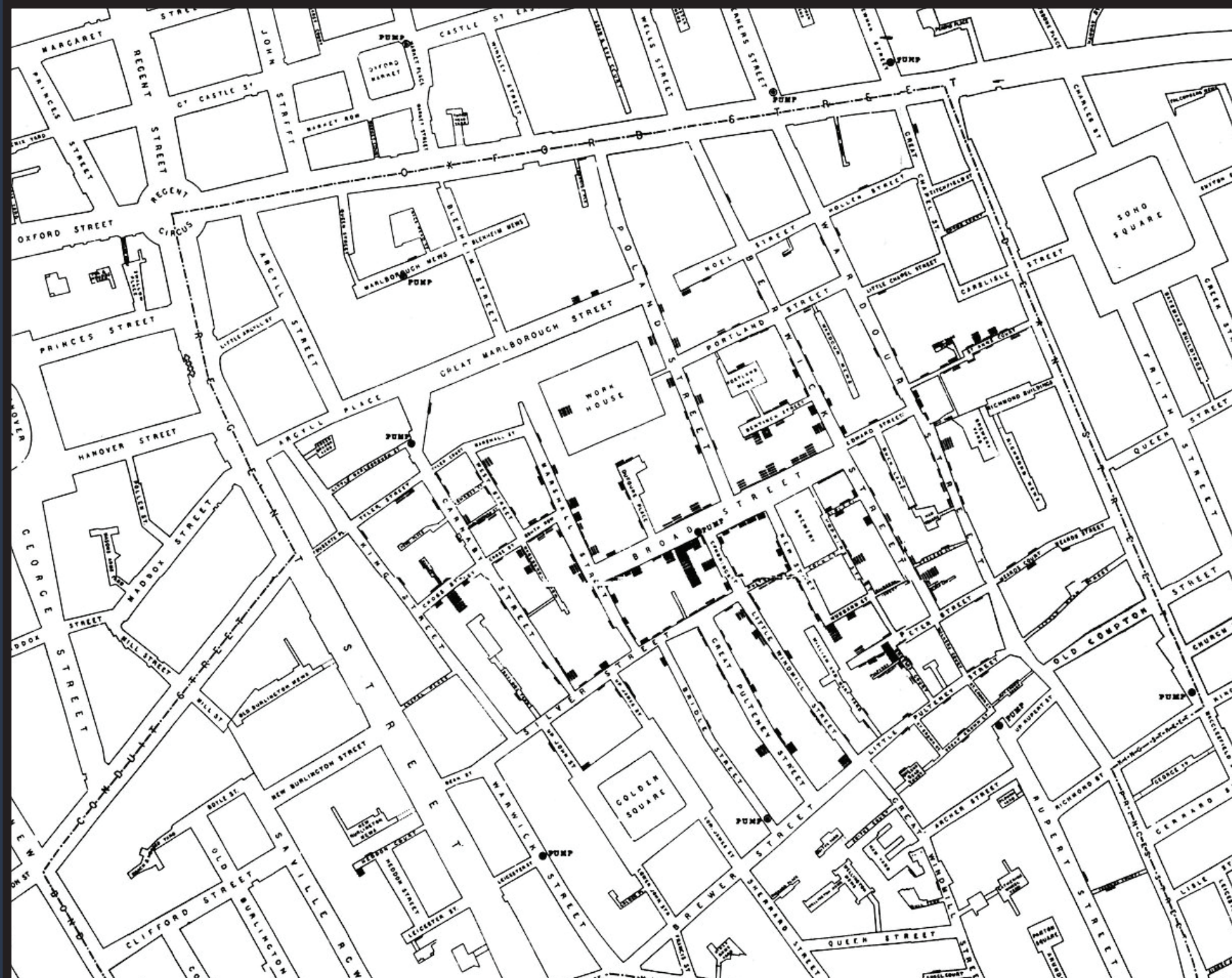
P. 233

NAME IN FULL.	DATE OF DEATH.			PLACE OF DEATH.	Single, Married, Widowed.	AGE.			PLACE OF BIRTH.			OCCUPATION.	NAMES OF PARENTS.		DISEASE.	DIRECT OR INDIRECT CAUSE OF DEATH.	COLOR.	LAST PLACE OF RESIDENCE.
	Month.	Day.	Year.			Years.	Mo.	Days.	City, Town or Township.	County.	State.		Father.	Mother.				
Sadrich Thebe	Augt	16	82	Cleveland				29	Cleveland	Cuyahoga	Ohio		Joseph	Julia	Infantum		W	Black 37
Michael Arthur	May	3	82					9	"	"	"		Adolf	Sara	Head Disease		"	" 27
Michael Adolf	Augt	17	"		Married 32				"	Germany	"	Maider	Mader, Chs		Consumption		"	" 27
Stuter Maggie	June	26	"		do 40				"	Switzerland	"	Housekeeper	Weidmeier Jacob		do		"	" 136
Murphy James	Oct	19	"		Single 11	"	"	22	Cleveland	Cuyahoga	Ohio	School	Nicholas	Catherine	Diphtheria		"	Tamworth 21
Kobson Martha	Mich	26	83		Wid 82				Chute	La Pa	"		Mr Walton		Acid C.		"	Cyprus 58
Flynt Estl.	April	22	82		Married 59	3			Wicksbarra	Pa	"	Trunk Maker	Abraham	Anna	Consumption		"	" 62
Saubert Mks	"	23	"		do 60				Sontina	Germany	"	Trunk Maker			Inflammation of Lungs		"	Ocean 4
Ray Warren	Mich	18	83		Single 1	6			Cleveland	Cuyahoga	O		James	Sarah	Croup		"	Cyprus 20
Bernard Albert	Sept	30	83		" 22	6			Ahorn	Switzerland	"	Jeweler	John M.	Rosina C.	Consumption		"	" 13
De Forest Jacob	June	28	"		Married 10				Hessen	Germany	"	Farmer	Philib	Barbara	do		"	" 19
Kipbart Sarah	Augt	9	"		do 36				Clarkville	Penn	"	Housekeeper	Stooper	Sarah	do		"	Scot 27
Hall Walter	"	10	"		Single 39				Cleveland	Cuyahoga	Ohio	School	James H.	Margaret	Pneumonia		"	Madison 1052
Offie Adla	Sept	13	"		" 16				Saucator	Taiched	"		Thomas	Susan	Consumption		"	Edwards St
Prochaska Chs	Nov	26	"		"				Cleveland	Cuyahoga	"		Charles	Anna			"	Swiss
Frickhoff May	Janu	10	83		"	7	10		"	"	"		George	Barbara	Diphtheria		"	South
Gray Harry R.	Mich	3	"		"	3	9		"	"	"		Thomas	Elizabeth	Swm Complaint		"	
Fries Adolf	Augt	27	82		"	9	22		"	"	"		Rudolf	Elizabeth	Accidental Swm Complaint		"	
Forster A.W.	Dec	17	"		Married 76				State of	Maine	"	Real Estate			Diphtheria Accident		"	
Suacoh John	Augt	"	"		Single 8				Cleveland	Cuyahoga	Ohio		Joseph	Mary	do		"	
Suacoh Fannie	Sept	18	"		" 33				"	"	"		Joseph	Mary	do		"	
Kahout Anna	July	20	83		" 11	3			"	"	"	School	Frank	Anna	do		"	
Kahout Mary	"	10	"		" 9				"	"	"		Frank	Anna	do		"	
Kutner Edward	"	6	"		" 9				"	"	"		Joseph	Julia	Unkown		"	
Pelack Charles	June	17	82		" 1	12			"	"	"		Michael	Anna	Stomach		"	
Shaffney Francis	Nov	15	"		" 8	11			East	"	"		Frank	Reia	Diphtheria		"	
Hawkins Victoria	April	6	"		" 19				"	"	"		Jesse	Mary	do		"	
Liden Ellen F	Mar	9	"		Wid 69				Cohasset	Mass	"	Housekeeper	Nashel W.		Consumption		"	
Battel Baby	Mich	7	83		"				Cleveland	Cuyahoga	O		Jacob	Figgis	Still Born		"	
Kane Catherine	"	3	"		Married 40				Wexford	Ireland	"		Harwin M.	Amestacia	Inflammation		"	
Frechman Anna	Sept	22	82		" 33	11			Hessia	Germany	"		Sauerwein	Elizabeth	Abdom Typhoid		"	
Roberts James	Augt	17	"		" 9	17			Cleveland	Cuyahoga	O		James	Nora	Stomach		"	
Roth Clara	Janu	29	83		" 11	21			"	"	"		Fred	Hattie	Croup		"	
Samuels Sophia	April	11	82		Married 35				"	"	"	Housekeeper	Brooks S.D.		M Fever		"	
Schneider Riea	Dec	3	"		" 22				Baden	Germany	"	do	Karl Fred	Catherine	Suicide		"	
Slattery William	May	31	"		" 40				Tiphary	Ireland	"	Carpenter	Thomas	Mary	Consumption		"	
Ronch Patrick	Nov	12	"		" 25	2			Dublin	"	"	"	Andrew	Margaret	do		"	
Fox Minnie	Janu	15	83		" 2	2			Cleveland	Cuyahoga	Ohio	"	Nicholas	Sara			"	
Truff Sophia	Oct	3	82		" 1	5			Glasgow	Scotland	"		August	Christi			"	
Hart Annie	June	27	"		Single 23	6			Cleveland	Cuyahoga	Ohio		Michael	Ellen			"	
Saupe Ellen M.	Sept	11	"		" 1	4			Cleveland	Cuyahoga	Ohio		William	E			"	
Quarles John	Mich	25	83		Married 38				Hicksville	File of Mass	"	Mason	John				"	
Hunt Johell	Janu	8	"		Single 25	21			Cleveland	Cuyahoga	Ohio	School	Felix				"	
Hawkins Charles	April	10	82		do 22				"	"	"	Farmer	Jesse				"	
Reuber Henry	Sept	3	"		" 11				"	"	"	School	Henry				"	
B...					" 6	1			"	"	"		do				"	



