

MAM Final Project Proposal

1) Big picture: What is the phenomenon you'd like to model?

I would like to model a food pyramid. Meaning creates a model similar to the wolf and sheep model, but increases the number of animals. There would be apex predators, omnivores, and plants.

2) Rationale: Why is this an interesting phenomenon to model?

I think this is interesting because it can visualize and help explain real world population differences between the different types of animals. I see there could be some extensions down the line that could add in the inclusion of invasive species and how they affect an environment.

3) Why is this a good fit for using ABM?

Animals are well represented by agents. The rules are fairly straightforward. The entire model is based on agents and how their rules in the micro, change the macro effects of the ecosystem.

4) Do you have a driving question formulated? If so, state it here.

- How do apex predators affect populations
- How do invasive species affect populations

5) Do you have a reference pattern in mind? If yes, describe it here.

- In the wild you typically lower population counts the higher up the food chain you go, so I am expecting to get a similar result in this model.

6) What are the agents of your model? What are the turtle agents? What are the patch agents? Are there link agents?

Currently I am thinking something along the lines of having lions, antelope, hyenas, and grass. Lions would hunt and kill hyenas and antelopes. Hyenas would hunt only antelopes. Antelopes would eat the grass. The patch agents would be the grass.

7) What properties will the agents have?

- Agents will have energy
- Reproduction rates
- Speed
- Prey and Predators

8) What are the agent behaviors? How will agents interact?

- Agents will move

- Agents will eat
- Agents will reproduce

9) What are the core parameters of the model that will be exposed in the interface?

- Energy gained from each type of food
- Reproduction rates
- Energy levels

10) Can you sketch a time step of your model?

- Each agent moves
- Agents attempt to eat
- If reproduction condition is met then reproduce

11) What are the measures you will collect?

- The population of each of the animals
- The amount of grass.
- The amount of animals killed by each animal and the amount that starve.