

Introduction to Environmental Science

Section 2 of Chapter 1

The Nature of Science

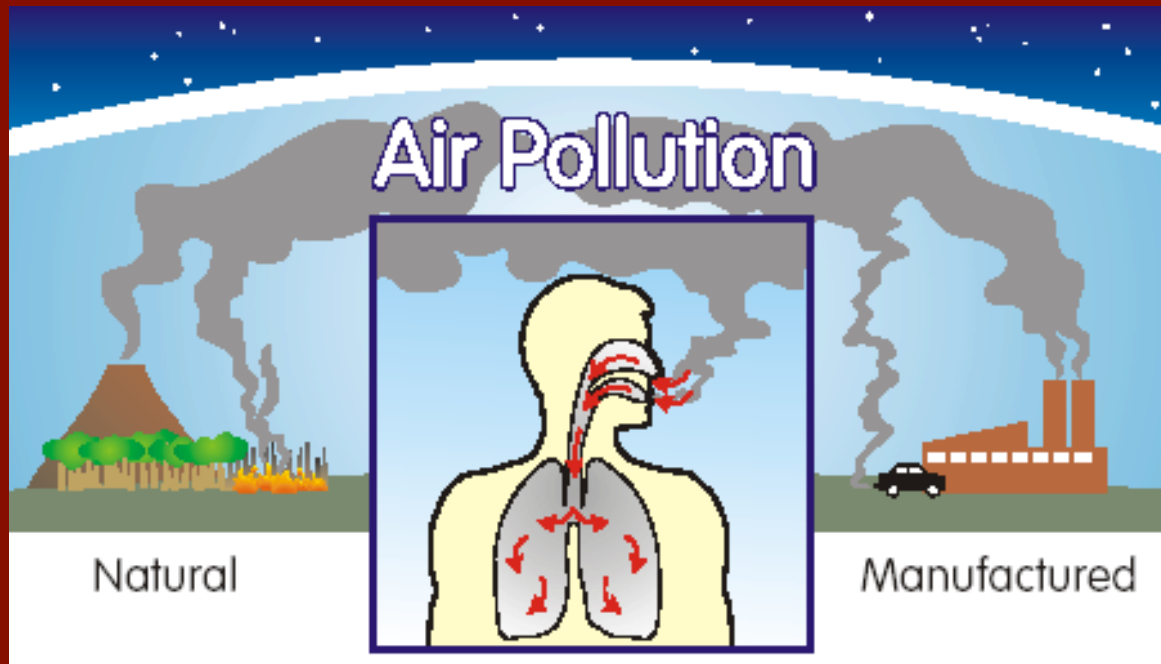
The word *science* comes from the Latin word *scientia*, meaning “knowledge.”

Thanks to Mr. Manskopf

Notes can also be found at kdecie.weebly.com

Goals for these notes

- Describe the steps that a scientist would use to figure out problems in our environment.



What Science is and is not

- Science is an organized way of studying the natural world, and the knowledge gained from such studies.
- Science assumes that the natural world functions in accordance with rules that do not change.
- Science does **not** deal with the supernatural.
- Science relies on evidence from measurements and observations.
- Scientific ideas are “supported,” not “proven,” and “accepted,” not “believed in.”

How Science Works



In order to satisfy our curiosity about why things are the way they are and about how things happen the way they do, we must..

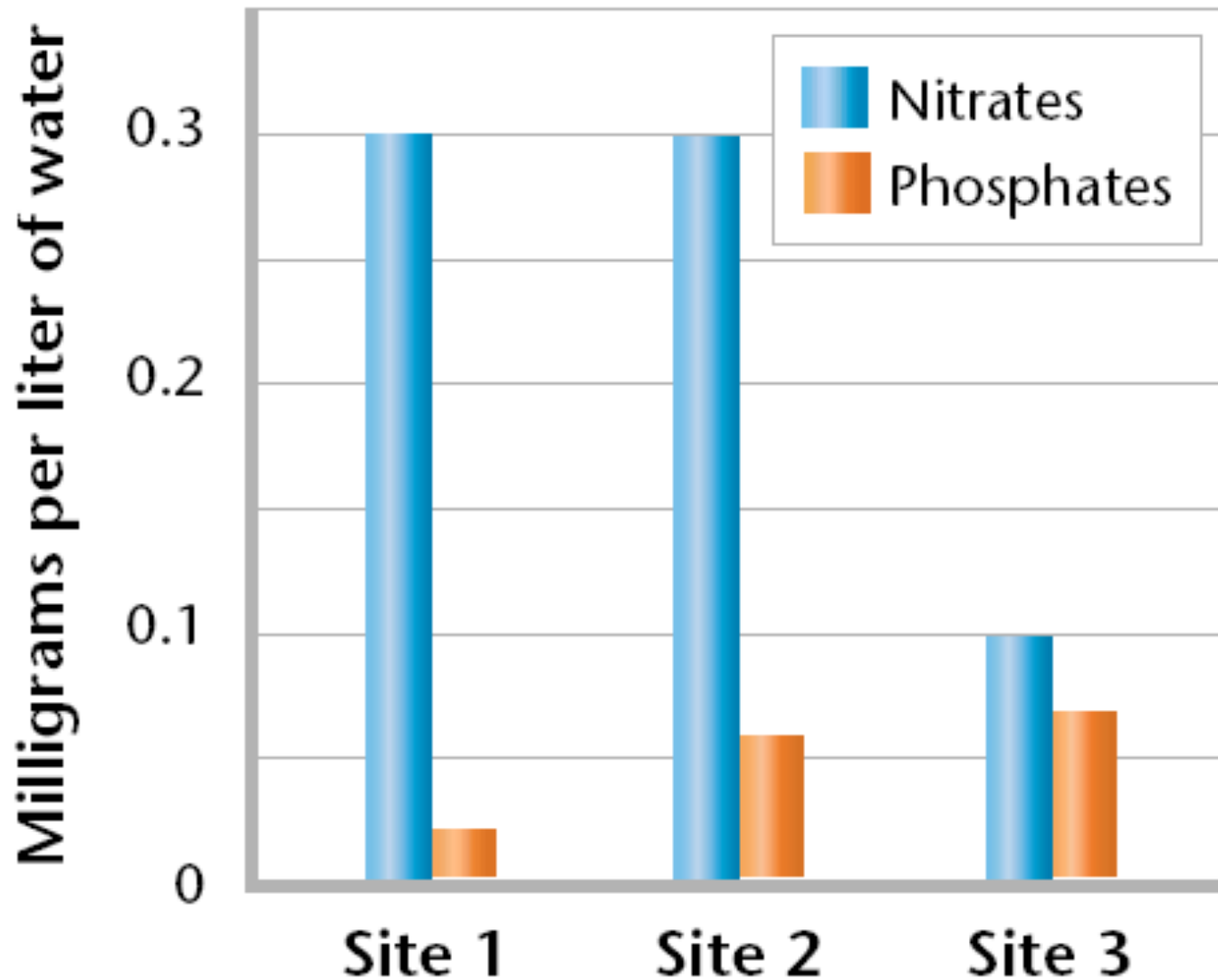
- Making Observations: using our senses and tools
- What are some tools a scientist may use?

