

Directions: Choose at least one major topic from each assignment to thoroughly research and include in your project. Be specific, but also be thorough! Use the third column to help plan how you will use these resources.

Assignment	Major Topics to consider	Topics to include in project
<p>I. Niche: Every living thing has a role to play reading <i>Topics covered: ecosystems, communities, niches, prey, predators, decomposers, how ecosystems stay balanced, ecosystem functions, overlapping niches.</i></p> <p>II. Which niche? Activity (Ecological Niche Worksheet) <i>Topics covered: ecosystems, communities, niches, connections to other species within an environment.</i></p> <p>III. Gorongosa Food Web Activity (Creating Chains and Webs to Model Ecological Relationships) <i>Topics covered: consumers vs. producers, ecological forces (disturbances), ecosystem impacts, trophic levels, 10% rule, feeding (energy) pyramid, food chain vs. food web, primary producer, primary consumer, secondary consumer, tertiary consumer/apex predator, top predator, carnivore, omnivore, herbivore/grazer, scavenger biotic vs. abiotic factors.</i></p> <p>IV. Species, Population, & Community Level Interactions <i>Topics covered: interspecific vs. intraspecific interactions, competition (competitive exclusion, resource partitioning), predation, parasitism, mutualism, commensalism, mimicry (Mullerian vs. Batesian), camouflage, startle vs. warning coloration, chemical protections.</i></p>	<p>1. Niche. How will the project impact specific organisms?</p> <p>2. Levels of hierarchy. How will the impacts of the project impact the different scales of the environment (organism, population, community...)</p> <p>1. Organisms in the same ecosystem with different niches and how the project would impact.</p> <p>2. population vs. community level impacts of your project.</p> <p>1. food web vs. food chain vs. energy pyramid and specific impacts to any or all of these.</p> <p>2. defining potential food chains in an Oak-maple forest and how the project might impact these.</p> <p>3. trophic levels that have been impacted the most by the project and how.</p> <p>4. concerns that may be present from major ecosystem changes</p> <p>1. noteworthy interactions present within the nature trail area.</p> <p>2. how the interactions will be impacted by the project and to what degree.</p> <p>3. new interactions that may result from the project</p>	

V. Random Sampling & Mark-Recapture Sampling Methods (the bean activity)

Topics covered: random sampling, sessile (immobile species), plot/grid/quadrat format, average calculations, % error = [(your estimate – actual value) / actual value] x100), 10 vs. 20 repetitions, direct counting vs. estimating, mark-recapture method of sampling, initially marked vs. recaptured with a mark difference, clumped vs. uniform vs. random population dispersion (spread).

VI. Measuring Biodiversity with Beans as a Model (HONORS ONLY)

Topics covered: community, population, species richness, species relative abundance, biodiversity and the biodiversity index, ecosystem health evaluation using biodiversity index.

VII. Topographic Maps (Nature Trail Analysis Qs)

Topics covered: elevation, contour lines, steep vs. gentle slope, scale (unit of measurement), compass point, watershed, topographic vs. street map (like Google Maps), water runoff and point source pollution, identifying the topographic map when only given a profile (side-view) of the terrain.

VIII. Limiting Factors Worksheet

Topics covered: density-dependent and independent limiting factors, biotic & abiotic components, carrying capacity, logistic vs. exponential growth, s-shape vs. j-shape growth curves

1. sampling trials necessary to give an impact assessment of the scope of your project.

2. knowing the organisms present in the ecosystem where your project will be carried out and how this is important to the planning.

3. propose a testing regimen that will help determine organisms present and how these will be impacted and in what way.

1. will this be altered by carrying out the project and how?

2. how would ecosystem health/balance look before vs. after the project has been carried out.

1. topographic changes the project may cause and the abiotic impacts.

2. water runoff and how this might change as a result of the project.

3. any seasonal streams that may be affected, or ones you'll need to protect in your planning.

4. model of the area before and after your project has been carried out.

1. abiotic factors the project may introduce to the ecosystem and their impacts

2. cause-and-effect of all the potential parts of the project on the ecosystem

3. carrying capacity or potential growth curve impacts of species

4. new/altered biotic factors result in population level changes