

CensusAtSchool Developing Statistical Literacy

Christine Sergi Assistant Director, Education Services Unit Australian Bureau of Statistics

5th & 6th March 2010





ABS Mission

• To assist and encourage informed decision making, research and discussion within governments and the community, by leading a high quality, objective and responsive national statistical service.



The Importance Of Statistics In Today's Society

"Statistical thinking will one day be as necessary for efficient citizenship as the ability to read and write." н.с wells 1928





Why is Statistics Education Important?

- Ensure school children develop an understanding and appreciation of how data can be acquired and used to make informed decisions in their daily lives, as children and then as adults; and
- Evoke in school children interest and enthusiasm for statistics, and provide sufficient statistical learning to prepare them for tertiary studies, or a potential career, in statistics.



What Defines Statistical Literacy?

- Data Awareness
- The Ability to Understand Statistical Concepts
- The Ability to Analyse, Interpret and Evaluate Statistical Information
- The Ability to Communicate Statistical Information and Understandings

CensusAtSchool Background

- CensusAtSchool was initiated in the United Kingdom by the Royal Statistical Society Centre for Statistical Education, the Department of Education and Employment, and the Office for National Statistics.
- The project was launched nationally in Australia by the ABS in 2005. It is used to promote the statistical literacy of students, in addition to promoting the Census of Population and Housing.



CensusAtSchool International Project

• CensusAtSchool has become an international project with a number of countries now participating. They include:

United Kingdom New Zealand Canada South Africa Australia Japan



iureau o tatistics

CensusAtSchool International Project

- All participating countries include a set of common questions in their questionnaires.
- There is now an International CensusAtSchool website.
- The website has an international database which allows students to compare their results with students across the world.





CensusAtSchool Strengths

Engages students in data about themselves

Supports curricula

Integrates Information and Communication Technology

Interdisciplinary learning

Rich, Raw, Real data





CensusAtSchool Characteristics

- CensusAtSchool is an online learning resource accessed via the CensusAtSchool web pages.
- The project is suitable for upper primary and secondary school students.
- Students can participate in the questionnaire and the data usage phases.



CensusAtSchool Questionnaire

- The Australian CensusAtSchool questionnaire consists of 30 questions. (This includes 11 common international questions.)
- The questionnaire asks student about their characteristics, lifestyle, and opinions. There are also interactive activities which measure students' concentration and reaction time.
- The questionnaire is completed and submitted online.
- All responses to the questionnaire are confidential and no student can be identified in the response data.



CENSUSATSCHOOL 2010 QUESTIONNAIRE

- Please complete all questions. You will need a measuring tape to complete questions 9, 10, 11 and 12. You must complete the questionnaire in one session. If you exit the questionnare you click the subamb button all your responses will be lost. You may begin the questionnare again the next time you login. The subamb questionnaire button to send your answers to the CensusAlScher onnaire and click or
- e. navigate the questionnaire using the following methods: the scroll bar on the right of the screen; the Tab key on your keyboard. The Tab key moves the cursor from one ans

This symbol denotes an international common question that may be included in the CensusAtSchool questionnaires of the United Kingdom, Canada and New Zealand.

YOUR DETAILS

-

Enjoy the questionnaire

1. Are you Male Male Female

2. When were you born?

av	Select Day	-	Month	Select Month	-	Year Select Year	-
	[From 1-31]		1	From Jan - De	9C]	[from 1988-2003]	1

In which state/territory or country were you born?Australian locations are at the top of the list followed by other countries.

Select one only Select one only New South Wales Victoria Gucensland South Australia Westem Australia Tasmania Northern Territory Australian Capital Territory Other Australian Territories Albania Austria Bosnia and Herzegovina Bulgaria Cambodia

istralian ireau of atistics	26a. Last week, did you earn or receive any money? Please select the source which provided you with the most money. Select one only No Yes – Baid Work Yes – Allowance or Pocket Money Yes – Gift Yes – Other	25. Complete the following concentration exercise. Uncover all the blocks by successfully matching the image pairs.
	✓ 23. In what sport or activity do you most enjoy participating? Seect one ony ✓ Athelics Basehall/Softball Basehall/Softball ✓ Basehall/Softball ✓ Cricket ✓ Cycling Dancing Dancing (AFL) Football (Rogby Legue) Football (Rogby Union) Football (Soccer) Goff Gymnastics Hockey Mortial arts Netball Skateboarding/Rollerblading Swimming Tennis Other activities/sports None	
	Hanging out with friends 0 Doing homework Doing homework Doing things with my family Playing sportsbuddoor games or activities	



CensusAtSchool Data Usage

- · Data can be accessed via the random sampler and students can take samples of up to 200.
- The data is presented in Excel spreadsheets. •
- · Alternatives are provided for teachers who cannot or do not want to use the random sampler e.g. prepared samples and information tables.
- Categorical, Discrete, Continuous and Bivariate data is available.



