

# WHAT VISUALIZATION IS

And what it's useful for

what to do over the weekend

Illustrator video tutorials: 1, 2, 3

Read intro, chapters 1 and 2, and  
interviews with John Grimwade and  
NYTimes team (from the textbook)

Critique/redesign exercise

# EXERCISE

1. Briefly analyze the graphic:  
What am I supposed to do with it?
2. Are there other (better) ways to display these data?
3. Redesign it (hand-drawn sketch)
4. Are there other variables we should include?



1. Total Donations

2. Donations as % of GDP

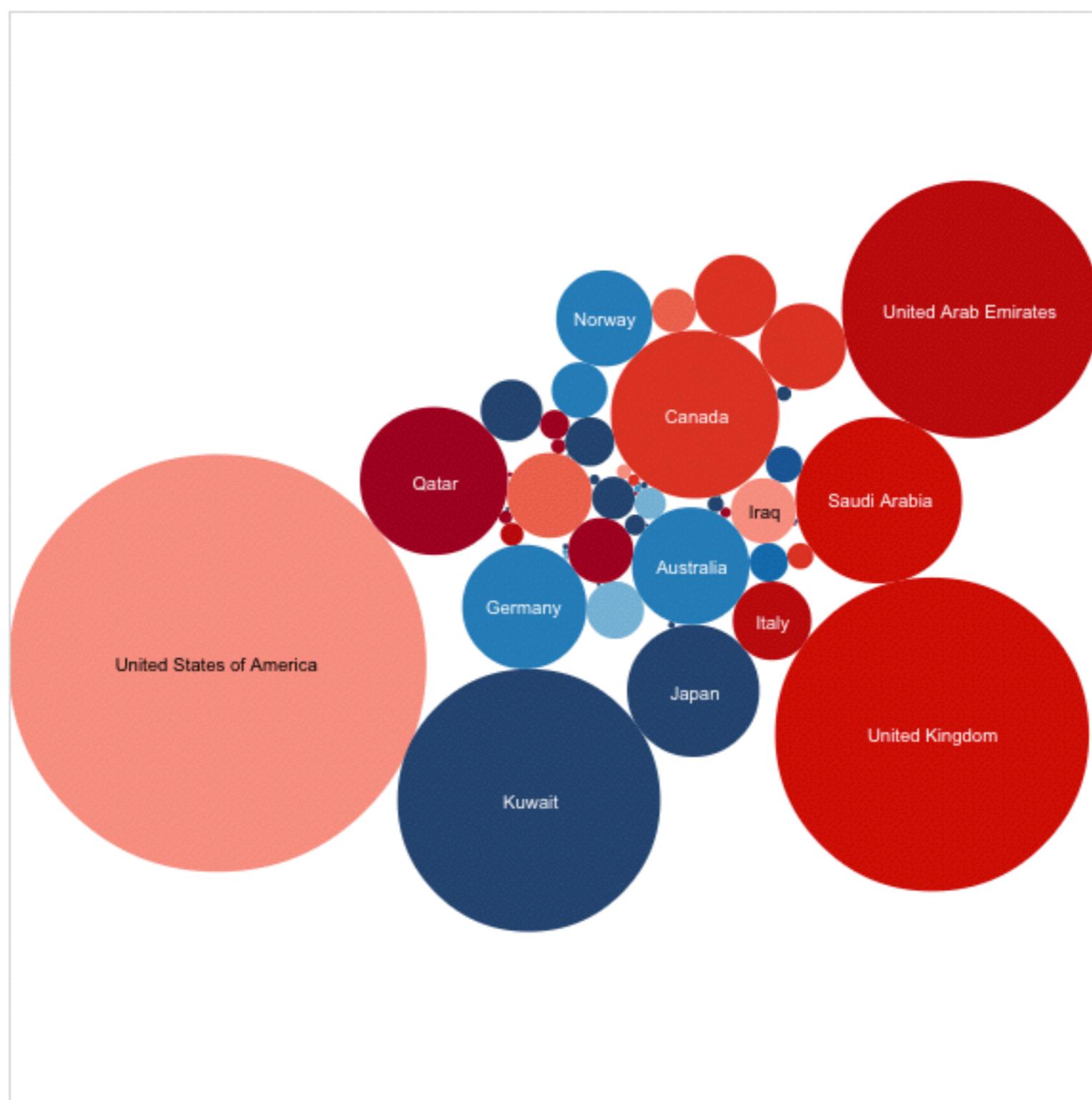
3. Donations over \$25M

4. Donations over \$25M as % of GDP

5. Donations under \$25M

% of total not yet paid

0.0 100.0



Share



Do

See more by this author



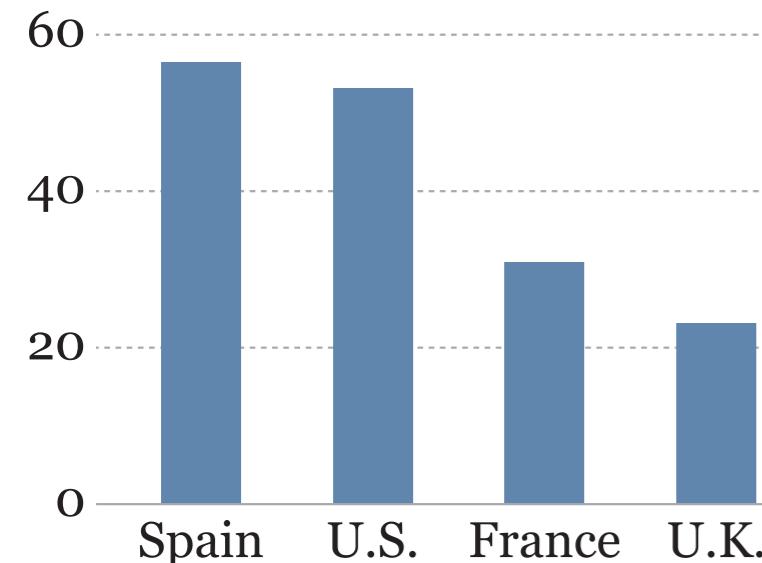


a visualization is any visual display  
intended to reveal evidence, making  
the invisible visible

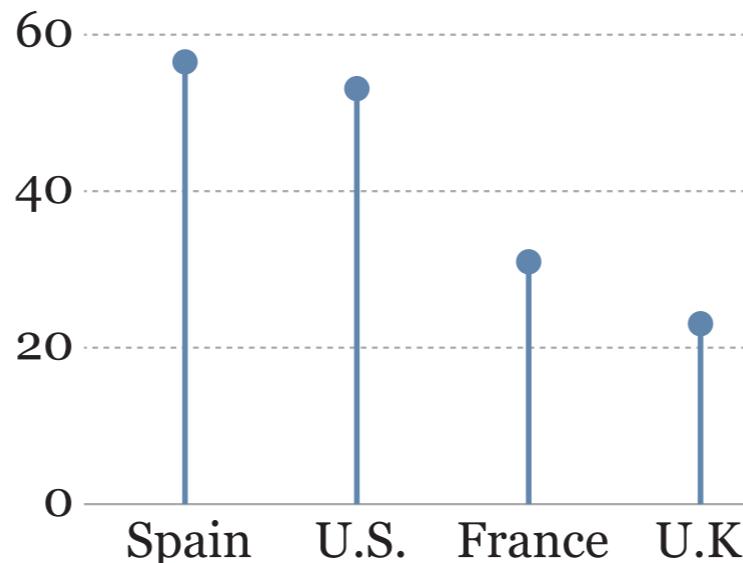
varieties

charts and maps  
scientific imagery  
infographics  
data visualization  
applications

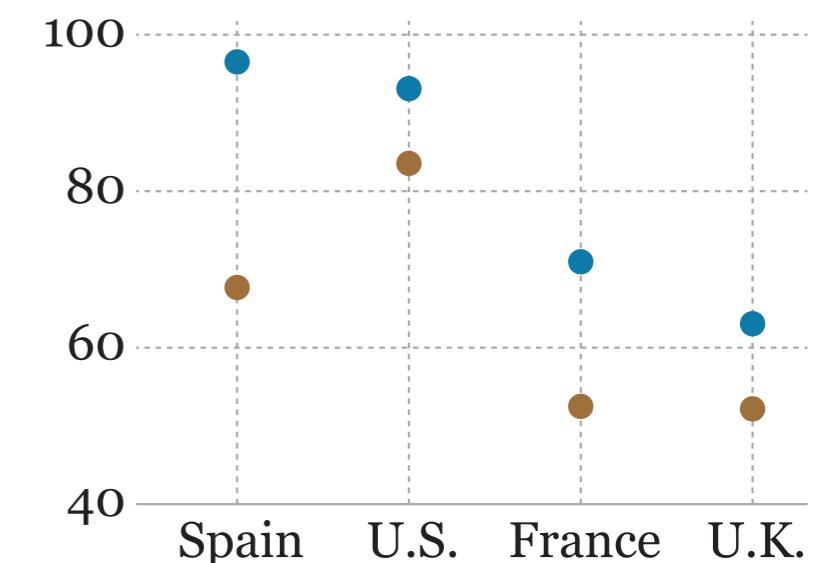
# charts



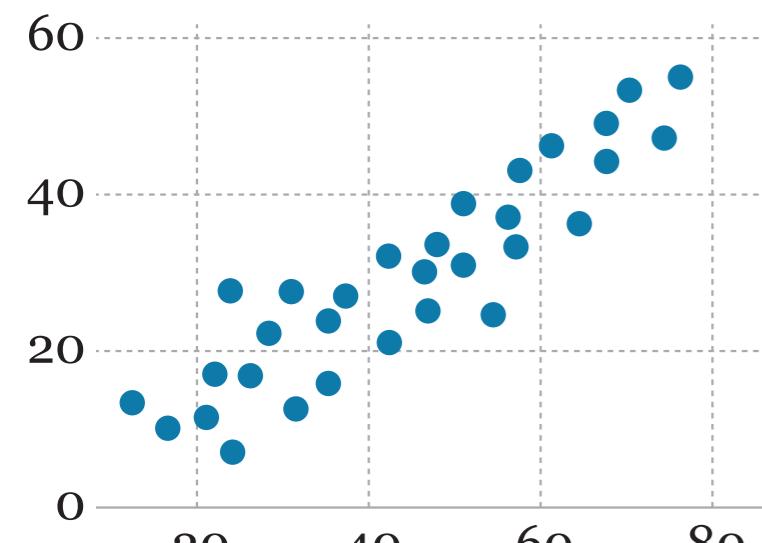
**BAR CHART**



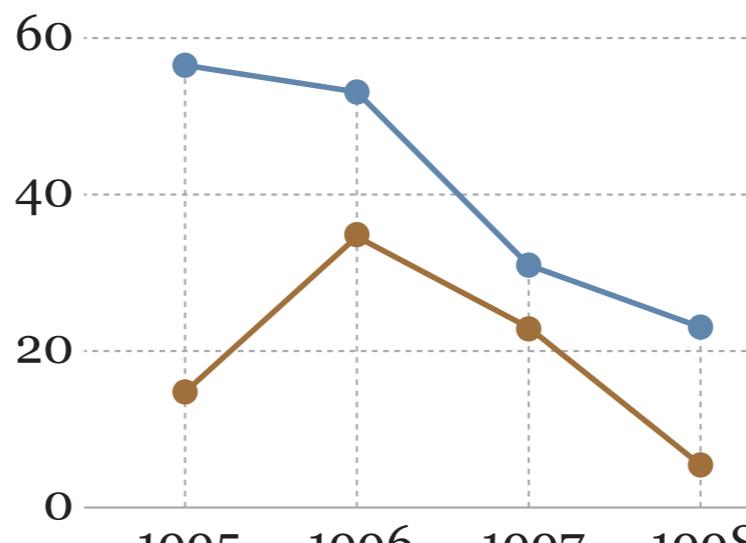
**LOLLIPOP CHART**



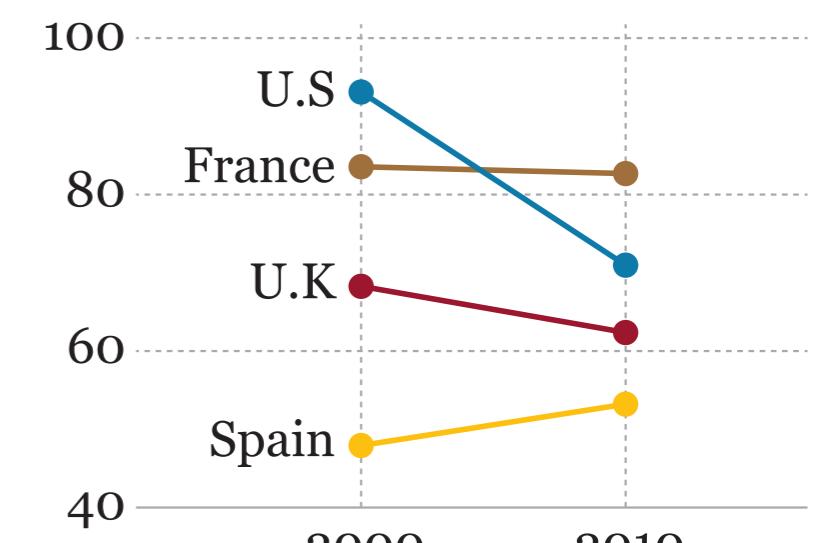
**DOT CHART  
(or dot plot)**



**SCATTER CHART  
(or scatter plot)**



**TIME-SERIES CHART**



**SLOPE CHART**

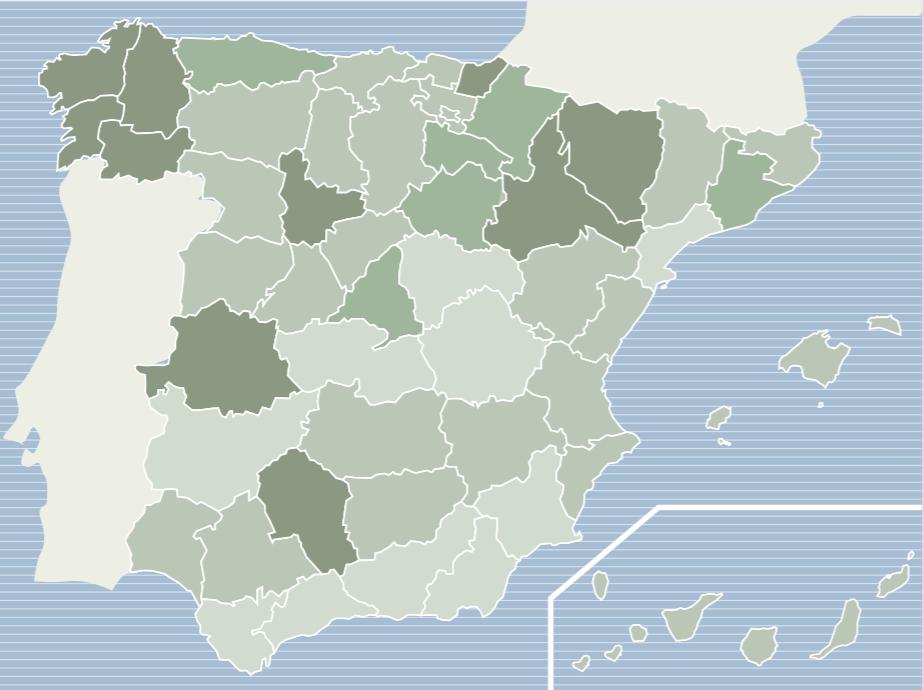
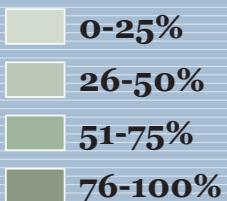
# locator maps