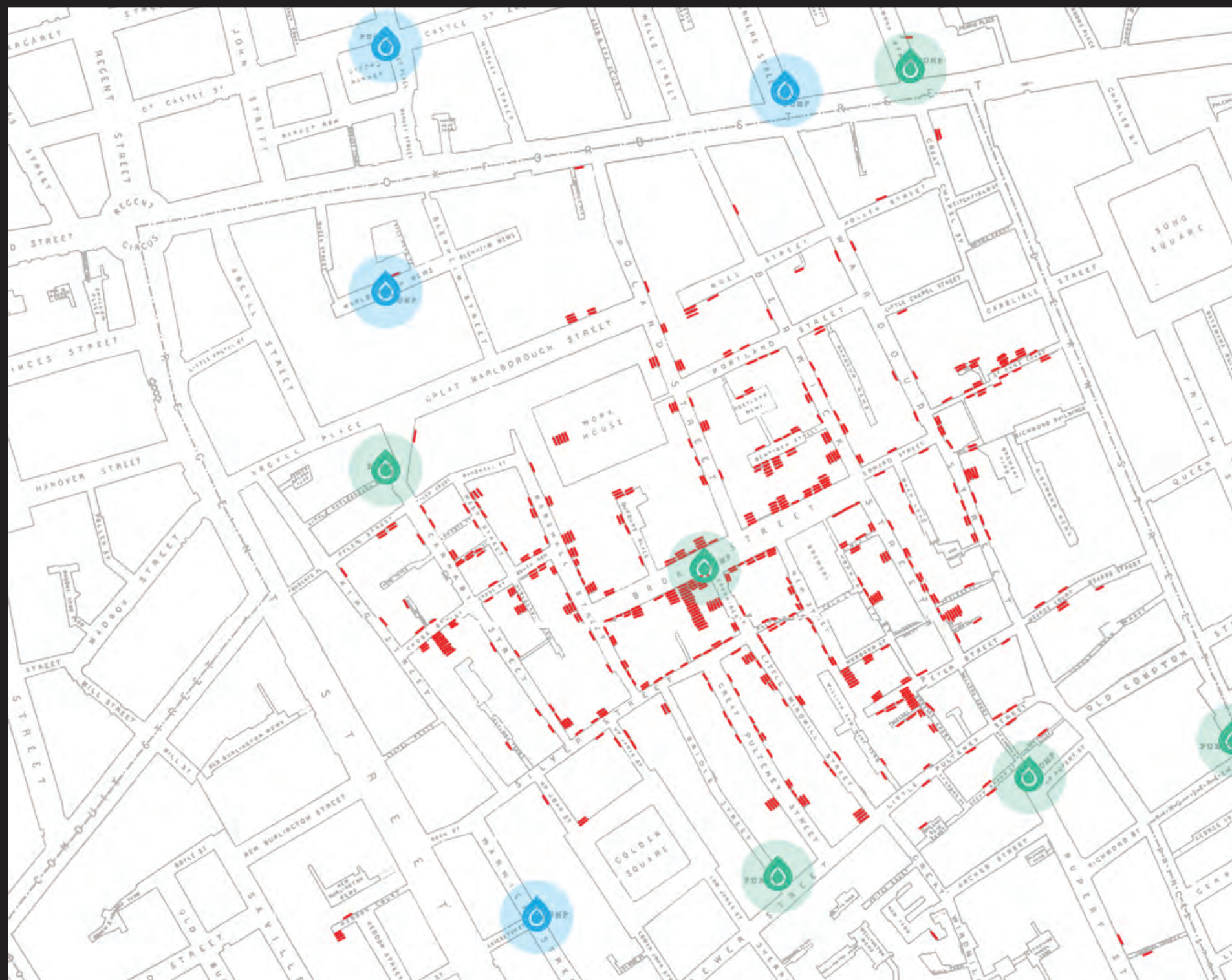


The Insight





The Insight



Death



Lambeth Pump



Southwark Pump



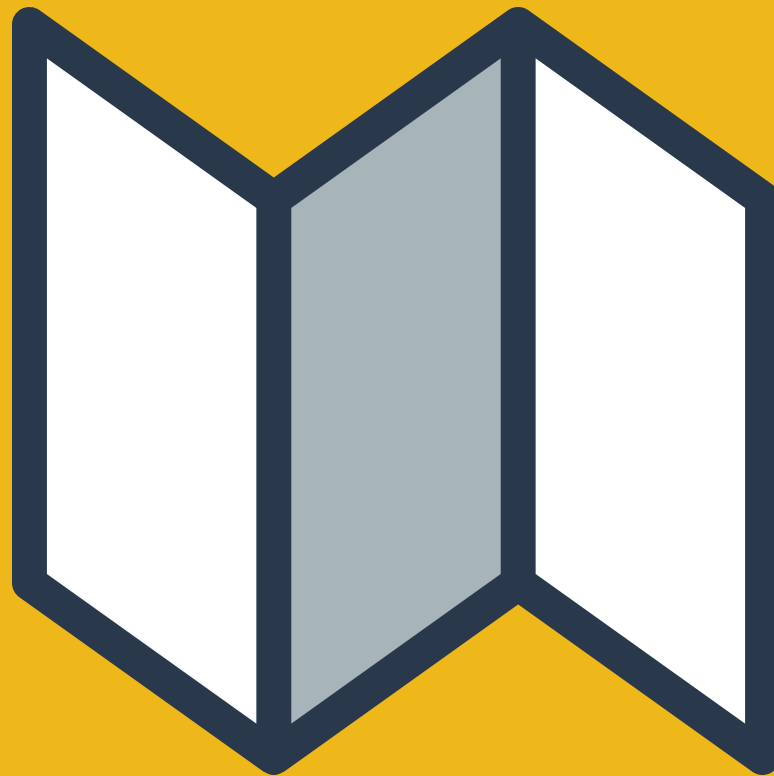
The Action



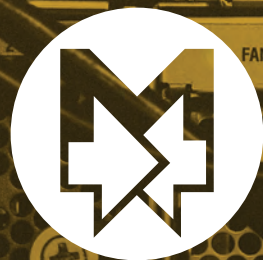


Lying





Lies of **Intent**



THE DATA
DOESN'T LIE



Forms of Data



Raw



“Scrub”



