

Statistics Teachers' Day 2012

Thursday 22 November 2012

Workshop Information

If you are one of the 140 people who responded to our survey on workshop preferences, thank you very much. We would have loved to be able to offer enough repeats to ensure that every one of you could attend your most favoured options. Unfortunately time, room and presenter constraints combined to make that impossible. We have, however, tried to ensure that the room capacities are such that we should be able to accommodate most participants' preferences.

Please read the information on workshops carefully prior to registering for Statistics Teachers' Day 2012.

Workshops have been planned to cover all the Level 3 statistics standards and four of the Level 2 statistics standards. Most workshops will be offered in at least 2 sessions.

Many workshops will include demonstrations and use of the free iNZight software. iNZight may be downloaded from <http://www.stat.auckland.ac.nz/~wild/iNZight/>

Please read the workshop outlines carefully. You may find it helpful to bring a laptop with iNZight already installed. Note that your laptop should be fully charged as there are only a minimal number of power plugs in the seminar rooms and lecture theatres.

Listed below are the 16 different workshops that will be offered. Included is a brief description of the workshop and which session/s it will be offered in.

AS 3.8

A new look at Time Series analysis using iNZight

This workshop compares the changes between AS 3.1 and AS 3.8 at Achieved/Merit and Excellence levels. Details on how to use the time series module of iNZight, including necessary data protocols, and an example of a typical time series analysis using the Polar Ice data set (currently available on NZQA website) will be covered. A brief explanation of the Seasonal Lowess Model and the Holt-Winters Model, both of which are used by iNZight, will be given. There will also be a discussion of why these models are an improvement over past techniques used. Details of resources that have been developed for time series analysis using iNZight will also be available.

Workshop Sessions: ~~WS1~~(full), ~~WS2~~ (full), WS3, WS4

AS 3.9

Investigating bivariate measurement data using iNZight

This workshop will focus on key issues when teaching bivariate data and will address some possible misconceptions. Teaching points will be related to AS 3.9, especially to differences between AS 3.9 and the previous standard. Regression analysis will be conducted using iNZight.

Workshop Sessions: WS3, WS4

AS 3.10A

Sample-to-Population Inference: The Path to 3.10

This workshop will focus on the expectations and requirements of 3.10 “Use Statistical Methods to Make a Formal Inference”. We will look at the progressions of key ideas from 1.10 to 2.9 and 3.10 and discuss what good teaching and assessment may mean in this standard.

Note: The technical aspects of how to construct bootstrap confidence intervals for a population parameter will not be covered.

Workshop Sessions: ~~WS1~~ (full), WS2, WS3, WS4

AS 3.10B

Beginner’s guide to bootstrapping, a repeat of last year’s bootstrapping presentation

This workshop introduces the bootstrapping process as a method for constructing a confidence interval for the population median. A hands-on activity and an introduction to using iNZight to construct bootstrap confidence intervals are included.

Workshop Sessions: WS1, WS2

AS 3.10C

Bootstrapping, part 2: builds on last year's introductory presentation

This workshop assumes some familiarity with the material covered in workshop AS3.10B. A brief recap of bootstrapping will be followed by looking at the success rate of bootstrap confidence intervals containing the population parameter. Bootstrap confidence intervals for a mean and a difference between means/medians will be constructed.

Workshop Sessions: WS2, WS3, WS4

AS 3.11A

Conducting and assessing experiments for 3.11

This workshop will provide guidance for conducting and assessing experiments for the new standard 3.11. In particular, the use of experimental design principles, informed contextual knowledge and the practical aspects of co-ordinating student-designed experiments will be covered. Ideas for investigations involving experiments will be shared and advice for incorporating this standard into a Year 13 teaching and learning programme will be shared. Note: *It would be helpful for teachers to bring a web-connected device such as an Android or Apple smartphone or tablet, or a laptop.*

Workshop Sessions: WS1, WS2

AS 3.11B

Beginner's guide to randomisation, a repeat of last year's randomisation presentation

This workshop introduces the randomisation test as a tool for making conclusions from experiments. A hands-on activity and an introduction to using iNZight to perform a randomisation test are included.