# data maps

## CHOROPLETH MAP

Percentage of people who ate at least one serving of boiled octopus last year



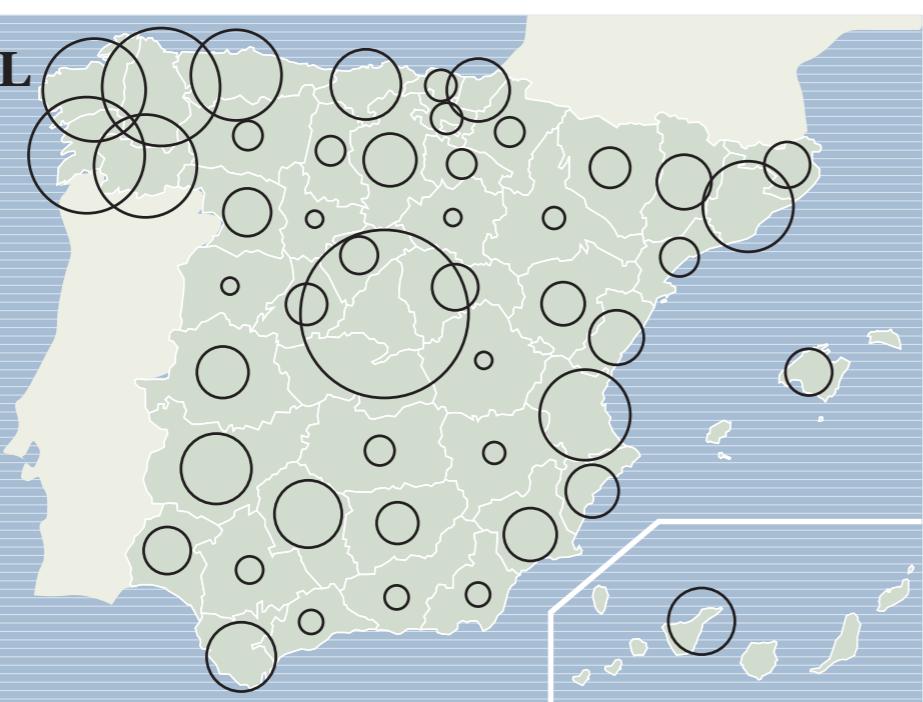
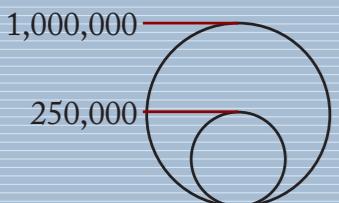
## DOT MAP

Every dot represents a restaurant that served boiled octopus at least once last year



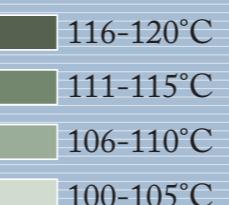
## PROPORTIONAL SYMBOL MAP

People who ate at least one serving of boiled octopus last year



## ISOPLETH MAP

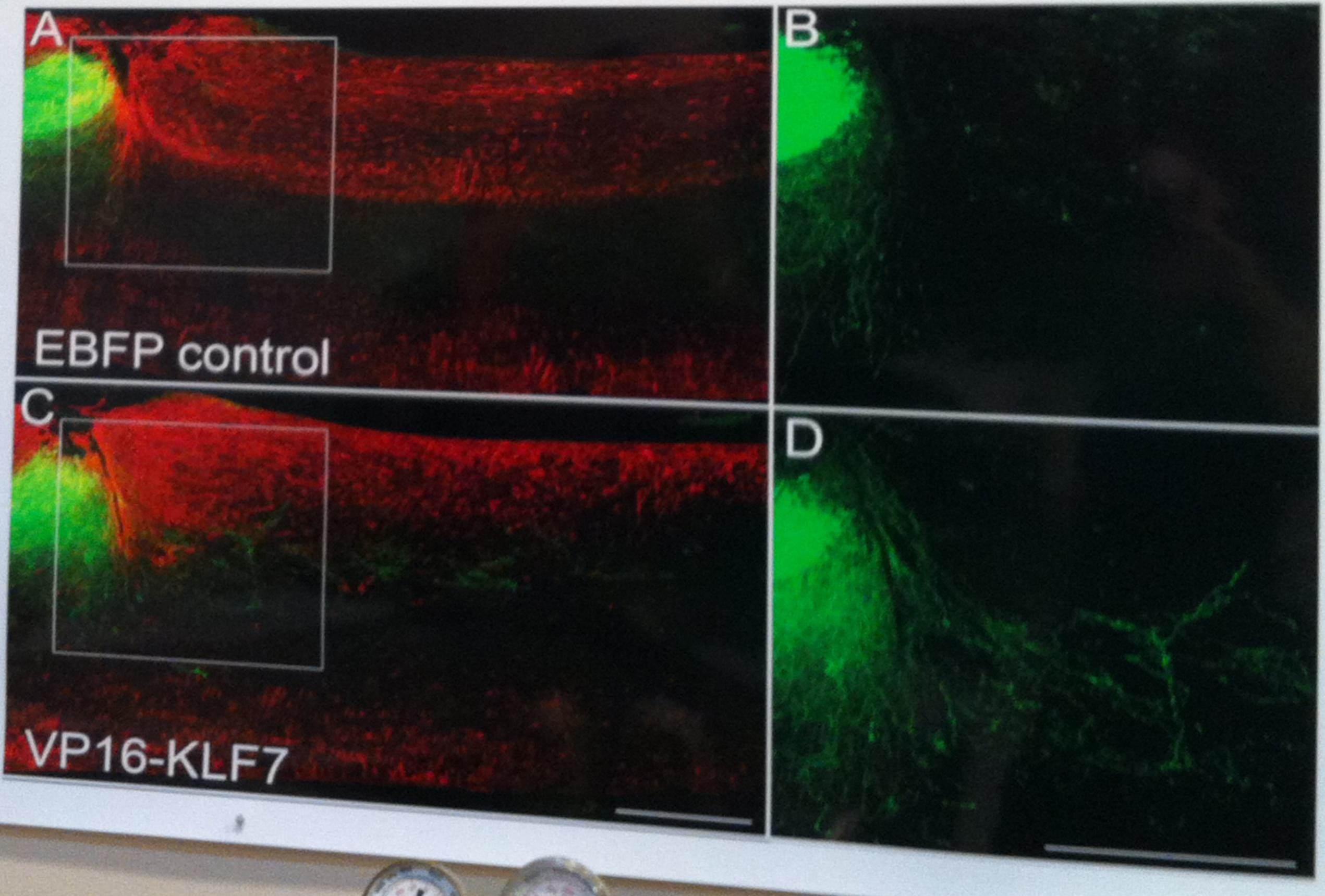
Most common temperature at which octopuses are boiled



varieties

charts and maps  
scientific imagery  
infographics  
data visualization  
applications

this is scientific imagery/visualization



varieties

charts and maps  
scientific imagery  
infographics  
data visualization  
applications

# this is an infographic

## DIAGRAM

NEWS IN PERSPECTIVE

### Brazil's Demographic Opportunity

How Brazil can take advantage of a future with fewer children per couple.

Alberto Cairo, Francine Lima,  
Marco Vergotti

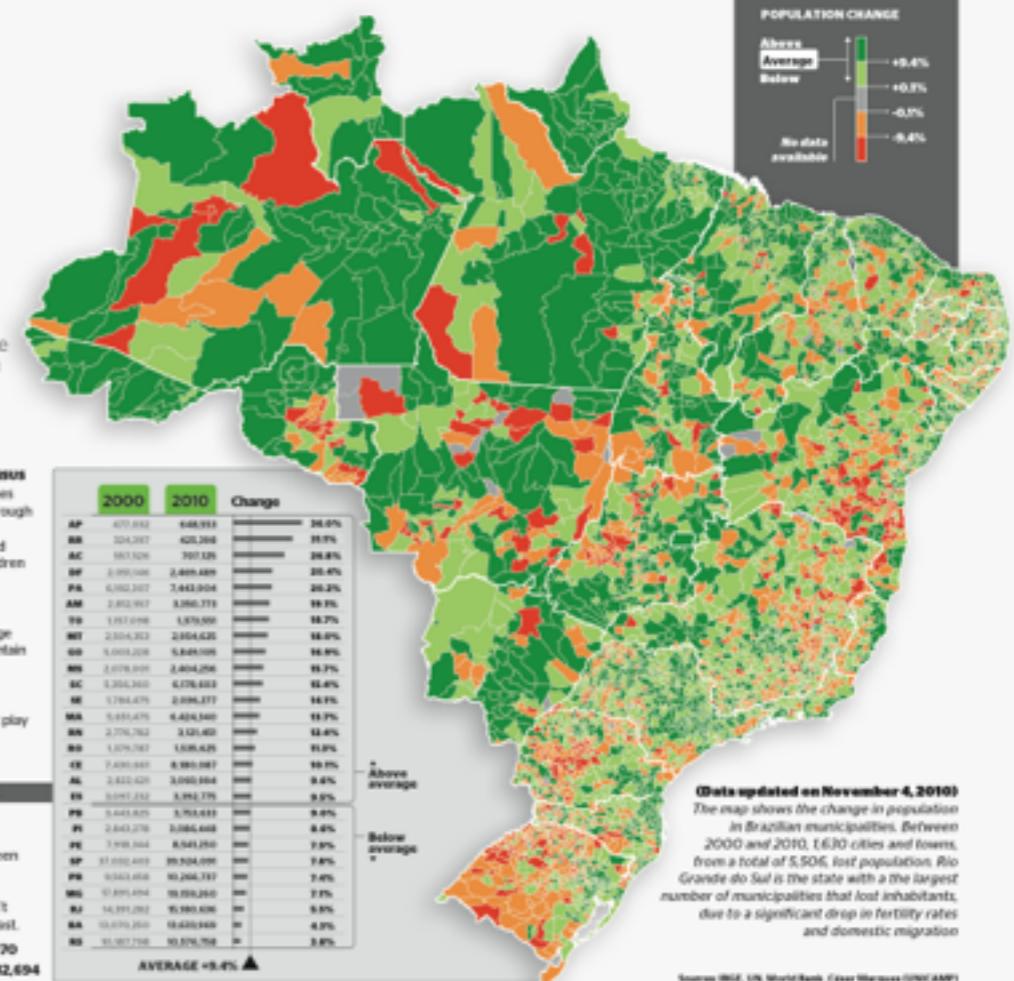
**PRELIMINARY DATA FROM THE 2010 CENSUS**  
 create an interesting picture of the changes that the Brazilian population has gone through in the past ten years. Brazil's population grew, on average, 10% between 2000 and 2010, but the fertility rate is below 2.1 children per woman, the minimum to keep a population from shrinking. According to César Marques, a demographer from the University of Campinas, the main challenge Brazil will face in the future is how to maintain a healthy Social Security system if the number of older and retired people will likely be much larger than it is today. Read on to learn about all the variables at play in this story.

#### 1 BRAZIL'S POPULATION IS BIGGER

The 2010 Census has revealed a 9.4% population increase between 2000 and 2010. The differences between states, as you can see on the chart on the right, are noticeable. Most rich states, such as São Paulo and Rio, didn't grow as fast as the ones in the north east.

2000  169,799,370  
2010  179,732,694

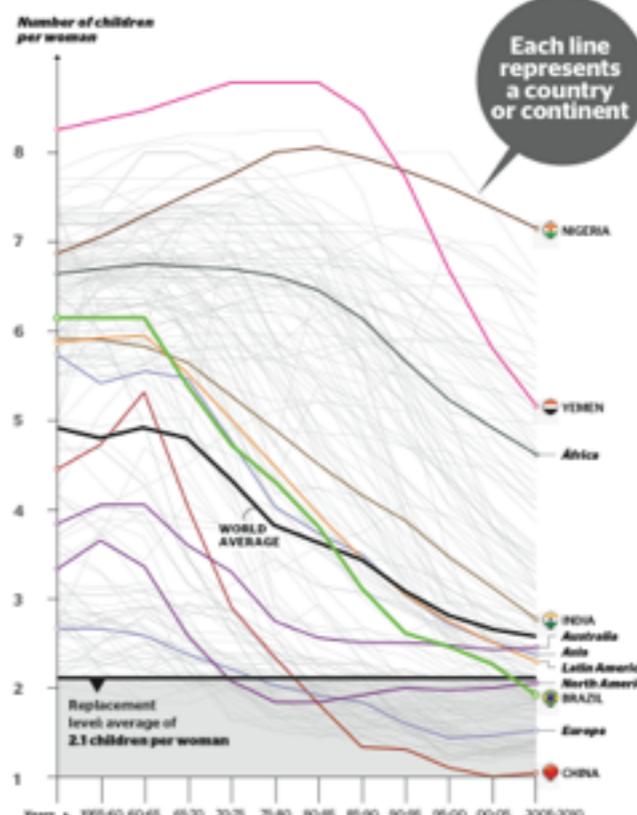
AVERAGE +9.4% ▲



Sources: IBGE, UN, World Bank, Cesar Marques (IPHCAMP)

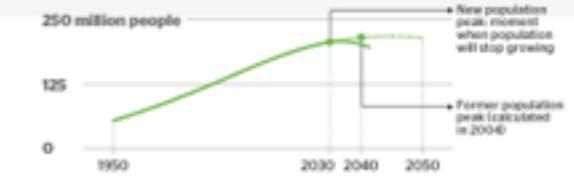
#### 2 -BUT THE FERTILITY RATE IS MUCH LOWER THAN EXPECTED

A study in 2004 estimated that in 2010, the fertility rate would be 2.4 children per woman, on average. But new data collected by the IBGE prove that the fertility rate is already 1.9, below the threshold called "replacement rate". When the fertility rate drops below this number, the population of a country will eventually start to shrink and grow older.



