

Welcome to Physics 1100

(Conceptual Physics)

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Chapter 1 Topics

- What is **science**?
 - In particular, what is **physics**?
- Scientific Attitudes
- Scientific Methodology
- Science vs. Technology

What is SCIENCE?

Science is...

- ...the gathering and organizing of knowledge about the natural world.
- ...applies methods of inquiry to answer questions about the natural world.
- ...the body of knowledge that describes that order and the causes of that order.
- ...an ongoing human endeavor.

What is PHYSICS?

- The BASIC science.
- Learning the “rules of the game.”

What rules are we trying to learn here?

- Nature’s basic rules.
- Generally, addresses the “How things happen?” (rather than the “Why things happen?”)

Scientific Attitudes

Curiosity

- Raise questions about the natural world and a willingness to seek answer to some of them.
- The desire to understand how/why things happen.

Open-mindedness

- A willingness to change ones mind in light of new information.
- Being able to distinguish between *what one sees* and *what one wishes to see*.

Healthy skepticism

- A willingness to suspend judgement in the absence of credible evidence and/or logical argument.

Facts, Hypotheses, and Theories

Fact:

- A close agreement by competent observers who make repeated observations of the same phenomenon.

(Scientific) Hypothesis:

- An educated guess or reasonable explanation of an observation or experimental outcome that is not accepted as factual until tested many times by experiment.

Theory:

- A synthesis of a large body of information that encompasses well-tested and verified hypotheses.
- Not static, but evolve with redefinition and refinement.

Question:

Which of the following (if any) is a **scientific hypothesis**?

- A) The moon is made of green cheese.
- B) Our universe is surrounded by a second universe that is undetectable.
- C) Einstein was the greatest physicist that ever lived.
- D) There is intelligent life elsewhere in the universe.

Scientific Methodology

- Raise a question.
- Make an educated guess.
- Predict consequences of that guess.
- Test the prediction.
- Formulate a simple rule based on the outcome of the test.

Science versus Technology

Science:

- Originates in questions about the natural world.
- Applies methods of inquiry.
- Proposed explanations...
 - ...which often raises new questions.

Technology:

- Originates in problem of human adaptation.
- Applies problem-solving strategies.
- Proposes solutions...
 - ...which often raises new problems.

Units & Measurement

Suppose you asked someone, “How fast is that river flowing?” and the response was, “25.”

What would be your reply?