

Answers for the first of the activities in the “theory for everyone” workshop:

Questions that “best answered with theory (math or simulations)” (theoretical) are numbered in multiples of 3 or 4. The rest are questions that “Best answered with experiments or observations” (empirical)

1. Are the plants in the Cedar Creek old fields nitrogen-limited? (empirical)
2. How does the periodicity of resource pulses influence the number of species that can coexist in a system? (empirical)
3. Will communities of species without stabilizing coexistence mechanisms tend to exhibit realistic community statistics (rank-abundance curves, variation in population sizes, etc)? (Theoretical)
4. How can mechanisms of coexistence interact with one another? Is it likely that more species can coexist if there are more mechanisms of coexistence at play? (Theoretical)
5. Does habitat fragmentation decrease pollinator diversity? (empirical)
6. Under what conditions should obligate (rather than facultative) mutualisms evolve? (Theoretical)
7. Does productivity increase with biodiversity in a prairie plant community in England? (empirical)
8. Can phenotypic plasticity act as a buffer against climate change? (Theoretical)
9. Might assisted migration hinder the goal of preventing species extinctions? (Theoretical)
10. Are the food webs of medium-sized Michigan lakes controlled from the bottom up (by abiotic resources) or top down (by predators)? (Empirical)
11. Are the ranges of marine phytoplankton changing in response to climate change? (Empirical)
12. Are obligate or facultative mutualisms more likely to be robust against cheaters in the face of evolution over long periods? (Theoretical)
13. Is the greater diversity observed in the tropics driven by higher speciation rates? (Empirical)
14. Do N-fixing plants increase the growth and diversity of the neighboring plants? (empirical)
15. How does the stochasticity that comes from realistic processes of birth and death (whereby whole individuals are born and die at single time points) influence the relationship between average birth and death rates and population size? (Theoretical)

16. Do you always need to vaccinate everyone in a population in order to eradicate a disease through vaccination? (theoretical)
17. What impact does an algal bloom have on other species in a lake? (Empirical)
18. Can robust mutualisms among species in the same trophic level arise from realistic physiological tradeoffs? (theoretical)
19. How does community composition change as succession progresses? (Empirical)
20. If predators can shift the focus of their predation from rare species to abundant species, is it possible for a greater diversity of locally rare but regionally widespread prey species to exist? (theoretical)
21. What would the limit of tree height be if hydraulic stress were the only physiological constraint on tree height? (Theoretical)
22. How does native species diversity of a community affect its susceptibility to invasion? (Empirical)
23. How does increasing atmospheric CO₂ influence ocean acidification? (Empirical)
24. What mechanisms are likely responsible for the invasiveness of some introduced species over others? (Theoretical)
25. Are communities with more species than others more stable than others? (Empirical)
26. Are higher temperatures associated with smaller body sizes? (Empirical)
27. If the effects of species on one another are drawn from probability distributions centered around 0, are communities with more species than others also more stable? (Theoretical)
28. What mechanisms likely allow diseases to persist season after season? (Theoretical)
29. How does soil biodiversity both influence and respond to above-ground biodiversity? (Empirical)
30. Can interactions with parasites stabilize the coexistence of host species? (Theoretical)