

EBIO 4760/5760: MAMMALOLOGY Learning Goals

OVERARCHING LEARNING GOALS in Alignment with EBIO Learning Goals

1. Core Competencies in the Process of Science

a. Observation & Discovery & Assessment of Validity of Scientific Claims:

- Assess hypotheses for various aspects of mammalian biology
- Identify, describe, access relevant parameters in particular hypotheses
- Use and interpret models & data to access validity of hypotheses
- Correctly interpret graphical, tabular, and text-based description of data
- Develop mammalian lab skills using skulls, skeletons, skins for identification
- Develop mammalian field skills of mammal observation and identification

b. Collaboration:

- Collaborate with classmates in think, pair, share learning activities
- Collaborate with classmates in discussions and presentations
- Collaborate with classmates in lab activities and group learning-teaching

c. Communicate scientific content, methods and thinking

- Construct scientific arguments based on evidence
- Communicate arguments and hypotheses for mammalian patterns & processes
- Communicate applications of mammalian content to environmental issues

2. Ecology & Evolutionary Biology Principles of Real-World Significance

a. Use the principles of evolution to explain the diversity of life

- Explain how evolution occurred through 320 million years of mammal evolution
- Use mammal phylogenies, fossils, and earth's history to understand mammalian life on earth in the past and today
- Recognize mammal taxa (Orders, families, genera, species) based on traits
- Know mammal biology well and as a lens to understand ecology & evolution
- Explain the evolutionary trade-offs between mammalian specialization (e.g., flight, speed) and other life-history consequences

b. Describe the Importance of Abiotic Factors (Climate, Geology, Plate Tectonics) to mammals

- Predict temperature, precipitation and productivity effects on mammal populations & species—currently and across evolutionary time
- Understand the importance of various mammalian adaptations to cold and heat, how and when they evolved, and their importance to changes in cold & heat in the future

- Predict how those factors may change with past and anthropogenic global climate change
- Understand how plate tectonics, isolation, and connection influence mammalian biogeography

c. Use your knowledge of processes to explain patterns across multiple temporal and spatial scales

- Illustrate how life history traits, body size, competition, predation, and niche effects can influence the abundance, diversity and distribution of species
- Use data and theory to illustrate the influence of productivity on mammal diversity
- Illustrate how ancestry and mutation influence structure and function across different scales using mammalian evolution & phylogeny
- Use physical traits and interactions with the environment to understand the evolution and application of echolocation in mammals

d. Describe fundamental biological structures and processes

- Recognize and describe the structure and function of mammalian physical and physiological traits and structures
- Develop knowledge about mammalian abundance & communities
- Evaluate human impacts on the ecology and evolution of mammals
- Describe mammalian extinction risks in relationship to life history, traits, rarity
- Predict conservation impacts and hypothesize mitigation strategies