Studying for Exam One:

The Scientific Revolution

(ca. 1500-1700)

1. **How to study? 🡪 see the syllabus or talk to me**
2. **What to study? 🡪 see below for textbook readings [remember website readings, study guides, & in-class handouts too]**

Think about the **broad themes** of each chapter & section. How does the material presented **illustrate** these broad themes? **Re-read** the **introductions** to each chapter and the **conclusions**. Most importantly, think about how the material is connected to tell a larger story of scientific change between 1500 & 1700. See how the **specific evidence** fits into the **bigger picture**. Remember that your book is NOT just a collection of facts, it is an INTERPRETATION of selected facts that comprise a larger historical argument. This is the model to use for writing good essays.

**Page numbers are for *Revolutionizing the Sciences* (Second Edition, 2009)**

## Introduction: Philosophy & Operationalism

1. Renaissance & revolution [7-9]

**Chapter One: “What was Worth Knowing” in 1500?**

1. The universe of the university [10-14]
2. Natural knowledge & natural philosophy [14-18]
3. Astronomy & cosmology [18-23]
4. Beyond the university & Learned life . . . [23-27]
5. Learned life & everyday life [27-28]

**Chapter Two: Humanism & Ancient Wisdom: How to Learn Things in the Sixteenth Century**

1. Language & wisdom [29-32]
2. The scientific renaissance [33-36]
3. Finding out how the ancients did it [36-40]
4. Renovation, innovation, & reception [40-43]
5. Restoration & a new philosophical programme: *Archimedes redivivus* [43-46]

**Chapter Three: The Alchemist, the Craftsman, & the Scholar**

1. Mastering the occult [47-50]
2. Craft knowledge and its spokesmen [50-55]
3. Francis Bacon [53-63] OMIT

**Chapter Four: Mathematics Challenges Philosophy: Galileo, Kepler, & the Surveyors**

1. Natural philosophy—the only game in town? [64-66]
2. Galileo the mathematical philosopher [66-70]
3. The rising status & cognitive ambitions of the mathematical sciences: Galileo & Kepler [70-77]
4. Knowing, doing, & mathematics [77-78]

**Chapter Five: Mechanism: Descartes Builds a Universe**

1. A world to fit the knower [79-82]
2. Getting inside the mind of God [83-85]
3. Matter in motion [85-88]
4. Believing in Descartes’ universe through analogies [88-93] **OMIT**
5. Descartes’ cosmos [93-96]
6. The success of Cartesian physics [96-98]

**Chapter Six: Extra-Curricular Activities: New Homes for Natural Knowledge**

1. Changing places [99-101]
2. Galileo: from university to court [101-106]

**Chapter Seven: Experiment: How to Learn Things about Nature in the Seventeenth Century**

IV. Physiological experimentation [134-137]

Here's what you need for the exam: **good** **notes, pen, bluebook**. Open notes will only help if you do not spend most of the exam looking at them. You will need to ***manage time wisely*** and have ***well-organized* notes**. Students who rely too heavily on notes will run out of time. Remember: the time-constraint is part of the exercise. Handing in the exam early is ***not*** a good sign.

Finally, remember that if you need help or have any questions to be sure and ask me. I am more than willing to help any student with study skills or course content, but ultimately students must put in the effort and seek assistance when they need it.

**Exam Format**

**SECTION POINTS TIME (Approx.)**

Essay 70 points (2 BROAD questions, pick **ONE**) 60-65 minutes

Quotations 10 points (4-5 listed, pick **ONE**) 7-10 minutes

Identifications 20 points (10-12 listed, pick **TWO**) 12-15 minutes

 100 points

**Big Picture Questions: Scientific Revolution (ca. 1500-1700)**

**What** were some of the major changes?

**Why** did they take place?

**Who** were the main characters involved?

Were they **thinking** & **behaving** likemodern "scientists"?Did they **separate** “science” from “religion”?

