



## **Independent Studies Course Syllabus**

**Course Number: SCI 907-Classroom Science, Cells and Genetics (Methods and Activities, Grades K-12)**

**Instructor: Marvin Harms**

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**Web page: <http://www.hands-on-experiments.com>**

**Number of Units: Three**

### **Course Description:**

This online methods course is designed to explore how the study of Biology, with emphasis on cells and genetics, can be used to enrich the science programs. The participants are required to complete and evaluate a planned series of experiments and/or experiences with their students. This course is in alignment with the California State and National Science Standards. Common Core State Standards for Literacy in History/Social Studies, Science and Technical Subjects are included in lesson plans and assignments. All of these experiments and/or experiences may be used with children in the classroom, home, and/or neighborhood.

### **Course Dates**

This course is self-paced; students may enroll at any time and take up to one year to complete assignments. (Three week minimum)

### **Course Materials:**

All the materials are found online.

### **Moodle Site**

Students will be required to work in the Moodle environment. For those students who do not have access to a Moodle site on a school or district server, free options are provided.

### **Technology Requirements (For online courses)**

In order to successfully complete the course requirements, course participants will need Internet access, be able to send and receive email, know how to manage simple files in a word processing program, and have a basic understanding of the Internet.

Please remember that the instructor is not able to offer technical support. In the event that you need technical support, please contact your Internet Service Provider.

If you need help logging on to the Moodle site, contact The Help Desk at Fresno Pacific University by telephone 1 559 453 3410 or by email [helpdesk@fresno.edu](mailto:helpdesk@fresno.edu).

### **Course requirements.**

1. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.
2. Use a variety of print and electronic resources (including the World Wide Web) to collect information and evidence as part of a research project.
3. Communicate the logical connection among hypotheses, science concepts, test conducted, data collected, and conclusions drawn from the scientific evidence.
4. Construct scale models, maps, and appropriately labeled diagrams to communicate scientific knowledge (e.g., motion of Earth's plates and cell structure).
5. Communicate the steps and results from an investigation in written reports and oral presentations.
6. Plan and conduct a scientific investigation to test a hypothesis.
7. Evaluate the accuracy and reproducibility of data.
8. Distinguish between variable and controlled parameters in an experiment.
9. Recognize the slope of the linear graph as the constant in the relationship  $y=kx$  and apply this principle in interpreting graphs constructed from data.
10. Construct appropriate graphs from data and develop qualitative statements about the relationships between variables.

### **National Standards**

<http://corestandards.org/the-standards> Download Common Core State Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects. Go to pages 60 - 66 to see the Common Core Standards for this Class.

The outcomes and course materials are aligned to and are supported by the six Science Teaching Standards, which are contained in the National Science Education Standards and can be located at [http://www.nap.edu/openbook.php?record\\_id=4962&page=1](http://www.nap.edu/openbook.php?record_id=4962&page=1) Content standards for experiments and experiences in this course are aligned to the National Science Education Standards that can be applied to each of the grade level content areas for :

- Unifying concepts and processes in science.
- Science as inquiry.
- Physical science.
- Life science.
- Earth and space science.
- Science and technology.
- Science in personal and social perspectives.

- History and nature of science.

Students will apply grade level standards applicable to their state or local district standards.

### **Primary Learning Outcomes.**

1. Teachers who take this course will demonstrate how to make science learning relevant to daily life.
2. Teachers will be able to effectively present the study of cells and genetics in a variety of situations.
3. Teachers will be able to articulate how the State and/or National Science Standards were met using this material.
4. Teachers will be able to identify and assess a process on how to teach this material effectively.
5. Teachers will understand that major scientific breakthroughs may link large amounts of knowledge, build upon the contributions of many scientists, and cross different lines of study.
6. Teachers will understand that scientific discovery is often a combination of an accidental happening and observation by knowledgeable persons with an open mind.
7. The cell is considered to be the basic living unit. Be able to distinguish between single-celled organisms and multi celled organisms.
8. Be able to arrange in order, from smallest to largest, the levels of organization that occur in nature and to write a brief description of each.
9. Organisms use a molecule known as ATP to transfer chemical energy from one molecule to another. Why is this essential for living things to exist.
10. Reproduction is the means by which each new organism arises. Why is this an essential characteristic of life?
11. How are DNA and cellular reproduction linked in the process of inheritance?
12. Explain what the term biological diversity means to you, and speculate about what caused the great diversity of life on Earth.
13. Outline a set of steps that might be used in the scientific method of investigating a problem.
14. Explain why a control group is used in an experiment.

