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Designing and using multiple-possibility physics problems in physics courses

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One important aspect of physics instruction is helping students develop better problem solving expertise. Besides enhancing the content knowledge, problems help students develop different cognitive abilities and skills. This presentation focuses on multiple-possibility problems (alternatively called ill-structured problems). These problems are different from traditional “end of chapter” single-possibility problems. They do not have one right answer and thus the student has to examine different possibilities, assumptions and evaluate the outcomes. To solve such problems one has to engage in a cognitive monitoring called epistemic cognition. It is an important part of thinking in real life. Physicists routinely use epistemic cognition when they solve problems. I have explored the instructional value of using such problems in introductory physics courses.