Secondary



I KNOW THE
AUDIENCE



The Audience



Influencer



Stakeholder



User



The Usual Audience



Influencer

Stakeholder

User



The Better Audience



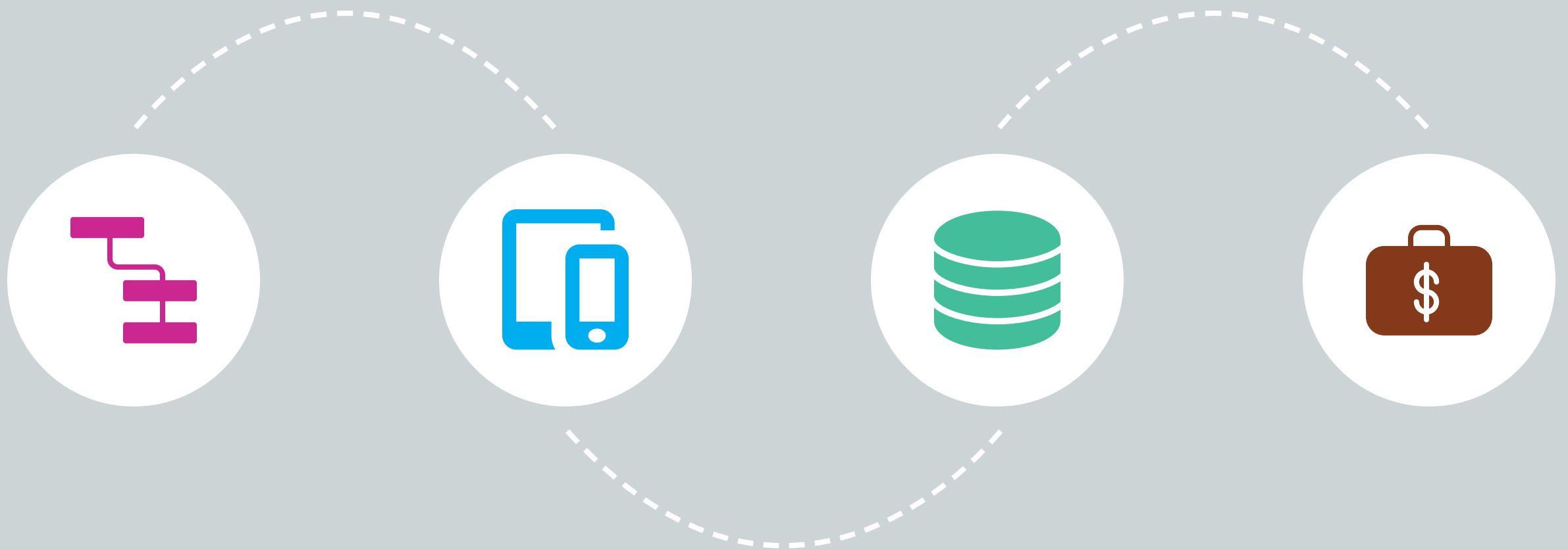
Influencer

Stakeholder

User



The User Variables



Role

Work Flow

Data Skills

Expertise



EVERYTHING IS
CRITICAL



Info Discrimination



**What would you do
If you knew this info?**

Interesting

Actionable



THE DASHBOARD DOES EVERYTHING





Info Analysis



Reporting

Measure and monitor the known / predictable



Exploration

Develop understanding of new / erratic behaviors



Choosing Metrics



Credible

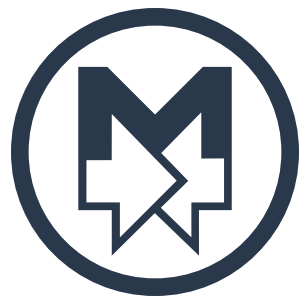
Known

Transparent

Actionable



Lies by **Design**



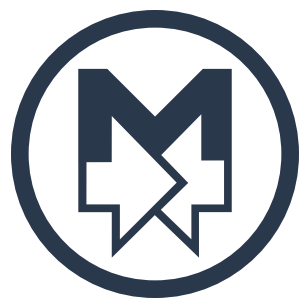
How Many...

2	5	6	7	1	1	6	5	1	2	2	5	6	7
6	1	7	5	5	5	6	2	5	7	3	1	7	5
4	5	2	3	6	5	7	6	4	6	4	5	2	4
8	1	5	7	8	5	6	6	6	7	8	1	5	7
7	2	3	6	8	2	1	7	3	1	7	2	3	6
3	8	6	4	4	5	6	6	4	5	3	8	6	4
4	9	5	2	3	7	1	7	1	2	4	5	8	2
3	7	8	1	6	1	5	6	1	6	3	9	8	1
5	6	6	8	6	6	8	1	2	6	5	6	6	8
3	2	4	2	6	5	4	2	7	1	3	2	4	2



How About **Now**

2	5	6	7	1	1	6	5	1	2	2	5	6	7
6	1	7	5	5	5	6	2	5	7	3	1	7	5
4	5	2	3	6	5	7	6	4	6	4	5	2	4
8	1	5	7	8	5	6	6	6	7	8	1	5	7
7	2	3	6	8	2	1	7	3	1	7	2	3	6
3	8	6	4	4	5	6	6	4	5	3	8	6	4
4	9	5	2	3	7	1	7	1	2	4	5	8	2
3	7	8	1	6	1	5	6	1	6	3	9	8	1
5	6	6	8	6	6	8	1	2	6	5	6	6	8
3	2	4	2	6	5	4	2	7	1	3	2	4	2

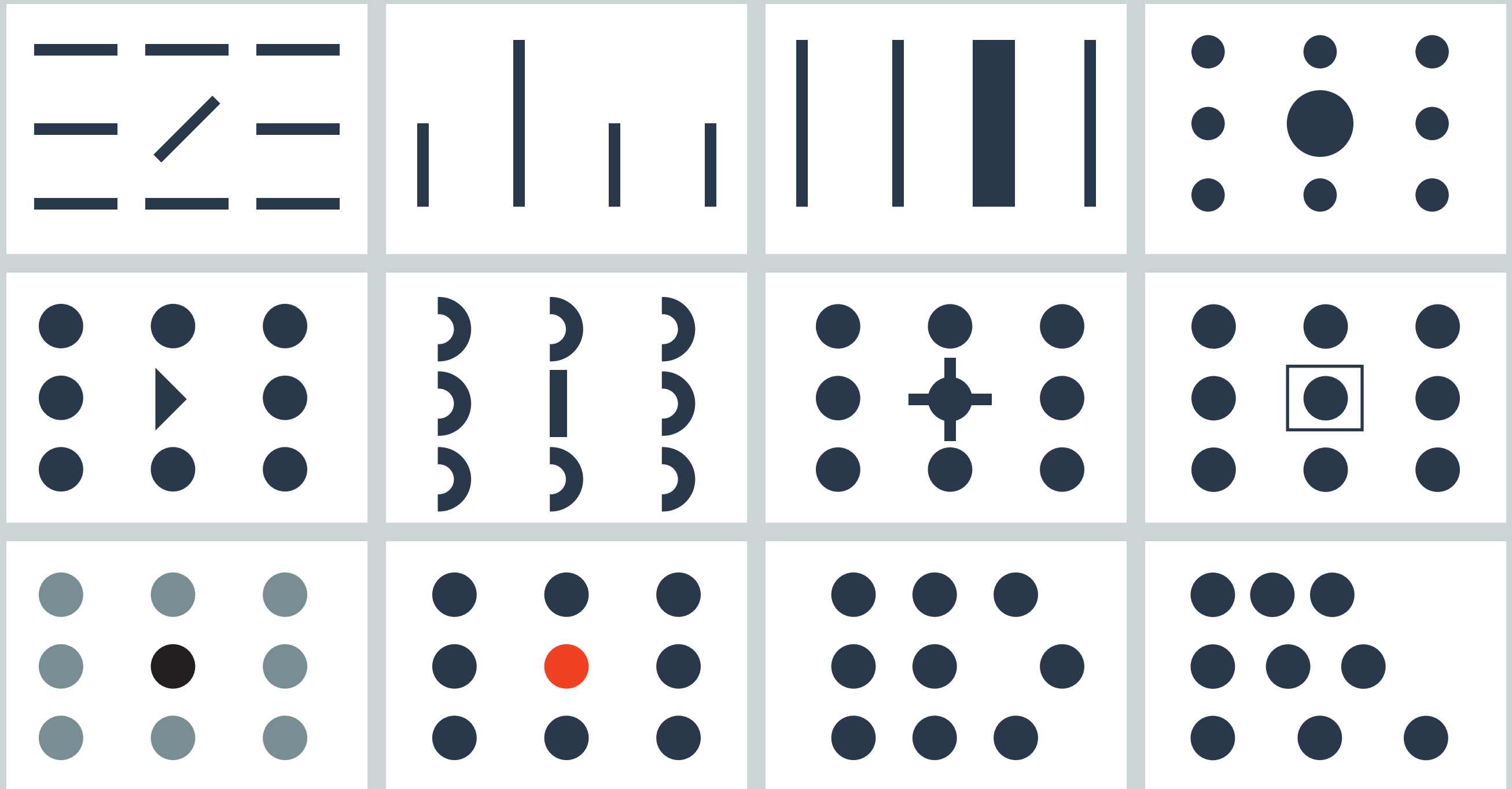


How About **Now**

2	5	6	7	1	1	6	5	1	2	2	5	6	7
6	1	7	5	5	5	6	2	5	7	3	1	7	5
4	5	2	3	6	5	7	6	4	6	4	5	2	4
8	1	5	7	8	5	6	6	6	7	8	1	5	7
7	2	3	6	8	2	1	7	3	1	7	2	3	6
3	8	6	4	4	5	6	6	4	5	3	8	6	4
4	9	5	2	3	7	1	7	1	2	4	5	8	2
3	7	8	1	6	1	5	6	1	6	3	9	8	1
5	6	6	8	6	6	8	1	2	6	5	6	6	8
3	2	4	2	6	5	4	2	7	1	3	2	4	2



