

PHSC 102
Introductory Physical Science
Spring 2005

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CATALOG DESCRIPTION: PHSC 102. (3-2-2) An interdisciplinary approach to the laws and principles of chemistry and physics applied to matter, and energy. (40.0101).

PREREQUISITES: None

REQUIRED TEXTS AND OTHER MATERIALS:

1. Physical Science, Tillery, 5th edition, McGraw Hill, 2001
2. Activities Packet for Physical Science 102. Available at Copy Connection in Thibodaux
3. Three ring, 2-prong folder with pockets (**not** a 3 ring binder)

REQUIRED SUPPLEMENTARY READINGS: list or if none required, state it.

COURSE GOALS: Students will develop an understanding of

1. Scientific inquiry,
2. Energy transfer via waves, and
3. Physical and chemical changes of properties of matter

STUDENT OUTCOME OBJECTIVES:

Upon completion of this course students will:

1. Identify questions that can be used to design a scientific investigation. SI-M-A1
2. Design and conduct a scientific investigation. SI-M-A2
3. Develop descriptions, explanations, and graphs using data SI-M-A4
4. Develop models and predictions using the relationship between data and explanations. SI-M-A5
5. Compare alternative explanations and predictions. SI-M-A6
6. Communicate scientific procedures, information, and explanations. SI-M-A7
7. Identify and compare the characteristics of different types of energy. PS-M-C1
8. Understand that the sun is a major source of energy and that energy arrives at the Earth's surface as light with a range of wavelengths. PS-M-C3
9. Observe and describe the interactions of light and matter (reflection, refraction, absorption, transmission, scattering). PS-M-C4
10. Understand that Energy is involved in chemical reactions PA-M-C7
11. Understand that matter is made up of particles called atoms and that atoms of different elements are different PS-M-A2.
12. Group substances according to similar properties and behaviors. PS-M-A3
13. Understand that atoms and molecules are perpetually in motion PS-M-A4
14. Investigate the relationship among temperature, molecular motion, phase changes, and physical properties of matter. PS-M-A5
15. Investigate chemical reactions between different substances to discover that new substances formed may have different physical properties and do have different chemical properties. PS-M-A6
16. Understand that during a chemical reaction in a closed system, the mass of the products is equal to that of the reactants. PS-M-A7
17. Discover and record how factors such as temperature influence chemical reactions. PS-M-A8
18. Identify elements and compounds found in common foods, clothing, household materials, and automobiles. PS-M-A9

COURSE CONTENT:

- 1) Waves
 - i) Types
 - (a) Compression
 - (b) Transverse
 - ii) Characteristics
 - (a) Frequency
 - (b) Wavelength
 - (c) Amplitude
 - iii) Properties
 - (a) Interference
 - (b) Diffraction
 - (c) Refraction
 - (d) Reflection
 - (e) Doppler Effect
 - (f) Resonance
 - (g) Polarity
 - iv) Sound
 - v) Light
 - (a) Mirrors
 - (b) Lenses
 - (c) Interaction with matter
 - (d) Electromagnetic Spectrum
- 2) Composition of Matter
 - i) Atomic Structure
 - (a) Basic particles
 - (b) Atomic Number
 - (c) Atomic Mass
 - ii) Nuclear Energy
 - (a) Radioactivity
 - (b) Fission Reactions
 - (c) Fusion Reactions
 - iii) Physical and Chemical properties
 - (a) Mixtures
 - (b) Reactions
 - iv) Periodic Table
 - (a) Element Symbols
 - (b) Arrangement
 - v) Nomenclature
 - (a) Binary covalent molecules
 - (b) Ionic compounds
 - vi) Chemical Reactions
 - (a) Ionic Bonding
 - (b) Covalent Bonding
 - vii) Types of Reactions
 - (a) Combination
 - (b) Decomposition
 - (c) Single Replacement
 - (d) Double Replacement
 - viii) Acids and Bases
 - (a) Neutralization
 - (b) pH

COURSE REQUIREMENTS:

1. Attendance-Due to the nature of this course, many hands-on experiences will be provided in class that cannot be made up. More than two unexcused absences will result in a lower grade in the course.
2. Required Readings: Students are to read Chapters 6, 8, 9, 15, 10, 11, 12, 13 in the textbook.
3. Required written work:
 - a. Activity journal
 - b. Elements project
 - c. Connection project
 - d. Concept map
4. Activities
 - a. Cooperative group discussions
 - b. Hands-on/minds-on activities (Constructivist Model--Learning Cycle)
 - c. Individual/Group projects
 - d. Group presentations
 - e. Concept mapping
5. Field Experience
 - a. Education Majors: 6 hours of field experience coordinated with Alyson Naquin. Reflections must be turned in for credit.
 - b. All other majors: 6 hours of service learning. This can include many types of community service, the only stipulation is that it should include a connection between physical science content (from Phsc 102) and your major. A report is included as part of this

