Net Primary Productivity, Gross Primary Productivity, and Respiration

Syllabus Topics 2.5.6 and 2.5.7

Objective: You will design an experiment which will allow you to measure the influence of one biotic or abiotic factor on productivity. You've watched the respiration/photosynthesis demo video from Vernier, and you've gone over the sample NPP problems in the ESS Course Companion (pp. 319-320). Using these examples as a jumping-off point, you must design your own experiment, which I hope we will carry out in the classroom later this term. This part of your investigation is the *planning portion only*, meaning it is assessed under the PL strands of the attached rubric only - not the DCP or the DEC portions, which may come later if we're lucky.

Research question/problem: Your research question/problem should clearly link the factor you want to investigate and the way you think it will impact the productivity of plant samples in the experiment. As a part of this you should include some scientific explanation (maybe even citing some previous research - hint, hint!) and place the topic of your experiment into context: Where/when might it apply in a real-world setting, and why would anyone care?

Method: When developing this plan, pay close attention to the method. Make sure you…

- explain how you change the independent variable
- explicitly state how the independent and dependent variables will be measured, using which tools and/or lab equipment
- describe how to use any tools or equipment selected
- control any factor which might impact either the level of photosynthesis or the level of respiration in your sample(s)
- include instructions that ensure you have collected enough data relevant to your investigation
- remember that calculations are a part of your method and should be included so that your plan is as complete as possible

Due date: Wednesday 18 January 2012

*This lab will be completed during class, so you can submit a hand-written copy if you want. Otherwise, your plan must be in a digital format, preferably as a PDF, sent as an email attachment to me by the end of Wednesday's lesson. Please title the file, "FIRST NAME_LAST NAME_NPP_LAB.PDF".

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.