

Doane College Course Syllabus
For
Principles of Physical Science (PHS 105)
 By
 James P. Hale, Ph.D.

Credit Hours: 4

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Course Description for *Principles of Physical Science*: An introductory course in physical science processes and selected content with applications to your daily life. Hands-on activities will include the following science content:

- ◆ **How Long Is That?**....including science content such as length, estimation, accuracy, and rulers.
- ◆ **Closed Systems**....including science content such as pressure, buoyancy, effects of heating and cooling on pressure and density of liquids.
- ◆ **Mystery Powders**....including science content such as physical and chemical properties of matter, chemical reactions, scientific testing and identifying an unknown.
- ◆ **Balancing**....including science content such as forces, balancing, symmetry (center of gravity) and equivalence.
- ◆ **Batteries and Bulbs**....including science content such as electricity, circuits, conductors, and energy flow.
- ◆ **Swingers**....including science content such as pendulums, forces, energy exchange, and effects of mass (wt.) on swinger momentum.
- ◆ **Will It Float?**....including science content such as mass, volume, density, and buoyancy.
- ◆ **Jim the Ole Air Bag** including science content such as chemical reactions and car air bag chemistry.
- ◆ **Light It Up?** including science content such as properties of light, refraction, reflection, color and spectrum.
- ◆ **Water World Questions**.....Take-home Final Exam.

These hands-on activities that will demonstrate the following science processes:

Observing	Controlling variables
Describing	Interpreting data
Measuring	Identifying qualitative (descriptive) relationships
Ordering	Identifying quantitative (numeric) relationships
Classifying	Identifying spatial relationships
Symbolic representation	Identifying time relationships
Using numbers	Inferring
Making hypotheses	Data synthesis
Designing experiments	Predicting
Experimenting	Communicating results

Textbook:

- Class notes from handouts, lectures and activities
- Internet sources and library science texts

Course Objectives: Upon completion of this course, the student should be able to.....

- Identify descriptions of common physical science terms.
- Identify descriptions of common physical science processes.
- Learn scientific content and processes through discovery.

Instructional Approach: *Primarily, this course will be individualized, discovery-oriented and self-instructional in nature.* The course instructor will use a set of step-by-step handouts to guide the students through a series of eight (8) hands-on activities. The instructor will conduct mini-lectures covering at least one “big concept” during each class period (e.g., the relationship between temperature and pressure, how mass affects the swing rate of “swingers,” the meaning of density, how energy flows thru liquids, solids and gases, etc). But, each class period will mostly be given over to *scientific discovery by the students....* with 1-on-1 assistance from the instructor.

Assessment Methods: One-half of your final grade (50%) will result from the instructor’s receipt and evaluation of the take-home activity (**Water World Questions**). The remaining half of your final grade (50 %) will be derived from a final exam covering the science content and process presented and/or discovered in the course. This exam will be objective in nature, including multiple-choice, true-false and matching-type questions.

Course Policies: Students will be encouraged to participate in each other’s learning. Students should cooperate to complete their LAB Reports. But, each student must complete his/her two final exams (2) without assistance from others.

The Doane College Academic Integrity Policy will be adhered to in this class. All projects and tests will represent your own work. Any use of others’ ideas and words without proper citation of sources is plagiarism and will result in penalties to be determined by the instructor and/or the dean of undergraduate studies.

Principles of Physical Science
PHS 105
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Class Schedule

Date	Activities	Time
Monday 7/28	1. Focus on you. 2. Course Requirements (Course Syllabus) 3. Science Activity: “Is the bottle full?” 4. Mini-lecture: “Science Processes and Content” (Handouts 1 & 1A) 5. Break 6. Take-home Final Exam (100 points): “Water World Questions” 7. Discovery Activity: “How long is that?” 8. Mini-lecture: “What is a System of Measurement?” (Handout 2) 9. Researching References On the Internet: “Water World Questions”	6:00pm to 10:30pm
Tuesday 7/29	10. Discovery Activity: “Closed Systems” 11. Mini-lecture: “Forces: Interaction Between Volume, Pressure and Temperature” (Handout 3) 12. Break 13. Discovery Activity: “Mystery Powders” 14. Mini-lecture: “Classification of Physical and Chemical Properties” (Handout 4)	6:00pm to 7:45pm 7:45pm to 8:00pm 8:00pm to 8:15pm 8:15pm to 10:00pm 10:00pm to 10:30pm
Wednesday 7/30	15. Discovery Activity: “Balancing” 16. Mini-lecture: “Forces: Interaction between Mass and Distance” (Handout 5) 17. Break 18. Discovery Activity: “Batteries & Bulbs” 19. Mini-lecture: “Energy: Electricity, Light & Heat” (Handout 6)	6:00pm to 7:45pm 7:45pm to 8:00pm 8:00pm to 8:15pm 8:15pm to 10:00pm 10:00pm to 10:30pm

Thursday 7/31	20. Discovery Activity: “Swingers” 21. Mini-lecture: “Pendulum Forces: Interactions between Mass, Length and Swing Frequency” (Handout 7) 22. Break 23. Discovery Activity: “Will It Float?” 24. Mini-lecture: “Mass, Volume and Density” (Handout 8)	6:00pm to 7:45pm 7:45pm to 8:00pm 8:00pm to 8:15pm 8:15pm to 10:00pm 10:00pm to 10:30pm
Friday 8/1	25. Discovery Activity: “Jim’s an Ole Air Bag” 26. Mini-lecture: “Jim’s An Ole Air Bag Chemical Reactions” (Handout 9) 27. Discovery Activity: “Light it Up” 28. Break 29. Mini-lecture: “Light, Refraction, Color & Reflection” (Handout 10) 30. Discovery Activity: “What’s on the PHS Final Objective Exam?” (Handout 11) 31. Water World Questions – Do you need any equipment?	6:00pm to 6:30pm 6:30pm to 7:00pm 7:00pm to 8:30pm 8:30pm to 8:45pm 8:45pm to 9:00pm 9:00pm to whenever
Saturday 8/2	32. Take-home Final Exam: 100 point “Water World Questions”	100pm to 5:30pm (No Formal Class)
Sunday 8/3	33. Final Exam: 100 point Objective Test (Includes 100 Multiple Choice, True-False & Matching Questions)	1pm to 2:30pm
Monday 8/4	34. The 100 point Take-home Final Exam “Water World Questions” is due via <u>E-Mail</u> by Monday (8/4) by <u>Midnight*</u>.	Via james.hale@doane.edu
Good Luck!!!!!!		

*Your Take-home Final Exam score will be reduced by 1% for each day the “Water World Questions” are turned in late.