2011 Sec 3 Physics
Problem Solving Strategy in Physics - I SEE

Name: _____ ( ) Class: 3/ ___ Date: _____

IDENTIFY the relevant concepts

Try to **understand** the physics of the problem before choosing the approach or launching into any mathematical analysis

1. identify the required variable(s)
2. recall related physical laws/principles, formulae and equations
3. recall similar systems in related topics

SET UP the problem

1. Sketch a **diagram** if it helps (it nearly always does).
2. Choose the **equations** or **formulae** you'll use to solve the problem and decide how you'll use them.
3. Try to keep expressions algebraic (using **suitable symbols**) rather than numerical.
   Advantages:
   - **units** of your answer can be checked easily at the end of your calculation.
   - less likely to make mistakes if you are manipulating a few **symbols** rather than actual numbers.
   - expressing your answer algebraically first allows easier checking later.

EXECUTE the solution

1. List known and unknown **quantities**.
2. Solve the equations for the unknowns.
3. Show your **working** neatly and clearly on the page, and explain what you are doing and why you are doing it.

EVALUATE the answer

1. Check the **units** of your answer.
2. Generally, **use 2 or 3 significant figures** in your **final** numerical answer.
3. Check the **magnitude** of your answer against common sense or other knowledge.

To summarize the 4-step strategy:

IDENTIFY
→ **SET UP**
→ **EXECUTE**
→ **EVALUATE** OR **I SEE** (acronym)

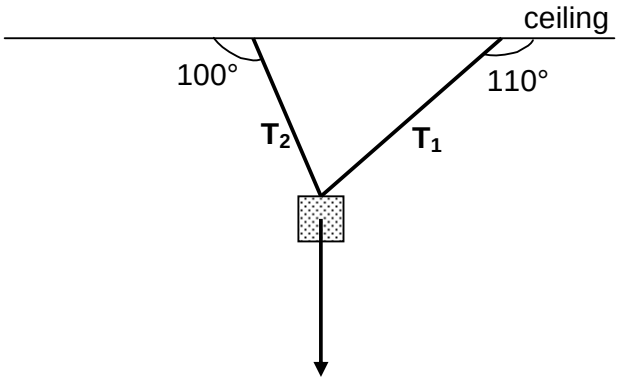
Note: Some steps may be carried out simultaneously depending on the problem.

Reference: *Adapted from University Physics (with Modern Physics) by Young and Freedman, 2008 (12th Edn).*

AngJL

Worked Example

The figure below shows a 30 N weight being supported by two strings from a ceiling. The tension forces in the two strings are $\mathbf{T_1}$ and $\mathbf{T_2}$.



(a) On the figure above, label the directions of $\mathbf{T_1}$ and $\mathbf{T_2}$ in the strings acting on the weight.

(b) With the aid of a scale diagram, determine the magnitudes of $\mathbf{T_1}$ and $\mathbf{T_2}$.

I: IDENTIFY the relevant concepts	Vector triangle approach • Forces (tensions, weight) • Vector triangle • Stationary object • Forces in equilibrium → closed vector triangle
S: SET UP the problem	• Sketch vector triangle • Identify, determine angles
E: EXECUTE the solution	• Choose suitable scale (make full use of space available) • Draw scaled diagram with protractor , ruler, pencil • Label all forces, arrows, angles
E: EVALUATE the answer	• Check unit, s.f. • Is magnitude of each tension reasonable? Is their sum > 30 N?