

OXFORD HIGH SCHOOL SCIENCE DEPARTMENT
COMPARATIVE ANATOMY CURRICULUM

#362 Comparative Anatomy (A) (11-12) One Semester 0.5 Credit

This course is designed to be a hands-on inquiry-based exploration of invertebrate and vertebrate animal anatomy. Always focused on making the connections between science and technology and their impact on the quality of our lives, the study of anatomy uses multiple pathways of scientific reasoning to examine both the diversity and the uniformity of structure among animals. This course includes laboratory study of representative animals through observation and dissection. The prerequisite for this course is Biology.

ENDURING UNDERSTANDINGS (BROAD IDEAS, USUALLY GROUNDED IN THE DISCIPLINE):

Science is a creative endeavor that uses logical, analytical processes.

SCIENTIFIC INQUIRY

- Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena.
- Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation.
- Scientific inquiry requires the sharing of findings and ideas for critical review by colleagues and other scientists

SCIENTIFIC LITERACY

- Scientific literacy includes the ability to read, write, discuss and present coherent ideas about science.
- Scientific literacy also includes the ability to search for and assess the relevance and credibility of scientific information found in various print and electronic media.

SCIENTIFIC NUMERACY

- Scientific numeracy includes the ability to use mathematical operations and procedures to calculate, analyze and present scientific data and ideas.

COURSE SPECIFIC GOALS (ALIGNED WITH CONTENT STANDARDS):

DARWINIAN BEGINNINGS – The origin of life can be traced back throughout history and is recorded in the genetic record.

EXTINCTION – The genetics of species change over time and based on phenotypic expression and adaptation to a changing environment some species cannot survive.

SURVIVAL / EVOLVING – The genetics of species change over time and based on phenotypic expression some species better adapt to environments, fill niches and thrive.

HUMAN ORIGINS – There is a continuum and continuity to the relationships of different organisms on the phylogenetic tree.

COMMON UNIT EXPECTED PERFORMANCES (ALIGNED WITH STATE EXPECTED PERFORMANCES):

Standard #	Standard/Expected Performance
C-1	Identify questions that can be answered through scientific investigation.
C-2	Read, interpret and examine the credibility and validity of scientific claims in different sources of information.
C-3	Design and conduct appropriate types of scientific investigations to answer different questions.
C-4	Identify independent variables, dependent variables, constants and controls in an experiment.
C-5	Use appropriate tools and techniques to make observations and gather data.
C-6	Use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.
C-7	Articulate conclusions and explanations based on research data, and assess results based on the design of the investigation.
C-7	Assess the reliability and validity of the data that was generated in an investigation and justify confidence in results.
C-8	Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.
C-9	Identify an issue and its implications completely.
C-10	Develop an action plan that addresses all aspects of the issue in detail.
C-11	Use a variety of reliable sources of relevant information, data, knowledge, or experiences to take and support a critical stance.

UNIT I: DARWINIAN BEGINNINGS – THE ORIGIN OF LIFE CAN BE TRACED BACK THROUGHOUT HISTORY AND IS RECORDED IN THE GENETIC RECORD.

Standard #	Standard/Expected Performance
I-1	Understand how Darwin’s observations led him to propose the mechanism of natural selection as an explanation for what he saw.
I-2	Explore how fossils provide evidence for two of Darwin’s key assertions: (1) that if life evolved we should see tree-like “nested patterns of resemblance” among living things; and (2) a general sequence of primitive to more advanced forms of organisms in the history of life.
I-3	Examine the history of evolutionary thought through the use of classification systems and evolutionary trees.
I-4	Examine the history of life on Earth
I-5	Understand how phylogenetic principles help track changes in epidemiology.
I-6	Examine how evolutionary theory helps in the development of high-yielding, disease resistant crops

UNIT II: EXTINCTION – THE GENETICS OF SPECIES CHANGE OVER TIME AND BASED ON PHENOTYPIC EXPRESSION AND ADAPTATION TO A CHANGING ENVIRONMENT SOME SPECIES CANNOT SURVIVE.

Standard #	Standard/Expected Performance
II-1	Explore how an understanding of speciation is important for conservation efforts.
II-2	Examine what fossils tell us about patterns of evolution over long periods of time.
II-3	Consider how evolutionary theory helps in biodiversity conservation efforts
II-4	Observe the anatomical features of organisms to determine simple/complex features and structure/function relationships

UNIT III: SURVIVAL / EVOLVING – THE GENETICS OF SPECIES CHANGE OVER TIME AND BASED ON PHENOTYPIC EXPRESSION SOME SPECIES BETTER ADAPT TO ENVIRONMENTS, FILL NICHEs AND THRIVE.

Standard #	Standard/Expected Performance
III-1	Understand the mechanisms of speciation.
III-2	Describe the interconnected relationship between physical and chemical conditions as well as biological diversity
III-3	Observe the anatomical features of organisms to determine simple/complex features and structure/function relationships

Unit IV: HUMAN ORIGINS – THERE IS A CONTINUUM AND CONTINUITY TO THE RELATIONSHIPS OF DIFFERENT ORGANISMS ON THE PHYLOGENETIC TREE.

Standard #	Standard/Expected Performance
IV-1	Examine the intersection of systematics using paleontology and molecular biology through an exploration of human evolution
IV-2	Understand how phylogenies are constructed
IV-3	Establish the basis of “tree thinking”.
IV-4	Understand the Biological and Phylogenetic species concepts and explore how each is suited to different research questions.
IV-5	Explore how human evolution is studied through fossils.
IV-6	Describe the diversity of hominid species through history
IV-7	Examine the movement of the human species across the Earth