

# The Royal Statistical Society *getstats* Campaign Ten Years to Statistical Literacy?

**Neville Davies**

**Royal Statistical Society  
Centre for Statistical Education  
University of Plymouth, UK**

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*twitter.com/CensusAtSchool*



# RSS Centre for Statistical Education

- What do we do?
- Who are we?
- How do we do it?
- Where are we?

# **What we do: promote improvement in statistical education**

**For people of all ages –  
in primary and secondary schools, colleges,  
higher education and the workplace**



**Cradle to grave  
statistical education!**







Mark  
Treagust

Neville  
Davies

Kate  
Richards

Dominic  
Martignetti

Lauren Adams

John  
Marriott

Paul Hewson

Royal Statistical Society Centre  
for Statistical Education – who we are



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- statsclub
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## Welcome to the RSSCSE

### Thousands of students from 800 schools rep the 2011 BBC News School Report Day

On the 24 March more than 30,000 pupils from around the UK turned their classroom news for real as part of the BBC NEWS School Report. Children from England, Scotland, the news, live on BBC Television, Radio and online.



The RSSCSE worked with the BBC NEWS School Report team on the annual event to report news of all sorts, by giving them the chance to make their own news.

The RSSCSE team and the BBC News School Report team worked with schoolteachers and pupils to design, write and produce an online survey comprising 29 questions that were of interest to school children aged 11 - 16. Over 320 of the BBC News School Report-registered secondary schools took part in the survey. The survey results live as part of the BBC NEWS School Report day that was transmitted from Manchester, on 24 March. Neville Davies and Kate Richards took part in the event to interpret the results from the survey.

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'Men of Rock' Iain Stewart Presented CensusAtSchool Champion School Prizes

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Where are we?







Bristol Channel

Lundy

Exeter

Brownsea Is

Plymouth, PL4 8AA, UK

St. Martins  
St. Marys  
St. Agnus

Alderney

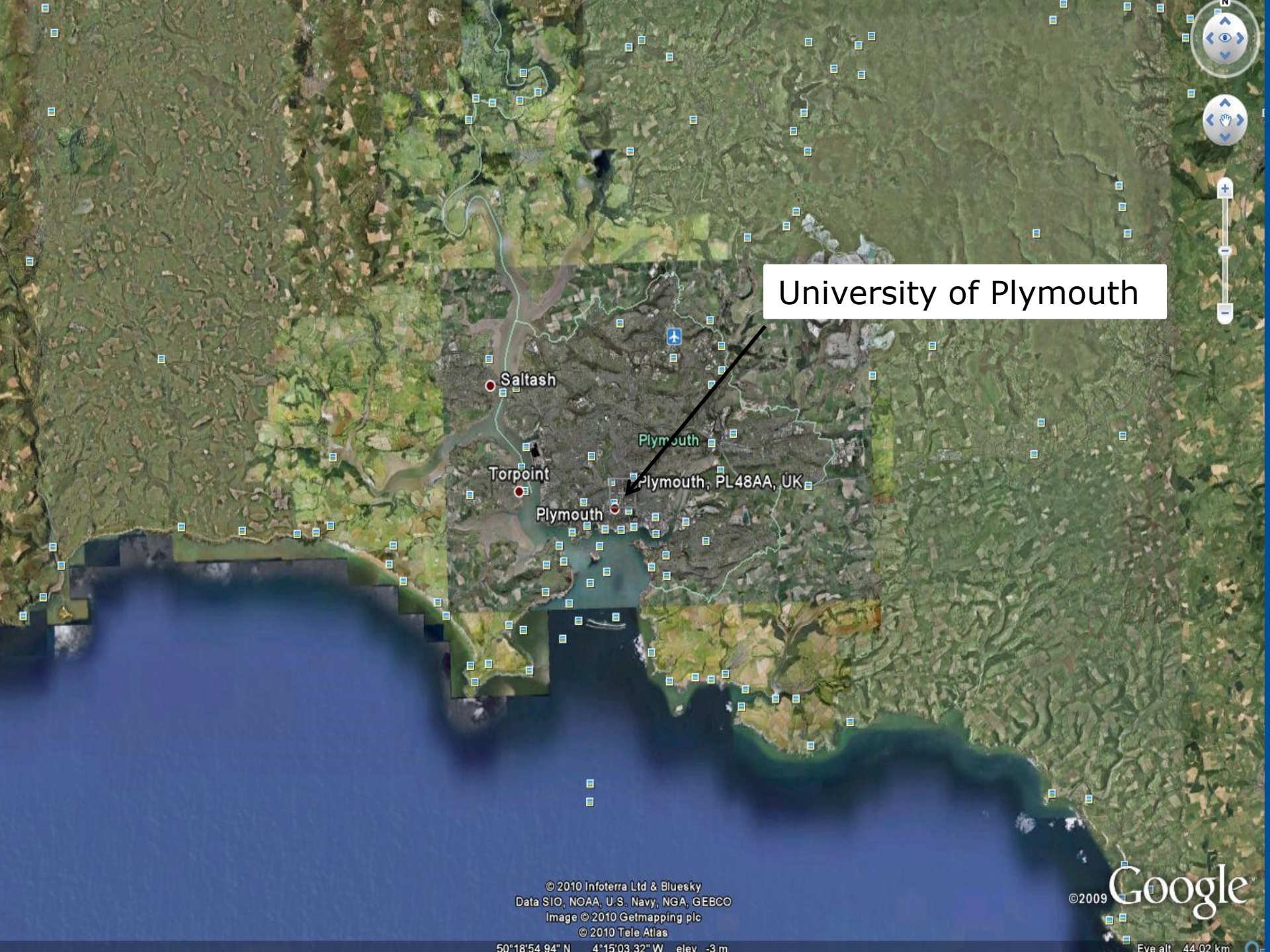
Data SIO, NOAA, U.S. Navy, NGA, GEBCO  
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50°40'43.93" N 4°48'49.15" W elev. -11 m

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Guernsey iHerm  
Sark  
Eve alt. 298.20 km

Plymouth - on the border between Devon and Cornwall





University of Plymouth

Saltash

Torpoint

Plymouth

Plymouth, PL48AA, UK

Plymouth





## University of Plymouth Panorama 2

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Plymouth, PL48AA, UK



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# Local attractions for visitors to RSSCSE - Plymouth harbour area



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## View of Plymouth Barbican, fro Capt'n Jaspers

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## Plymouth. Barbican in the night. SG

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Central Location, competitive rates  
ring us or book on line now  
[www.invictahotel.co.uk](http://www.invictahotel.co.uk)



# The Royal Statistical Society (RSS) 10-year statistical literacy campaign, *getstats*



**Aims to help build a society in which lives and choices are enriched by an understanding of statistics**



# *What people know about statistics – before the getstats campaign – people in London, 2010*





# getstats Campaign Board

## David Walker, Campaign Director

- John Pullinger, House of Commons Librarian (Chairman)
- Professor Ian Diamond, University of Aberdeen
- Professor Neville Davies, RSS Centre for Statistical Education
- Dr Martin Dougherty, RSS
- Mark Easton, BBC
- Keith Gilbey, Citizens Advice
- Professor Harvey Goldstein, University of Bristol
- Mike Harris, Institute of Directors
- Dr Julian Huppert MP, House of Commons
- Professor Denise Lievesley, King's College London
- Professor John MacInnes, University of Edinburgh
- Jil Matheson, National Statistician
- Professor Bernard Silverman, Home Office
- Professor Chris Skinner, University of Southampton
- Professor David Spiegelhalter, University of Cambridge

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The getstats blog

Get involved

Links

Numbers are everywhere.

But mostly we don't really get what they mean, even when they're key to the important choices we make in our lives.

The getstats campaign is about turning this around – giving everyone the skills and confidence to use numbers well.

Otherwise as individuals and as a society we'll just keep missing out.



## Working to influence those who inform us most about statistics...

### the media

Whether on TV or radio, in newspapers or on the web, statistics pervade media output...



[read more](#)

### elected representatives

Elected representatives make decisions on spending billions of pounds of public money...



[read more](#)

### schools and universities

Statistics is studied by all school students in mathematics and in many other subjects...



[read more](#)

### employers

Everyday business decisions rely on the collection and interpretation of data...



[read more](#)

## What others are saying about getstats...



# getstats - Ten years to Statistical Literacy? - this talk covers

1. RSS activities and plans
  - *where the RSSCSE has started work in getstats*
2. A citizen's charter for statistics
  - *the minimum every citizen should know?*
3. Developing a course in statistical awareness
  - *for undergraduates and employees*
4. Teaching statistics in a more appealing way
  - *using a problem solving approach*
5. Engagement with outside bodies
  - *the BBC and more*

# 1 RSS Activities and plans



**Irreversible step-change**

*Re-branding statistics as a discipline*

**Economic benefit to UK**

*Supplying employers with the talent needed*

**Social benefit to society**

*Ensuring citizens have skills for modern life*

# Getstats Campaign Activity Areas



Media



Elected reps



Education



Employers



General Public

## Specialist resources

Journalists

Elected representatives

Teachers, lecturers and students

Employers and employees

General Public



# Phase 1 (2010 – 2012) Objectives for the media

- Build demand for skills
- Support and develop stats skills of **journalists**
- Overview data exploratory & visualisation techniques
- Support interface between providers and users

# Phase 1 (2010 – 2012) Objectives for Elected reps

- Build a dialogue with elected reps & decision makers (MPs) to espouse the role of evidence-informed policy making
- Work with users of official statistics to build trust in good statistics and skills

# Phase 1 (2010 – 2012) Objectives for Education

- *Promote real data and applications across the curriculum*
- *Build statistics teaching skills across the curriculum*
- *Reach out to young people with positive experiences of stats*
- *Develop projects that reach parents and citizens*



# Phase 1 (2010 – 2012) Objectives for Employers

- *Build understanding of the role of statistics skills for developing a fully competent work force*
- *Show how to audit statistics skills and where and how to develop them*
- Develop an appreciation of how stats skills can improve productivity, enhance job satisfaction and career progression

# Phase 1 (2010 – 2012) Objectives for the public

- *Reach citizens (including children) through the media*
- Support the interface between providers and users
- Provide news and services via the web

[getstats.org.uk](http://getstats.org.uk)





# getstats

**Working for a society  
in which our lives and  
choices are enriched  
by an understanding  
of statistics**

What others are  
saying...

**Ronald L. Wasserstein,  
Executive Director, American  
Statistical Association**

The ASA applauds and  
congratulates the RSS on the  
timely launch of getstats on  
World Statistics Day.

The vision of this campaign is  
a society we not only want to  
live in, but one we  
desperately need - a  
statistically literate citizenry  
capable of understanding  
data and making informed  
choices based on that  
understanding.

The getstats campaign is a  
sound strategy implemented  
at the right time by a  
progressive professional  
society, and we wish it all the

## About getstats

Numbers are everywhere. But mostly we don't really get what they mean, even when they're key to the important choices we make in our lives.

The getstats campaign is about turning this around – giving everyone the skills and confidence to use numbers well.