Observations



Make some observations from this photo

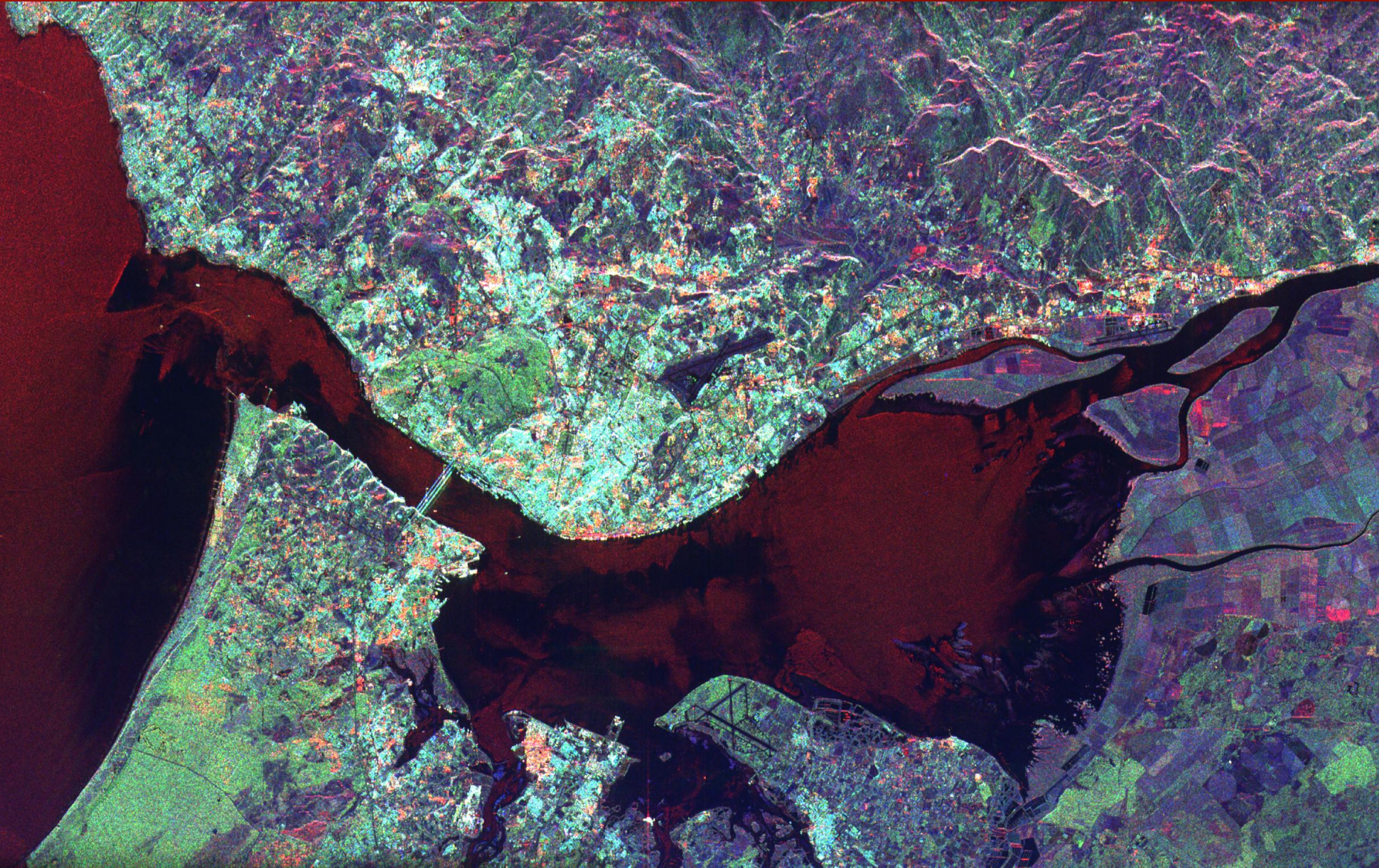
Make some observations



Observation



Observation

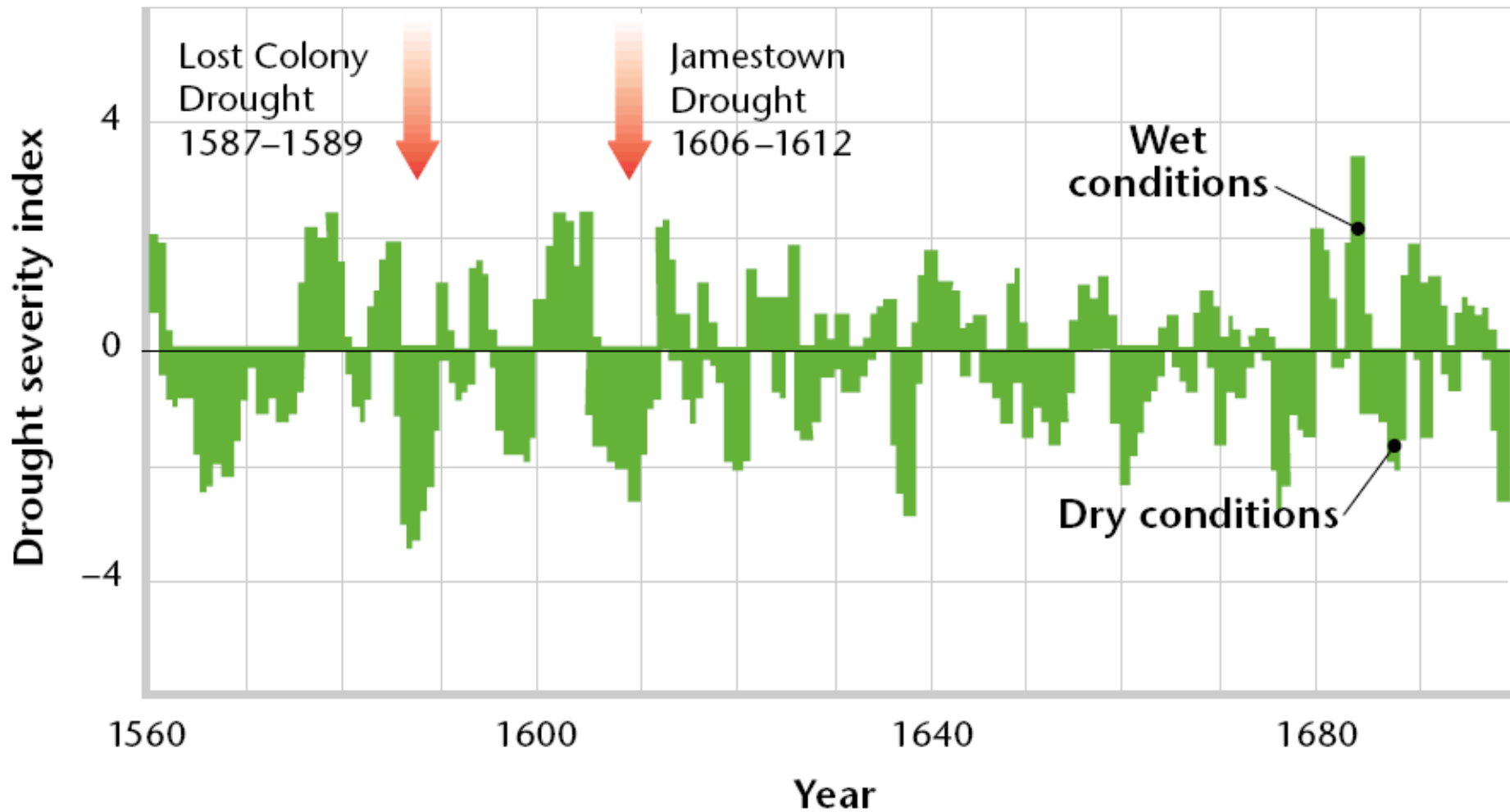


