**Solving Word Problems in four Steps**

* **Identifying relevant information**. Read the problem carefully. State everything known about the problem and explore the equation “what is this problem asking us to do?” Do NOT try to solve the problem yet.
* **Planning**. Detail the steps involved in solving the problem.
 - Translate word expressions to mathematical expressions/equations.
 - State the concepts, formulas, and/or methods that you plan to use.
* **Computing**. Solve the problem based on your plan.
* **Answering**. Interpret the result from the computation and check if the answers make sense.

**Group activity**:

Divide the class into groups of four members and provide them with a handout containing the example below and a separate sheet with problems to be solved.

Instruction to students: Your group is to solve each problem using the four steps.

1. Assign the four roles – Identifier, Planner, Computer, and Answerer to the group members (either amongst yourselves or as designated by the instructor).
2. For each step, the person with that role works out that step, with other group members asking questions or chiming in if they think there is an error, but it is the job of that student with the role do the work and write the answers in to the grid.
3. Before you start the next problem, rotate the roles clockwise according to this scheme on the right.
4. At the end of the designated time period for working on the problems, one person from each group will be called to present/share one of the steps of one of the problems. All group members are equally responsible to be able to present each step, irrespective of whether they were the ones doing that step or not. That means your group needs to make sure that each group member understands all the steps of the problem solving process for each problem.

**Example** **of the 4-step solving process for word problems:**

The U.S. uses Fahrenheit temperatures while most of the rest of the world uses Celsius temperatures. People who travel between the U.S. and other countries usually need to convert between Fahrenheit temperatures and Celsius temperatures just to understand weather reports. Conversions between Celsius (C) and Fahrenheit (F) temperatures follow a linear relationship.

1. Use the facts that water freezes at 0℃ and 32℉, while it boils at 100℃ and 212℉ to come up with the formula that converts Celsius to Fahrenheit temperatures. Write the equation in slope-intercept form.
2. Use the formula from part (a) to convert 80$℃$ to degrees Fahrenheit.

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| **Identification of Relevant Information**: Givens:1. Input is C and output is F
2. The function is linear.
3. Two points: (0, 32) and (100, 212)

Tasks: (a) Write F(C) in slope-intercept form and (b) find F(80) | **Planning**:1. Need:
* slope and a point
* Slope formula: $m=\frac{change in output}{change in input}$
* Equation: $y-y\_{1}=m(x-x\_{1})$
* Convert the equation to slope-intercept form.

(b) Substitute C= 80 into the function |
| **Computing**:$$m=\frac{212-32}{100-0}=\frac{180}{100}=1.8$$$$y-32=1.8(x-0)⟹y=1.8x+32$$$$F(C)=1.8C+32$$$$F(80)=1.8(80)+32=176$$ | **Answer**:(a) The formula to convert degree Celsius to degree Fahrenheit is $F(C)=1.8C+32$(b) $80℃ $corresponds to $176℉$.Checking: We expect the slope to be positive and the temperature to be between 32 and 212, closer to 212. The answer is reasonable. One could also plot the data to confirm. |