

**Richmond Public Schools**  
**Department of Curriculum and Instruction**  
**Curriculum Pacing And Resource Guide – Unit Plan**



**Course Title/ Course #: Life Science**

**Unit Title/ Marking Period # (MP): LS.8 Population Interactions; MP3**

**Start day: \*See RPS Pacing Guide**

**Meetings (Length of Unit): 1-3 Weeks**

***Desired Results ~ What will students be learning?***

**Standards of Learning/ Standards**

LS. 8 - The student will investigate and understand interactions among populations in a biological community. Key concepts include

- a) the relationships among producers, consumers, and decomposers in food webs;
- b) the relationship between predators and prey;
- c) competition and cooperation;
- d) symbiotic relationships; and
- e) niches.

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**Essential Understandings/ Big Ideas**

The concepts developed in this standard include the following:

- Organisms or populations that rely on each other for basic needs form interdependent communities.
- Energy resources of a community are shared through the interactions of producers, consumers, and

decomposers.

- The interaction between a consumer that hunts for another consumer for food is the predator-prey relationship.
- In a community, populations interact with other populations by exhibiting a variety of behaviors that aid in the survival of the population.
- Organisms may exist as members of a population; populations interact with other populations in a community.
- Populations of one species may compete with populations of other species for resources. Populations of one species may also cooperate with populations of other species for resources.
- A symbiotic relationship may exist between two or more organisms of different species when they live and work together.
- Symbiotic relationships include mutualism (in which both organisms benefit), commensalism (in which one organism benefits and the other is unaffected), and parasitism (in which one organism benefits and the other is harmed).

Each organism fills a specific role or niche in its community.

### **Key Essential Skills and Knowledge**

In order to meet this standard, it is expected that students will

- identify the populations of producers, consumers, and decomposers and describe the roles they play in their communities.
- interpret, analyze, and evaluate data from systematic studies and experiments concerning the interactions of populations in an ecosystem.
- predict the effect of population changes on the food web of a community.
- generate predictions based on graphically represented data of predator-prey populations.
- generate predictions based on graphically represented data of competition and cooperation between populations.

differentiate between the types of symbiosis and explain examples of each.

infer the niche of organisms from their physical characteristics.

design an investigation from a testable question related to interactions among populations. The investigation may be a complete experimental design or may focus on systematic observation, description, measurement, and/or data collection and analysis.

