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**Research-based assessment instruments: Design, validation and interpretation**

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This presentation describes the process for creating and validating a research-based assessment instrument that measures the effectiveness of instruction. These assessments are designed to measure how well instruction causes students to think like experts. Although, the primary goal is not to obtain a comprehensive assessment of student learning; rather it is to provide formative assessment of teaching. Specific examples of instruments for physics conceptual understanding and student perceptions of the discipline of physics will be described, including the extent and limitations of how results can be interpreted.