Chapter-wide learning goals:

1. Demonstrate how models of population growth, competition, and predator-prey interactions can provide insight into community dynamics.
2. Evaluate the importance of bottom-up vs. top-down forces in a given community.
3. Provide examples for how both direct and indirect species interactions affect community dynamics.
4. Explain what is meant by community stability and why some communities are more stable than others.

Section 1: Community Dynamics in Yellowstone

1. Describe why Yellowstone National Park is an ideal place to study community dynamics.

Section 2: Disturbance and Succession

1. Determine which model of succession offers the best mechanistic explanation for an observed successional sequence.
2. Compare and contrast the three models of succession proposed by Connell and Slatyer (i.e., facilitation, tolerance, and inhibition).
3. Predict how changes in a community's disturbance regime are likely to affect its dynamics, particularly its successional sequences.
4. Distinguish between primary and secondary succession and the types of disturbances that tend to initiate them.
5. Explain the mechanism(s) driving succession in Yellowstone National Park, paying particular attention to the role of the 1988 fires.
6. Summarize the physiological and life-history traits that characterize early- vs. late-successional plants.
7. Paraphrase the intermediate disturbance hypothesis and its key predictions.

Section 3: Food Chains and Indirect Effects

1. Provide an example of how an ecosystem engineer affects community dynamics.
2. Distinguish between autogenic and allogenic ecosystem engineers.
3. Explain how the ecology of fear is expected to influence foraging behavior.
4. Show how giving-up densities can be used to assess a forager's perception of predation risk.
5. Contrast the direct effects of predators vs. the indirect effects of predators through the ecology of fear.
6. Design a set of experiments that could distinguish between the effects of predators and of disturbance on a plant population.
7. Interpret data from exclosure experiments that test the effects of herbivores on plant communities.
8. Summarize the evidence that would be needed to demonstrate that a predator is producing a behavioral trophic cascade vs. a traditional, numerical trophic cascade.
9. Explain the role that community ecology concepts and data can play in debates on managing ecosystems using an example.
10. Predict how each trophic level will change when new trophic levels are added or removed from a food chain using trophic cascade theory.

Section 4: Top-Down vs. Bottom-Up Control

1. Explain what drives successional sequences of decomposers as a given piece of detritus is decomposed.
2. Explain how the predictable successional sequence that occurs as decomposers colonize a corpse can be used to estimate when a person died.

3. Contrast the predictions stemming from the theory of top-down control, proposed by Hairston, Smith and Slobodkin, with predictions stemming from the theory of bottom-up control.
4. Draw conclusions on whether a community is structured by bottom-up, top-down, or some combination of factors using experimental data.
5. Distinguish between different hypotheses on what drives food chain length using correlational data such as from Post and colleagues.
6. Provide examples of keystone species.

Section 5: Community Stability

1. Provide examples of studies supporting the hypothesis that animals select foraging sites that reduce their perceived predation risk.
2. Provide an example of how invasive species can affect ecological communities.
3. Design experiments to test alternative hypotheses for why some communities are more stable than others.
4. Defend a ranking of two or more communities in terms of how "stable" they are when faced with a disturbance.
5. Interpret graphs that qualitatively compare the dynamics after a disturbance in different ecosystems that vary in resistance, return time, and resilience.
6. Describe how the effects of a disturbance on a community whose resistance is low will compare to that of a community whose resistance is high.
7. Describe how the effects of a disturbance on a community with a short return time will compare to that of a community with a long return time.
8. Describe how the effects of a disturbance on a community whose resilience is low will compare to that of a community whose resilience is high.
9. Explain when a disturbance is expected to push a community into an alternative stable state.
10. Give examples of how a community can vary (and potentially become unstable) without being perturbed by an outside disturbance.
11. Predict which community is likely to be more stable using connectance.
12. Demonstrate how community importance and total impact can be used to distinguish between dominant vs. keystone species.