Teaching Practices Inventory answer key. Inventory showing formatting, with scoring and footnotes to references that justify the scoring. We did not insert the references directly in the document to allow the format to be shown. The formatting improves the user-friendliness of the inventory. A clean copy of the inventory is available at www.cwsei.ubc.ca/resources/TeachingPracticesInventory.htm.

Teaching Practices Inventory

(Scoring rubric points are the numbers in bold to right of each item.)

I. Course information provided to students via hard copy or course webpage. (check all that occurred in your course)[a]

- ❑ List of topics to be covered **1**
- ❑ List of topic-specific competencies (skills, expertise, …) students should achieve (what students should be able to *do*) **3**
- ❑ List of competencies that are not topic related (critical thinking, problem solving, …) **1**
- ❑ Affective goals – changing students' attitudes and beliefs (interest, motivation, relevance, beliefs about their competencies, how to master the material) **1**
- ❑ Other (please specify)

If you selected other, please specify____

II. Supporting materials provided to students (check all that occurred in your course)

- ❑ Student wikis or discussion boards with little or no contribution from you **0**
- ❑ Student wikis or discussion boards with significant contribution from you or TA[b] **1**
- ❑ Solutions to homework assignments[c] **1**
- ❑ Worked examples (text, pencast, or other format) **1**
- ❑ Practice or previous year's exams **1**
- ❑ Animations, video clips, or simulations related to course material **1**
- ❑ Lecture notes or course PowerPoint presentations (partial/skeletal or complete)[d] **1**
- ❑ Other instructor selected notes or supporting materials, pencasts, etc. **0**
- ❑ Articles from related academic literature [e] **1**
- ❑ Examples of exemplary papers or projects **0**
- ❑ Grading rubrics for papers or large projects **0**
- ❑ Other (please specify)

If you selected other, please specify____

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[a] Promising Practice No. 1: Prepare a Set of Learning Outcomes in Froyd (2008); chap. 5 in Ambrose et al. (2010).

[b] (Black & Wiliam, 1998; Hattie & Timperley, 2007); Promising Practice No. 5: Providing Students Feedback through Systematic Formative Assessment in Froyd (2008); chap. 5 in Ambrose et al. (2010).

[c] (Atkinson et al., 2000).

[d] (Kiewra, 1985).

[e] (Pintrich, 2003); chap. 3 in Ambrose et al. (2010).

III. In-class features and activities

A. Various

Give approximate average number:

Average number of times per class: pause to ask for questions	______________	(**1** if >3)
Average number of times per class: have small group discussions or problem solving[f]	______________	(**1 if** 1**,** **2** if >1)
Average number of times per class: show demonstrations, simulations, or video clips	______________	**0**
Average number of times per class: show demonstrations, simulations, or video where students first record predictions (write down, etc.) and then afterwards explicitly compare observations with predictions[g]	______________	(**1** if >0.5)
Average number of discussions per term on why material useful and/or interesting from students' perspective[h]	______________	**1** if 3-5, **2** if>5

Comments on above (if any):____________

Check all that occurred in your course:

- ❑ Students asked to read/view material on upcoming class session **0**
- ❑ Students read/view material on upcoming class session and complete assignments or quizzes on it shortly before class or at beginning of class[i] **2**
- ❑ Reflective activity at end of class, e.g. "one minute paper" or similar (students briefly answering questions, reflecting on lecture and/or their learning, etc.)[j] **1**
- ❑ Student presentations (verbal or poster)[k] **1**

Fraction of typical class period you spend lecturing (presenting content, deriving mathematical results, presenting a problem solution, …)[k] **2** if 0-60%, **1** if 60-80%, **0** if 80-100%

- ❍ 0-20%
- ❍ 20-40%
- ❍ 40-60%
- ❍ 60-80%
- ❍ 80-100%

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[f] Promising Practice No. 2: Organize Students in Small Groups in Froyd (2008); chap. 5 in Ambrose et al. (2010).

[g] (Crouch et al., 2004; Sokoloff & Thornton, 1997, 2004).

[h] Promising Practice No. 4: Scenario-based Content Organization in Froyd (2008); chap. 3 in Ambrose et al. (2010); (Pintrich, 2003).