#### 3 AS A CONSEQUENCE, POPULATION WILL STOP GROWING

Forecasts made in 2004 anticipated that Brazil's population would stop growing in 2040. But the most recent data from the IBGE suggests that this could happen much earlier, in 2030.



#### 4 -AND IT WILL BECOME OLDER

Comparing the current population pyramid with the one predicted for 2050

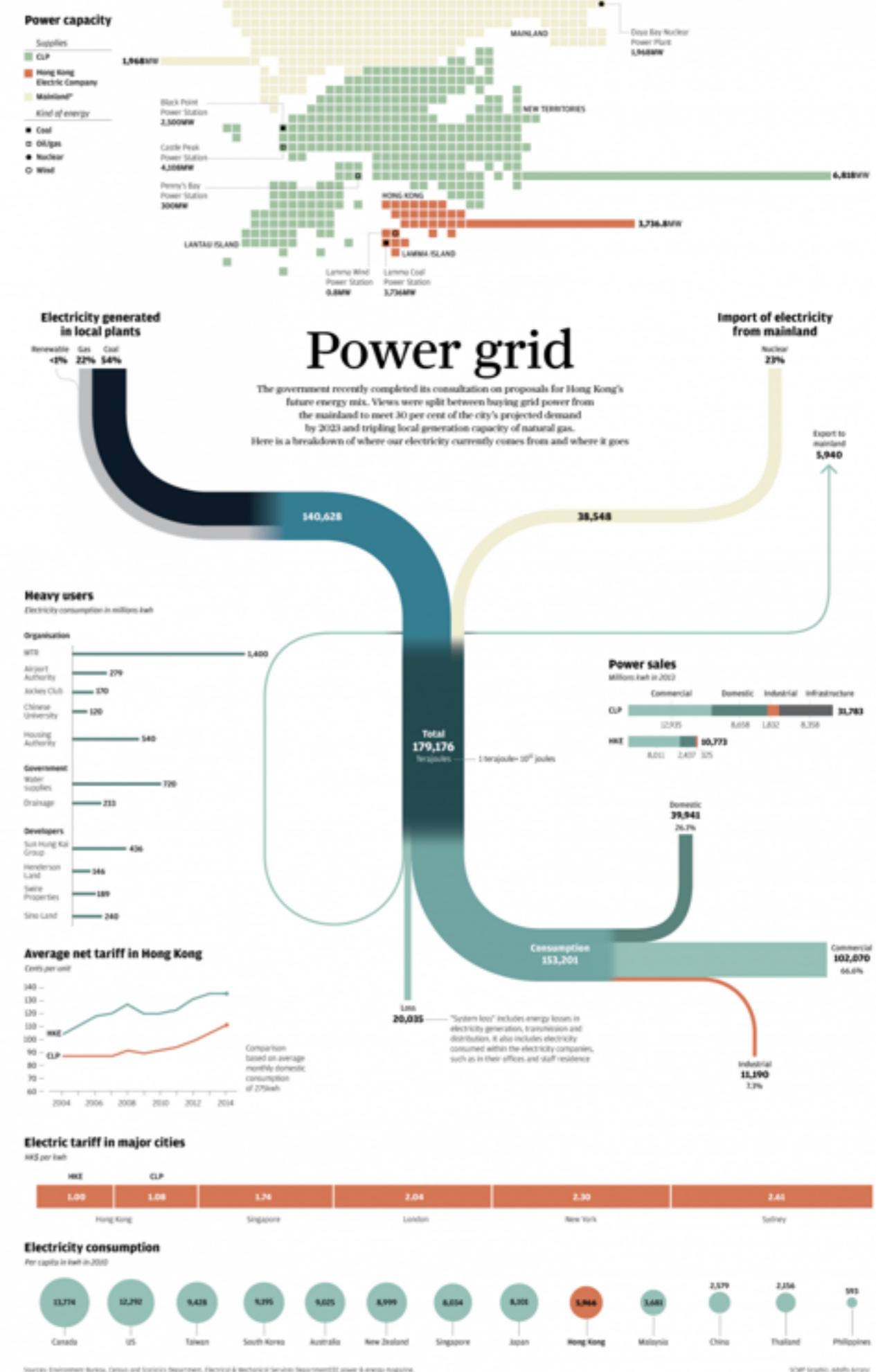


#### How Brazil can transform the population challenge into an opportunity

- As the population ages, the proportion of people of working age increases. The country will therefore have more people producing wealth (if the labor market can absorb them) and fewer children to consume investments. It is a window of opportunity, because in some cases the number of people of working age to fall back when older people are leaving the market.
- The population under 15 years of age is falling today. A smaller number of students in public schools will facilitate the quality of teaching, if the amount invested in education stays the same.
- Educational policy focused on low-income youth favors the formation of more skilled workforce and greater social mobility.
- In the future, Brazil will reach the stage of Europe and Japan, which struggle to support their elders. This is why it's so important to prepare a more balanced retirement system, which will include retirement at a later age.

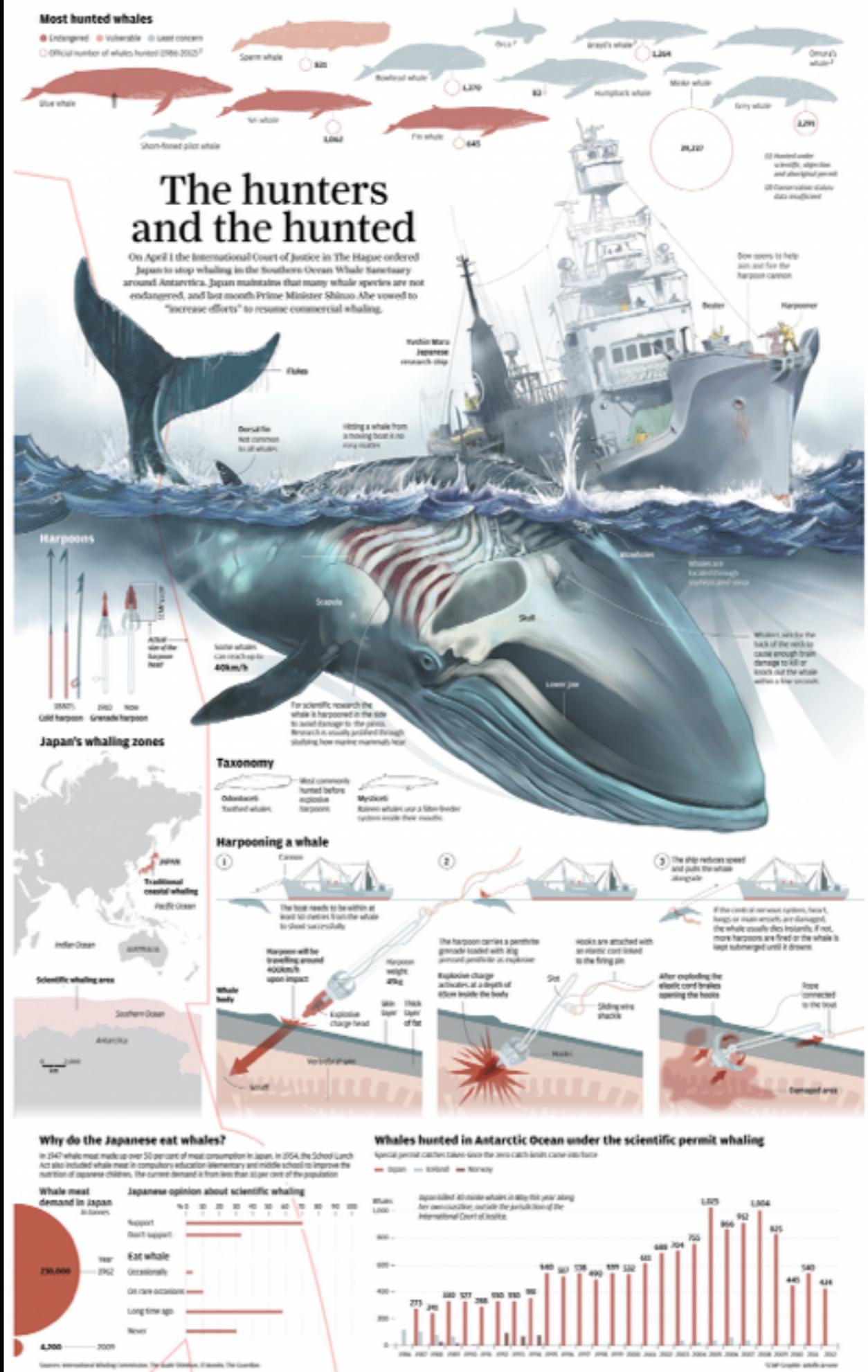
# this is an infographic

<http://www.scmp.com/infographics/article/1538887/power-grid>



# this is an infographic

<http://www.scmp.com/infographics/article/1544125/hunters-and-hunted>



# this is a data visualization

The New York Times

## Mapping the 2010 U.S. Census

Browse population growth and decline, changes in racial and ethnic concentrations and patterns of housing development.

Share this view on [Twitter](#) or [Facebook](#)

[View More Maps](#) | ▾



Address, ZIP code or city

Go

### Change in population since 2000

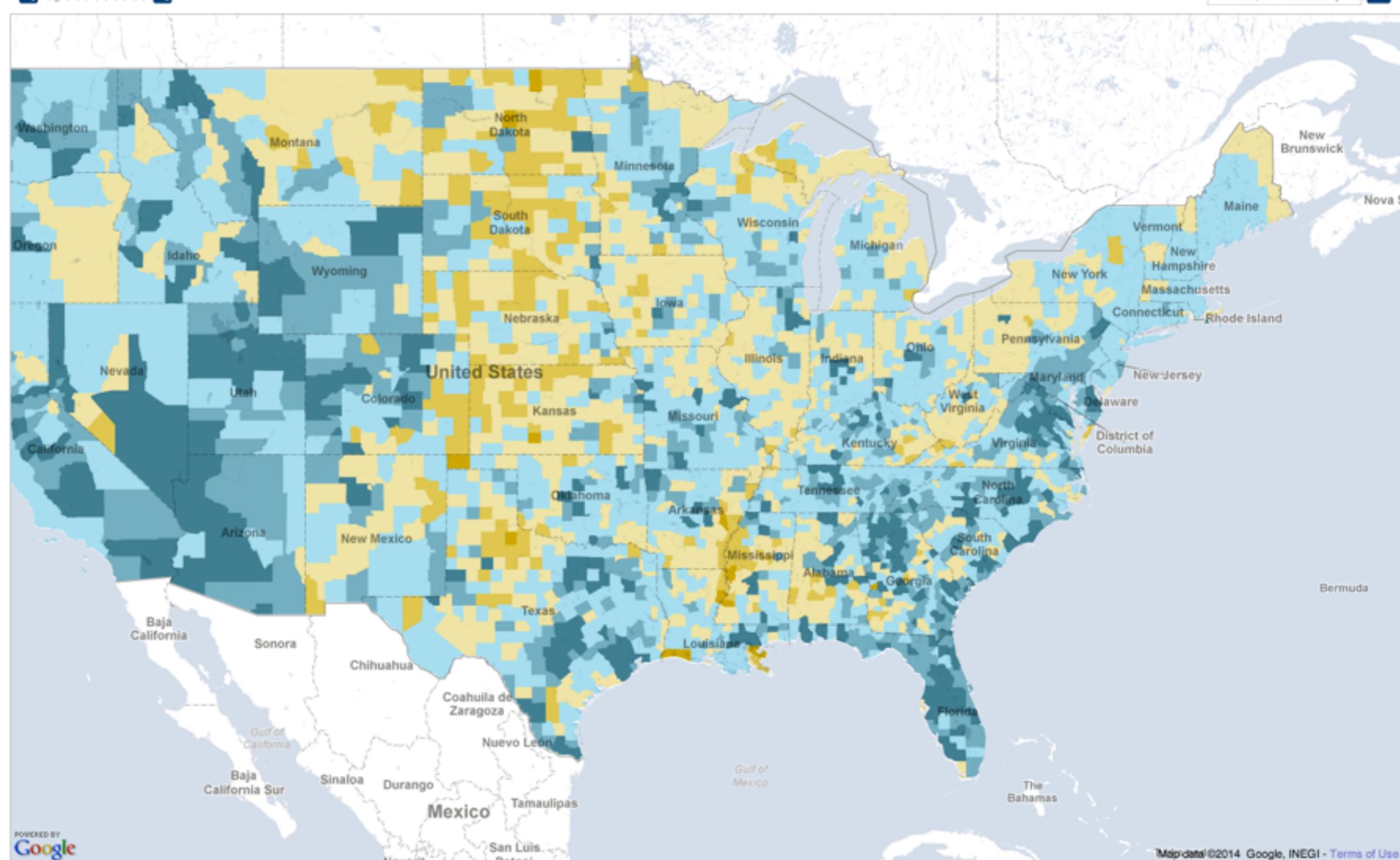
- Over 20% increase
- 10% to 20%
- 0% to 10%
- 0% to -10%
- -10% to -20%
- Over 20% decline

[Zoom to a State](#) | ▾

### North Dakota

2010 POPULATION CHANGE FROM 2000  
672,591 +4.7%

RACE/ETHNICITY	SHARE OF POP.	CHANGE FROM 2000
Whites:	89%	+2%
Blacks:	1%	+105%
Hispanics:	2%	+73%
Asians:	1%	+92%
Native Amer.:	5%	+16%
Multiracial:	2%	+55%
Other groups:	0%	+26%



POWERED BY  
**Google**

Map data ©2014 Google, INEGI - Terms of Use

By MATTHEW BLOCH, SHAN CARTER and ALAN MCLEAN | Source: Census Bureau; socialexplorer.com

<http://projects.nytimes.com/census/2010/map>

# —and this is a ‘news application’

## HealthCare.gov Explorer

See the rates for health plans available through HealthCare.gov, the federal insurance exchange. Many consumers will also be eligible for federal subsidies to help buy coverage through the exchanges, and may pay lower rates. Plans are labeled Catastrophic, Bronze, Silver, Gold or Platinum depending on the level of coverage.

Interactive by: Martin Burch, Madeline Farbman, Jonathan Keegan, Adam Suharja, Christopher Weaver, Kurt Wilberding/The Wall Street Journal.  
Write to the editors at [WSJGraphicsEditors@WSJ.com](mailto:WSJGraphicsEditors@WSJ.com).

How Health-Insurance Subsidies Are Calculated



AGE PLAN TYPE STATE COUNTY OR ADDRESS  
30 Silver Alabama Autauga SEARCH GEO LOCATE

Range of prices for lowest-cost Silver plans on HealthCare.gov

Location	Price
Allegheny, Pa.	\$144
Autauga, Ala.	\$215
Worth, Ga.	\$409

Alabama: Autauga



Leaflet | Map tiles by Stamen Design, under CC BY 3.0. Data by OpenStreetMap, under CC BY SA.

