# http://t1.gstatic.com/images?q=tbn:_4PtUIpeE1GK3M:http://cache2.artprintimages.com/p/LRG/16/1686/JF41D00Z/lucy-autrey-wilson-lizards-and-geckos.jpg&t=1

# Biodiversity in the Library

1.    Which would you consider to show greater diversity, a small island with 100 lizards that belong to 5 species or a larger island that has 2500 lizards belonging to 5 species? Both islands have the same number of species, therefore that number alone cannot properly show biodiversity. For that reason, diversity is measured in different ways.

A simple method allows us to compare diversities from different sample sizes

**D = (S-1)/(Log N)**

Where **S** = number of species and **N** = total number of individuals in the sample.



1. Determine the diversity of lizards on the islands.

Small Island D =

Large Island D =

2.   Determine the number or your assigned species (color) of book in the assigned section. Please remember to look for the predominant color on the spine of the book. Remember that members of the same species may come in various sizes.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Group 1  reference, graphic novels, career | Group 2  Fiction | Group 3  Nonfiction 001 Van – 741 GAT | Group 4  Nonfiction 741.58 Reb – 998 Wil |
| Black |  |  |  |  |
| Brown |  |  |  |  |
| Blue |  |  |  |  |
| Green |  |  |  |  |
| Orange |  |  |  |  |
| Purple |  |  |  |  |
| Red |  |  |  |  |
| White |  |  |  |  |
| Yellow |  |  |  |  |
| Total |  |  |  |  |

3.     Compare the diversity of the data from the four groups.

1. Group 1: D =
2. Group 2: D =
3. Group 3: D =
4. Group 4: D =

4.    There is more to diversity than just the number of species in an environment. A community that has more or less equal numbers of individuals of seven different species will look more diverse than a community that is dominated by one species. Because of this, some measures of diversity include a way of counting the number of individuals of each species as well as the total number of species. One commonly used measure of species diversity that includes proportions of individuals is represented by the Shannon-Wiener equation, which is:

**H(S) = *pI* ln *pI***

Where ***pI*** is the proportion of the species **I** (number of species **I** / Total Number) and ln is the natural logarithm. The sum (****is a practical measure of the biological diversity in the system. The more species there are the greater the diversity. *The diversity is largest when there are equal numbers of individuals of all the species*.

Fill in the following table to find H for your group.

***Total of Column D = H*** *Fill in your H below, as well as the H for the other groups.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Table II** | Column A | Column B | Column C | Column D |
| # from Table 1 | pI = A/Total | ln pI = ln B | ***pI* ln *pI*** |
| Black |  |  |  |  |
| Brown |  |  |  |  |
| Blue |  |  |  |  |
| Green |  |  |  |  |
| Orange |  |  |  |  |
| Purple |  |  |  |  |
| Red |  |  |  |  |
| White |  |  |  |  |
| Yellow |  |  |  |  |
| **Total** |  |  |  |  |

1. Group 1: H =
2. Group 2: H =
3. Group 3: H =
4. Group 4: H =
5. Which group had the greatest diversity according to the simple method and according to the S-W method?
6. Did both methods agree (explain)?
7. Explain why the diversity is greatest and why there may be some differences.

**FOLLOW-UP QUESTIONS:**

1. What does biological diversity mean?
2. If you cut down the variety in a piece of forest you owned and replanted with one type of tree, what will happen to much of the wildlife that was adapted to the forest? (Hint: they cannot just move elsewhere. If other habitats are good, they will probably be near carrying capacity already.)
3. Will this fate happen to all the wildlife? Explain.
4. Many species can only live/reproduce in 1 type of forest. The spotted owl is an example - it can only live and successfully reproduce in old growth forests (big, old cedars, hemlocks, etc.). If these old growth forests are cut down, it's unlikely this owl will survive. Environmentalists call it an "indicator species". What does this mean?
5. Why be concerned about one species?
6. Growing one plant, as is the case of growing only Douglas fir, is called monoculture. Give examples of monocultures a) in your home and b) in agriculture.
7. Why would you need to use more insecticides in monoculture?
8. Is this good or bad?
9. If you wanted to help wildlife, what would you do with regards to the landscaping of your own home?