Preattentive Attributes

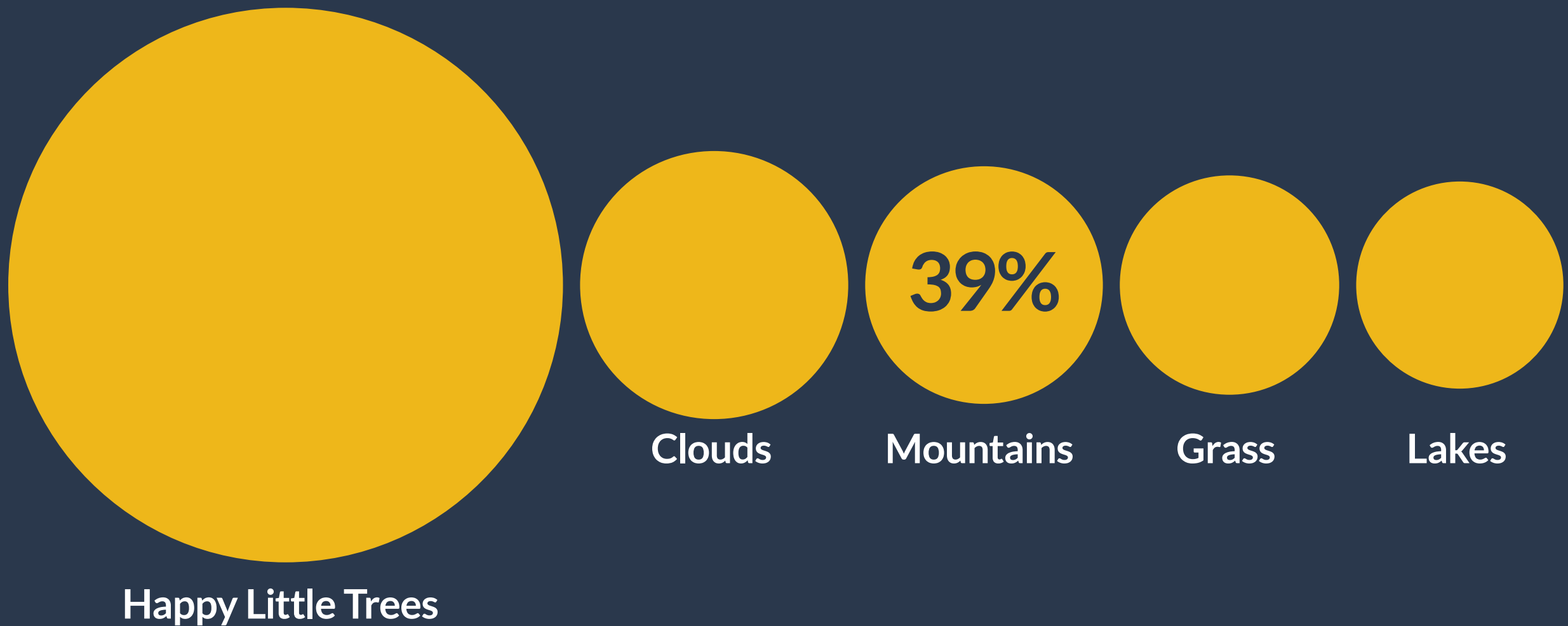




CHARTS DON'T LIE



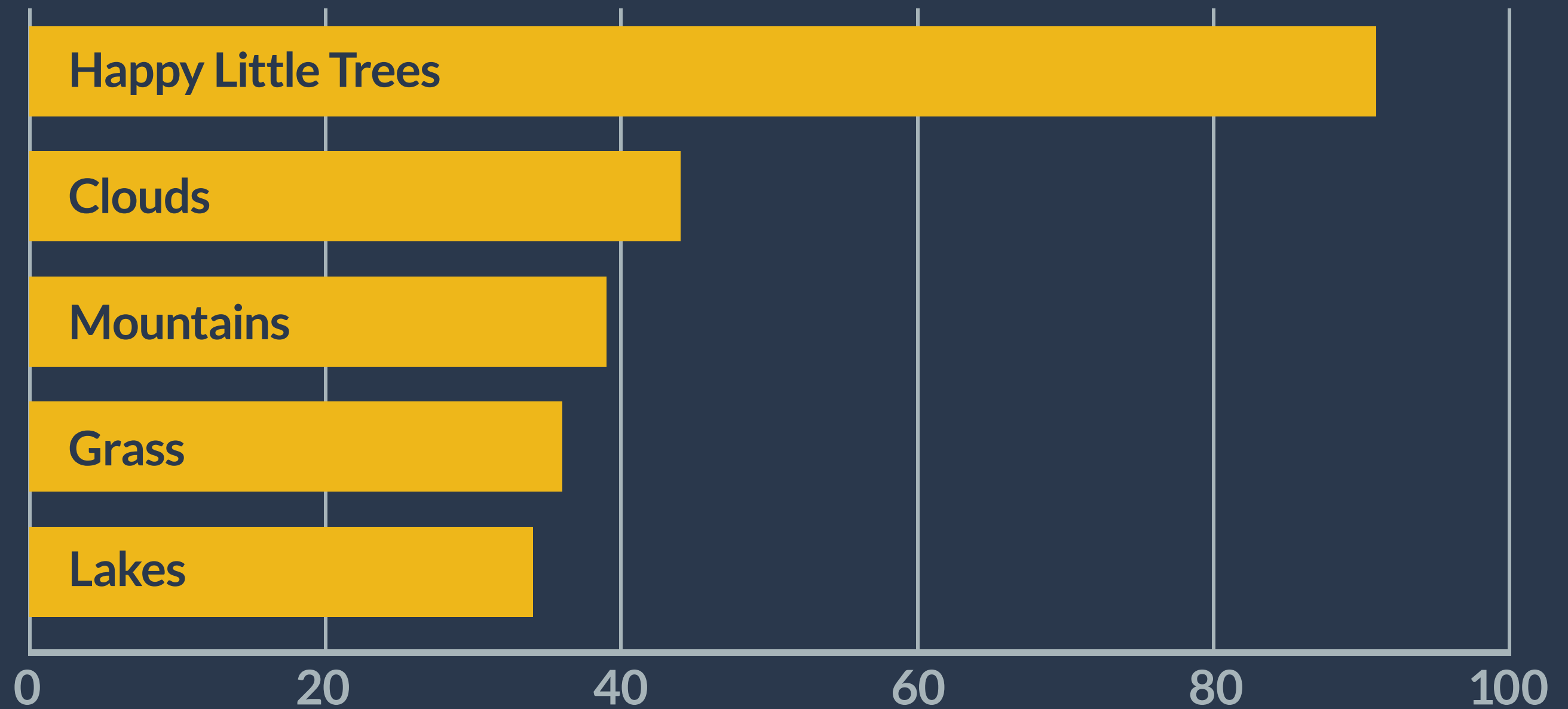
Top 5 Objects in Bob Ross Paintings by %



Percentage containing each object



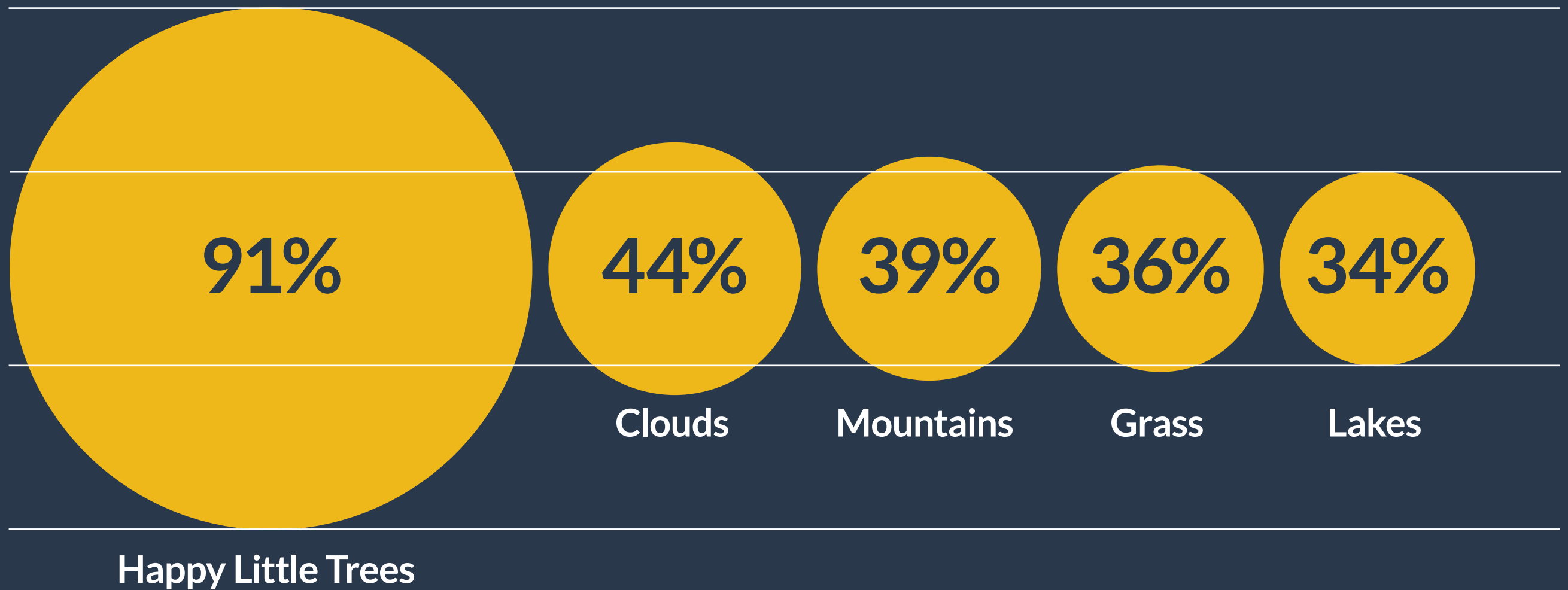
Top 5 Objects in Bob Ross Paintings by %



Percentage containing each object



Top 5 Objects in Bob Ross Paintings by %



Percentage containing each object



Questioning Graphs



=



=



What is the
QUESTION?

What does the
DATA SAY?

What does the
VISUAL SHOW?