Results

CALCULATE SUBSIDY ► SHOW ALL

**\$215** monthly premium

Silver PLAN DETAILS »  
AGE 30  
AUTAUGA, ALA.  
BLUE CROSS AND BLUE SHIELD OF ALABAMA  
**Blue Value Silver**

DEDUCTIBLE	\$2,400
OUT-OF-POCKET MAX	\$6,350
COST OF DOCTOR'S VISIT	\$40

About Silver plans »

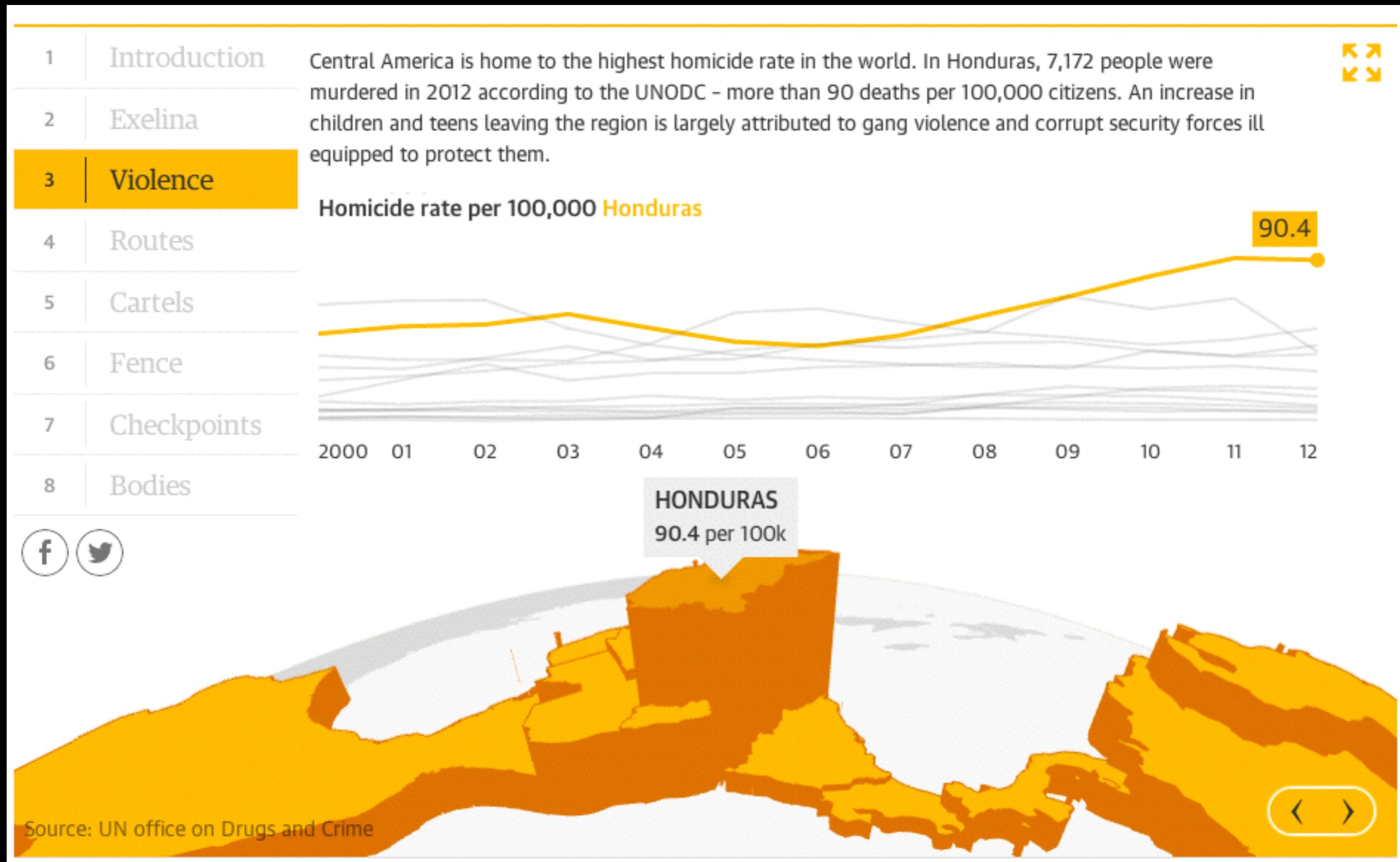
**\$228** monthly premium

Silver PLAN DETAILS »

Your plans

Click pins to compare and share plans

# but then, how do we call this?



# Or this: Data art?

## Documental: Jaime Serra III

Jaime Serra Palau. Periodista y artista multidisciplinar. En los últimos 25 años ha dirigido la integración de algunos de los principales medios de Europa, EE.UU. y Latinoamérica. En su trabajo artístico utiliza los métodos y el lenguaje propio de la integración científica para tratar temáticas pertenecientes a su propia mundo personal.

Se ofrece se ha impuesto en Estados Unidos, Argentina, México y España. Reconocido por la prestigiosa Society for News Design como el integrador más influyente del periodo 1990-2012.

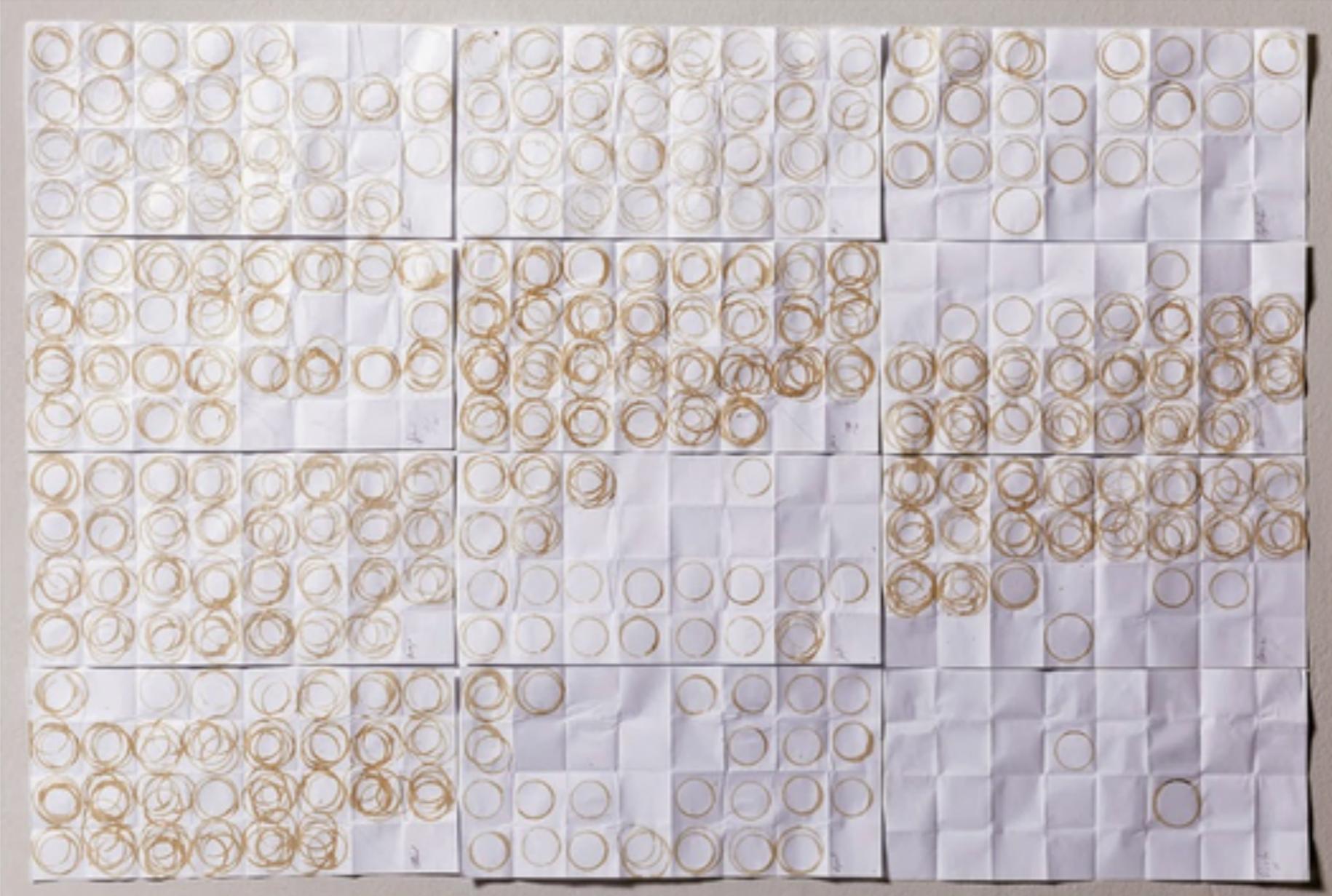
Es, desde entonces del 2005, responsable de las integraciones de "La Vanguardia".

### Tres historias verdaderas

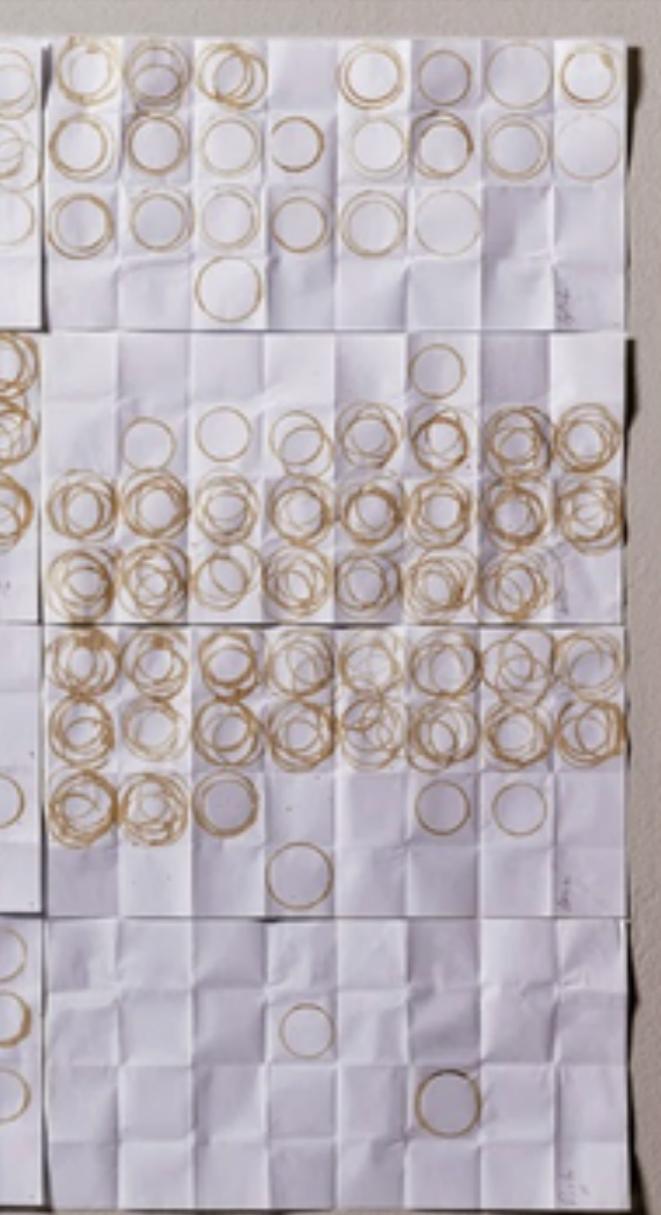
Los datos son materia prima, en bruto no tienen utilidad. Deben ser procesados y transcritos a un lenguaje visual para ser comprendidos. La herramienta que dibuja la información que contienen es la integración, una herramienta de comunicación habitualmente asociada a la divulgación científica pero que, como cualquier otra herramienta de comunicación humana, puede narrar hechos o verdades, realidad o ficción. Los datos colectivos, recopilados con las actuales tecnologías capaces de prescindir de la intermediación del individuo, son objetivos. Precisamente por eso no pueden aportar nada sobre el individuo: no pueden ser verdades. La verdad confina un componente de interpretación que permite que cada individuo disponga de la suya propia. Son los datos aplicados a lo que hace una persona concreta, en un momento dado-concreto, sobre un tema concreto lo que puede resultar revelador para otro individuo. Porque en la intimidad todos los seres humanos, por analogía u oposición, nos encontramos.

PATROCINADO POR  
**Endesa**

1. Tres historias verdaderas



2. Café a diario



3. Café a diario

La relación que mantengo con el café es dual: por una parte puedo llegar a consumirlo de modo compulsivo, casi como una adicción, por otra parte la reacción de mi organismo a los lácteos -no me gusta solo- me obliga a reducir o abandonar por completo su consumo durante días.

Durante el año 2013 cuantifiqué las tazas de café que tomaba a partir de las manchas que dejaban sobre hojas de papel.

Del número total de tazas existen dos tipologías: café cortado y café con leche, usando un modelo de taza de diferente diámetro para cada caso. Con el fin de otorgarle mayor exactitud a la distinción, utilicé las mismas tazas todo el año.

Para la visualización utilicé una hoja de 25 cm x 50 cm para cada mes. Como debía transportar las hojas a todos partes era necesario doblarla. La dimensión de la hoja elegida permitió que, doblada cinco veces sobre su mitad y nuevamente desplegada, dibujase treinta y dos cuadrados de 8 cm cada uno, una forma ligeramente mayor que el diámetro de la taza de café con leche. A modo de calendario, cada cuadrado corresponde a un día, reservando el último para el nombre del mes y otras anotaciones.

# or this?



THE LENS Losing Ground



DONATE TO PROPUBLICA

DONATE TO THE LENS



## Louisiana is drowning, quickly.

In just 80 years, some 2,000 square miles of its coastal landscape have turned to open water, wiping places off maps, bringing the Gulf of Mexico to the back door of New Orleans and posing a lethal threat to an energy and shipping corridor vital to the nation's economy.

And it's going to get worse, even quicker.

Scientists now say one of the greatest environmental and economic disasters in the nation's history is rushing toward a catastrophic conclusion over the next 50 years, so far unabated and largely unnoticed.