Otherwise as individuals and as a society we'll just keep missing out.

## Latest news

- ▶ The Joy of Stats YouTube clip has now topped 4m views.
- ▶ Visit the **getstats** Stand: [Visualisation and Presentation in Statistics](#), Open University, 18 May 2011
- ▶ Speed Data-ing: the effects of the rapid rise of the data society
- ▶ Campaign posters now available for download
- ▶ Our survey says... "Half of UK adults not confident what government cuts mean for them"

## Features

**In this BBC video  
Hans Rosling  
shows how  
animation can help  
us understand the  
meaning in data...**



**Significance magazine  
explains how statistics has  
an impact on all of us**

## Get involved...

### Tell us what you think

Your views can help make the  
getstats campaign better

### Volunteer

Take part in an existing activity  
or propose one of your own

### Spread the word

Tell others about getstats and  
how it can help them

## Specialist resources

**Journalists**

**Elected representatives**

**Teachers, lecturers and  
students**

**Employers and employees**

**General Public**

Advancing the science and application of statistics, and promoting use and awareness for public benefit

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You are here : [getstats](#) : [journalists](#)

## getstats

**Working for a society  
in which our lives  
and choices are  
enriched by an  
understanding of  
statistics**

### Working with journalists to report statistics well can help millions of people to be better informed...

We are expanding our existing activities with journalists across all media to develop their awareness of the benefits of statistics, their confident use and knowledge of good sources of data, and when to seek advice.

#### Workshops for journalists

The RSS's workshops for journalists help them explain the basic statistical issues in a way that the general public can easily understand.

#### Coordinating science training

Statistics lies at the heart of science - working with the Science Media Centre, and funded by a government grant, the RSS is hosting the **national coordinator for science journalism training**

#### Recognising excellence

The RSS's awards for statistical excellence in journalism spotlight the best in using and reporting statistics

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**The BBC College of Journalism videoed our most recent workshop for journalists. Here, David Spiegelhalter discusses whether or not some health stories are coincidental.**





Advancing the science and application of statistics, and promoting use and awareness for public benefit

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## getstats

**Working for a society  
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of statistics**

Working with elected representatives at all levels can help make sure services are effective and meet all our needs...

Informing policy making

By responding to consultations and public inquiries the RSS promotes cost-effective, evidence-informed policy making

Working with parliamentarians

The RSS is working closely with the all-party parliamentary group on statistics, supporting politicians in understanding and using statistics

Developing expert advice

The RSS actively develops expert advice and policy on major public issues, such as swine flu, ecosystem change and criminal justice

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## getstats

**Working for a society in which our lives and choices are enriched by an understanding of statistics**

**Role for RSSCSE in campaign**

### Building confidence so students can learn, value and use statistics in tackling life's issues...

We will work with secondary and further education teachers of all subjects in which statistics is used and taught. We aim to build teachers' confidence and skills in teaching statistics in a way which reflects how the subject is used in the real world so that school leavers have the statistical life skills they need.

#### Inspiring teaching

The Significance in the Classroom project uses real-world statistical applications to inspire teaching and learning

#### Centre for Statistical Education

The aim of the Royal Statistical Society Centre for Statistical Education is 'To promote the improvement of statistical education, training and understanding at all ages'.

#### Engaging students and parents

Our Planet Earth project engages students and their parents in real-world problem solving using their own data

#### getstats poster competition

Launched on World Statistics Day 20.10.2010, the getstats poster competition for school students across the UK will help students to understand the environment through data and to develop statistical skills which will help them in their daily lives.

#### Providing insight

The RSS Schools Lecture provides informative and entertaining insight into the wide applicability of statistics

#### Forthcoming Events

#### Visualisation and Presentation in Statistics

18 May 2011 (1040-1730 hrs), Open University, Milton Keynes

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**Volunteer**  
Take part in an existing activity or propose one of your own

**Spread the word**  
Tell others about getstats and how it can help them

### Specialist resources

- Journalists
- Elected representatives
- Teachers, lecturers and students
- Employers and employees
- General Public



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## getstats

**Working for a society  
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of statistics**

## Working with employers to develop statistical skills across the workplace building stronger businesses...

We will enable employers in targeted industries and sectors to understand the role of statistical skills across all levels of a high performing workforce and provide employers and employees with pathways to those skills and to their professional recognition.

### Identifying needs

The RSS Employers Forum will identify and fill gaps in statistical literacy at all levels across a range of business sectors

### Supporting careers

Supporting employers and employees with an online recruitment portal, professional development courses, and pathways to Chartered Statistician status

### Promoting dialogue

The RSS Statistics User Forum bringing together official statistics users and producers from all sectors to maximise the benefits from data

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## getstats

**Working for a society  
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The getstats campaign has a vision in which everyone in society is able to understand and use statistics in their own lives.

In this section we will set out information and resources to help the public generally find out more about statistics and explore what they mean for their lives.

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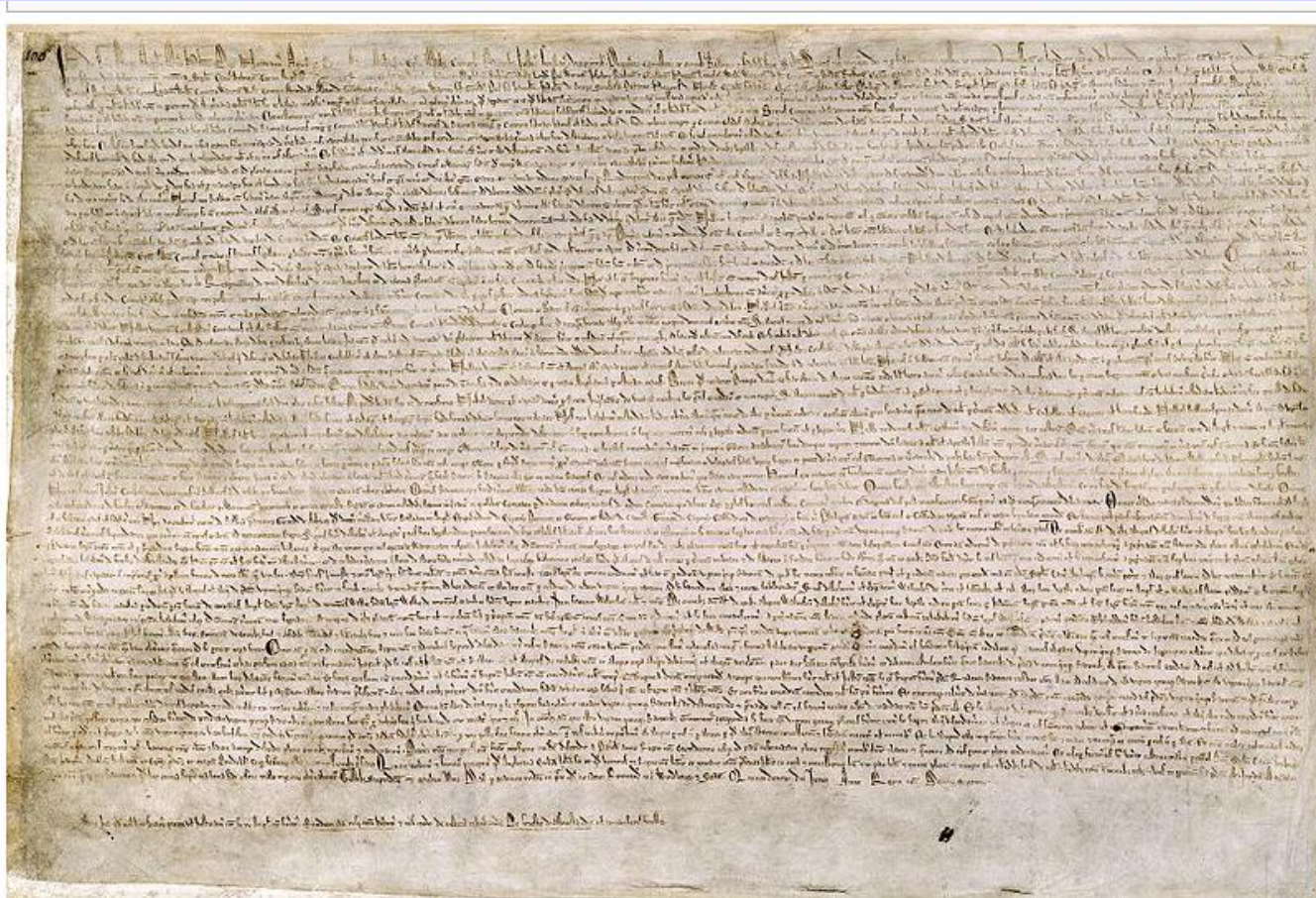
**General Public**

## 2 A citizen's charter for statistics?

- A charter is the grant of authority or rights

Magna  
Carter

796 years ago  
tomorrow!



Size of this preview: 800 x 533 pixels



# Citizens' Statistics Rights?

- 1 What they should know about**
- 2 What they should be able to identify and critically evaluate**
- 3 What they should be able to do or use**

## **(i) Know about, but not necessarily able to do**

1. Risk
2. Inference
3. Probability for quantifying
4. Govt data and info
5. Quality improvement
6. Examples of statisticians' work
7. Strengths and weaknesses of indicators
8. Large data sets
9. Application areas
10. Technical terms

## **(ii) Identify or critically evaluate**

1. Media accounts of an issue
2. Advertising
3. Use in other subjects
4. Graphical representations
5. Risk assessment
6. Misuses of statistics
7. Nature of sampling
8. Anecdote and design
9. Quality of questions in a questionnaire



## **(iii) Able to do or use**

1. Target populations
2. Representative samples
3. Probability as a measure of uncertainty
4. Randomness
5. Variability
6. Evidence and inference for decision making
7. Reduction of bias in sampling
8. Reduction in bias in measuring
9. Contexts

## DRAFT A Statistical Education Charter for Citizens

### 1 What citizens should know about

- simple applications of probability including relative and absolute risk;
- the statistical process of drawing inferences about populations from well designed experiments or well-chosen samples; that these inferences can be quantified using probabilities and a clear idea of what these probabilities mean;
- the sort of information collected by government and other agencies and how this information is used;
- how statistics is used in industry and commerce, for example in quality improvement processes;
- some current areas in which statisticians are actively working and the sort of problems they are solving; examples can be found in *Significance* and *Chance* magazines as well as the more serious press and other journals;
- the use of statistical indicators to measure performance; their strengths and weaknesses;
- how and why businesses use large data sets;
- how statistics is used in different applied areas such as medicine and crime;
- basic technical terms that might be met in everyday reporting such as *standard deviation* and *confidence interval*.

*These are areas where it would not be feasible for citizens to do the statistics for themselves, but they should be able to discuss the issues on the basis of what they know.*

### 2 What citizens should be able to identify and critically evaluate

This includes basic concepts of how statistical arguments are sometimes used to inform or sometimes mislead, especially through advertising, the media and special interest groups, for example:

- newspaper and popular magazine accounts of an issue in which statistics was used;
- the use of statistics in other (school) academic subjects;
- officially produced tables of data;
- graphs of data;
- risk assessment.

