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Student understanding of basic concepts in dc electric circuits

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After instruction on dc circuits in a typical introductory physics course, students are often able to apply the formalism they have learned to analyze relatively complicated circuits, even those containing multiple batteries and multiple loops. However, research conducted over a period of many years has shown that despite facility with the equations, students often fail to understand some very basic concepts. Results from a recent investigation involving multiple batteries reveal the surprising extent of the gap between what is taught and what students learn. The findings have strong implications for instruction.