**Name: Period:**

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**Trophic cascades and keystone species**

**Film guide**

1. Why would it be important to understand what controls the number and types of species in an ecosystem? (1:13)
2. Prior to the 1960s, what did people think controlled the number of herbivores in a food web?
3. What was missing from this “bottom up” explanation?
4. Describe how the green world hypothesis differs from the bottom-up explanation.(4:05)
5. Why was it important for Paine to record the number of different species as well as the overall number of animals on the rock outcrop?
6. What happened to the number of different species over time?
7. What conclusion did Paine arrive at after seven years?(7:05)
8. Why are the arch shape and the keystone at the top of the arch a fitting analogy for what Robert Paine observed?
9. What does he mean by his claim that some species are more equal than others?
10. What evidence does he have to support that claim?(8:44)
11. Why was it important for him to remove urchins from some tide pools but not all others?
12. How did the observation that sea urchins were eating all the kelp in some tide pools violate predictions from the green world hypothesis?(11:11)
13. How did the two islands with and without otters differ in the amount of kelp?
14. How did Payne and Estes’ observations support the green world hypothesis?
15. What were the indirect effects of the removal of sea otters that Paine described?
16. What is a trophic cascade, and why is it important to understand the relationships it’s describing?(14:50)
17. How had human activity influenced the trophic cascade of the Aleutian Islands kelp forest?
18. Why are apex predators critical to ecosystem structure?(18:53)