

# Week 2: Class 3

## **1:30-2:10:**

- ◆ KCES Treasure Hunt Q & A
- ◆ How to select appropriate sources for research
- ◆ Activity: Cheeseman ESA (Contd. from Class 2)

## **2:10 – 3:20**

- ◆ Activity (Check out Wright and Boorse, 12<sup>th</sup> Ed, from the SRC)
  - ◆ Three Unifying Themes of Environmental Science
  - ◆ 9 concepts of Sustainability
- ◆ Share with class

# Sources for Online Research

Types of appropriate sources for content research:

- ◆ **Science magazines and journals:** *E.g., Science, Nature, Scientific American, Conservation Biology*
- ◆ **Government agency reports and websites:** *US Fish and Wildlife Service, California Department of Fish and Wildlife*
- ◆ **Science-based organizations:** *Center for Biological Diversity, International Union for the Conservation of Nature*
- ◆ **Some Non-profits:** *Rainforest Alliance (does conservation work in rainforest ecosystems)*
- ◆ **News organizations that have investigative reporting:** *E.g., Environmental News section of New York Times, LA Times, SJ Mercury News, Living on Earth, KQED Science*
- ◆ **Universities:** *E.g., Safe Passage for Coyote Valley, Yale University reports on Environmental Science, UC Berkeley's Evolution 101*
- ◆ **Museums:** *E.g., American Museum of Natural History*

# *Sources for Online Research*

- ◆ HINT: Check the “About” section of the website for the purpose of the website.
- ◆ When in doubt, “dig deeper”
- ◆ Keep each other honest

## Types of inappropriate sources for content research:

- ◆ Personal websites
- ◆ Class websites
- ◆ Commercial websites, e.g., travel websites

## Examples of inappropriate sources (from past classes):

- ◆ Earth Eclipse (personal website)
- ◆ Blueplanet Biomes (class website)
- ◆ Conserve-energy-future.com (personal website)
- ◆ Bioexpedition.com
- ◆ w3.marietta.edu/... (student website)

## Class 3: Activity

# Three Unifying Themes of Environmental Science

1. What are the *three unifying themes of Environmental Science* (Fig. 1-8)?
2. Who are *Stewards* (Pg 17)? Go to the website of the Goldman Environmental Prize. Pick one winner and briefly explain when and why they were awarded the prize. **Prepare to share with class.**
3. What is *environmental racism* (pg 18)? Work with your team to show a local example. **Prepare to share with class.**
4. See Exploring a Stewardship Ethic (Pg 19). What does “anthropocentric” stewardship ethic mean? Do you agree that this is sufficient? Give at least one example to justify your answer. **Prepare to share with class.**

# *Class 3: Activity (contd.)*

## *Sustainability and sustainable societies*

*Wright and Boorse, 12<sup>th</sup> Ed. Use pages 12-13 to answer the following in your journal:*

1. Define *development, sustainable yields, sustainable ecosystem, sustainable society*
2. What are the *dimensions of sustainable development* (Fig 1-9)
3. Is it possible to apply *sustainability to human systems*? Explain with an example. **Prepare to share with class.**
4. What is a *sustainable development ideal*?
5. What is Yale University's *Environmental Sustainability Index*
6. What will it take to **transition to a sustainable future**?

# Week 2: Class 4

## **1:30-2:15:**

1. Lecture: Science, Scientific Method, and Environmental Science
2. Video: Rachel Carson and the Modern Environmental Movement

