Science Standard
Catalina Foothills School District
High School: Field Science (Physics-based)

Field Science is an inquiry-based, outdoor, and laboratory-based course that studies local environments through the physics topics of mechanics, wave phenomena, energy and matter interactions, electricity, and magnetism. Other topics include physical geology, identification of local plants and animals, scientific field sampling methods and equipment, and computer modeling of ecosystems. The skills of data analysis, scientific inquiry, and systems thinking are integrated throughout the course. Field trips to investigate local ecosystems are offered as an optional component of this course. This course fulfills the CFHS third year science credit requirement.

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

3B. SYSTEMS THINKING: INTERDEPENDENCIES	
FIELD.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	
FIELD.3c.1	Explains reasons why specific behaviors result from the organization of a system *(for example: the dynamic rock cycle).*
4. CARTOGRAPHIC AND FIELD DATA SKILLS	
FIELD.4.1	Determines elevation and terrain features from topographic maps.
FIELD.4.2	Uses directional tools with maps to locate position.
FIELD.4.3	Uses Geographic Information Systems and Global Positioning Systems to interface geospatial data.
FIELD.4.4	Conducts field research to assess how the size and the rate of growth of a population are determined.
5. MOTION AND FORCES	
FIELD.5.1	Analyzes relationships between forces and motion.
FIELD.5.2	Determines the rate of change of a quantity *(for example: rate of erosion, rate of reaction, rate of growth, velocity).*
FIELD.5.3	Analyzes the relationships among position, velocity, acceleration and time.
FIELD 5.4	Explains how Newton's Laws apply to animal movement and flight.
6. INTERACTIONS OF ENERGY AND MATTER	
FIELD.6.1	Describes various ways in which matter and energy interact.
FIELD.6.2	Describes the characteristics of waves *(required: wavelength, frequency, period, amplitude).*
FIELD.6.3	Explains the relationship between the wavelength of light absorbed or released by an atom or molecule and the transfer of a discrete amount of energy.
FIELD.6.4	Describes various ways in which energy is transferred from one system to another.
7. GEOCHEMICAL CYCLES	
FIELD.7.1	Describes the interactions between the Earth's structures, atmosphere and biogeochemical cycles.
FIELD.7.2	Demonstrates how dynamic processes such as weathering, erosion, sedimentation, metamorphism, and orogenesis relate to distribution of materials within the Earth system.
FIELD.7.3	Demonstrates the relationship between the Earth's internal convective heat flow and plate tectonics.
FIELD.7.4	Explains how the rock cycle is related to plate tectonics.
8. ENERGY IN THE INTERNAL EARTH SYSTEM	
FIELD.8.1	Describes the flow of energy to and from the Earth and its influence on Earth systems.
FIELD.8.2	Explains the mechanisms of heat transfer (convection, conduction, radiation) among the atmosphere, landmasses and oceans.
FIELD.8.3	Demonstrates the relationships among earthquakes, volcanoes, mountain ranges, mid-oceanic ridges, deep-sea trenches, and tectonic plates.
9. ENERGY IN THE EXTERNAL EARTH SYSTEM	
FIELD.9.1	Demonstrates the effect of the Earth's rotation on the movement of water and air.
FIELD.9.2	Describes the origin, life cycle, and behavior of weather systems *(for example: how weather is influenced by both natural and artificial Earth features)*.
FIELD.9.3	Describes the factors that determine weather and climate.
FIELD.9.4	Explains the cause and/or effects of climate changes over long periods of time.

10. BIOGEOGRAPHY	
FIELD.10.1	Describes the various stages in a biogeographic sequence to explain the distribution of organisms in the world.
FIELD.10.2	Conducts field research to describe the sequence of successional stages in an ecosystem after a disturbance.
11. INTERDEPENDENCE OF ORGANISMS	
FIELD.11.1	Describes the relationships among organisms within populations, communities, ecosystems, and biomes.
FIELD.11.2	Describes how organisms are influenced by a particular combination of biotic and abiotic factors in an environment.
FIELD.11.3	Describes common Arizona animal and plant species.
FIELD.11.4	Demonstrates natural area restoration techniques.