Hypothesis and Predicting

- Is a testable idea that can be lead to further investigation.
- Can you give an example?



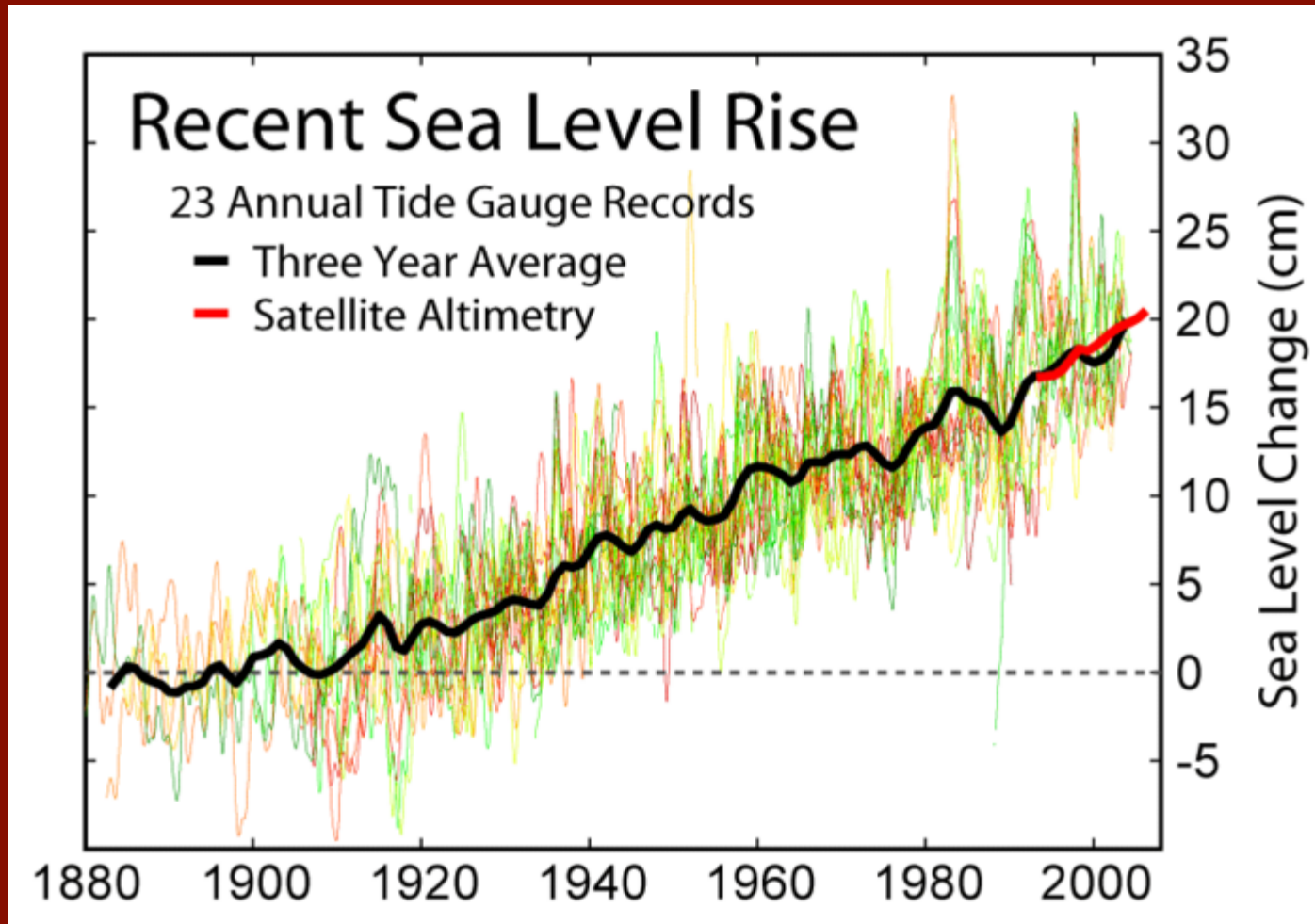
What can you tell from this data?



