

## NS 150 – 05 Course Syllabus

Title:	NS 150 – 05 Intro/Natural Science
Instructor:	Nathan Boguslawski
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Office Hours:	Monday: 9:00 – 11:45 am Tuesday: 7:30 – 10:15 am Wednesday: 9:00 – 11:45 am Thursday: 7:30 – 10:15 am Also by appointment
Class Times:	Monday: 7:30 – 8:45 am Wednesday: 7:30 – 8:45 am

### Required Material:

Text: Science and Its Ways of Knowing, John Hatton and Paul B. Plouffe, 0-13-205576-7

Text: A Short History of Nearly Everything, Bill Bryson, 076790818X

### Optional Material:

Text: A Beginner's Guide to Scientific Method, Third Edition, Stephen S. Carey, 053458450-0

### Course Description:

NS 150 is an introduction to the way in which the natural sciences contribute to our understanding of the world around us. Although some content is present, the focus will be on the processes involved rather than the conclusions reached. We will approach the question “What is Science?” not by plowing through a laundry list of facts, data and theories; rather, we will examine the way scientists examine facts, collect data, investigate questions, and finally formulate and test theories. Science is both a product of and a contributor to western (and indeed, increasingly world) culture.

This course is a part of the Introductory Component of the General Education Core. The Introductory Component is designed to introduce students to the essential thinking and problem solving processes in various traditional disciplinary groups. In this specific case, the goal is for you to understand the problem solving process used by scientists as they try to understand the natural world. This understanding will help you to evaluate claims reported by the media, made by politicians and editorial writers, and other statements purported to be scientific.

## Course Themes:

**The Scientific Method:** Is there really a single “scientific method?”

**The relationship between science and society**

**The history of science:** How long has it been around and how has it changed?

**The interplay of science and technology:** They’re not the same.

**Science is a human endeavor:** Who are the scientists?

**Science is a social institution:** How do the scientists work?

**Science is a self-correcting institution:** How can the “facts” change?

**Science has power:** intellectual, social, and political.

## Students Responsibilities:

Students are responsible for all lecture material, class exercises, class questions, and any other material presented in the course. Students will be responsible for understanding the in-class exercises and techniques taught in the courses for the exams and quizzes.

## Methods of Evaluation:

Type:	Number	Weight:
Midterm Exam:	1	20%
Exit Essay:	1	10%
Critical Reading Documents:	3	25%
Causal Links Paper:	1	10%
Homework	~12	10%
PowerPoint Presentation	1	10%
Assessments of Understanding:	~10	5%
Science in the News:	2	10%
Total:	~31	100%

## Midterm Exam:

The midterm exam is a comprehensive check of current student knowledge and understanding. Content for the exams will be drawn from PowerPoint Notes of A Beginner’s Guide to Scientific Method, videos, lectures, discussions, A Short History of Nearly Everything, and readings from Science and Its Ways of Knowing. Make-up for the Midterm Exam will be given only for legitimate excused absences. If you are going to miss an exam, please call or email me in advance. No Exams will be given early.

## Critical Reading Documents:

**(CRDs)** are longer written exercises, which help you to analyze selections from Science and Its Ways of Knowing. These CRDs will follow a specific format that is provided in a separate document (starts on page 6 of this document). CRDs will be evaluated on both form and content. The CRD 1 will be peer reviewed on the date listed in the schedule. Failure to attend a peer review date will result in loss of points. After CRD 1 is returned to you, you may rewrite it and resubmit it within 3 class meetings; resubmission may result in an enhanced grade, you must include the previously graded CRD 1 with your second resubmission. The CRDs should be typed, double-spaced, 12-point Times New Roman font with good sentence and paragraph structure.

**Causal Links Paper:**

The **Causal Links Paper** and is a more in depth version of Science in the News. In this paper, you will trace a claimed causal link from a popular print media article to its scientific journal roots and evaluate both the original article and its report in the popular media. You will use the tools developed in A Beginner's Guide to Scientific Method as part of this evaluation. Again, the paper will be peer reviewed before final submission. The causal link paper should be typed, double spaced, 12-point Times New Roman font with good sentence and paragraph structure.

**Homework:**

Refers to select exercises from the texts, which I feel illustrate important points from the reading and provide excellent opportunities for the student to learn through working them. Homework will be due at the beginning of the class specified. The questions should be typed, double spaced, 12-point Times New Roman font, and answered using good sentence and paragraph structure.

Homework will be evaluated on both form and content. Late homework will be accepted, but will be docked 10% per day for being late.

**PowerPoint Presentation:**

PowerPoint presentation is a presentation to the class on a scientist and their contribution to their field of study. The presentation should include a bio of the scientist along with a short description of what their individual contribution to science was. The presentation should include a maximum number of slides of 5 with one being a title slide including the name of your scientist you're your name. Another slide should be an overview slide of what your presentation will include and then a reference slide. The length of the presentation is to be around 5 to 7 minutes, 6 minutes be the optimum time to have.

