Generation of this list of concept inventories relied on a list found at http://www.ncsu.edu/per/TestInfo.html. More inventories can be found there.

**Attitudes toward Physics**

**Epistomological Beliefs Assessment for Physical Sciences (EBAPS)**

Probes students’ epistemologies, their views about the nature of knowledge and learning in the physical sciences.


**Maryland Physics Expectations Survey (MPEX)**

Probes student attitudes, beliefs, and assumptions about physics on a 34-item Likert-scale (agree-disagree) survey.


**Force**

**Force Concept Inventory (FCI)**


The Force and Motion Conceptual Evaluation (FMCE)

Assess student’s conceptual understanding of Newton’s Laws of Motion. Publication describes assessment of an introductory physics class.


Rotational and Rolling Motion Conceptual Survey (RRMCS)

A 30-question research-based multiple-choice test is designed to evaluate students' conceptual understanding of rotational and rolling motion and can be found at: http://www.compadre.org/per/items/detail.cfm?ID=11956.


Graphing and Representations

Representational Variant of the Force Concept Inventory

Investigates students’ ability to interpret multiple representations consistently (e.g., motion map, vectorial, and graphical). Available at http://www.compadre.org/per/items/detail.cfm?ID=11958.


Test of Understanding Graphs in Kinematics (TUG-K)

A measure of students’ ability to interpret kinematics graphs.

Energy

The Energy Concept Assessment (ECA)

Evaluates students’ understanding of various energy related topics. Created for a calculus-based introductory physics course. Contact Lin Ding at Ohio State University.

The Energy and Momentum Conceptual Survey (EMCS)

Assesses concepts in energy and momentum and can be found at http://www.compadre.org/per/items/detail.cfm?ID=11896.


Thermodynamics

Thermodynamics Concept Inventory (TCI)

The TCI is intended for use in introductory thermodynamics courses. Please contact Clark Midkiff at the University of Alabama about this inventory.


Introductory Thermal Concept Evaluation (ITCE)

Developed to assess a wide range of beliefs or understandings about thermodynamic concepts in 15-18 year old students. Administered in less than 30 minutes.


The Heat and Energy Concept Inventory (HECI)

A 36 multiple-choice question inventory for an undergraduate heat transfer course of (1) temperature vs. energy, (2) temperature vs. perceptions of hot and cold, (3) factors that affect the rate vs. amount of heat transfer, (4) thermal radiation.

Michael Prince, Margo Vigeant, Katharyn Nottis. Development of the Heat and Energy Concept Inventory: Preliminary Results on the Prevalence and Persistence of

The Heat and Temperature Concept Evaluation (HCTE)

Survey on heat, temperature and heat flow. A 28 inventory that takes 30-40 minutes to complete. Twenty-seven items are machine graded and one item requires drawing a graph and writing a sentence.

Thornton, R. and Sokoloff, D., "The Heat and Temperature Concept Evaluation (HCTE)"
http://physics.dickinson.edu/~wp_web/wp_resources/wp_assessment.html#HTCE

Heat Transfer Concept Inventory (HTCI)

Assesses student understanding of concepts, identifies misunderstandings, provides feedback to instructors, and evaluates student gains in a heat transfer course. The HTCI is being evaluated for coverage; concepts include fundamental ideas, conduction, convection, and radiation. Contact Jay Marin at University of Wisconsin-Madison.


Thermal and Transport Concept Inventory (TTCI)

Faculty and students use the Thermal and Transport concept inventory (TTCI) assessment instrument to identify fundamental misconceptions about heat transfer, fluid mechanics, and thermodynamics in engineering students. Contact Ron Miller at Colorado School of Mines.


Waves

Waves Concept Inventory (WCI)
Assesses visualization of waves, mathematical depiction of waves, and wave definitions. The WCI allows more than one correct choice for most of the questions. Choosing more than one answer correlates with increasing understanding of the material. The WCI is intended for junior-level electronics of materials courses. Contact Ron Roedel at Arizona State University.


**Wave Diagnostic Test (WDT)**

The University of Maryland WDT investigates student difficulties with wave physics at the introductory level. Contact Janice Redish at University of Maryland.

**Electricity**

**Circuits (CCI)**

Part I measures students' conceptual understanding of the basic properties of electricity, circuit components, and linear time-invariant networks (DC and AC). Part II addresses frequency domain concepts, coupled inductors, convolution, impulse response, and transform techniques. Contact Robert Helgeland at University of Massachusetts at Dartmouth.


**Electromagnetics (EMCI)**

EMCI Version 1.0 is composed of three instruments: (i) Fields (electro and magnetostatic, and time-varying EM fields), (ii) Waves (uniform plane waves, transmission lines, waveguides, and antennas), (iii) Fields and Waves (combination of the first two instruments). Contact Branislav Notaros at University of Colorado.


**Electronics (ECI)**

The 35-question ECI assesses student understanding of introductory electronics concepts that are covered in the first of a two-course sequence. The exam includes a small subset of basic circuit analysis questions so that instructors can differentiate between misconceptions in circuit analysis and misconceptions in electronics. Contact Marc Herniter at Rose-Hulman Institute of Technology.

Quantum Mechanics

The Quantum Mechanics Visualization Instrument (QMVI)

The QMVI is designed to assess student’s understanding of core concepts in introductory quantum mechanics. It is available by contacting Richard Robinett at Penn State.

Description of the development of the instrument is found in Erdat Cataloglu’s dissertation (https://etda.libraries.psu.edu/paper/5937/).

Quantum Mechanics Survey (QMS)

This survey is designed to evaluate student’s conceptual understanding of quantum mechanics in junior-level courses. It is available after obtaining a password via http://perusersguide.org/items/detail.cfm?ID=11903.


Quantum Mechanics Conceptual Survey (QMCS)

This twelve question survey is designed to assess students’ conceptual understanding of quantum mechanics.


Quantum Mechanics Assessment Tool (QMAT)

This assessment was developed to (1) reflect faculty learning goals, provide an assessment of student learning difficulties, and act as a tool to help guide faculty efforts at improving QM instruction. Contact Steve Pollack at University of Colorado.


Astronomy

Astronomy Diagnostic Test (ADT)
This diagnostic survey for undergraduate, non-science majors taking their first astronomy course. The first 21 questions are the content portion of the test, while the final 12 questions collect demographic information. Please contact Grace Deming at University of Maryland.


**Astronomical Misconceptions Survey (AMS)**

Developed for identifying student misconceptions in astronomy in introductory courses.


**Newtonian Gravity Concept Inventory (NGCI)**


**Lunar Phases Concept Inventory (LPCI)**

The Lunar Phases Concept Inventory (LPCI) was developed to aid instructors in assessing students’ mental models of lunar phases. Contact Rebecca Lindell at Southern Illinois University.


**Star Properties Concept Inventory (SPCI)**

This concept inventory covers the areas of stellar properties (focusing primarily on mass, temperature, luminosity, and lifetime), nuclear fusion, and star formation with distractors from known misconceptions of these areas.

Janelle M. Bailey, Bruce Johnson, Edward E. Prather, Timothy F. Slater. Development and Validation of the Star Properties Concept Inventory.
Space Physics Concept Inventory

Doxas, M. Klymkowski, K. Garvin-Doxas, and C. Willis. Developing a Space Physics Concept Inventory. American Geophysical Union, Spring Meeting 2005, abstract #ED11A-06.