Chart Junk



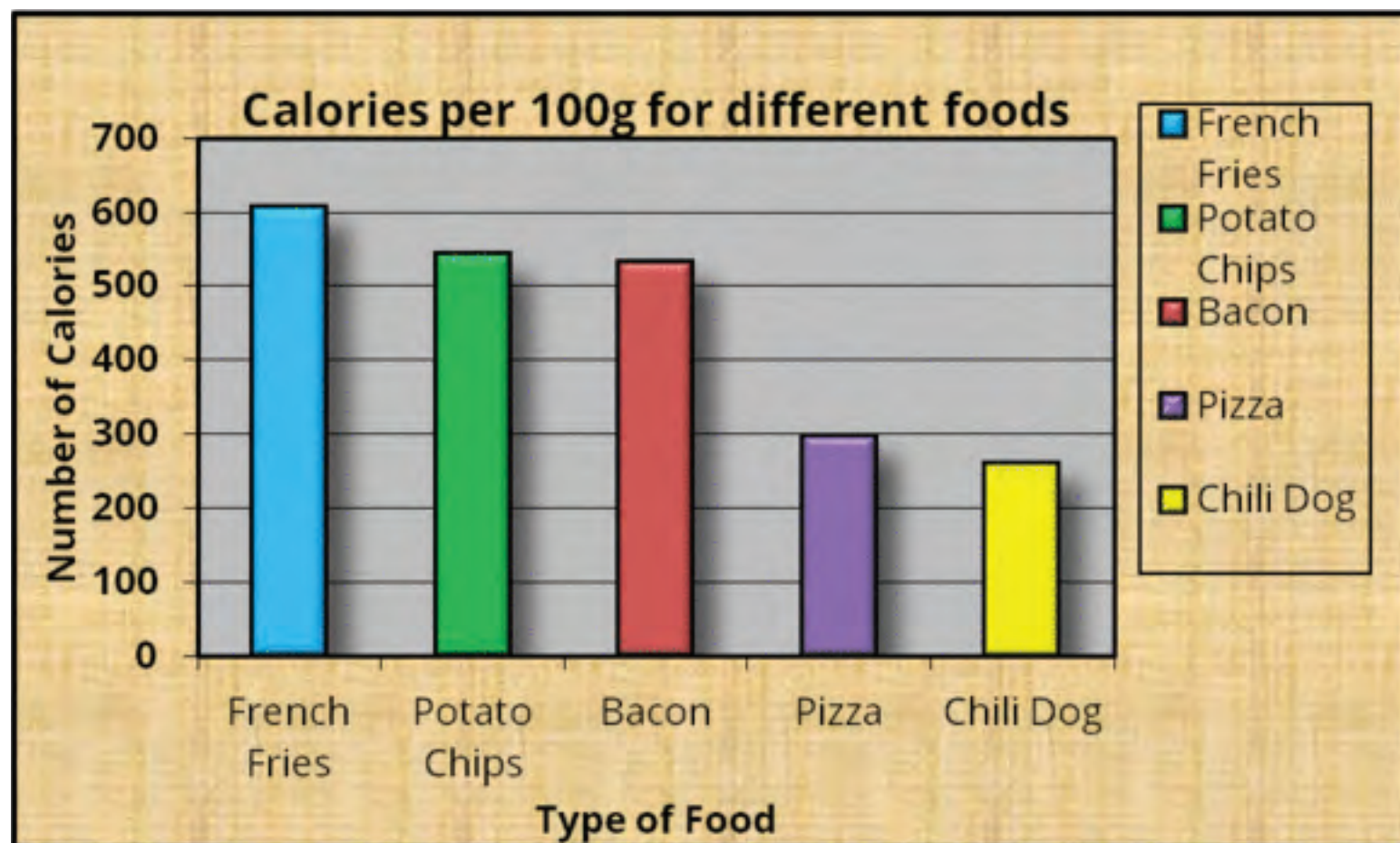
Decrease Chart Junk



Increase Data Ink



Decrease Chart Junk

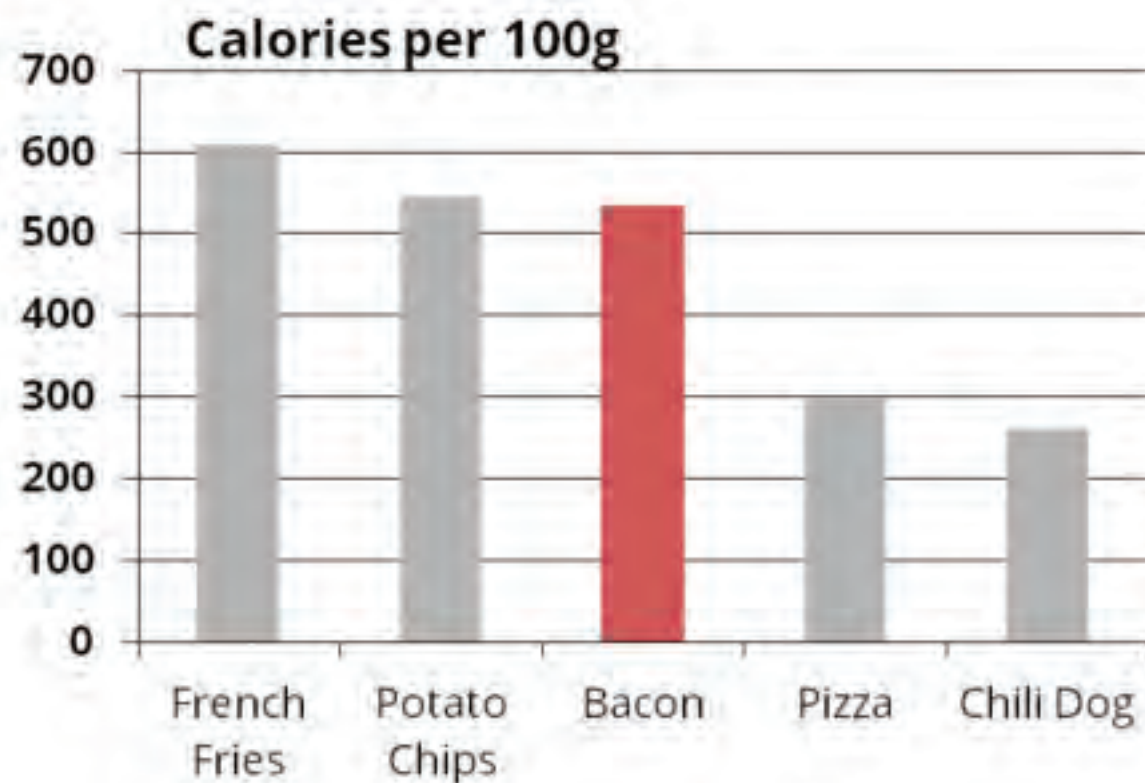


REMOVE

- Backgrounds
- Redundant Labels
- Borders
- Unnecessary Colors
- Special Effects