## **2:15 – 3:20**

1. E-mail team name with list of team members
2. Activity: Local Case Study in Conservation Biology



# *Science, Scientific Method & Environmental Science*

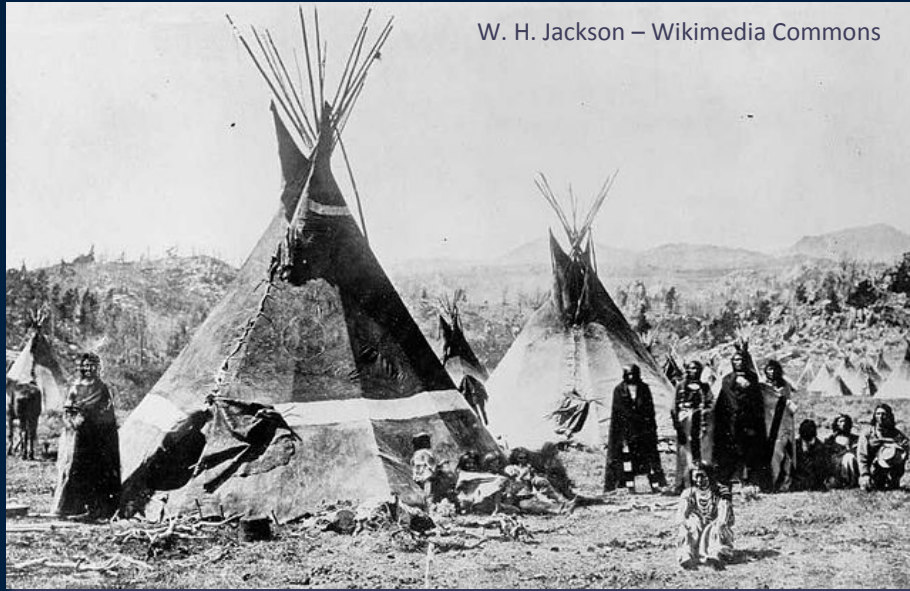


- ◆ **What is Science?**
- ◆ **What is Environmental Science?**
- ◆ **What is the Scientific Method?**