*Citizens would be expected to comment on such things as: the nature of the sampling or experimental design; nature of questions on a questionnaire; whether the written description matched with the numerical or graphical presentation; whether the important points are made; whether there were any omissions; any misuses of statistics and so forth.*

### 3 What citizens should be able to do

Activities should be focused on the major ideas of statistics, including using:

- target populations and representative samples;
- different measurement scales;
- probability as a measure of uncertainty;
- randomness and variability;
- inference to make decisions
- ideas to reduce bias in sampling and measuring.

*Real data should be used and it should be drawn from a wide range of contexts.*

# Words in a Charter... Wordle





# 3 Developing a course in statistical awareness

- Employees and employers needs
  - need to find out
- What are the statistics profiles of employers and employees
  - audit skills and knowledge
- How do we find out?
  - RSSCSE has applied for funding to investigate knowledge, skills and needs of employees and employers
- Decide on the (wide) range of questions to ask....

## 4. Teaching statistics in a more appealing way - *to engage non-specialists*

- Michael Stewart – ‘Changing the Way we Teach Statistics’ - article in *The Statistician* (1993 - all levels)
- PPDAC cycle in Wild and Pfannkuch paper (NZ from 1999)
- Use the data handling cycle (UK schools from 1999)
- GAISE recommendations from ASA (USA from 2003 - all levels)
- Qualifications and Curriculum Authority commissioned report (UK – 2005, school)
- Mathematics and Statistics curriculum (NZ – 2008, school)
- Emphasise the use of real, purposeful, motivating data in a problem solving context
- Wild, C. J., Pfannkuch, M., Regan, M. and Horton, Nicholas, J. (2011). Towards More Accessible Conceptions of Statistical Inference (with discussion). *JRSS (A)*, 174.

## 4. Teaching statistics in a more appealing way - *to engage non-specialists*

- Michael Stewart – ‘Changing the Way we Teach Statistics’ - article in *The Statistician* (1993 - all levels)
- PPDAC cycle in Wild and Pfannkuch paper (NZ from 1999)
- Use the data handling cycle (UK schools from 1999)
- GAISE recommendations from ASA (USA from 2003 - all levels)
- Qualifications and Curriculum Authority commissioned report (UK – 2005, school)
- Mathematics and Statistics curriculum (NZ – 2008, school)
- Emphasise the use of real, purposeful, motivating data in a problem solving context
- Wild, C. J., Pfannkuch, M., Regan, M. and Horton, Nicholas, J. (2011). Towards More *Accessible* Conceptions of Statistical Inference (with discussion). *JRSS (A)*, 174.



# Teaching in a more appealing way

- By demonstration and using a problem solving approach
- *Guidelines for Assessment and Instruction in Statistics Education*
  - emphasise statistical literacy and develop statistical thinking;
  - use real data (and real world applications);
  - stress conceptual understanding rather than mere knowledge of procedures;
  - foster active learning in the learning environment;
  - use technology for developing conceptual understanding and analysing data;
  - use assessments to improve and evaluate citizen learning.

# Teaching Statistics through Problem Solving

Plan

Collect

Process

Discuss

You can build on the first try by continuing here...

Plan

First you decide what problem to solve and what data you need

Discuss

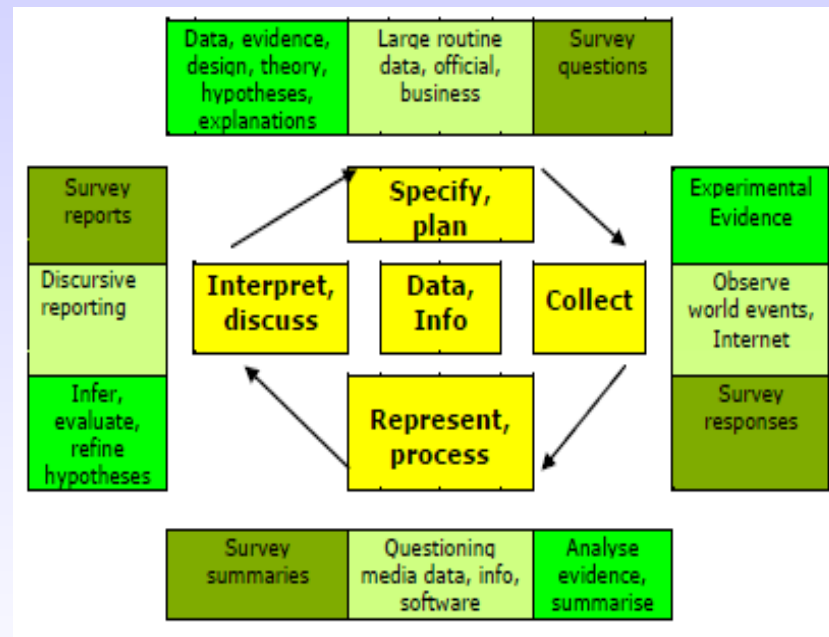
Collect

Then you collect suitable data.

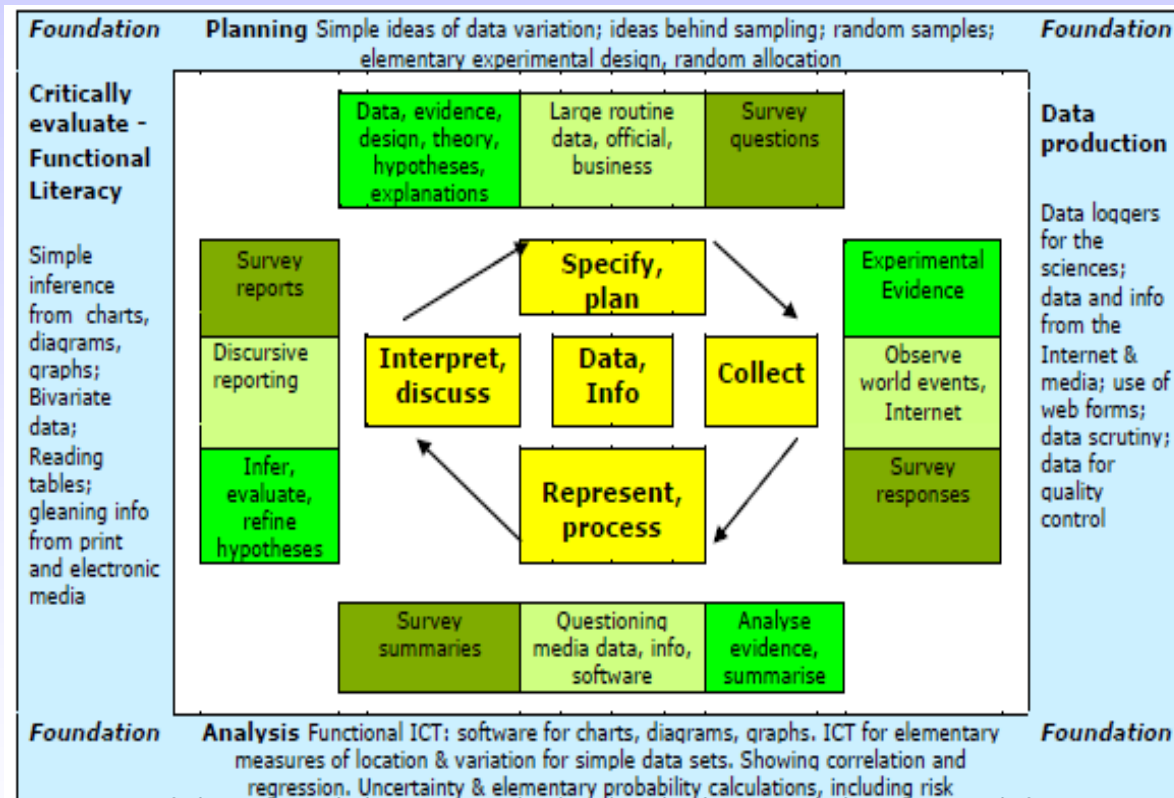
Have you got all the evidence you want?

Process









**Intermed**

**Planning** Sampling for a purpose; scales of measurement; devising suitable questions for statistical investigation; stratified sampling, paired comparison in designing experiments. Deciding what to measure.

**Intermed**

**Critically evaluate - Functional Literacy**

Evidence based decisions; findings in the context of problems and publicly available statistics; interpreting social data and several related variables; reading quality improvement graphs and charts

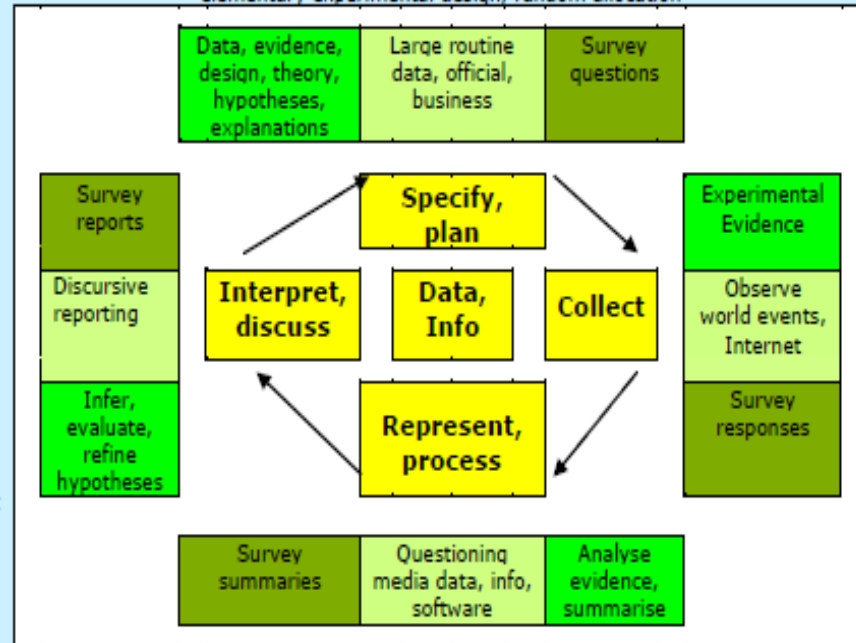
**Foundation**

**Planning** Simple ideas of data variation; ideas behind sampling; random samples; elementary experimental design, random allocation

**Foundation**

**Critically evaluate - Functional Literacy**

Simple inference from charts, diagrams, graphs; Bivariate data; Reading tables; gleaning info from print and electronic media



**Data production**

Data loggers for the sciences; data and info from the Internet & media; use of web forms; data scrutiny; data for quality control

**Data production**

Survey making and questionnaire design using the Internet; getting useful data from other schools inside and outside the UK; getting data from scientific and observation studies

**Foundation**

**Analysis** Functional ICT: software for charts, diagrams, graphs. ICT for elementary measures of location & variation for simple data sets. Showing correlation and regression. Uncertainty & elementary probability calculations, including risk

