CHILDREN STATISTICAL LITERACY: EMPOWERING AND INFORMING OUR FUTURE DECISION-MAKERS

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2015 Joint Statistical Meetings
Simulation-based curricula and Statistical Literacy
Session
Seattle, WA. August 2015

MY OBJECTIVE TODAY

Share the **results** and the **experience** of the implementation of a Statistical Literacy course for talented High School students.

Statistical literacy
"the ability to understand and critically evaluate statistical results that permeate our daily lives" (Wallman, 1993).

MY MOTIVATION

- My background
  - Teaching
  - Engineering
  - Statistics

- Technical content + Real context

- Socially Relevant topics

- My mission: Help prepare more socially conscious professionals

- Statistical Literacy

- Talented Children Summer Camp

- Idea Based Learning Course – First Year PhD classes

- USCOTS 2015 ☺

COURSE OBJECTIVE

Statistics Unchained: Uncovering the power of information

At the end of this summer course the students will:

- be able to **generate critical reviews of statistical reports** presented by the media

- be aware of the **interactions between statistics and current topics in society** such as sports, health, politics, etc.

- be aware of the **relevance of statistics in their decision making processes**

SETTING AND CHALLENGES

- 2 weeks Summer Camp
- 3 hours daily
- 2 sections (Morning and Afternoon)
- Teenagers
- Cultural Diversity
    - Group 1 (4 US. – 5 Colombian – 4 Asian)
    - Group 2 (2 US. – 3 Asian)
    Need to do all instructions bilingual (English- Spanish)
- Talented Kids
- Statistics background diversity
    - While all of them were talented, their backgrounds was quite varied

It had to be FUN!!

TOPICS

- Types of Data
- Data collection and representation (Bars, pies, lines, scatters, box-plots)
- **Demographics**
- **Surveys**
- Experiments
- Correlation
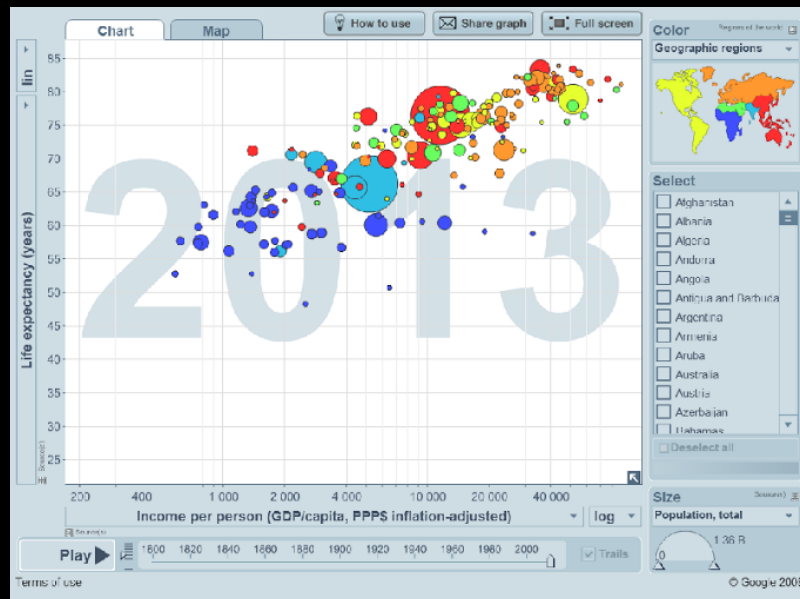- Regression
- Probability

Some Tools
Minitab
Excel
Online tools

SOME ACTIVITIES

DEMOGRAPHICS

- Imagine you are the president of your country,

- think about which information would you like to have available in order to make decisions?

SURVEYS

- Identify a topic

- Look for a survey made related to your topic

- Evaluate the quality of such survey

Losing our religion? Two thirds of people still claim to be religious.

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2015-04-13 - press release ()

