

ESSP Pre-Workshop (Climate) Common Reading Experience Questions
Earth: the Operator's Manual
By Richard Alley

Chapter 1:

The chapter title, "Prepare to come about," is a metaphor. What is Dr. Alley referring to "coming about" in this metaphor?

Chapter 2:

Compare energy use of the human body to energy use of a 100 W light bulb. How are they similar? How are they different?

Chapter 3:

Compare wood to whale oil as an energy resource. Why wasn't either resource sustainable?

Chapter 4:

Describe the formation of fossil fuels, starting with plants and ending with natural gas, coal and oil. Be sure to include a description of the time scale of the transformation.

Chapter 5:

Write briefly about Dr. Alley's definition of science and the process of in light of the teaching you do and the way science is assessed by the PSSA.

Chapter 6:

How does CO₂ in the atmosphere affect heat-seeking missiles?

Chapter 7:

In Dr. Alley's kayak tipping story, what was the *positive feedback* of the system? Does water vapor in the atmosphere have a positive or negative feedback to increasing temperatures? Why?

Chapter 8:

What is the difference between weather and climate?

Chapter 9:

How do scientists know what the Earth's climate was like 100,000 years ago (long before people or thermometers)? Describe two or more proxies for direct measurements.

Chapter 10:

Over million year timescales, how is average global temperature related to the amount of CO₂ in the atmosphere?

Chapter 11:

What are the astronomical factors that exert primary control on the occurrence of the ice ages?

Chapter 12:

Summarize the human evidence for Earth's climate change history over the last century. How did humans record the history of Earth's climate change?

Chapter 13:

Describe the "hockey stick" that was at the center of the Climategate scandal.

Chapter 14:

How will continually increasing CO₂ in the atmosphere affect the climate in Pennsylvania?

Chapter 15:

Evaluate the strategy outlined for reducing CO₂ emissions, and how it would affect the economy. How would such a strategy affect your daily life?

Chapter 16:

Compare the story of public sewer development in London to proposed changes to the US energy model. How are they similar? How are they different?

Chapter 17:

Which sustainable energy resource most appeals to you from a practical standpoint?

Chapter 18:

Compare solar and hydro power – which is more disruptive to human livelihoods? Why?

Chapter 19:

Describe how tides can be used by humans as an energy resource.

Chapter 20:

Describe how geothermal heat is used as an energy resource. Contrast geothermal fields to using a domestic geothermal heat pump.

Chapter 21:

Describe the dangers of nuclear power, and how we can mitigate those dangers.

Chapter 22:

How have you been conserving energy at home and in the classroom?

Chapter 23:

How confident are you that geo-engineering would address the atmospheric CO₂ problem?

Chapter 24:

Do you think it is possible for 10 billion humans to live on the Earth in a sustainable way? Why or why not?