**Six Major Changes**

1) Abandonment of ancient Greek picture of the universe

2) Gradual rejection of Aristotelian binary physics

3) Undermining of ancient Greek anatomical & physiological knowledge

4) Shift from Aristotelian theory of knowledge to modern skepticism

5) Development of new methods for establishing certainty by mathematics, instrumentation, and experimental techniques.

6) Founding of the first national, government-sponsored scientific societies

**Writing Timed Essays: Some Basics**

**by Robinson Yost**

**“There are no secrets to success. It is the result of preparation, hard work, learning from failure.”**

Colin Powell

What types of preparation and hard work are necessary to write an essay within a time limit? One thing to keep in mind is that doing well on fill-in-the blank (or true/false) reading quizzes is a *necessary* but not a *sufficient* condition for doing well on essay exams. Even those who ace the quizzes may still struggle with the essays. Why? Because they are not the same mental activities. Filling in blanks or answering true/false questions is *fundamentally different* (and easier) than synthesizing material and explaining it in your own words.

**PREPARATION & STATE OF MIND**

Those who do best on timed essays have been engaged in regular activities throughout the semester. Students who attend class regularly, keep up with the assigned readings, take good notes, pay attention in class, frequently review their notes, ask questions, and hand in the writing assignments regularly, always outperform those who do not engage in these common sense practices. Therefore, the best way to do well on the exam is to BE PREPARED. Finally, it is perfectly natural to be nervous before an exam. Staying calm and focused will help performance, but what makes it more likely that you will remain calm and focused? PREPARATION. And remember, this course is structured to discourage, and hopefully break, students of BAD STUDY HABITS (including procrastination, short-term memorization, & last-minute cramming). If you have avoided these awful habits, then odds are you will be calmer (but not completely stress free) and more focused on exam day.

**TIME MANAGEMENT**

Quite often a natural response to the first essay exam is: “I could have done better, *if* I had *more* time.” Don’t fall into this trap. Everyone has the SAME AMOUNT of time, so it’s really a question of preparation, organization, & practice before the exam and staying calm and focused during the exam. Of course, everyone could write a better essay if they had two hours (or three or four or more), but you simply DO NOT have more time. The time limit is PART OF THE EXAM. It’s best to accept this and ADAPT to the situation (a good ‘real world’ skill).

Finally, it is not expected that prepared students will FULLY ANSWER the broad questions on exams within the time limit. In fact, you are purposefully being given more than you can answer. This means that you will NOT BE ABLE TO INCLUDE everything you know. BEING SELECTIVE is crucial and anyone who gets bogged down in one part of an essay question (or any part of the exam) will run out of time. Therefore, you need a healthy balance of detail, evidence, and explanation, on the one hand, and addressing ALL PARTS of the question (and the exam), on the other hand. Part of this exercise is seeing how well you can SELECT the MOST RELEVANT evidence within these constraints. Remember, the time constraints are PART OF THE EXAM.

**PRACTICE**

The first (and best) advice is to practice writing essays within a time limit. How should one go about this?

1. Think about the BROAD THEMES from class and the textbook. Come up with BROAD QUESTIONS based on these themes. For example, questions that compare and contrast, integrate several chapters of material, address big changes, etc. are BROAD QUESTIONS— not questions that ask about one particular event, person, or idea. Rereading the introductions and conclusions of the assigned chapters may help.
2. ROUGHLY OUTLINE (either mentally or written) what you want to write. The outline should include a clear statement of the OVERALL ARGUMENT followed by the SPECIFIC EVIDENCE supporting it.
3. TIME YOURSELF and write the practice essay. Avoid looking at your notes too often. Open notes will not help students who spend most of the exam digging through them. It is assumed that well-organized notes will assist in quickly looking up facts (names, dates, etc.). If you don’t already know the information to some degree, you will either not finish the exam or end up copying information directly from notes rather than demonstrating your UNDERSTANDING.
4. READ OVER the practice essay. Does it make sense? Have someone else read it and find out. Does it show what you know or is it a list of facts copied from notes? Does it clearly explain and elaborate on major themes? Does it offer historical evidence supporting a broader argument? Is the information relevant to the question(s) you began with? As well, remember that your instructor will gladly look over and discuss the strengths and weaknesses of practice essays with you (not by e-mail).

