

SCI 101/101A - 16,17 Early Success in Science and Mathematics

M or W 1:00pm-3:50pm 8-149

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Office Hours:

Monday	
Tuesday	1-3pm
Wednesday	12-1pm
Thursday	9-10am, 2-3pm
And by appointment	

Furlough: SCI 101-16 will be affected by the furlough, and there will be no class November 9. SCI 101-17 will not be affected by the furlough. Homework will be assigned this week, though.

Course Description: Development of the student as a scientist and mathematician. Role of science and mathematics in society. Developing attitudes and behaviors leading to academic success and active learning. Community building through collaborative learning activities. Understanding of the foundations of Science. 1 lecture, 1 two-hour activity. Concurrent enrollment required. SCI 101/101A and SCI 102/102A together satisfy GE Area E.

Grading:

Attendance & Participation	25%	Final Exam	25%
Weekly Assignments	25%	Weekly Assessment	5%
Campus Resource Assignment	15%	Name Quiz	5%

Assignments:

- Learn the names of your fellow students and pass a quiz.
- Complete any assignments given in class.
- Complete the Library assignment.
- Keep track of your expenses for the months of October and November.
- Complete the Campus Scavenger Hunt.
- Listen to the Radiolab episode "Yellow Fluff and Other Curious Encounters" and complete the corresponding questionnaire during week 7. The episode is available for free on iTunes or at www.radiolab.org.
- Complete the group assignment on campus resources, and give a short presentation on your chosen campus resource.
- Complete weekly course assessments. Each week you will write a paragraph evaluating the success of the previous week's activities and information.

Help: If you have a physical, learning, or psychological disability and require accommodations, please let the Disability Resource Center know as soon as possible. You will need to register with, and provide documentation of, your disability to Disability Resource Center, Building 9-103, 869-3333, 869-4178 - TTD, drc@csupomona.edu.

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Schedule:

Week 1: Presuppositions

Science: What is Science? What differentiates Science from other fields of study? Begin talking about what makes for good Science. Discuss the presuppositions that underlie Science. Explore the refutation of Science through the philosophical arguments of the Skeptics. Where does this leave Science? Discuss the non-contradictory dichotomy between Science and Faith.

Activity: Campus Scavenger Hunt

Week 2: PEL Model I

Science: What model underlies scientific inquiry? Continue talking about what makes for good Science. Introduce the PEL model of Presuppositions, Evidence, and Logic. What role does each piece play in the process of scientific inquiry? Can a functional model exist without any of these pieces? What isn't included in this model? Is it necessary?

Activity: Library Exercise in computer lab

Week 3: Deductive and Inductive Logic I

Science: Review the PEL model. Discuss the differences between inductive and deductive logic. Introduction to deductive logic. Discuss the absolute nature of deductive logic, as well as the movement from fact to hypothesis as the direction of deductive logic.

Use the following models: (1) the revolution of the universe around the Earth. (2) General Relativity and the introduction of Dark Matter.

Activity: Check Digits

Week 4: Deductive Logic II

Science: Review deductive logic. Discuss the role of probability in deductive logic. Introduction to probability. What can probability tell us about the expectation of certain events occurring given the absolute knowledge provided by deductive logic.

Activity: Probability and genetics

Week 5: Deductive Logic III

Science: Review deductive logic. Discuss common fallacies in deductive logic: ad hominem attacks, assuming the conclusion, denying the argument, begging the question, circular arguments, and others.

Activity: Financial Math

Week 6: Inductive Logic II

Science: Introduction to inductive logic. Compare and contrast with deductive logic. Discuss the statistical nature of inductive logic, as well as the movement from collected data to constructed model as the consequence of inductive logic. Can we trust inductive logic? Is the universe that consistent? Discuss the role of statistics in inductive logic.

Activity:

Week 7: No class

Activity: Radiolab episode "Yellow Fluff and Other Curious Encounters"

Week 8: PEL Model II

Science: Review the PEL model and the two types of logic. How do deductive logic and inductive logic work together with the PEL model in Science? Discuss the back-and-forth process of using deductive logic to create hypotheses and using inductive logic to take collected data and create models and evaluate hypotheses. Can we do Science without either type of logic?

Apply the PEL model to personal behavior. Based on personal habits with time management and financial matters, what does inductive logic suggest? What model describes your habits? Based on deductive logic, what are the consequences of your habits? What changes should be made in your lifestyle? What does deductive logic say about the consequences of these changes?

Activity: Personal finances

Week 9: Parsimony

Science: Is a more complicated model necessarily better? Introduction to predictive and postdictive results. Which one will be of most use to you? Introduction to the concept of parsimony and Ockham's Razor. Discuss examples from Science history.

Activity: Developing a model

Week 10: The Limitations of Science

Science: Discuss the limitations of Science both as a way of thought and as a practical basis for exploration of the universe.

Activity: Evaluating Scientific theories, review

Week 11: Finals