At the current rates that the sea is rising and land is sinking, National Oceanic and Atmospheric Administration scientists say by 2100 the Gulf of Mexico could rise as

<http://projects.propublica.org/louisiana/>

When you hear me using the word “visualization” I may be referring to any of these things

- charts and maps
- scientific imagery
- infographics
- data visualization
- applications

Visualization is an umbrella term



why visualizing information is useful

# Dataclysm

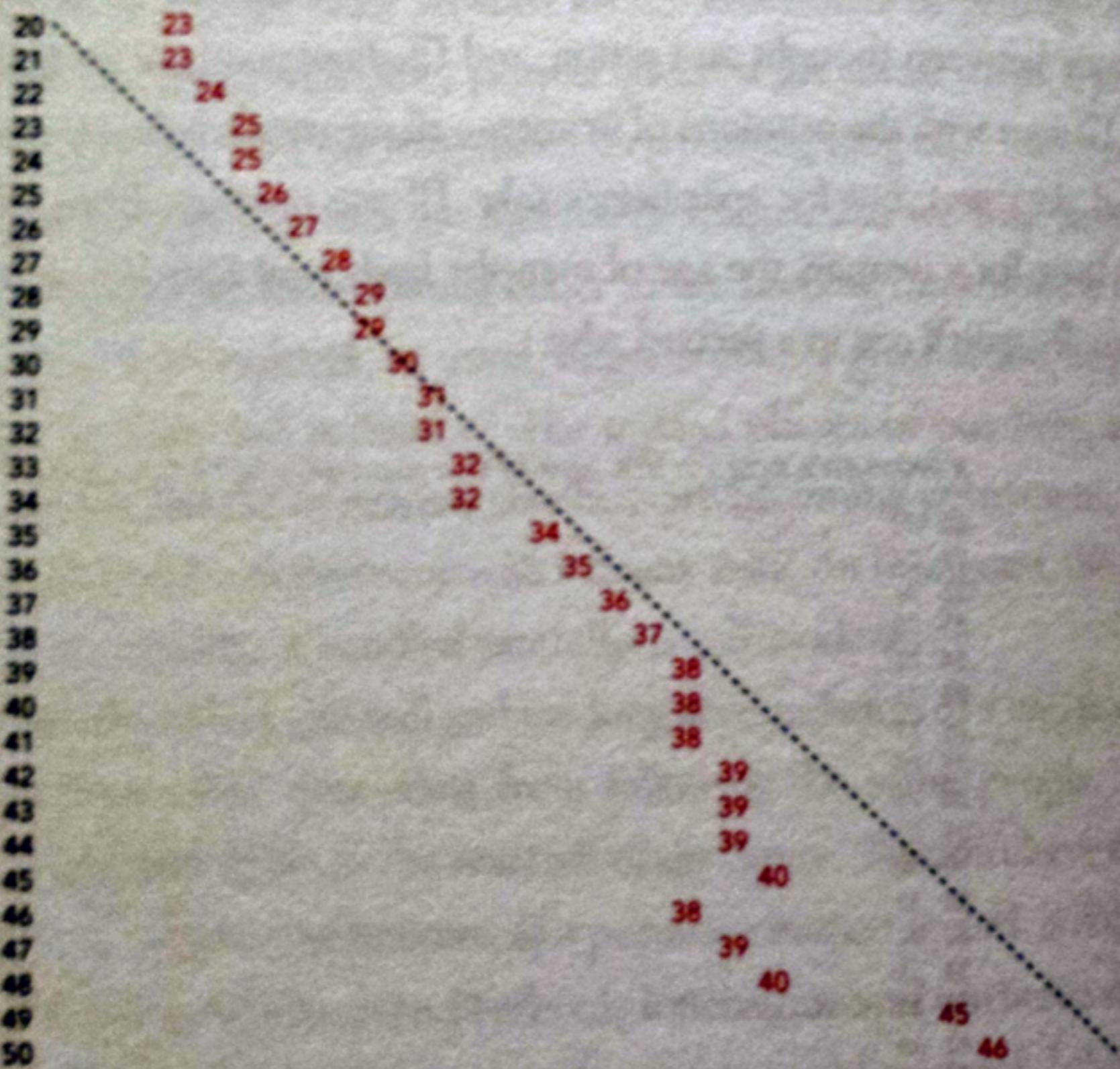
## Who We Are\*

## Christian Rudder

\* When We Think No One's Looking

[http://www.thefunctionalart.com/  
2014/09/facing-dataclysm.html#more](http://www.thefunctionalart.com/2014/09/facing-dataclysm.html#more)

a woman's age vs. the age of the men who look best to her



*a man's age vs. the age of the women who look best to him*

20	20
21	20
22	21
23	21
24	21
25	21
26	22
27	21
28	20
29	20
30	20
31	20
32	20
33	20
34	20
35	20
36	20
37	22
38	20
39	20
40	21
41	21
42	20
43	23
44	21
45	24
46	20
47	20
48	23
49	20
50	22

This graph—and it's practically not even a graph, just a table with a couple



7-year old girl



7-year old girl  
“Why don’t planets stop spinning?”





wtf?





“Google it, kiddo!”



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## Why and how do planets rotate?



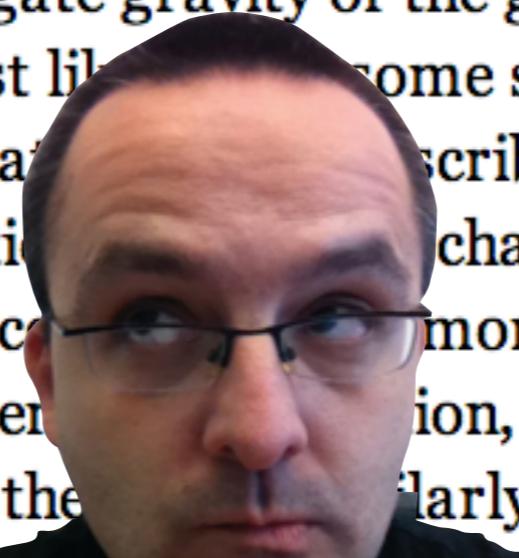
Apr 14, 2003



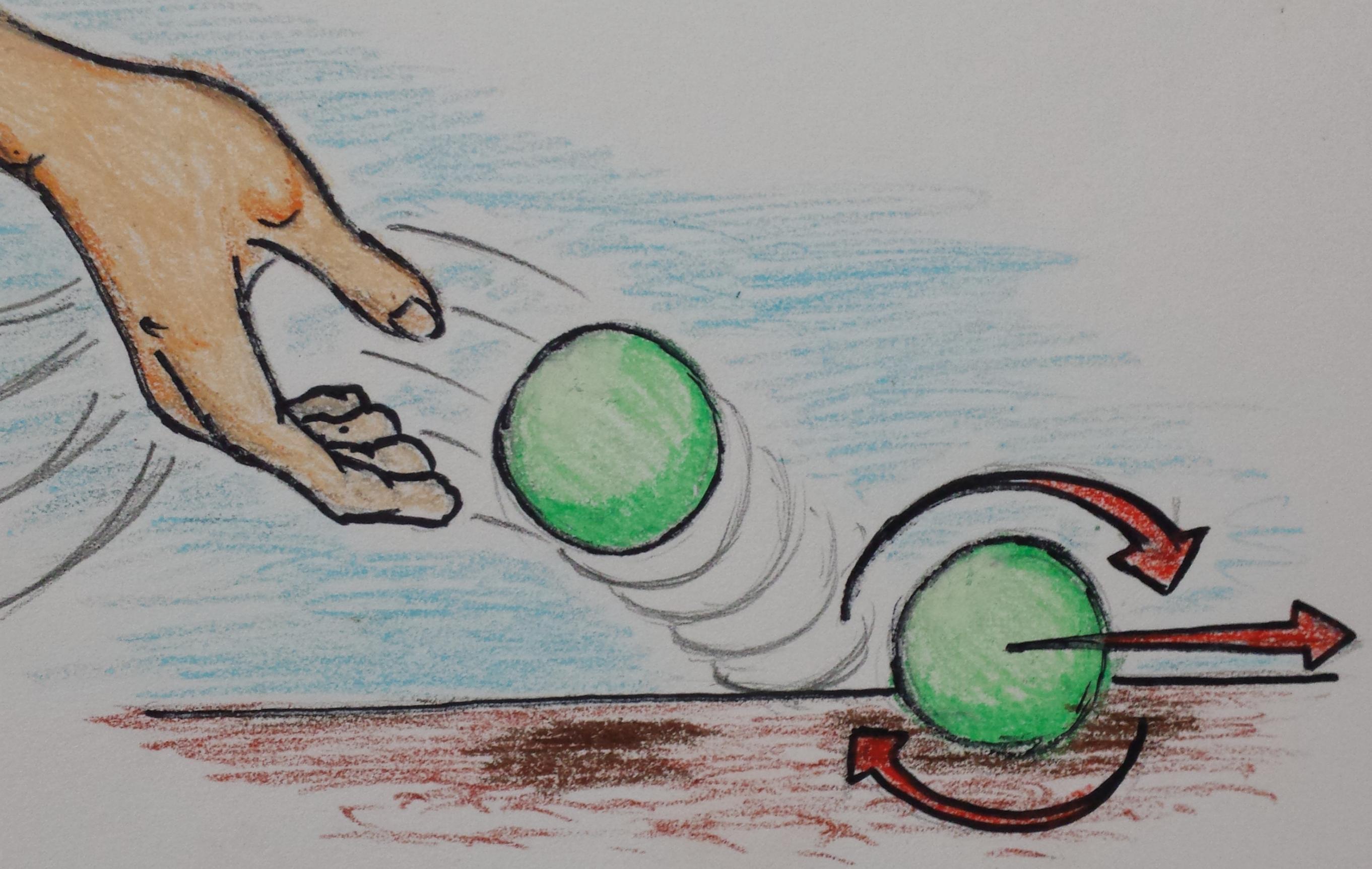
**George Spagna, chair of the physics department at Randolph-Macon College, explains.**