# *What is Science?*

**A Framework**  
to acquire  
**FACTUAL knowledge**

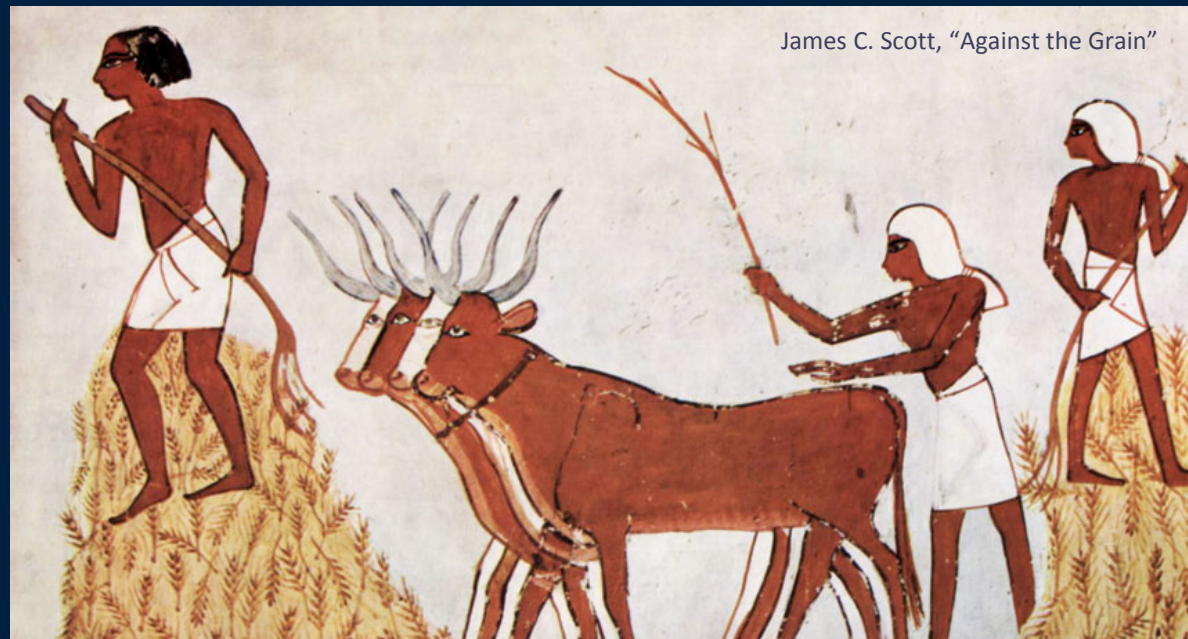
# Traditional Knowledge - Informal



W. H. Jackson – Wikimedia Commons



By JMGRACIA100 – Wikimedia Commons

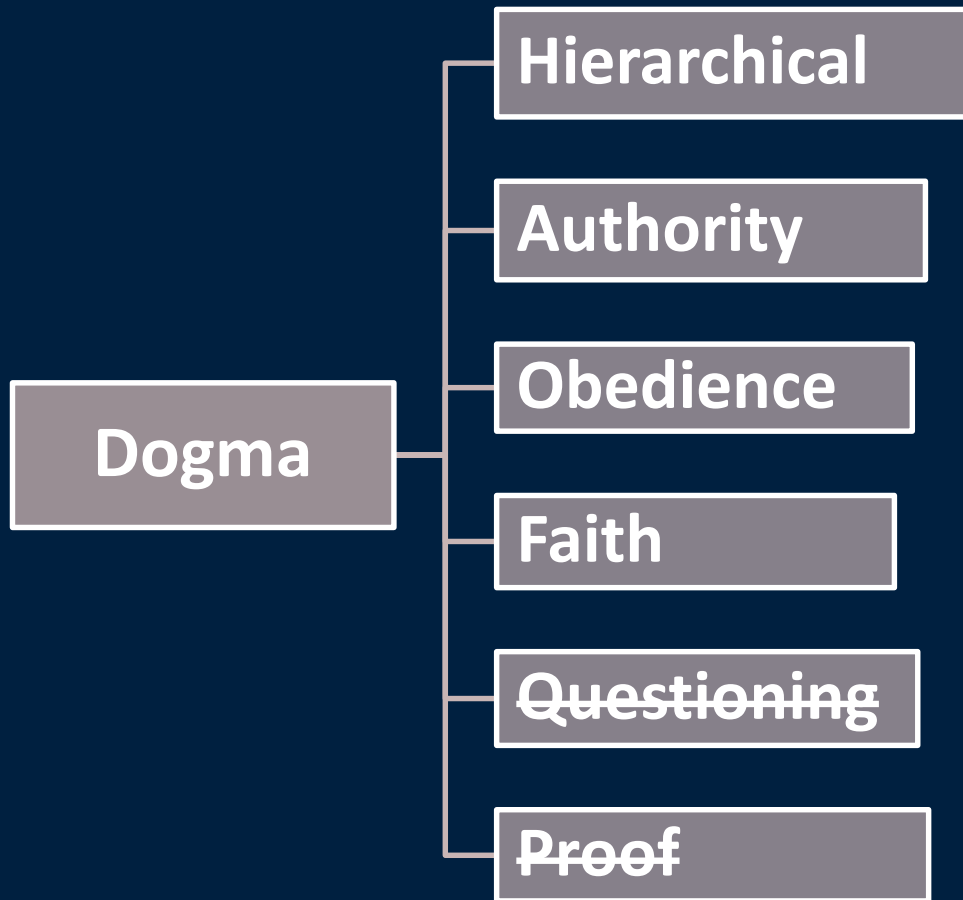


James C. Scott, "Against the Grain"



