**Title:** MO1D01-A: Coral polyp density and water depth.

**Keywords:** Abiotic; adaptation; autotroph; biome; biotic; coral; ecosystem; heterotroph; limiting factor; mutualistic; photosynthesis; population; quadrat; sampling; symbiosis

**Mathematical skills:** Simple calculations, graph drawing and interpretation.

*Montastrea cavernosa* is a common Caribbean coral made up of individual polyps/corallites. It is found at varying water depths and its morphology (shape and form) changes as you go deeper underwater.

Image 1 – 16m depth Image 2 – 5m depth

|  |  |
| --- | --- |
| Briefcase:WRL mini-exercises:MO1D01:Photographs:Image 1.jpg | Briefcase:WRL mini-exercises:MO1D01:Photographs:image 7.jpg |

The scientist conducting the research constructed a simple plastic quadrat (with dimensions of 8x8cm) which he placed over the coral at a known depth and then counted the number of corallites within the area.

The following table shows the results for the number of corallites per quadrat at different depths.

|  |  |  |
| --- | --- | --- |
| **Depth (m)** | **Number of corallites per quadrat** | **Number of corallites 100cm-2** |
| 5 | 98 |  |
| 8 | 74 |  |
| 9 | 49 |  |
| 10 | 71 |  |
| 11 | 51 |  |
| 14 | 41 |  |
| 15 | 36 |  |
| 16 | 43 |  |
| 17 | 25 |  |
| 18 | 40 |  |

**Tasks and questions:**

1. Using the information provided, fill in the right hand column to convert this figure into the number of corallites 100cm-2.
2. Why is it useful to convert the number of corallites per quadrat to number of corallites 100cm-2?
3. The scientist took more than one quadrat reading for most depths. Why was this a good idea?
4. Plot a suitable graph to show how the corallite density varies with water depth.
5. Summarise the trends that you can see from these results.
6. From your analysis, what abiotic factor do you think is causing the observed variation in corallite number? Can you think of any other abiotic factors that might also cause this relationship?
7. Corals are Cnidarians (sea anemone like organisms) that contain photosynthetic unicellular algae. How does this fact help the scientist to understand his findings?
8. There is not a perfect correlation between the depth of the coral and the corallite density. Suggest 2 reasons why this might be.