Workshop Sessions: WS1, WS3

AS 3.11C

Randomisation, part 2: builds on last year's introductory presentation

This workshop assumes some familiarity with the material covered in workshop AS3.11B. In this workshop we will consider both large and small tail proportions. We will also consider how the design of a study determines what types of inferences we can make. Randomisation tests will be conducted using iNZight.

Workshop Sessions: WS2, WS3, WS4

AS 3.12A

Margin of Error and testing claims in the media

This workshop will use iNZight visualisation tools and other simulation activities to build a conceptual understanding of margin of error, and the "rules of thumb" for testing claims in statistically-based reports. The accompanying resource pack will include a teaching outline, the activities, media reports, and worksheets

Workshop Sessions: WS1, WS3

AS 3.12B

Non-Sampling Errors as they Apply to Polls and Surveys and Observational Studies

This workshop will outline a possible teaching unit for standard AS 3.12.

The content will include strategies for developing students' statistical literacy skills, ideas for sourcing media articles, non-sampling errors and potential biases with examples from the media, the methodologies used by polling companies, and a comparison of observational and experimental studies. The accompanying resource pack will include articles, templates, worry questions and PowerPoints.

Workshop Sessions: WS2, WS4

AS 3.13

Apply probability concepts in solving problems

This workshop will use hands-on learning experiences to explore some of the new concepts in probability. We will investigate randomness, true probability vs model estimates, distribution tables and graphs.

Workshop Sessions: ~~WS1~~, ~~WS2~~ (full)

AS 3.14

Apply probability distributions in solving problems

This workshop will use hands-on learning experiences to explore probability distributions. We will investigate: discrete and continuous probability distributions; mean and deviation of random variables; distribution of true probabilities vs distribution of model estimates of probabilities versus distribution of experimental estimates of probabilities.

Workshop Sessions: ~~WS3~~, ~~WS4~~ (full)

AS 2.9

Statistical Investigations at Level 7

This is an introductory workshop about teaching and learning; NOT about assessment.

Come prepared for an overview and an opportunity to reflect. The focus is on the NZC objectives, with a suggested teaching sequence and links to activities. You will learn there is much ready-prepared material, which Jeanette Saunders has worked with Pip Arnold to develop.

Workshop Session: WS1

AS 2.10

Conducting experiments

We have really enjoyed working as a department this year developing ideas for teachers and students to be successful in teaching and learning concepts relevant to conducting experiments for AS2.10. Emma will help consolidate understandings around this achievement objective as well as share ideas about how to co-ordinate the actual assessment of this standard.

Note: This workshop will be similar to the AMA Saturday workshop that Emma ran earlier in the year.

Workshop Sessions: WS1, WS3

AS 2.11

Evaluate a statistically based report

We had great success with AS 2.11, despite initially being very apprehensive about tackling this new standard. This workshop will explore two different approaches taken by our Maths department to the teaching of AS 2.11, as well as the ideas I developed regarding the actual co-ordination of the assessment task.

Workshop Sessions: WS2, WS4

AS 2.12

Risk in context – resources useful for teaching content related to AS 2.12

Statistical information is prolific in today's media, yet many of us are easily misled or have difficulty in interpreting and challenging statements that are made. What does "Eating bacon increases your chances of bowel cancer by 20%" really mean? To be informed citizens, it is important that we are able to understand statements that are made about risk so that we can make informed decisions about our lifestyles. This workshop will illustrate how to calculate a variety of statistics relating to risk, and explore their interpretations within given contexts. It will also give teachers some background knowledge for teaching risk in Year 12.

Note: This is a repeat of a recent AMA Saturday morning workshop.