[i] (Novak et al., 1999); Although there is little peer-reviewed research showing the specific benefits of pre-class reading with associated quizzes, essentially every instructor that introduces active learning techniques in their classrooms reports that results are improved when they introduce pre-class reading. Similarly, when instructors in the Science Education Initiative give graded quizzes on the pre-class readings, we have always seen improvement in the fraction of students doing the reading.

[j] (Froyd, 2008; Pascarella & Terenzini, 2005).

[k] Promising Practice No. 6: Designing In-class Activities to Actively Engage Students in Froyd (2008); chap. 5 in Ambrose et al. (2010).

Considering the time spent on the major topics, approximately what fraction was spent on the *process* by which the theory/model/concept was developed, including the experimental methods and results that support specific theories?[l] **1** if more than 10%

- ❍ 0-10%
- ❍ 10-25%
- ❍ more than 25%

B. Individual Response System

If a student response method is used to collect responses from all students IN REAL TIME IN CLASS, what method is used? (check all that occurred in your course)

- ❑ raising hands **0**
- ❑ raising colored cards **0**
- ❑ electronic (e.g. "clickers") with student identifier **0**
- ❑ electronic anonymous **0**
- ❑ written student responses that are collected and reviewed in real time **0**
- ❑ Other (please specify)

If you selected other, please specify____

Number of ISR questions posed followed by student-student discussion per class[m]____ **2** if >1
Number of times ISR used as quiz (counts for marks and no student discussion) per class ____ **0**

IV. Assignments (check all that occurred in your course)

- ❑ Homework/problem sets assigned or suggested but did not contribute to course grade **0**
- ❑ Homework/problem sets assigned and contributed to course grade at intervals of 2 weeks or less[n] **2**
- ❑ Paper or project (an assignment taking longer than two weeks and involving some degree of student control in choice of topic or design)[o] **1**
- ❑ Encouragement and facilitation for students to work collaboratively on their assignments[p] **2**
- ❑ Explicit group assignments[p] **1**
- ❑ Other (please specify)

If you selected other, please specify____

V. Feedback and testing; including grading policies (check all that occurred in your course)

A. Feedback from students to instructor during the term[q]

- ❑ Midterm course evaluation **1**
- ❑ Repeated online or paper feedback or via some other collection means such as clickers **1**
- ❑ Other (please specify)

If you selected other, please specify____

B. Feedback to students (check all that occurred in your course)[r]

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[l] (Abd-El-Khalick & Lederman, 2000).

[m] Promising Practice Nos. 2 & 6: Organize Students in Small Groups & Designing In-class Activities to Actively Engage Students in Froyd (2008); chap. 5 in Ambrose et al. (2010).

[n] Chap. 5 in Ambrose et al. (2010); (Cooper et al., 2006; Walberg et al., 1985). The reviews by Cooper (2006) and Walberg (1985) are of the extensive K-12 research literature on the beneficial effects of graded homework. No such reviews exist for the study of homework in undergraduate math and science, but numerous articles report the educational benefit at this level. Two examples are Richards-Babb et al. (2011) and Cheng (2004).

[o] (Kuh, 2008).

[p] Promising Practice No. 2: Organize Students in Small Groups in Froyd (2008).

[q] (Centra, 1973; Cohen, 1980; Diamond, 2004).

[r] (Black & Wiliam, 1998; Hattie & Timperley, 2007); Promising Practice No. 5: Providing Students Feedback through Systematic Formative Assessment in Froyd (2008); chap. 5 in Ambrose et al. (2010).

❑ Assignments with feedback from instructor, teaching assistant, or peer before grading or with opportunity to redo work to improve grade **2**

❑ Students see graded assignments **1**

❑ Students see assignment answer key and/or grading rubric **1**

❑ Students see graded midterm exam(s)/quizzes **1**

❑ Students see midterm exam(s)/quizzes answer key(s) **1**

❑ Students explicitly encouraged to meet individually with you **1**

❑ Other (please specify)

If you selected other, please specify____

C. Testing and grading[s]

Number of midterm tests during term that reflect course expectations (e.g. midterm exams, but not final exams)	____________________	**0** if 0, **1** if 1, **2** if 2 or more
Approximate fraction of test scores from questions that required students to explain reasoning	____________________%	**1** if >15%)