bbc.co.uk

# *Formal Frameworks of Knowledge*



**Mid 15<sup>th</sup> Century**

**Science**

**Questioning**

**Proof-based(data)**

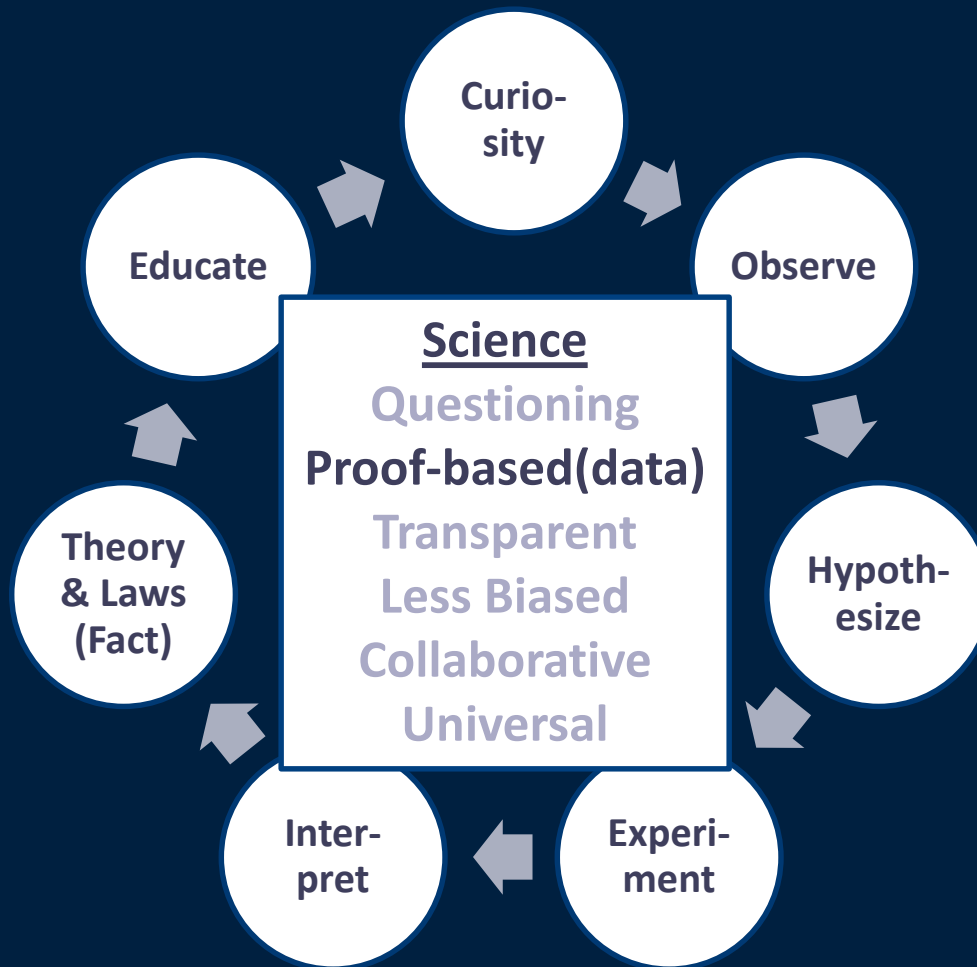
**Transparent**

**Less Biased**

**Collaborative**

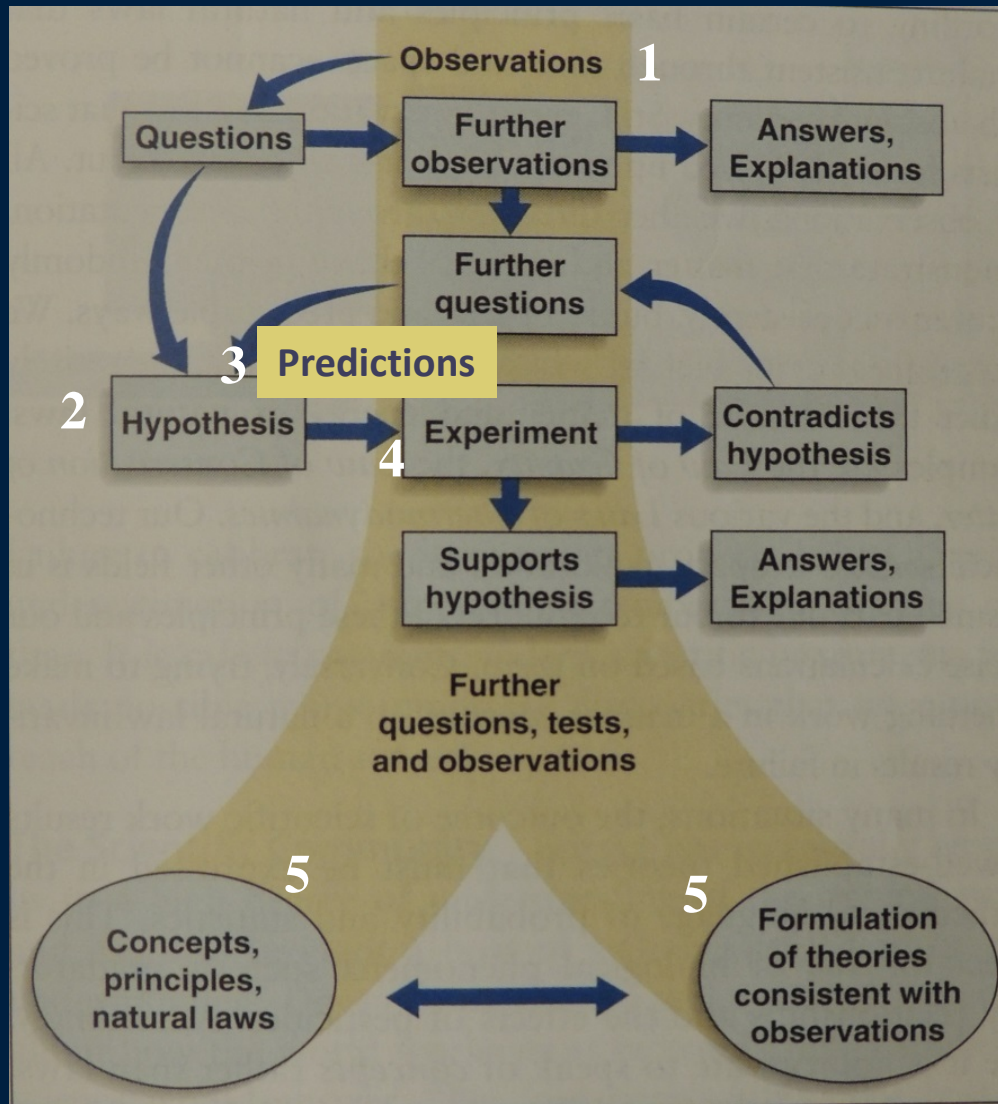
**Universal**

# Framework of Science



- **Data**
  - Systematic collection
  - By Observation or Experimentation
  - Measurements
- **Facts**
  - Statement
  - By *Interpreting data*
- **Scientists**
  - Seek facts using the *Scientific Method*

# 5 Steps of the Scientific Method



**A Scientific Theory  $\neq$  A Hypothesis**

# *Bias in Science*

## Avoidable

- ◆ **\$\$\$ Funding**
  - ◆ Industry vs Independent
- ◆ **\$\$\$ Communication**
  - ◆ Sensational vs Negative
- ◆ **Cultural**
  - ◆ Gender
  - ◆ Current Paradigm
    - ◆ Religious beliefs (Evolution)
    - ◆ Economics/Environment (Global warming and Climate Change)

## Unavoidable

- ◆ **Accessibility**
  - ◆ E.g., Cognitive abilities in animals
- ◆ **Instrumentation**
  - ◆ E.g., Germ theory of disease
- ◆ **Survey-based data**
  - ◆ E.g., Dietary guidelines
- ◆ **Reductionist vs Holistic**
  - ◆ E.g., Ecosystems
- ◆ **Ethical Considerations**

# Bias in Science

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**Difficult to overcome**

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- ◆ **Reductionism vs Holistic**
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- ◆ **Ethical Considerations**

**Easier to overcome**





# *Environmental Science*

- Scientific study of life ***in the context of the living and nonliving environment***, E.g.,
  - *Environmental Pollution and Prevention*
  - *Conservation Biology*
  - *Renewable Energy*
  - *Ecosystem Management & Sustainability Studies*
- Complex and Less amenable to reductionism
  - Large spatial and time scales
  - *“When we try to pick out anything by itself, we find it hitched to everything else in this universe.” - John Muir*



# *Environmental Science*

- Part science, part social science
  - *Our actions impact the environment*