Increase **Data Ink**



REMOVE

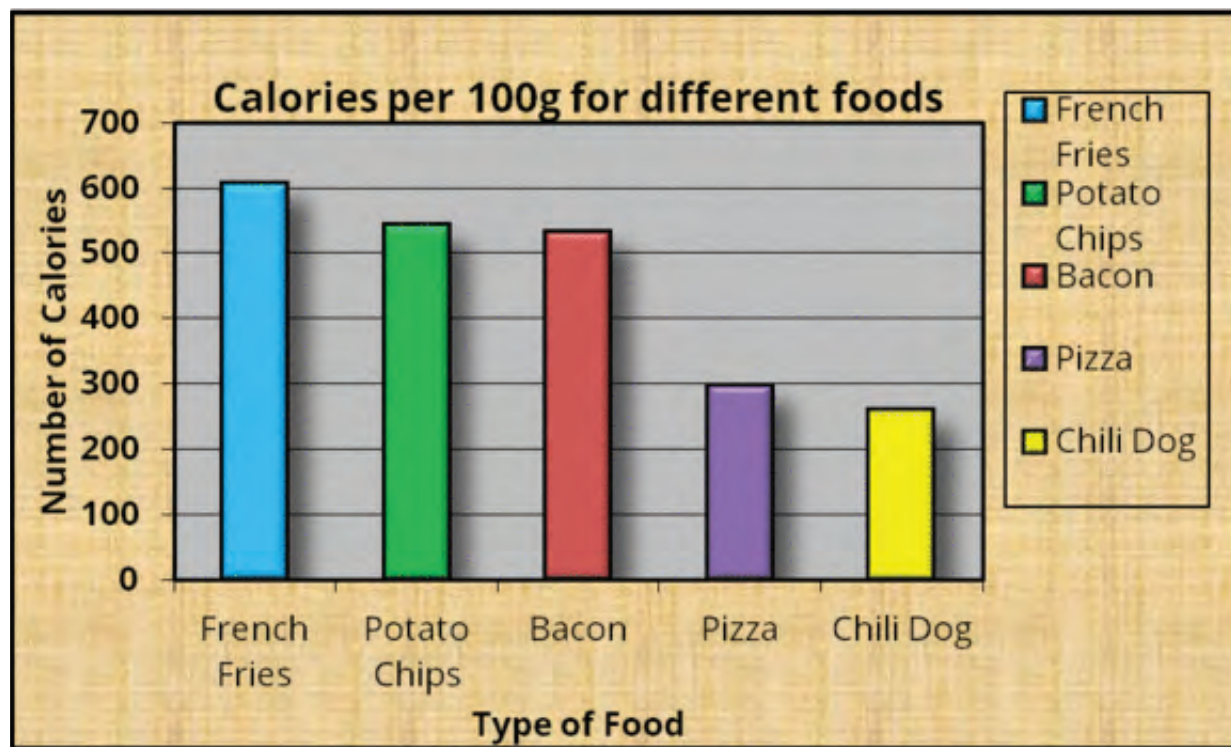
- Bolding
- Axis Lines

ADD

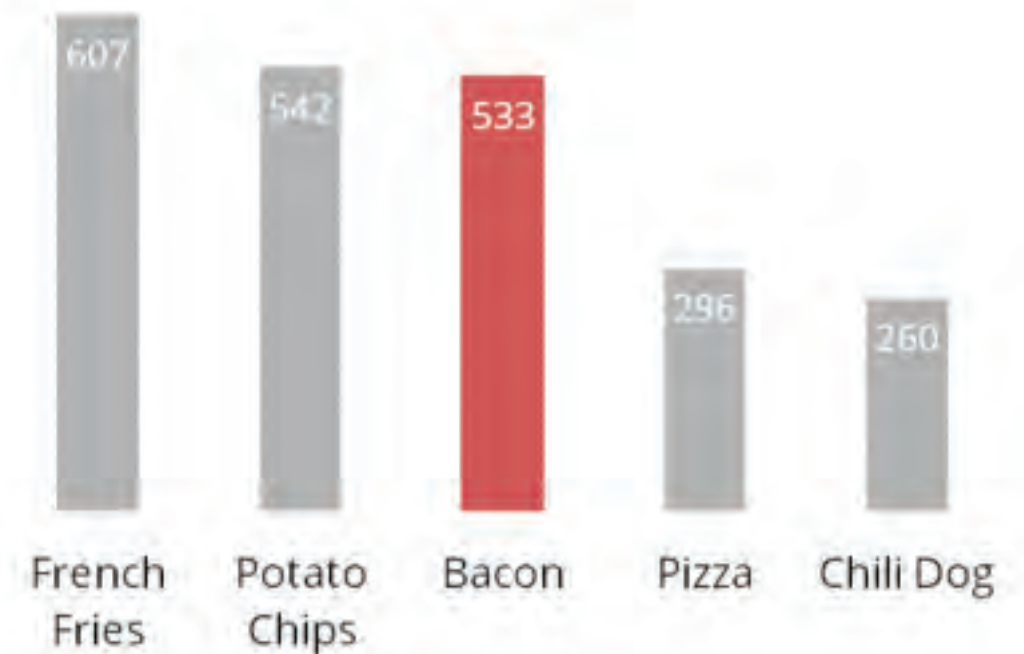
- Direct Labels



Chart Junk



Calories per 100g





**Do you know when you are
lying or lied to with data?**



UNDER PRESIDENT OBAMA,
MORE STUDENTS ARE EARNING THEIR HIGH
SCHOOL DIPLOMAS THAN EVER BEFORE

HIGH SCHOOL GRADUATION RATE

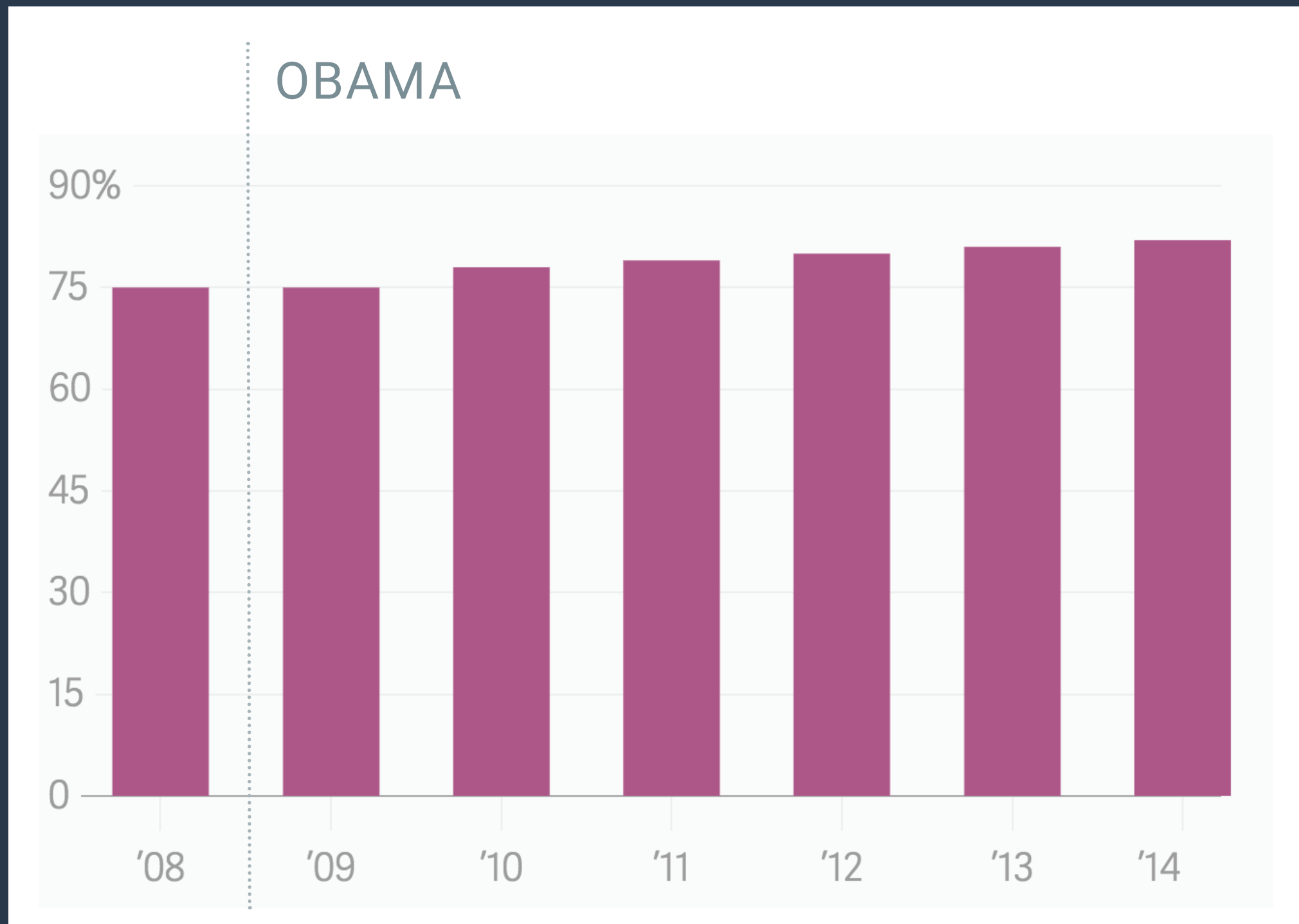


#LeadOnEducation

SOURCE: U.S. DEPARTMENT OF EDUCATION,
NATIONAL CENTER FOR EDUCATION STATISTICS

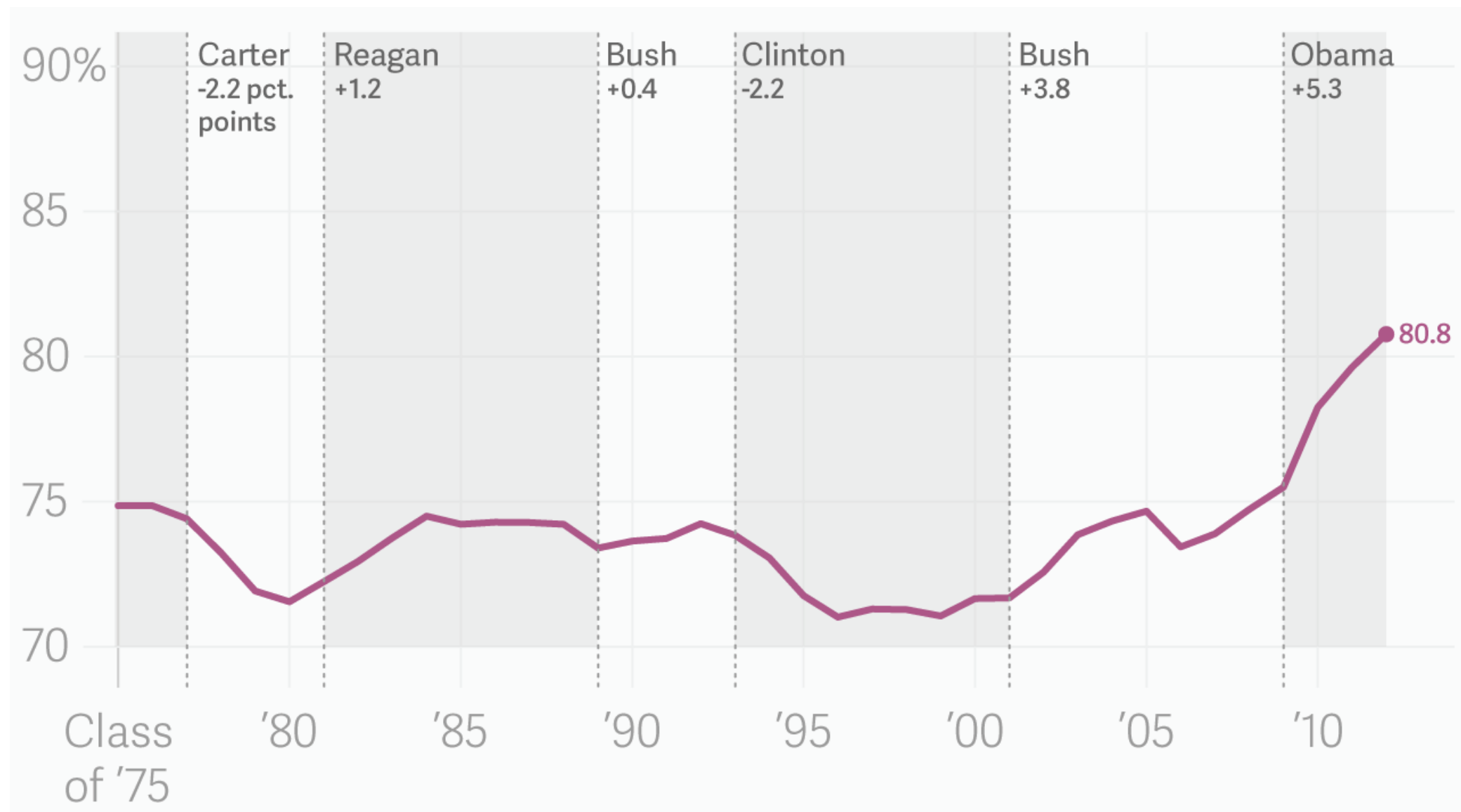


HIGH SCHOOL GRADUATIONS RATES





HIGH SCHOOL GRADUATIONS RATES



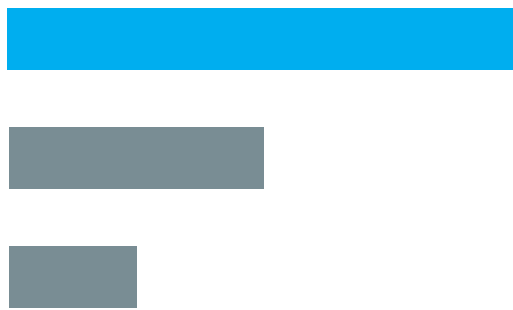