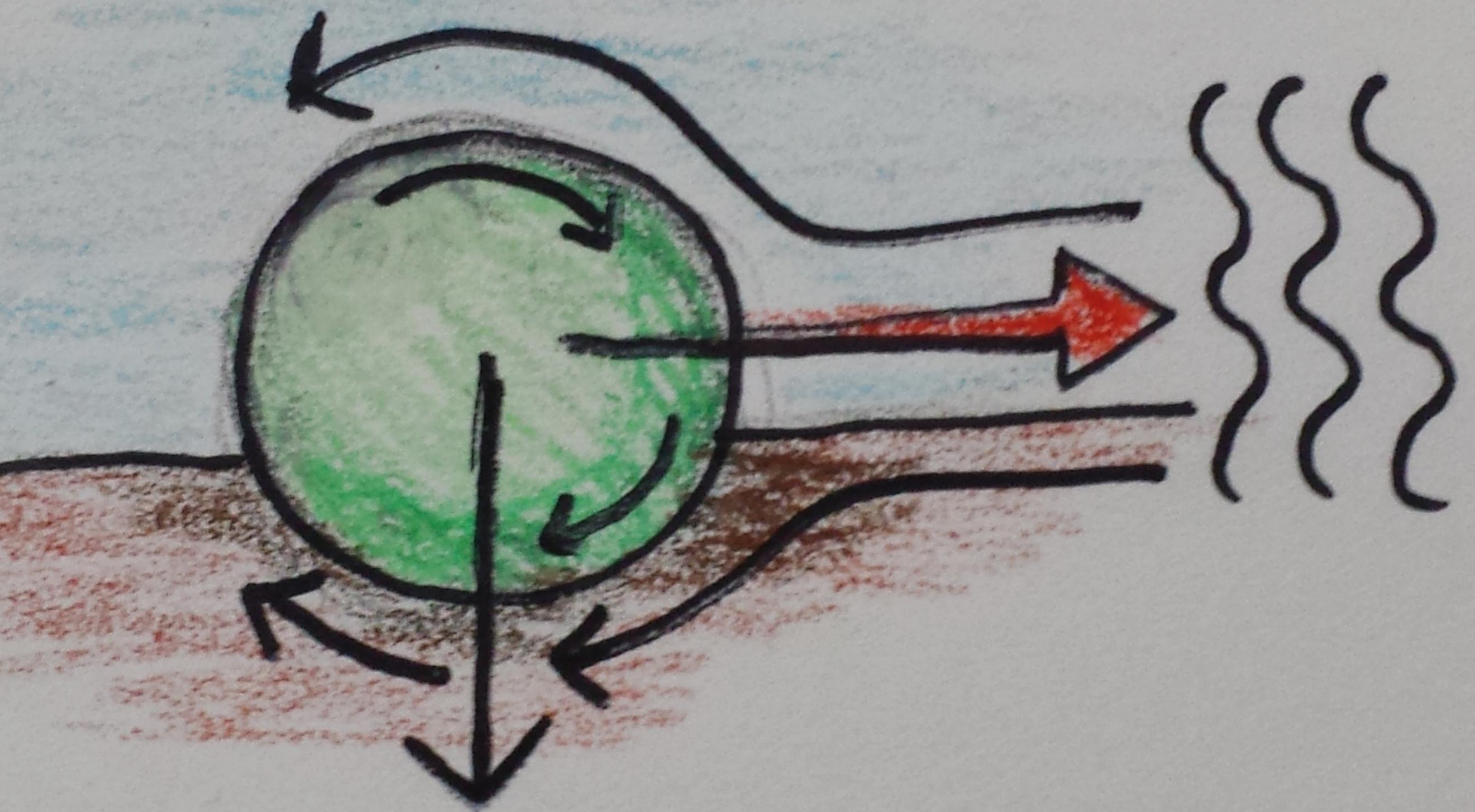


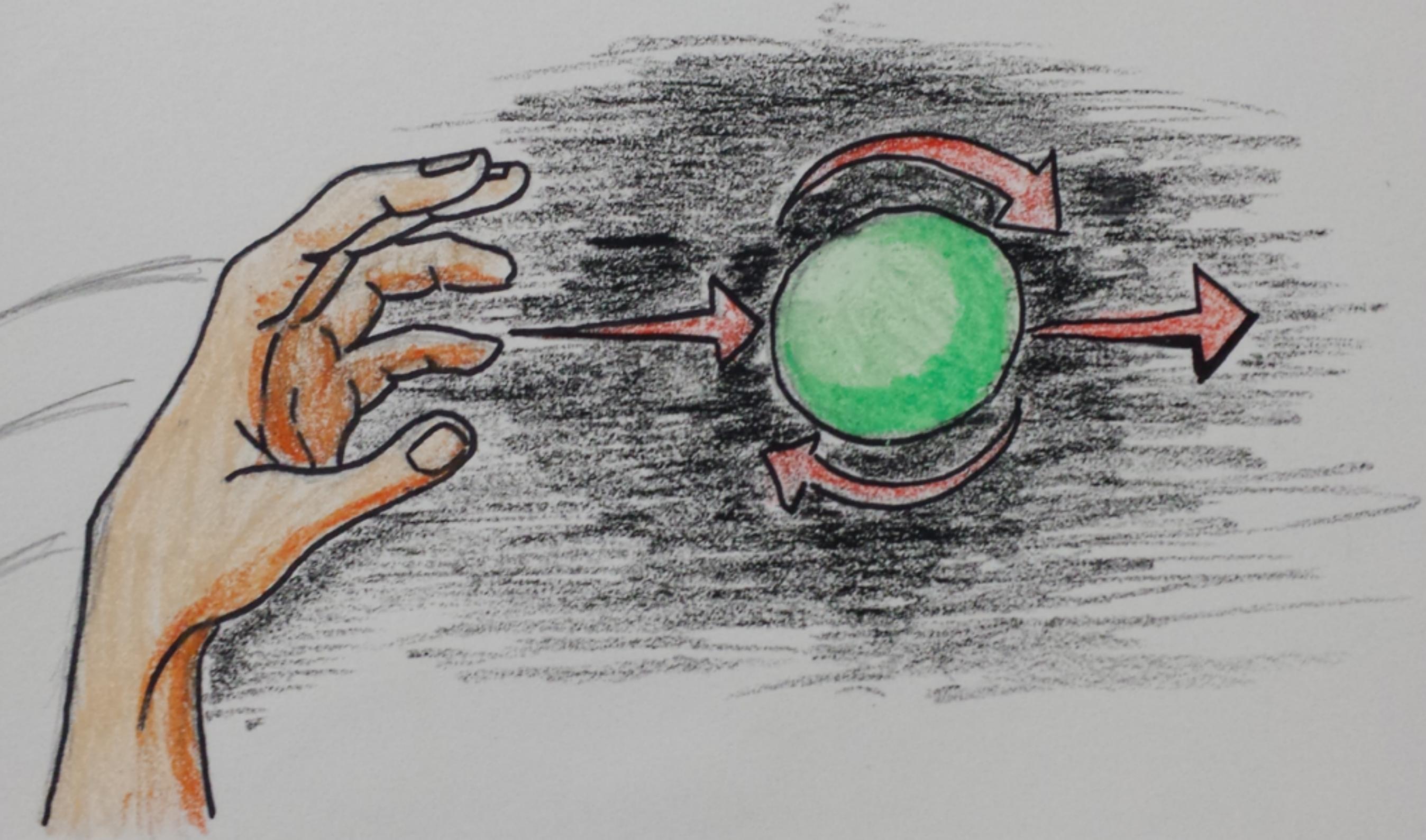
Stars and planets form in the collapse of huge clouds of interstellar gas and dust. The material in these clouds is in constant motion, and the clouds themselves are in motion, orbiting in the aggregate gravity of the galaxy. As a result of this movement, the cloud will most likely have some slight rotation as seen from a point near its center. This rotation is described as angular momentum, a conserved measure of its motion. As angular momentum does not change. Conservation of angular momentum explains why an ice skater spins more rapidly as she pulls her arms in. As her arms come closer to her center of rotation, her speed increases and her angular momentum remains the same. Conversely, her rotation slows when she

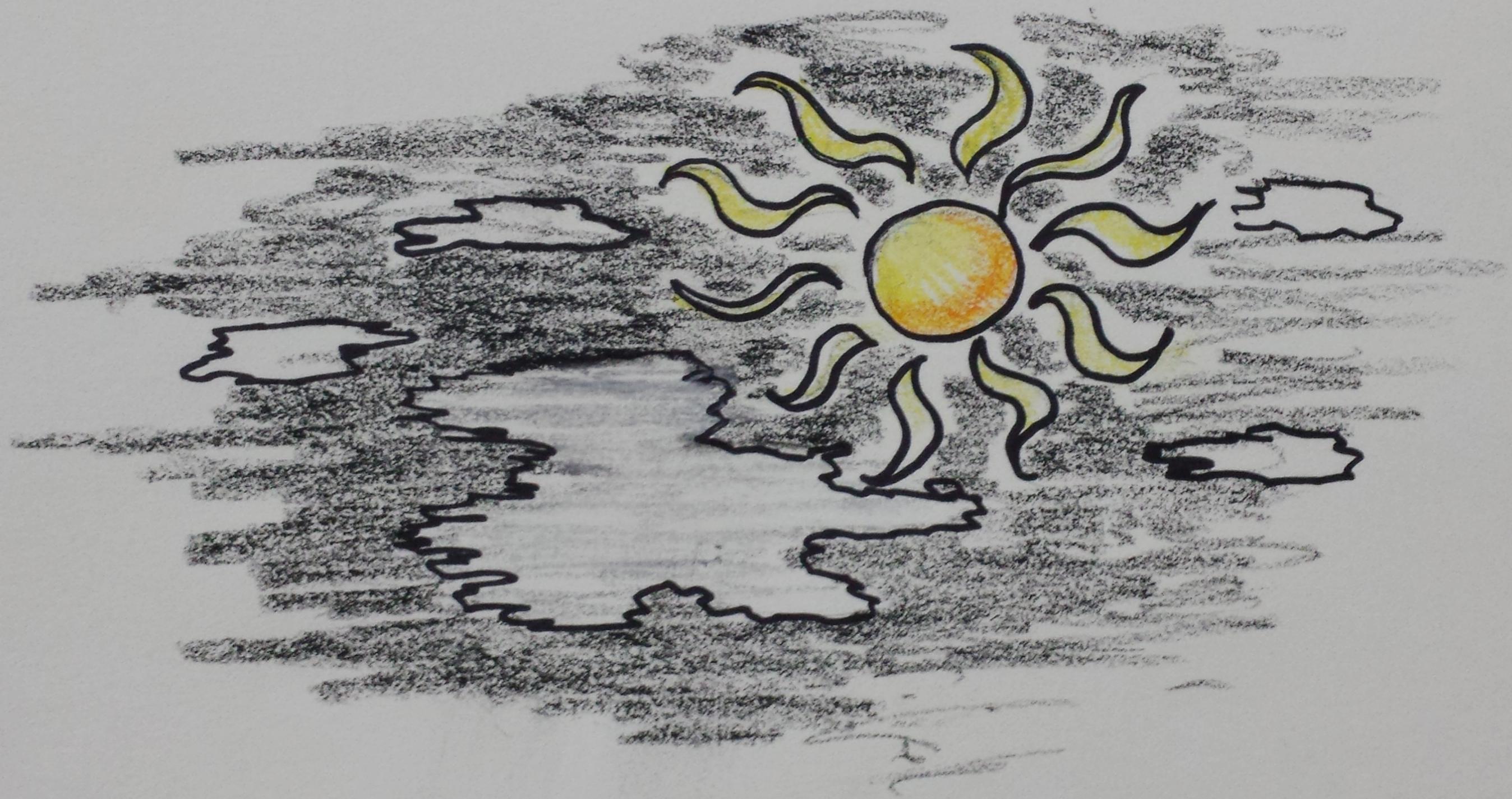


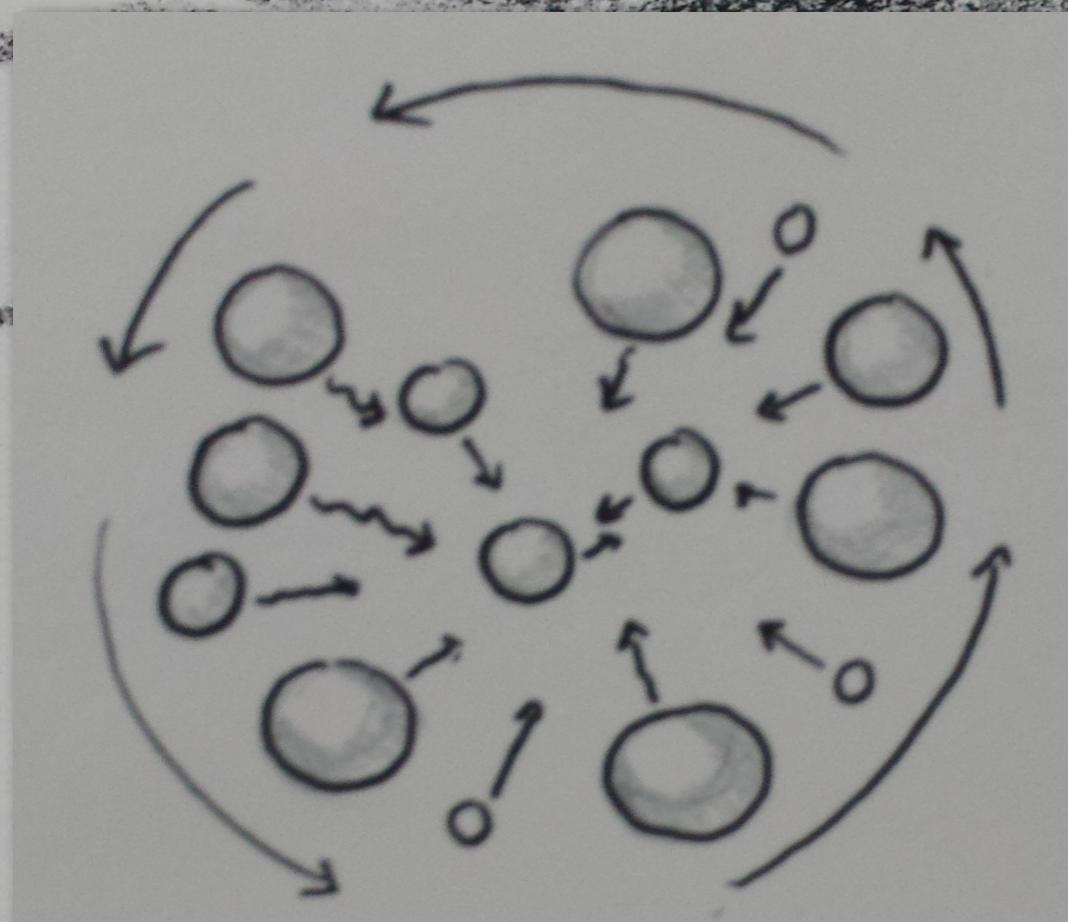
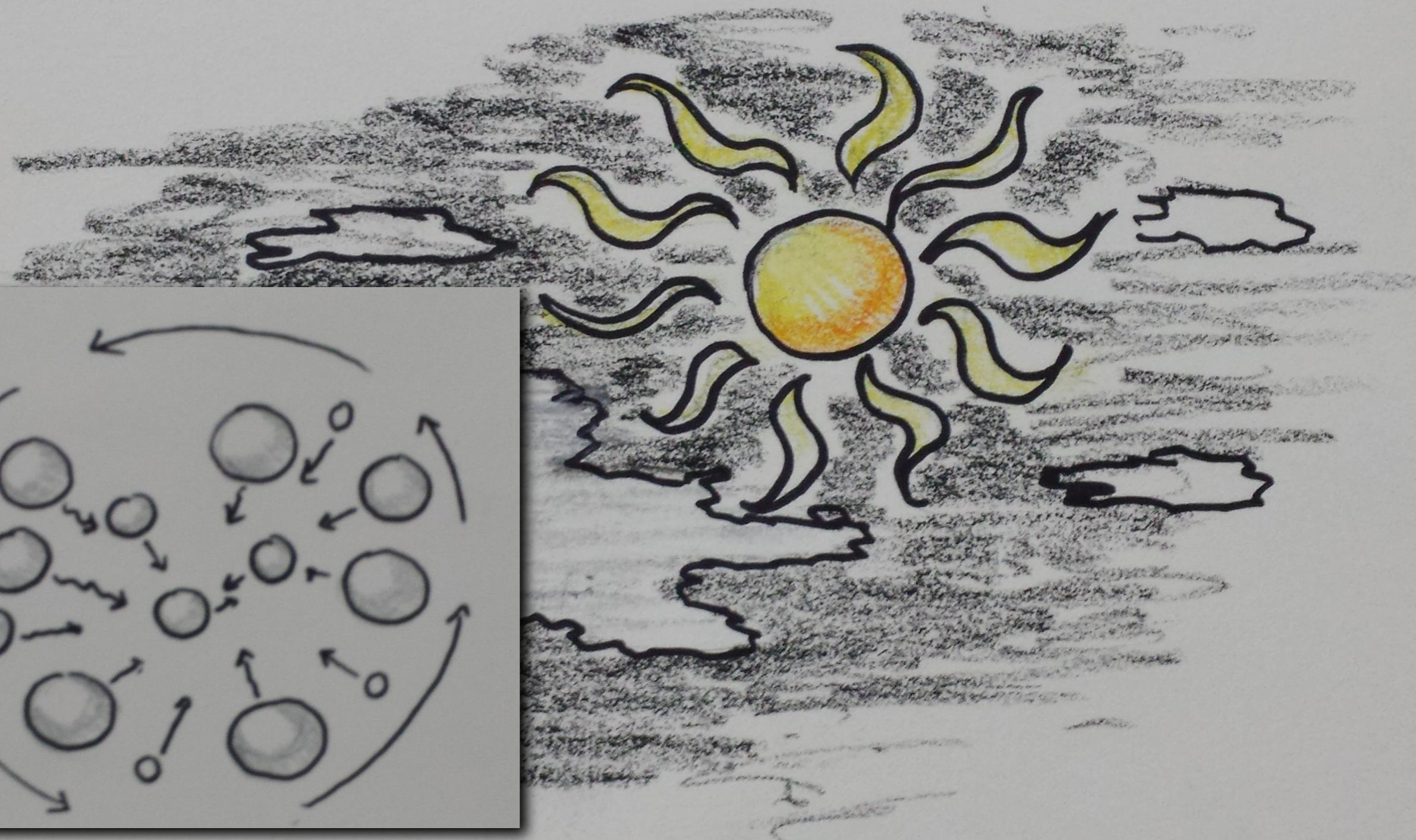


