Practical Guide
Biology
Field Investigations

This document contains:

- Links to YouTube clips showing the practical procedure
- Information from examination boards AQA, OCR, Edexcel
- Potential examination questions and answers

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Required practical – exam boards

- AQA

Required practical activity	Apparatus and techniques
Measure the population size of a common species in a habitat. Use sampling techniques to investigate the effect of a factor on the distribution of this species.	AT 1, AT 3, AT 4, AT 6, AT 8

- Edexcel

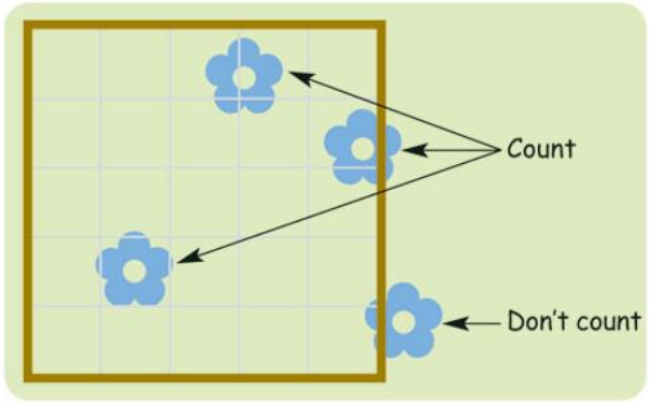
9.5	*Investigate the relationship between organisms and their environment using field-work techniques, including quadrats and belt transects*	This investigation involves the use of a belt transect along a gradient (e.g. shaded area to an area with no shade). It involves students thinking about how to sample their chosen area, including the identification and observation of plants/organisms.

- OCR

PAG 3: Sampling techniques

Investigate the differences in habitats using ecological sampling techniques

Practical procedure: Field Investigations



Video 1

Video 2

Images from: http://www.nuffieldfoundation.org/practical-biology/biodiversity-your-backyard
http://con102.blogspot.co.uk/2014_07_01_archive.html

Possible examination style questions

1. A student wanted to determine how many clover plants there were in a field using a 1m x 1m quadrat. Explain how they would sample the field to determine the mean number of clover plants per m^2.
2. Describe how students could use the mean number of clover plants in a quadrat to estimate the total number in the field.
3. A students wanted to investigate how the distance from the shoreline impacted on the number of barnacles growing on the rocks on a beach. Explain how they would investigate this using quadrats.

Possible examination style questions answers

1. A student wanted to determine how many clover plants there were in a field using a 1m x 1m quadrat. Explain how they would sample the field to determine the mean number of clover plants per m^2.

ANS:

- **Find the area of the field/ create a grid of the field**
- **Using random number table work out where to place the quadrat**
- **Count number of clover plants in quadrat**
- **Repeat until have taken a number of samples from the field (around 10%)**
- **Divide total number of clover plants by number of quadrats**

Possible examination style questions answers

2. Describe how students could use the mean number of clover plants in a quadrat to estimate the total number in the field.

ANS:

- **Find area of field in m^2**
- **Area of field m^2 x mean number of clover plants per quadrat**

Possible examination style questions answers

3. A students wanted to investigate how the distance from the shoreline impacted on the number of barnacles growing on the rocks on a beach. Explain how they would investigate this using quadrats.

ANS:

- **Transect (using tape measures)**
- **Moving from shoreline inland or vice versa**
- **Place quadrat at regular intervals down the quadrat**
- **Count number of barnacles in each quadrat**
- **Repeats**

Key questions:

- What are the 5 main species in each area?
- What do you think are the reasons for any differences?
- How would you investigate these differences further?
- What has surprised you most about the diversity of plants on your school playing field?
- What variables need to be considered when measuring light intensity?
- How many plants species should be measured?
- How long should the belt transect be?
- How frequently along the transect should a measurement be taken?

http://qualifications.pearson.com/content/dam/pdf/GCSE/Science/2016/teaching-and-learning-materials/GCSE-9-1-Sciences-core-practical-guide.pdf

Key questions:

- How does a belt transect differ from a line transect?
- Which plants on the edges of the quadrat should be included in the count?
- How can the results be recorded and presented?
- What factors, other than light intensity, could affect the distribution of organisms along the belt transect?
- How might the results differ at different times of the day?
- How might the results differ at different times of the year?
- How would the method be modified to measure the abundance of a particular species across a large area?

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Summary document

A summary document is also available on Huddle which contains all the relevant information about this practical from the different examination boards. This document includes practical methods and other potential examination questions