DATA: NATIONAL CENTER FOR EDUCATION STATISTICS



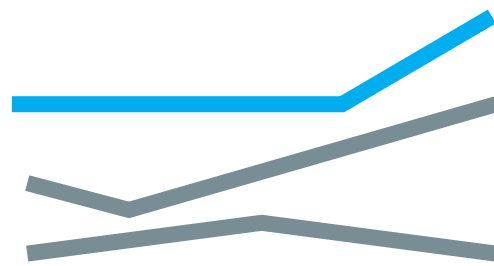
CHARTS ARE INTERCHANGEABLE



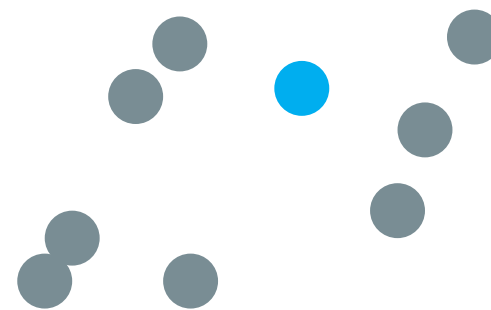
Types of Charts



Bar



Line



Scatter-plot



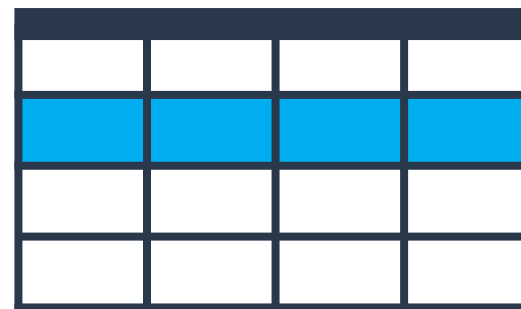
Dot Plot



Filled Map



Symbol Map



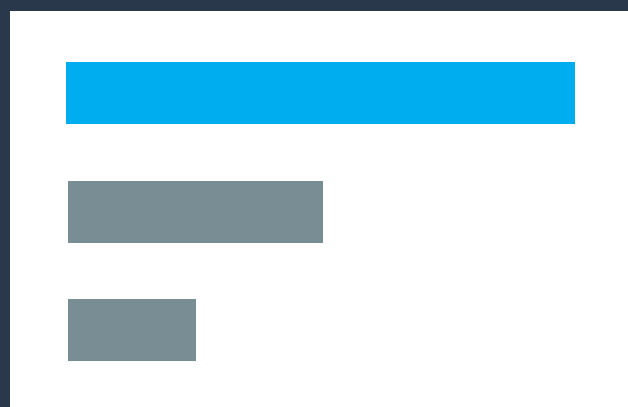
Table



Bullet Graph

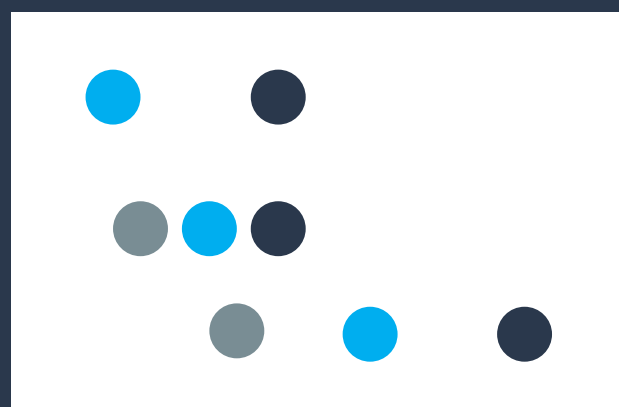


Comparison Charts



Bar

Compare highs
and lows of a
few categories



Dot Plot

Compare many
categories over
many variables



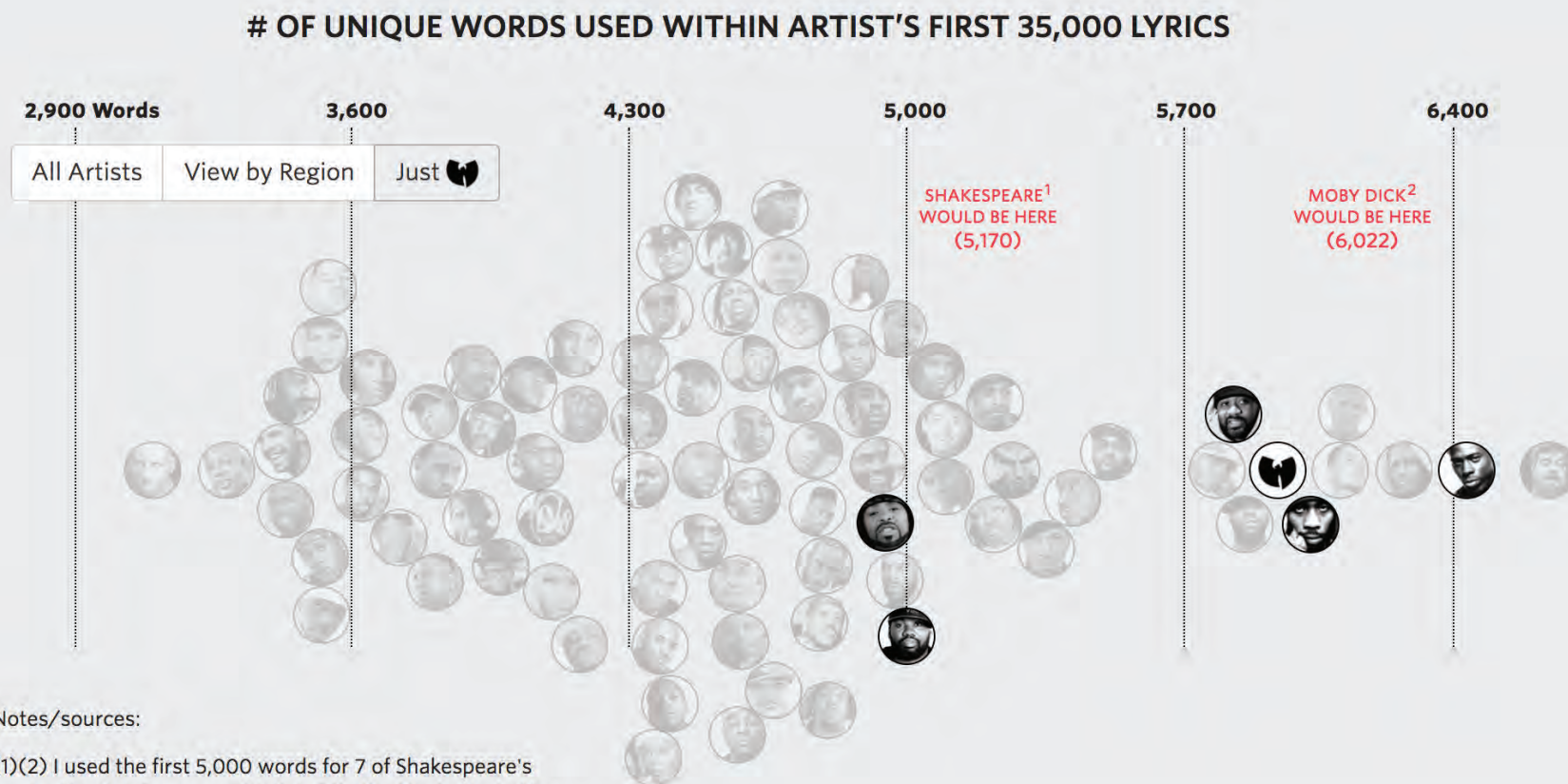
Line

Compare
trends of many
categories over
time



Dot Plot

OF UNIQUE WORDS USED WITHIN ARTIST'S FIRST 35,000 LYRICS



Notes/sources:

