# Chapter 19; Unit 4

#### Learning Objectives:

* Define population genetics and describe how scientists use population genetics in studying population evolution
* Define the Hardy-Weinberg principle and discuss its importance
* Use Hardy-Weinberg Equilibrium to solve population genetics problems
* Describe the different types of variation in a population.
* Explain why only natural selection can act upon heritable variation.
* Explain how each evolutionary force can influence a population's allele frequencies.
* Describe the founder effect and the bottleneck effect.
* Explain the different ways natural selection can shape populations.
* Explain the difference between natural selection and sexual selection.
* Explain why evolution does not produce perfect organism

**Directions:**

**Project 1:**

Instructors should print the student handout for the Allele and Phenotype Frequencies in Rock Pocket Mouse Populations Lab from <https://www.biointeractive.org/sites/default/files/Mouse_HardyWeinberg_Student.pdf> and distribute to the students. Before students begin the lab, show the video entitled “Natural Selection and the Rock Pocket Mouse” found at <https://www.youtube.com/watch?v=sjeSEngKGrg>.

Students then complete Parts 1 and 2 of the lab.

Optional: If students have access to Microsoft Excel, they can complete Part 3. The Excel spreadsheet can be downloaded at <https://www.biointeractive.org/classroom-resources/allele-and-phenotype-frequencies-rock-pocket-mouse-populations>. The Excel spreadsheet should be downloaded by the instructor and then electronically distributed to the students. In addition to the lab handout and spreadsheet, this web link contains the teacher’s manual for the lab, so students should not access the activity online on their own

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**Project 2:**

Find the correct answers to the end of the chapter “Review Questions.” Note the page number on which you found the answer. Be prepared to share and explain your answers in a group setting.

**Project 3:**

Answer the end of the chapter “Critical Thinking Questions.” Note the page number on which you found the answer. Be prepared to share and explain your answers in a group setting.