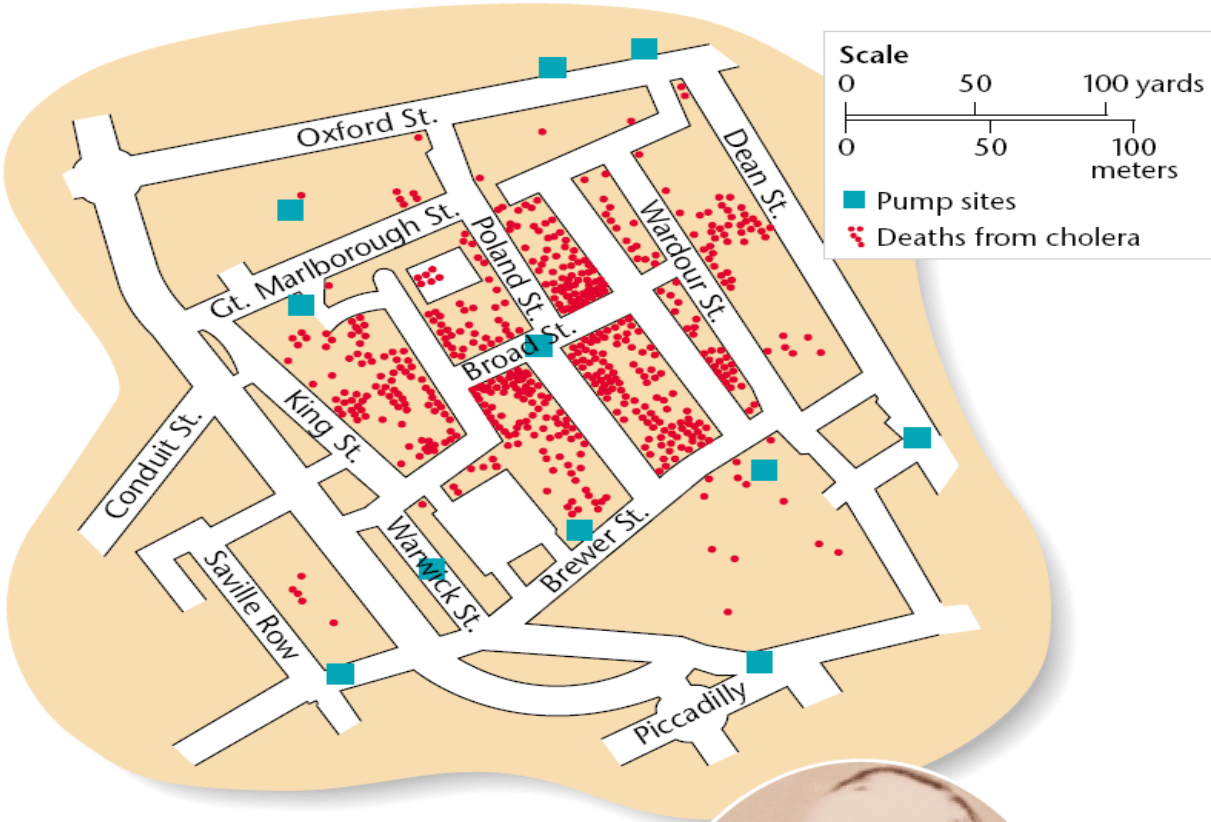
Hypothesis



Hypothesis



Hypothesis



Cholera is caused by people drinking contaminated water.

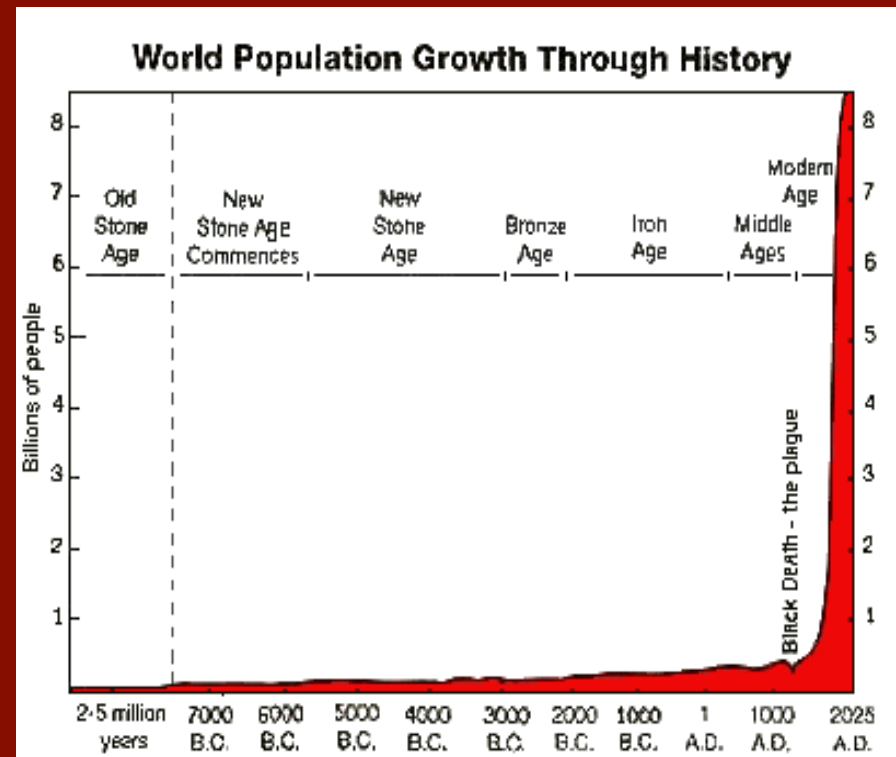
Which pump appears to be causing the 1854 London Cholera outbreak?

