

NATURAL SCIENCES 1
Laws and Models in Chemistry
Fall 2008 Instructor: Steven Werlin
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Introduction:

Natural Sciences One is an opportunity to reflect on the material aspects of our world. We will consider in what sense the world can be said to have a material basis and discuss various claims as to what the character of its material basis might be.

Expectations:

The centerpiece of any Shimer class is conversation. For a group and the individuals in it to make progress through conversation requires that all participants attend consistently and are on time. This is especially true in Natural Sciences One, because class time will often be devoted to shared observation of experiments. Excellent attendance is, thus, only the minimal expectation for the class. Students who miss too many classes, or are too often late for class, will receive a warning from the instructor that they are in danger of failing the course. Students who miss classes or continue to arrive late after having been warned may be dropped from or may fail the class.

Our class will involve frequent short writing assignments—usually one-two pages. These will generally emerge directly from classroom activities, and sometimes without advanced warning.

Students' final grades will depend roughly equally on their written work and their class participation.

Reading Schedule:

The following is a projected schedule of readings for the semester. Readings can change, and students should always take responsibility for making sure that they know what the assignment.

Course readings

Aristotle, The Physics

Bacon, The Novum Organum

Shamos, Great Experiments in Physics

Lucretius, On the Nature of The Universe

Wheelwright, The Presocratics

Shimer College Reprints

Avogadro A Manner of Determining the Relative Masses...

Berzelius Electrochemical Theory, Chemical Symbols and Formulas

Black Lectures on the Elements of Chemistry

Curie 1911 Nobel Lecture, On Radioactivity

Cannizzaro Sketch of a Course of Chemical Philosophy (to p. 34)

Clausius On the Nature of the Motion that We Call Heat

Dalton 1810 Extract, Absorption of Gases, Atomic Principles of Chemistry, Letter to Nicholson, 1808 Extract

Dulong & Petit Atomic Weights and Specific Heat

Gay-Lussac On the Combination of Gaseous Substances . . .

Lavoisier Memoir on the Calcination of Tin . . . , Elements of Chemistry (selections)

Macquer Excerpts from A Dictionary of Chemistry, The Theory and Practice of Chemistry

Mendeleev The Relation Between Properties and Atomic . . . , The Periodic Table

Pascal Scientific Treatises

Priestly On Dephlogisticated Air

Stahl Excerpts from On Sulfur

Thompson Source of the Heat Which is Excited by Friction

CALENDAR

Aug	22	Presocratics	pp. 31-63	12	Chemical Symbols and Formulas
	25		pp. 64-89	14	Cannizzaro Sketch of a Course of Chemical Philosophy
	27		pp. 90-119	17	Sketch of a Course of Chemical Philosophy (to p. 34)
	29		pp. 120-136, 143-154		
Sep	3		pp. 200-229	19	Mendeleev The Relation Between Properties and Atomic. . .
	5	Lucretius	On the Nature of The Universe Book I	21	The Periodic Table
	7		On the Nature of The Universe Book II	24	Curie 1911 Nobel Lecture <i>On Radioactivity</i>
	11	Aristotle	<i>Physics</i> , II 1-7		
	13		<i>Physics</i> , III 1-3		
	15		<i>Physics</i> , IV 1-9		
	18	Pascal	New Experiments Concerning The Vacuum (including the Preface) Account Of The Great Experiment		
	20		On The Equilibrium Of Liquids		
	22		On The Weight And Mass Of The Air		
	24		First paper due		
	27	Boyle	Touching the Spring of the Air (in Shamos) -- Boyle's Law		
	29	Bacon	<i>Novum Organum</i> - Book II through aphorism #22		
Oct	1		<i>Novum Organum</i> - Book II through aphorism #22		
	3	Lavoisier	Elements of Chemistry (to p. 15)		
	6	Black	Lectures on the Elements of Chemistry		
	8	Macquer	Excerpts from A Dictionary of Chemistry Theory and Practice of Chemistry		
	10	Priestly	On Dephlogisticated Air		
	13	Lavoisier	Memoir on the Calcination of Tin...		
	15		Memoir on the Calcination of Tin...		
	20	Thompson (Rumford)	Source of the Heat Which is Excited by Friction		
	22	Joule	On the Mechanical Equivalent of Heat (Shamos)		
	24	Lab			
	27	Dalton	Theory of the Absorption of Gases Atomic Principles of Chemistry		
	29		Letters to Nicholson (one each by Bostock and Dalton) 1808 Extract		
	31	Gay-Lussac	On the Combination of Gaseous Substances. . .		
		Dalton	1810 Extract		
Nov	3	Avogadro	A Manner of Determining the Relative Masses...		
	5	Dulong-Petit	Atomic Weights and Specific Heat		
	7	Clausius	On the Nature of the Motion that We Call Heat		
	10	Berzelius	Electrochemical Theory		