☐ 2. Present to your counselor a one-page report on how and why honey bees are used in pollinating food crops. In your report, discuss the problems faced by the bee population today, and the impact to humanity if there were no pollinators. Share your report with your troop or patrol, your class at school, or another group approved by your counselor.

☐ 3. Hive a swarm OR divide at least one colony of honey bees. Explain how a hive is constructed

Before you choose requirement 3g(3), you will need to first find out whether you are allergic to bee stings. Visit an allergist or your family physician to find out. If you are allergic to bee stings, you should choose another option within requirement 3. In completing requirement 3g(3), your counselor can help you find an established beekeeper to meet with you and your buddy. Ask whether you can help hive a swarm or divide a colony of honey bees. Before your visit, be sure your buddy is not allergic to bee stings. For help with locating a beekeeper in your state, visit www.beeculture.com and click on "Bee Resources," then "Find a Local Beekeeper."

4. Choose two outdoor study areas that are very different from one another (e.g., hilltop vs. bottom of a hill; field vs. forest; swamp vs. dry land). For BOTH study areas, do ONE of the following:

a. Mark off a plot of 4 square yards in each study area, and count the number of species found there. Estimate how much space is occupied by each plant species and the type and number of non-plant species you find.

Study Plot Location 1: field not far from home Number of Species: 5

Plant Species	Space each occupies
Cyclostachya- wild grass	4 square yards
Ulmus americana - American elm, white elm	2ft trunk diameter, 15ft tall
Narcissus papyraceus- Paperwhite flower	scattered, about 15% area coverage

Non-Plant Species	Number found
Formica rufa- red wood ant	colony located near base of tree
Otospermophilus beecheyi, California Ground Squirrel	3

Study Plot Location 2: Courtyard at school Number of Species: 4

Plant Species	Space each occupies
Cynodon dactylon- Bermuda Grass	4 square yards
Betula nigra- black birch	6inch trunk diameter, 10ft tall

Non-Plant Species	Number found
Acris crepitans- Northern Cricket Frog	6
Branta canadensis- Canada Goose	2

Write a report that adequately discusses the biodiversity and population density of these study areas. Discuss your report with your counselor.

Biodiversity is the amount of variety among living things in a certain ecosystem. I studied two different ecosystems and noted some differences between them. The field was completely populated by wild grass whereas the courtyard was populated by Bermuda grass (where the sidewalk wasn't cutting through it). This difference is probably due to the architect in charge of designing the courtyard. He or she probably thought Bermuda grass would be better to look at while at work. Due to the enclosed nature of the courtyard, it's not surprising that I only found two species of living things. The Canada goose is well known for going wherever it wants and doesn't seem to mind co-habitating in an area with humans. The Cricket frogs stayed in or near the pond, probably due to their amphibious nature. The presence of the Paperwhite flowers in the field is probably due to natural growth and the reproductive cycle of the plant. Since it is not in a closed environment like the courtyard, I believe the area has a higher chance of having more species of flower bloom in the future. Since there are currently no other flowers or plants competing for space, it is quite reasonable to assume the Paperwhites will continue to spread out in the area.

b. Make at least three visits to each of the two study areas (for a total of six visits), staying for at least 20 minutes each time, to observe the living and nonliving parts of the ecosystem. Space each visit far enough apart that there are readily apparent differences in the observations. Keep a journal that includes the differences you observe

Study Area 1:

Visit 1 Date: 4/6/2019 **Time Started:** 12pm **Time Ended** 12:20pm

Observations of living parts:

-one large elm tree, lots of flowers (of the same kind), and lots of tall wild grass
-several squirrels were running around the tree
-found an ant colony at the base of the tree, ants were actively working- I wonder how its location affects the tree roots and vice versa

Observations of nonliving parts:

-bright sunny day, hardly any clouds
-light breeze
-not really a lot of large rocks in the area
-the busy road nearby creates a lot of noise-I wonder if this affects how many or what kind of animals live here?

