Abiotic Factors at IST

Syllabus Topics 2.2.1 and 2.2.2

Objective: You will measure and compare the correlation between 2 different abiotic factors within the boundaries of the IST Masaki science garden. Make sure you design your investigation to answer the research question - it would be unfortunate if you correctly answered the wrong question! Come back at the end and verify that your research question does in fact match your experiment! The question should refer to both the independent variable and the dependent variable, as well as 'where/why/how' they change.

Variables: First, identify which abiotic factors you will investigate - choose from the terrestrial ones listed in topic 2.2.2 of the syllabus. Think about which characteristics are most likely to be significantly linked. Consider all the different factors which may influence your chosen abiotic factor at different places around campus: its exposure to sunlight; proximity to buildings, walls, and overhangs; how people use an area; how many people use it regularly; and/or the total number and variety of plants growing there. How might these factor change over time? How might they change with depth (in the soil) or over a distance (either across campus, or in height)? Identify what you will measure to test your ideas. Identify all the variables you will have to keep the same in order to ensure a fair test.

Hypothesis: Having decided what you will be investigating, you will now need to predict what you think will happen, and then justify why you think it will happen. The justification is a great place to include references to other, previous scientific investigations into similar subjects. The hypothesis must be directly related to your research question.

Apparatus: You have a selection of materials available, including garden tools, a variety of Vernier probes and software, as well as several field guides. You will need to decide how you will test your hypothesis. We have test kits for several components of soil and water chemistry, a variety of Vernier probes, and a number of other tools stored in the science building. If you're not sure which tools you should use, *ask your teacher for help*. Remember that all the materials are in limited supply, so please take care of them, treat them gently, and share with your classmates.

Method: Consider how you will alter your independent variable, measure your dependent variable and control all the others. Remember to think about how much data and what data is sufficient to justify your hypothesis. Record how you are being environmentally aware.

Results: design a way of recording your data before you start the experiment- it helps you to record only relevant data and makes the experiment easier. Remember that you might want to process the data using some statistical techniques or using one of the biological test or indexes we have looked at in class.

Conclude and evaluate: While doing the experiment think about where you were limited in your accuracy, how might your results be affected by things beyond your control or even what mistakes you might make. Write them down in your field book as you think of them so you don't forget! Think about how these problems could be fixed. When you are finished you will need to be able to answer whether your hypothesis was right or wrong and explain why!

Attempt to explain why the patterns or trends you identify in your results are there. What might be causing them? What are the implications of those results? This is another great opportunity to refer to other scientific research to support your hypothesis and/or conclusion.

Assessment Criteria

This is a *full lab*, meaning your work will be assessed under the PL, DCP, and DEC criteria described in the student handbook and listed below.

PLANNING (PL): Total Marks _____ out of maximum 6			
Levels/marks	Aspect 1	Aspect 2	Aspect 3
	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): Total Marks _____ out of maximum 6			
Levels/marks	Aspect 1	Aspect 2	Aspect 3
	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): Total Marks _____ out of maximum 6			
Levels/marks	Aspect 1	Aspect 2	Aspect 3
	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.