**Lesson 3A:** Cascading impacts

Lesson Objectives:

1. Students will be able to hypothesize how decreased populations of shelled organisms impact other species in the ecosystem.
2. Students will be able to hypothesize how these changes impact people and industries in Washington.

Relevant NGSS Standards

1. MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
   1. Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources
2. MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
   1. Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, and on defining the boundaries of the system
3. MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
   1. Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.

Powerpoint:

* 1. Revisit shells from first activity
  2. What happens to other species?
     1. Diets of secondary and tertiary predators.
     2. Activity: model before vs. after - food webs with smaller populations of species that depend on calcium carbonate (MS-LS2-1, MS-LS2-3)
        1. NGSS: *Developing and Using Models*
  3. Human impacts
     1. How do these things impact humans?
        1. Fisheries, Tourism, Livelihoods