INTERNATIONAL BACCALAUREATE

Environmental Systems and Societies

**PRACTICAL** SCHEME OF WORK

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# PRACTICAL REQUIREMENTS

## Overview

## There are no prescribed practicals on the ESS course. However, a minimum allocation of class time for practical work is required. It is expected that 30 hours of class time be dedicated to practical activities. 10 hours of this should be given to the IA. *(IA Details are not included in this practical scheme of work).*

## Group 4 Project

The group 4 project is ***NOT REQUIRED*** on the ESS course, but it is a good opportunity to develop practical skills and it is not uncommon for schools to include ESS students in the project.

## Types of Practical Work

Practical activities may include the following types of work:

* short labs or projects extending over several weeks
* computer simulations
* using databases for secondary data
* developing and using models
* data-gathering exercises such as questionnaires, user trials and surveys
* data-analysis exercises
* fieldwork

# PRACTICALS BY CHAPTER

## Topic 1

*Time (approx.): 6+ hrs*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Chapter** | **Practical Details** | **Hrs** | **Type** | **Assessment Criteria** |
| 1.1 | Use a survey to investigate any correlation between Environmental Value Systems and one other factor (e.g. age). | 2.0 | * Data gathering
* Data analysis
 | * Planning
* Results, Analysis and Conclusion
 |
| 1.2 | Construct and evaluate a systems diagram from given information on a system.  | 0.5 | * Developing and using models
 | * Discussion and evaluation
 |
| Use and evaluate a simple software model (e.g. Lovelock’s Daisy World). | 2.0 | * Developing and using models
 | * Results, analysis and conclusion
* Discussion and evaluation
* Applications
 |
| Design, construct and monitor a mesocosm. | 1+ | * Developing and using models
* Extended lab project
 | * Planning
* Communication
 |
| 1.5 | Construct a systems diagram to model the impact of a named pollutant in a named location. | 0.3 | * Developing and using models
 | * n/a
 |

## Topic 2

*Time (approx.): 13 hrs*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Chapter** | **Practical Details** | **Hrs** | **Type** | **Assessment Criteria** |
| 2.1 | Investigate factors that affect an organism’s niche using a computer simulation.([Simulation here](https://www.learner.org/wp-content/interactive/envsci/ecology/ecology.html)). | 1.0 | * Computer simulations
* Data analysis
 | * Results, analysis and conclusion
 |
| 2.2 | Construct/modify a feeding relationship model using given data e.g. Using the Lotka-Volterra equations ([Information and model here](http://www2.nau.edu/lrm22/lessons/predator_prey/predator_prey.html)). | 1.0 | * Developing and using models
* Data analysis
 | * Results, analysis and conclusion
* Discussion and evaluation
 |
| 2.3 | Construct a quantitative model (using spreadsheet software) of the transfer of energy or matter through a given system. | 0.5 | * Developing and using models
 | * n/a
 |
| Measure the productivity in an aquatic ecosystem using the bottle method. | 1.0 | * Short labs
 | * Planning
* Results, analysis and conclusion
 |
| 2.4 | Analyse climate data for a range of locations. Use the Whittaker biome diagram to “predict” the biome of the location and compare with the known biome. | 0.5 | * Data analysis
 | * n/a
 |
| 2.5  | Construct an identification key (for a maximum of 8 species). | 0.5 | * Developing and using models
 | * n/a
 |
| Simulate (using seeds in a jar) the capture-mark-recapture method to ascertain the validity of the Lincoln index. | 1.5 | * Data gathering
* Data analysis
 | * Results, analysis and conclusion
* Discussion and Evaluation
* Communication
 |
| Design and carry out an investigation to determine the change in the population of one or more species along an environmental gradient and investigate a correlation with at least three abiotic variables. | 6.0 | * Fieldwork
 | * Identifying the context
* Planning
* Results, analysis and conclusion
* Discussion and Evaluation
* Applications
* Communication
 |
| Use a quadrat to estimate the population(s) of one or more species. | 1.0 | * Fieldwork
* Data gathering
* Data analysis
 | * n/a
 |

## Topic 3

*(No practical activities)*

## Topic 4

*Time (approx.): 2 hrs*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Chapter** | **Practical Details** | **Hrs** | **Type** | **Assessment Criteria** |
| 4.4 | Compare the dissolved oxygen content of at least three different water samples using the Winkler method | 1.0 | * Short lab
 | * n/a
 |
| Use secondary data to compare and contrast the impact of water pollution in two named areas. | 1.0 | * Using databases for secondary data
 | * n/a
 |

## Topic 5

*Time (approx.): 3 hrs*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Chapter** | **Practical Details** | **Hrs** | **Type** | **Assessment Criteria** |
| 5.1 | Compare the soil composition at several locations using the “jar method” (with measuring cylinders). | 1 | * Short lab
 | * n/a
 |
| 5.2 | Use secondary data to evaluate the relative environmental impacts of two named food production systems. | 1 | * Using databases for secondary data
* Data analysis
 | * Result, analysis and conclusion
* Applications
* Communication
 |
| 5.3 | Use secondary data to evaluate soil management strategies of a given commercial farming system and of a given subsistence farming system. | 1 | * Using databases for secondary data
* Data analysis
 | * Result, analysis and conclusion
* Applications
* Communication
 |

## Topic 6

*Time (approx.): 5 hrs*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Chapter** | **Practical Details** | **Hrs** | **Type** | **Assessment Criteria** |
| 6.2 | Use secondary data to investigate changing trends in the concentrations of stratospheric ozone and ozone depleting substances and create a presentation to an intergovernmental panel providing recommendations. | 3 | * Using databases for secondary data
* Data analysis
 | * Results, analysis and conclusion
* Discussion and evaluation
* Applications
* Communication
 |
| 6.3 | Design and carry out an investigation to compare the air pollution level at three nearby locations using Vaseline-covered white card. | 2 | * Extended lab
* Data analysis
 | * Planning
* Results, analysis and conclusion
* Discussion and evaluation
 |

## Topic 7

*Time (approx.): 4 hrs*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Chapter** | **Practical Details** | **Hrs** | **Type** | **Assessment Criteria** |
| 7.1 | Use secondary data to evaluate and compare the energy security of two nations. | 2 | * Using databases for secondary data
* Data analysis
 | * Discussion and evaluation
* Communication
 |
| 7.2 | Use secondary data to produce a model (using spreadsheet software) to predict the change in one climate variable into the future. | 2 | * Using databases for secondary data
* Developing and using models
* Data analysis
 | * n/a
 |

## Topic 8

*Time (approx.): 4 hrs*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Chapter** | **Practical Details** | **Hrs** | **Type** | **Assessment Criteria** |
| 8.1 | Use secondary data and construct a model (using spreadsheet software) to predict the future demographics of one or more nations. | 2 | * Using databases for secondary data
* Developing and using models
* Data analysis
 | * Results, analysis and conclusion
 |
| 8.3 | Create a survey to collect data and report on the extent to which, and ways in which, individuals in the school can reduce their contribution to landfills. | 2 | * Data gathering
* Data analysis
 | * Planning
* Results, analysis and conclusion
* Discussion and evaluation
* Conclusion
 |