**4.7.2.1 Sampling – Year 10 Biology Self Study**

**Facts**

* Transects and quadrats are used by ecologists to determine the distribution and abundance of species in an ecosystem
* A quadrat is a square frame that is divided up into smaller squares
* Quadrats are used to sample plants (or slow-moving small animals) in a habitat
* Before counting organisms, it is important to identify what they are
* Transects are used to sample along a line at regular intervals
* Transects are used to see how an environment changes e.g. along a beach
* Transects use systematic sampling
* Random sampling is used to prevent bias
* Methods of random sampling include:
	+ Closing your eyes and throwing the quadrat
	+ Making a grid with x and y axes and a random number generator to generate coordinates
* Once a quadrat is on the ground you count the number of particular species of plant in the frame or you can estimate % cover

**Task 1: Watch free Science lessons (if you can) and write notes on key ideas**

* GCSE Science Biology (9-1) Sampling Organisms
* GCSE Science Biology (9-1) Required Practical 9: Sampling
* <https://www.youtube.com/watch?v=UDp3I07Wcrg> – additional Sampling Video

**Task 2: Answer these Questions**

1. What is a quadrat?
2. What is a transect?
3. Why is random sampling important?
4. How can random sampling be done?
5. When would a transect be useful?
6. What is meant by bias?
7. Why do we sample habitats?
8. What is meant by abundance?
9. Extension: what other sampling techniques can be used for other organisms? Research these methods.

**Task 3: Copy and Complete the gap fill.**

Physical factors in the \_\_\_\_\_\_\_\_ affect the \_\_\_\_\_\_\_\_\_\_ of living \_\_\_\_\_\_\_\_\_. Ways to measure the numbers of animals and plants in a \_\_\_\_\_\_\_ include \_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_.

**Task 4: These statements are in the wrong order, write them out correctly.**

* Find the mean average for the samples you have collected. (add your total number of daisies together divided by how many quadrats you sampled)
* Count the total number of daisies in the quadrat. Record the number in a table.
* Randomly throw (with your eyes shut!) your quadrat onto the field you are sampling.
* Multiply your mean average by the total number of quadrats that fit in the field. This is your estimate as to how many daisies are in that field.
* Randomly throw the quadrat a number of times in the same field. Each time count the total number of daises and record your results.
* Find out how quadrats fit into the total area of the field (total area of field/area covered my quadrat)

**Task 5: Make a poster or a storyboard of how we carry out sampling techniques.**

You should include details of the method. Try and use as few words as possible.

**Task 6: Decide if it would be best to use random sampling or a belt transect and explain your reasoning.**

1. patterns of grass growth under trees
2. distribution of daisy and dandelion plants in a field
3. distribution of lichens or moss on trees, walls and other surfaces
4. distribution of the alga *Pleurococcus* on trees, walls and other surfaces
5. leaf size in plants growing on or climbing against walls, including height and effect of aspect

**Task 7: Exam Questions**

1. Describe how you would find out how many daffodils are in the field [6 marks]
2. The field had an area of 6 000 m2. The student used 0.25m2 quadrats. The students found a mean of 0.42 dandelion on the field. Estimate the population of dandelions on the field. [2 marks]
3. In one area on the field there is a lot of grass growing in the same area as dandelions. Sugest why the dandelions may **not** grow well in this area. [4 marks]
4. Describe how to use a belt transect to find out how trampling on the path affects the distribution of daisies. [6 marks]

**Task 8: Mean, Mode, Median, Range**

Sometimes in this topic, you will be asked to calculate one of the above. Write a brief method of how you calculate these, for someone younger to understand.

Calculate the mean, mode, median and range for this set of numbers of daisy found in different quadrats on a school field.

12, 15, 8, 22, 16, 8, 13, 14, 17, 11