

Human beings are driven to explore ourselves and the world around us and to ask how things work. Today it may be difficult for us to imagine how mysterious the inside of a living person seemed only about 100+ years ago, when x-rays were discovered in 1895. Amazing breakthroughs have been made since then, such as the invention of the atomic bomb, penicillin, cloning and artificial intelligence.

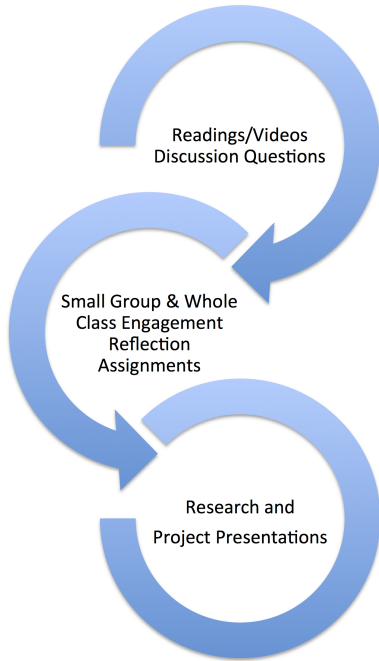
In this course we will look at the process of discovery as well as the implications of recent breakthroughs and developments. We will choose topics and explore these issues using articles and videos. We might choose to debate climate change, string theory, or the 2005 president of Harvard University's comments about the innate ability of women in mathematics. We could explore the ethics of biodiesel or unbreakable codes, and whether we still need to learn multiplication tables.

We will delve into diverse and opposing viewpoints on many issues as we discuss current scientific consensus. In this context we will focus on what science and mathematics is, strategies for success in these fields, ethical and philosophical considerations, public perceptions, applications to daily tasks, and the relationship of science and mathematics to American competitiveness and the global economy. We'll also think about a series of interrelated questions: What is truth? When are we convinced? What are the consequences of certain truths? What is the role of chance and probability? The only prerequisite for this course is an open mind.



First Year Seminar Learning Goals

- I can examine a single issue from **multiple perspectives**, e.g. local and global connections.
- I can conduct **quality research** and summarize it.
- I can **analyze the arguments** of others and connect them to me (including current scientific consensus).
- I can **communicate effectively** to produce publication-quality written, verbal and visual work in a logical, organized manner that demonstrates consideration of context, audience, and purpose.
- I can make **connections with others and the university** through a shared process of inquiry via regular attendance and respectful participation in our classroom community (community membership).



Grading and Policies

Grading connects to course objectives

–multiple chances to meet each learning goal

–separates out any problem areas

–once someone has met a learning goal, they can focus their energies on other goals

- attendance and positive participation is required
- regular hw questions on ASULearn (informal writing is ok!) due at 10:30am
- semi-regular reflections
- 2 research projects

Reflections and projects:

–can send it with another student, put it under my office door, or even turn in on ASULearn if need be, but I prefer printed

–no late work, but lowest hw and reflections are dropped, and accommodations for emergencies with documentation

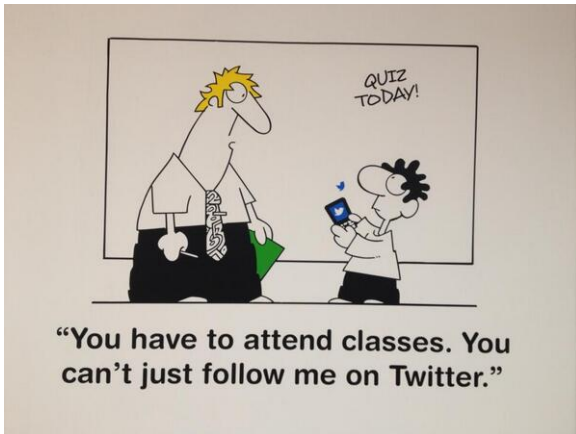
I can make a good faith effort in hw questions.	9
I can produce thoughtful reflections.	5
I can produce quality projects.	1 proficient 1 outstanding
I can examine a single issue from multiple perspectives , e.g. local and global connections.	2 reflections 2 projects
I can conduct quality research and summarize what I found.	1 reflection 2 projects
I can analyze the arguments of others and connect them to me (current scientific consensus).	2 reflections 1 project
I can communicate effectively to produce publication-quality written, verbal and visual work in a logical, organized manner that demonstrates consideration of context, audience, and purpose.	2 reflections 1 project
I can make connections with others and the university through a shared process of inquiry via regular attendance and respectful participation in our classroom community (community membership).	regular attendance and positive participation