**Foundation**

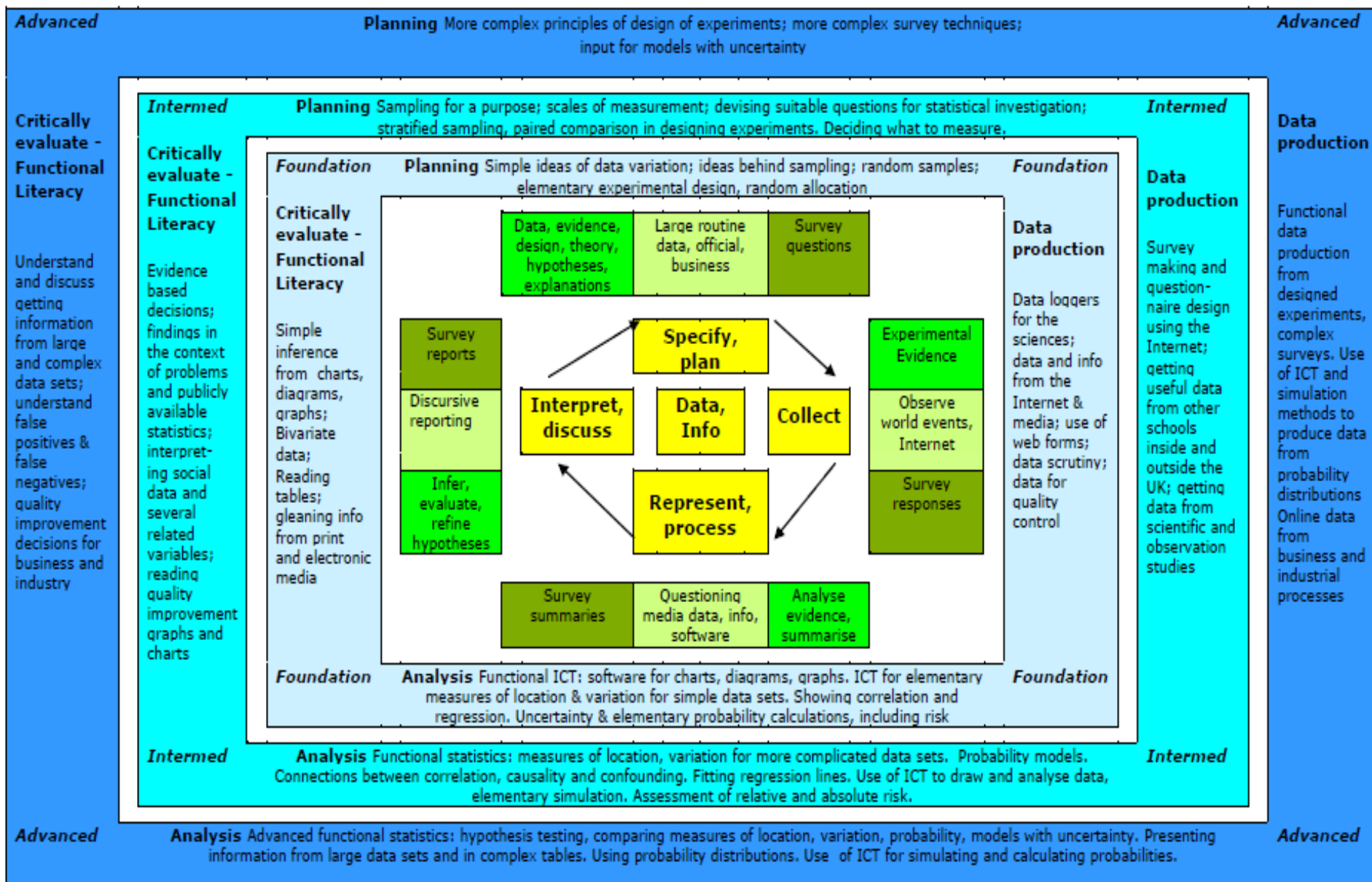
**Intermed**

**Analysis** Functional statistics; measures of location, variation for more complicated data sets. Probability models. Connections between correlation, causality and confounding. Fitting regression lines. Use of ICT to draw and analyse data, elementary simulation. Assessment of relative and absolute risk.

**Intermed**

# Knowledge and Skills Diagram: Statistical Awareness for Citizens

## Numbers-Data-Information-Collection-Presentation-Analysis-Discussion-Reporting-Decision Making



All citizens should have knowledge and skills from doing the iterative cycle (yellow boxes) using material at intermediate (intermed) level



# A simple Cornish Pasty



Could a Cornish pasty help promote statistical literacy through problem solving?

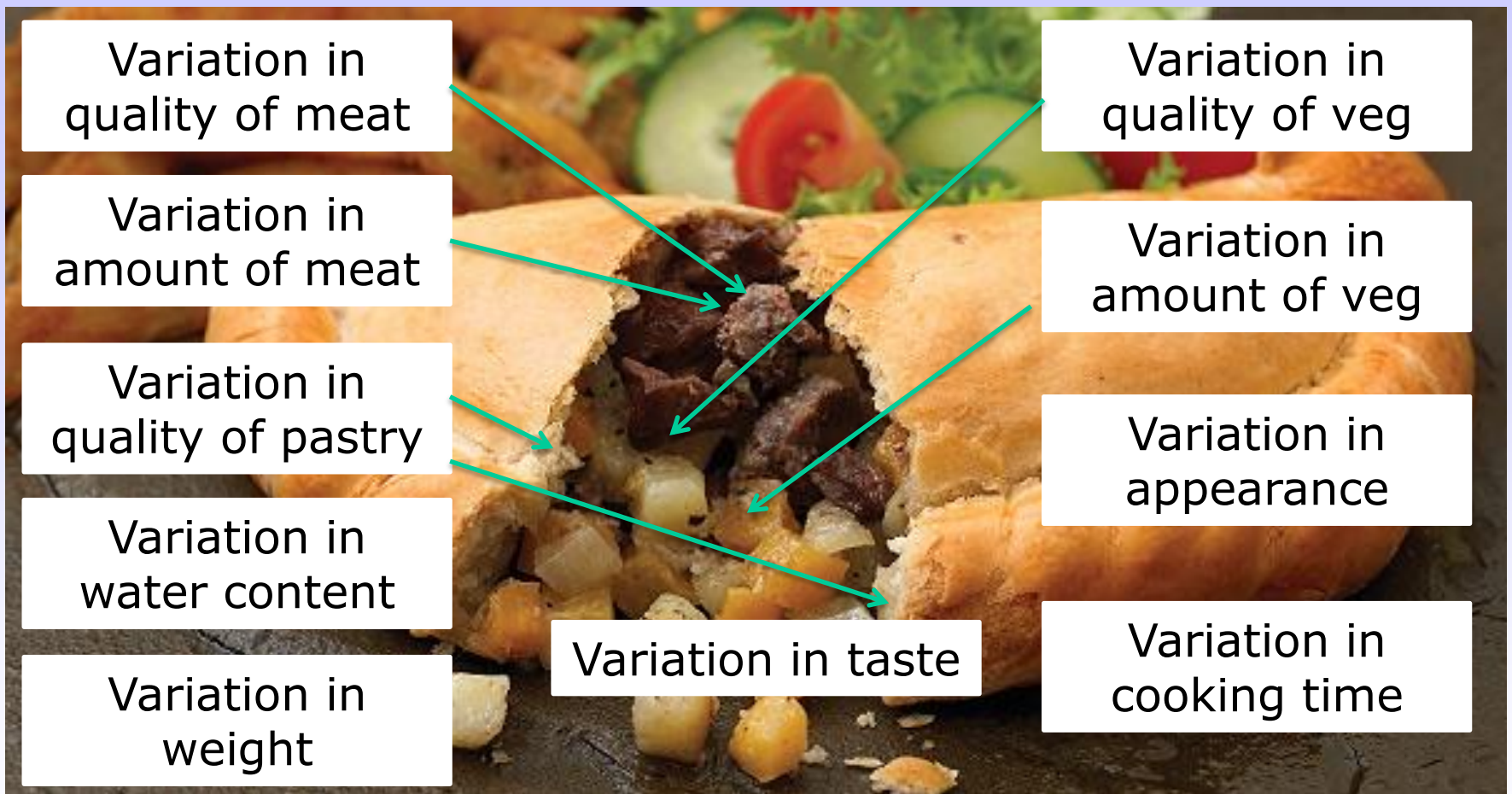
# Problem: optimise making Cornish pasties



It's a real problem

It provides real data in context

Can use pedagogy to teach employees and employers the statistics through solving the pasty production problem



A Cornish Pasty has everything ... use it to teach statistics through problem solving?

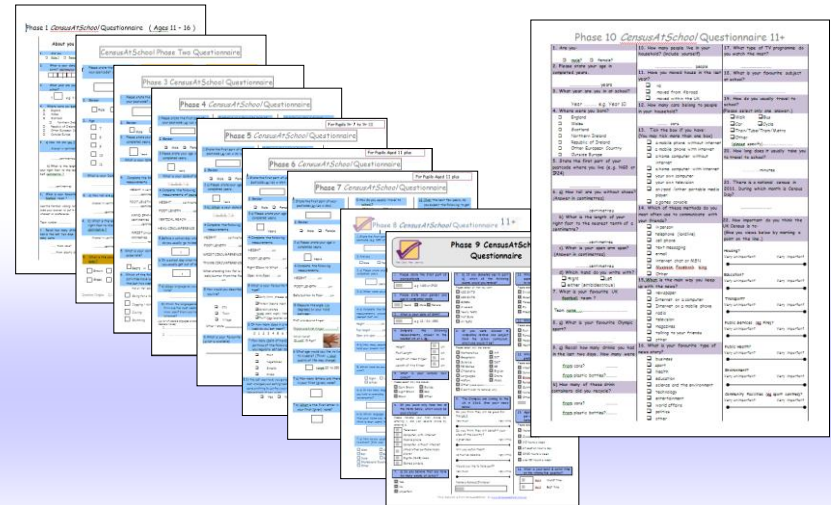
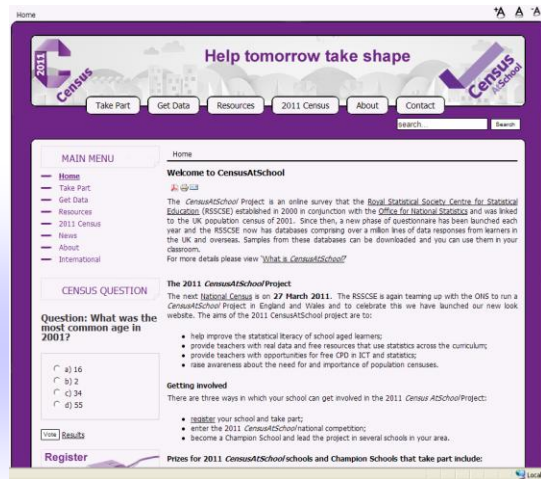


# More real data – for and about learners

## Eleven years of *CensusAtSchool*

Real Data in context:  
10 years of *CensusAtSchool* data

*CensusAtSchool* Project  
Real Data Real Learning



### 2011 Online survey

**2011 CensusAtSchool Questionnaire**

0%  100%

School Details

Please enter your School's three digit LEA Code

If you do not know your LEA Code please ask your teacher

Please enter your School's four digit School Code

If you do not know your School Code please ask your teacher

Please enter the name of your School

Please enter your teacher's name or class set

[Edit and Clear Screen](#) [Resume Later](#)

### 2011 *CensusAtSchool* Project Reaction Time Game

**2011 CensusAtSchool Questionnaire**

0%  100%

Final Question: 28 Find your reaction time

**Reaction Timer**

How quickly can you respond with the mouse?  
You will be tested three times using your **left** hand and then three times using your **right** hand.