- Spot Map
- See patterns in data
- How could you test this hypothesis?

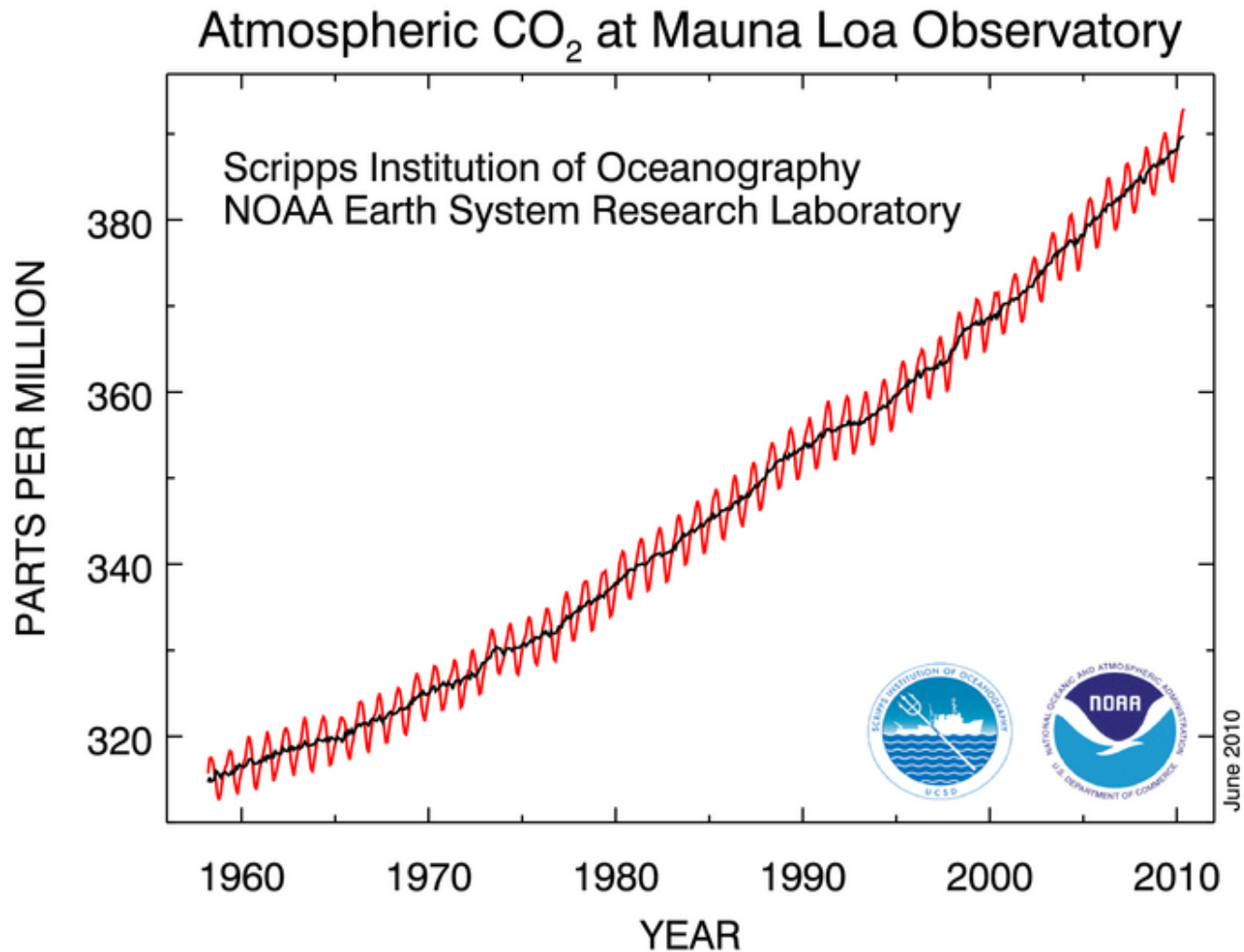


Collecting Data

- To study the hypothesis data must be collected and analyze.
- Conclusions must be drawn
- Results must be repeatable
- Results should be communicated



