Comparative Physiology

5 credits
Grade: 9

This lab based course, which is a precursor to Biology in grade 10, is designed to build a conceptual understanding of systems, which is mandated by the New Jersey Core Content Standards in Science. Participants will explore the structure, function, and interactions of the major human anatomical systems through a comparative and developmental tour of the diverse fauna of Earth's biosphere.

PROFICIENCIES:

Upon completion of the course, students will be able to:

1. Compare and give examples of different forms of asexual reproduction
2. Hypothesize how asexual reproduction is an adaptation in plants and animals
3. Compare conjugation in different organisms
4. Explain the generalized life cycle of animals
5. Relate the idea of alternation of generations to the life cycle of a typical plant
6. Distinguish between internal and external fertilization in animals
7. Relate human reproductive structures to functions in females and males
8. Compare estrus in mammals with the menstrual cycle in humans
9. Sequence the early stages in animal development
10. explain embryo formation and germination in angiosperms
11. Describe how differentiation is controlled
12. Relate the events of metamorphosis and development within an amniotic egg to the needs of animal embryos
13. describe the formation and functions of the placenta
14. Distinguish between the nutrient requirements of autotrophs and heterotrophs
15. Compare intracellular and extracellular digestion
16. Explain the need for digestion
17. Compare patterns of digestion in animals having one body opening with those having two body openings
18. Describe the process of filter feeding in several different animals
19. Relate the process of physical digestion and chemical digestion
20. Explain the importance of a balanced diet
21. Identify physical and chemical aspects of digestion in each part of the human digestive system
22. Compare the absorption and transport of sugars and amino acids with that of fatty acids and glycerol
23. Determine why simple organisms do not have a transport system
24. Compare the transport of water and minerals with transport of organic molecules in a vascular plant
25. Distinguish between open and closed circulatory systems
26. Sequence the flow of blood in the circulation of birds and mammals
27. Discuss the various means by which materials are exchanged between the blood and the body cells
28. Compare the structure and function of components of the blood
29. Define the role of white blood cells and platelets
30. Predict the outcomes of mixing the four blood types of humans
31. Discuss how gases are exchanged in various plants
32. Compare respiration in segmented worms and bony fish
33. describe respiration in humans
34. Discuss why many organisms must have adaptations for maintaining osmotic balance
35. Describe maintenance of osmotic balance in animals having circulatory systems
36. Describe various ways in which pathogens are transmitted
37. Compare how bacteria and viruses may cause disease
38. Discuss nonspecific lines of defense against pathogens

39. Describe how the immune system defends against pathogens present in blood and tissue fluid
40. Demonstrate how the immune system functions in destruction of infected, abnormal, or foreign cells.
41. Distinguish between active and passive immunity
42. Discuss the use of drugs in treating bacterial and viral diseases
43. Relate the life cycle of HIV to the symptoms of AIDS