METHOD OF EVALUATION:

1. 3 exams (40%) Exams 1-2, 10% each; Test 3, 20%(final)
2. Elements Project - (Individual) 5%
3. Concept Map - (Group) 5%
4. Inquiry Project (Group) 5%
5. Connection Project - (Group) 10%
6. Activity Journal - (Individual) 30%
7. Field Experience – (Individual) 5%

GRADING SCALE 90-100% A 80-89% B 70-79% C 60-69% D

MAKE-UP POLICY:

Exams (for excused absences only) must be made up on the last day of classes 1:00-3:00 pm. Failure to do so will result in loss of points allotted for that exam. Hands-on activities will **NOT** be made up. All other projects must be made up before the end of the last day of class.

ATTENDANCE POLICY:

Attendance is mandatory. More than two unexcused absences will result in a lower grade in the course.

ACADEMIC HONESTY POLICY: Any student found cheating will be subject to the penalties as stated in the Student Code of Conduct handbook; including but not limited to a score of zero on exam, expulsion from the class or expulsion from the University.

SEMESTER WITHDRAWALS :

The last day to withdraw from the class with a “W” is 7 April 2005.

ACADEMIC DISABILITIES POLICY: If you have a documented disability that requires assistance, you will need to register with the Office of Disability Services for coordination of your academic accommodations. The Office of Disability Services is located in Peltier Hall, Room 100-A. The phone number is (985) 448-4430 (TDD 449-7002).

CLASS DISRUPTIONS: Are not tolerated. The use of cell phones, pager and/or any other electronic personal device in class is prohibited. Any infractions will result in the dismissal from class.

PHYSICAL SCIENCE: ACTIVITIES JOURNAL

JOURNAL FORMAT: A 2-pocket, 3-prong folder (not a 3-ring binder) is **required**, so that you can add pages throughout the semester.

TITLE PAGE OF JOURNAL: (page 1, centered) Be creative! Choose your own title.

"Title"
in
partial completion of
Physical Science 102
Nicholls State University
Spring Semester 2005
By
"Your Name"

TABLE OF CONTENTS: (page 2) As you complete each activity, write the title of each activity and the page number on which it begins in the Table of Contents. If you miss an activity, write "absent" instead of a page number.

FIRST ACTIVITY: (page 3)

Date: Record the date on the top right on the activity sheet from your packet. Record your Group # below the date.

Title, Purpose, Materials and Supplies, and Procedure are stated for you on the activity sheets. You need to make sure you understand these before you begin an activity.

Observations and Data: Record all observations and data as you do the activity on the observation sheets provided. Use labeled drawings or sketches when appropriate. Data should be organized in tables. Data includes qualitative and quantitative information *related to direct observations and not inferences*.

It is your responsibility to get my initials on your observation sheet or the activity will not be valid.

Thinking Questions: Include complete answers to all questions posed on the activity sheets. Use your observations and data, your textbook, and classroom discussion.

Conclusion: Relate to the purpose. Be specific and use your observations and data to support your concluding statements. Classroom discussion as well as information from your textbook should be used also to support your concluding statements. If your group's data does not agree with the majority of the class data, you should indicate possible reasons for this conflict.

Extensions: Apply the concepts related to this activity to **your everyday world**. Be specific describing the relationship. Do not include how or if you would use this in the classroom. I assume you will use them since activities and all of these concepts are required by the state.

SECOND ACTIVITY: Repeat the same steps.

Your journal is worth 30% of your grade. Be neat and thorough. You must use complete sentences and correct grammar and punctuation for the last three sections. Do not hesitate to ask questions before you write in your journal. At the end of the course, the journal is yours to keep, so use as much detail as you need to be able to repeat each activity.

Note: All written work is expected to be of college level writing. All journal entries are to be in complete sentences (excluding observations). The two projects (Elements and Connection) are to have proper references and citations. Encyclopedias and popular reading magazines are not acceptable references. Web-sites with .gov or .edu will be accepted. All others excluded unless you have an exception *in writing* from me. Do be careful with Internet sources, while a lot of information is available, not all of it is correct. Scientific texts (CRC Handbook of Chemistry and Physics, Merck Index -- both readily available in References in library) and journals (Science, Nature etc.) are the best source for information.