Collecting Data



Collecting Data



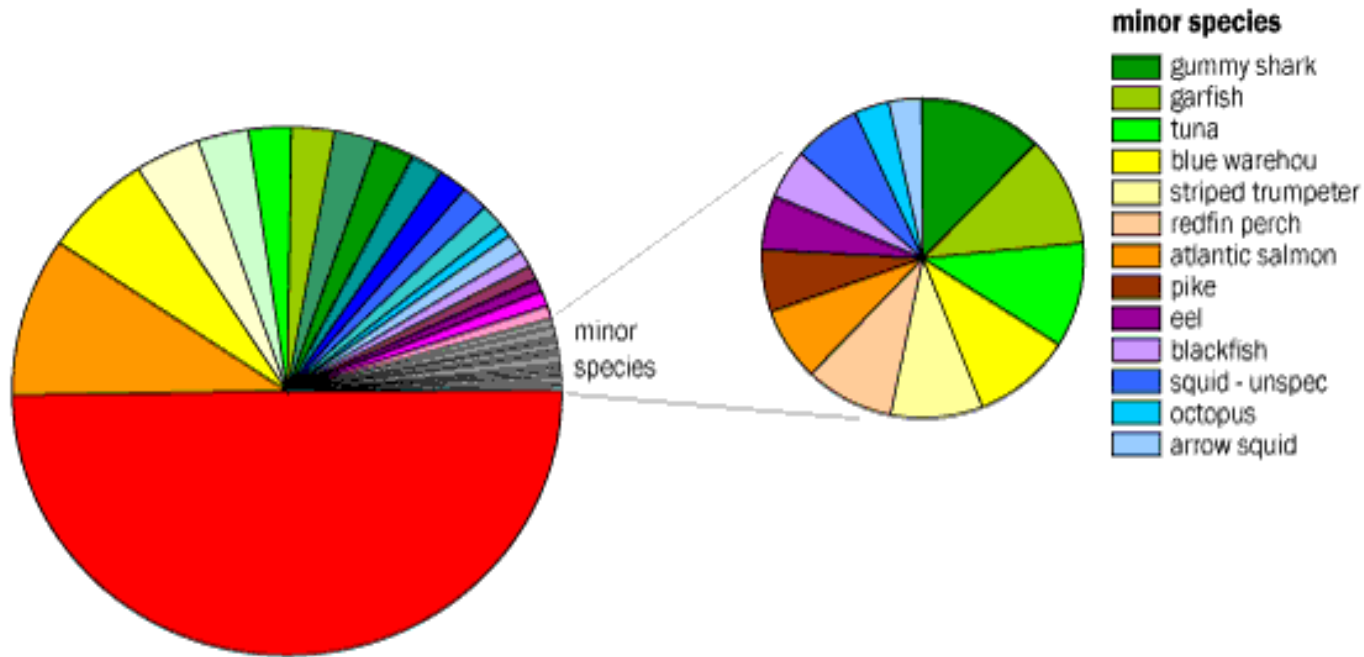
Drawing Conclusions



Repeating Experiments



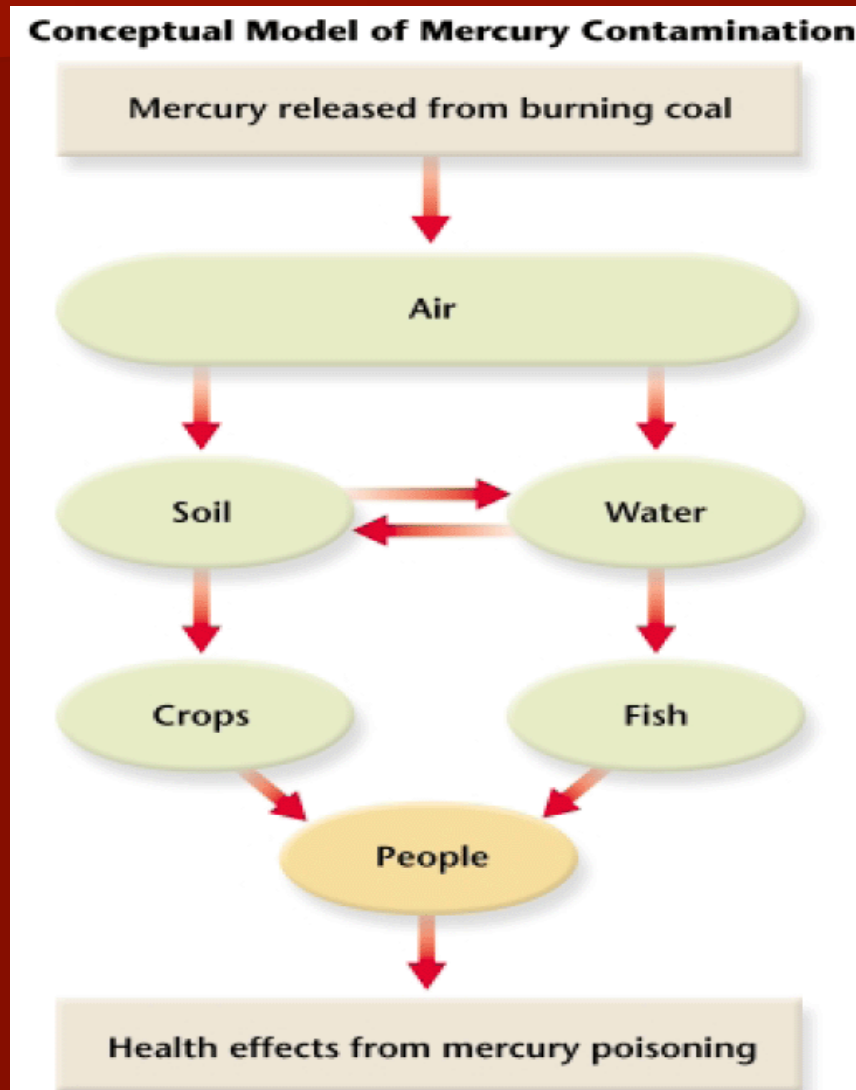
Communicating Results



major species



What does this model show us about how mercury gets to humans?



