UNIT 4 HOMEWORK AFTER SESSION ONE

- Remember to view the Prelecture "1-D Kinematics before 8AM of this session (or the night before).
- Answer the SmartPhysics Checkpoints question on 1-D Kinematics

Formal Problem Solving
For the next several assignments while you are working with Units 4 and 5 you will be doing a series of homework assignments involving the same set of kinematics problems. These with be done at increasing levels of sophistication to help you learn about the elements of formal problem solving. These elements are

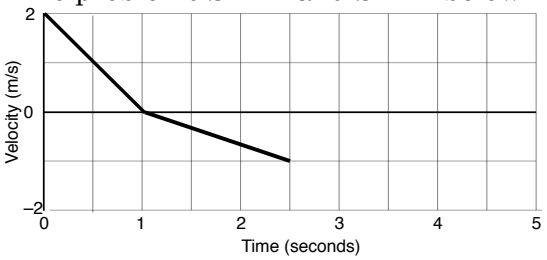
Part 1: Diagrams and Graphs
Part 2: Tables and Equations
Part 3: Algebra and Substitution
Part 4: Computation and Unit Checks

This approach was developed by Bob Morse a teacher at St. Albans School in Washington DC. An example of how to work a typical kinematics problem is the SAMPLE CONSTANT ACCELERATION PROBLEM. Then there is a packet of 5 problems. Each problem is printed at the top of a sheet entitled CONSTANT ACCELERATION PROBLEM WORKSHEET. You are to do parts of each of the 5 problems during the next few assignments until all the parts are completed.

- *Do Part 1 of each of the problems and bring them to class for inspection, but don't turn them in yet.*

UNIT 4 HOMEWORK AFTER SESSION TWO

- Do problems SP4-2 and SP4-1 below



SP4-1) The above graph shows the velocity of a cart moving along a track for 2.5 seconds. (a) How far is the cart from its starting point at 2.5 s? (b) If it continues with the same acceleration after 2.5 s, when will it return to its starting point? (c) Draw a position vs time graph of the motion of part (b) assuming that the starting point is at zero.

SP4-2) A ball is thrown up with a velocity of 8 m/s and allowed to fall back down. (a) If the acceleration is always –9.85 m/s^2 (downward) how long will the ball take to return to its initial position? (b) Air resistance adds some acceleration opposite to the direction of motion, negative on the way up and positive on the way down. If the ball's acceleration on the way up is –9.93 m/s^2 and –9.68 m/s^2 on the way down, how long does it take to return?

UNIT 4 HOMEWORK AFTER SESSION THREE

• Do supplemental problem SP4-3 below.

SP4-3) Examine Table 4-1 at the beginning of this unit. Enter the data in columns 2 and 3 into a modelling worksheet. Find the values of acceleration, initial velocity, and initial position that fit that data. Submit your worksheet and graph with a discussion of how the results compare with the calculated results you reported in Table 4-2. **Hint**: How do your results for the average acceleration of the object based on modelling compare with the average of the acceleration values you calculated in column 5 of Table 4-2?

Complete all Unit 4 entries in the Activity Guide. This Activity Guide Unit is to be handed in at the beginning of the next unit's session.

Work Part 2 of each of the kinematics problems in your packet. Add tables and equations to the solutions you started in the assignment for the last class. Bring them to class for inspection, but don't turn them in yet.

➡**SmartPhysics:** *View the Prelecture "*Vectors and 2-D Kinematics*" before the first class of next unit and answer the Checkpoint questions.*

➡*Note that the next unit will be Unit 6.*