Data Analysis

Mean and Median Analysis

Qtime	Sex	BrthYear	Age
12	Male	1990	16
12	Male	1989	17
13	Male	1993	13
14	Male	1994	12
14	Male	1991	15
14	Male	1993	13
15	Male	1990	16
16	Male	1990	16
20	Male	1991	15
23	Male	1993	13
24	Male	1992	14
24	Male	1989	17
24	Male	1992	14
27	Male	1994	12
33	Male	1994	12

	Time to fin	ish the Ques	stionnaire
	Gender	Mean time	Median time
$\left \right\rangle$	Boys	19.0	16
	Girls	20.1	18

. Why is the mean greater than the median?

.What happens to the mean and median if a large Qtime is removed?

.Change a value to Qtime to make the mean the same as the median

. How can you make the median for males equal to 20?



Data Analysis







Data Analysis

Outliers: Delete if height/belly button is <1.2 or >2





Data Analysis





Data Analysis

Have opinions from 2006 translated into actions in 2008?

Actions Water 2008







CensusAtSchool Teaching Resources

• All teaching resources are available at www.abs.gov.au/censusatschool

-	Ball Area fail	institution multi trees his too
Apple States Records of Real States	Australian Bureau of Statistics	C fair to chi un
-	these dark and interiors deriver Course Means Methods & Darkette Means & Medica	Acaton Labo
akt home		Gergfe taant na fdit verein
	Welcome to the Australian CensusAtSchool	4
Chanadhthind Chanadhthind long Anadar Sa Marka Sa Mar Ananay (Ma Cal Chanadhthill	<image/> <image/> <section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header>	Image: Strategy of the





CensusAtSchool **Statistics Lessons**

CensusAtSchool Home					
About CensusAtSchool	TEACH	LK AREA			
Teacher Area					
Teacher Account	Census	AtSchool Mathematics Acti	vities		
Support Haterials	The Eduthe	station articles have been mined	to meet the own	of a research as sold and bearing and	
CensusAtSchool Data	THE HURLING	matica activities name peen revisies	to meet the ne	ees of a range of feaching and learning accu	nors.
CensusAtSchool Classroom	Each activ	vity has attached a:			
Adivities		 Student Worksheet 			
Professional Development		Simplified data sample - for use	when access 1	o the internet is problematic and as a back	up for teachers
Community		 Lable of data - for use when stored 	penta do not ha	we access to compoters	
Student Area	The heat of	and will be obtained by students of	attion their own	samela from the Canaus It School Dandom	Campler
Summary Data	ting Delit is	reason and the suscented by situations g	and the first	earright and the Gendus-Cochoo Handom	
News	The activi and learnin	ties are only available in the Te to emironment. Then provide the re-	acher Area, n ised activity to	ot the Student Area. You can use the act students in a format appropriate to your cla	why as it is or modify it for your class as Eq. As a Word document over the
Contact CensusAtSchool	school intri	anet			
	10	Title	Year Level	Description	Related Survey Questions
	CaSMa01	Eye Colour	6 - 8	Students conduct a survey of eye colour within their class. They can use Excel to construct appropriate graphs and make comparisons with other communities.	Q.11 Eye colour
	CasiMa02	Does Your Rock and Roll Stat Rock2	5.0	Students are asked to milew and suggest improvements to a school radio program. They can use surveys and Census/ASChool data to construct appropriate graphs in their recommendations to the Junior School Council.	Q.35 Favourite music
	a 1.20 March	Are Students Being Taken For A	5-8	Students can conduct a time series	Q 25 Method of travel to school
	CasMa03	Ride?		investigation on how students travelled to school in 2008 compared to 2006, using Excel to sort and analyse the data	Q.25 Time of travel to school

CaSMa01 EYE COLOU	R
TEACHER AREA	
CaSMa01 EYE COLOUR	
You can <u>download</u> this activity as a 1. Subject Area	rich text file (RTF) using the links at the bottom of the page Mathematics
2. Suggested Level	Years 5-8
3. Key Statistical Literacy Competencies Addressed	Data answerses The ability to understand statistical concepts The ability to understand statistical information The ability to analyse, interpret and evaluate statistical information Communicating statistical information and understandings
4. Overview	This classroom activity involves examining the eye colour of the students in your class. Students are asked to conduct a sim analysis using graphs to describe how the student's class compares to a sample population, by (a) comparing their class of with a hypothetical sample, and, (b) taking a real sample from the Census/School Random Sampler. See Sections 7 and 8 below to find out more about the Census/ASchool Questionnaire and Random Sampler prior to beginning this activity
5. Requirements	Computer with Internet connection Spreadsheet software program Pens and paper Worksheet
6. Instructions	6.1 The scenario While John was filing out the 2008 CensusAtSchool questionnaire, he stopped at question 11 and remembered a maths tasi from his previous activat. In the task he had surveyed the students in his class about their eye colour. He had created a frequency table of the information and drawn a graph of the results. He throught that his previous class was different to this cl He then unordered if his present class would be a typical vasitalinal class.

