GROUND RULES FOR SDI LABS

What I cannot create I do not understand.

Richard Feynman

GROUND RULES FOR SDI LABS

- The primary goal of SDI labs is to help you attain a good understanding of the basic concepts of Newtonian mechanics through *creative engagement* with simple mechanics experiments.
- You are encouraged to *work collaboratively* with other students
  - Your lab report should be your own work and not simply copied from the work of others. TRY TO FIGURE THINGS OUT FOR YOURSELVES.

GROUND RULES FOR SDI LABS

- It is essential that you take an ACTIVE part in the labs and actually perform ALL the experiments yourself.
  - YOU MUST TAKE RESPONSIBILITY FOR YOUR OWN LEARNING
- . Please use pencils in making sketches and answering questions, since you may wish to revise your work as the lab progresses and your ideas change (if your ideas are not changing you are probably not learning very much!).

GROUND RULES FOR SDI LABS

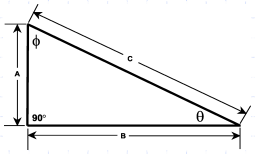
- In order to help carefully distinguish the various vectors used to describe motion, we **INSIST** that you use the standard course color code (vectors are indicated by **boldface** letters with arrows above them in this manual):
- BLUE: force **F ,** torque t ;
- BLACK: displacement **D ;**
- RED: velocity **v** , angular velocity w ,
- PURPLE: acceleration **a ,** angular acceleration a ;
- GREEN: linear momentum **p ,** angular momentum **L ;**
- YELLOW: bodies *to which Newton's First or Second Laws are applied* (but please place *black-pencil outlines* around all bodies colored yellow).

GROUND RULES FOR SDI LABS

- The lab manual questions are designed to help you **THINK** about the experiments and how they relate to Newton's laws. You will often be asked to *predict* the outcome of an experiment and then
- *perform* that experiment. A curly bracket { } indicates that you should **ENCIRCLE** O a response within the bracket and then, we **INSIST,** briefly **EXPLAIN** or **JUSTIFY** your answers in the space provided on these sheets. The letters { Y, N, U, NOT} stand for {Yes, No, Uncertain, None Of These}.

. MATHEMATICS REVIEW

- Vectors describe quantities which possess both magnitude and direction, e.g., displacement, force, velocity, acceleration. In contrast, *scalars* possess only magnitude, e.g., time, temperature, density, volume. Proper treatment of the magnitude and direction of vectors in this lab requires some familiarity with the trigonometric properties of right triangles (i.e., triangles which contain a 90 angle), as contained in the Pythagorean Theorem and the *definitions* given below. (Note that the symbol "≡" in Eqs. (2 -3) means



Lab Notes

- Today's Objectives are:
  - 1. the ground rules for Socratic Dialogue Inducing (SDI) Labs;
  - 2. the algebra and trigonometry needed for elementary use of vectors;
  - 3. the meaning of *operational definition, frame of reference,* and *position;*
  - 4. how to represent a vector by means of (a) an arrow, (b) components, (c) magnitude and
  - direction;
- Disregard references to the "z" axis