Community Analysis and Feedback – Peer Reviewed



Present their work and get feedback from other researchers at conferences

Write papers about their study

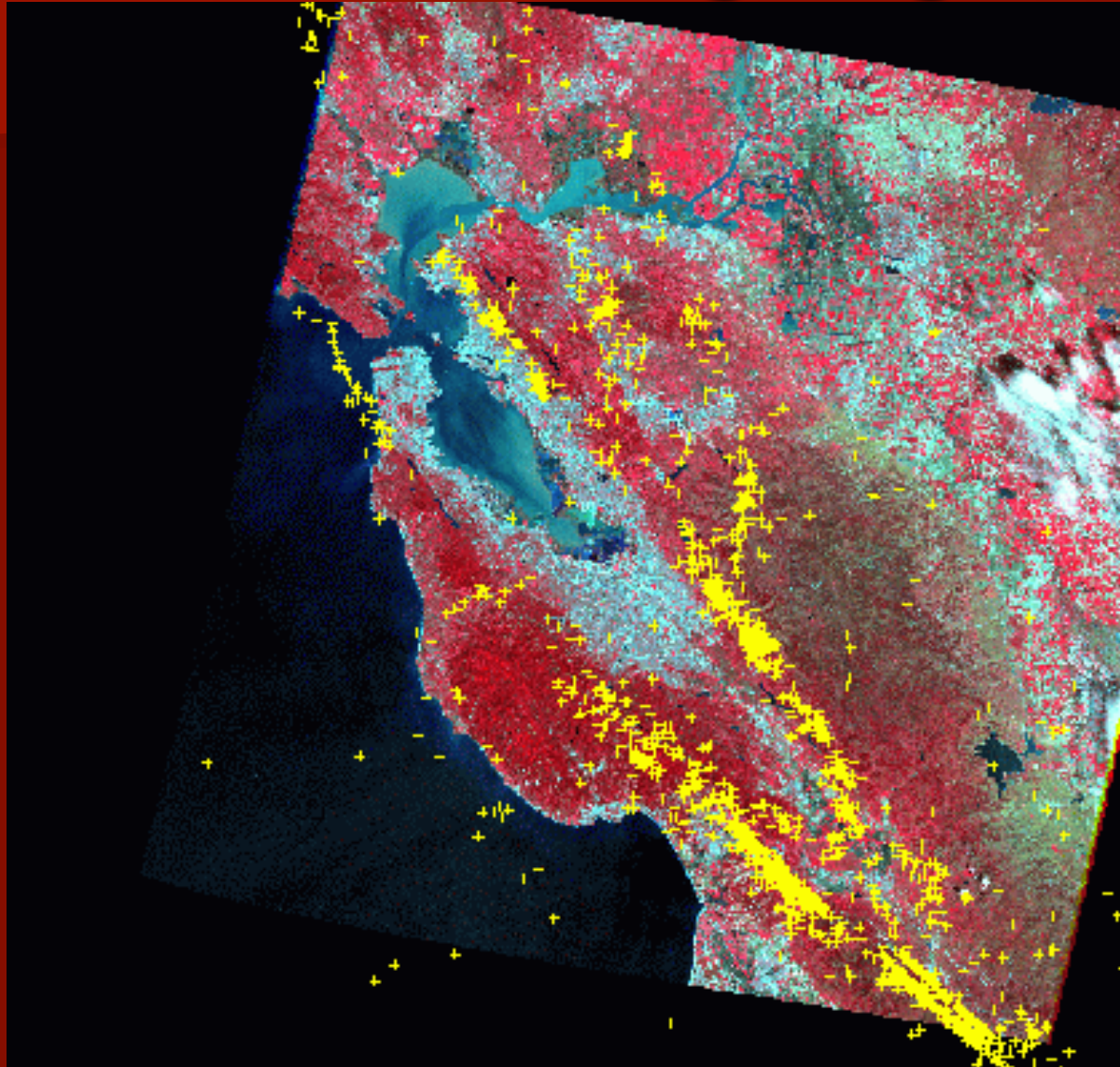
Submit papers for publication in a journal

Habits of a Scientist

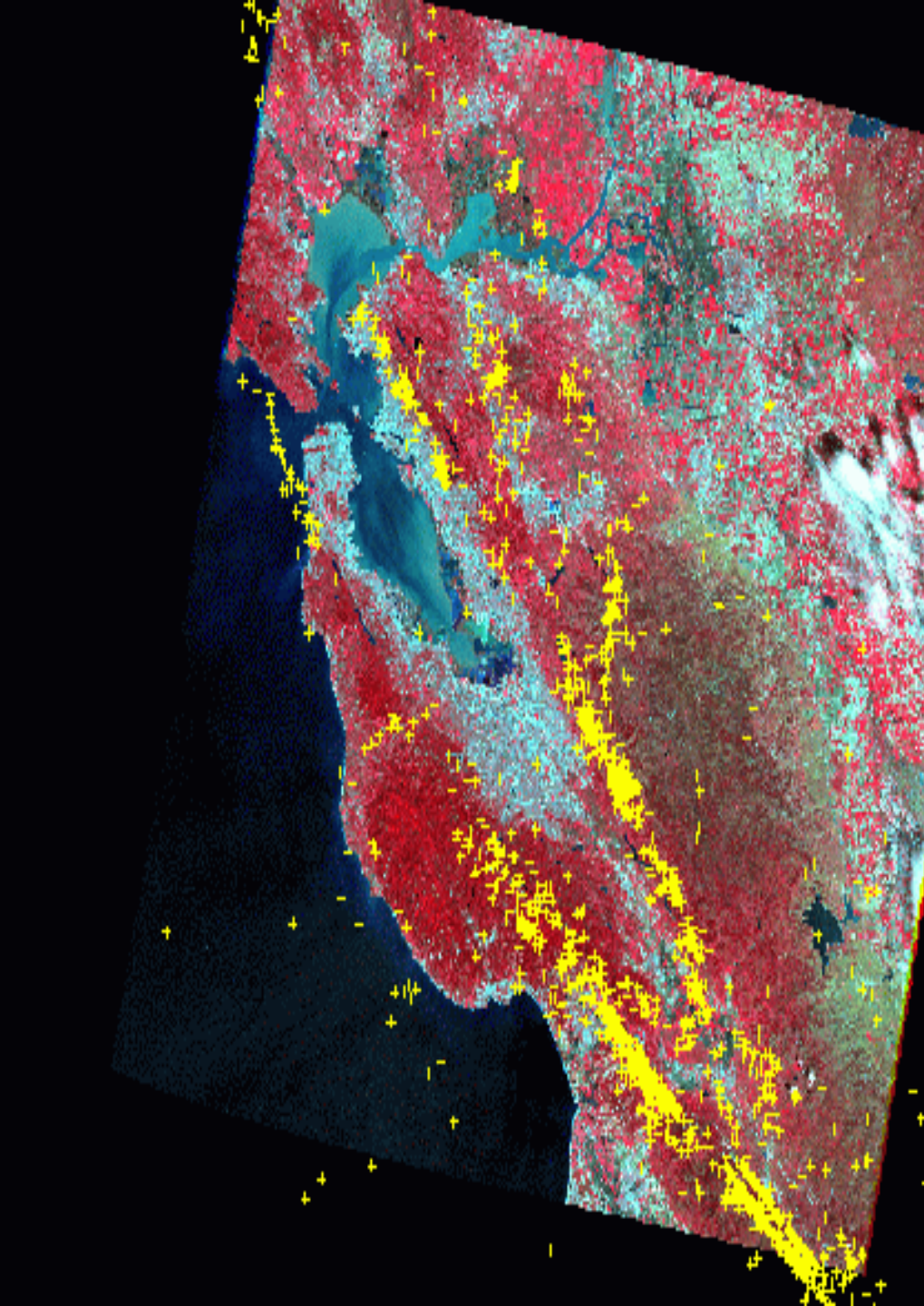


- Curiosity
- Skepticism
- Openness to New Ideas
- Intellectual Honesty
- Imagination and Creativity