Click the **red** light to begin each test. The traffic light will turn **amber** as it prepares a test.

Click on the **green** light as soon as it appears.

Left hand Right hand

First time

Second time

Third time

Fourth time

Fifth time

Final time

[You will need the Flash Player for this question. This question is not compulsory. If you do not have the Flash Player plugin and cannot install it.](#)

### 2011 *CensusAtSchool* Project Random Data Selector

**Real Students, Real Data, Real Learning**

**CensusAtSchool: Random Data Selector**

Random Data Selector

Choose the Country you want to select data from:

18. The international database contains the responses to the international questions asked in 2007 from Canada, Australia, New Zealand and the UK.

Australia  Canada  Ireland  New Zealand  UK

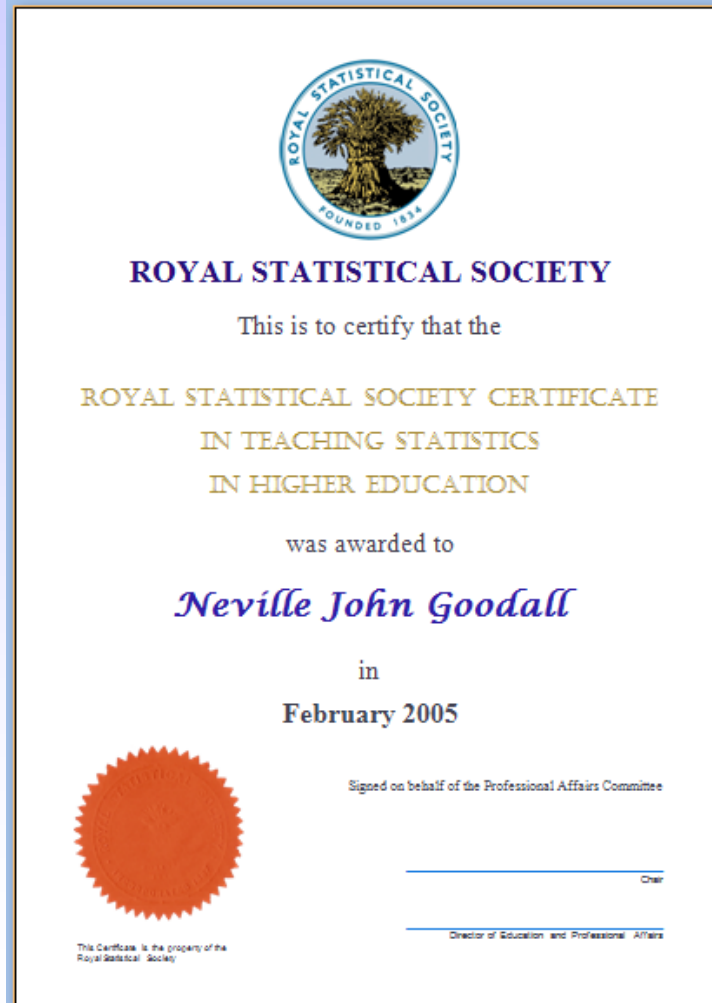
Can't see the country you want? Click here

Eight countries' data: UK; SA; OZ; NZ; Canada; Ireland; Japan; USA



# Professional Development for Teachers of Statistics

## *RSS Certificate in Teaching Statistics in Higher Education*



# Professional Development for Teachers of Statistics

## ***RSS Certificate in Teaching Statistics (CTS) up to Pre-university Level***



**ROYAL STATISTICAL SOCIETY**

This is to certify that the

**ROYAL STATISTICAL SOCIETY  
CERTIFICATE  
IN TEACHING STATISTICS  
UP TO PRE-UNIVERSITY LEVEL**

was awarded to

***A N Other***

in

**September 2010**

Signed on behalf of the Professional Affairs Committee

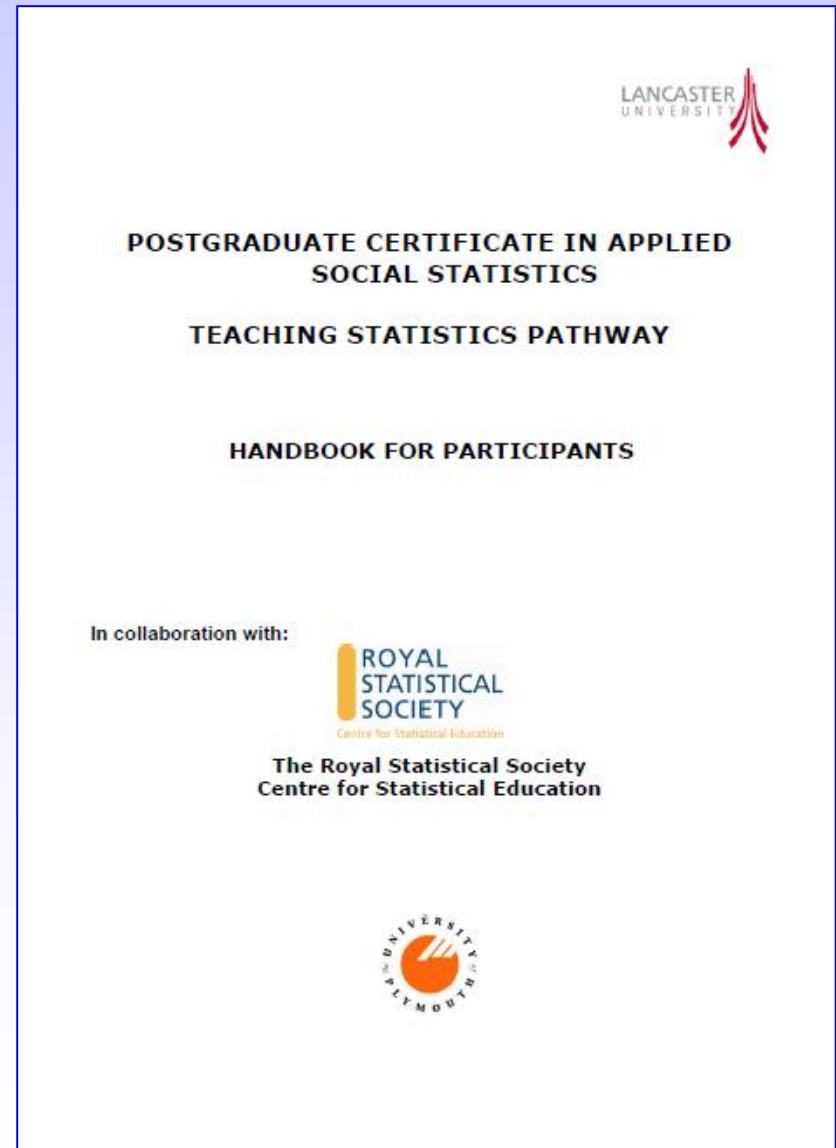
\_\_\_\_\_  
Chair

\_\_\_\_\_  
Director of Education and Professional Affairs

This Certificate is the property of the  
Royal Statistical Society

# Trying to get the (schoolteacher) *Certificate in Teaching Statistics* embedded in university courses

(Eg – University of Lancaster)



# 5 Engagement with outside bodies

- People who influence the curriculum – government education departments
- People who teach – get them to change their ways?
- Business and Industry
  - Bringing industrial problems into the HE curriculum
  - UK HE Science, Technology, Engineering and Mathematics (STEM) initiative
- *Engaging with journalists*
- *BBC*
  - *Engagement through news and schools*



Advancing the science and application of statistics, and promoting use and awareness for public benefit

Search :  ▶

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You are here : [getstats](#) : [journalists](#)

## getstats

**Working for a society  
in which our lives  
and choices are  
enriched by an  
understanding of  
statistics**

### Working with journalists to report statistics well can help millions of people to be better informed...

We are expanding our existing activities with journalists across all media to develop their awareness of the benefits of statistics, their confident use and knowledge of good sources of data, and when to seek advice.

#### Workshops for journalists

The RSS's workshops for journalists help them explain the basic statistical issues in a way that the general public can easily understand.

#### Coordinating science training

Statistics lies at the heart of science - working with the Science Media Centre, and funded by a government grant, the RSS is hosting the **national coordinator for science journalism training**

#### Recognising excellence

The RSS's awards for statistical excellence in journalism spotlight the best in using and reporting statistics

### Get involved...

#### Tell us what you think

Your views can help make the getstats campaign better

#### Volunteer

Take part in an existing activity or propose one of your own

#### Spread the word

Tell others about getstats and how it can help them

### Specialist resources

**Journalists**

**Elected representatives**

**Teachers, lecturers and students**

**Employers and employees**

**General Public**

**David Spiegelhalter  
great media  
communicator**

**The BBC College of Journalism videoed our most recent workshop for journalists. Here, David Spiegelhalter discusses whether or not some health stories are coincidental.**





# Understanding Uncertainty

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## A disastrous piece of risk communication?

Posted April 13th, 2011 by david in [level 1](#) [radiation](#)



*Yesterday's announcement that the Fukushima accident was now upgraded to a Level 7 was greeted with some consternation, since this is not only the same level as Chernobyl but as high as the scale can go – there is no Level 8. But is this scale really fit for its purpose?*

The [International Nuclear and Radiological Event Scale\(INES\)](#) is intended to be "used for promptly and consistently communicating to the public the safety significance of events associated with sources of radiation". In the [guidance manual](#), Level 7 is technically defined as

*"Level 7: An event resulting in an environmental release corresponding to a quantity of radioactivity radiologically equivalent to a release to the atmosphere of more than several tens of thousands of terabecquerels of 131I."*

It therefore has a technical definition in terms of radiation release translated to an equivalent amount of radioactive iodine.

But the definition of Level 7 that is communicated to the public is in terms of the impact on people and the environment:

*"Major release of radioactive material with widespread health and environmental effects requiring implementation of planned and extended countermeasures"*

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David Spiegelhalter

Professor of the Public  
Understanding of Risk

Cambridge University

*60% of the time*

00:14:18





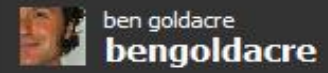
# Ben Goldacre – The Guardian Bad Science



## Stuff

- About Dr Ben Goldacre
  - Upcoming talks
  - Twitter
- What You Can Find Here
  - Audio and Video
  - Bad Science Shop
  - The Bad Science Forums
  - The Rules
- What is the MiniBlog?