## Vocabulary

### **Ecology Vocabulary Words**

**1. Abiotic Factor**- A non-living part of an ecosystem. Ex: water, sunlight, climate

**2. Biosphere** - The part of the earth, including air, land, surface rocks, and water, within which life occurs

**3. Biotic Factor**- A living part of an ecosystem. Ex: plants, animals, insects

**4. Carnivore** - An animal that eats only other animals

**5. Carrying Capacity**- The largest population that an area can support

**6. Pioneer Species**- the first species to populate an area.

**7. Commensalism**- A symbiotic relationship in which one organism benefits and the other is unaffected

**8. Community** - All the different populations that live together in an area

**9. Competition** - Organisms compete for the limited number of biotic and abiotic factors

**10. Consumer** - An organism that obtains energy by feeding on other organisms. Ex: herbivores, carnivores, scavengers

**11. Decomposer** - Organisms that return nutrients to the soil and break down dead organisms “Nature’s recyclers”

**12. Ecology**- The study of how living things interact with each other and their environment

- 13. Ecosystem** - All the living (biotic) and non-living (abiotic) things that interact in an area
- 14. Immigration**- Moving into a population.
- 15. Energy Pyramid** - A diagram that shows the amount of energy that moves from one feeding level to another in a food web
- 16. Exponential Growth**- If a population has a constant birth rate through time and is never limited by food or disease. The birth rate alone controls how fast/slow the population grows.
- 17. Food Chain** - series of events in which one organism eats another
- 18. Food Web**- The pattern of overlapping food chains in an ecosystem. A model of feeding relationships
- 19. Habitat** - The environment in which an organism lives.
- 20. Herbivore** - An animal that eats only plants. Organism that obtains energy ONLY from producers
- 21. Host** - An organism that provides a source of energy or a suitable environment for a virus or for another organism to live
- 22. Limiting Factor** - Anything that restricts the number of individuals living in a population
- 23. Mutualism** - A symbiotic relationship in which both organisms benefit
- 24. Niche** - An organism's particular role in an ecosystem, or how it makes its living (what it eats, when it eats, etc.)
- 25. Primary Succession** - The series of changes that occur in an area where no soil or organisms exist.
- 26. Omnivore** - An animal that eats both plants and animals
- 27. Parasite** - An organism that lives on or in a host and causes harm to the host
- 28. Parasitism** - A symbiotic relationship in which one organism benefits while the other is harmed

- 29. Population** - Organisms of one species living together in the same place at the same time
- 30. Emigration** - Leaving a population.
- 31. Predation** - An interaction in which one organism hunts and kills another animal for food
- 32. Predator** - A carnivore that hunts and kills other animals for food and has adaptations that help it capture the animals it preys upon
- 33. Prey** - An animal that the predator feeds upon
- 34. Producer**- Organisms that use sunlight to make food
- 35. Species** - A group of similar organisms whose members can mate with one another and produce fertile offspring
- 36. Symbiosis** - A close relationship between two organisms in which at least one of the organisms benefits
- 37. Transpiration** - The process by which water is lost through a plant's leaves
- 38. Photosynthesis** - The process in which light energy becomes chemical energy using carbon dioxide and water.
- 39. Respiration** - A process that uses oxygen in organisms to break down simple food molecules to produce energy.
- 40. Secondary Succession** - The series of changes that occur in an area where the ecosystem has been disturbed, but where soil and organisms still exist.

***Assessment Evidence ~ What is evidence of mastery? What did the students master & what are they missing?***

**Assessment/ Evidence**

TSWBAT: (Choose **ONE** or more to collect evidence of mastery)

1. Demonstrate proficiency on a teacher-generated assessment created on Interactive Achievement
2. Demonstrate proficiency on the Predator-Prey Online Quia Quiz
3. Complete GIZMO Assessment with passing score
4. Pass the Brainpop quiz on Populations
5. Complete Cooperation and Competition Flashcards and Match-Up Game (Activities can be used as either formative or summative assessments, or both)

**Learning Plan ~ What are the strategies and activities you plan to use**

**Learning Experiences/ Best Practice**

- ✓ Graphing the effect of a predator-prey relationship;
- ✓ Predicting which variety of related species is better adapted to its environment;
- ✓ Visualizing how adaptations help a species increase their survival rate through a simulation;
- ✓ Complete a GIZMO on population interactions;
- ✓ Watch a video on populations;
- ✓ Complete competition and cooperation flashcards;
- ✓ Play a competition and cooperation match-up game.

**Technology Integrations**

- ✓ Interactive Achievement;
- ✓ Quia;
- ✓ McGraw Online;
- ✓ GIZMO;
- ✓ Brainpop.

## **Resources**

1. Population Interaction Activity (Attached)
2. Predator-Prey Relationships (Attached)
3. Peppered Moth Simulator <http://www.biologycorner.com/worksheets/pepperedmoth.html> (student handout) AND <http://peppermoths.weebly.com/> (online simulation)
4. GIZMO: <http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=380>
5. Brainpop: <https://www.brainpop.com/science/ourfragileenvironment/populationgrowth/qanda.weml>
6. <http://www.solpass.org/6-8Science/7science/LS.8-12activity%20page.htm>  
(Competition and Cooperation Flashcards and Match-up Game)

## **Cross Curricular Connection**

Algebra I – Generating graph demonstrating predator-prey relationships

English – Vocabulary Competition and Cooperation Flashcards

History – Evolution of Peppered Moths due to interactions of humans with their environment (industrial revolution)

Art – Drawing grey and white peppered moths to show camouflage