**Assessments of Understanding:**

(AU) will be short (approximately 3-5 minutes) unannounced quizzes. The purpose of these quizzes is to determine whether you understand the "big ideas" from homework, readings, or lectures.

**Science in the News:**

(SN) is a pair of brief (approximately 2-3 minutes or 200 words) oral summaries of media reports of science. The SN summary should be typed, double-spaced, 12-point Times New Roman font. Your first SN should come from the popular media such as newspapers, newsmagazines, or WWW sources. Your second should come from a science-related journal such as Physics Today, Science, Nature, or the New England Journal of Medicine. Each must contain the citation information, a brief summary, and short comments indicating why you think this particular scientific item is important or interesting. Those greater than a week old will not be graded.

## Grades:

93 – 100 %	A
90 – 92 %	A-
87 – 89 %	B+
83 – 86 %	B
80 – 82 %	B-
77 – 79 %	C+
73 – 76 %	C
70 – 72 %	C-
67 – 69 %	D+
60 – 66%	D
< 60 %	F

## Students with Disabilities:

If any student of this class needs course adaptations or accommodations due to a disability, if you have emergency medical information to share with me, or if you need special arrangements in case the building must be evacuated, please make an appointment to talk with me.

## Scholastic Honesty:

In the event of academic dishonesty, those involved **will receive an “F” grade for the course** and the violation of the Student Code of Conduct will be referred to the Director of Student Life for judicial action.

As defined in the LCSC Student Handbook, Academic Dishonesty is:

<http://www.lcsc.edu/osl/shb/shbcodeofconduct.htm>

- a) **Cheating** – intentionally using or attempting to use unauthorized materials, information, or study aids in any academic exercise. The term "academic exercise" includes all forms of work submitted for credit hours.
- b) **Fabrication** – intentional and/or unauthorized falsification or invention of any information or the source of any information in an academic exercise.
- c) **Collusion facilitating academic dishonesty** – intentionally or knowingly helping or attempting to help another to commit an act of Academic Dishonesty.
- d) **Plagiarism** – the deliberate adoption or reproduction of ideas or words or statement of another person as one’s own without acknowledgment.

According to the Student Code of Conduct,

The sanctions imposed for a violation of this section of the Code are independent of, and in addition to, any adverse academic evaluation which results from the student’s conduct. The course instructor is responsible for academic evaluation of a student’s work and shall make that evaluation without regard to any disciplinary action which may or may not be taken against a student under the Student Code of Conduct.

**Make-up Work (Late Assignments):**

My policy on late homework is that I will not accept any without a documented reason, if you turn it in late expect to lose 10% of the points per day. If you have a documented reason for turning in an assignment late than I will accept it, but I do need a note from your doctor if you plan to turn an assignment in late. All assignments are due at the **BEGINNING** of class time.

**Important Dates:**

<b>Date:</b>	<b>Item:</b>
Aug. 29, 08	Last day to reg/add/drop classes on-line
Sep. 1, 08	Labor Day - Campus Closed
Sep. 2, 08	Instructor's written approval required to add class(es)
Sep. 8, 08	Last day to add class(es) or to drop without 'W' grade on transcript
Oct. 1, 08	Last day to apply for graduation (Spring 2009 - all degrees/certificates)
Oct. 24, 08	Mid-term grades due
Oct. 31, 08	Last day to withdraw from class(es) or college for the semester
Nov. 24 - 28, 08	Thanksgiving Break - no classes
Dec. 15 - 18, 08	Final Exam Week
Dec. 19, 08	Final Exam
Dec. 23, 08	Final Grades posted to WarriorWeb

## Critical Reading Document Instructions

### Critical Reading Documents:

**CRD #1:** A Method of Enquiry, George F. Kneller (Hatton and Plouffe, pp. 11-24)

**CRD #2:** Science: Conjectures and Refutations (HP, pp. 81-86)

**CRD #3:** Setting the Stage for Discovery, Robert S. Root-Bernstein (HP pp. 108-117)

### Part I – Comprehension

Write a short (approximately 100 words) abstract of the reading selection. Following the abstract, list 3 words that are least familiar to you, together with the sentence context, look up each word in a dictionary and write down the most appropriate definition for the context. Give the dictionary citation. This section should not include any of your opinions. It is a summary of the essay.

### Part II – Course Themes

Choose one of the course themes and describe how the reading selection relates to that theme. This section should be a well-developed essay of 4-6 paragraphs or, if you prefer 500-1000 words. Each of the selections can be reasonably said to address several themes, so you should have some options for each essay. Some questions you might consider for each theme follow. Be sure to add quotes from the text to help support your chosen course theme.

**The Scientific Method:** Is there really a single clearly defined scientific method? Do all scientists approach science the same way? Is there a single criterion or perhaps a small set of criteria by which methods can be judged to be scientific?