## Twitter



@AlexMurraySmith pleasure, good stuff!  
9 hours ago · reply · retweet · favorite

Join the conversation

## I love them



## MiniBlog

- How does a riderless bike stay upright? [...]
- Extraordinarily leading questions in the NHS "listening exercise" by @manpreet1 [...]
- David Cameron compares his NHS reforms to homeopathy wow [...]
- This cargo-cult-science

## Kids who spot bullshit, and the adults who get upset about it

June 4th, 2011 by Ben Goldacre in [brain gym](#), [bullying](#), [childishness](#), [schools](#) | [24 Comments](#) »

Ben Goldacre, The Guardian, Saturday 28 May 2011

If you can tear yourself away from [Ryan Giggs' penis](#) for just one moment, I have a different censorship story.



[Read the rest of this entry »](#)

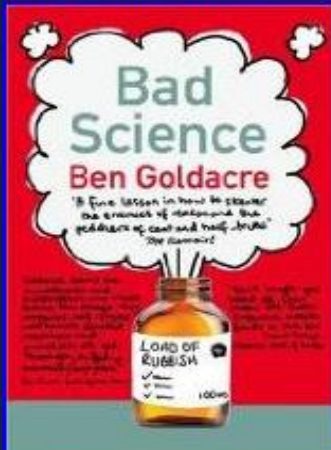
## Existential angst about the bigger picture

June 22nd 2011, Ben Goldacre, [The Guardian](#), [Science](#), [Existential angst about the bigger picture](#)

## Search

## This Great Book







## We should so blatantly do more randomised trials on policy

May 23rd, 2011 by Ben Goldacre in [africa](#), [evidence based policy](#), [politics](#) | [19 Comments »](#)

Ben Goldacre, The Guardian, Saturday 14 May 2011

Politicians are [ignorant about trials](#), and they're [weird about evidence](#). It doesn't need to be this way. In international development work, resources are tight, and people know that good intentions aren't enough: in fact, good intentions can sometimes do harm. We need to know what works.

In two new books published this month – "[More Than Good Intentions](#)" and "[Poor Economics](#)" – four academics describe amazing work testing interventions around the world with proper randomised trials. This is something we've bizarrely failed to do at home. [Read the rest of this entry »](#)

## Asking the wrong question: how crap research gets drugs to market

May 7th, 2011 by Ben Goldacre in [big pharma](#), [numerical context](#) | [25 Comments »](#)

Ben Goldacre, The Guardian, Saturday 7 May 2011

Some of the biggest problems in medicine don't get written about, because they're not about eye-catching things like one patient's valiant struggle: they're protected from public scrutiny by a wall of tediousness.

Here is one problem that affects millions of people. What if we had rubbish evidence on whether hundreds of common treatments really work, simply because nobody asked the right research question? A [paper published this week](#) looks at how much evidence there was for every one of the new drugs approved by the FDA between 2000 and 2010, at the time they were approved. [Read the rest of this entry »](#)

## I foresee that nobody will do anything about this problem

April 23rd, 2011 by Ben Goldacre in [bad science](#), [publication bias](#) | [23 Comments »](#)

Ben Goldacre, The Guardian, Saturday 23 April 2011

Last year a mainstream psychology researcher called [Daryl Bem](#) published a competent [academic paper](#), in a well respected journal, showing evidence of precognition. Instead of designing new studies to see whether people could consciously tell you about the future, he ran some classic psychology experiments backwards.

[Read the rest of this entry »](#)

geotagged and timestamped data points by [@godawful](#) [...]

[Nerdy Day Trips](#)

filling up nicely, tell us about your [#nerdytrips](#) [...]

[Relentless and extraordinary](#) amateur footage of the sea washing through a city [...]

[Extraordinary before and after images of Japan](#)

[mouseover](#), [amazing](#) [...]

## The Bad Science Forum

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[Meaningless Banter](#) :: Little things that really annoy, even though they shouldn't

[Meaningless Banter](#) :: Pub quiz

[Bad Science](#) :: [The Economist](#)

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# Engagement with the BBC 2011 BBC News School Report Survey

■ BBC NEWS SCHOOL REPORT ■

Make the news  
in your school



Page last updated at 16:19 GMT, Thursday, 7 April 2011 17:19 UK

- News Front Page
- School Report
- News Day 2011
- School Report Survey**
- Teachers' resources
- Student reports
- School Report 2012
- School Report First Click
- Project news
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## Snapshot of a generation revealed

A BBC survey of schoolchildren has given a unique insight into the daily lives, fears and aspirations of a generation of young people in the UK.

- Survey suggests family cutbacks

### MORE STORIES

- ▶ School Report Survey Q&A
- ▶ Schools analyse survey results
- ▶ How the UK census helped inspire School Report's Survey

### RESOURCES FOR TEACHERS

- ▶ Top tips on data visualisation
- ▶ Introductory Lesson
- ▶ Turning statistics into stories

### SCHOOL REPORT SURVEY FEATURES



## In pictures: School Report Survey

Pupils from Hendon School get creative to showcase the School Report survey.

### WATCH/LISTEN



What are School Reporters most interested in?

[▶ Watch](#)



Stretford Grammar investigate the Survey

[▶ Watch](#)



How dangerous are computer games?

[▶ Watch](#)



Can statistics be fun?

[▶ Watch](#)

### SCHOOL REPORT SURVEY KEY FACTS

- ♦ More than 24,000 children from across the UK, all aged 11-16, filled in the 2011 survey
- ♦ Topics include home life, technology, exercise and wellbeing
- ♦ Schools can report on their own data, as well as looking at the overall figures
- ♦ The full results will be released on School Report News Day on 24 March
- ♦ Find out more

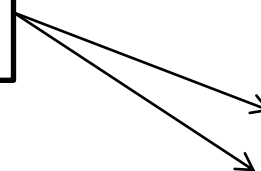
### UK CENSUS NEWS

- [▶ Census: A fair reflection of the UK?](#)
- ▶ Census awareness push under way
- ▶ A tale of two censuses

### MORE INFORMATION

- ▶ Royal Statistical Society Centre for Statistical Education
- ▶ CensusAtSchool

Publicity for RSSCSE on  
BBC web site







Page last updated at 00:04 GMT, Thursday, 24 March 2011

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## BBC survey reveals snapshot of UK schoolchildren

By Hanna White, BBC News



**A third of schoolchildren who took part in a UK-wide BBC survey say they do not believe in God, a majority help adults to use the internet and at least one in three is feeling the effects of the economic slowdown.**

These are just some of the findings of a BBC School Report survey of more than 24,000 children aged 11 to 16. It gives a unique insight into the daily lives, fears and aspirations of a generation of young people in the UK, as outlined below.

### RELIGION

When asked "What is your religion?" just under 34% of children surveyed said they did not have one.

Compare that with 15% of the

### SCHOOL REPORT NEWS DAY 2011



Map of schools taking part in your area

▶ Sign up for 2011/12

### STUDENT REPORTS

- ▶ News Day as it happened
- ▶ Paralympian eyes Games legacy
- ▶ London school has 2012 Olympics role
- ▶ Rihanna triumphs in AV experiment
- ▶ Royal wedding scoop revealed
- ▶ School Report Shout Out Wall

### IN AUDIO AND VIDEO

- Schools survey: hopes and fears
- Royal Wedding: 'Can I marry at Abbey?'
- Ex-child soldier tells of reform
- MPs pay tribute to School Report
- The school girl who saved a life
- Grandad revisits dancehall days

### PROJECT BASICS

- ▶ What is BBC News School Report?
- ▶ Frequently asked questions
- ▶ In pictures: News Day 2011

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[School Report](#)

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- [Weather](#)
- [Democracy Live](#)
- [Radio 1 Newsbeat](#)
- [CBBC Newsround](#)
- [On This Day](#)
- [Editors' Blog](#)

# The BBC News School Report Survey 2011



BBC News School Report  
BBC Television Centre  
London W12 7RJ  
bbc.co.uk/schoolreport



Royal Statistical Society  
Centre for Statistical Education  
University of Plymouth  
Plymouth PL4 8AA  
rsscse.org.uk



## A snapshot of what it's like to be an 11-16 year old in 2011.

Publication embargoed to 00:01 - Thursday March 24<sup>th</sup> 2011

## The BBC News School Report Survey 2011

### Summary

#### Background

This report presents the key findings from the BBC News School Report Survey 2011. The survey was carried out in conjunction with the Royal Statistical Society Centre for Statistical Education (RSCSE) at the University of Plymouth.

The BBC News School Report Survey achieved a total sample of 24,052 respondents – all children aged 11-16. The survey aimed to offer pupils attending School Report partner schools the opportunity to give their views and experiences of life, home, technology, faith and other topical issues. Questions were also asked relating to the 2011 Census. Teachers and pupils were consulted in all stages of its development. The survey was available to be completed online between 20<sup>th</sup> January 2011 and 4<sup>th</sup> March 2011.

School Report invited the 804 schools signed up to the project in the relevant period to take part, 329 did so. There was no maximum or minimum limit to the number of children at each school that could take part. The average participation rate was 73 but figures ranged from 1 to 784<sup>1</sup>.

There is no claim that those responding to the School Report Survey are representative of all 11-16 year olds because of self-selecting nature of the schools that take part and the sample of children therein. However there is some evidence that the schools taking part in School Report are broadly representative of schools across the UK and that those taking part in the Survey are representative of that group<sup>2</sup>.

Research by the RSCSE on similar scale projects indicates that the children involved were generally representative of children in the whole population

#### Key findings of the BBC News School Report Survey

##### Home life

87% of respondents are born in the UK and Ireland, the second highest area of birth was the rest of Europe at 4%.

More than 1 in 5 (22%) use two or three languages in conversation with family and friends.

Just under 70% of respondents live with their dad and just over 10% with their step-dad. 93% live with their mum and 3% with their step-mum. 4% live with a grandparent.

<sup>1</sup> There are 3941 state maintained secondary schools in the UK. Independent schools can take part in School Report, and the number participating is proportional to the number of independent schools in the UK. 19 of the 329 schools participating in the Survey (or 6%) are Independent.

<sup>2</sup> The average percentage of pupils known to be eligible for Free School Meals in 279 of the schools who completed the survey is 17.6%. This compares to the English average of 15.4.



# Engagement with the BBC for 2012 London Olympics and BBC

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## ■ BBC NEWS SCHOOL REPORT ■

Make the news  
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## In pictures: School Report 2012



2012 is the year of the Olympics, the Paralympics and the Diamond Jubilee. Find out how your school can report for real on events all around the UK, between now and the end of 2012.



# SportAtSchool – for the Olympics in London

## SportAtSchool

### About You

1 Please state the first part of your postcode ( e.g N63 or IP23).

2 Are you?

Male  Female

3 Please state your age in completed years and the month you were born.

 Years  Month

4 a) Which hand do you write with?

Right  Left  Either

b) When going up steps which foot would you place on the first step?