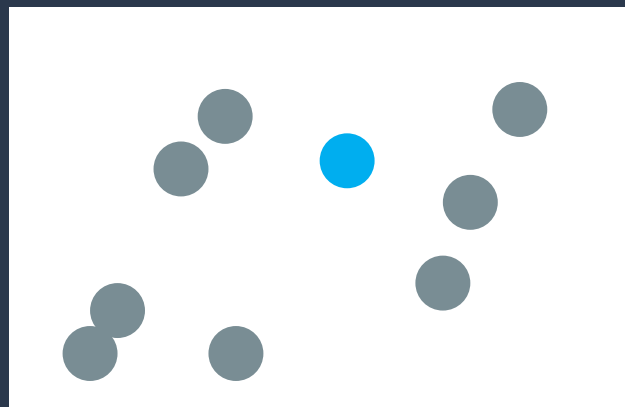
(1)(2) I used the first 5,000 words for 7 of Shakespeare's works: Hamlet, Romeo and Juliet, Othello, Macbeth, As You Like It, Winter's Tale, and Troilus and Cressida. For Melville, I used the first 35,000 words of Moby Dick.

All lyrics are provided by Rap Genius, but are only current to 2012. My lack of recent data prevented me from using quite a few current artists.

This data viz uses code by Amelia Bellamy-Royds's in [this](#) jsfiddle.

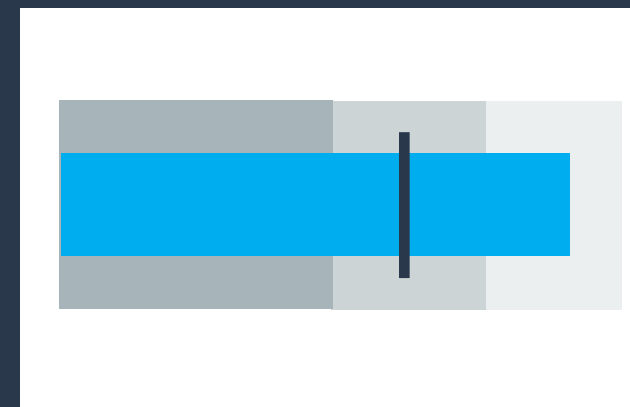


Relationship Charts



Scatter-plot

Relationship
between two
variables



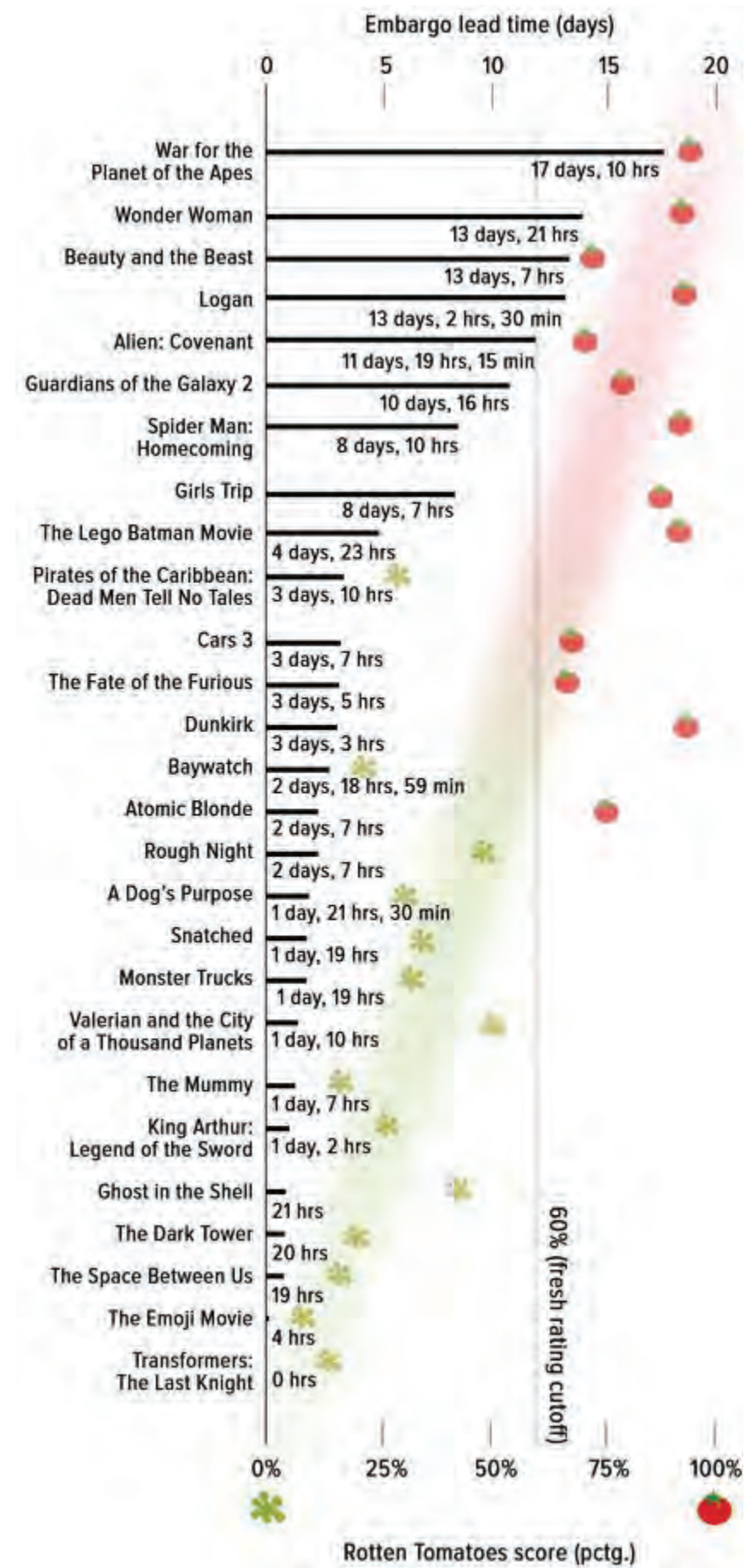
Bullet Graph

Show actual
versus target
against grades



Scatter-plot

ROTTEN TOMATOES
SCORE VERSUS CRITIC
REVIEW EMBARGO LIFT





Bullet Graph

M NIGHT SHYAMALAN DIRECTED MOVIES ROTTEN TOMATOES SCORES

The Sixth Sense 1999



Unbreakable 2000



Signs 2002



The Village 2004



Lady in the Water 2006



The Happening 2008



Afer Earth 2013



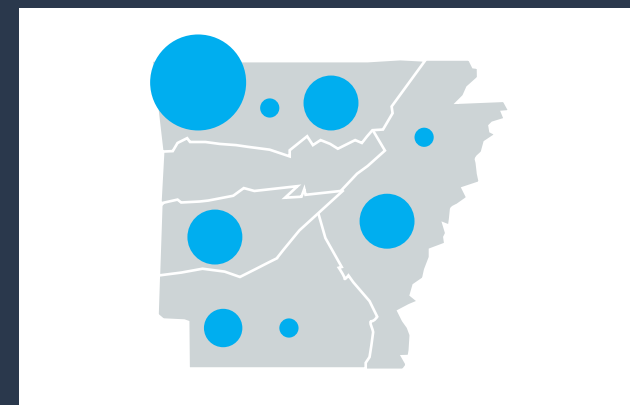


Value Charts



Filled Map

Show values of
different areas



Symbol Map

Show values of
exact locations



HONEST DASHBOARDS



Honest Data



Validate your Data source(s)
Refresh Data as needed or requested



Honest Audiences



Establish who will be the user(s)

Design for roles or segments

Adjust for data skills



Honest Metrics



Reporting or Exploration?
Is the metric actionable?



Honest Charts



Answer the stated question

Reduce Chart Junk increase Data Ink

Design for clarity



MAINSTREAM TECHNOLOGIES
EXPERTS IN DATA



MAINSTREAM
TECHNOLOGIES

QUESTIONS?

mainstream-tech.com

501.801.6700





MAINSTREAM
TECHNOLOGIES



Compliant Hosting



Custom Software



Managed Services

mainstream-tech.com

501.801.6700

