TAMALPAIS UNION HIGH SCHOOL DISTRICT
Larkspur, California

Course of Study

HONORS INTEGRATED SCIENCE 3-4

I. INTRODUCTION

Honors Integrated Science 3-4 (HIS 3-4) is the second year of a two-year integrated science core curriculum for 9th and 10th graders. It is designed to give students who are talented in and/or particularly interested in science and scientific issues the preparation needed for college level science. Honors Integrated Science 3-4 is a rigorous course that emphasizes independent investigation and extension of the complex relationships and concepts experienced in Integrated Sciences 3-4. The program will be laboratory based, using a thematic approach. It will stress data gathering and interpretation, as well as research and presentation skills. These skills will be developed/applied within the context of the major concepts in biology (previously taught in Biology 3-4) and earth science, as well as important introductory concepts from chemistry and physics. The curriculum will be delivered using concept-organizing units such as San Francisco Bay, Epidemics, Gold Mining and Sensory Systems of Animals. Through these concept-organizers, the themes of the Science Framework and the traditional topics of Biology, Earth Science and basic Chemistry and Physics will be taught in a context-rich setting promoting motivation and achievement. The prerequisites for this course are:

1. Completion of Integrated Science 1-2 with a grade of B or better.
2. Recommendation of Integrated Science 1-2 teacher.
3. Completion of an essay demonstrating good writing and thinking skills.
4. "Contract" agreement by both parent and student indicating willingness to put in extra time required of higher-level work.
5. Teacher approval. Teacher approval may waive one or more of the above prerequisites.

II. OBJECTIVES

A. Student Outcomes

1. Students will demonstrate high level critical thinking skills in analyzing data, forming hypotheses, designing research and developing conclusions to scientific inquiry in the areas of Ecology, Astronomy, Evolution, Plate Tectonics, The Atmosphere (and Meteorology), Hydrosphere and Lithosphere and Diversity of Life.

2. Students will comprehend, evaluate and make informed decisions on socially relevant scientific issues such as Global Warming, Deforestation, Water Pollution, Waste/Natural Resource Management and Endangered Species.
3. Students will become informed citizens, participating in environmentally sound practices such as Recycling, Conservation and Habit Preservation and Restoration.
4. Students will be proficient in presenting/communicating information in written, oral and/or multi-media formats.

B. Means

This course will utilize themes as guideposts to the delivery of science concepts. Listed below are 6 examples of themes with the concepts that could be included.

1. Energy. Heat, light, sound, electricity, kinetic and potential energy, volcanic eruptions, earthquakes, wind, precipitation, metabolism, growth, development, biochemical reactions.
2. Evolution. Anatomy, plate tectonics, genetics, environmental issues (greenhouse effects, acid rain), adaptation, biochemistry, ecology.
3. Patterns of Change. Velocity, acceleration, decay, colonization, life cycles, seasonal changes, action/reaction systems of chemistry, predator/prey cycles, population cycles, changes of state, color.
4. Scale and Structure. Relationships from scale and structure perspective (atoms to compounds; organelles to species; compounds to galaxies; species to ecosystems to planets; vectors.
5. Stability. Equilibrium (static or dynamic), homeostasis, reproducibility of scientific research, ecosystem dynamics, mechanics (Rotational, etc)
6. Systems and Interactions. Solar systems (planets, black holes, gravity satellites, orbits); ecosystems (individuals, species, predation, competition, mutualism); organism structure (circulatory, respiratory, digestive, reproductive).

Ethical, social and environmental issues are important to the consideration of all areas outlined above (e.g., renewable and nonrenewable resources; human impact on energy systems, evolution, genetics).

C. Skills

The following skills will be developed within the context of the above themes:

1. Use and manipulation of basic laboratory equipment
2. Collection and manipulation of data
3. Experimental design and implementation
4. Study skills including listening, critical reading, research skills, note taking, writing and memorization techniques
5. Scientific ways of thinking using the scientific method through experiments
6. Modeling

7. Qualitative and quantitative analysis
8. Techniques for working productively in groups
9. Solving complex, open-ended problems

III. SUGGESTED MATERIALS

Self-generated materials will be utilized in conjunction with textbooks currently available. Additional lab materials will be required for newly developed integrated lab experiments.

IV. MAJOR ACTIVITIES AND LEARNING STRATEGIES

This is a hands-on, lab and project oriented program. Instruction will employ a combination of lecture/discussion, demonstration, reading, inquiry and inductive teaching strategies. In-depth research reports, laboratory experiments, scientific debates, oral and multi-media presentations and group investigations will be the major activities of this program. The particular selection of strategies will be aligned with the student outcomes listed in II above.

V. MEANS OF EVALUATION

Portfolio materials will be gathered that will allow both the student and teacher to assess progress over the course of the semester and year. The portfolio will include, but not be limited to, the following:

A. A two to three page in-depth student report on one of the science themes included in the course of study. The topic will be selected by the student with teacher as guide.
B. A laboratory experiment will be conducted in two phases:
   Phase One. Students will conduct a wet lab and collect data. Students will be assessed on the accuracy of their data collection. The timing of Phase One is at the discretion of the teacher.
   Phase Two. Students will complete a dry lab with the same lab experience but with different data. This will allow the students to interpret data. Phase Two will be given at a standardized time across the district.
C. Students will be provided articles containing conflicting points of view on a socially relevant, environmental issue. Students will be required to interpret the data and present their own conclusions in writing and orally. The environmental issue will change each year.
D. Students will complete a non-written presentation. Other students in the class will critique this presentation with established criteria developed by students with teacher as guide.
E. Tests and semester exams will also be included in the portfolio.

VI. GENERAL INFORMATION

Honors Integrated Science 3-4 is a ten credit, yearlong course. It satisfies ten credits of the district's science graduation requirement. Integrated Science 1-4 will satisfy the requirements for both physical and life science.

Completion of Honors Integrated Science 3-4 will count for one year of the U.C. "D" (laboratory science) entrance requirement.

No special fees or materials would be necessary.

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