Right  Left  Either

5 Which one of the following would you prefer to have?

- Agility (quickness)  
 Endurance (stamina)  
 Speed  
 Skill  
 Strength

6 What is your?

Height .....cm  
 Length of right foot .....cm  
 Vertical reach .....cm  
 Open arm span .....cm  
 Hand span of the hand you write with .....cm

7 What is your resting pulse rate?

 beats per minute

8 a) How long can you stand on one leg with your eyes closed? The leg you lift off the floor must be bent 90 degrees at the knee.

 secs

b) How long can you hold a one kg weight to the side of you with your arm in line with your shoulder?

 secs

### At School

9 a) What time did you go to bed last night?

 : 

b) Where did you keep your mobile phone last night when you were asleep?

- Under my pillow  
 In my bedroom  
 In another room  
 Other (please state) .....

10 What time did you get out of bed this morning?

 : 

11 a) On a school day do you eat breakfast?

- Before I leave for school  
 On the way to school  
 At School  
 I don't have breakfast

b) Please state what you had for breakfast this morning.

|                            |                          |                          |
|----------------------------|--------------------------|--------------------------|
|                            | Yes                      | No                       |
| Fruit                      | <input type="checkbox"/> | <input type="checkbox"/> |
| Cereal                     | <input type="checkbox"/> | <input type="checkbox"/> |
| Cooked breakfast           | <input type="checkbox"/> | <input type="checkbox"/> |
| Toast                      | <input type="checkbox"/> | <input type="checkbox"/> |
| Sweets/chocolate           | <input type="checkbox"/> | <input type="checkbox"/> |
| Cake                       | <input type="checkbox"/> | <input type="checkbox"/> |
| Other (please state) ..... |                          |                          |
| I did not have breakfast   |                          | <input type="checkbox"/> |

12 a) How many portions of fruit and Veg did you eat yesterday? See Just Eat More Guide.

 Portions

b) Were you at school yesterday?

Yes  No

13 Will you compete in your school's sports' day?

- Yes  No  
 My school does not have sports' day

### Sport and Exercise

14 a) How much sport or exercise did you do in school last week (or the last week you were at school)?

 hours

b) How much sport or exercise did you do out of school last week (or the last week you were at school)?

 hours

15 What activities have you taken part in during the last year? (This can be a club activity.)

a) In school b) Out of school

16 Have you been involved in competitive sport:

a) In school b) Out of school  
 Yes  No  Yes  No

b) What sports would you like to take part in but are unable to in school?

17 Can you:

a) Swim 25m b) Ride a bike  
 Yes  No  Yes  No  
 Never tried  Never tried

18 Name a famous Olympian.

19 Are you going to an event at the:

a) 2012 Olympics b) 2012 Paralympics  
 Yes  No  Yes  No

20 In the last week approximately how much time did you spend, to the nearest hour, playing motion-controlled games? (Wii, Xbox, PS3.)

 hours

21 How many medals do you think these nations will win at London 2012? (Gold, silver and bronze.)

|        |  |     |  |
|--------|--|-----|--|
| China  |  | USA |  |
| Russia |  | UK  |  |

## SportAtSchool (Parents, guardians and carers)

Your child's school is taking part in the SportAtSchool project to give learners the opportunity to, improve their data handling skills, be part of a national sporting event, become a BBC News School Report School. The answers to the questions below will help to create worksheets and activities from these real data. This questionnaire is anonymous, entirely voluntary and the data cannot be traced back to an individual.

1 Are you

Male?  Female?

2 a) Do you normally eat breakfast?

Yes  No

b) What did you have for breakfast this morning?

|                            |                          |                          |
|----------------------------|--------------------------|--------------------------|
|                            | Yes                      | No                       |
| Fruit                      | <input type="checkbox"/> | <input type="checkbox"/> |
| Cereal                     | <input type="checkbox"/> | <input type="checkbox"/> |
| Cooked breakfast           | <input type="checkbox"/> | <input type="checkbox"/> |
| Toast                      | <input type="checkbox"/> | <input type="checkbox"/> |
| Sweets/chocolate?          | <input type="checkbox"/> | <input type="checkbox"/> |
| Cake                       | <input type="checkbox"/> | <input type="checkbox"/> |
| Other (please state) ..... |                          |                          |
| I did not have breakfast   |                          | <input type="checkbox"/> |

3 Which one of the following would you prefer to have?

- Agility  Endurance  
 Speed  Skill  
 Strength

4 How much sport or exercise did you do last week?

 hours

5 What sporting activities have you taken part in during the last year? (This can be a club activity.)

6 Can you?

a) Swim 25m? b) Ride a bike?  
 Yes  No  Yes  No

7 Do you play a sport or take part in a sporting activity with your child/children?

Yes  No

8 Are you going to an event at the:

a) 2012 Olympics? b) 2012 Paralympics?  
 Yes  No  Yes  No

9 In the last week approximately how much time did you spend, to the nearest hour, playing motion-controlled games? Eg Wii, Xbox, PS3.

 hours

There is a reaction time game to complete on the SportAtSchool online questionnaire.

# *What people know about statistics – after the getstats campaign – people in London, 2020?*



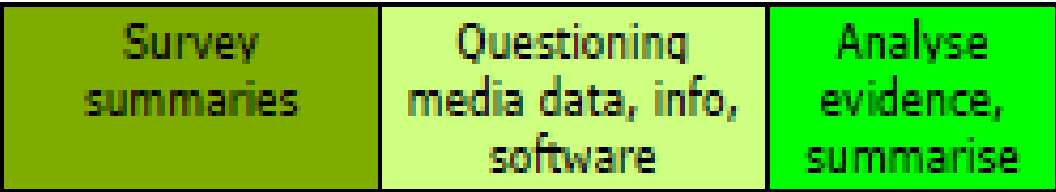
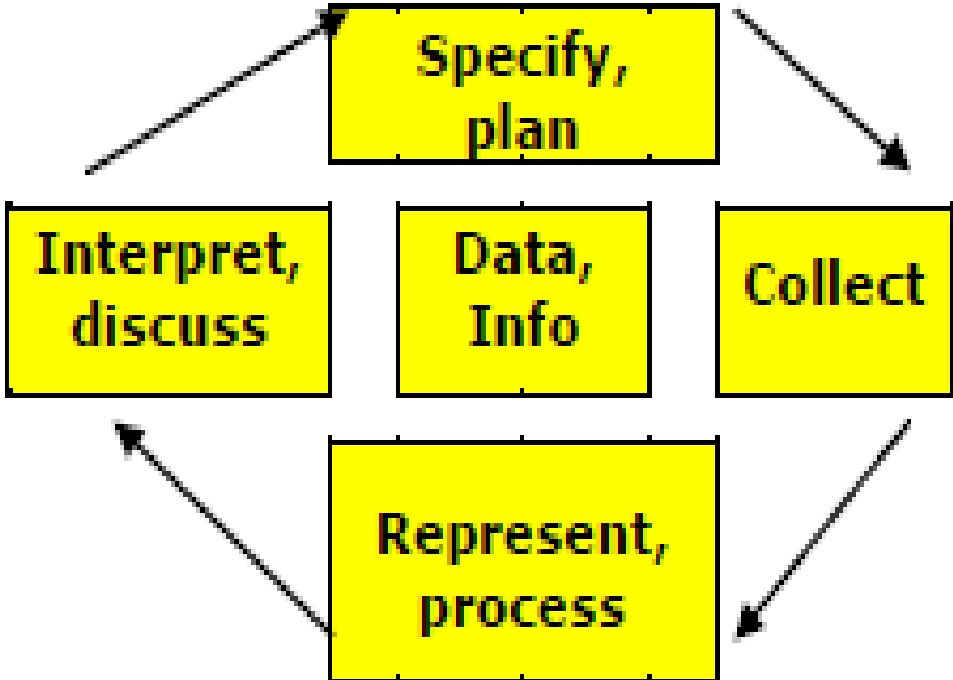
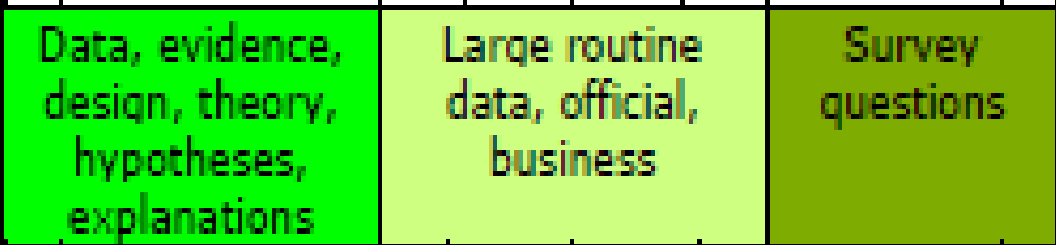
# The last slide

- “Statistics is the most important science in the whole world:
  - for upon it depends the practical application of every other science and of every art;
  - the one science essential to all political and social administration, all education, all organisation based upon experience, for it only gives the results of our experience.”
- Florence Nightingale



# RSSCSE contributions to getstats to date

- *Education*
  - *Promote real data and applications across the curriculum*
  - *Build statistics teaching skills across the curriculum*
  - *Reach out to young people with positive experiences of stats*
  - *Develop projects that reach parents and citizens*
- *Employers*
  - *Build understanding of the role of statistics skills for developing a fully competent work force*
  - *Show how to audit statistics skills and where and how to develop them*
- *Public*
  - *Reach citizens though the media*