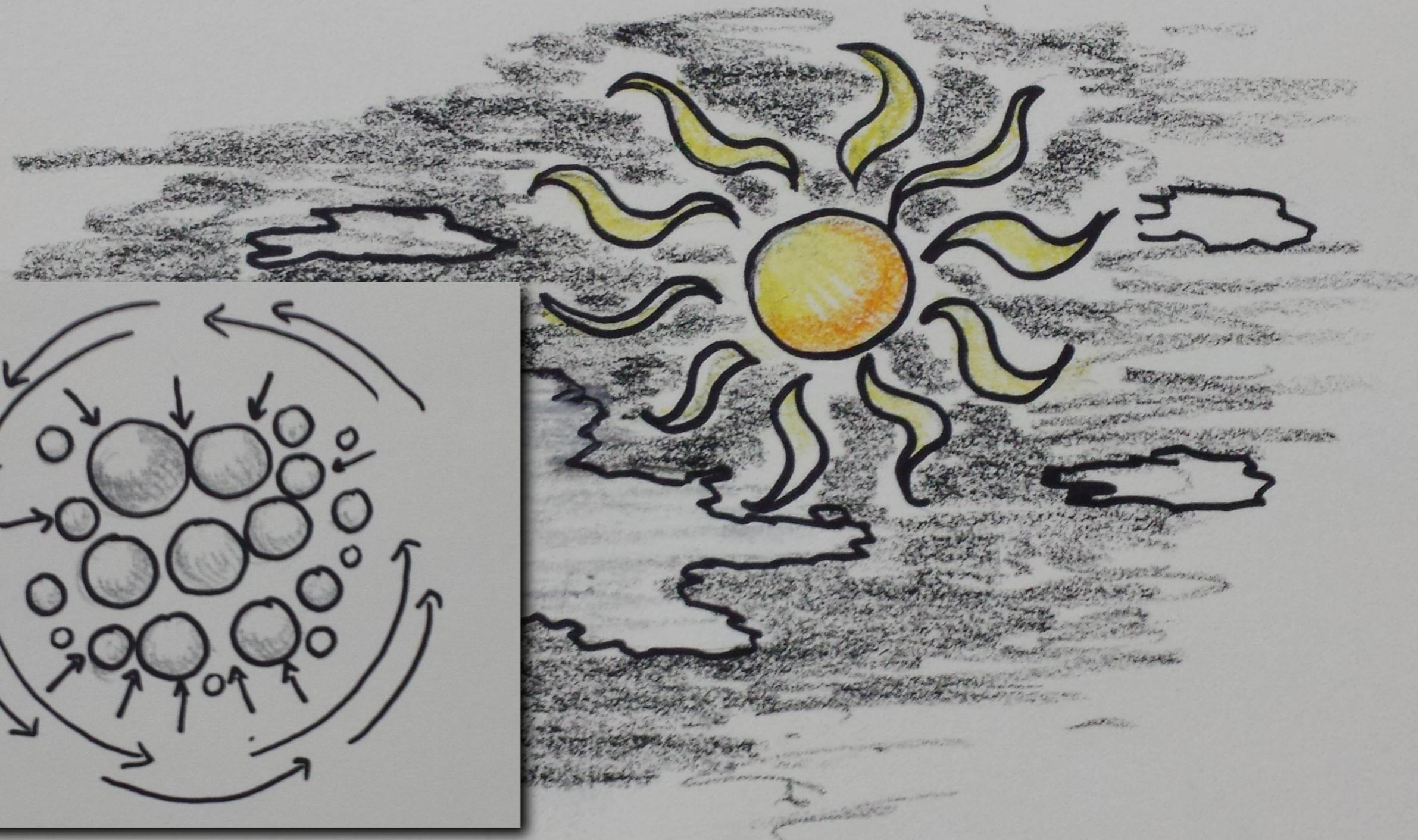
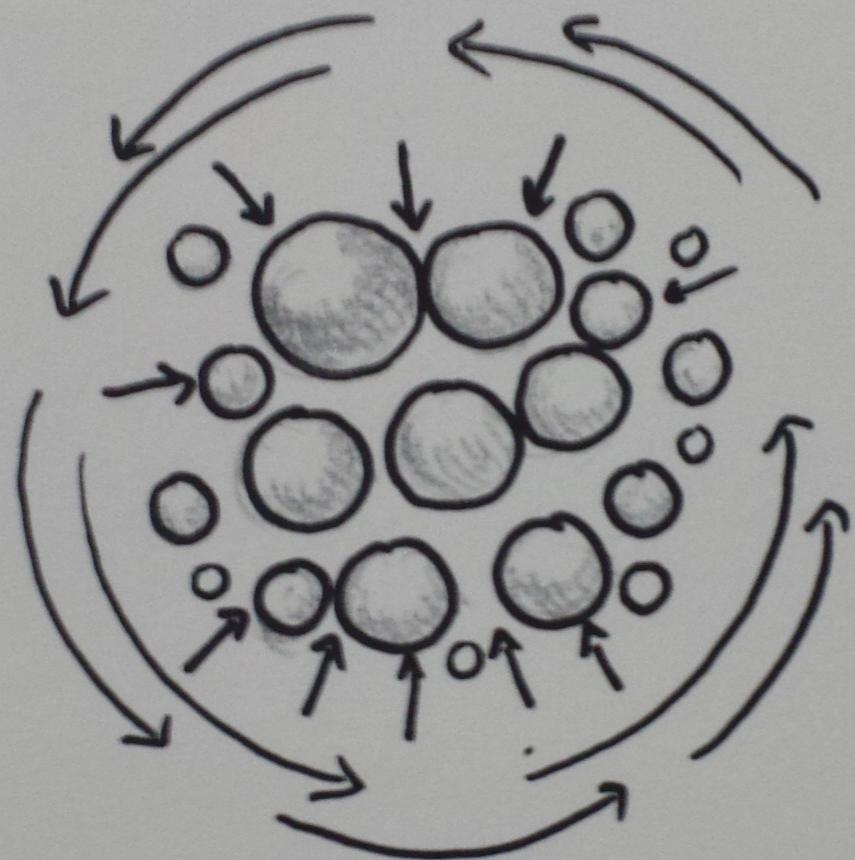


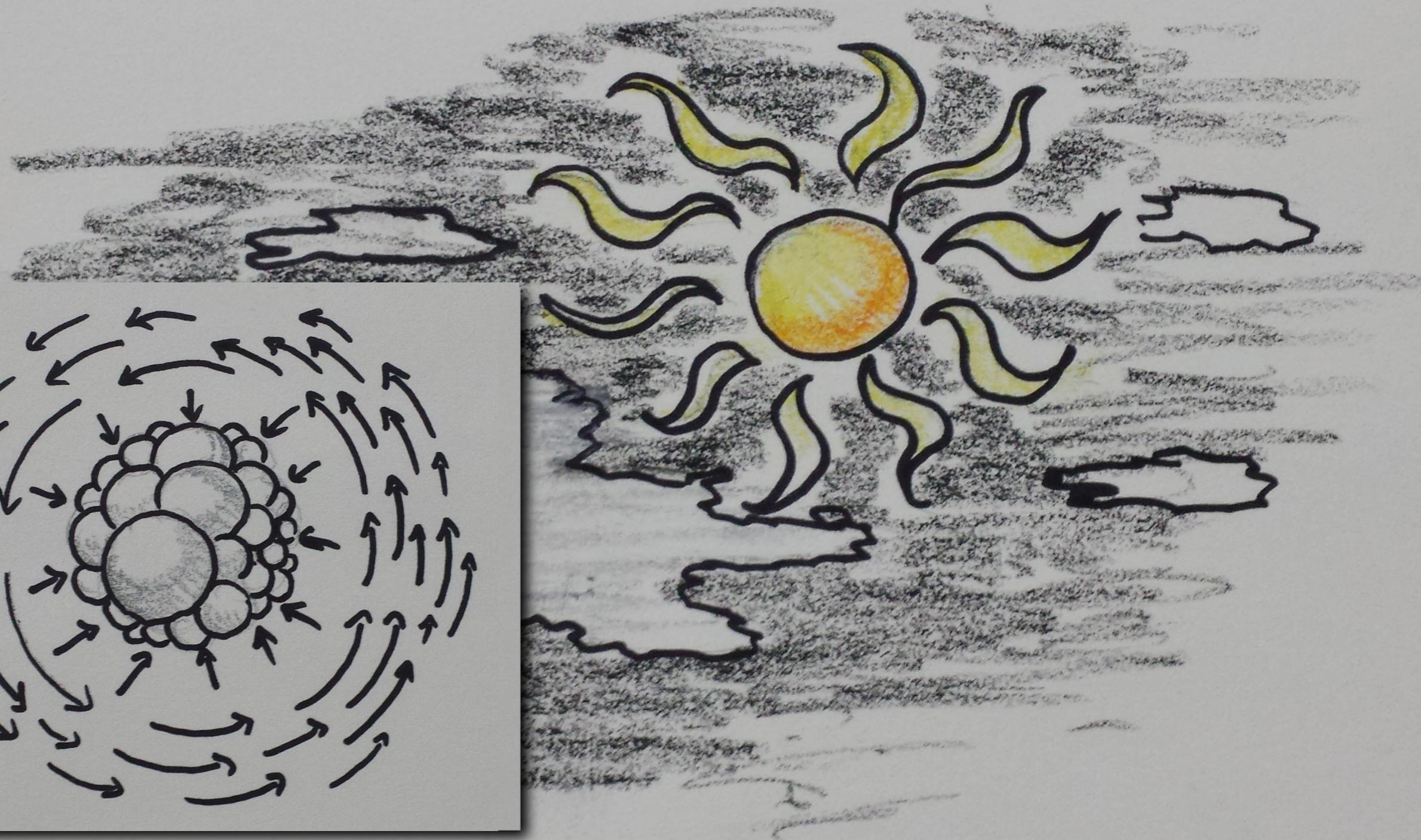
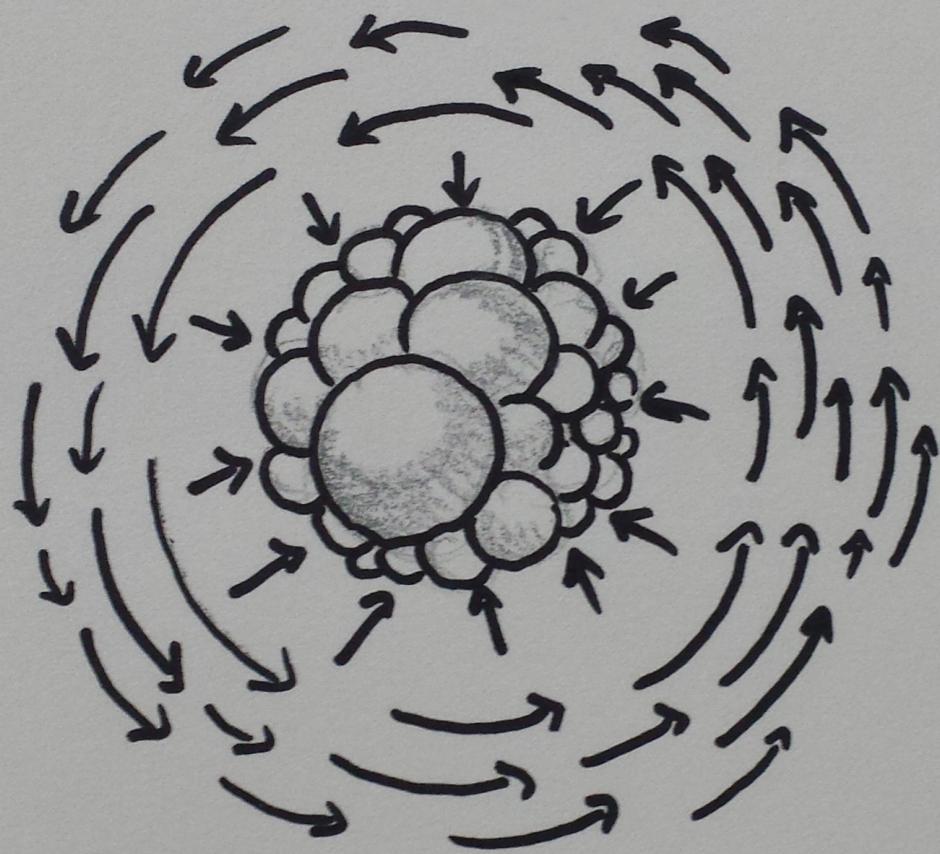


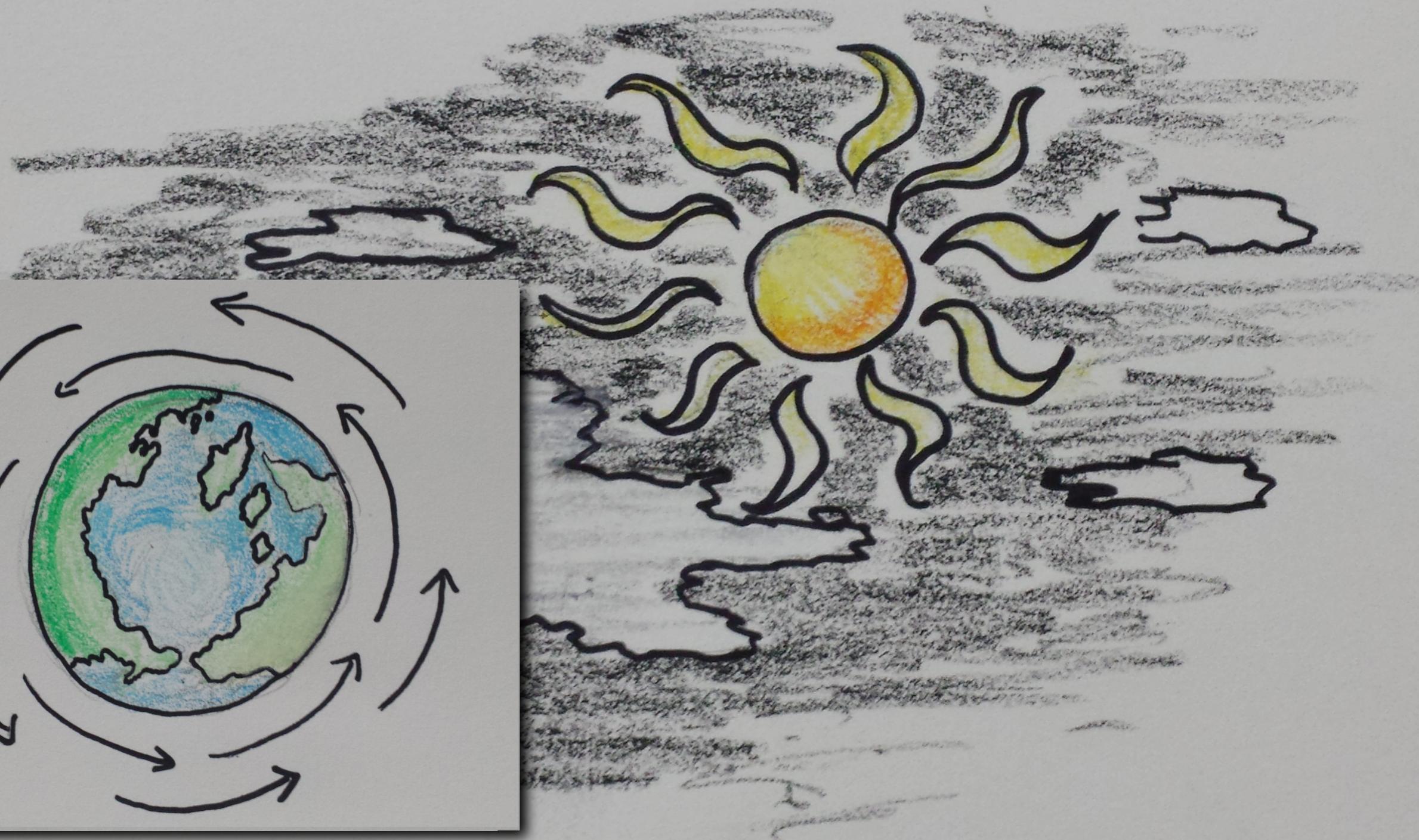
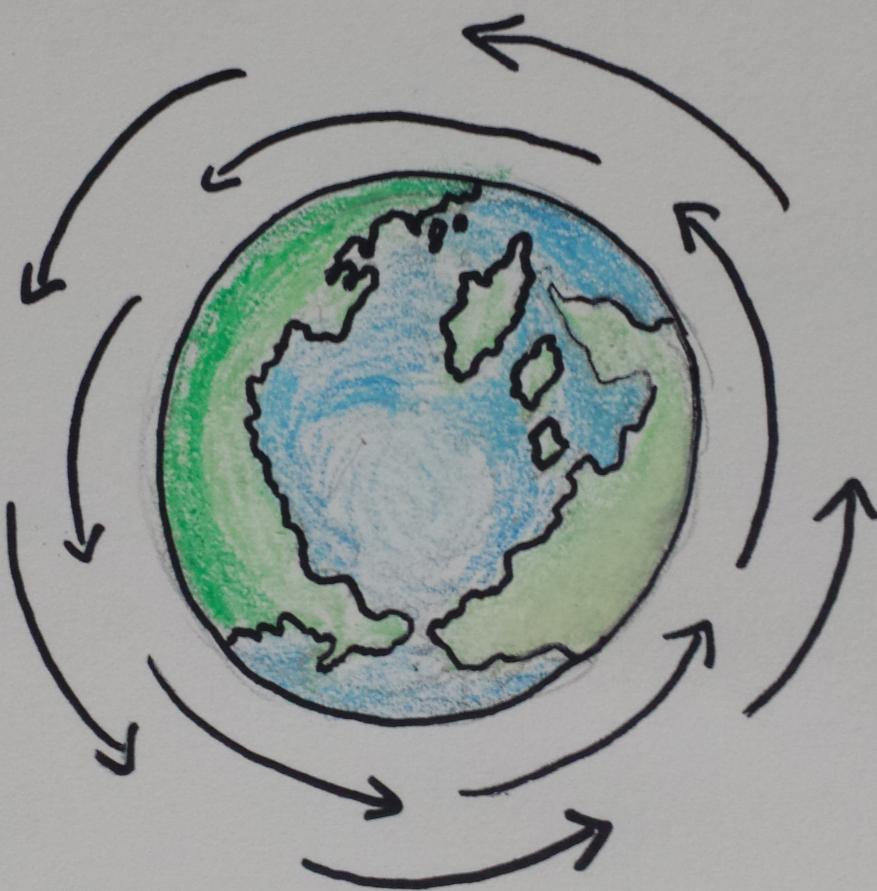