  - *Our actions governed by consensus-based policy*
  - *Ethics: Who will represent those that cannot be at the table?*
  
- Science of hope
  - *How to address current global challenges*
  - *Knowledge is power, the power to restore*

Follows the 5 steps of the Scientific method

# *Environmental Stewardship*

Environmental Science has a sixth step!

## 6. Stewardship

- ◆ Make Informed policy
- ◆ Educate Stakeholders
  - ◆ Policy Makers
  - ◆ Citizens
- ◆ Advocacy
  - ◆ Represent those that are not at the table!



# *Environmental Scientist's Challenge*

Study complex interactions, slow processes,  
long-term impacts, large-scale impacts, ...

Find solutions while not creating new problems...

Need a Holistic approach

Needs everyone's participation

Citizen scientists - The world needs you!



# *Science, Scientific Method & Environmental Science*



## CONCLUSION

- ◆ Knowledge about how the natural world works is *absolutely crucial* to humans living on Earth!
- ◆ The scientific method has a track record for being the *least biased*

It is our *collective responsibility* to seek this knowledge *and act in accordance*

Rachel Carson  
Author, "Silent Spring"

Rachel Carson and The  
Modern Environmental  
Movement

## Class 4 Activity

### Environmental Science: Local Case Study

Sources: <http://wildlife.ucsc.edu/> and <http://santacruzpumas.org>

Answer the following:

1. Who are the scientists?
2. What is their research interest?
3. Where do they work (i.e., what is the *study site*)?
4. How do they study their research subject?
5. What tools/instruments do they use?
6. What are some of the results of their study?
7. What are they trying to *sustain*?
8. Are they following the scientific method? Explain.
9. Would you consider them as **Environmental Scientists**? Why?
10. Be prepared to share 2 highlights from your summary.

# *Extra Credit (Individual)*

- ◆ Based on your research, what one question do *you* have about the Santa Cruz Puma and its environment?
- ◆ This is not a team question. It is for you as an individual.
- ◆ Extra credit: 5 pts