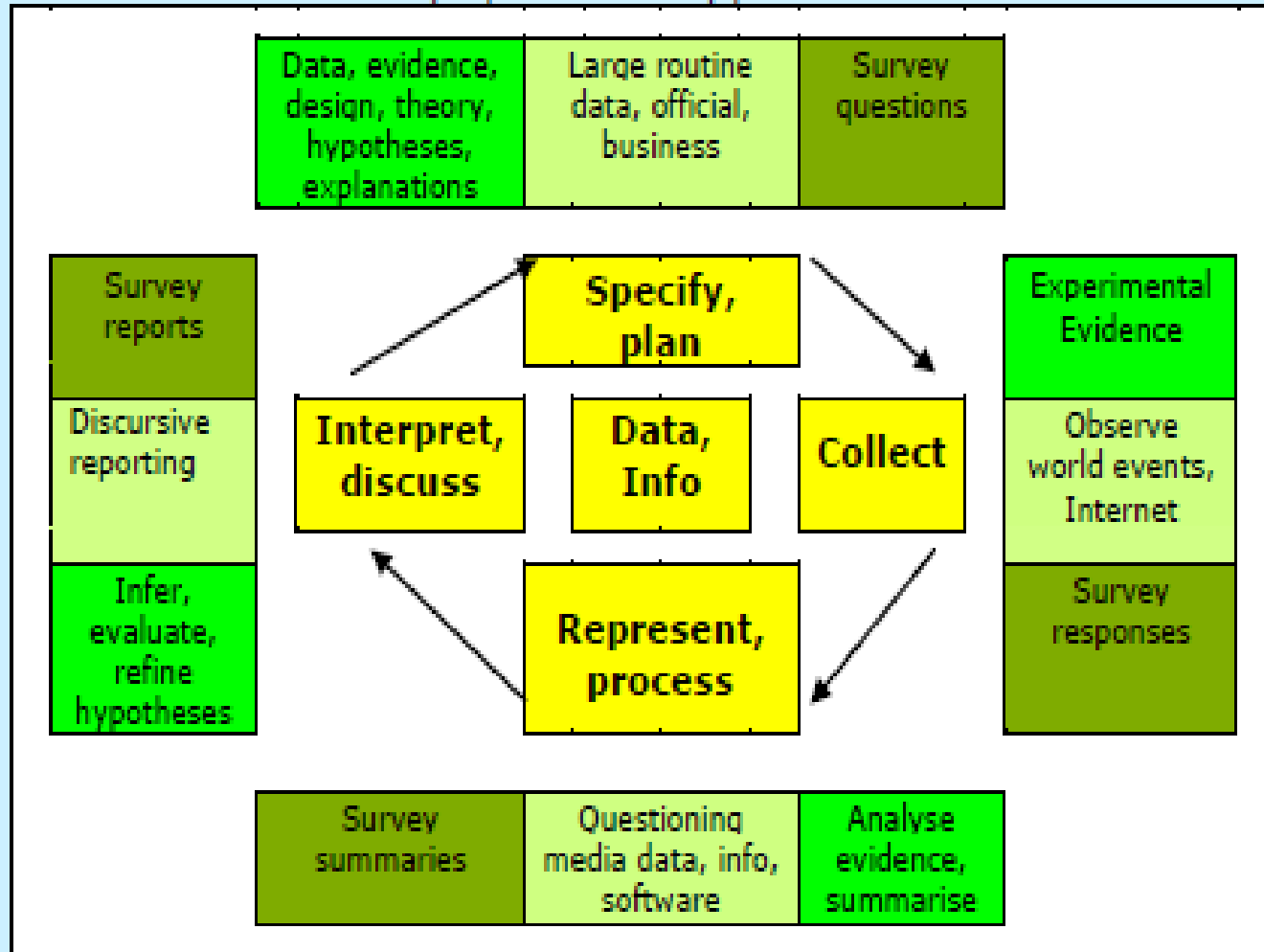
Foundation

**Planning** Simple ideas of data variation; ideas behind sampling; random samples; elementary experimental design, random allocation

Foundation

Critically evaluate - Functional Literacy

Simple inference from charts, diagrams, graphs; Bivariate data; Reading tables; gleaning info from print and electronic media



Data production

Data loggers for the sciences; data and info from the Internet & media; use of web forms; data scrutiny; data for quality control

Foundation

**Analysis** Functional ICT: software for charts, diagrams, graphs. ICT for elementary measures of location & variation for simple data sets. Showing correlation and regression. Uncertainty & elementary probability calculations, including risk

Foundation

**Intermed**

**Planning** Sampling for a purpose; scales of measurement; devising suitable questions for statistical investigation; stratified sampling, paired comparison in designing experiments. Deciding what to measure.

**Intermed**

**Critically evaluate - Functional Literacy**

Evidence based decisions; findings in the context of problems and publicly available statistics; interpreting social data and several related variables; reading quality improvement graphs and charts

**Foundation**

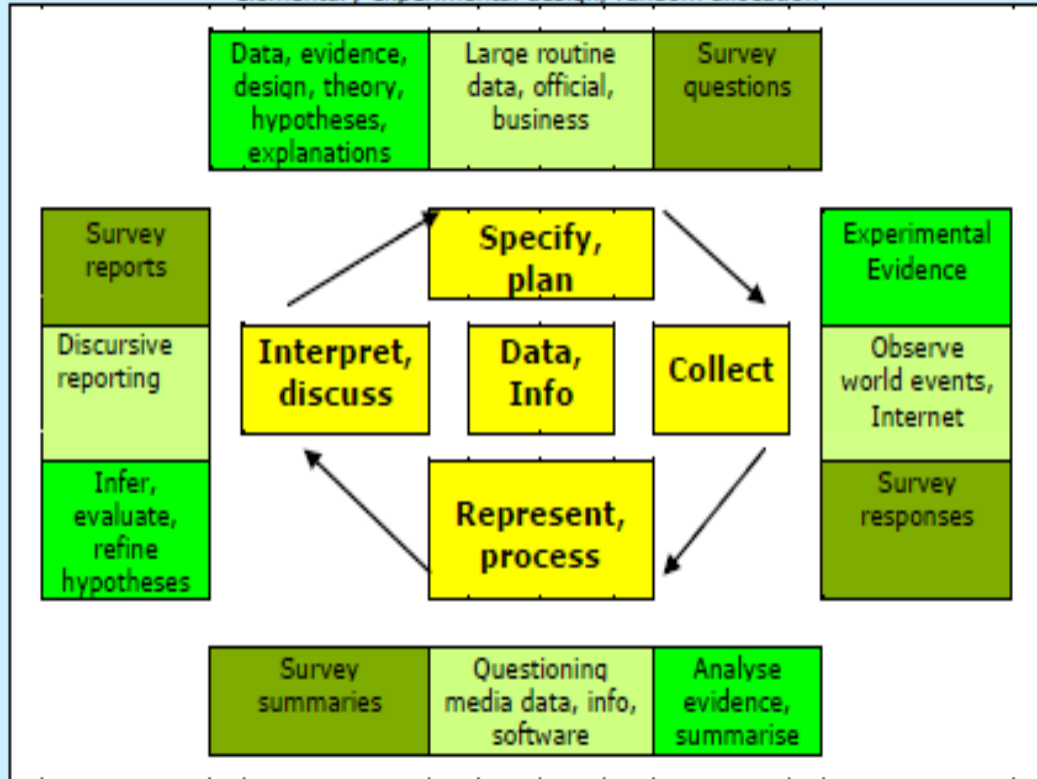
**Critically evaluate - Functional Literacy**

Simple inference from charts, diagrams, graphs; Bivariate data; Reading tables; gleanng info from print and electronic media

**Foundation**

**Planning** Simple ideas of data variation; ideas behind sampling; random samples; elementary experimental design, random allocation

**Foundation**



**Data production**

Survey making and questionnaire design using the Internet; getting useful data from other schools inside and outside the UK; getting data from scientific and observation studies

**Data production**

Data loggers for the sciences; data and info from the Internet & media; use of web forms; data scrutiny; data for quality control

**Foundation**

**Analysis** Functional ICT: software for charts, diagrams, graphs. ICT for elementary measures of location & variation for simple data sets. Showing correlation and regression. Uncertainty & elementary probability calculations, including risk

**Intermed**

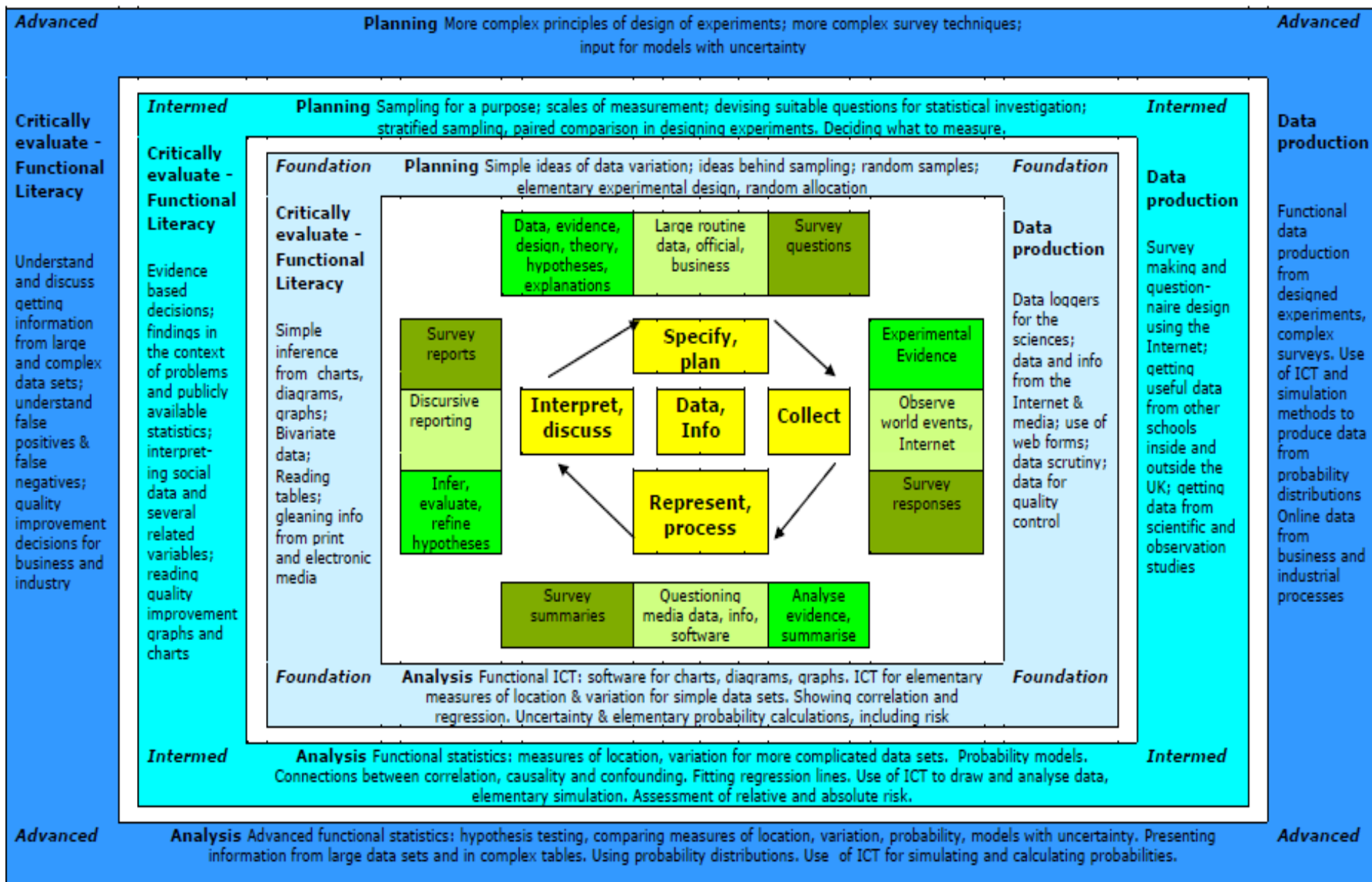
**Analysis** Functional statistics: measures of location, variation for more complicated data sets. Probability models. Connections between correlation, causality and confounding. Fitting regression lines. Use of ICT to draw and analyse data, elementary simulation. Assessment of relative and absolute risk.

**Intermed**



# Knowledge and Skills Diagram: Statistical Awareness for Citizens

## Numbers-Data-Information-Collection-Presentation-Analysis-Discussion-Reporting-Decision Making



All citizens should have knowledge and skills from doing the iterative cycle (yellow boxes) using material at intermediate (interned) level