

Question 09d codes:

- Two blocks explode. Is energy conserved, increasing or decreasing?
- The first entry is the answer (whether it increases, decreases, or stays the same) and the following entries are the reasonings detected.

Answer:

a = increases

b = same

c = decreases

? = Students don't explicitly give an answer

Reasoning:

1 = compensation between A and B or energy. A goes up so B goes down. Usually associated with "energy is conserved."

2 = students do an explicit calculation (2x = calculation is conceptually incorrect)

3 = reasoning with some "ambiguous explosion effect."

4 = only considering block A or B in the reasoning

5 = Rule Quoting (5x = a rule is quoted that that isn't "energy is conserved.")

6a = Reasoning with the idea that work is being done by the explosion

6b = Reasoning with the idea that the explosion causes an external force

6c = Reasoning with the idea that the explosion had chemical energy

7 = Reasoning with heat

8 = Reasoning using a functional dependency (8x = the functional dependency described is mathematically incorrect)

If you see a (number)?, that means that I suspect that reasoning was of the (number) type, but it was sort of ambiguous and I can't put my finger on it. For example, 5? means I think students were rule quoting, but I'm not sure.