DEVIL PHYSICS
BADDEST CLASS ON CAMPUS

GIANCOLI READING ACTIVITY
Section 2-7

1. Big Idea(s):

   a. Big Idea 3: The interactions of an object with other objects can be described by forces.

   b. Big Idea 4: Interactions between systems can result in changes in those systems.

2. Enduring Understanding(s):

   a. Enduring Understanding 3.A: All forces share certain common characteristics when considered by observers in inertial reference frames.

   b. Enduring Understanding 4.A: The acceleration of the center of mass of a system is related to the net force exerted on the system, where $\vec{a} = \frac{\Sigma \vec{F}}{m}$.

3. Essential Knowledge(s):

   a. 3.A.1: An observer in a particular reference frame can describe the motion of an object using such quantities as position, displacement, distance, velocity, speed, and acceleration.

      i. Displacement, velocity, and acceleration are all vector quantities.

      ii. Displacement is change in position. Velocity is the rate of change of position with time. Acceleration is the rate of change of velocity with time. Changes in each property are expressed by subtracting initial values from final values.

      iii. A choice of reference frame determines the direction and the magnitude of each of these quantities.

   b. 4.A.1: The linear motion of a system can be described by the displacement, velocity, and acceleration of its center of mass.

   c. 4.A.2: The acceleration is equal to the rate of change of velocity with time, and velocity is equal to the rate of change of position with time.

      i. The acceleration of the center of mass of a system is directly proportional to the net force exerted on it by all objects interacting with the system and inversely proportional to the mass of the system.

      ii. Force and acceleration are both vectors, with acceleration in the same direction as the net force.

4. Learning Objective(s):

   a. (3.A.1.1): The student is able to express the motion of an object using narrative, mathematical, and graphical representations.

   b. (3.A.1.2): The student is able to design an experimental investigation of the motion of an object.

c. (3.A.1.3): The student is able to analyze experimental data describing the motion of an object and is able to express the results of the analysis using narrative, mathematical, and graphical representations.

d. (4.A.2.1): The student is able to make predictions about the motion of a system based on the fact that acceleration is equal to the change in velocity per unit time, and velocity is equal to the change in position per unit time.

e. (4.A.2.3): The student is able to create mathematical models and analyze graphical relationships for acceleration, velocity, and position of the center of mass of a system and use them to calculate properties of the motion of the center of mass of a system.

5. It is of the utmost importance that you give this lesson your undivided attention. I can overestimate the gravity of the situation.

6. Read section(s) 2-7 in your textbook.

7. Use the Frayer Model worksheet below to explore the term, *acceleration due to gravity*.

8. Answers may be typed or neatly printed. Drawings may be freehand, but try to make use of the 'Shapes' or 'Insert Clipart" functions of MS Word. If you submit this assignment electronically, the filename must be in the following format, "LastnameFirstinitialPerXReadActX-X". You do not need to submit these instructions – I already know the assignment – but if you would like to keep them together in order to study from the objectives, that's fine too. Whatever floats your boat. Actually, it's buoyancy which floats your boat which is a differential of the weight of the boat and the water pressure generated by the displacement of the boat's volume in the water, but that's another story (chapter 10).

Definition

Characteristics

ACCELERATION DUE TO GRAVITY

Examples

Non-examples