Student comments about what they like about this:

- Values your learning over grades. You work toward learning goals, not a grade
- Didn't always expect perfection
- Being able to consistently keep track of my progress—and having several opportunities to improve where I feel flat initially
- You know exactly what to strive for and what the outcome will be specifically
- More focused learning; less confusion and ambiguity
- a lot of flexibility

Critical Academic Indicators

- Attendance
- Engagement with material (in and outside of class)
- Interaction with each other (faculty and other students)

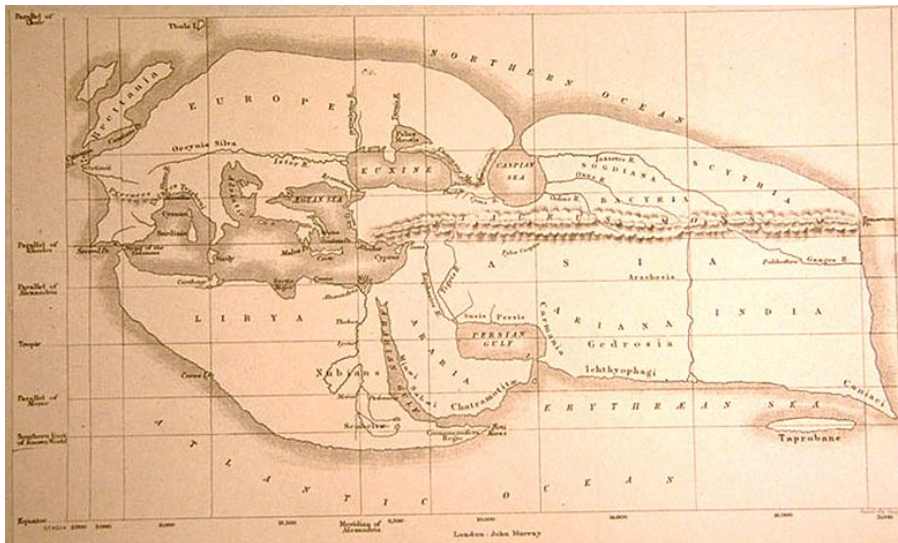


Discussion Question

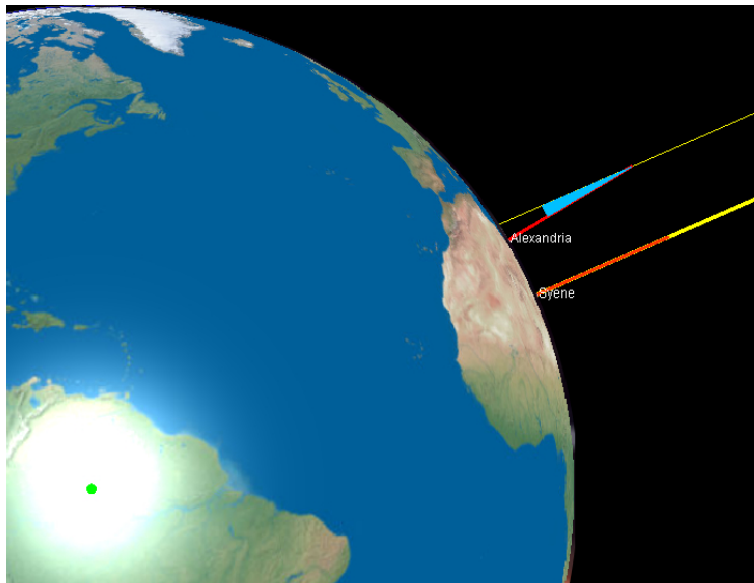
💡 How could we know that the earth is round without using modern technology from the 20th or 21st centuries?