Losing our religion? Two thirds of people still claim to be religious

- 63% of people polled say they are religious
- China is the least religious country with twice the amount of convinced atheists than any other nation (61%) followed by Hong Kong (34%), Japan (31%), Czech Republic (30%), and Spain (20%).
- Thailand is the most religious country globally (94%), followed by Armenia (93%), Bangladesh (93%), Georgia (93%), and Morocco (93%).
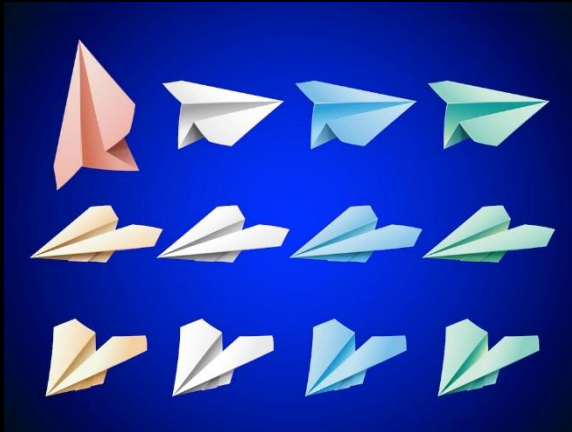
New research this Easter shows that worldwide six out of ten (63%) citizens say they are religious, while one in five (22%) say they are not and one in ten (11%) consider themselves convinced atheists. In Africa and the Middle East more than 8 out of 10 people (86% and 82% respectively) portray themselves as religious while 7 out of 10 say so in Eastern Europe and America (71% and 66% respectively) and 6 out of 10 (62%) in Asia, say they are.

WIN/Gallup International, the world's leading association in market research and polling, has today published its latest data exploring the religious beliefs of 63,898 people from 65

SOME ACTIVITIES (ADJUSTMENTS)

Paper planes competition

Whole designs w/replicates
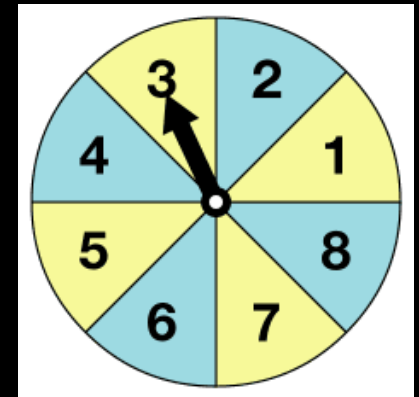
Adjusted from online resources such as www.causeweb.org

Toy Soldier Parachute competition

Analysis of controllable factors

www.pcprg.com

Design your own game

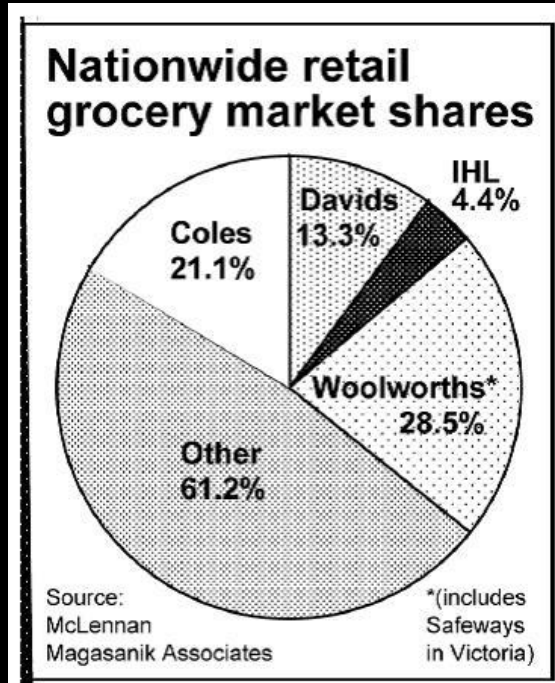Based in probabilities, and calculate expected values

www.teachforever.com

STAT LITERACY ASSESSMENT

- Modest Pre-assessment
- POST Assessment based on Watson (2006) framework
- Modified version of Structure of Observed Learning Outcomes (SOLO)
- 20 questions
- Applied on the last day of the course,
- Took between 35 mins to 2 hrs to finish

AN EXAMPLE

Levels of Response

1st Tier - Appropriate terminology

"pie chart about…"

2nd Tier - Understanding of prob and stats language and concepts embedded within a social context

"Coles got 21.1%, Davids 13.3%..."

3rd Tier - ability and confidence to challenge statements

"The percentages add up to 128.5!"

STAT LITERACY ASSESSMENT RESULTS

STUDENT SATISFACTION SURVEY

They Liked	They Didn't like	Suggestions
Minitab	Excel	More interactive activities
Hands-on projects	Power Point slides	More Videos
Looking for their own things in the internet	Math level	More cool things every day

CONCLUSIONS AND FUTURE WORK

- The assessment showed a wide variety of levels reached by each topic and by each student

- The challenge is to get more consistent results by the end of the course

- Need of a more efficient pre-assessment

- Involve a higher level of Idea-Based learning design

- Find a better balance between content and fun

- More intense level of use of technology within a structured plan

ACKNOWLEDGEMENTS

Questions?

Suggestions?

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LEARNING *to Make a* **DIFFERENCE**