**A-level Biology required practical No. 12**

**Student Sheet**

**Investigation into the effect of a named environmental factor on the distribution of a given species**

**Learning Objectives**:

1. To develop practical skills **a, b, k and l,** and begin to demonstrate **competencies 2c and 4a**
2. To investigate the effect of soil temperature/wind speed/distance from sea shore on the distribution of sand dune species.
3. To use a statistical test to discover if there is a correlation between position in the transect and number of species.
4. To compare the species diversity in the middle marsh and the lower marsh terrain.

**How are the species distributed along your transect?**

**Method**

You are provided with the following:

|  |  |
| --- | --- |
| * A quadrat frame |  |
| * Ranging poles |  |
| * Tape measure |  |
| * Key of plants common on sand dunes |  |
| * Temperature probe * Anemometer * A sand dunes transect survey record sheet |  |

**You should read these instructions carefully before you start work**.

1. You will be taken to the starting point on the seashore of East Head. We will be running transects from the shore into the dunes and sampling the species at regular intervals.
2. Place the first quadrat on the ground and record the species that are present on the record sheet. Use the key to sand dune species to identify those present. Bear in mind not all species will necessarily be in flower, so you may have to rely on other features.
3. Use the temperature probe to record the soil temperature and the air temperature. Use an anemometer (if available) to measure wind speed.
4. Us the tape measure to determine the site of your next quadrat. You need to make sure that you are moving regular distances along a straight line (a compass bearing can help ensure that you do this).
5. Place the next quadrat and record the species present, and record the abiotic factors as before.
6. Identify the species present, and note them on the record sheet.
7. Repeat at regular intervals along the transect. You will need a minimum of 5 data points.

**How does position in the salt marsh affect the species diversity?**

**Method**

You are provided with the following:

* A quadrat frame
* Tape measure
* Random number table
* Key of plants common on sand dunes/salt marsh
* A sand dunes quadrat survey record sheet

**You should read these instructions carefully before you start work**.

1. You will be taken to a region of East Head where there is a salt marsh. You will compare the middle marsh with the lower marsh to look at any differences in species distribution
2. Run a tape measure along the side of the path, and then another at right angles into the marsh. This will be used to select random positions to place your quadrat.
3. Use the random number table to generate a random number. This will correspond to a position along the tape measure. If (for example) the random number is 34, then your first quadrat will be placed at the 3m mark along one tape, and at the 4m mark on the other
4. Use the key to sand dune plant species to identify which species are present and record these on the quadrat record sheet in the “middle marsh” section.
5. Once all species are identified you can add up the total number of species present.
6. Repeat at another randomly placed quadrat.
7. Once you have sampled several quadrats in the middle marsh region, move to the lower marsh region.
8. Repeat points 1-6 in the new region, recording in the “lower marsh” section of the record sheet.

**Risk assessment**

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| Hazard | Associated Risk | Method to reduce risk |
| Ranging poles | Risk of injury if fallen on, potential to hit others if not carried correctly | Carry carefully and upright if possible. |
| Hazardous debris e.g.  broken glass | Risk of cuts to feet/hands | Warning before practical work. First aid kit available at all times. If debris is found, create an area “out of bounds” for sampling. |
| Sea spurge and plants in  General | Risk of irritation/rash when handling plants | Warned not to pick vegetation unless specifically advised |
| Tripping hazards, uneven  Ground | Uneven sand-dunes when walking transect, risk of tripping | Warning before survey work |
| Hypothermia / heatstroke/sunburn | No shade in survey region. Coastal region exposed to the elements. | Bring hats/glasses, suncream and warm layers if necessary |
| Dangerous currents/tidal  Flows | Chichester Harbour nearby, rip currents make area dangerous for bathing | Do not enter the water unless specifically advised |

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| Competencies demonstrated | |
| 2. Applies investigative approaches and methods when using instruments and equipment | c. Identifies and controls significant quantitative variables where applicable, and plans approaches to take account of variables that cannot readily be controlled. |
| 4. Makes and records observations | a. Makes accurate observations relevant to the experimental or investigative procedure. |

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|  | Apparatus and techniques |
| AT a | use appropriate apparatus to record a range of quantitative measurements (to include mass, time, volume, temperature, length and pH) |
| AT b | use appropriate instrumentation to record quantitative measurements, such as a colorimeter or potometer |
| AT k | use sampling techniques in fieldwork |
| AT l | use ICT such as computer modelling, or data logger to collect data, or use software to process data |

**Report on Fieldwork**

Once you have completed both tasks you will have collected enough data to produce a report on your fieldwork. This will be a substantial piece of work, and will be finished in the days following the trip (including home study).

You should aim to include the following:

* Details of any hypotheses you were testing
* Your data
* Graphs
* Any statistical tests you conducted
* Any conclusions that you can draw and a suggested biological explanation for them