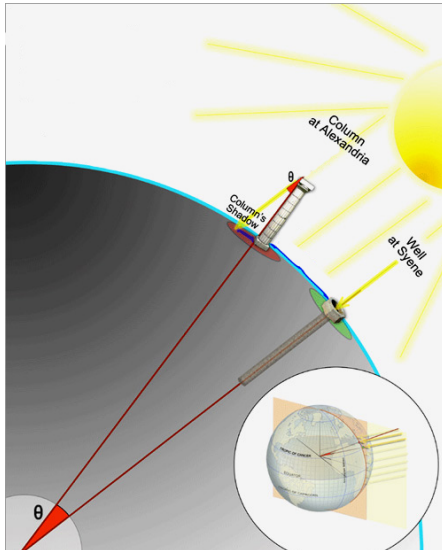
Eratosthenes' (~276 BCE – ~195 BCE) View of the Earth



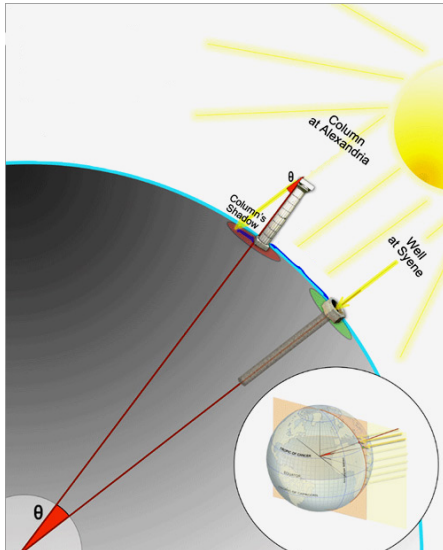
Eratosthenes' Data



Eratosthenes Thinks Big (Globally!)



Eratosthenes Thinks Big (Globally!)



$$\frac{7.2^\circ}{360^\circ} = \frac{5000 \text{ stadia}}{\text{circumference}}$$

Local to Global: Multiple Perspectives



How could we know that the earth is round without using modern technology?

Local to Global: Multiple Perspectives



How could we know that the earth is round without using modern technology?

Geography

Philosophy

Physics & Astronomy

Mathematics

History

Navigation

Weather

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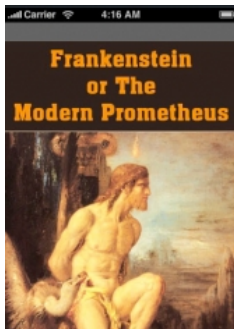
Weather

Still controversial: Flat Earth Society, Rapper B.o.B, NBA stars



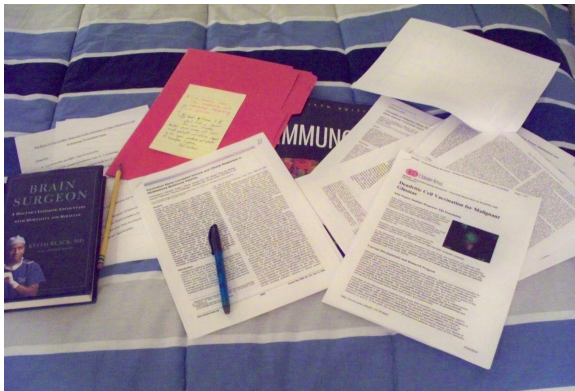
Academic Reading: Frankenstein

- Fun sci-fi monster or treatise about the limits of science?
- Context of the author Mary Shelley:
 - Medical schools were examining the bodies of recently dead and entrepreneurs dug up specimens for doctors.
 - Her mother, Mary Wollstonecraft, died just 11 days after she was born.
- Appeal of a novel lies in collaborative nature—actively involved in the creation of meaning.



Reading about Science & Mathematics

- Textbooks
- Journalist or other summaries (Wikipedia...)
- Scientists and mathematicians writing for a general audience
- Scientific or mathematical research papers



Sixth Extinction: New Yorker staff writer Elizabeth Kolbert

- Read through the handout.
What questions, if any, do you still have?
What do you think?
Was the author empirical in presenting the ideas? Any logical errors like faulty cause/effect relationships? distortion? oversimplification? or faulty generalization?

Sixth Extinction: New Yorker staff writer Elizabeth Kolbert

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a weekly magazine offering a signature mix of reporting and commentary on politics, international affairs, popular culture and the arts, science and technology, and business, along with fiction, poetry, humor, and cartoons.
<http://www.newyorker.com/contributors/elizabeth-kolbert>

Names in Motion