Approximate breakdown of course grade (% in each of the following categories) **1** if final ≤60%, 0 if >60%

Final Exam	______________________________%
Midterm/other Exam(s)	______________________________%
Homework assignments	______________________________%
Paper(s) or project(s)	______________________________%
In-class activities	______________________________%
In-class quizzes	______________________________%
Online quizzes	______________________________%
Participation	______________________________%
Lab component	______________________________%
Other	______________________________%
If you selected other, please specify:	______________________________

VI. Other (check all that occurred in your course)

❑ Assessment given at beginning of course to assess background knowledge[t] **1**

❑ Use of instructor-independent pre-post test (e.g. concept inventory) to measure learning **2**

❑ Use of a consistent measure of learning that is repeated in multiple offerings of the course to compare learning **2**

❑ Use of pre-post survey of student interest and/or perceptions about the subject[t] **1**

❑ Opportunities for students' self-evaluation of learning[u] **1**

❑ Students provided with opportunities to have some control over their learning, such as choice of topics for course, paper, or project, choice of assessment methods, etc.[v] **1**

❑ New teaching methods or materials were tried along with measurements to determine their impact on student learning **2**

VII. Training and guidance of Teaching Assistants (check all that occurred in your course)[w]

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[s] (Gibbs & Simpson, 2005).

[t] Chap. 1 in Ambrose et al. (2010); chap. 1 in Bransford et al. (2000).

[u] Chap. 7 in Ambrose et al. (2010); chap. 3 in Bransford et al. (2000).

[v] (Pintrich, 2003); chap. 3 in Ambrose et al. (2010).

[w] (Seymour, 2005).

- ❑ No TAs for course **3** (to normalize)
- ❑ TAs must satisfy English language skills criteria[x] **1**
- ❑ TAs receive ½ day or more of training in teaching **1**
- ❑ There are Instructor-TA meetings every two weeks or more frequently where student learning and difficulties, and the teaching of upcoming material are discussed. **2**
- ❑ TAs are undergraduates **0**
- ❑ TAs are graduate students **0**
- ❑ Other (please specify)

If you selected other, please specify____

VIII. Collaboration or sharing in teaching[y]

- ❑ Used or adapted materials provided by colleague(s) **0**
- ❑ Used "Departmental" course materials that all instructors of this course are expected to use[z] **1**

Discussed how to teach the course with colleague(s) **1** if ≥3, **0** otherwise

- ❍ 1 Never
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5 Very Frequently

Read literature about teaching and learning relevant to this course[aa] **2** if ≥3, **1** if 2, **0** otherwise

- ❍ 1 Never
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5 Very Frequently

Sat in on colleague's class (any class) to get/share ideas for teaching **2** if ≥3, **1** if 2, **0** otherwise

- ❍ 1 Never
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5 Very Frequently

IX. General (open-ended comments)

Please write any other comments here. If this inventory has not captured an important aspect of your

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[x] (Anderson-Hsieh & Koehler, 1988; Hinofotis & Bailey, 1981; Jacobs & Friedman, 1988; Williams, 1992). There is little recent research on this, likely, because the use of language proficiency requirements for TAs has become so common.

[y] There are many reports in the literature of collaborative efforts in teaching undergraduate science and mathematics. These are all local efforts, and the outcome measures are the self-reports of the participants. The many reports that we have examined all report perceived improvements in their teaching, but we know of no studies of the impact on student learning. Nevertheless, it is very likely that such collaborative efforts in teaching result in improved teaching, for much the same reason that collaborative activities with students result in improved learning, for which there is extensive evidence.

[z] Common sense would suggest that such departmental materials are likely to receive much better vetting than those prepared by a teacher in isolation. This is certainly true for all of the numerous examples we know of across multiple institutions.

[aa] (Sadler et al., 2013). Although this reference is not on the direct value of reading the relevant science education literature, the article does show the benefit to student learning of instructor pedagogical content knowledge; knowledge that would plausibly be gained by reading the relevant literature.

teaching of this course, or you feel like you need to explain any of your above answers please describe it here.

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Approximately how long did it take you to fill out this inventory? ____________________

We thank you for taking the time to fill out this inventory