

Trial/Pilot Event

Contact the organizers of your tournament to find out what trial/pilot events will be held.

EVOLUTION

- 1) **DESCRIPTION:** Contestants will rotate from station to station, integrating content knowledge and process skills in the area of biological evolution.

A TEAM OF UP TO: 2

Suggested Revisions to the Trial/Pilot Event

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- 2) **EVENT PARAMETERS:** Non-programmable used during the competition.
- 3) **THE COMPETITION:**
- The competition will be administered at a series of stations that may include experimental data, scientific apparatus, models, illustrations, fossils, data analysis, and problems for students to solve. The team will complete one answer sheet.
 - Content topics may include: the nature of science, history of evolution theory, mechanisms of evolution, history of life on earth, evidence for and examples of evolution, human evolution, and the relevance of evolutionary theory to everyday lives.
 - Process skills may include: comparing structures, analyzing data, interpreting graphs and diagrams, dating fossils, calculating gene frequencies, and molecular sequence analysis.
- 4) **SAMPLE QUESTIONS:**
- Describe how science differs from other ways of knowing.
 - Describe the role and meaning of theory, hypothesis, law, fact, inference and interpretation in the processes of science.
 - Describe the contributions of Darwin, Wallace, Lamarck, Lyell, and Malthus in the history of evolutionary theory.
 - Explain the role of mutation, genetic variation, (gene flow), genetic drift, and natural selection in evolution.
 - Define the biological species concept.
 - Describe how speciation occurs. Discuss allopatric vs, sympatric speciation, convergent evolution, and adaptive radiation.
 - Describe how the evolution of one species affects another (coevolution).
 - Describe how fossils are formed and dated. Calculate the age of a fossil using radiometric data.
 - Place major events, such as the evolution of the first cell, eukaryote, multi-cellular organism, mammal, and hominid, on a geologic time line.
 - Construct and interpret family trees (phylogenies).
 - Use biochemical variations (DNA and amino acids) to determine ancestral relationships.
 - Cite how studies of anatomical and molecular homologies, biogeography, DNA hybridization, whale fossils, Galapagos finches, peppered moths, cyclids, and sickle cell disease provide evidence to support the theory of evolution.
 - Outline major trends in hominid evolution indicated by fossils of *Australopithecus* (*A. afarensis*, *A. africanus*, *A. robustus*) and *Homo* (*H. habilis*, *H. erectus*, *H. neanderthalensis*, and *H. sapiens*).
 - Describe competing models (Replacement Model and Multi-Regional Model) that explain how modern humans populated the earth.
 - Identify primates and describe characteristics of major sub groupings in the order Primates.
 - Distinguish between concepts that are consistent with evolutionary theory and those that are common misconceptions.
 - Calculate allele, genotype and phenotype frequencies using the Hardy-Weinberg equation.
 - Cite how recent hominid fossil discoveries, such as those in Chad (Toumai), the Republic of Georgia (Dmanisi), and Indonesia (Flores) are contributing to our understanding of human evolution.
 - Explain how an understanding of evolution is useful in treating disease, improving the world's food supply, and conserving biodiversity.
- 5) **SCORING:** Each correct response will be assigned a point value. The highest score wins. Selected questions will be used as tiebreakers.