Workshop Session: WS4

When you register you will need to choose one workshop for each of the 4 sessions and a further 2 back-up choices. These may be from any session but should be different to your other 4 choices. Registration for workshops will be on a first-in, first-served basis. In the event of one (or more) of your choices being full we will first try and accommodate you by offering you the same 4 workshops in a different mix of sessions. If we cannot do that we will use one (or both) of your back-up choices.

We strongly encourage schools with more than one person attending to converse before making workshop choices and choose different workshops, to ensure that there is space for people from other schools.

Workshops by Workshop Session

We suggest you use this list to highlight your choice for each session prior to completing your registration.

| | |
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| Workshop Session 1 (WS1) 10:45 – 11:40am | AS3.8 Time series analysis (full) AS3.10A Sample-to-Population Inference (full) AS3.10B Beginner's guide to bootstrapping AS3.11A Conducting and assessing experiments AS3.11B Beginner's guide to randomisation AS3.12A The margin of error AS3.13 Apply probability concepts (full) AS2.9 Statistical Investigations at Level 7 AS2.10 Conducting experiments |
| Workshop Session 2 (WS2) 11:45am – 12:40pm | AS3.8 Time series analysis (full) AS3.10A Sample-to-Population Inference AS3.10B Beginner's guide to bootstrapping AS3.10C Bootstrapping, part 2 AS3.11A Conducting and assessing experiments AS3.11C Randomisation, part 2 AS3.12B Non-Sampling Errors AS3.13 Apply probability concepts (full) AS2.11 Evaluate a statistically based report |
| Workshop Session 3 (WS3) 1:20 – 2:15pm | AS3.8 Time series analysis AS3.9 Bivariate measurement data AS3.10A Sample-to-Population Inference AS3.10C Bootstrapping, part 2 AS3.11B Beginner's guide to randomisation AS3.11C Randomisation, part 2 AS3.12A The margin of error AS3.14 Apply probability distributions (full) AS2.10 Conducting experiments |
| Workshop Session 4 (WS4) 2:20 – 3:15pm | AS3.8 Time series analysis AS3.9 Bivariate measurement data AS3.10A Sample-to-Population Inference AS3.10C Bootstrapping, part 2 AS3.11C Randomisation, part 2 AS3.12B Non-Sampling Errors AS3.14 Apply probability distributions (full) AS2.11 Evaluate a statistically based report AS2.12 Risk |

Back-up option 1 (BU1) – you will be able to choose any ONE of the 16 workshops offered. They listed again below. (Please do not select a Workshop already chosen above.)

Back-up option 2 (BU2) – you will be able to choose any ONE of the 16 workshops offered. They listed again below. (Please do not select a Workshop already chosen above.)

We suggest you use this list to record your two back-up choices.

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|---------------------------|---|
| AS 3.8 | A new look at Time Series analysis using iNZight |
| AS 3.9 | Investigating bivariate measurement data using iNZight |
| AS 3.10A | Sample-to-Population Inference: The Path to 3.10 |
| AS 3.10B | Beginner's guide to bootstrapping, a repeat of last year's bootstrapping presentation |
| AS 3.10C | Bootstrapping, part 2: builds on last year's introductory presentation |
| AS 3.11A | Conducting and assessing experiments for 3.11 |
| AS 3.11B | Beginner's guide to randomisation, a repeat of last year's randomisation presentation |
| AS 3.11C | Randomisation, part 2: builds on last year's introductory presentation |
| AS 3.12A | Margin of Error and testing claims in the media |
| AS 3.12B | Non-Sampling errors as they Apply to Polls and Surveys and Observational studies |
| AS 3.13 | Apply probability concepts in solving problems (full) |
| AS 3.14 | Apply probability distributions in solving problems (full) |
| AS 2.9 | Statistical Investigations at Level 7 |
| AS 2.10 | Conducting experiments |
| AS 2.11 | Evaluate a statistically based report |
| AS 2.12 | Risk in context – resources useful for teaching content related to AS2.12 |