A mustang contracts a serious skin infection and is treated with antibiotics. It is hypothesized that as bacteria grow, mutations can develop creating new strains. Upon exposure of this new population of bacteria to antibiotics, antibiotic-resistant strains will outnumber sensitive strains over time. This process is called natural selection.

A large herd of Kiger Mustangs was discovered in 1977 by the Bureau of Land Management (BLM) during a round-up in Oregon. Genetic DNA testing showed the mustangs were closely related to the Spanish horses brought over in the 1600’s. To preserve the breed, the BLM placed seven horses in a new location.

There is a population of beetles that is made up of 10 green individuals and 10 brown individuals and their coloration is genetically inherited. A group of people play soccer on the field where the beetles live and they try to avoid stepping on the beetles. However, because they are better able to see the brown beetles than the green beetles they end up stepping on and killing 8 of the green individuals and only 2 of the brown individuals.

Jean Baptista van Helmont (1577-1644) was a Flemish physician-scientist who enhanced our early understanding of photosynthesis. Since he accurately concluded that matter was neither created nor destroyed, van Helmont wished to determine how a growing plant obtained its biomass (wood, bark, roots). He grew a potted willow tree and meticulously measured the weights of the soil and tree as well as the weight of the water he added. After five years the plant had gained about 170 pounds. Since the amount of soil was approximately the same as it had been when he started his experiment, van Helmont rejected the common idea that plants were fed exclusively by the soil. However, he also concluded erroneously from his experimental data that the tree’s weight gain had come from water alone.

How did the imagery of witches flying upon broomsticks originate? Historians have found evidence that some medieval European “drug cults” included women who would prepare a potion by grinding up belladonna plants into an extract. Known as an anesthetic and muscle relaxant, this extract was applied using long sticks on the skin for rapid absorption into the bloodstream. The resulting symptoms included slowed breathing, dilated pupils, heavy eyelids, and a delirious sensation of flying.
In an article entitled, “Land Snails on Porto Santo: Adaptive and Non-Adaptive Radiation”, Cameron, Cook and Hallows (1996) concluded that various groups of species of snails on this 5 X 12 km island, which is part of a chain of islands near Spain, resulted from adaptive radiation, as we discussed in class. With this information, you should be able to make some reasonable predictions or ask some reasonable questions about the findings in their paper (Phil. Trans. R. Soc. Lond. B 351 (1337): 309-327 http://rstb.royalsocietypublishing.org/content/351/1337/309.abstract).

Adrian and Edmund Gittenberger study snails in Papua New Guinea. The snails are parasites that bore into and live within a specific host species of mushroom corals. Studying them is very difficult because the coral must be hammered into pieces to remove the solitary snail.

Snails move secreting a mucus train then gliding over it using cilia and different sets of muscle contractions. The composition of the mucus includes the glycoprotein (protein with a sugar attached) mucin. Snail mucus is quite energetically costly for the snail – up to 30% of the energy obtained from its food may be used to make mucus for locomotion. This has led to the hypothesis that snails save energy by using the mucus trails of other snails. Snail mucus has many other ingredients and so it has been suggested for a variety of medical uses including coatings for rectal suppositories and wound-healing agents.

The Gittenbergers decided to test the prediction that snails will move more quickly when following the trail of other snails. They watched the snails within a population as they naturally moved around and recorded the time it took each to move 10 cm. They watched 20 snails that followed a path and 20 snails that did not.