**The relationship between science and society:** How does science influence society? How do other social institutions influence the practice of science? What is the role of science in contemporary politics?

**The history of science:** What are the cultural roots of science? How has the practice of science changed over the past few decades or centuries?

**The interplay of science and technology:** How does the use of particular technologies influence the practice of science? How does “theoretical” science lead to “practical” technology? How do you distinguish between science and technology?

**Science is a human endeavor:** Who are the scientists? What do they do? Why would someone choose to become a scientist? Why would someone choose not to become a scientist?

**Science is a social institution:** How does science happen? How does an idea move from conjecture to hypothesis to theory? How do ideas in science become accepted as mainstream?

**Science is a self-correcting institution:** How can the “facts” change? How does one theory displace another?

**Science has power:** What is the intellectual power of science? How is science employed as a political tool? How is science an engine of social change?

### **Part III – Integration**

Describe how this reading selection fits with the course as a whole, using specific examples from lectures, other readings, or exercises to illustrate your points. This section is most easily executed as an extension of Part II; trace the course theme through a section of the course, comparing and contrasting the statements made by the author to those of other essay writers, the instructor, or Stephen Carey. Again, 3-6 paragraphs is a good guideline.

### **Part IV – Application**

Briefly discuss how the selected course theme and the particular essay has impacted or could impact your life outside the NS 150 class. Has this critical reading exercise influenced your thoughts, words or deeds? Has this critical reading exercise influenced the way you perceive the thoughts, words, or deeds of others? One long or two or three short paragraphs will work here.

### **Part V – Evaluation**

Has this been a worthwhile exercise? In a nutshell, what value has the exercise had for you? Was it worth the time it took? A paragraph or two here is sufficient.

### **Rules for CRD Submission:**

Your CRD must be typed, double spaced, one inch margins, using a 12 point or larger typeface, preferably a serif font. Pages in the body of the document must be numbered.

The document must have a cover page which includes your name and the assignment (e.g. CRD #1). Each part must be clearly labeled, in fashion similar to that of the instructions.

There must be a bibliography including at a minimum the citation for the essay which is the focus of the document. You may use any reasonable format for citations and text notes.

The body of your CRD cannot exceed 8 pages.

**Schedule:** (Tentative)

<b>Date</b>	<b>Topic Lecture</b>	<b>Assignments</b>
25-Aug	Syllabus & Entry Essay	
27-Aug	Carey: Chapter 1, Observation Exercise	Bryson: Chapters 1 – 3
1-Sep	Robert Pirsig -- On Scientific Method, <b>Campus Closed</b>	
3-Sep	Carey: Chapter 2	Bryson: Chapters 4 – 6
8-Sep	Video: The Search for Adam	
10-Sep	Carey: Chapter 3	Bryson: Chapters 7 – 8
15-Sep	Peer Review for Critical Reading Document 1	
17-Sep	Carl Sagen -- Can We Know the Universe	Bryson: Chapters 9 – 10, <b>CRD1</b>
22-Sep	Charles Wynn -- Does Theory Ever Become Fact?	
24-Sep	Carey: Chapter 4	Bryson: Chapters 11 – 12
29-Sep	M&M worksheet, Bring a bag of M&Ms to class	Bag of M&M (Milk Choc.)
1-Oct	Carey: Chapter 5	Bryson: Chapters 13 – 14
6-Oct	Video: Missoula Flood	
8-Oct	Experiment: Brick	Bryson: Chapters 15 – 16 , <b>CRD2</b>
13-Oct	Midterm Exam Review	
<b>15-Oct</b>	<b>Midterm Exam</b>	
20-Oct	Stephen Gould -- Evolution as Fact and Theory	
22-Oct	Carey: Chapter 6	Bryson: Chapters 17 – 18
27-Oct	Causal Link Articles	
29-Oct	Video: Newton's Dark Secrets	Bryson: Chapters 19 – 20, <b>CRD3</b>
3-Nov	Evelyn Keller -- A Feeling for the Organism	
5-Nov	Stephen Hawking -- My Position	Bryson: Chapters 21 – 22
10-Nov	Causal Link Paper Peer Review	
12-Nov	Causal Link Paper, Crater Experiment	Bryson: Chapters 23 – 24 <b>Causal Link Paper</b>
17-Nov	Samual Scudder -- Learning to See, Magnetic Fields	
19-Nov	Electric Motor Experiment & Poster Requirements	Bryson: Chapters 25 – 26
1-Dec	PowerPoint Presentations	Bryson: Chapters 27 – 29
3-Dec	PowerPoint Presentations	
8-Dec	PowerPoint Presentations	
10-Dec	PowerPoint Presentations	
<b>15-Dec</b>	<b>Exit Essay Due</b>	December 15, 2008 by 9:30 am

**This schedule is subject to change at anytime during the semester.**