Science Education Initiative (SEI) Suggested Indicators for Full Implementation

SEI Goal and Philosophy: By supporting and facilitating faculty, the SEI effort seeks to:
- better align student learning with the faculty-defined, key learning goals/outcomes (e.g. what faculty want students to be able to do at the end of the course).
- maximize student learning and engagement in learning by having faculty use research and measurements of learning to guide their instructional approaches
- sustain a research-based approach to teaching in these courses through 1) the broad representation of faculty in the process and 2) the development of resources that make it both easier and more rewarding for faculty to use a research-based approach to teaching.

Suggested Indicators for Full Implementation: Below we provide a list of suggested indicators. The list offers guidance to departments, faculty, and science education specialists [CU Science Teaching Fellows (STFs); UBC Science Teaching & Learning Fellows (STLFs)] on the activities and accomplishments that maximize the chances that the SEI efforts on a particular course meet the above goals. The length of time required to implement all of the suggestions below will vary with the course, but it is expected that it will require at least two iterations of teaching the course to complete them satisfactorily.

1) Overarching theme: Learning goals, assessments, and curricular resources reflect faculty priorities and are developed with faculty input.
2) Course-scale and topic-scale learning goals
    a. Highlighting the key concepts and big ideas that faculty want students to learn and at what level
    b. Indicating what students would be able to do if understood concept/idea at desired level
    c. Faculty consensus on 70-75% of goals
    d. If developed, examples of various learning goals for the remaining 30%
3) Examples of lecture-scale learning goals that are consistent with course- and topic-scale learning goals
4) Assessment tool(s) that provide data to guide faculty in their efforts on the course
    a. General Characteristics:
        i. Aligned with learning goals
        ii. Validated through student interviews and faculty reviews
        iii. Valued by faculty – reflects their priorities and their input
        iv. Easy-to-use
    b. Types of assessment tools:
        i. Content learning and conceptual understanding
        ii. Beliefs about discipline / Interest in discipline (e.g. CLASS) (optional)
        iii. Skills learning assessment (e.g. Lawson scientific reasoning test) (optional)
        iv. Student feedback on aspects of course that are useful (e.g. SALG) (optional)
5) Resources for faculty that are aligned with learning goals, with many based on research (e.g. student interviews, existing literature, or assessment results). Include documentation of research-justification associated with the approach/questions/activities to the extent it is available. Examples include:
    a. Lecture notes
    b. Concept/clicker questions
    c. Homeworks/Tutorials/In-class activities
    d. Exam questions
    e. Summary of common student difficulties by learning goal / topic (required)
6) Plan for sustainability
    a. Archived information, easily transferable/adaptable by new faculty.
    b. If appropriate, structure and funding in place to support course components that have been added (homework sessions, additional TAs or undergraduate assistants, added recitation/tutorial, data analysis, etc).
    c. Most of the relevant faculty have the knowledge and background to implement the materials.
    d. Plans for how faculty instructors teaching the course in the future will be introduced to Departmental goals, materials, and expectations for the course.