Field Techniques: Quadrats

Topic 2.3.2

Objective: You will use quadrats to determine the diversity and percentage cover of various plant species on IST's Masaki campus. In this investigation, you will practice making and using 1m x 1m square sampling plots called quadrats. Quadrats are one of the most common tools used to sample areas in scientific investigations, and you will be required to employ this technique in some of your future investigations. I've linked a couple of really good resources below - also linked on my website - which should help you understand the quadrat method for collecting scientific data.

- Great information on ecological sampling methods to use for IA's:
  http://www.countrysideinfo.co.uk/biol_sampl_cont.htm
- Some more information on quadrats and transects
  http://scienceaid.co.uk/biology/ecology/studying.html

Recording data: For this strand, you need to systematically record numerical (quantitative) measurements, including the units you used. Systematically means that your data should be organized into a neat, clear table. The column headings should include the type of data (i.e. location, species, number, % cover, etc) as well the unit used to measure those data. You may also include qualitative data, such as descriptions of the plants you encounter, as well as observations about environmental factors such as weather, treatment by people, or anything else you think might have an impact on the raw data collected. You may also take photos of any species you can't identify, so that you can identify it later in the lab with your classmates. Pictures may be included in the write-up to support your data table, but they *may not replace* observations! For the percentage cover, you will need to show how you do it, remembering that the % may not always add up to 100%, depending on layers of plants and sampling height in your method. A diagram might be helpful in this regard.

Processing data: Processing data means performing calculations. With this lab, you have a ready-made formula: Simpson's diversity index, or the reciprocal index if it makes more sense to you. What you need to do is show the formula, describe the variables in the formula, and use some of your actual data in a sample calculation so that the reader can follow along with your process. Then you should include a table of your calculated values, though it is not necessary to show the full procedure for every single calculated value in the table - it is assumed that if you can do the sample correctly, the rest of your calculations are also correct.

Presenting data: Presenting data means showing your raw data (see references to the data table above, in "recording data") as well as the processed data. It almost always involves a graph, which shows the independent variable and the dependent variable. Below is the same checklist I gave you for the *Intro to Biodiversity IA* recently.

- Title: A descriptive title tells the reader what they're looking at.
- X-axis: This is labeled and shows the units used to measure the independent variable. You should show at least 5 intervals of the independent variable.
- Y-axis: This is labeled and shows the units used to measure the dependent variable.
- Scatter plot: Don't make a line graph by connecting your data points! Use a scatter plot and add a trend line after (see below).
- Trend line: Also called a line of best fit, this shows the overall trend in the data, and it can be added using any spreadsheet software such as MS Excel or Mac Numbers.
- Multiple trials: You need to conduct multiple tests (a minimum of 3 at each interval of the independent variable) in order to have enough data to clearly establish any trends.

Due Date: Wednesday 1 February 2012
*Please remember to save your file as a PDF with a title like this: "FIRST NAME_LAST NAME_FIELD_TECHNIQUES.PDF". Final drafts must be submitted to the appropriate folder on Turnitin.com.

Criteria Descriptors for Lab Reports and Investigations

PLANNING (PL)			
	Aspect 1	**Aspect 2**	**Aspect 3**
Levels/marks	**Defining the problem and selecting variables**	**Controlling variables**	**Developing a method for collection of data**
Complete/2	States a focused problem/research question and identifies the relevant variables.	Designs a method for the effective control of variables.	Describes a method that allows for the collection of sufficient relevant data.
Partial/1	States a problem/research question that is incomplete or identifies only some relevant variables.	Designs a method that makes some attempt to control the variables.	Describes a method that does not allow for the collection of sufficient relevant data.
Not at all/0	Does not state a problem/research question and does not identify any relevant variables.	Designs a method that does not allow for the control of the variables.	Describes a method that does not allow for the collection of any relevant data.

DATA COLLECTION AND PROCESSING (DCP)			
	Aspect 1	**Aspect 2**	**Aspect 3**
Levels/marks	**Recording data**	**Processing data**	**Presenting processed data**
Complete/2	Systematically records appropriate quantitative and/or qualitative data*, including units.	Processes primary and/or secondary data correctly.	Presents processed data appropriately and effectively to assist analysis.
Partial/1	Records appropriate quantitative and/or qualitative data but with some mistakes and/or omissions.	Processes primary and/or secondary data but with some mistakes and/or omissions.	Presents processed data appropriately but lacks clarity or with some mistakes and/or omissions.
Not at all/0	Data is not recorded or is recorded incomprehensibly.	No processing of data is carried out or major mistakes are made in processing.	Presents processed data inappropriately or incomprehensibly.

DISCUSSION, EVALUATION AND CONCLUSION (DEC)			
	Aspect 1	**Aspect 2**	**Aspect 3**
Levels/marks	**Discussing and reviewing**	**Evaluating procedure(s) and suggesting improvements**	**Concluding**
Complete/2	Discussion is clear and well reasoned, showing a broad understanding of context and the implications of results.	Identifies weaknesses and limitations and suggests realistic improvements.	States a reasonable conclusion, with a correct explanation, based on the data.
Partial/1	Discussion is adequate, showing some understanding of context and implications of results.	Identifies weaknesses and limitations but misses some obvious faults. Suggests only superficial improvements.	States a reasonable conclusion or gives a correct explanation, based on the data.
Not at all/0	Discussion is inadequate, showing little understanding of context and implications of results.	The weaknesses and limitations are irrelevant or missing. Suggests unrealistic improvements.	States an unreasonable conclusion or no conclusion at all.