Problem of the Week: Lettuce for Sale

On Monday, the produce manager stocked the display case with eighty heads of lettuce. By the end of the day some of the lettuce had been sold.

On Tuesday, the manager surveyed the display case and counted the number of heads of lettuce left. He decided to add an equal number of heads of lettuce. (He doubled the leftovers.) By the end of the day he had sold the same number of heads of lettuce as on Monday.

On Wednesday, the manager decided to triple the number of heads of lettuce that had been left in the case Tuesday night. He sold the same number of heads of lettuce that day, too. However, at the end of the day there were no heads of lettuce left.

How many heads of lettuce were sold each day? At least one method for solving this problem must be *algebraic*.

	Novice	Apprentice	Practitioner	Expert
Problem Solving				
Interpretation	Shows understanding of few of the criteria listed in the Practitioner column.	Shows understanding of most but not all of the criteria listed in the Practitioner column. For example, for example, understands that same number of heads are sold each day and that there are none left at the end, but does not understand how the starting amount each day is determined.	Understands that: • the same number of heads are sold each day • there are 80 heads on Monday • when the lettuce is restocked on Tuesday morning, the restocking doubles the number of heads of lettuce • when the lettuce is restocked on Wednesday morning, the restocking triples the number of heads of lettuce • there are no heads of lettuce left on Wednesday at the end of the day • the goal is to minimize to figure out how many heads of lettuce were sold each day	Not possible for this problem since there is no Extra.
Strategy *(based on the solver's interpretation of the problem)*	Has no ideas that will lead them toward a successful solution. Has not written enough to tell what strategy they might have used.	Picks an incorrect strategy, or relies on luck to get the right answer. For example, might use guess and check but does not use that to generalize to an equation.	Picks a sound strategy—success achieved through skill, not luck. For example, might choose a variable to represent the number sold each day and either work forwards or backwards to solve the problem.	Uses two separate strategies or one unusual or sophisticated strategy. Might solve the problem backwards and forwards and compare the two approaches.
Accuracy *(based on the chosen strategy)*	Has made many errors.	Has made several mistakes or misstatements.	Makes few or no mistakes of consequence and uses largely correct vocabulary.	[Generally not possible – can't be more accurate than Practitioner.]
Communication				
Completeness *(an incorrect solution can be complete)*	Has written very little that tells or shows how they found their answer.	Submitted explanation without work or work without explanation. Leaves out enough details that another student couldn't follow or learn from the explanation.	Defines variable(s). Shows equations, formulas, and calculations used and explains the rationale behind them. Explains the logic used to decipher which is the false statement.	Adds in useful extensions and further explanation of some of the ideas involved The additions are helpful, not just "I'll say more to get more credit."
Clarity *(incomplete and incorrect solutions can be explained clearly)*	Explanation is very difficult to read and follow.	Explanation isn't entirely unclear, but would be hard for another student to understand. Explanation is long and is written entirely in one paragraph. Explanation contains many spelling and typing errors.	Explains the steps that they *do* explain in such a way that another student would understand (needn't be complete to be clear). Makes an effort to check formatting, spelling, and typing (a few errors are okay).	Format and organization make ideas exceptionally clear. Answer is very readable and appealing.