It’s unwise to come in completely cold and try to write a timed essay. In fact, most will find it quite disorienting and unpleasant. So be prepared and organized. Even if your practice questions are not identical to the exam questions, the practice will still help.

**STRUCTURE & ORGANIZATION**

The structure of timed essays in this course is straightforward and may differ from other classes. The essay should have TWO BASIC PARTS:

1. INTRODUCTION: The introduction should be a brief paragraph that LAYS OUT THE ARGUMENT for the entire essay. It will state the big picture themes to be discussed in detail within the subsequent paragraphs. The intro should not repeat or reword the actual question(s), this simply looks like you are wasting time because you have nothing of your own to say. Therefore, make sure you are clear on what the essay is about and, in your own words, write in introduction.
2. BODY PARAGRAPHS: Each paragraph following the intro should be indented, to set it apart with a change of topic. Essays should not be one long run-on paragraph. Neither should paragraphs be only two or three sentences long. Body paragraphs should clearly lay out a major point in the beginning before elaborating and providing historical evidence and details to support that MAJOR POINT. Do not worry in this class about having a specific number of body paragraphs. Use enough to get the job done and cover all the major points.

If the structure is not clear before you start writing, then don’t begin. For this reason, rough outlining (mentally or in writing) may be helpful. Do not worry in this course about adding a concluding paragraph for timed essays. CONCLUSIONS are not necessary and take away valuable time for providing more evidence. Focus on the INTRO (argument) and the BODY PARAGRAPHS (evidence).

**LANGUAGE USE & CONCISENESS**

Essays should be written in formal English rather than slang or everyday speech. Therefore, avoid using such words as “cuz”, “kinda”, “u”, “shoulda”, “gonna.” Remember that you are not writing an e-mail or text message, so do not write as if you were. Academic writing is not the same as everyday speech, so focus on being CONCISE and to the point. Avoid using “I” as in “I think”, “I believe”, “I feel”, etc. Your name will be on the exam book, so it’s already known who is doing the thinking, believing, or feeling. This is both a matter of practical concern (using “I” wastes time and space) and a matter of good style. Be CONCISE, avoid empty words or phrases including “Basically”, “During this time”, “In general”, “It’s my understanding that”, “From what I’ve read in the textbook.” Although a sentence such as “It’s my understanding, basically, that people during this time had many important ideas about things and other stuff” may be grammatically correct and take up lots of space, it has NO CONTENT. In fact, sentences filled with EMPTY LANGUAGE like this make it appear that you have nothing to say. Finally, proper names of people, places, and things should be spelled correctly. OPEN NOTES leave no excuses for misspelling words such as Aristotelian, Napoleon, Bismarck, Umayyad, or Copernicus.

**FOLLOW UP & IMPROVEMENT**

Once you have written your first exam, it will take up to two weeks to get it back. Try not to give in to temptation during that time by abandoning your good study habits. When you finally get the exam back, be sure to talk about your performance with the instructor. This is especially true if you do worse than you expected or do not understand the evaluation. Getting upset is natural, but *staying* upset and *blaming* external factors (e.g., the instructor, the test, the time limit, etc.) for poor performance will never lead to improvement.

If this all sounds difficult (and even a bit overwhelming), then realize that you are not alone. Nevertheless, anyone can improve via focused preparation, frequent reviewing, lots of practice, and asking questions. Students who do not do these things (or fall back on excuses rather than accepting responsibility for their performance) are missing out on one of the key lessons of learning (or life): “You become strong by defying defeat and by turning loss into gain and failure to success.” [Napoleon Bonaparte]