

How Things Work  
IDST 1720 (Core 7 or 9)  
Spring 2007

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*Schedule:* T and Th 10:00-11:15 (OH-240), Th 1:00-4:00 (Lab OH-265)

*Texts:* The Sciences: An Integrated Approach, 5<sup>th</sup> edition, Trefil and Hazen  
Death's Acre by Dr. Bill Bass and Jon Jefferson

*Goggles:* Required for laboratory (\$5.00 purchase in lab)

*Calculators:* A basic calculator is required.

*Note:* This course is designed to be taken in conjunction with IDST 1710 (offered in Fall). Taken together these courses fulfill the Core 7 & 9 requirements.

**Goals:**

*How Things Work* is a topical course designed to deliver the fundamental scientific principles of Chemistry and Physics necessary to interpret the barrage of scientific information available to all citizens. At the completion of this course students will be able to more carefully evaluate and critique current events in the media related to chemistry and physics and evaluate the impact that those events have on their daily lives.

**Expectations:**

You are expected to attend each lecture and laboratory. In fact, class attendance is crucial to success in this course as many activities will be completed using groups both in class and during laboratory sessions. Roll will be taken and absences reported to the College according to the Millsaps Catalog. For freshman that is four class absences during the semester and for any student after three unexcused absences. The reporting is designed to be a counseling instrument.

**Students are expected to attend every meeting of this course. Missed exams and laboratory assignments cannot be made up without an approved excuse.** Furthermore, laboratory assignments are due by 4:00 pm the day of lab or at the beginning of the following lecture period if time runs out. Late assignments will result in point deductions of 10% per day.

**Grading:**

3 lecture exams	40%
Comprehensive final exam	15%
Lab, attendance, in-class assignments	35%
Writing assignment/Oral Presentation	10%

**Tentative Exam Schedule:**

Tuesday February 13-Exam 1

Thursday March 22-Exam 2

Tuesday April 24-Exam 3

*Final Exam:* Thursday May 3, 2007 at 9:00 am

Grades will be scaled as follows:

94-100	A	73-76	C
90-93	A-	70-72	C-
87-89	B+	67-69	D+
83-86	B	60-66	D
80-82	B-	below 60	F
77-79	C+		

*Grading errors:* For consideration of a possible grading error on an exam/assignment, you must return it to the instructor within one week of the date it was returned to you. Furthermore, you must include a clear written statement of why you feel you deserve more credit.

### **Liberal Arts Abilities:**

Because this course is part of the core, a number of essential skills and abilities will be emphasized.

*Reasoning:* Scientific thought is evidence-based. Our reasoning does not depend on faith, but on a way of knowing that is based on natural laws, and modifies our knowledge structure on the basis of observation and data. The scientific method will be utilized to understand the nature of “how science works”. Furthermore as you analyze information to arrive at a specific conclusion, or use numerous individual observations to construct a general model, you will develop reasoning skills.

*Written and Oral Communication:* A 3-5 page paper, writing assignments, and essay questions on exams will allow the students to communicate through writing. Informal discussion groups and in-class presentations are intended to enhance oral communication skills. The writing assignment included in this course is suitable for submission to the Writing Program to fulfill the Core 6-9 writing portfolio requirements.

*Quantitative Thinking:* During this course you will utilize various techniques for making measurements, then use those measurements to construct explanations for your observations. In doing so, you will develop quantitative thinking skills and gain an understanding of the role of mathematics in science.

*Historical Consciousness:* Because new discoveries build on earlier work and the ways in which observations are interpreted depend largely on the prevailing culture, knowing the history of any field is an essential part of understanding it. In this class, you will examine major historical episodes that trace the process of scientific discovery and portray the lives of central figures in science.

*Global and Multi-Cultural Awareness:* Events that scientists once thought were localized to a particular region, zone, or continent are currently understood to have global implications. Political, economic, and social decisions made by cultures around the globe tend to impact all people. Understanding science is an important part of becoming a globally aware citizen.

*Valuing and Decision Making:* Science is sometimes said to deal with facts, not values. Perhaps, but at the least, science can certainly suggest the consequences of one or the

other of several paths of action, and can also enable cost-benefit analysis. An aspect of “valuing” that is generally overlooked is “not valuing”. This course will pay attention to misinformation put out in the name of science and the characteristics and detection of pseudoscience. Another important aspect of decision making is risk analysis.

### Honor Code:

This course operates under the guidelines defined by the Millsaps College Honor Code. Unless stated by the instructors, **all work turned in for a grade is pledged** individual work.

Students are not allowed to leave the classroom during an exam for any reason. Also students may not use or look at cell phones for any reason during an exam. Finally, it is considered an Honor Code violation if students relay information from exams to other students who have not yet taken the exam.

*Changes:* Changes to this syllabus are not anticipated, but if necessary they will be announced in class and/or via e-mail.

### Tentative Course Outline:

- 1) How Does Science Work?-Chapter 1
- 2) How Does the Universe Work?-Chapters 2, 6, 14, 16
- 3) How Does Energy Work?-Chapters 3 and 4
- 4) How Does Electricity Work?-Chapter 5
- 5) How Do Chemical Reactions Work?-Chapters 8,10, 12, 22
- 6) How Does Forensic Science Work?-*Death's Acre*

**Tentative schedule:** Lecture and lab meeting dates including lab topics and related text chapters.

	<u>Tues.</u>	<u>Thurs.</u>
<b>January</b>	16	18, Scientific Method, Cell Phone Case study
	23	25, Emission Spectra lab and UV beads
	30	
<b>February</b>		1, Planetarium
	6	8, Energy drinks, “A Can of Bull?”
	13	15, Food chemistry
	20	22, Geiger Counter Experiment (Inverse Square Law)
	27	
<b>March</b>		1, Simple circuits/switches
	6	8, Simple circuits/switches
	13	15, SPRING BREAK
	20	22, Thin Layer Chromatography (Analgesics)
	27	29, NSTA Meeting in St. Louis (No Lab)
<b>April</b>	3	5, Fingerprint Analysis
	10	12, Determination of age, gender, stature, and ethnicity using skeletal remains
	17	19, Blood Spatter Analysis (Chemiluminescence)
	24	26, Blood Typing with Saliva