

**Title:**

How Biodiverse is Your Environment?

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**Abstract:**

Students will identify as many plant species in a given area. The NCBI BLAST site will be used to find the DNA sequence for the gene *rbcL* which is common to most plants. The DNA sequences will then be uploaded into the Mega site which will generate a phylogenetic tree showing the relationships of the plants in the area.

**Subject, Grade, Level:**

This lesson is designed for higher level life science courses like AICE/AP/IB Environmental Science or Biology.

**Learning objectives:**

- Students will explain the meaning of biodiversity.
- Students will describe why biodiversity is important for a healthy ecosystem.
- Students will describe how a conserved gene can show evolutionary relationships amongst plants.

**Timeframe:**

Seven days are budgeted for the lesson, although more time might be needed to get DNA sequences if many species are found.

**List of materials:**

- Access to internet (or download prior) HHMI The Guide video.  
<https://www.hhmi.org/biointeractive/guide-biologist-gorongosa>
- Copies of HHMI The Guide worksheet. <https://www.hhmi.org/biointeractive/film-guides-guide-biologist-gorongosa>
- Field guides to plant identification.
- Camera (smartphone) to document plants.
- Copies of student worksheet from HHMI activity calculating biodiversity using the Shannon Index.  
<https://www.hhmi.org/biointeractive/human-impacts-biodiversity>

**Procedure and general instructions (for instructor). REQUIRED.**

Day One: Introduce what a bioblitz is by showing the HHMI video The Guide along with student worksheet.

Day Two: Students will complete the HHMI activity Human Impacts on Biodiversity, which has them use the Shannon Index to score the biodiversity level.

Day Three: Students travel to nature area and identify the different plant species while also recording the number of each plant specie.

Day Four: Students total the different species found along with the number of each specie and then use the Shannon Index to determine the biodiversity score.

Day Five: Students use the NCBI site (with tutorial) to find the DNA sequence for the rbcl gene for each of the plant species found.

Day Six: Students enter the FASTA files from NCBI into the Mega program to create a phylogenic tee.

Day Seven: Students create display board with the phylogenic tree and explaining the process of creating the phylogenic tree for public viewing.

**Procedure and general instructions (for students).**

Student worksheets are available for the HHMI activities on the HHMI links. Tutorials for using the NCBI site and the Mega site are in progress.

**OPTIONAL SECTIONS (other sections you can add if applicable)****Suggestions and materials for assessing student learning****Student data****Reference list****Student assignments related to the activity****Any other appendices appropriate for your particular activity**