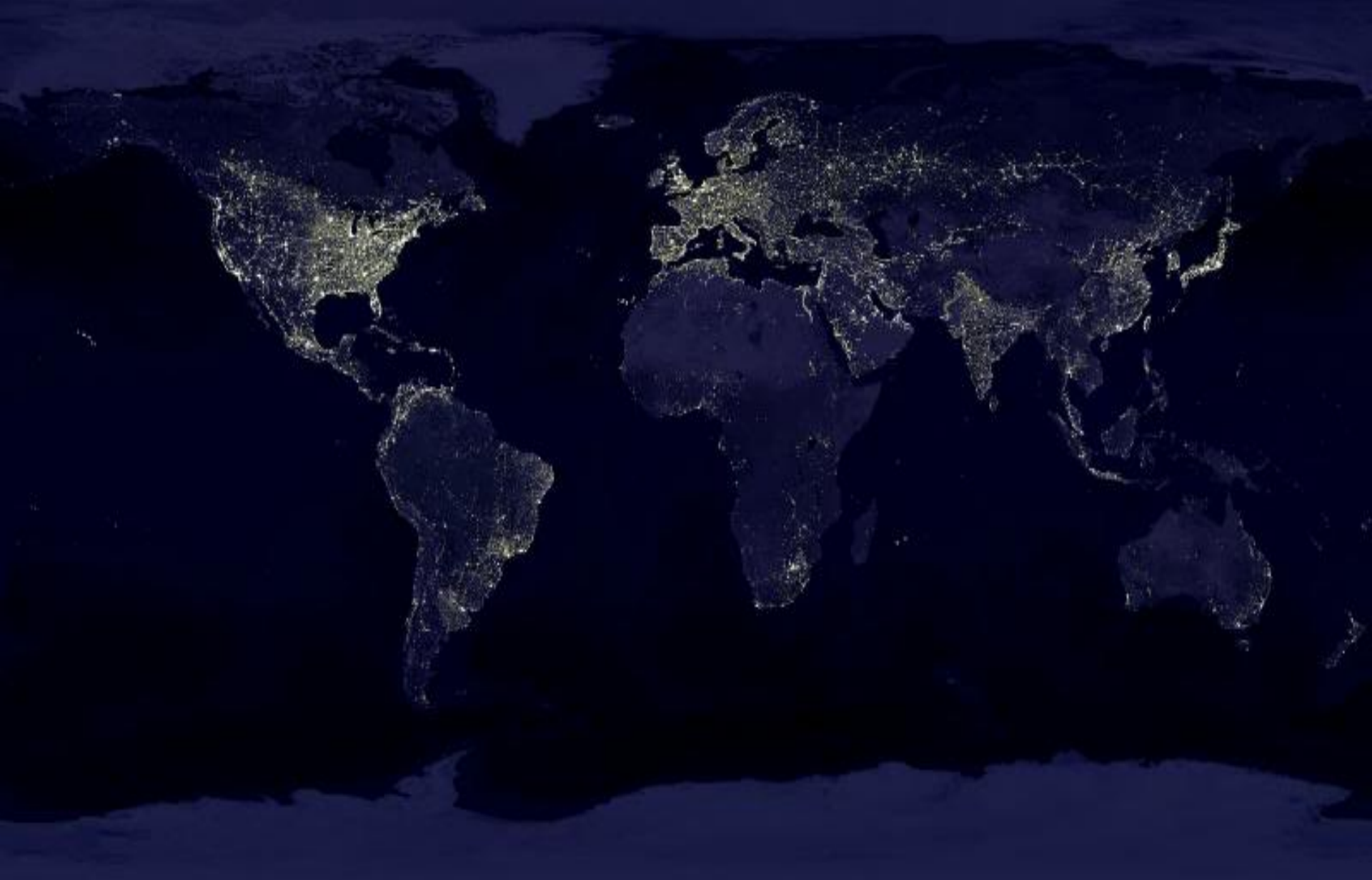
What is going on here?



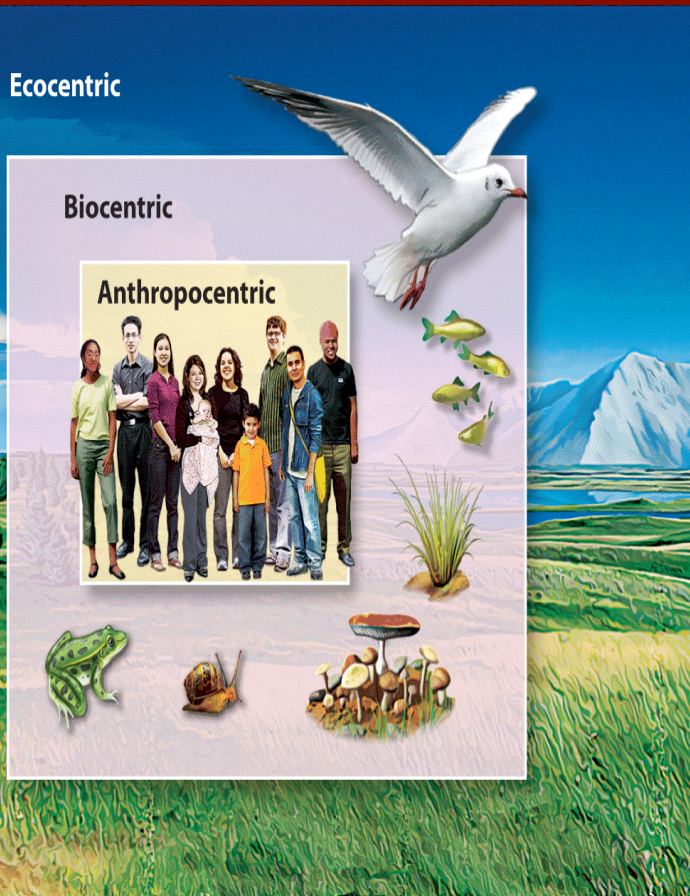
1999 Earthquakes
in yellow



How can we use the scientific method to study our impacts on the environment?



Environmental ethics is the application of ethical standards to the relationship between humans and the environment.



Anthropocentrism: Humans and human welfare most important

Biocentrism: All living things have value; some may be more important than others

Ecocentrism: Well-being of a species or community more important than that of an individual