



# Counting Squirrels #1 Cone Quadrats



**Challenge:** Find out the density of squirrels in a conifer woodland.

**Things You Will Need:**

- 'Identifying Squirreled Cones' work sheet.
- Cone Survey Information sheet.
- Map of the conifer woodland.
- Clipboard, pencil and quadrat recording form
- 2 x 30m tape measure.
- 4 x 1m rulers.
- Permission from the woodland owner to do the survey.
- Plastic bags
- Lots of friends to help – you will need three people to do one quadrat.

**What You Need to Do**

In School:

- Find out the size of the woodland you are planning to survey.
- Ideally you will need at least one quadrat for every 4 hectares (ha) of woodland. This might be quite hard in reality, so aim to do at least 10 quadrats. The quadrats should be randomly spread through the woodland.
- On the map, locate 13 start points where you plan to do the quadrats – some may be difficult to reach in reality, which is why you need some extra ones. Give all the transects numbers and starting grid references so you know which is which.

In The Woodland.

Write down the general information about date, time of survey, weather and grid reference on your recording sheet (see next page).

For each quadrat:-

- Measure 30m in a straight line under the conifer trees. Put the tape measure down and at every 10m, put a 1m rule. Put the second tape measure on the far side of the metre rules – see diagram below.



- Identify the tree species in this quadrat.
- Walk slowly along the quadrat picking up all the cones – squirreled and whole. Put the cones from the first 10m into one bag, the cones from the second 10m into the second bag and the cones from the third 10m into a third bag.
- At the end, count all of your cones from each quadrat and put the information into the table. If you find very old, dark coloured and rotten cones do not count these ones. You only want to count the cones that are quite recent – firm to touch and similar colours to those on the trees.
- Find the start of the next quadrat and repeat the above steps.

You can use the table on the next page to put your data in.



## Cone Quadrat Recording Form



Woodland Name: \_\_\_\_\_ Name of Surveyors: \_\_\_\_\_

Date: \_\_\_\_\_ Weather: \_\_\_\_\_

Transect Number	Grid Reference	Tree Species	Whole Cones	Squirreled Cones	'Moused cones'
1	0-10m				
	10-20m				
	20-30m				
2	0-10m				
	10-20m				
	20-30m				
3	0-10m				
	10-20m				
	20-30m				
4	0-10m				
	10-20m				
	20-30m				
5	0-10m				
	10-20m				
	20-30m				
6	0-10m				
	10-20m				
	20-30m				
7	0-10m				
	10-20m				
	20-30m				
8	0-10m				
	10-20m				
	20-30m				
9	0-10m				
	10-20m				
	20-30m				
10	0-10m				
	10-20m				
	20-30m				
<b>Totals</b>					

You can show your information as graphs as well



## What Does This Information Mean?

### 1. What is the Density of Red Squirrels

Find out the total number of squirreled cones = \_\_\_\_\_

Divide this by the total area surveyed (remember 1 quadrat is 30m<sup>2</sup>) = \_\_\_\_\_ cones/m<sup>2</sup>

Multiply this answer by the energy value of the cones for that species\* = \_\_\_\_\_ Kj/m<sup>2</sup>

Multiply this answer by 10,000 to convert m<sup>2</sup> into hectares = \_\_\_\_\_ Kj/ha

Multiply this answer by the total area of the woodland to give you the estimated total amount of food energy used by squirrels in the woodland = \_\_\_\_\_ Kj

Then divide this answer by the amount of energy squirrels\* need per year to survive = \_\_\_\_\_ red squirrels in the woodland.

Finally divide the estimated number of red squirrels in the woodland by the area of the woodland = \_\_\_\_\_ red squirrels/ha. This is the density of red squirrels in this wood.

*\* Use the Cone Survey Information Sheet to find these numbers.*

2. How does the density of red squirrels in your woodland compare to other woods of the same tree species\*?

2. Now use your data to answer the following questions. Try to explain what you find.

- Are whole cones spread evenly through the wood?
- Are squirreled cones spread evenly through the wood?
- Are moused cones spread evenly through the wood?

4. Is this a good method to use if you have both red and grey squirrels?

5. Did you have any problems doing the survey or the calculations?

6. How did you solve these problems?

7. What would you do differently next time to make the survey better?