Science Standard
Catalina Foothills School District
High School: Honors Advanced Field Science

Honors Advanced Field Science is a research-centered course for seniors who have demonstrated high achievement in Field Science. Major topics include how biological and physical systems interact to produce the biogeographical and geological phenomena we see in the natural world today, statistical field research, and community service. The skills of data analysis, scientific inquiry, collaboration, and systems thinking are integrated throughout the course. Overnight trips to demonstrate competency in field knowledge and methods are offered as an optional component of this course. Fluency with physical processes, the taxonomy and behavior of local flora and fauna at the family and species levels, as well as expertise with field research techniques are critical skills in this course.

1A. SCIENTIFIC INQUIRY: GENERATING SCIENTIFIC QUESTIONS	
H/FS.1a.1	Frames testable questions showing evidence of observations and connections to prior knowledge.
H/FS.1a.2	Develops a testable question appropriate to the scientific domain being investigated.
1B. SCIENTIFIC INQUIRY: FORMULATING HYPOTHESES	
H/FS.1b.1	Develops a testable hypothesis based upon evidence of scientific principles, probability and/or modeling.
H/FS.1b.2	Clearly distinguishes relationships between variables *(required: cause and effect or correlation) within a testable hypothesis)*.
1C. SCIENTIFIC INQUIRY: DESIGNING INVESTIGATIONS	
H/FS.1c.1	Specifies the parameters of measurement.
H/FS.1c.2	Describes suitable controls for the investigation.
H/FS.1c.3	Designs procedures that appropriately address the hypothesis.
1D. SCIENTIFIC INQUIRY: DATA COLLECTION	
H/FS.1d.1	Creates and demonstrates safe and ethical procedures.
H/FS.1d.2	Uses units of measurement with appropriate degree of accuracy.
H/FS.1d.3	Creates procedures that appropriately and adequately address the hypothesis *(for example: adequate sample size, multiple trials)*.
H/FS.1d.4	Creates a suitable method of recording data.
1E. SCIENTIFIC INQUIRY: ANALYSIS	
H/FS.1e.1	Interprets data to describe relationships between variables *(for example: positive, negative, no relationship)*.
H/FS.1e.2	Incorporates mathematical analysis, where appropriate.
H/FS.1e.3	Critiques the investigation for possible sources of error and suggests corrections.
1F. CONCLUSIONS AND EXTENSIONS	
H/FS.1f.1	Makes evidence-based predictions *(for example: extrapolations and interpolations)*.
H/FS.1f.2	Evaluates whether the data support the hypothesis.
1G. COMMUNICATION	
H/FS.1g.1	Uses suitable media to inform an audience about an investigation.
H/FS.1g.2	Applies appropriate ethics *(for example: language, style, citations)*.
2. INTERACTION OF SCIENCE AND SOCIETY	
H/FS.2.1	Describes the interaction of science, human curiosity and societal needs *(for example: investigating how and why birds fly informing human flight)*.
H/FS.2.2	Critically analyzes the science concepts behind societal issues *(for example: how field work and scientific theory informs our understanding of global warming)*.

3A. SYSTEMS THINKING: CHANGE OVER TIME	
H/FS.3a.1	Explains how a system's components change over time *(for example: development of an atmosphere)*.
3B. SYSTEMS THINKING: INTERDEPENDENCIES	
H/FS.3b.1	Explains the causal relationships in a system as being either positive or negative feedback relationships *(for example: global warming)*.
3C. SYSTEMS THINKING: SYSTEM-AS-CAUSE	
H/FS.3c.1	Explains reasons why specific behaviors result from the organization of a system *(for example: the dynamic rock cycle)*.
4. INTERDEPENDENCE OF ORGANISMS	
H/FS.4.1	Conducts original field research to statistically assess the relationship between and organism and its environment.
H/FS.4.2	Describes Arizona animal and plant species to the species and familial level.
5. BIOGEOGRAPHY	
H/FS.5.1	Creates Geographic Information Systems databases to describe ecosystems around the world.
H/FS.5.2	Uses current biogeography research to develop theories about the distribution of organisms around the world.
H/FS.5.3	Uses biogeographical theories to predict changes in the Earth's ecosystems in the next 50 years.
6. ETHNOBIOLOGY	
H/FS.6.1	Describes the current research about the use of organisms in cultures around the world.
H/FS.6.2	Conducts ethnobiological field research about food.
H/FS.6.3	Creates an organism-based food and non-food item either used by a non-Western culture or using a local organism.
7. CARTOGRAPHIC AND FIELD DATA SKILLS	
H/FS.7.1	Determines elevation and terrain features from topographic maps.
H/FS.7.2	Uses directional tools with maps to locate position.
H/FS.7.3	Uses Geographic Information Systems and Global Positioning Systems to store yearlong data.
H/FS.7.4	Uses Global Positioning Systems throughout Arizona to interface geospatial data.
8. GEOLOGY	
H/FS.8.1	Uses a geologic map to determine the probable age and origin of field-collected rocks.
H/FS.8.2	Compares rocks collected from all over Arizona.
H/FS.8.3	Uses the geologic time scale to describe the evolution of the Earth.
H/FS.8.4	Distinguishes between relative and absolute geologic dating techniques.
9. ORIGIN AND EVOLUTION OF THE UNIVERSE	
H/FS.9.1	Describes the Big Bang Theory as an explanation for the origin of the Universe.
H/FS.9.2	Describes the fusion process that takes place in stars.
H/FS.9.3	Compares the evolution (life cycles) of stars of different masses.
H/FS.9.4	Explains the formation of the light elements in stars and the heavier elements.