Differences noted:

NOT APPLICABLE ON DAY ONE

Visit 2 Date: 4/7/2019 **Time Started:** 12pm **Time Ended** 12:20pm

Observations of living parts:

-elm tree, tall wild grass, and wild flowers I saw yesterday
-didn't see any squirrels today
-ant colony wasn't active- why?

Observations of nonliving parts:

-today was very dark and overcast
-strong, constant wind was blowing, the air smelled like rain- maybe this is why the ants and squirrels weren't visible today?
-less traffic on the nearby road
-there was a lot of litter in the area today

Differences noted:

The weather was the most obvious difference today. I'm fairly certain it's responsible for why I didn't see the creatures I saw yesterday. It's probably also why there were less cars on the road. The wind brought in a lot of litter which will no doubt affect the ecosystem.

Visit 3 Date: 4/8/2019 **Time Started:** 12pm **Time Ended** 12:20pm

Observations of living parts:

-same tree, grass, and flowers as the previous days
-squirrels were back
-ant colony was active, saw a second entrance to the colony

Observations of nonliving parts:

-the weather was pleasant again today
-moderate traffic on the road
-litter has spread out across the area

Differences noted:

The weather was better today and so that's why I saw the animals again. Between the nearby traffic and the litter, there has been a noticeable human impact on the area.

Study Area 2:

Visit 1 Date: 4/6/2019 **Time Started:** 3pm **Time Ended** 3:20pm

Observations of living parts:

-flock of Canadian geese loitering in the area
-the courtyard is about 50% grass and 50% concrete
-small frogs were playing in the pond

Observations of nonliving parts:

-sidewalks make up about 50% of the ground
-medium sized pond in the center of the courtyard (circular, 10ft diameter)
-plastic coyotes have been set up to scare the geese away
-weather was pleasant

Differences noted:

NOT APPLICABLE ON DAY ONE

Visit 2 Date: 4/7/2019 **Time Started:** 3pm **Time Ended** 3:20pm

Observations of living parts:

-frogs were in the water
-flowers have been planted along the western wall of the courtyard

Observations of nonliving parts:

-pond has higher water level due to the storm earlier today
-fake coyote fell over (probably during storm)

Differences noted:

The pond had more water in it as a result of the storm. New flowers have been planted. Their impact on the ecosystem has yet to be seen. The geese were absent today. I wonder why.

Visit 3 Date: 4/8/2019 **Time Started:** 3pm **Time Ended** 3:20pm

Observations of living parts:

-geese were loitering near the pond but didn't see the frogs- hiding?
-saw some bees around the new flowers

Observations of nonliving parts:

-fake coyotes have been repositioned
-water in pond seems to be back to original level
-litter from someone's lunch along east wall, drifted with the wind along the wall

Differences noted:

The presence of the flowers has already brought in new animals. The bees have the potential to cross pollinate the current flowers and create new plant life in the area. I think the geese were scaring the frogs into hiding. I don't know why we have these fake coyotes since they don't seem to be doing any good.

Then, write a short report that adequately addresses your observations, including how the differences of the study areas might relate to the differences noted, and discuss this with your counselor.

Probably the biggest difference between the two areas is the main reason why the ecosystems are so different. The courtyard is a closed environment that has been worked into an area inhabited by humans. The field is an open environment and barely touched by people. Since geese are known to not care about if people are around or not, it makes sense to find them in the courtyard. Since there is no pond in the field, it makes sense that the geese and the frogs aren't in the field. The coyotes are an interesting attempt to control nature by scaring away the geese. The planting of new flowers in the courtyard is also an attempt to control the environment but ironically, that will lead to unintended natural changes that will happen in the ecosystem once the bees have pollinated the flowers and new plant life grows. Definitely the biggest difference between these two areas is the impact we as people have had there.

5. Using the construction project provided or a plan you create on your own, identify the items that would need to be included in an environmental impact statement for the project planned.