

APES- Chapter #2- Science As a Way of Knowing: Critical Thinking About the Environment

Guided Reading



Name: _____

1) What was the environmental problem/question at Mono Lake, Ca?

What was the outcome?

<http://www.danielbbotkin.com/2012/07/03/an-environmental-success-story-saving-mono-lake/>

2) Botkin states, “*Whether it is possible, at least in principle, to disprove the statement*”.

Explain the idea of “disprovability” in scientific studies.

3) What are the *assumptions of science* that are important in understanding and conducting scientific investigations?

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4) **Explain** the difference between *inductive and deductive reasoning*.

5) Define **Probability** in science.

6) Using the *Challenger Space Shuttle* scenario, explain *what uncertainties in science are and why they are so important to acknowledge and define.*

7) Define:

- **Accuracy:**
- **Precision:**

Explain the difference between the two- use examples in your answer.

8) Define the following steps of a scientific study:

- **Observations:**
- **Inferences:**
- **Fact:**
- **Hypothesis:**
- **Dependent Variable:**
- **Independent Variable (manipulated):**
- **Manipulated Variable (responding):**
- **Controlled Experiment:**
- **Operational Definition:**
- **Quantitative Data:**
- **Qualitative Data:**
- **Model:**
- **Theory:**

9) Why is a “*Scientific Theory*” different than an everyday theory? ***Explain.***

10) What is the difference between *science and technology*? **Explain.**

11) How does *individual objectivity* sometimes get in the way or “blur” scientific data? **Explain.**

12) What is *pseudoscience* and how does it *relate to “real” science*?

13) *Explain these alternatives to “traditional direct experimentation”:*

- **Historical Evidence:** *(Give an example):*

- **Modern Catastrophes** *(Give an example):*

Pg. 32- How Do We Decide What to Believe About Environmental Issues?

Read and answer the following questions below:

1) *What is the major claim made in the article?*

2) *What evidence does the author present to support the claim?*

3) *Is the evidence based on observations, and is the source of the evidence reputable and unbiased?*

4) *Is the argument for the claim, whether based on evidence or not, logical?*

5) *Would you accept or reject the claim?*

6) Even if the claim were well supported by evidence based on good authority, **why** would your acceptance be only tentative?

Pg. 33- Study Questions:

Answer questions (#1-10 below). Attach another piece of paper if necessary.