### **Schedule of Topics and Assignments.**

Take a look at the curriculum required by your district. Perform the experiments and/or experiences included in this course that are appropriate to meet the needs of your district. By doing the experiments and/or experiences, you will be able to become more proficient in your ability to communicate with your students, parents, fellow teachers and administration.

Experiments and/or experiences are designed with the busy life of a teacher in mind. The experiments are designed to give you a basic format from which to develop the concepts. The Experiment Forums are designed so that you may evaluate your teaching strategy. The Experiment Forums are to be completed for each Experiment that you do. The Experience Assignments are to be posted in the Forum section. The way the class works

is that you are to do fifteen (15) assignments plus post a one page report about how this class enhanced your teaching day. There is a place to do this at the top of the front page. So, if you do 10 Experiments than you must do the value of 5 Experiences to equal 15. If you do (15) Experiments than you will not do any Experiences. Remember that some of the Experiences are valued at more than one assignment.

### **Evidence of Learning;**

Instructor will assess student's learning based on evaluation of work submitted by students based on class participation, reflective writing, and criteria established for each assignment and/or experiment or experience. I will read the Forums that you post. The Forums will be responded to within 24 hours. This will be a way of communication with you about your progress.

### **Grading and Rubrics**

Grades will be assigned based on points earned during the course. Grades will be given on the following basis: A=99-110 points, B=88-98 points. For a credit grade you must have at least 88 points.

Check the grading rubric for expectations and points given.

### **Instructor/Student Contact**

"Built into the course requirements, are several contacts between the course instructor and the student. Questions are addressed and assistance is offered through these contacts between the instructor and student." These contacts are confirmed when the Student goes online and posts the assignments.

### **Submitting the Grade Form**

The Grade Form is to be completed online. Look on the left of the top page and you will see Grade Form under Administration. If you have not created a login account, you will need to do so. <http://ce.fresno.edu>.

### **Instructor/Student Contact:**

Built into the course requirements, are several contacts between the course instructor and the student. Questions are addressed and assistance is offered through these contacts between the instructor and student. These contacts are confirmed when the Student goes online and posts their assignments. If I cannot reach the student by email, I will give them a telephone call and discuss their work. I will contact the student as many times as is necessary. The minimum will be at least three contacts.

### **Online Courses**

Throughout the course students will be communicating with the instructor on a regular

basis through the use of Forums. In addition, students are encouraged to email the instructor at any time. Students will also receive feedback on the required assignments as they are resubmitted. I will contact the student within twenty four hours after they have posted an assignment.

### **Policy on Plagiarism**

All people participating in the educational process at Fresno Pacific University are expected to pursue honesty and integrity in all aspects of their academic work. Academic dishonesty, including plagiarism, will be handled according to the procedures set forth in the Fresno Pacific University Catalog.

Alignment to Fresno Pacific University Desired Student Outcomes:

Graduate level course work reflects Fresno Pacific University's Desired Student Learning Outcomes as it applies to professional development to demonstrate the following:

- Oral and written communication individual and group settings.
- Content knowledge, and application of such knowledge in the student's area of interest to affect change.
- Reflection for personal and professional growth.
- Critical thinking.
- Cultural and global perspectives to understand complex systems.
- Computational/methodological skills to understand and expand disciplines, including an understanding of technological systems"

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