a visualization is a display  
intended to make evidence  
visible

a visualization is a **display**  
intended to make evidence  
**visible**

information shaped as a graphic  
functions as a **cognitive aid**

a visualization is a **display**  
intended to make evidence  
visible

information shaped as a graphic  
functions as a **cognitive aid**

the nature of the information can guide  
you when choosing **the most appropriate**  
**ways** of telling the story



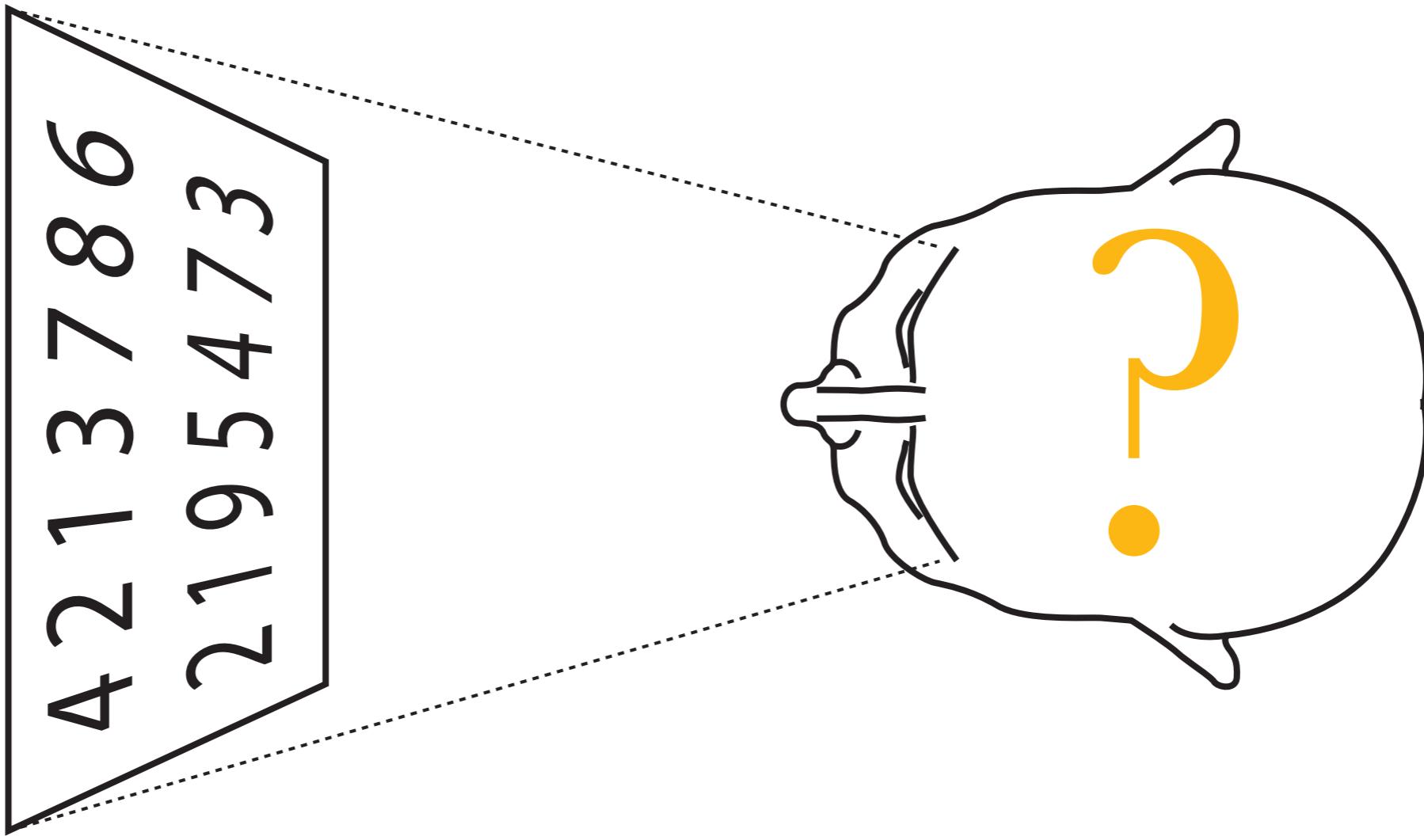


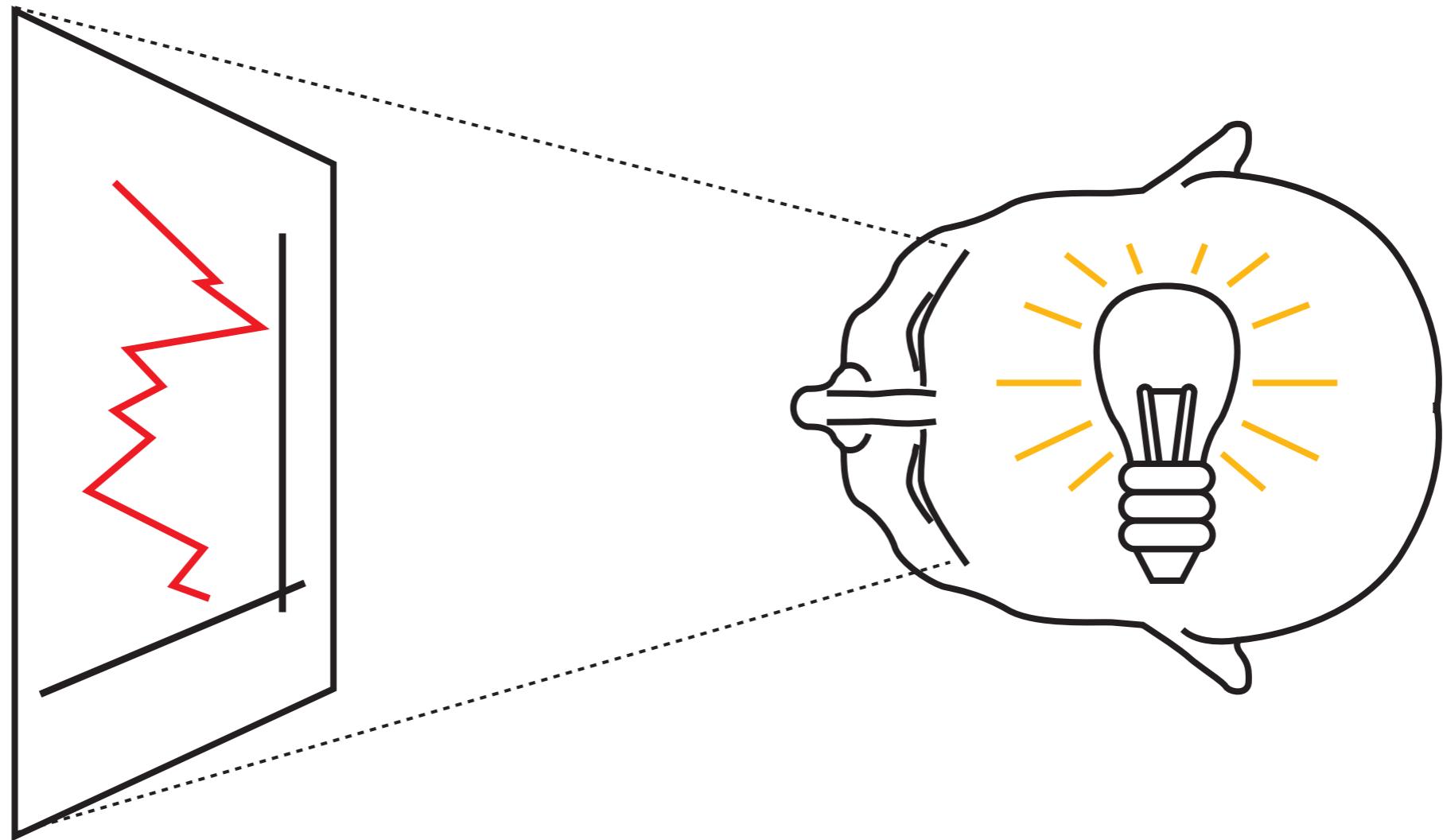


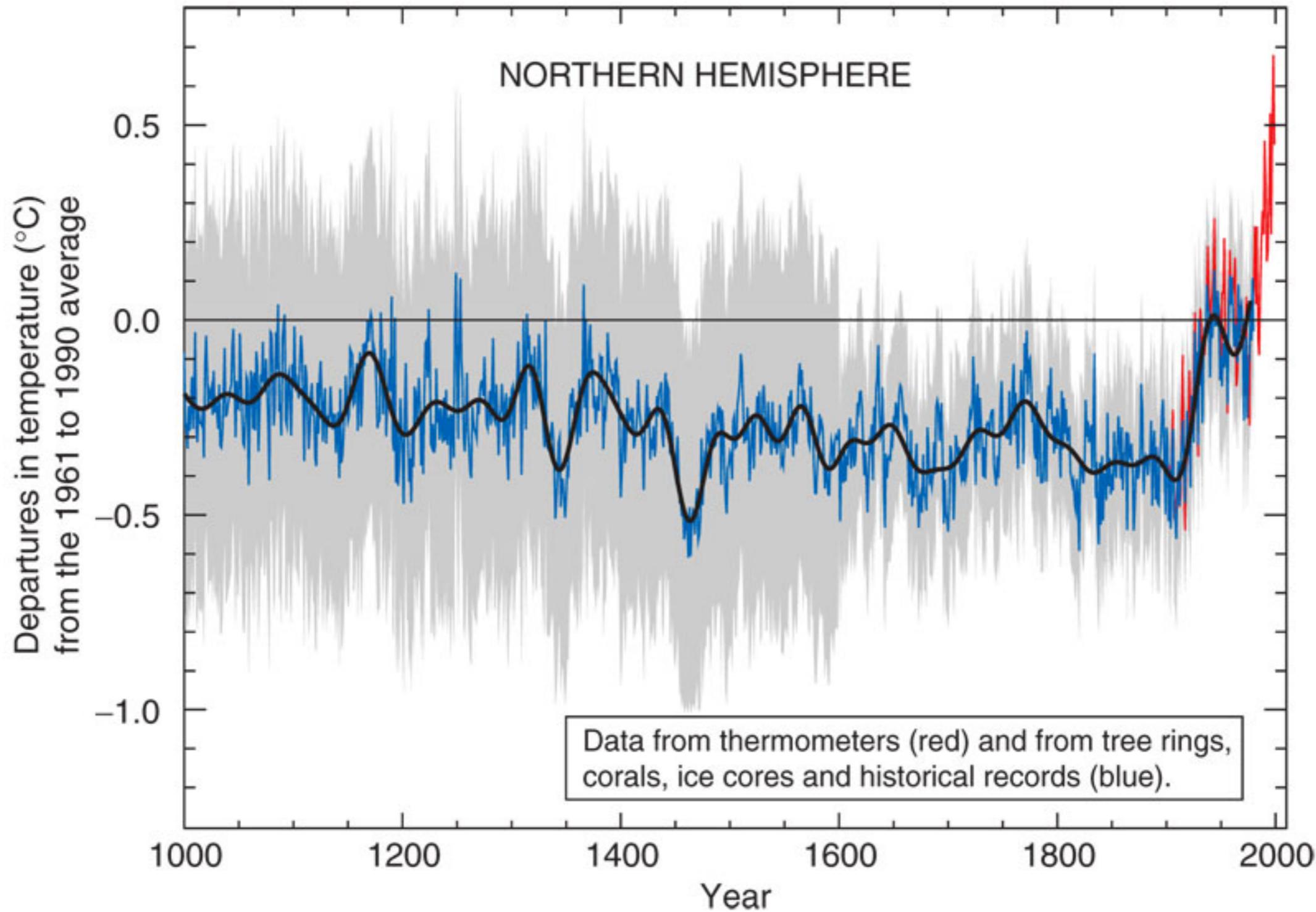
But the shape the brain  
envisions **is not any**  
**shape**. It depends on a  
purpose.

Michelangelo  
“Moses”  
(1513-1515)

In this case:  
Inspire awe, convey a  
sense of power and  
majesty







Mann, Bradley & Hughes 1999

[http://en.wikipedia.org/wiki/Hockey\\_stick\\_controversy](http://en.wikipedia.org/wiki/Hockey_stick_controversy)

“The question is not whether a map can be made,  
but what insights it will bring”

Gareth Cook