Bure



Eye Colour	Numbe	er of Student	8
Blue		12	
Brown		4	
Green		3	
Grey		0	
Hazel		7	
Other		0	
2 3 Draw grap olumn graphs omparisons ci olumn graph b EYE COLOUR	hs to compare J and pie charts a an be made more y having both set OF STUDENTS	ohn's previous re often used t a easily by hai ts of results in	class to your class. to represent categorical data like eye colour. ing both classes on the same graph. You can represent both classes on the one the one table.
2.3 Draw grap olumn grapho omparisons ci olumn graph b CYE COLOUR Comparing C	hs to compare J and pie charts a an be made more y having both set OF STUDENTS lasses	ohn's previous re often used t a easily by hai ts of results in	class to your class. In represent categorical data like eye colour ing both classes on the same graph. You can represent both classes on the one the one table.
2.3 Draw grap olumn grapho omparisons ci olumn graph b YE COLOUR comparing C Eye Colour	hs to compare J and pie charts a an be made more y having both set OF STUDENTS lasses John's class	ohn's previous re often used t a easily by hai ts of results in	class to your class. to represent categorical data like eye colour. Ing both classes on the same graph. You can represent both classes on the one the one table.
2.3 Draw grap blumn grapho omparisons ci blumn graph b CYE COLOUR comparing C Eye Colour Blue	hs to compare J and pie charts a an be made more y having both set OF STUDENTS lasses John's class 12	ohn's previous re often used t e easily by har ts of results in • • • •	class to your class. to represent categorical data like eye colour ing both classes on the same graph. You can represent both classes on the one the one table.
2.3 Draw grap olumn grapho omparisons ci olumn graph b YE COLOUR comparing C Eye Colour Blue Brown	his to compare J and pie charts a an be made more y having both set OF STUDENTS lasses John's class 12 4	ohn's previous ce often used t e easily by hai ts of results in	class to your class. to represent categorical data like eye colour. Ing both classes on the same graph. You can represent both classes on the one the one table.
2.3 Draw grap olumn graphs omparisons ci olumn graph b CYE COLOUR Comparing C Eye Colour Blue Brown Green	hs to compare J and pie charts a an be made more y having both set OF STUDENTS assos 12 4 3	ohn's previous ce often used t e easily by hai ts of results in	class to your class. to represent categorical data like eye colour. Ing both classes on the same graph. You can represent both classes on the one the one table.
2.3 Draw grap blumn graphs omparisons ci blumn graph b YE COLOUR comparing C Eye Colour Blue Brown Green Grey	hs to compare J and pie charts a an be made more y having both sel OF STUDENTS lasses 12 4 3 0	ohn's previous ce often used t a easily by hai ts of results in	class to your class. to represent categorical data like eye colour ing both classes on the same graph. You can represent both classes on the one the one table.
2.3 Draw graphs omparisons ci form graph b VYE COLOUR Comparing C Eye Colour Blue Brown Green Grey Hazol	hs to compare J and pie charts a an be made more y having both set OF STUDENTS lasses 12 4 3 0 7	ohn's previous ce often usod t a easily by hat is of results in	class to your class. to represent categorical data like eye colour. Ing both classes on the same graph. You can represent both classes on the one the one table.
2 3 Draw grap olumn graphs omparisons ci olumn graph b EYE COLOUR Comparing C Eye Colour Bloom Brown Green Grey Hazol Other	hs to compare J and pie charts a an be made more y having both set OF STUDENTS lasses 12 4 3 0 7 0	ohn's previous ce often used 1 a easily by har ts of results in My Class	class to your class. to represent categorical data like eye colour. Ing both classes on the same graph. You can represent both classes on the one the one table.





CensusAtSchool ABS Support for Teachers



- Professional development workshops.
- · Prepared materials and lesson plans.
- Representation at teacher conferences and workshops.
- Articles in teacher journals and websites.
- CensusAtSchool webpages, with email and phone contact details.



CensusAtSchool ABS Support for Teachers

• On-line videos



Student feedback on CensusAtSchool.



CensusAtSchool Professional Development tutorials for teachers on YouTube and TeacherTube.

CensusAtSchool Advice Based on ABS Experience

- CensusAtSchool can be used in a simple or sophisticated way.
- Allow students the opportunity to handle and explore data.
- Information and Communication Technology is important.
- Prepared materials and lesson plans support teachers' use of CensusAtSchool.
- · Teachers learn from other teachers.
- CensusAtSchool resources free and on the web.





StatSmart Project

"The CensusAtSchool questionnaire worked very well. Students were genuinely interested in collecting personal measurement statistics and comparing themselves to both others in the class and students of similar ages around Australia."

"Some students poor at mathematics found themselves participating in the activity."

"At times it was hard to get some students to spend time thinking and experimenting rather than doing, which is something they were not used to in mathematics."

"The fact that in some cases there wasn't really a correct or an incorrect answer was hard for certain students to swallow."



In Conclusion.....

"It would be a capital mistake to theorize before one had data."

Thank you