

Steps for Setting Up Applied Problems

1. **Read and reread** the problem carefully. Determine which quantity you are looking for. If possible, determine realistic possibilities for the answer.
2. **Make a verbal model** of the relationships between all the quantities. Draw a diagram or chart if applicable.
3. **Assign a variable** to represent the quantity you are looking for. (or another unknown quantity the other quantities can be expressed in terms of).
4. **Express the other quantities** in terms of the variable.
5. Replace the verbal descriptions of the quantities with numbers or algebraic expressions, to **form an equation**.
6. **Solve the equation** for the variable, and answer the question in the same terms as the question.
7. **Check the answer** with the facts given in the problem. If it doesn't agree, try again.

Special Categories:

Mixture Problems - In a solution, the "solute" is the substance dissolved in another substance called the "solvent".

1. Draw a chart with a row for each solution, where each row represents (amount of solute) = (concentration)(volume), and fill in the given information.
2. Set a variable for the volume of the solution you want to find.
3. Form an expression for the volume of the other solution.
4. In each solution, use the fact that (amount of solute) = (concentration)(volume) to form expressions for the amount of solute in each.
5. The equation comes from the fact that none of the solute is being created or destroyed, so the amount of solute in the mixture is the sum of the amounts in the two mixed solutions.

Work Problems - An individual's **rate** of work is the amount of a job that the individual completes in one unit of time. For example, if it takes someone 4 hours to complete some job, then that person's rate of work is $\frac{1}{4}$ of the job per hour (may be per minute depending on the question)

1. Draw a chart with a row for each worker or machine, where each row represents (Part of the Job Done)=(Rate of Work)(Time Spent Working) for each worker.
2. Set a variable for the time they work.
3. Use the fact that (Part of the Job Done)=(Rate of Work)(Time Spent Working) to form an expression for the part of the job done by each.
4. Form an equation modeling the fact that the job will be finished when the two parts of the job each worker has completed add up to 1.