PHY 100 - Assignment #1

Post-Lecture Problems (in Problem Set 1)
No assigned problems from previous lecture (since this is the first lecture).

Topics of Lecture 1
- Course Introduction
- Properties of Physical Law
- Process of Science
- Metric system including prefixes
- Converting units
- Powers-of-ten notation

Pre-Lecture Reading (for lecture 1)
Please prepare the following before lecture. Check-off the boxes as you go …
- Read Chapter 1 → Section: First Grade
- Read Chapter 1 → Section: On Building a World View
- Read Chapter 1 → Section: Bode’s Law
- Read Chapter 1 → Section: Measurements
  - Including ‘Working it out’
  - Including ‘Everyday Physics’
- Read Chapter 1 → Section: Sizes: Large and Small
  - Including ‘Working it out’
  - Optional: Play around with this site …
    http://primaxstudio.com/stuff/scale_of_universe/
- Read Chapter 1 → Section: Summary

Test your understanding with these reading questions:
- What is the analogy the authors are making between physics and first grade?
- Why do the authors title this book “Physics: A Conceptual World View?” What do they mean by World View?
- Figure 1-1 (b) represents how Einstein envisioned the scientific process. Can you explain this diagram?
- Since many scientific ideas are non-intuitive, how do scientists decide to accept them?
- Bode’s law is not a physical law and is not an important part of this course, so why did the authors choose to write about it in Chapter 1?
- What are the three criteria required for an idea to become a physics law?
- What are the advantages of the metric system over the U.S. customary system? Why has the U.S. not switched over yet?
- What are the meaning of the following prefixes micro-, nano-, centi-, kilo-, milli-, and mega-?
- What was the reason the $125 million Mars Climate Orbiter flew too close to the planet and burned up instead of going into orbit?
- Why use power-of-ten notation?
- Why does ‘order of magnitude’ mean?
- What is the size of the known universe in meters? What is the size of a proton in meters? (Feel free to use power-of-ten notation.)